Mehmet Huseyin Bilgin
Hakan Danis   *Editors*

Entrepreneurship, Business and Economics - Vol. 2

Proceedings of the 15th Eurasia
Business and Economics Society
Conference

Springer

Eurasian Studies in Business and Economics 3/2

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Preface

This is the third issue of the Springer's series *Eurasian Studies in Business and Economics*, which is the official book series of the Eurasia Business and Economics Society (EBES, www.ebesweb.org). This issue includes selected papers presented at the 15th EBES Conference that was held on January 8, 9, and 10, 2015, at the *ISCTE-IUL Instituto Universitário de Lisboa* in Lisbon, Portugal, with the support of the *Istanbul Economic Research Association*. Due to space limitation, the accepted papers are published in two volumes. All accepted full-length papers for the issue went through peer-review process and benefited from the comments made during the conference as well.

In the conference, 369 papers were presented and 628 colleagues from 51 countries attended the conference. In addition to publication opportunities in EBES journals (*Eurasian Business Review* and *Eurasian Economic Review*, which are published by Springer), conference participants were given opportunity to submit their full papers to this Issue. We regret that we could accept only a small portion of those papers.

Theoretical and empirical papers in the series cover diverse areas of business, economics, and finance from many different countries, providing a valuable opportunity to researchers, professionals, and students to catch up with the most recent studies in a diverse set of fields across many countries and regions.

EBES conferences have focused on the areas of economics, finance, and business. Therefore, each volume of the *Eurasian Studies in Business and Economics* series covers a wide variety of topics from business and economics and provides empirical results from many different countries and regions that are less investigated in the existing literature. The first volume of the set covers the following fields:

1. Entrepreneurship
2. Small and Medium-Sized Enterprises
3. Human Resources
4. Management

5. Marketing
6. Tourism

The first volume includes many empirical studies on developing European countries such as Poland, Romania, and Lithuania which are not extensively examined in the existing literature. Therefore, these papers should enlighten the researchers interested in these regions.

The second volume of the set focuses more on economics and finance. The broad topics that volume covers:

1. Accounting
2. Corporate Governance
3. Energy Studies
4. Economic Growth and Development
5. Economics
6. Banking & Finance

Although the papers in the second volume provide empirical evidence from Eastern European countries, the readers would find them useful as some of the results could be valid for similar economies.

We believe that the accepted papers in this issue will provide an invaluable opportunity for our readers to catch up with the most recent studies in a diverse set of fields across many countries and regions and empirical support for the existing literature.

On behalf of the Volume Editors and EBES officers, I would like to thank the host institution *ISCTE-IUL Instituto Universitário de Lisboa*, all presenters, participants, board members, and keynote speakers and look forward to seeing you at the upcoming EBES conferences.

Best regards,

Istanbul, Turkey   Ender Demir

Eurasia Business and Economics Society (EBES)

EBES is a scholarly association for scholars involved in the practice and study of economics, finance, and business worldwide. EBES was founded in 2008 with the purpose of not only promoting academic research in the field of business and economics but also encouraging the intellectual development of scholars. In spite of the term "Eurasia", the scope should be understood in its broadest term as having a global emphasis.

EBES aims to bring worldwide researchers and professionals together through organizing conferences and publishing academic journals and increase economics, finance, and business knowledge through academic discussions. To reach its goal, EBES benefits from its executive and advisory boards which consist of well-known academicians from all around the world. Every year, with the inclusion of new members, our executive and advisory boards became more diverse and influential. I would like to thank them for their support.

EBES conferences and journals are open to all economics, finance, and business scholars and professionals around the world. Any scholar or professional interested in economics, finance, and business around the world is welcome to attend EBES conferences. Since 2012, EBES has been organizing three conferences every year: one in Istanbul (usually in late May or early June) and two in Europe or Asia (usually in January and October). Since our first conference, 3611 academic papers by 6345 colleagues from 91 different countries have been presented. Also, in a very short period of time, **EBES has reached 1394 members from 76 countries**.

Since 2011, EBES has been publishing two academic journals. One of those journals, **Eurasian Business Review—EBR**, is in the fields of industry and business, and the other one, **Eurasian Economic Review—EER**, is in the fields of economics and finance. Both journals are published biannually, and we are committed to having both journals included in SSCI as soon as possible. Both journals have been published by *Springer* since 2014 and are currently indexed in the *EconLit*, *Google Scholar*, *EBSCO*, *ProQuest*, *ABI/INFORM*, *Business Source*, *International Bibliography of the Social Sciences (IBSS)*, *OCLC*, *Research Papers in Economics (RePEc)*, *Summon by ProQuest*, and *TOC Premier*.

Furthermore, since 2014 Springer has been publishing a new conference proceedings series (*Eurasian Studies in Business and Economics*) which includes selected papers from the EBES conferences. The 10th, 11th, 12th, and 13th EBES Conference Proceedings have already been accepted for inclusion in the Thompson Reuters' **Conference Proceedings Citation Index**, and subsequent conference proceedings are in progress.

On behalf of the EBES officers and Board, I sincerely thank you for your participation and look forward to seeing you at our future conferences.

With my very best wishes,

Australia   Jonathan Batten, Ph.D.

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Part I
Accounting and Corporate Governance

The Value Relevance of Audit Report Under IFRS in the Case of Romanian Listed Companies

Alina Mihaela Robu and Ioan-Bogdan Robu

Abstract On a financial market, investors need relevant and fair information on which to base their decisions. Investors seek instruments to assess the information quality which can indicate the stock that can reward them with high performance. To answer the investors' problem, financial statements must be audited, receiving an opinion related to the quality of reported financial information. With the adoption of IFRS, can the audit report contain a professional, objective and independent opinion on the true and fair view of the financial statements, in the most significant aspects, related to the information that reflects financial position and performance, in accordance with an applicable accounting framework? The purpose of this study is to analyze, with the adoption of IFRS, if the auditors' affiliation to the Big 4 and the audit opinion are value relevant for investors and have a significant impact on the stock price. To achieve the research objectives, a sample of 59 companies listed on Bucharest Stock Exchange (BSE) was selected. These companies use IFRS in financial reporting. To obtain the research results, multiple regression analysis, ANCOVA models and GLM were used. Data was collected from the financial statements of companies and from other reports provided by BSE. For data processing, SPSS 20.0 was used. The results achieved from the ANCOVA and GLM regression analysis indicate that information provided by the audit report, auditors' affiliation to the Big 4 and the audit opinion, are value relevant for investors and have a significant impact on the stock price.

Keywords Value relevance • Audit report • Audit opinion • Financial information • Multiple regression analysis • ANCOVA models

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1 Introduction

Reporting information related to the company's financial position and performance and also to the environment where it operates is considered to be the starting point for the efficient functioning of a capital market. The methods to inform the persons that are interested in the activity of a company (actual stockholders, possible investors, creditors, providers, clients or even employees) can be various, including managers' decisions and analyses, press releases, news or even standardized periodical reports (Healy and Palepu 2001). From the perspective of the activity of a company, the main information source is represented by the annual or intermediate financial reports.

The main objective of reporting is to provide useful information regarding the company, to support the users of financial statements in their decision making process (International Accounting Standards Board 2013). Financial information must provide a true and a fair view of the financial position and performance of a company, as well as regarding the changes in the equity ownership and the cash flows in one company. The perfect information regarding the financial position and performance supposes the uniform and total transmission of the content of financial reports to all users (Philips 1988). The imperfect information leads to the emergence of information asymmetry. At the level of the reporting system, financial asymmetry can be reduced by introducing a third part in the system (a financial auditor), in order to guarantee the accuracy and the precision of the transmitted information (Steinmueller 1992). This third person (the auditor) must be recognized and agreed by all users when he or she issues a proficient, objective and independent opinion regarding the accuracy of the reported information on the financial position and performance of the company, under all the significant aspects (Hakim and Omri 2010; Hope et al. 2012).

The transmission of the auditing opinion is made through the audit report, which play an essential role in the communication process between the company, represented by its manager, and the users of the financial information (Ittonen 2012), bringing value-added in the decision making process of the investors. The major financial scandals in the recent years and mainly the errors reported in financial statements have emphasized the highly important role of financial auditors in ensuring the quality of the information that has been transmitted on the financial markets (Hakim and Omri 2010).

The purpose of this study is represented by the analysis of the audit report influence (issued for the financial statements of the listed companies) and their content on the investors' decisions regarding the stock acquisition or sale within financial markets. These decisions are reflected by the variation of the stock price of the listed and audited companies.

In order to reach the research objectives, the study was carried out upon a sample of 59 Romanian companies, listed on the Bucharest Stock Exchange (BSE), for the financial exercises that use the IFRS (International Financial Reporting Standards). Research results have been reached by using the ANCOVA regression analysis and

the generalized linear models (GLM). The main results of the study indicate the existence of a significant influence of the reported information of the companies regarding the financial position and performance and which were audited by companies in the Big 4, on the variation of the stock price of the listed companies (and implicitly, on the investors' decisions). These decisions were also influenced by the type of the issued auditing opinion.

The study also includes five more parts: a literature review in order to develop the research hypotheses (Sect. 2), a part dedicated to the research methodology (Sect. 3), a part dedicated to the obtain results and their discussion (Sect. 4) and the last part which displays the conclusions of the study.

2 Literature Review and Hypotheses Development

Annual financial statements can significantly influence the evolution of the stock price of the listed companies at the moment of their issuance or when changes appear in the methods that lead to obtaining financial information (Dumontier and Raffournier 2002). The feature of financial information to significantly influence the investors' decision-making process, reflected by the stock price or stock return is called value relevance (Beisland 2009; El-Sayed Ebaid 2012).

Starting from the influence of the financial performance of one company reflected by the income statement on the stock price or stock return, Francis and Schipper (1999) have shown a fall in the relevance of the information regarding financial results. Lev (1989) claims that the information regarding the financial results explains just one part of the changes in the stock price and implicitly in the stock return. This fall has determined the need to explain the changes in the level of the stock price as a result of other factors, which are considered more relevant; the information in the balance sheet (Francis and Schipper 1999), in the case of the cash flows (Barth et al. 2001), or other non-financial information (regarding the auditor and the audit report).

The relevance of the information regarding the auditor and the audit report support the demand of audit and insurance services. Of the causes that determine the emergence of auditing services, we can mention the following: the existing gap between the financial information providers and its beneficiaries, the interests conflict between different financial statements' users, the complexity of economic transactions, the effect of the informational content of the financial statements on the investors' decisions (Arens et al. 2006; Moradi et al. 2011).

From the perspective of the investors operating on the financial market, Mansi et al. (2004) claims that the auditing services provided to the listed companies play two essential roles: an informational and an assurance role. The informational role takes shape through the verification of the financial statements, in order to discover and report gaps in the accounting system of the client. Discovering and reporting by the auditor of such gaps has a direct impact on the growth of the auditing services quality (DeAngelo 1981). The assurance role emerges in the moment of issuance of

the auditing opinion, giving a superior credibility and a high accuracy level of the reported financial information (Mansi et al. 2004). Skinner and Srinivasan (2012) claim that the role of assurance services is also influenced by the investors' desire to call on big auditing companies which provide a superior quality of the audit and assurance services. The quality of the auditing services is supported by the auditors' notoriety (Lennox 1999), and, on the chance of disparities within the audit report, investors can reclaim in court the damages caused by the auditors' failure in insuring a true and fair view.

Starting from the auditor's size criteria, DeAngelo (1981) considers that an auditor with a large number of clients does not display an opportunistic behavior, and the audit reports issued by him or her display a high quality. The large sized auditing companies provide high quality services (Chen et al. 2009), as a result of the possibility to train the employees and of the standardized auditing methodologies (Lawrence et al. 2011). The audit reports issued by the auditing companies in the Big 4 are neutral, integral and lack errors, compared to the companies that are not in the Big 4 (Lee and Lee 2013). From the perspective of the auditing services quality, auditing reports corresponding to the Big 4 and non-Big 4 companies should not influence in a different manner the financial market, and the quality of the auditing mission should be comparable. This phenomenon can be explained through the need to respect the same auditing standards and professional guidelines, irrespective of the size and notoriety of the auditing company.

The audit report represents the principal communication channel between the auditor and the users of the information displayed within the financial statements and can significantly influence the stock price of a listed company (Ittonen 2012). The informational content of the audit report can influence the estimation or size of the future cash flows and implicitly the risk of obtaining such flows. As well, the audit report contains information regarding the ability of a company to continue its activity in a predictable future, thus ensuring or not the going concern principle (Ittonen 2012). Mutchler (1985) demonstrates the fact that information regarding the ability of the company to continue its activity is firstly based on the available public information, giving the chance to be anticipated by investors. The influence of the audit report on the stock price can also be explained by the investors' perception about the auditors' access to the privileged information of the company, such as the one used within certain foresights or the management plans. Thus, one considers that the audit report reveals private information about the company, which investors can use in order to make decisions.

The stock price of an audited company can also be influenced by the type of the audit opinion. A reserved auditing opinion can have a significant impact on the stock price of a company, given the fact that this opinion is supported by auditing proofs that give the investors new information regarding the financial position and performance (Dodd et al. 1984). For the investors, the relevance of the reserved opinion is shown by the fact that the auditing report issuance, where such an opinion is developed, will have a negative effect on the stock price of the listed and audited company, and the lack of such opinion will cause a growth in the

investors' trust, regarding the reported and audited financial statements, and, implicitly, a growth in the stock price (Dopuch et al. 1986).

Within the Romanian literature, the main studies aimed at studying the value relevance of the financial information on the financial market. Compared to the international and European results, the results of the studies regarding the value relevance on the Romanian financial market are still inchoate. This can be also argued by the fact that the Romanian capital market is an emerging and reduced size one. The studies of Filip and Raffournier (2010), Tudor (2012), Jaba et al. (2013), Robu and Robu (2014) have aimed at testing and estimating the influence of the financial factors (computed based on the reported information in the financial statements) on the stock price or the stock return of the listed companies and less on estimating the influence of non-financial factors. From this point of view, we consider that our study is amongst the first Romanian studies that test and estimate the influence of the information in the audit report on the value relevance of the financial information in the case of Romanian BSE listed companies.

Starting from the results reported in the literature, previously displayed, the study proposes to test and validate the following research hypotheses:

H₁ The information reported in financial statements regarding the financial position and performance are value relevant to investors and have a significant influence on the stock price for the Romanian BSE listed companies.

H₂ The Information reported in financial statements, as well as the one in the audit report (the one regarding the auditor and the audit opinion), are value relevant to investors and have a significant influence on the stock price of Romanian BSE listed companies.

H₃ On the Romanian financial market, the value relevance of the information in the reported and audited financial statements is also conditioned by the affiliation of the auditor to the Big 4, as well as by the type of the issued auditing opinion.

H₄ The information in the financial statement for which an audit opinion was expressed by an auditor affiliated to the Big 4 is value relevant to investors and has a significant influence on the stock price of Romanian BSE listed companies.

3 Research Methodology

The study aims at analyzing the influence of the audit report (especially information related to auditors' type and audit opinion) on the investors' decisions, with a direct impact on the stock price of Romanian listed and audited companies.

3.1 Target Population and Analyzed Sample

The studied population is represented by all the Romanian Bucharest Stock Exchange listed companies, which use the IFRS in financial reporting and which are the subject of the financial auditing. BSE is the main capital market in Romania, which had included three large sections until 2015: BSE (as regulated market), RASDAQ (non-regulated market) and ATS (Alternative Transaction System). We must mention that the BSE listed companies are the subject of financial auditing and starting with the 2012 financial exercise they have had to use the IFRS in financial reporting. Companies that are not listed on the BSE section (but on RASDAQ or ATS) are not mandated to audit their financial statements and use the Romanian accounting regulation in financial reporting. Starting with 2015, the RASDAQ section has been closed, companies having the opportunity to choose the listing on the BSE regulated market or on the ATS section. The total number of companies listed on the BSE section (Premium and Standard sections), is 81 (22 Premium and 59 Standard ones). The analyzed sample includes 59 BSE listed companies as follows: from the total 81 companies, 12 were removed, representing financial intermediates, banks, investment funds and insurance companies, 6 were removed, companies that were suspended and 3 companies were excluded, companies for which the needed information for the study was not found.

The analyzed period is represented by the 2012 and 2013 financial exercises. At the level of BSE, until 2012, the listed companies were not mandated to apply the IFRS in financial reporting, but just at the consolidated level, thus leading to the existence of significant differences regarding the financial auditor's opinion; if, given the use of Romanian accounting regulation, the opinion would have been clear, given the use of the IFRS (at the consolidated level), the audit opinion would have registered some insignificant observations or it would have been an unclear one. Thus, in order to compare, the study only kept the 2012 and 2013 financial exercises, for which all the listed companies use the IFRS in financial reporting. In this case, the analyzed sample includes 118 observations.

3.2 Models Proposed for Analysis and Data Source

In order to reach the research results, the study starts from the model proposed by Feltham and Ohlson (1995). This model links the values based on the accounting numbers (book value of equity and net result) and the market value (calculated based on the stock price of listed companies), according to the Eq. (1):

$$P_{i,t+1} = \beta_0 + \beta_1 \cdot BVPS_{i,t} + \beta_2 \cdot EPS_{i,t} + \varepsilon_{i,t} \qquad (1)$$

where:

$P_{i,t+1}$ represents the stock price of company i at the $t + 1$ moment, scaled with the stock price at *31.12.t*;

$BVPS_{i,t}$ represents the book value of equity of company i at t moment (compared to the number of issued stocks) and scaled with the stock price at *31.12.t*;

$EPS_{i,t}$ represents the net result per stock for company i at t moment, scaled with the stock price at 31.12.t;

$\varepsilon_{i,t} \sim N(0, 1)$ represents the error component of the proposed model.

β_1 and β_2 represent the parameters model, and the significant and estimated values show the existence of a significant influence of the accounting numbers on the market value, in a positive or a negative direction, depending on the sign of the estimation of the two parameters in the regression model.

As we can see, the dependent variable is represented by the stock price in the $t + 1$ exercise, but 150 days from the data of the previous financial exercise closing, just to include as much as possible the influence of the audit report on the stock price. The 150 days period is specific to Romania and is established by the Financial Supervisory Authority.

As well, in order to estimate the influence of the information included in the audit report (the auditor's type and the auditing opinion), as well as the interactions between these and the information in the financial statements (*BVPS* and *EPS*), the study proposes the following models for analysis:

$$P_{i,t+1} = \beta_0 + \beta_1 \cdot BVPS_{i,t} + \beta_2 \cdot EPS_{i,t} + \beta_3 \cdot Big4 + \beta_4 \cdot UnqOp + \beta_5 \cdot QualOp + \varepsilon_{i,t} \tag{2}$$

where:

Big 4 represents a dummy variable with value 1 if the company is audited by an auditor in the Big 4 and 0 in the opposite case;

UnqOp represents a dummy variable, with value 1 if the opinion in the issued audit report for the audited company is unqualified and 0 in the opposite case;

QualOp represents a dummy variable, with value 1 if the opinion in the issued audit report for the audited company is qualified and 0 in the opposite case; it is to be mentioned that at the level of the analyzed sample, only three types of opinions were registered: unqualified, unqualified with insignificant observations and qualified (in the study, the unqualified opinion with insignificant observations will be chosen as a reference for the development of the econometric models);

$\beta_{i=1,\ldots,5}$ represent the parameters of the regression model, and their significant value indicate the existence of some influence of the various information categories (financial and from the audit report) on the stock price.

$$P_{i,t+1} = \beta_0 + \beta_1 \cdot BVPS_{i,t} + \beta_2 \cdot EPS_{i,t} + \beta_3 \cdot Big4 + \beta_4 \cdot UnqOp + \beta_5 \cdot QualOp$$
$$+\beta_6 \cdot Big4 \cdot BVPS + \beta_7 \cdot Big4 \cdot EPS + \beta_8 \cdot UnqOp \cdot BVPS$$
$$+\beta_9 \cdot UnqOp \cdot EPS + \beta_{10} \cdot QualOp \cdot BVPS + \beta_{11} \cdot QualOp \cdot EPS + \varepsilon_{i,t}$$

$$(3)$$

For the model in Eq. (3), the significance of the variables remains unchanged, but the $\beta_{i=6,\ldots,15}$ parameters surprise the combined influence of the audited accounting numbers by a certain auditor (Big 4 or non Big 4) for which a certain audit opinion was issued, on the stock price. The sign of these parameters also indicates the direction of the influence determined by the interaction between the *BVPS*, *EPS*, *Big 4*, *UnqOp* and *QualOp*.

$$P_{i,t+1} = \beta_0 + \beta_1 \cdot BVPS_{i,t} + \beta_2 \cdot EPS_{i,t} + \beta_3 \cdot Big4 + \beta_4 \cdot UnqOp + \beta_5 \cdot QualOp$$
$$+\beta_6 \cdot Big4 \cdot BVPS + \beta_7 \cdot Big4 \cdot EPS + \beta_8 \cdot UnqOp \cdot BVPS$$
$$+\beta_9 \cdot UnqOp \cdot EPS + \beta_{10} \cdot QualOp \cdot BVPS + \beta_{11} \cdot QualOp \cdot EPS$$
$$+\beta_{12} \cdot Big4 \cdot UnqOp \cdot BVPS + \beta_{13} \cdot Big4 \cdot UnqOp \cdot EPS$$
$$+\beta_{14} \cdot Big4 \cdot QualOp \cdot BVPS + \beta_{15} \cdot Big4 \cdot QualOp \cdot EPS + \varepsilon_{i,t}$$

$$(4)$$

To estimate the parameters of the regression equations, the study uses generalized linear models, which allow the estimation of the influence of the interactions between variables, given the fact that the hypotheses of the multiple linear regression models cannot be fully met (Field 2009). For the four proposed models for the analysis, data has been collected using Datastream Advanced 4.0 from the Thomson Financial database.

4 Research Results and Discussion

As a result of the collected data analysis at the level of the studied sample, the main research results aim at displaying a series of descriptive statistics for the analyzed variables (per total and on categories considered in the analysis), of the values of the Pearson correlation coefficients and the estimations of the parameters of the regression models proposed in the study.

Table 1 displays the descriptive statistics corresponding to the variables proposed in the model in Eq. (1) which stand at the base of the other models.

Table 1 Descriptive statistics

Variables	N	Minimum	Maximum	Mean	Std. Deviation
$P_{i,t+1}$	118	0.7830	1.6074	1.0732	0.2114
$BVPS_{i,t}$	118	0.4206	7.0452	2.4330	1.7444
$EPS_{i,t}$	118	-3.3152	0.2740	-0.1878	0.8187

Table 2 Estimated means for the variables considered in the analysis, by auditor and audit opinion

Categorial variables	Categories	Noncategories	$P_{i,t+1}$	$BVPS_{i,t}$	$EPS_{i,t}$
Big 4 (N = 118)	Da	43	1.0326	1.5684	−0.6587
	Nu	75	1.1038	2.1482	−0.2955
Audit Opinion (N = 118)	UnqOp[a]	77	1.0791	2.2615	0.0607
	QualOp[b]	31	1.0898	0.5950	−1.4625
	UnqOpOBS[c]	10	1.0304	3.5977	−0.9824

[a]Unqualified opinion
[b]Qualified opinion
[c]Unqualified opinion with insignificant observations

Based on data in Table 1, we can notice that at the level of the BSE, Romanian listed companies report average growths of the stock price after 150 days from the closing of the financial exercise, as well as positive values of the book value of equity, but loses at the level of the accounting net result. This observation will also significantly influence the way of interpreting the estimations of the regression models' parameters proposed in the analysis. Depending on the auditor's affiliation (or not) to the Big 4 companies, as well as on the type of the issued audit opinion, Table 2 displays the means of the variables considered in Eq. (1).

Based on data in Table 2, we can notice that, on average, audited companies by the auditors in the Big 4 display much lower values of the analyzed variables, both at the level of the stock price and at the level of book value of equity and the net result. This can signal the existence of prudence in financial reporting for the audited companies by auditors in the Big 4. At the same time, companies for which an unqualified opinion was issued, displayed on average positive values of the net result, compared to the companies for which qualified opinions or qualified opinions with insignificant observations were issued.

For the study of the causality relations proposed in Eq. (1), Table 3 studies the links between the analyzed variables, based on the Pearson correlation coefficients. One can notice a significant and positive influence of the book value of equity on the stock price and a negative influence of the values of the registered loss of the company (negative result) on the stock price. As well, low values of the Pearson correlation coefficient between the value of the book value of equity and the one of the net result emphasize the lack of collinearity between the independent variables.

Once the values of the correlation coefficients have been estimated, to study the causality, Table 4 displays the estimations of the parameters of the four regression models proposed for testing and validation.

Table 4 displays the estimations of the four regression models proposed for analysis. Thus, for the model in Eq. (1) we can observe that, on average, the value of the book value of equity has a significant and positive influence on the stock price, while the value of the net result (on average, a loss) has a negative influence on the stock price.

Table 3 Estimated values for the Pearson correlation coefficients

Variables	$P_{i,t+1}$	$BVPS_{i,t}$	$EPS_{i,t}$
$P_{i,t+1}$	1	0.329 (Sig. 0.000)	−0.142 (Sig. 0.125)
$BVPS_{i,t}$	0.329 (Sig. 0.000)	1	0.078 (Sig. 0.403)
$EPS_{i,t}$	−0.142 (Sig. 0.125)	0.078 (Sig. 0.403)	1

Table 4 Estimations for the parameters of the regression models proposed in the analysis

Variables	Model 1		Model 2		Model 3		Model 4	
	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.
Intercept	**0.964**	**0.000**	**0.868**	**0.000**	**0.856**	**0.000**	**0.961**	**0.000**
BVPS	**0.041**	**0.000**	**0.045**	**0.000**	**0.049**	**0.101**	0.012	0.762
EPS	**−0.044**	**0.055**	**−0.063**	**0.013**	−0.050	0.377	**−0.146**	**0.076**
Big4	–	–	−0.028	0.479	0.031	0.695	0.054	0.516
UnqOp	–	–	**0.116**	**0.108**	0.074	0.554	−0.041	0.791
QualOp	–	–	0.069	0.338	0.113	0.423	0.023	0.897
Big4·BVPS	–	–	–	–	−0.031	0.315	−0.023	0.719
Big4·EPS	–	–	–	–	−0.021	0.668	**0.155**	**0.188**
UnqOp·BVPS	–	–	–	–	0.012	0.722	0.049	0.239
UnqOp·EPS	–	–	–	–	**0.314**	**0.104**	**0.534**	**0.021**
QualOp·BVPS	–	–	–	–	−0.012	0.738	0.025	0.562
QualOp·EPS	–	–	–	–	0.003	0.965	0.115	0.211
Big4·UnqOp·BVPS	–	–	–	–	–	–	0.001	0.990
Big4·QualOp·BVPS	–	–	–	–	–	–	−0.030	0.632
Big4·UnqOp·EPS	–	–	–	–	–	–	**−0.657**	**0.137**
Big4·QualOp·EPS	–	–	–	–	–	–	**−0.206**	**0.108**
Observations	118		118		118		118	
R-squared	0.136		0.165		0.202		0.235	

Dependent variable: $P_{i,t+1}$; *Big4* (Auditor is from Big4); *UnqOp* (Unqualified opinion, a dummy variable: 1 if the opinion is unqualified, 0 in the opposite case); *QualOp*(Qualified opinion, a dummy variable: 1 if the opinion is qualified, 0 in the opposite case); *UnqOpOBS* (Unqualified opinion but with observations, reference category); Significant values for Sig. < 0.200
The bold values are statistically significant

In the case of the model in Eq. (2), we can notice that the values of the book value of equity and the ones of the net result keep the same influence on the stock price, but the companies for which an unqualified opinion was issued report much higher values of the stock price compared to the ones for which other audit opinions were issued. As well, in this case, the affiliation of the auditor to the Big 4 companies does not have a significant influence on the stock price and, implicitly, on the investors' decisions (the lack of value relevance).

At the level of the model in Eq. (3), we also studied the influence of the interactions between the affiliation of the auditor to the Big 4 companies or the type of the audit opinions and the financial information regarding the position and performance (book value of equity and net result) on the stock price. In this case, the value of the book value of equity has a positive influence on the stock price,

while the net result does not influence the investors' decisions any more. At the same time, the net result of the companies for which an unqualified opinion was issued (in this case, profit, according to the results displayed in Table 2) has a positive influence on the stock price. The other interactions have an insignificant influence on the stock price of the Romanian BSE listed companies.

In the case of the regression model displayed in Eq. (4), the results of the analysis indicate the following: at the level of the Romanian BSE listed companies, an increase in the loss (see results in Table 2) leads to a decrease in the stock price. Though, for the audited companies by auditors in the Big 4, the value of the net result determines an increase in the stock price, which is also supported in the case of expressing an audit unqualified opinion. When the audit opinions is unqualified or qualified at the level of the net result (in this case of the loss), we report a negative influence of them on the stock price of the BSE listed companies.

5 Conclusions

The results of the study allowed the validation of the research hypotheses and reaching the research objectives. Starting from the variables included in the Feltham and Ohlson model (1995), the value relevance of the financial information in the reported financial statements on the stock price was tested and validated. Thus, we estimated a positive influence of book value of equity and a negative influence of the reported losses on the stock price.

Regarding the value relevance of the information in the audit report, at the level of the analyzed sample we can notice that an unqualified audit opinion has a significant and positive influence on the stock price. Thus, we can conclude that, at the level of BSE, the information in the audit report which includes unqualified opinions are value relevant to investors.

Moreover, for the Romanian BSE listed companies, the registered net result at the end of the financial exercise and for which an unqualified opinion was issued has a positive influence on the stock price. In this case, we can conclude that financial information regarding the net result, for which an unqualified audit opinion was issued (irrespective of the auditors' affiliation or not to the Big 4) has a significant and positive influence on the investors' decisions, with direct impact on the stock price of the listed companies.

Not the last, through Eq. (4), we have shown the influence of the audited information by an auditor affiliated to the Big 4, for which a certain type of opinion was issued, on the stock price. Thus, at the level of the study, we can notice that the losses reported by the BSE listed companies for which unqualified opinions were issued or the profits for which qualified opinions were issued by the auditors in the Big 4 have determined a decrease in the stock price. In this case, both the results reported by the company and the auditors' opinions have had a significant impact on the investors' decisions.

The limits of this study are mainly determined by the low size of the analyzed sample (only 59 companies; they reflect the low size of the BSE, as an emerging market), which includes only two financial exercises (2012 and 2013, when the BSE listed companies use the IFRS). In this case, future research directions aim at enlarging the analyzed sample by also including the companies listed before 2012 (the moment of IFRS implementation) in the analysis, in order to test the existence of significant differences regarding the value relevance of the financial information and also the ante and post IFRS audit reporting.

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Performance Indicators Development in Function of Higher Education Quality Monitoring

Verica Budimir, Ivana Dražić Lutilsky, and Robert Idlbek

Abstract The aim of this paper is to explore issues of higher education institution's performance indicators development in Croatia. Accepted standards and regulations require defining of key performance indicators, but the process and the method of their choice and the definition is optional to institutions. Higher education institutions are obligated to measure and track performance. They need to define key performance indicators, in accordance with the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG) and defined strategic goals. Tracking performance is important for program financing of higher education and performance monitoring of selected institution's program goals and higher education in general. For higher education institutions, it is important to monitor and improve the quality. For that purposes they need to develop adequate and comparable performance indicators. In order to create comparable indicators it is necessary to conduct a detailed analysis of performance measurement of related higher education institutions in Croatia and the European Higher Education Area. The basis for performance measurement is information that institution owns, acquires and processes. In order to be relevant, indicators need quality information basis for their measurement. This paper analyzes the current performance indicators of selected institutions from Croatia, Great Britain, Canada and Australia. Based on the analysis, as the result of work, we propose indicators for one higher education institution. Authors propose a methodology for development of indicators, as well as a way of measuring and monitoring performance.

Keywords Performance indicators • Quality • Higher education

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1 Introduction

The globalization processes that take place in all areas of human work and activities represent a strong economic, political and social force that promotes the internationalization of higher education. Although higher education institutions are established primarily to meet the needs for higher education population of some countries, their international activities are increasingly more pronounced and significant. The extent, scope and complexity of the international activities of higher education institutions have grown over the last two decades (Altbach and Knight 2007). International activities of higher education institutions has strongly influenced the increase in the scope of activities related to cross-border cooperation and mobility while the United States, United Kingdom and Australia are the most popular destinations for study abroad. These are the world's strongest providers of transnational education (Van Der Wende and Westerheijden 2001).

The challenges that higher education is faced around the world include: the need to ensure quality and standards due to the continued increase in the number of students, reducing budgetary subsidies per student, the need for greater accountability because of increased autonomy and deregulation institutions, the requirements of different stakeholders for a high quality and comprehensive information on programs, learning outcomes and institutions as a whole (Campbell and Rozsnyai 2002; The World Bank 2002; Schwarz and Westerheijden 2004). Development and strengthening of institutions of higher education in the international higher education area is limited by several factors: regulation, quality assurance and recognition (Dos Santos 2000; Campbell and Van Der Wende 2000). The concept of quality assurance means all policies, processes, activities and mechanisms to recognize maintain and develop the quality of higher education (Glanville 2006). The focus of higher education is teaching, learning and research, while the management and administration represent support to these processes. Quality assurance engaged in the development and improvement of quality is for all three areas (Schwarz and Westerheijden 2004). Ensuring quality and standards of their programs is important to the successful delivery of services, and thus the activities of higher education institutions in domestic and international Higher Education Area.

Standards and body for independent external evaluation of the quality of such control mechanisms for the first time in Europe appear in the mid 1980s in Great Britain and the Netherlands (Cave et al. 1997; Rhoades and Sporn 2002). Discussions on Quality Assurance which followed the mid 1980s took place at the national level in the United Kingdom, the Netherlands, Belgium, Denmark, Finland and Norway. Ensuring quality was observed in the context of limiting budget spending and the need for greater accountability in higher education (Van Vught and Westerheijden 1994; Rhoades and Sporn 2002). The aim was to increase the autonomy and improve the performance of higher education institutions, and the implementation of self-control, self-assessment and evaluation of the program were seen as mechanisms to ensure the quality of institutions. In the absence of systematic procedures for evaluation of higher education institutions in Europe, the

European Commission in 1991 established a European pilot project for evaluating quality in higher education, with the aim of raising awareness of the importance of evaluation and improvement of procedures and knowledge transfer between higher education institutions (Thune and Staropoli 1997; The World Bank 2002).

The basis for systematic care of quality assurance, as a prerequisite for successful business, institutions of higher education was introduced by the adoption and signing of the Bologna Declaration in 1999. In order to increase the mobility and employment of European citizens and increasing the international competitiveness of the European Higher Education Area 47 countries have so far signed this document (UNESCO 2014), and among them Croatia in 2001. One of the most important goals of the Bologna Process is quality assurance in higher education, taking care of the establishment of comparable criteria and methodologies (European Ministers of Education 1999). The initiative to establish comparable criteria as a basis for evaluating and developing quality improved by the establishment of the European Network for Quality Assurance in Higher Education 2000 (ENQA), publishing the document Standards and Guidelines for Quality Assurance in the European Higher Education Area—ESG (ENQA 2009) and establishing a European register for quality assurance in higher education—EQAR.

ESG represent a global framework for measuring and ensuring the quality of higher education institutions (Kohoutek 2009). Standards and guidelines should serve as a source of improving the quality of higher education institutions (further HEI) in the provision of services and justify their institutional autonomy. To students those guidelines should enable better quality access to services in the European higher education area, and to the agencies that carry out the external evaluation of quality should provide a high level of accessibility and comprehensibility of the results of the evaluation (ENQA 2009; Kohoutek 2009; Kauko and Berndtson 2013).

Development of quality assurance system in Europe is closely linked with the development of strategic business management of higher education institutions (Rhoades and Sporn 2002). Higher education institutions at lulled, traditional, unsystematically accessing business can no longer respond to the needs of the education market and the many challenges they face. Management, teachers and administration of modern higher education institutions systematically define plans, programs, priorities and expenses to ensure their future (Keller 1983). In a time of constant change as it is today, with higher education increasingly bind concepts like corporate governance, enterprising, innovative and customer-oriented business (Rasmussen 1998). In doing so, strategic planning is seen as a tool for the establishment of a change, strengthening institutions and achieves success (Machado and Taylor 2010). Strategic planning and business management should define and implement strategy so as to take into account various internal and external conditions, where it ensures a high level resources management in achieving desired goals (Machado and Taylor 2010; Taylor and Miroiu 2002).

Initiatives to increase the quality of public services, lower budgetary allocations for public purposes, the creation of the citizens in a friendly environment and greater performance in the management operations of budgetary users, demand

for monitoring the efficiency and effectiveness of higher education institutions (Matei 2009; Guthrie and Neumann 2007; Chalmers 2008a). To monitor the performance of higher education institutions can use different models: the Balanced Scorecard (Kaplan and Norton 1996; Niven 2003), European Quality Improvement System—EQUIS (EFMD 2014), Value Added Measurement (Kim and Lalancette 2013), European Foundation for Quality Management Excellence Model (EFQM 2003), Association to Advance Collegiate Schools of Business Accreditation Standards (AACSB 2013), World University Rankings methodology (Reuters 2014), as well as models from other international and national (ASHE 2013) accreditation of institutions. At the centre of all these models, as a tool for measuring and monitoring performance, and strategic business management of higher education institutions stand out performance indicators.

Performance indicators are objective measures that provide adequate information and statistical framework for monitoring the performance of institutions in which allow comparison among areas, over time and generally accepted standards (Burke et al. 2002; Poister 2003; Chalmers 2008a, 2008b). By studying literature in performance measurement, it is evident that there are numerous attempts to define performance indicators of higher education, in theory and practice. However, the development of performance indicators is not an easy job and depends on a number of factors: information users, availability information platforms for performance measurement, the desired quality standards, strategy of HEI, comparability, development institutions and higher education system in general.

This paper will therefore explore the role of performance indicators in monitoring the quality of HEI's viewed through the prism of strategic management and program financing of higher education. Below are studied and analyzed the performance indicators selected institutions of higher education in Croatia and the UK, as representatives of the European Higher Education Area and the developed world systems performance measurement—Australia and Canada. Through a review of the problem of the existing performance measurement the authors develop performance indicators in the example of one institution of higher education in Croatia. Based on the analysis of application performance indicators in monitoring and improving the quality and comparing (benchmarking) institutions shall be adopted conclusions on the significance of performance indicators about monitoring the quality of higher education institutions.

2 The Role of Performance Indicators in Monitoring the Quality of HEI's

2.1 The System of Quality Assurance in HEI's

The need for providing quality programs and services has become a part of everyday life of all higher education institutions in the European Higher Education

Area, and developed as a "consequence" of internationalization and the Bologna process. Responsibility for the quality of provided services, its assurance and improvement, primarily are borne by higher education institutions (Dolaček-Alduk et al. 2008). To ensure the quality of the educational process, HEI's established systems of quality assurance. Quality assurance system represents institutional mechanism of HEI's that enables further development of the quality and provides a clear formal mechanisms for its monitoring. Each HEI is developing its own quality assurance system (further QAS) based on legal regulations, the ESG, follow good practices of other HEI's and previous experience of HEI's in the establishment and implementation of QAS. Establishment of QAS is a complex and demanding process that involves continuous research, monitoring, evaluation, supervising and improvement of the activities of HEI's (Budimir et al. 2014).

To establish mechanisms for internal quality assurance in accordance with the ESG, HEI's must have (ENQA 2009; Budimir et al. 2014):

Defined Policies and Procedures for Quality Assurance Institutions are expected to have a defined policy and strategy of quality, in line with the mission, vision and strategy of the institutions. As mechanisms for monitoring performance, improvement and development of QAS are established: the body responsible for quality assurance, internal regulations, manual for quality assurance, annual plans and objectives of activities and others.

Mechanisms for Approval, Monitoring and Periodic Review of Programs and Awards For successful completion of study programs are defined: enrolment quotas, the curriculum, detailed execution plans of the course. Approval procedures, audit and improvement of study programs should be clearly defined, taking into consideration the involvement of all stakeholders in the process.

Defined Transparent Criteria, Rules and Procedures for the Assessment and Evaluation of Students' Work It is necessary to ensure equal conditions of assessment for all students, which is achieved by defining the unique conditions at the institutional level and at the level of all the courses and continuous informing students.

Mechanisms for Ensuring the Quality of Teaching Staff and Mechanisms for Verification of Their Eligibility The HEI should analyze the situation of teacher resources, their workload in teaching and other activities, and allow for continuous training of teachers' competencies and other skills. Evaluation of the teachers is implemented through student surveys, evaluation of scientific and professional work.

Insured Educational Resources and Support for Students It is necessary to analyze the availability of educational resources (teachers, space, equipment, finance, teaching materials, administrative support, etc.) and continuously implement measures to improve availability.

Established Information System to Collect, Analyze and to Use Relevant Information The higher education institution should monitor and report on student

progression and success, employability of graduates, satisfaction of students programs, effectiveness of teachers, profile of the student population, the availability of educational resources, and key indicators of success.

Mechanisms for Objectively, Impartially and Continuously Informing the Public In addition to the website, which is the basic way of informing the public, HEI's should be utilized and use other media notification and take care of the accuracy and objectivity of information processed.

In order to improve the quality, institutions with specified define additional standards in the field of scientific and professional work, cooperation with industry, international cooperation and other areas not directly covered by the ESG.

Evaluation of the effectiveness of institutions and programs in relation to the set minimum standards (ESG) is carried out through several steps (Kohoutek 2009). First step is self-evaluation, carried out by teachers and other stakeholders of the institution in accordance with the criteria set by the competent agencies. Second step is to read external documents, prepared by independent experts who reviewed the evidence and interviewing stakeholders and provide recommendations to the Agency. After that, Accreditation Agency revises evidence and recommendations and makes a decision on compliance with quality expectations. At the end there is a follow-up phase in which the institution is developing a strategy for improving quality in accordance with the identified weaknesses and recommendations.

For the purpose of monitoring and measuring the performance, the agency submits to HEI's a number of schedules according to ESG, through which they should show the performance indicators. However, HEI's in Croatia usually do not have a mechanism or model, for monitoring their performance, and therefore they cannot on easy way, because of the lack of systematic monitoring indicators, collect all the data and process them in accordance with the required (Ćukušić et al. 2014). The periodicity of the external evaluation, results in a situation that HEI's are not following the performance continuously. Therefore, the definition of key performance indicators, which is prescribed with standard 6—Information system of higher education institutions, and their systematic monitoring of the institutions of the utmost importance to assure and improve the quality of HEI's. Reliance on key performance indicators in the field of quality assurance in consideration of a full picture of the performance of the institution has a number of drawbacks and limitation: indicators are significantly related to the requirements of agencies (outside body), following only the output values (outputs) rather than the connection with the input values (inputs) (Ćukušić et al. 2014), and do not take into account the financial indicators. Therefore, the authors explore the role of indicators in strategic management and program funding (financing by agreement) of HEI's.

2.2   *Strategic Management and Program Funding of HEI's*

HEI's today are faced with many challenges in their activities: a complex organizational structure with a number of external constraints, insufficient financial resources, the need for better decision-making and quality decisions, new technologies, better connectivity with the economy, globalization and internationalization of higher education, competitiveness, unpredictability (Machado and Taylor 2010). In order to successfully respond to the challenges HEI's are introducing strategic planning and business management. Although each institution develops its own, unique system of strategic management, steps in development are common to most successful models: defining the mission and vision, analysis of the internal and external environment (SWOT analysis), comparison with similar institutions (Benchmarking), setting the strategy (strategic areas and goals), definition of performance indicators, define action plans, data collection and reporting on performance, evaluation of the performance and return on impact of HEI's activity and evaluation of strategies and adaptation to change.

Central position in the strategic planning occupies performance indicators. In order that performance indicators become a useful management tool, they need to be carefully defined, in accordance with established objectives and strategy.

Strategic business management of HEI's is being driven by the adoption of strategic documents at the EU level—Horizon 2020, and national level—Strategy for Education, Science and Technology (Croatian Parliament 2014). Internationalization of Higher Education encourages countries to create specific strategies of higher education related to mobility (Newman and Graham 2013; Finland Ministry of Education 2009; EUA 2013). Strategic areas and goals differ among countries, but facilitating access to education, increasing student mobility and sustainable funding, are common features of most strategic documents.

End of the twentieth and beginning of the twenty-first century was marked by trends that significantly affect financing of the higher education. The cost of tuition per student increased significantly, the number of students also, increased expectations of all stakeholders due to the development of knowledge-based economy, the budget fail to follow the growth of costs, globalization enhances the effects of costs growth and uncertainties of government revenues, the liberalization of the economy leads to decentralization and the privatization of public entities including institutions of higher education (Knight 2009). Solutions for the financial pressures on the governments are seeking on the expense and revenue side. Enhancing the number of teaching groups and teaching load, reject the less important programs, increased financial responsibility of the HEI's management (new public management), and introduced tuition fees for all or part of the students, reducing the student scholarships and others.

Extra pressure on the financing of higher education has created a crisis due to which the economic situation of many European countries has deteriorated significantly since 2008. There are very frequent structural reforms in education that seek to rationalize consumption, increase the transparency and efficiency of use of

limited budgetary resources. The state budget continues to be a major source of financing of the majority of higher education institutions in Europe, but the ways of allocating that budgetary resources are different. Line financing in recent times was replaced with block grants which funds have been allocated for a particular activity or cost item.

Institutions of higher education in Croatia from 2012/2013 entered into the system of financing through funding agreements. Programme contracts are contracts between the founders and the HEI about financing on the basis of the agreed program objectives, results and performance indicators for their implementation. According to a study from the European University Association in 2013 (EUA 2013) in two thirds of surveyed European countries (15 of 22) HEI's enter into some kind of program contracts.

The idea of the program funding occurred back in 2008 when the Croatian Ministry of Science, Education and Sports started concluding agreements with public institutions of higher education on financing subsidies participation in the cost of study for full-time students on the basis of a special decision of the Croatian Government (MSES 2014). In 2012 seven public universities and 14 polytechnics and colleges entered into three-year contracts (the pilot program contracts) on the full subsidy of participation in the cost of full-time students study. The above contracts, Ministry and public higher education institutions jointly and in accordance established general and specific objectives which serve to achieve the greatest possible improvement in the system of teaching and education in Croatia, and thus indirectly improve the quality of management of public institutions of higher education. Defined were six general and nine specific objectives (MSES 2014). Higher education institutions have the ability to choose the objectives that fit into their development strategy, in cooperation with the competent ministry HEI's defined the desired results and performance indicators which will measure their implementation. Defining activities that are considered effective for achieving the targets selected higher education institutions are able to carry out independently.

Budget Act from 2008, in Croatia has introduced the obligation of program budgeting and financial plans of budget users. The starting point of resource management and service delivery program planning is a strategic plan, and to monitor the achieved results it is necessary to define measurable performance indicators.

2.3 Performance Indicators

All accentuated competition of HEI's in the international "market" in attracting students and teachers, desire to create a positive image, procedures of external and internal quality assessment, re-accreditation, strategic decision-making, and efficient management of financial resources, have created a continuing need for measuring and monitoring performance. Performance indicators, as a tool for performance measurement in higher education have been known since 1977

(Birch and Calvert 1977). Evaluating the effectiveness of the university on the basis of quantitative performance indicators in England was introduced in 1985 (Elton 2004), in Australia at the end of the 1980s (Henman and Luong Phan 2014), in Canada at the beginning of the 1990s (Almgren 2009). At the international level, the OECD formulated performance indicators for the purposes of comparability of higher education systems across countries (OECD 2007).

Performance indicators are taken from the private sector where they are used as an internal management tool. In the public sector usually measure the economy, efficiency, effectiveness and relevance of the results achieved and the objectives of the programs, projects, activities or processes (IFAC 2000). Performance indicators are usually divided into four basic groups (Chalmers 2008a). First group stands for Indicators of inputs (e.g. the average score of students when entering the study, the percentage of full-time students). Second group make Indicators of the process (e.g. the engagement of students, professional development of teachers). There are Indicators of output (e.g. the rate of progression through the study, the rate of graduates). At the end we have Indicators of outcome (e.g. the satisfaction of graduates, employee satisfaction).

Indicators of inputs and outputs are quantitative indicators, and the indicators of process and outcome are qualitative indicators. Performance indicators are the most effective when used and monitored through a system of performance measurement—control system to calculate the specific performance indicators at prescribed intervals in order to achieve effective and responsible management decisions. In order to be an adequate tool for measuring results and performance management, indicators should be relevant, understandable, reliable, complete, objective, neutral, timely and comparable (IFAC 2000). The role of performance indicators in monitoring the quality of higher education is manifold. First, performance measurement helps establish strategic goals of the institution. Monitoring the performance of the information on realization of the mission and instructs the administration of HEI's on the strengths and weaknesses of the institution. This allows the definition of a quality strategy and strategic business management of higher education institutions. Furthermore, performance indicators are an important tool for financial planning and efficient allocation of resources. Information about successful and less successful activities and projects, facilitate HEI's decision on the allocation of scarce financial resources in areas with greater prospects for success. Results efficiency measurements presented to the public increase the accountability of institutions for economic and efficient use of limited budgetary resources.

Performance indicators are an important instrument in the ranking of HEI's. Monitoring the performance which is based on objective indicators allows comparison among institutions. The position on the "market" and the desire to attract (quality) students positively influence the development of competitiveness and competitive spirit within and among HEI's. Results of efficiency measurements are an important tool in informing students, public and other stakeholders in higher education system, about the achievements of the institution. Repeated information increases transparency of HEI's which reflects positively on the quality of the whole system of higher education. Information provided by performance indicators

is important to regulators and agencies in the procedures of external evaluation of the quality and (re) accreditation of HEI's. Based on measurements of their achievement in the mission and strategic goals of the institution, and to comply with the minimum set of quality standards system, it allows the assessment and monitoring by external agencies. Regulatory authorities and agencies on the basis of information on the effectiveness recognize quality and they certify HEI.

Development and use of performance indicators in higher education is not simple and causing several political and technical issues. One can single out a few key problems. The first question is who should develop performance indicators. ESG standards and regulations on the conditions for issuance of licenses (MSES 2010) stipulates that HEI's must define key performance indicators. The need for defining indicators by the institutions stems from the desire (and need) for monitoring its own performance for the purposes of promotion, competition and accountability. However, subjectivity in the selection of indicators and control over the information that have HEI's may limit the quality of the monitoring results. On the other hand, the definition of indicators by regulatory bodies at the national or international level provides an opportunity for comparison and ranking of HEI's. However, the question arise about their comparability due to differences in national systems (Yorke and Longden 2004), the particular operations that may arise in certain years, sample selection which is monitored and others. Next question that arises is who the users of information are. In higher education system we can single out six key stakeholders (Ćukušić et al. 2014): students and potential students, teachers, administration of HEI's, University, Ministry and the wider community. Information needs of these stakeholders, as well as views on the effectiveness and quality of institutions differ significantly, which makes it difficult to define key performance indicators. Given the importance of performance indicators for monitoring the quality and financing of the HEI's, it is important to choose an appropriate model for measuring performance and to establish a balance between financial and non-financial, qualitative and quantitative indicators. One model that considers the needs of different stakeholders, combines financial and non-financial indicators derived from the strategy of institutions, and provides a framework for strategic management and performance measurement is BSC model (Niven 2003). Once you have defined key performance indicators, established target values and activities, management information system should collect data, process them and provide information on business performance. In information systems of HEI's often there is no single database needed to calculate performance indicators but they should be collected from various sources (accounting, student services, personnel records, records of the relevant ministry, etc.). Given the unquestionable importance of performance indicators in monitoring the quality of HEI's and a number of difficulties that arise in their definition, below the authors analyze the performance indicators of selected HEI's and approaches in their definition.

3   Analysis of Performance Indicators of Selected HEI's

Research about performance indicators of selected HEI's was carried out based on the analysis of available information of the results of performance measurement at the web site of selected HEI. Since the ESG regulated reporting obligations on key performance indicators, and the web site is considered to be the central tool to disseminate all relevant information to interested parties, this kind of research is considered to be relevant. The research results are presented in tabular form through the following elements: the name of the HEI and defined performance indicators. These data are supplemented by information about monitoring of the performance which is regulated at the national level, but also based on the information available on the national website, relevant (inter) national studies and the research conducted by other authors. In conclusion of the chapter authors analyze the approaches in defining key performance indicators and provides an overview of the most commonly used indicators. For research purposes we have chosen ten HEI's from four countries. HEI's were randomly selected.

3.1   Key Performance Indicators of Selected HEI's in European High Education Area

For the purposes of research performance measurement in the European Higher Education Area selected were the two countries: the United Kingdom (see Tables 1 and 2) and Republic of Croatia (see Tables 3 and 4). Higher education institutions in the UK have 30 years experience in measuring, monitoring and reporting on the success of its programs. Sector indicators were developed at the end of the last century and have been systematically published since 1999 (Pollard 2013). Unlike them, higher education institutions in Croatia only in the last 4 years become familiar with the concepts of performance measurement and performance indicators. Level Indicators sector have not yet been developed. We can say that HEI's in Croatia are still finding their paths in this complex area. Therefore, the experiences that higher education institutions in the UK have, can significantly contribute to the understanding and to the quality of the establishment of processes related to performance measurement in higher education Croatian.

Performance indicators at the level of the higher education sector are not developed and made publicly available in Croatia. Summarised below are the criteria for assessing the quality and efficiency of the processes of external quality assessment and accreditation of higher education institutions in Croatia. Results of measuring performance based on the above criteria are not monitored and are not published at the national level. In addition to these criteria, the HEI's are signed program contracts that contain performance indicators to achieve the set goals, but not publicly available indicators for monitoring at the sector level. Performance indicators are defined in the Strategy for Education, Science and Technology.

Table 1 Key performance indicators of selected HEI's in Great Britain

Key performance indicators: Lancaster University (LU 2014**)**		
Teaching		
Input	**Output**	**Outcome**
UCAS points/Graduate entry standards Staff/student ratios Library/ISS expenditure Home/EU student numbers Overseas student numbers	Degree classes awarded Student Satisfaction Retention of students	Graduate track employment Alumni engagement
Research		
Input	**Output**	**Outcome**
Research student numbers Equipment condition and expenditure	Research degrees awarded Number of publications Research grant income Third mission income Percentage recovered of full economic cost	Citations per faculty International esteem Economic impact Technology transfer
Finance		
Input	**Output**	**Outcome**
Staff cost as % of total cost Non-HEFCE income per staff member	Cash generation Surplus Current Asset ratio Debt to income ratio	Credit rating Reinvestment in University activities
Staff		
Input	**Output**	**Outcome**
Posts filled at first advertisement Accidents at work	Staff satisfaction Staff turnover Sickness absence	Diversity
Estates		
Input	**Output**	**Outcome**
Maintenance spend as % of insured value Energy costs and consumption	Estate condition Quality of facilities	Environmental impact Staff and student satisfaction with facilities
Key performance indicators: University of Northampton (UN 2010**)**		
Student experience	*Financial sustainability*	
NSS Overall student satisfaction % Graduate Employability % Student Mix pt:pg:I Taught completion rate % Internationalization of the curriculum	% Cash flow from operating activities Pay costs as % income Reserves as % total income % School targets met Dependency on funding council income	
Intellectual capital	*Strategic partnership*	
Research and Enterprise income Investment in facilities (£FTE)	Community and Civic Engagement Private/public sector CSR	

Table 1 (continued)

Academic staff with Doctorates % SSR Academic subject areas/41	Access Philanthropic endowments (% turn)

Key performance indicators: City University London (CUL 2012)

Academic reputation—Position in Times Higher Education World University Rankings. The metrics it combines are: the learning environment, research quality and influence, industry income and international outlook (proportion of overseas academic staff and students).

Position in The Times Good University Guide. The metrics this table combines are: research quality, student satisfaction, student entry qualifications, quality of degree outcome and completion, student: staff ratio, graduate prospects and spend per student on services and facilities.

Financial performance—Surplus as a proportion of income (%)

Environmental performance—Classification in People and Planet Green League

Key performance indicators: University of Exeter (UE 2014)

Entry profile. 'A' level qualifications and the background of our entrants (school type, socioeconomic background).
Progression and achievement. The %'s of students progressing to completion and gaining a 1st or 2:1.
National Student Survey. The % of students highly satisfied/satisfied by the Exeter student experience.
Graduate level employment. The % of graduates gaining a graduate level job/further studies, six months after graduation.
Research quality. Measures of our research quality as determined by periodic national review.
Research income. Research income, per member of academic staff.
Research students. The numbers of active research students, per member of academic staff.
Postgraduate taught student population. The % of students who are on a postgraduate (Masters) program.
International student population. The % of students who are international fee payers.
Earned income. The % of income generated that does not directly relate to the State.

Table 2 Key performance indicators in HE system of Great Britain

Key performance indicators—sector indicators (HESA 2014)
1. Access/widening participation
2. Non-continuation/retention
3. Employment/outcomes
4. Research

Table 3 Key performance indicators of selected HEI's in Croatia

Indicators of performance strategies, University of Rijeka (UoR 2011)	
Field of studies and students	Field of scientific work and innovation
Number of accredited study programs The number of students per teacher The percentage of components and study programs who have completed the first and second cycle of quality assurance Percentage of full-time students who achieved in the first year 60 ECTS The percentage of graduates per generation Average time of graduation Number of programs with multidisciplinary contents The number of programs that are running in a foreign language Number of student-ECTS achieved through lifelong learning programs Average% of the study program that uses tools of e-learning	Number of PhD dissertations The ratio between research funding and the number of teachers Number of published articles cited in SC Rank of the University of Rijeka in the system SIR (SCImago Institutions Rankings) The number of doctoral students in full-time employment Number of research projects by fields of science Number of collaborative programs at the University Number of support to the University Annual plans for the popularization of science Number of teachers and students who participate in institutional organized popularization activities
Field of capacity—human, financial and material resources	Field of connection with the community and economy and adjustment with community needs
Share of assistants and research assistants in teaching staff The age structure of assistant professors at the University Established system and financial instruments for lifelong learning staff The three-year plan to raise the personal standard of all employees The ratio of the number of students and teachers The share of student-ECTS allocated through lifelong learning programs Persons who have completed a systematic training for management The share of own revenues in the budget of the University The budget of the University in EUR/student The share of capital investment in the best equipment	Number of joint research projects with industry and local community A number of studies, surveys and expertise for the needs of the economy Number of research projects in partnership with organizations and/or institutions of civil society Number of contracts for consulting services Number of protection of industrial property The share of revenues from the provision of services to the economy and the local community and revenues from intellectual property in total revenue The number of development projects realized in cooperation with educational institutions
Integration into the European Union, openness to the world and mobility	
Number of Framework (FP) projects at University Number and structure of joint studies at University Share of teachers and students involved in exchange and mobility programs	Share of own revenues in University budget achieved through programs of education and competence for life in EU Share of own revenues in University budget achieved through structural funds of EU

(continued)

Table 3 (continued)

Indicators of performance strategies, University of Rijeka (UoR 2011)	
Quality indicators of Civil Engineering in Osijek (Pinterić and Markulak 2013)	
The number of applicants compared to the number of students enrolled in the first year of study Total enrolment in the next academic year The number of graduates per year Employment after graduation The average length of study The average score of study The passing rate of prelim/examination The success of students transferring from university undergraduate to graduate studies	The number of students who have lost their student status The ratio of the number of teachers and students The share of the use of e-tools in teaching Number of staff publications State of equipment The number of field trips/student excursions/field work The percentage achieving signatures by subjects and studies
Performance indicators of program contracts funding of the University of Zadar (MSES 2012)	
Objective 1: Facilitate access to study and aid in studying for people with disabilities and students with lower socioeconomic status	Objective 2: Increase the number of people who have completed studies in STEM fields, and in the information and communication field and in interdisciplinary studies related to these areas
Signed an agreement with the county, local governments and civil society organizations for services for people with disabilities Provide a personal assistant for eight people with disabilities Removed architectural barriers and access for people with physical disabilities in the building Made analysis of the needs for special equipment for people with disabilities Made university form for students enrolling in the first year and next years of studies that examine the social profile of students to a variety of factors that influence the course of the study (e.g. Family financial status, education level of parents, disability, age, high school diploma, etc.) The completed university curricula at the beginning of the academic year 2013/2014. Created a database about the social profile of students of the academic year 2014/2015. Formed Fund for scholarships Defined criteria for obtaining scholarships that cover the cost of study Secured three major donors of the Fund Secured 15 student grants from the Fund	Launched one interdisciplinary undergraduate Made a proposal of graduate study program Prepared technical documentation for the construction of buildings of natural and technical sciences
	Objective 3: Facilitate access and quality assurance study for students older than 25 years
	Introduced quotas for the two places in the study program Prepared two lifelong learning programs Introduced quotas for students older than 25 years for the five people on the program of study for part-time students
	Objective 4: The internationalization of higher education institution
	Increased number of students, professors and administrative staff who participate in mobility programs (input and output) to 100 % (for 150 people) Held 12 international conferences, workshops and summer schools
Performance indicators of HEI's in Croatia (Budimir 2011, pp. 123–124)	
Financial indicators	Non-financial indicators
Recovery of costs Excess of revenues over expenses The realization of the plan by type of service A positive result	Progression in the professions Published papers Number of enrolled students The passing rate of students

Table 3 (continued)

Indicators of performance strategies, University of Rijeka (UoR 2011)	
Reducing liability	The quality of teaching
The execution of the revenue plan	The success of study
The gearing ratio of expenditures	Work efficiency
The execution of the plan by program	Capacity utilization
Implementation of the plan by source	Tracking the users' needs
Implementation of the plan	Valuation of processes and programs by users
Cover the cost of the investment in staff, premises and equipment	Customer satisfaction
Cost-effectiveness	Number of projects
Productivity	Effectiveness
Liquidity	

Table 4 Criteria for evaluating quality of higher education in Croatia

Criteria for evaluating quality of HEI's on the sector level (ASHE 2014)	
1. Criteria for evaluating the quality of higher education within the university and criteria for evaluating the quality of Polytechnics and Colleges: – Managing institution of higher education and quality assurance – Programs of Study – Students – Teachers – Education and research activities – Scientific Research and Projects – Mobility and international cooperation – Resources: professional services, facilities, equipment and finances	1. The criteria for judging the degree of development and effectiveness of the quality assurance system of higher education institutions (according to ESG): – Policy, mission, vision, general strategy of HEI/sub-strategies – Approval, monitoring and periodic review of academic programs and degrees of education – Scientific research – Assessment of students – Ensuring the quality of the teaching staff, his interactions, the impact on society of knowledge and contribution to regional development – Learning resources and support for students – The importance of access to information and the quality assurance system – Public information

3.2 Key Performance Indicators of Selected HEI's in Australia and Canada

At the global level, Australia and Canada, with the United Kingdom, are representing the country with the longest tradition and the most developed systems for performance measurement of higher education. HEI's in Australia in the last 10 years strongly contribute to the development of the Australian economy and have become one of the most important export products. The Australian

Government has therefore introduced a "market approach" to education. Universities are increasingly functioning as big companies, trying to attract substantial private funding, focused on monitoring costs and economic position in society. In these conditions, monitoring performance and quality assurance are becoming everyday and business imperatives of higher education institutions (Guthrie and Neumann 2007).

Measuring performance in Canada is seen as a mean of informing the public about higher education system, and is used as a tool for understanding and encouraging debate at the national level. Government institutions and performance indicators provide information important for the quality management and improvement system (HEQCO 2014). Their goal is to develop indicators that evaluate the system as a whole, and that at the same time is a good framework for the development of institutional indicators as a basis for evaluating their own performance. Both countries have developed sector indicators. In Tables 5 and 6 we are presenting indicators for Canada, while in Tables 7 and 8 for Australia.

3.3 Performance Indicators as a Basis for the Financing HEI's in Europe

Measuring the expenses without reducing the quality of public services is one of the imperatives in the financing of European higher education. Budget funds are still the major source of financing HEI's, but the ways of their allocation change. The tendency today's budgetary system is effectively allocate limited resources and track the success of achieving of set strategic budget goals. European countries are therefore increasingly using performance measurement as a key element of budget financing. Models of financing and key performance indicators that accompany them are different in European countries. The use of program contracts is given in Table 9. Institutions of higher education funding are usually granted through the so-called blocks support. The amount of funds to be awarded to a higher education institution is conditional on the negotiation process, historical reasons or formula used for distribution. Regardless of the chosen model, funding is based on the measurement and monitoring of performance. Institutions of higher education shall conclude with the relevant ministries program contracts which include agreed targets and indicators to monitor their achievement.

The most important performance indicators applied in program funding of higher education in Europe (Estermann et al. 2013) are: the number of enrolled bachelor, number of the masters enrolled, number of doctoral graduates, the amount of EU/international financing, the amount of external financing, the number of graduates master's degrees, research evaluation, the number of bachelor graduates, number of credits, the number of doctorate students, number of employees, research contracts, international students, doctoral dissertations, scholarly activities, successful patent applications, an indicator of diversity, international employees, the

Table 5 Key performance indicators of selected HEI's in Canada

Key performance indicators: University of Calgary (UC 2013)	
Ratio of applicants to student intake Average entering grade from high school Student mix (graduate proportion of total enrolment) Student mix (international enrolment) Student to faculty ratio (total) Student to faculty ratio (graduate) Postdoctoral fellows	Sponsored research revenues (total) Sponsored research revenues (per tenure and tenure-track faculty member) Tri-council revenue (total) Tri-council revenue (per tenure and tenure-track faculty member)
Publications (total) Publications (per tenure and tenure-track faculty member) Citations (total) Citations (per tenure and tenure-track faculty member) New invention disclosures New licenses	Undergraduate student engagement Graduate student engagement Graduate satisfaction Degrees awarded Employment rate
Employee engagement Fundraising Financial health (endowment balance) Financial sustainability (unrestricted net asset) Financial sustainability (facilities condition index) Sustainability (Sustainability Tracking, Assessment and Rating System (STARS))	Teaching Undergraduate retention rate Graduation rate Time to completion
Key performance indicators: Ryerson University (RU 2014)	
Strategic direction	*Financial capacity*
Satisfaction with Overall Quality of Education Received at Ryerson National Survey of Student Engagement: Benchmark Summary Scores and Comparisons Applications : Registrants Ratio Mean Entering Average from Secondary School Scholarships and Bursaries as Share of Total Operating Expenditures Percentage of Students Retained from Year I After 1, 2, and 3 Years of Study MTCU Graduation Rate CSRDE 6-Year Graduation Rate and First-Year Retention Rate MTCU Employment Rate: 6 Months and 2 Years After Graduation Percentage of Faculty with Doctoral Degrees Value and Number of Peer-Adjudicated Research Grants per Eligible Faculty Member	Operating Deficit/Surplus as a Percentage of Operating Revenue Total Liabilities as Share of Total Assets Long Term Debt per FFTE Student Endowment per FFTE Student Ryerson University Endowment Fund Effective management Student : Faculty Ratio Faculty Turnover Rate Staff Turnover Rate Staff : Faculty Ratio Student : Staff Ratio Actual Space Inventory versus Space Guidelines Calculated by Council of Ontario Universities Facilities Condition Index (Deferred Maintenance/Current Asset Value) University profile Percentage of Alumni Who Made a Donation to University Annual Number of Non-Alumni Donors Annual Level of Donation Commitments

Table 5 (continued)

Total External Research Funding	Annual Level of Donations Received
Library Expenditures as Share of Total Operating Expenditures	Media References to Ryerson: Newspaper Clippings, Newspaper Impressions and Broadcast References
Library Expenditures per FFTE Student	

Table 6 Key performance indicators in HE system in Canada

Key performance indicators—sector indicators (HEQCO 2013)
1. Access
2. Quality
3. Productivity
4. Social

percentage of employed graduates, space, impact on the community, patent applications, place on a national scale, a place in the international rankings.

3.4 Conclusions of Conducted Analysis

Based on the analysis of institutional and sector key performance indicators of selected higher education institutions and countries the following was concluded. Higher education institutions define key performance indicators based on the strategic goals of the activity. Sector indicators, if any, significantly affect the definition of institutional performance indicators. The number of performance indicators at the level of institutions somewhere is too large (preferably there should be about 20 defined indicators).Higher education institutions define the financial and non-financial performance indicators. Indicators are classified in the area of monitoring, with the most common areas defined as: students, teaching, scientific research and finances. Results of measuring performance are published in the annual reports on performance. In the annual reports, stating indicators provide information on the method of calculation and sources of information. Defined indicators used for benchmarking (comparison over the period, with target sizes and other similar institutions).

Indicators that are commonly defined as: students' satisfaction with teaching, teacher/student ratio, student mix, retention rate in the study, exam results, employment after graduation, number of publications, scientific advancement, income from research, expenditures for capital investments.

Selected institutions are examples of good practice performance measurement. Selected countries: Great Britain, Australia and Canada are examples of good practice in defining and monitoring of sector performance indicators. Croatia, despite taking the ESG standards and thus has committed itself to defining and

Table 7 Key performance indicators of selected HEI's in Australia

Key performance indicators: The University of Western Australia (UWA 2013)	
Education	*Research and Research Training*
Student satisfaction on the Course Experience Questionnaire Course completion rates Student pass rates Graduate employment outcomes Proportions of top school leavers enrolled Access rates for designated equity groups Expenditure ratios	Research grants Publication rates Higher degree by research completions Higher degree by research student satisfaction
Key performance indicators: Curtin university of technology (CUT 2012)	
Teaching and learning	*Research and development*
Effectiveness: Employment and Study Destinations of New First Degree Graduates Perceived Course Quality—Australian Graduate Survey Perceived Teaching Quality—Curtin eVALUate Unit Survey Subject Load Pass Rate Efficiency: Teaching and Learning Expenditure per Equivalent Full-Time Student Load (EFTSL) and as a Percentage of Curtin Total Expenditure Teaching and Learning Expenditure per Successful EFTSL Graduate Productivity Rate—Course Completions per 10 Full-Time Equivalent (FTE) Academic Staff Commencing (First Year) Bachelor Degree Retention	Effectiveness: Growth in Research EFTSL Institutional Grants ($) Ranking Total Research Income ($) Ranking Cooperative Research Centre ($) Ranking Research Publication (weighted Higher Education Research Data Collection (HERDC) points) Ranking Efficiency: Research Funding per Research Staff (using Research Performance Index database) Weighted Research Publication per Research Staff (using Research Performance Index database)

Table 8 Key performance indicators in HE system in Australia

Key performance indicators—sector indicators (AU 2014)
1. The University Experience Survey, measuring satisfaction of current students
2. The Graduate Outcomes Survey examining labor market outcomes of higher education graduates
3. Employer Satisfaction Survey to assess the generic skills, technical skills and work readiness of graduates

monitoring key performance indicators, still has not implemented those indicators at the national level. At the institutional level is usually accompanied by indicators of execution strategies. Information about key performance indicators, if defined, is not publicly available.

Table 9 The use of program contracts in Europe

Program contracts existing	Austria, Belgium—French-speaking, Germany, Denmark, Estonia, Spain, Finland, France, Iceland, Italy, Latvia, Netherlands, Portugal, Sweden, Turkey, Croatia
Program contracts do not exist	Belgium—Flemish-speaking, the Czech Republic, Hungary, Ireland, Norway, Poland, Slovakia,

Source: Estermann et al. (2013), MSES (2014)

These conclusions will be used in creating our own model on the example of a HEI in Croatia.

4 Development of Performance Indicators in the Case of Higher Education

4.1 Selecting and Defining Performance Indicators

Based on the analysis of need for performance measurement in the function of monitoring the quality and efficient business management, and analysis of the current state of monitoring the performance of the elected institutions, the following shows the selection and definition of performance indicators for one HEI in Croatia.

The assumptions underlying the selection of indicators are following: HEI operates as a public institution in Croatia, HEI is engaged in teaching and scientific research, an analysis of the internal and external factors was made, the mission, vision and strategy of the HEI was defined, programming contract is in line with the strategy of HEI, the information needed to calculate the indicators are available at the HEI, key performance indicators are used to monitor the quality and strategic business management of HEI, collected information are presented to internal (students, staff, administration) and external (university, agency, department, public) system stakeholders, measurement results are used to make business decisions of various interest groups, but they are not the only source of information and they should be supplemented by the necessary quantitative and qualitative data.

In order to cover a wide range of activities through monitoring the performance HEI propose a definition of indicators through four areas: teaching process, teachers, professional and scientific research, resources. Quality assurance and internationalization as a component of performance monitoring are spread across all four areas. Proposed model by authors is given in Table 10.

On example of HEI authors have selected 20 key performance indicators that provide interested users with information about the quality of the HEI. Number of indicators may differ, as well as areas of measurement, depending on the interests of stakeholders. In order to make measure successful it is necessary to describe each indicator, its purpose and objective method of calculation, method of collection and

Table 10 Model for performance indicators

Performance indicators of teaching process area are related to the quality of university programs, satisfaction and achievement of students. Key performance indicators are: 1. Students' satisfaction with the programs and teachers. 2. Progress through the program. 3. The average duration of study. 4. Structure of students (student mix). 5. Students' satisfaction with the programs and teachers. 6. Ensuring the quality of study programs (revision).	Performance indicators of Teachers area cover qualifications, advancement and development of teachers as the most important educational resource. Key performance indicators are: 1. Student teacher ratio. 2. Number of advancement in rank. 3. The number of realized incoming and outgoing mobility of teachers. 4. Percentage of plan development for teachers. 5. The number of award-winning teachers.
Professional and scientific research is closely linked with the quality of teaching and teachers' work in this area and contributes positively to the quality of the teaching process. Key performance indicators are: 1. Number of publications per teacher. 2. The number of contracted projects per teacher. 3. Revenue from professional and scientific-research work per teacher. 4. Number of scientific advancement of teachers.	Area Resources includes monitoring of physical resources (space, equipment, financial resources, etc.) and human resources (teachers, administration, etc.). Key performance indicators are: 1. The proportion of own revenues in total operating revenues. 2. The cost per full-time student. 3. Space for education per student. 4. Coverage of teaching content in the recommended reading. 5. Satisfaction with administrative services.

sources of information, reporting deadlines, availability and way of presenting the results. For management purposes it is important to specify the measures that should be taken into consideration in order to increase the success of the HEI. The way of defining is shown in Table 11, on the example of indicator called Students' satisfaction with the programs and teachers.

4.2 The Use of Performance Indicators in Monitoring and Improving the Quality of Higher Education Institutions

Once defined, performance indicators can be applied in several areas that contribute to the quality of higher education at institutional and sector level. The use of indicators is particularly useful in: (re) accreditation, internal and external judgments of quality, comparing (benchmarking) the quality of institutions, business decision making, reporting, program planning and funding of HEI. The significance, the use and interpretation of indicators in these processes varies, depending

Table 11 Description of performance indicator

Type of information	Description
Description of indicators	Collected information about the satisfaction of students about courses, programs, studies and teachers.
The purpose of the indicators	Investigate the satisfaction of students in order to monitor the strengths and weaknesses of the study programs and HEI as a whole.
Data sources	Student survey was conducted
Data collection	The collection of information by student kiosks and/or entering the planned survey forms by the students, processing and analysis of student satisfaction with the course in the study, the teacher and the institution as a whole.
Deadlines	Survey at the end of each semester, reporting on a semi-annual and annual basis.
Responsible persons	A survey carried out through student service, processed by department heads, feedback by Vice-Dean for Education.
Availability of results	Management, all interested stakeholders.
The way of presenting results	Results satisfaction about teachers is published separately and anonymously for each teacher on page of HEI. Results about satisfaction of programs and teachers at the level of institutions are published in the annual report on key performance indicators on the website of HEI.
Measures to increase satisfaction with programs	The introduction of new ordinary and/or elective courses, better availability of literature, etc. as needed.
Measures to increase the satisfaction with teachers	Teachers' observations on the reasons that have led to poor perception of teachers by students and an action plan to improve efficiency.

on the objectives and tasks of the procedure itself as well as national goals and values of higher education.

(Re) accreditation is a process of external assessment and audit quality study programs that confirms that the institution meets the appropriate standards, thereby allowing it to be recognized among the stakeholders system (The Croatian Parliament 2009). The process of re-accreditation in Croatia is done by the Agency for Science and Higher Education (ASHE), on the basis of laws and regulations (MSES 2010). The basic document for assessing the quality is the Self-evaluation, which HEI has to compile in according to the instructions of ASHE. In the process of self-evaluation it is required from HEI calculating the set of performance indicators, such as: progress through the program, the ratio of student/teacher, employment after graduation,[1] teaching content coverage with required reading and others. By comparing the results of performance measurement with the specified standards and other similar institutions, competent Ministry's is bringing decision on issuing licenses for performing activities of HEI. HEI's that continuously monitors its

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[1] It is an indicator on which HEI's have little influence and because of that it should be avoided since it doesn't represent only the quality of HEI but also the total country economy.

performance indicators can be detected in time of weakness and implementing improvement measures to ensure compliance with the predetermined minimum quality criteria.

HEI's in Croatia must have a system of measures and activities to ensure their accountability for performance and achievement of quality outcomes of educational and scientific activities (Croatian Parliament 2009), so-called quality assurance system (QAS). Evaluation of the degree of development and efficiency of QAS is carried out by the institution itself (internal audit) and ASHE (external independent periodical assessment of the internal quality assurance system—audit). With QAS judgment it shall be determined whether the activities and results of the activities that make up the system of quality assurance of higher education institutions are effective and in accordance with national and ESG standards, and it estimates contribution to the continuous improvement of quality and culture of education in the institution (ASHE 2010). External and internal audit of QAS is using indicators of performance such as: completing the audit programs of study, the percentage of plan development for teachers, etc., in order to compare achievements of HEI with defined criteria (ASHE 2009). Results efficiency measurements are used in the procedures of continuous quality improvement that HEI carries out.

Performance indicators have a very important role in comparing (benchmarking) institution quality with other similar institutions, the higher education sector as a whole, the targeted (default) values and through time. Benchmarking indicators such as number of publications per teacher, the number of contracted projects per teacher, average duration of studies and others allows HEI to evaluate its performance, identify its strengths, weaknesses and areas for improvement and for better decisions making (Pollard 2013). Performance indicators enable benchmarking at institutional and national level. At the institutional level comparison of quality boost competitiveness and competition between institutions. At the national level indicators allow evaluation and ranking of the HEI. Competitive bidding between HEI's has a positive impact on increasing the quality of university programs.

Higher education institutions that want to survive in the competitive environment that is established by the internationalization of the higher education, must provide high quality services at the lowest cost for taxpayers. For a successful and balanced management of the HEI, public managers need information on costs, prices of services, implementation strategy, program goals, methods for measuring performance of the program, financial and non-financial indicators and others (Budimir 2011). Indicators such as: satisfaction of students and teachers, programs, progress through the program, the average duration of study, employment after graduation, etc. help managers in making complex decisions about the performance of their programs, the necessary investments and improving the quality of existing and new study programs.

Indicators tracking incoming and outgoing teacher's mobility, student's structure, the number of scientific advancement of teachers, etc. are a good basis for the preparation and presentation of reports about performance. Reports about performance can be presented to different groups of internal and external stakeholders, as a basis for making business decisions, but also as the presentation of success in

order to promote the institution. Reporting about the selected set of indicators, which are relevant for national goals, provides state policy makers with useful business information (Pollard 2013).

To ensure responsible and purposeful use of the limited budgetary resources, in accordance with the objectives for the development of higher education in Croatia, activities of HEI's are financed through funding agreements. The implementation of selected institutional and national objectives, defined programming contracts, is monitored by performance indicators. Being one of the national objectives is Acquisition of qualifications in the period anticipated through study program (MSES 2014), indicators such as: progress through the program, the average duration of studies and similar, could be applied in order to monitor and improve the quality of higher education. Higher education institutions that achieve exceptional results, visible through indicators, in addition are financially rewarded, which represents a very concrete incentive for institutions in order to be responsible and to promote quality.

5 Conclusion

The interest in measuring the performance of HEI's in Croatia is being driven by political and economic changes in Europe, by the internationalization of higher education and by the need to provide quality teaching and effective management of restricted resources. Institutions of higher education have the institutional autonomy, but state at the same time is asking for more transparency and accountability in their activities. In order to successfully respond to a series of external and internal challenges, higher education institutions define performance indicators as a basis for measuring and monitoring the performance of all institutional processes. The information provided with indicators show the level of realizing strategic goals and institutions of higher education as a whole and are therefore of utmost importance for monitoring the performance of higher education institutions. The use of performance indicators at institutional and national level is broad. Indicators allow and contribute to a simpler evaluation of the quality, comparing and ranking of higher education institutions, their better competition in the market of higher education, recognizing strengths and weaknesses, making quality decisions and strategic management, constructive dialogue on the mode of financing, the mobility of students and teachers, transparency and accountability towards public.

However, the development of indicators is not a simple but a very demanding and complex task for several reasons: indicators should provide relevant information to the numerous stakeholders in the system (students, teachers, administration, budget, general public), and their interests are not consistent, measurement of the performance requires sound and complete information that are often hard to reach and scattered through the entire system, performance indicators should enable a comparison between the institutions, which requires unification of models and ways of measuring, results of performance measurement should be the basis for

improving quality, when defining the indicators it should be taken into account quality standards, the development strategy of the institution, the surrounding conditions and a number of other internal and external factors.

Based on the analysis of selected higher education institutions of Great Britain, Australia, Canada and Croatia, the paper defined model for monitoring performance through four groups of indicators. This model can be used in every institution of higher education for the development of indicators and mechanisms in their own terms and conditions. Of course, for the evaluation of the quality and performance only results of key indicators cannot be taken into account but they must be combined with other quantitative and qualitative data, which depend on the needs of stakeholders. Since the key performance indicators are not defined at the level of the higher education sector in Croatia, and the paper has shown the need for that, it is expected that this paper will contribute to the discussions on measuring performance of institutions of higher education at institutional and national level.

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Environmental Accounting as Information Support for Ecological Controlling

Farida Yerdavletova

Abstract The article reveals the essence of environmental accounting and environmental controlling, as well as to identify and consider their relationship. The field of study is environmental accounting as information provision processes controlling areas. The purpose of the study is to reveal the relationship of environmental accounting and controlling. The study was conducted with the use of general scientific methods: observation, comparison, abstraction, analysis and synthesis. Environmental accounting is an independent direction in comparison with accounting statements and its widespread adoption will allow users of natural recourses to enhance the ecological protection activities and implement informational support of environmental controlling. The development of environmental l accounting within information support of ecological controlling will provide an opportunity to correctly plan, control, analyze, forecast the environmental costs, more accurately determine the economic efficiency of environment protection and nature restoration activities, evaluation of economic damage caused by pollution of the natural environment, representation of reliable and accurate information to investors and auditors in respect to the natural environment components of the economic entity.

Keywords Accounting • Environmental management • Financial reporting

1 Introduction

Political and economic reforms in many countries lead to the need to change organizational and management approaches to management. The main criteria of management efficiency is becoming the company's competitiveness and flexibility of management relative to requirements of the market. The external environment of companies is characterized by extreme instability. Rapid changes in the external environment forces the enterprises to become more complex systems.

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Manageability of these systems requires new methods corresponding to the complexity of the external and internal environment of companies.

A new trend in management is the development of controlling as functionally independent direction of economic activity in the enterprise. Controlling linked with the implementation of the financial and economic commenting function in management that provides operational and strategic decision-making. As an information security management solutions are the primary documents, accounting records and financial statements for the accounting activities of the company.

However, many of the economic, organizational, methodological and analytical aspects of regulatory accounting and reporting in the controlling system, the scientific literature is relatively uncharted. Consequently the relevance of studying such aspects of accounting is high. Many aspects of the economic have an impact on management decisions.

One of them is the environmental aspect of the business. At the same time economic sciences still weakly studied this aspect. Underestimating environmental factor was one of the causes of global conflict of man and the biosphere. Currently, environmental issues are considered in several aspects: economic, social, political, etc. In this case concepts such as ecology, economy, environment and its control of society and accounting are closely linked.

2   Modern Type of Economic Development and Environmental Problems

Nowadays, many countries face the problem of protecting the environment and promoting economic development. Any economic development is based on three factors: labor recourses, capital goods and natural recourses. In recent years, the natural factor became very limited. The modern type of economic development can be defined as a technogenic type. This kind of development is based on the use of artificial means of production, created without environmental restrictions, thus, carries a destructive nature. This lead to a fast depletion of non-renewable types of natural resources (fossil minerals) and overexploitation of reproducible recourses (soil, forests and etc.) with the speed greater than the possibility of recovery.

Furthermore, this type of economic development is characterized by large variety of external effects, leading to negative environmental and economic impacts for economic activities, which unfortunately, are not taken into consideration by subjects of this work. One of the reasons for modern ecological problems can be in the fact that the founding fathers for economic thought, such as Smith, Ricardo, Marx, Marshall, Keynes did not pay attention to the environmental economic development and natural factors. Only in 1970s of the twentieth century, when ecological problems deteriorated sharply, a question on the development of radically new concept rose before economics science.

Today, there are two main models for technogenic type of development: frontal type and model for environmental protection. The first model, essentially, does not consider the role of natural resources and highlights factors for economic growth, such as labor and capital, while ignoring the impact from economic development (environmental degradation and resources) and its opposite effects on the condition of labor resources and quality of life. On the other hand, a model with ecological factor has appeared recently. Based on the model for environmental protection, there were created the governmental structures related to the protection of nature, actively developed legislation for the protection of environment and procedures for the use of natural resources.

3   The Increasing Role of Environmental Accounting

In making strategic decisions, taking into account the natural factor, important role is given to accounting. Until the late 1980s of twentieth century, accountants stood aside while the questions regarding the protection of environment had been discussed. The main tool to introduce the given situation became the development and implementation of environmental accounting.

In the modern world, environmental accounting becomes a fast developing and growing area of science. Serious attention is given to these problems at the national level in order to get "clean" gross national product (GNP) and other macroeconomic indicators, taken into consideration the external effects. Also, special attention is given at the level of individual companies and corporations. At present, there is a substantial amount of suggestions; many different models are proposed in regard to environmental accounting, effective approaches are developed to detail and give full environmental costs of companies.

There are following known accounting models: national income accounting (registration at the government level, beneficial to external user of information), financial environmental accounting (at the level of company, department, service line and systems; for internal user of information). In the last few years, particularly relevant has become the environmental accounting in the general system of accounting and reporting, which greatly expanded the range of its users.

Currently, environmental accounting considers as a separate direction in accounting, it divisions into ecological financial accounting and ecological management accounting. Reporting on environmental indicators will allow at the level of companies which use natural resources to activate practical environment oriented work and carry out information support for ecological controlling (Fig. 1).

Moreover, the first guide (recommendation) for accountants stated what should be presented in the financial reports in order for users to see the real picture of the impact from economic and business activities on the environment. Also, it was established in 1991 by the intergovernmental working group of experts by international standards of accounting and reporting.
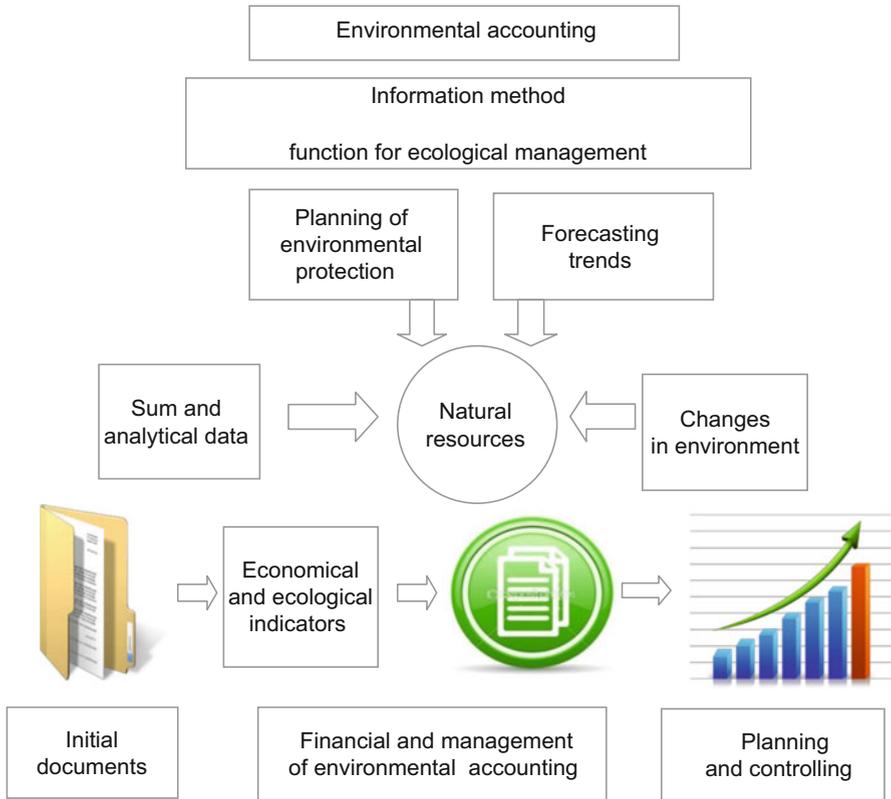
Fig. 1 Environmental accounting as an information method

Main reasons for the issues connected with environmental protection should be combined into corporate account by the following. Company's account has to reflect its relation to the environment protection. Also, accounts should reflect the impact of environment-related costs, risks and responsibilities/liability on the financial condition of the company. Investors to make investment decisions must have information on the level of ecological events and expenditures related to ecology protection. This contributes to a correct assessment of commercial effect and choice of marketing strategy.

Questions on nature protection activities are the subject of management: managers need to identify and allocate environmental costs so that products are properly assessed and investment decisions are based on real costs and benefits. The main tools of environmental management are: ecological expertise and evaluating the impact on the environment; environmental auditing; environmental monitoring; environmental certification; environmental reporting; environmental monitoring.

Businesses can use ecological compatibility of its products in competitive activity, proving that their products and services more preferable from an environmental point of view. It promotes the growth of demand for products, and

ultimately improve the company's profitability. Environmental accounting is the key to become effective by international term. In this case, environmental accounting shows the company's attitude to environmental issues (Serov 2000).

4 Definition and the Process of Formation of Environmental Accounting

In the Republic of Kazakhstan, the process of formation of environmental accounting is currently at its initial stage. While in other countries, such as Germany, Netherlands, UK, USA and others, there are already examples for using the system of environmental accounting, widely known rule for ecological management which states that 20 % of industrial enterprises carry on the responsibility for the 80 % of environmental costs (IFAC 2004).

This means that in certain types of companies, the systems of environmental accounting have to become mandatory. First of all, large companies which mine and process natural resources and fulfill the requirements of multiple number of laws and instructions in the field of environmental protection.

Furthermore, environmental accounting in most CIS countries is not yet regulated by national legislation. Despite this, many Russian and Kazakhstan scientist and researches have devoted many works for studying environmental accounting and ecological reporting.

At the same time, many economical, organizational, methodological and analytical aspects of environmental accounting and reporting in the system of controlling stay not enough developed area of financial, economic and administrative activity.

Primarily, it can be noted that there is no consistent terminology in determining the given concept. Most of the authors, associate environmental accounting with accounting for environmental protection and at the same time, contribute different meaning. For example, according to Bartolommeo (1997) in environmental accounting, from the national income point of new, includes inventory of natural resources and financial costs resulting from decreased quality of the environment and calculations of genuine or as many say "green" gross domestic product. At the corporate level under environmental accounting, methods should be defined as the combination of internal management accounting, financial accounting for external reporting purposes, as well as cost-benefit analysis for the actual performance.

Also, there are other definitions for environmental accounting occurring in the economic literature. Shapiguzov and Schneidman (1997) define environmental accounting as a system of accounting for environmental protection activities, taking into account that in general, system of accounting for environment protection activities in an organization has to include four main components: accounting for environmental protection costs, inclusion of ecological obligations, reports on environmental protection activities and audit of relevant information.

At the level of national accounting, given concept often interpreted as the account, belonging to physical reserves of natural resources to the valuation of environmental degradation and corresponding costs for ecological protection, as well as to the calculation of real gross domestic product. Whereas, at the level of a company, accounting for nature protection activities has to be used in the context of methods for internal (management) accounting, financial accounting for the purposes of external reporting, and analysis of physical flows of raw materials by the method "cost and issue" (Seilova 2003; Yerdavletova 2013).

In a broader sense, the environmental accounting can be understood as informational method and at the same time, function for ecological management. This usually associates with inclusion of natural resources, which, in fact, most of the time is defined as sum and analytical data on the quantity and quality of available resources in order to organize its rational use, planning of environmental protection, forecasting trends in different fields of natural resources and changes in environment.

If to imagine a company by a traditional method, as a set of management and controlling subsystems, then, it is possible to trace the following information chain. Economical and ecological indicators, received from the initial documents or other connection channels, are grouped and summarized into subsystem of financial and management of environmental accounting. After, it is used to analyze business activities, planning, forecasting and controlling (internal and external audit).

This information serves as the basis for administrative and management decisions, in turn, influencing the controlling subsystem, leading it to a new quality and creating new information flow which is needed for grouping and summarizing. Moreover, environmental accounting is directed at developing and updating information models, allowing on the basis of indicators system, objectively to evaluate the level and content of environmental protection activities of a company for reporting period. In dynamics, this reveals the influence of economical and ecological processes for financial and business perspectives for functioning enterprise.

Unlike other types of accounting, environmental accounting is regulated by maximum and the priority is given to in-house needs. For consideration of environmental accounting in the context of information support for controlling, in my opinion, should be used ecological controlling. Let us first consider what is controlling.

5 Controlling Model and Its Tasks

Controlling—a separate line of economic work in the enterprise associated with the implementation of economic and financial management functions for operational and strategic management decisions. The concept of controlling comes from the English (to control)—to control, manage. In the English-language sources, the term controlling is almost never used. In the United Kingdom and the United States uses

the term management accounting. Actually, the term controlling adopted in Germany.

The report Chartered Institute of Management Accountants (CIMA) notes that the current practice of control in German—a term that is usually translated into English as Managerial Accounting. Report considers contemporary practices of German controlling—a term which is usually translated into English as management accounting.

It examined the management accounting systems of three companies and their relationship with the companies' competitive strategies, organizational structures, computerized information systems and external reporting. German controlling has developed in very different ways to management accounting in the UK. The different education and training of German controllers, and the absence of a CIMA style professional body can result in variations in management accounting practices and interpretations.

Potential confusion can arise when translating management accounting terminology from German to English, and English speaking accountants should take care when interpreting financial reports in German (Robert et al. 2014). In Kazakhstan, the term controlling and its development activity acquired only at the beginning of the twenty-first century. Its main tasks are presented in Fig. 2.

It should be noted that the development of controlling in Europe and the US is opposed to the tasks of controlling. Table 1 shows a comparison of the features of American and European (for example, Germany) models controlling.

As can be seen from the table the American model includes whole accounting, reporting, and a number of additional functions. German model includes only internal accounting and reporting, as well as a number of additional functions. There are also differences in the functions performed by controlling service. So in the American model, these features include: audit, tax, insurance and data processing on a computer.

In the German—there is no such problem as revision. The German model, in contrast to the American model considers that the accounting balance and the development of activities refer to the controlling service. This once again confirms the link between accounting and controlling.
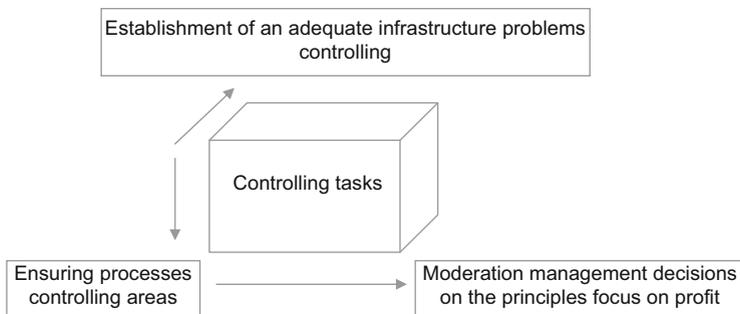
Fig. 2 "Cubes" elementary tasks of controlling. Source: Shigaev (2012, p. 28)

Table 1 Comparative characteristic of the American and European models controlling

American model	German model
Controlling	Controlling
Planning	Planning
Information management and reporting	Information management and reporting
Special economic problems, such as evaluation of investment projects	Special economic problems, such as evaluation of investment projects
Internal accounting	Internal accounting
Financial bookkeeping	
Taxes and Insurance	
Information Technology	
Internal audit	

6   Accounting Approach in the Methodology of Controlling

Controlling the system acts as a study assessing the full range of financial and economic performance of the company, based on the expansion of the information in its various aspects and its determining factors of the elements and their learning in a variety of cause-and-effect relationships and dependencies. It is an analytical and monitoring tool that focuses on optimizing and improving the efficiency of management decisions.

The set of techniques, tools and methods of purposeful research on the state of objects to scan in accordance with the objectives is the method of controlling. Accounting approach to the implementation of the method of controlling system examines compliance with the principles, methods and techniques of accounting, check speed, balance accounts, the validity and reliability of operations, analyzes the main indicators of financial and economic activities of the company.

In validating input indicators, it is necessary to use special analytical procedures for identifying patterns and quantitative relationships between key factors of production and determine the quantitative significance of individual factors in the formation of the cost of production. Management of production costs the company is in the process of implementing a complex accounting management accounting and controlling them using typical methods. The data management accounting acts as an information base of controlling. It is therefore very important to ensure the implementation of controlling their close relationship.

7 The Relationship Between Environmental Accounting and Controlling

The definition of environmental controlling has appeared in the last 10–15 years and has been developed in works such as Pakhomova et al. (2003) and Panova and Ravikovitch (2008).This concept is related to new informational and analytical instruments of ecological management and dedicated to internal fixation and analysis of environmental results. This formation is related on one hand, with development of controlling functions in the practice of business management and on the other hand, with the necessity to integrate and systemize different information flows which can be used in the system of ecological management, as well as in search for adequate tools and mechanisms.

Most experts define ecological controlling as the system for managing process of achieving the end goals and results for environment security of the companies. In my opinion, the most complete interpretation for environmental controlling can be done as following: the support system of management in the field of environmental protection on the basis of data from the system of ecological accounting, primarily aimed at analysis, planning, control, coordination and development of recommendations for making management and administrative decisions.

This conclusion follows from the fact that the method of controlling laid accounting approach.

The main purpose of environmental controlling has to be the system of information integration, analytical, instrumental and methodological support for management, which allows making optimal or better decisions related to environmentally directed activities of an organization.

In the essence of environmental controlling lies collected information about the level of pollution of controlled natural environment and the subsequent processing of complex information in order to form a complete picture of the environmental situation. The information system on all environmentally important processes occurring at the enterprises lies in the basis for further effective environmental management. In this case, information from the past, present and future process is needed.

To ensure the provision of such information in the company, institutionalized information system is used and it is expressed in the accounting and performance system. In other words, the regulation of production processes presents a problem of insufficient information security. Environmental controlling has to provide, firstly, the information about consumption and deficiency of resources, about used materials (raw materials, auxiliary materials), potential risks and emission from production.

Based on the nature of environmental accounting and proposed definition of ecological controlling, it can be concluded that the basic information for the system of ecological controlling comes from the system of environmental accounting. It includes ecological financial accounting and environmental management accounting, as well as reporting on environmental indicators and ecological audit.
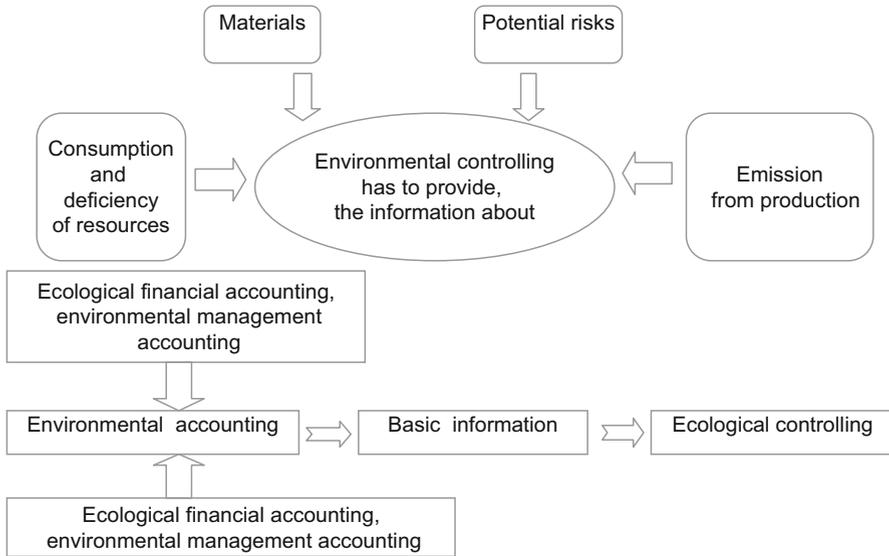
Fig. 3 The relationship of environmental accounting and environmental controlling

Moreover, environmental management accounting is an internal function of an organization, unlike financial accounting; it represents standardized account information that includes ecological aspects in the form of accounting statements for external users. In contrast to the financial environmental accounting, the management environmental accounting resists the level of legalized regulation (Fig. 3).

8 Conclusion

Environmental accounting is an independent direction in comparison with accounting statements and its widespread adoption will allow users of natural recourses to enhance the ecological protection activities and implement informational support of environmental controlling. The development of environmental accounting within information support of ecological controlling will provide an opportunity to correctly plan, control, analyze, forecast the environmental costs, more accurately determine the economic efficiency of environment protection and nature restoration activities, evaluation of economic damage caused by pollution of the natural environment, representation of reliable and accurate information to investors and auditors in respect to the natural environment components of the economic entity.

In this regard, the relation between environmental accounting and natural environmental controlling is obvious. In addition to abovementioned links, there are also important links between ecological controlling and the system of ecological management, environmental auditing and financial reporting. It is clear, that the

system of environmental controlling and these systems have to be compatible, complementary and mutually supportive to one another. I believe that a thorough study and research of environmental controlling may be the goal for a separate academic discipline.

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Inspection Results on the Quality of Auditing

Lajoš Žager, Sanja Sever Mališ, and Mateja Brozović

Abstract Financial statements auditing is conducted in order to protect public interest. In order to achieve that, it is necessary to establish the trust in auditor's work. One of the quality control mechanisms are the inspections over the auditors and auditing firms performed by an independent authorized institution. Following that practice, the Croatian Audit Chamber is performing the inspection of auditors and auditing firms since 2010. The aim of this paper is to compare the results of inspections carried out in Croatia with the results in the selected European countries. The reports on audit inspection show that there is still room for improvements in terms of the audit quality. The conclusions of the research point towards the lack of auditor's professional scepticism with regard to the statements of management. This refers to the importance of professional scepticism in audit fields which are exposed to increased risks in the context of the financial market and global economic crises. According to the experience of selected countries, the inspections that were carried out by an independent professional body have increased the quality of the performed audits. However, there are clear suggestions that there is still plenty of space for significant improvements.

Keywords Auditing • Audit quality • Control mechanism • Inspection results

1 Introduction

An annual audit should be conducted by an independent, competent, and qualified auditor, in order to provide an external and objective assurance to the board and the shareholders that the financial statements fairly represent the financial position and performance of the company in all material aspects (Sever Mališ et al. 2012). The degree that users can rely on the audited financial statements depends on the quality of auditing. This issue has become the centre of consideration after the worldwide financial crises. The role of auditors in the financial crises has been analysed in

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detail and there have been identified many problems affecting the quality of statutory audits. As a consequence of identified problems and the importance of financial reporting for capital markets and their stakeholders whose decision making process should be based on the high quality information, the audit quality question is a current issue among many professional organizations, regulators, investors and audit firms. In order to assure high quality audit, the European Directive on statutory audits of annual accounts and consolidated accounts (European Parliament and Council 2006, 2014) defines that each EU Member State shall establish a system of public oversight, with public oversight entrusted to a special body independent of the profession.

2 The Regulation of the European Union: External Quality Assurance Systems

In May 2008 the European Commission has introduced Recommendation on External Quality Assurance for Statutory Auditors and Audit Firms Auditing Public Interest Entities (European Commission 2008). These recommendations are the consequence of international efforts to introduce external system for quality assurance of auditing that is independent from auditing profession and where oversight is conducted by the members who are not included in auditing practice.

The recommendations use term authority of public oversight that is responsible for implementing independent quality assurance systems for statutory auditors and audit firms conducting an audit of public interest entities. Besides that, it is recommended that Member States should not designate as a public oversight authority any association or body affiliated with the accounting or audit profession.

Authority of public oversight should be responsible for tasks related to the execution of the inspections, which can be delegated to another appropriate body provided that the accountability of such body to the public oversight authority is ensured and that the latter retains at least the following responsibilities: (1) approval and amendment of the inspection methodologies, including inspection and follow-up manuals, reporting methodologies and periodic inspection programs; (2) approval and amendment of inspection reports and follow up reports; (3) approval and assignment of inspection for each inspection; (4) issuance of recommendations and instructions of any form to the body to which the tasks have been delegated (European Commission 2008).

Besides that, the public oversight authority should have the right to participate in inspections and get access to inspection files, audit working papers and other documents of relevance. A special article is focused on funding the authority of public oversight. The recommendations suggest that all funding for the quality assurance system, including those concerning the level of funding and financial control should not be subject to approval or veto by the persons or organizations

that are representatives of or otherwise affiliated with the accounting profession, the audit profession or an audit firm.

The Directive on Statutory Audits requires, as a minimum, that a public oversight system must have ultimate responsibility for the external quality assurance systems for the audit profession. This does not necessarily mean that the public oversight authorities must carry out inspections directly using its own employees. That means that public oversight body can use technical assistance from another appropriate body to carry out inspections. In that sense, the recommendation of the commission defines: independence of inspections, methodological guidance for conducting inspections and possible outcome of inspections. In that context, a person, who is practicing statutory auditor or is employed or associated with a statutory auditors or an audit firm, should not be allowed to act as an inspector. Besides that, a person should not be allowed to act as inspector in an inspection of the statutory auditor or audit firm until at least 2 years have elapsed since that person ceased to be a partner or employee of that auditor.

According to the EU Directives the scope of inspections covers: (1) an assessment of the design of the internal quality control system of the audit firm; (2) adequate compliance testing of procedures and a review of audit files of public interest entities in order to verify the effectiveness of the internal quality control system; (3) the contents of the transparency report published by a statutory auditor or an audit firm (European Commission 2008).

Besides the scope of the inspections, the Recommendation of the European Commission defines the outcomes of inspections. Inspection findings and conclusion on which recommendations are based should be properly communicated to and discussed with the inspected auditors or audit firms. The inspected statutory auditors or audit firms should be granted a period not exceeding 12 months to take action of recommendation on the quality control system of the audit firms.

The main objective of EU recommendation was to harmonize external auditing quality assurance among all the EU Members States. According to Isidro and Raonic (2012), financial reporting quality increases in the presence of strong monitoring mechanisms. Moreover, a stricter audit environment can reduce the magnitude of earnings management (Maijoor and Vanstraelen 2006). Although the European Commission through their legal requirements set basic determinations of implementation quality assurance into the auditing profession, there are still free options that Member States can develop and implement external quality assurance systems. As it is emphasized, according to the EU Directives Member States can implement two systems of quality assurance: monitoring and peer review. Although both systems are harmonized with EU Directives, there are some differences between them. The main difference is the fact that monitoring is conducted by the employees of independent external organization while peer review is conducted by the competent and authorized expert of auditing firms and statutory auditors. The advantages of one system are at the same time disadvantages of another. Monitoring should be conducted by inspectors with professional competences and great experiences, while peer review should be conducted by independent inspectors-auditors.

3   Specific Aspects of Audit Quality Control in Croatia

Audit quality control in Croatia is harmonized with the requirements of the European Union Directive and is regulated in the Croatian Audit Act (entitled Surveillance and quality control of audit firms, independent auditors and certified auditors). Additionally, there is a Regulation on the supervision and quality control of audit firms, independent auditors, joint audit offices and certified auditors.

The national oversight authority in Croatia is the Audit Public Oversight Committee which was founded in 2008. Members of the Committee are appointed by the Croatian Government on the proposal of the Minister of Finance. This task of audit oversight is delegated to the professional body—Croatian Audit Chamber. Therefore, the surveillance and quality control of audit is the responsibility of the Chamber. It has, among other things, the task to investigate whether the audit of financial statements is performed in accordance with the International Standards on Auditing, to check if the requirements of independence, quantity and quality of engaged human resources and other resources are meet, to test the internal quality control system and the system of charging audit fees, and to verify if they meet the licensing requirements. Surveillance is carried out by the employees of the Chamber (certified auditors with at least 5 years of experience in auditing), which are appointed by the Chamber's Governing Council with the prior approval of the Audit Public Oversight Committee. Appointment is conducted in an objective manner in order to prevent conflicts of interest between the person conducting the surveillance of audit quality and the evaluated audit firms, independent auditors and certified auditors.

One of the Audit Act provisions requires that the people who carry out the surveillance of the audit work quality must provide a sufficient number of selected audit files and documents in order to ensure a complete and high quality control, while applying auditing standards and requirements related to the independence of their work (Croatian Parliament 2012, Art. 5 and 15). The Regulation stipulates that the surveillance may be carried out through direct surveillance (inspection) at the company premises, but also via continuous surveillance and documentation analysis, since the supervised entities have deadlines to submit required documentation to the Chamber (Croatian Audit Chamber 2012, Art. 3). In the case of direct surveillance, the Chamber is obligated to notify (in writing) the subject of surveillance on the content, scope and the planned duration of the inspection. Therefore, the object of inspection is the audit documentation, which is actually a link between the accounting records of the client and the auditor's report. In this sense, the function of audit documentation is, besides from serving as the audit evidence in order to support the auditor's opinion, to be used as evidence in the process of audit inspection carried out by the Chamber's employees.

Inspection findings and conclusions are communicated to the inspected subject via written report. If the Chamber's employees conclude that the audit firm or independent auditor failed to comply with rules and regulation, Chamber may issue an order to eliminate irregularities, determine taking additional measures to

eliminate issues and initiate disciplinary proceedings. In that case, an audit firm or an independent auditor has a deadline to take corrective actions and submit a report to the Chamber, describing measures taken and providing evidence of the removal of irregularities. By determining additional measures, the Chamber requires the management of an audit firm or an independent auditor to implement improvements of the internal audit quality control system, to improve control procedures over the treatment of confidential information, along with other measures required for the proper application of the law, International Standards on Auditing and other rules of the profession.

4 Findings of Inspections Conducted by the Croatian Audit Chamber

Inspections are in the domain of the special unit within the Croatian Audit Chamber called Professional department in charge of monitoring and checking the quality of audit work performed by audit firms and independent auditors. In May 2010 a Plan and Program of Monitoring and Audit Quality Assurance was adopted and approved by the Audit Public Oversight Committee. Therefore, inspection activities in 2010 were primarily aimed at summarizing and analysing the entire audit market (Sever Mališ 2011). Additionally, there were limitations in the performance of the Department, which were primarily related to the necessary training of inspectors for the purposes of quality assurance, but also the lack of practice and previous experience in monitoring the quality of audit work. Nevertheless, inspections were conducted in 2010 as it was planned, primarily for the educational and advisory purposes. Considering that the inspections were conducted for the first time, it was fundamental to properly communicate and introduce this new form of surveillance to the audit firms and statutory auditors.

4.1 Methodology and Results of the Initial Inspections Carried Out in 2010

Initial inspections were carried out in 263 audit firms, which has been documented in written reports and delivered to subjects of inspection. It was not possible to conduct an inspection in 12 cases, which resulted in writing official notes and implementing appropriate procedures by the Chamber (Croatian Audit Chamber 2011). The scope of inspections included areas listed in Table 1.

Based on the initial inspection results, subjects were classified into five categories, as may be seen from the Table 2.

Table 1 Areas checked during inspections carried out by the Croatian Audit Chamber

Scope of inspections
• Organization and structure of the audit firm (and related parties)
• Application of the Code of Professional Ethics
• Application of the International Standards on Quality Control 1 (ISQC 1)
– Existence of policies and procedures of accepting new and retaining existing audit engagements
– Audit contracting—term of engagement
– Existence of policies and procedures for conducting audit
– Human resources, human resources management and professional training of employees
– Existence of internal control system
– Existence of ISQC 1 documentation
• Application of International Standards on Auditing (ISAs)—existence of work methodology (audit procedures)
• Annual Transparency report

Source: Croatian Audit Chamber (2011, p. 3)

Table 2 Classification of inspected entities

Categories	Number of subjects
Entities that meet the audit quality control requirements	26
Entities with identified irregularities in the application of the rules of the profession	96
Entities with identified law violations and irregularities in the application of the rules of the inspection	129
Entities that did not enable surveillance	12
Entities who have submitted the request for removal from the Register during the initial inspection	12

Source: Croatian Audit Chamber (2011, p. 3)

Therefore, inspection findings were divided into two categories: Audit Act violation and irregularities in the application of the rules of the profession. Overview of the irregularities is presented in Table 3.

The main purpose of the inspections and quality assurance is not to impose sanctions for auditors, but to take measures for preventing and eliminating irregularities and law violation. Therefore, the task and obligation of the Chamber is to issue further guidance, instructions and explanations to auditors that will improve and enhance the quality of future audits.

Table 3 Findings of the initial inspections conducted in 2010

Audit act violation[a]	Number of subjects
Amount of the audit firm's equity is not in accordance with requirements for companies founded in Croatia	34
Identified irregularities related to audit contracts—the audit contract shall be concluded in writing, it may be cancelled on justified grounds and it shall regulate mutual rights and obligations between the audit firm and a legal person where audit is carried out	7
Transparency report has not been published on time (within 3 months from the end of the financial year), or does not have all the necessary elements	39
Irregularities regarding the insurance policy—a minimum insurance cover per loss is defined in the Audit Act and depends on the type of audited entities	22
Auditing requirements are not meet—an independent auditor and audit firm employing only one certified auditor may not carry out audit of financial statements in certain companies	20
Failure to inform the Chamber in case of changes in data entered in the court register, acquisition of shares or business interests in another legal person, or other conditions listed in the Audit Act	72
Irregularities in the application of the rules of the profession[a]	
Entities do not act in accordance with the Code of Ethics	32
Entities do not have established policies and procedures as required by ISQC 1	188
Entities do not carry out audits in full accordance with ISAs	185

[a]One audit firm can be classified in more than one category
Source: Croatian Audit Chamber (2011, p. 5), Croatian Parliament (2012)
According to the Audit Act, an independent auditor and audit firm employing only one certified auditor may not carry out audit of financial statements of: joint stock companies and limited liability companies where the annual revenue exceeds HRK 40 million, companies whose securities are listed in the first quotation or in the public companies quotation, financial institutions and consolidated financial statements

4.2 Findings of Inspections Carried Out in 2011/2012 and 2012/2013

Since the initial inspections, two regular cycles of inspections have been completed and presented in the Annual Report of the Croatian Audit Chamber. Prior to "on-field" inspections, preparatory work includes the processing of submitted annual questionnaires with information on audits of financial statements. Planned activities are described in the annual plan, which is drawn up according to the risk assessment based on the previous findings and the significance of the clients being audited.

60 subjects were inspected in the year 2011/2012. In 47 cases the surveillance ended with writing reports and in 13 cases official notes were made due to the inability to conduct the inspections. Additionally, six inspections were requested by the third party (e.g. Croatian National Bank or HANFA) (Croatian Audit Chamber 2013). On the other hand, the number of regular inspections carried out in the year 2012/2013 has increased to 63, out of which two "on field works" resulted in

Table 4 Grades assigned to inspected audit firms

Grade	Grade meaning	Number of subjects 2011/ 2012	2012/ 2013
B	There are cases of non-compliance in other issues, but there is no need for follow up activities because the supervisor is convinced that the audit firm will be able to solve the problems	2	9
C	There are cases of non-compliance or other important issues; audit firm must provide additional evidence to prove the commitment and the ability to correct problems	15	28
D1	Serious violations in combination with the reluctance to implement changes; the supervisor recommends that the license of the audit firm should be withdrawn	9	1
D2	Serious or extensive irregularities combined with inadequate response from the audit firm; it results in issuing order to eliminate irregularities and recommending additional measures	18	14
N	All possible circumstances that do not fall into any of the above grades (for example, audit firm has submitted a request for removal from the Register)	3	9
Total		47	61

Source: Croatian Audit Chamber (2013, 2014)

making official notes. On top of that, five irregular inspections were conducted (Croatian Audit Chamber 2014).

According to the methodology, an employee of the Chamber that was in charge of the inspection has to assign a grade to the audit firm. An overall assessment is based on the worst grade assigned to key areas. Grades assigned to audit firms are shown in Table 4.

Awarded grades indicate that there were improvements in audit quality. In the year 2012/2013, 61 % of the inspected audit firms received grade B or C, as opposed to 36 % in the year 2011/2012. This means that the number of subjects that demonstrated serious irregularities has decreased. Inspection findings in the 2011/2012 report were divided into two categories: Audit Act violation and Application of International Standard on Quality Control 1. Additional category entitled Application of International Standards on Auditing was added in the year 2012/2013. Summary of findings is presented in Table 5.

Positive findings identified during the inspections are related to good acceptance of direct surveillance and cooperation shown by the supervised entities, interest and willingness to improve the quality of work and procedures in accordance with professional standards, and further education of certified auditors. Negative findings refer to incomplete audit documentation due to lack of practical training in the application of International Standards on Auditing (ISAs) and International Standards on Quality Control (ISQC1), insufficient resources (insufficient number of certified auditors) with respect to the uncertainty of future audit engagements.

Table 5 Key findings of inspections carried out in Croatia in 2011/2012 and 2012/2013

	No. of subjects	
Audit Act violation[a]	2011/2012	2012/2013
Transparency report—irregularities regarding the deadline for publication and content	20	5
Insurance policy—irregularities concerning renewal and a minimum insurance cover per loss	11	9
Conducting an audit of clients whose total income exceeds HRK 40 million—it should not be carried out by audit firms with only one certified auditor	3	/
Failure to inform the Chamber in case of changes in data entered in the court register, acquisition of shares or business interests in another legal person, or other conditions listed in the Audit Act	10	/
Conducting audit engagements—there are no working papers supporting the audit opinion	/	11
Irregularities regarding signature on the audit report—the audit report shall be prepared and signed by the certified auditor, in his/her own name, and by the authorised representative, in the name of the audit firm or independent auditor	/	11
Providing additional services along with conducting statutory audit	/	4
Irregularities related to conditions for conduction audits and other audit activity—audit may be carried out by certified auditors and the appointment of the audit firm may not be conditional.	/	3
Application of ISAs[a]		
Accepting and arranging audit engagements	/	46
Planning (including understanding of the subject) and risk assessment (including fraud)	/	48
Procedures in response to the risk assessment (audit plan, design and implementation of tests)	/	48
Auditing procedures and working papers	/	50
Final audit procedures	/	44
Financial statements and the auditor's report	/	47
Application of ISQC 1[a]		
Entities do not have fully established policies and procedures as required by ISQC 1	12	12
There are no visible effects of ISQC 1 application	/	10
Entities have established policies and procedures, but they do not act accordingly in the following areas:		
• Leadership responsibilities for quality within the firm	6	7
• Relevant ethical requirements	3	2
• Accepting and retaining clients	9	10
• Human resources	7	8
• Conducting audit engagements	23	20
• Surveillance	23	22

[a]One audit firm can be classified in more than one category
Source: Croatian Audit Chamber (2013, 2014)

5   The Comparison of Inspection System in Croatia
   with Selected European Countries

As already explained, according to the European Directive on statutory audits of annual accounts and consolidated accounts (European Parliament and Council 2006, 2014), each Member State shall establish a system of public oversight, with public oversight entrusted to a special body independent of the profession. The national oversight authority in Croatia is the Audit Public Oversight Committee, which has the responsibility for recurring inspections of audit firms. This task is delegated to the professional body—Croatian Camber of Auditors. Public oversight system in Croatia (with emphasis on a system of inspection) has been compared with selected European countries, which is summarized in Table 6. In order to identify similarities and differences, an analysis of the latest publicly available reports of their oversight bodies has been conducted.

As opposed to Croatia, the system of inspection in these countries is organized in a way where the inspections of audit firms are being carried out directly by the national oversight body (or one of its specialised units).[1] The Financial Reporting Council (oversight body in United Kingdom) has the most experience, since the year of its first inspection cycle was 2004. Object of inspection conducted by the Croatian Audit Chamber are audit firms, independent auditors and certified auditors that perform statutory audit, which is similar to the practice in Malta, Netherlands and Norway. However, the scope of selected oversight authorities in the United Kingdom and Switzerland is limited to the audit firms that audit public interest entities, while the inspection of other subjects is delegated to other professional bodies.

As for the frequency of inspections, all bodies act in accordance with the European Directive, which stipulates that the audit firms should be inspected at least once in 6 years, or at least once in 3 years in case of audit firm carrying out audit of public interest entities. National authorities of United Kingdom (Financial Reporting Council—FRC 2014b) and Switzerland (Federal Audit Oversight Authority—FAOA 2014) have additional provisions, under which major audit firms are subject of inspection annually. Since the independence of these bodies in relation to the audit profession is the main basis of the quality of external oversight, it is important to analyse their sources of funding. All selected oversight authorities are being financed by the subjects they inspect, usually charging fees for their services or membership. However, in their IFIAR member profiles (IFIAR 2014a) they all state that the funding is free from the influence of the profession, since the fees and the budget are approved by the third party (e.g. Ministry of Finance).

The monitoring approach of the oversight authorities is risk based. That means that they are led by suspected irregularities in forming the sample of audit firms to

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[1] According to their member profiles in The International Forum of Independent Audit Regulators (IFIAR).

Table 6 The comparison of inspection system in selected European countries

	Croatia	United Kingdom	Switzerland	Malta	Netherlands	Norway
National auditor's public oversight body	Audit Public Oversight Committee through the Croatian Audit Chamber	Financial Reporting Council	Federal Audit Oversight Authority	Accountancy Board—Quality Assurance Oversight Committee	Netherlands Authority for the Financial Markets	Financial Supervisory Authority of Norway
Reports reviewed	Annual report 2012/2013 (for the year ended 30 June 2013)	Annual report 2013/2014 (for the year ended 31 March 2014)	Activity report 2013 (for the year ended 31 December 2013)	Annual report 2013 (for the year ended 31 December 2013)	AFM annual report 2013; Report on AFM inspections of the quality of audit and system of quality control and quality monitoring at nine PIE licence holders (2011 and 2012)	Annual report 2013 (for the year ended 31 December 2013)
Experience/year of the first inspection	2010 (one initial review + two annual reports)	2004/2005 (ten annual reports)	2008 (six activity reports)	2007 (7 annual reports)	N/A	1993
Objects of inspection	Audit firms, independent auditors and certified auditors that perform statutory audit	Audit firms that audit more than ten PIEs	Auditors and audit firms carrying out statutory audits of public companies	Audit firms that perform statutory audit	Audit firms that perform statutory audit	Audit firms that perform statutory audit
Frequency of inspections	At least once in 6 years, or at least once in 3 years in the case of independent auditor or audit firm carrying out audit of PIE	Annually for the "Big 4" firms, BDO and Grand Thornton; three other firms are inspected every 3 years	At least every 3 years, annually for the "Big 3" firms (PwC, E&Y, KPMG)	At least once in 6 years, or at least once in 3 years in the case of audit firm carrying out audit of PIE	At least once in 6 years, or at least once in 3 years in the case of audit firm carrying out audit of PIE	All statutory auditors every 6 years, all audit firms with PIE engagements every 3 years

(continued)

Table 6 (continued)

	Croatia	United Kingdom	Switzerland	Malta	Netherlands	Norway
Funding	Committee—from the state budget, Chamber—from the contributions and membership fees of its members, from fees for taking certified auditor examinations and from other revenues	From the business community, the accountancy profession (relevant professional accountancy bodies) and the UK government	The Oversight Authority charges fees for its decisions, inspections and services; to cover additional costs, it charges an annual oversight levy to audit firms under state oversight	50 % from Government by way of annual subvention, 50 % by charging profession (audit regulatory fees payable on an annual basis)	From the firms under surveillance and the Ministry of Finance which provides fixed contribution	Costs of surveillance are levied on the institutions under supervision (auditors)
Monitoring approach (in forming sample for inspection)	Risk assessment based on data provided through the questionnaire and other relevant data submitted to the Chamber	Risk model in selecting individual audit engagements (focus sector is elected every year)	Risk-based approach, inspections are prompted by suspected irregularities	Risk-based approach, all annual returns are subject to Desk Top Monitoring and key Quality Assurance indicators are identified	Risk analysis is used to determine which audits and aspects of the system of quality control would be involved in the inspection	Risk assessment based on data provided through questionnaire (every 3 years)
Types of inspections	Regular inspections according to the annual plan, special inspections requested by the third party	Regular inspections (Annual Report plus Individual Report for major audit firms), thematic inspections, Third Country Auditor Inspections	Regular inspections ("firm review" and "file review"), special inspections prompted by suspected irregularities	Regular inspections	Regular inspections ("Big 4" audit firms in 2010, other nine PIE licence holders in 2011–2012), thematic inspections	Regular inspections, thematic inspections every year

Scope of inspections according to the report and legislation	Inspection of audit compliance in relation to the Audit Act, the ISAs, requirements of the ISQC1, the Code of Professional Ethics and the adequacy of the organization and resources engaged to audit	Inspection covers, but is not restricted to compliance with the requirements of the regulatory framework for auditing; reviews of individual audits emphasises the appropriateness of key audit judgments and the sufficiency of the audit evidence	Focus is on the enforcement of legal and professional requirements, while paying particular attention to required professional scepticism and to strict compliance with independence requirements	Credibility reviews, independence reviews, statutory compliance, audit report reviews, internal quality control procedure review	Inspection of compliance with the laws and regulations, inspection of audits and aspects of the system quality control and quality monitoring	Inspection of compliance with the audit legislation and the firm's internal policies and procedures, review of the systems for internal quality control (including policies with regard to independence, confidentiality and compliance with anty-money laundering requirements)
Form of presentation of the identified irregularities (in the latest report)	Findings divided into three categories: Audit Act violation, irregularities in the application of ISAs, irregularities in the application of ISQC 1	Findings divided into eight areas of key messages	Findings divided into two categories: firm review findings (two selected findings are elaborated) and file review findings (two selected findings are elaborated)	Findings divided into three categories: audit file findings, audit reports and whole practice matters (separated for PIE and non-PIE audit firms)	Findings divided into two categories: quality of the audits (eight areas of irregularities in 2013) and system of quality control and quality monitoring (two areas of irregularities in 2013)	Main findings in the form of text (eight weaknesses were identified in 2013)

Table 6 (continued)

	Croatia	United Kingdom	Switzerland	Malta	Netherlands	Norway
Follow up and sanctions that are reported and available to oversight bodies	Audit firms in which irregularities were found receive a written report and have a deadline to submit a proof of irregularities' elimination (deadlines depend on the type of irregularities)	Actions: audit firms receive a written report with areas that need improvement; audit firm and the oversight authority agree on the action plan; the authority assesses the adequacy of progress periodically	Actions: written report to the audit firm's highest supervisory or governing body, withdrawal of licence, actions against individuals working for audit firms, informing the public	Related audit firms are contacted through a letter indicating corrective actions to be taken; if they fail to respond, regulatory penalties are charged	The oversight authority informs inspected audit firms and requests recovery and improvement measures; audit firms sent their plans of measures as a response to the findings	N/A

Source: Authors review based on Accountancy Board—Quality Assurance Unit (2014), Accountancy Board (2011), Croatian Audit Chamber (2012, 2014); Croatian Parliament (2012), Federal Audit Oversight Authority—FAOA (2012, 2014), Financial Reporting Council—FRC (2014a, b), IFIAR (2014a, b), Federal Assembly of the Swiss Confederation (2005); The Financial Supervisory Authority of Norway—Finanstilsynet (2014), Netherlands Authority for the Financial Markets—AFM (2013, 2014)

be inspected. Annual reports of national bodies in Croatia, Malta and Norway provide additional information and explain that the risk assessment is conducted according to the data gathered through questionnaires. This approach limits the comparison of inspection results among countries, since the results are not statistically representative and the sample is intentional. Moreover, there are also differences in the types of inspection being carried out. Croatian Audit Chamber performs regular inspections according to the annual plan and special inspections if requested by the third party, which is similar to the practice of bodies in Malta and Switzerland. Authorities in the United Kingdom, Netherlands and Norway additionally perform thematic inspections of focus sectors. For example, UK Financial Reporting Council carried out two thematic inspections for the year 2013/2014 (Financial Reporting Council—FRC 2014a) (first concerning materiality, second concerning fraud risks, laws and regulations).

Methodologies of conducting inspections by selected bodies have some common issues. They all inspect audit compliance in relation to the relevant legal requirements. In Croatia, audit engagements have to be performed according to the Audit Act, the International Standards on Auditing, requirements of the International Standard on Quality Control 1 and the Code of Professional Ethics (Croatian Parliament 2012, Art. 43). In addition, each supervisory authority in the activity report (when describing the scope of inspections) emphasizes certain aspects that receive special attention during inspections. Croatian Chamber of Auditor added the inspection of adequacy of the organization and resources engaged to audit. National authorities in Switzerland, Malta and Norway pay particular attention to the independence requirements, while the United Kingdom oversight body emphasises the appropriateness of key audit judgements and the sufficiency of audit evidence.

Form of the presentation of identified irregularities in the annual reports varies by countries. It is evident that authorities with more experience (like the UK Financial Reporting Council) disclose more detailed results, while others just report types of irregularities, without additional explanation. Findings of the Croatian Chamber are divided into three categories: Audit Act violation, irregularities in the application of International Standards on Auditing and irregularities in the application of International Standard on Quality Control 1. Therefore, it is obvious that the greatest attention was paid to meeting regulatory requirements. On the other hand, some of the oversight bodies present their findings in the form of key messages, where they describe identified issues and give suggestions for future audit quality improvements. The United Kingdom oversight body discloses the most information among all six analysed countries, in the form of the Annual Report, the Individual Reports for the "Big 4" audit firms and thematic inspections' reports. Considering all the differences between countries, it is difficult to make a general conclusion and compare audit quality among them, but it is possible to identify common irregularities.

Follow up activities of selected oversight bodies are similar and usually include providing a written report to the governing body of the inspected audit firm. Audit firms usually have the deadlines to eliminate irregularities. According to the

Regulation of the Croatian Audit Chamber, non-compliance leads to disciplinary proceedings. The oversight body in Malta additionally state that regulatory penalties are charged if an audit firm fails to respond and take corrective actions (Accountancy Board 2011).

6 Common Findings of Selected Oversight Bodies from the Annual Reports

As previously explained, the methodology for conducting inspections is risk based, which means that the findings are not representative and cannot be compared across countries. Moreover, the degree of disclosing information in the publicly available reports varies between different oversight bodies. Garcia Osma et al. (2014) also came to similar conclusion in their analysis of the level of harmonization of public oversight systems for statutory auditors, in which they stated that differences among EU Member States arise particularly in terms of transparency. Despite all this, certain common irregularities and key messages can be recognized, as shown in Table 7. The analysis also includes IFIAR Report on 2013 Survey of Inspection Findings, which summarises findings of their members' individual inspections.

Irregularities concerning the audit of financial institutions were mainly related to the fair value measurement and loan loss provisions. It has been noted that the common issues were insufficient challenge of management or the failure to obtain further evidence to support provisioning judgements. The UK oversight authority

Table 7 Identified common findings across analysed countries

	Common findings	The country of the oversight body that carried out the inspection
1.	Deficiencies in the audit of financial institutions and financial instruments (concerning fair value and loan loss provisions)	United Kingdom, Switzerland, IFIAR
2.	Findings regarding audit of consolidated financial statements and letter-box companies	United Kingdom, Switzerland
3.	Threats to auditor independence	Croatia, United Kingdom, Switzerland, Malta, IFIAR
4.	Irregularities in internal control testing	United Kingdom, Norway, IFIAR
5.	Weaknesses in the internal audit quality control system	Croatia, Malta, Netherlands, Norway
6.	Failure to obtain sufficient and appropriate audit evidence	Croatia, Malta, Netherlands, Norway, IFIAR
7.	Findings regarding the work of experts	Croatia, Malta, Norway
8.	Reporting irregularities (concerning communication with those charged with governance and transparency reports)	Croatia, Malta, Norway

Source: Systematized by authors based on annual reports of oversight authorities

stated that the overall grading of bank and building society audits continues to be generally below those of other types of entity (Financial Reporting Council—FRC 2014a). Furthermore, the Switzerland authority expressed concerns about inadequate internal control testing in financial institutions (Federal Audit Oversight Authority—FAOA 2014), where the extensive reliance was often placed on internal audit, but their work was not always assessed sufficiently.

Various findings in UK and Switzerland were related to the role of auditor as group auditor. Key message is to ensure a greater consistency in quality between the audit work undertaken at group level and the work performed by component auditors. In auditing letter-box companies, auditing standards were inadequately applied to some extent because non-transferable responsibilities with respect to the direction, surveillance and performance of the engagement were delegated to one or more component auditor. Therefore, the key concern was that the auditor signing the group audit report often had insufficient involvement in the audit.

Identified threats to auditor's independence refer to providing non-audit services. According to the Code of Ethics (IESBA), "certain restrictions on auditors providing non-assurance services to their audit clients have been imposed" (IESBA 2013, p. 98). Findings of the UK oversight authority include cases where insufficient consideration was given to the appropriateness of continuing to provide such services when there was a change in status of the entity (for example, an entity becomes an audit client or is listed on the stock exchange). "The legal requirements in Switzerland differ in a way that the provision of additional services to audit clients is not forbidden in principle" (Federal Audit Oversight Authority—FAOA 2014, p. 22). However, there were cases where the audit fee was disproportionate to additional fees, which threatened auditor independence.

According to the IFIAR (2014b) survey results, a significant number of findings include inadequate internal control testing, especially in testing IT controls. The problem is especially evident in the audit of large entities, where sufficient audit evidence cannot be obtained from substantive testing alone. It is recommended to audit firms to review their approach to the audit of IT controls, either by providing additional training and guidance to audit staff or by using IT specialists.

Audit firm's internal quality control of completed audit engagements is an important mechanism for assuring audit quality. Inspections conducted by the Croatian Audit Chamber showed that a certain number of audit firms do not have adequate internal quality control procedures. There were also cases where they exist in paper, but these quality measures do no yet appear to be working well enough (Croatian Audit Chamber 2014). Similar conclusion can be derived from the inspection findings conducted by the oversight authority in Netherlands (Netherlands Authority for the Financial Markets—AFM 2014).

Another type of irregularities was related to insufficient audit evidence and audit documentation. The common rule to audit documentation is that documentation must be sufficient to enable an experienced (third) auditor to understand the audit procedures performed, the audit evidence obtained and any significant judgement applied. It was especially emphasized in the activity report of the oversight authority in Netherlands, where it was stated that in approximately 74 % of the assessed

audit engagements the external auditors did not obtain sufficient and appropriate audit evidence (Netherlands Authority for the Financial Markets—AFM 2014). The oversight authority of Malta reported that there were issues in the following areas: materiality thresholds, debtors and creditors and professional scepticism (Accountancy Board—Quality Assurance Unit 2014). Very little documentation was available on audit files about the substantive testing carried out on debtor and creditor balances, particularly in relation to possible impairment of debtor balances.

Findings regarding the work of experts were related to the lack of professional scepticism when evaluating the work of experts appointed by management. It was noted that "there was very little audit documentation as to what work was carried out by the auditor to assess the competence, integrity and independence of experts in order to dispel any management bias on accounting estimates regarding impairment or fair values" (Accountancy Board—Quality Assurance Unit 2014, p. 8). As far as the experts hired by the auditor, there were also examples of failure to differentiate between the uses made of specialists in the audit team, the use made of work performed by experts and the use of consultations with experts, as well as weakness in the documentation of the work done.

Oversight authorities of Malta and Norway have also revealed shortcomings in the area of communication with those charged with governance. It was noted that in a number of instances significant findings from the audit were not communicated with those charged with governance by way of a management letter. In cases where it was claimed that the findings were communicated verbally, no documentation related to the matters discussed was found. Moreover, there were several cases in Croatia where the transparency report was not in line with the provisions of the Audit Act.

7 Conclusion

Corporate scandals which involved audit firms resulted in discussions about how to enhance legislation and professional requirements in order to improve audit quality. Following this practice, the Croatian Audit Chamber started conducting inspections as a form of external surveillance of the auditor's work. Due to the lack of experience and the fact that it carried out only two cycles of regular inspections so far, there are still certain difficulties, primarily related to insufficient human resources and finding adequate supervisors. Although the analysed time period is too short to be able to spot trends in the improvement of audit quality, grades that were assigned to audit firms each year suggest that certain progress is already noticeable. Additional improvements are needed in the application of the International Standards on Auditing (especially those regarding audit evidence and audit documentation) and ensuring that the internal quality control system functions properly.

Comparison of the Croatian system of inspections with the practice in selected European countries shows that there are a lot of similarities. Approach to

conducting inspections is the same and it is based on risk. That means that oversight bodies use different techniques for risk assessment, which is then used in forming the sample of audit firms to be inspected. The scope of inspections usually includes checking compliance in relation to the relevant legal, professional and ethical requirements. However, it is evident that the system of inspections in countries with more experience in this area is also more advanced. For example, basic concept of conducting inspections in certain countries is supplemented with thematic inspections of focus sectors, annual inspection of major audit firms and very detailed public reports.

Due to the risk-based approach and differences in the level of disclosing information in publicly available reports, it is challenging to compare findings across countries. However, common findings include lack of professional scepticism in auditing areas that have become particularly risky in terms of changes in the financial markets and the global economic crisis (regarding fair value and loan loss provisions). Moreover, there are numerous irregularities in relation to the audit of consolidated financial statements, obtaining sufficient and appropriate audit evidence and internal control testing. Taking into account the experience of the selected countries, it is obvious that the inspections carried out by an independent public body contribute to the improvement of audit quality. However, there are clear suggestions that there is still plenty of space for significant improvements of the quality of the performed audit.

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Development of Cost Accounting in Higher Education Institutions in the Republic of Croatia

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Abstract This paper aims to present the level of development of cost accounting in the Higher Education Institutions (further HEI's) through conducted empirical researches. The main objective of this paper is to highlight that for quality decisions making at HEI's it is necessary to have relevant information about costs. Using different methods for managing costs, information about costs are significantly different. Based on that, the process of decision making and decision made on costs could vary. To examine the level of cost accounting used in HEI's, the research based on the questionnaire was conducted in the year 2006 and 2014. The questionnaire was sent to all HEI's in Republic of Croatia, more precisely to the Deans of HEI's and to the Head of Accounting of HEI's. The authors have set the main hypothesis that cost accounting tools are still not enough used in Croatian HEI's. The results of conducted research have shown that cost accounting in Croatian HEI's is still undeveloped and still not sufficiently used in the process of decision making and funding of HEI's. Moreover, authors have highlighted that some cost accounting instruments, e.g., cost allocation, are used less in 2014 than in 2006. The authors have also pointed out several potential obstacles for implementation of cost accounting in the accounting systems of HEI's. Also, in the paper, the authors have provided possible recommendations for implementation and better usage of cost accounting in Croatian HEI's.

Keywords HEI's • Costs • Cost accounting • Republic of Croatia

1 Introduction

In the last 20 years, requirements and expectations on universities, both in teaching and research activities are growing progressively. Changes in university culture associated with market orientation, greater competition of HEI's, and so on, mean

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that the role of universities is shifting towards a greater commercial orientation. This carries increase in costs of their activities and requires additional funds other than those provided in the state budget.

The main assumption of this paper is that the use of the cost information, given by the set of the cost accounting instruments, would increase the quality of accounting information that serves as basis for HEI's management decision making. Moreover, it can be used for the supervision of HEI's management work what can directly affect the effectiveness and efficiency in provided services of higher education gratifying the general public.

The main research goal was to point out the trends in cost accounting development in Croatian HEI's. Taking in consideration the specifics of HEI's since they are mostly budgetary users, the task is to define the informational demands of HEI's management and to establish the set of cost accounting instruments. Those instruments should assure that information about costs is headed towards assumption about efficient governing.

Moreover, the purpose of this research is to summarize the benefits from cost accounting instruments usage in HEI's. But also to determine potential obstacles in implementation of cost accounting at Croatian HEI's. It is important to take under the consideration informational demands of the management and the development of accounting information system. The accounting information system must be harmonized with purpose, goals and tasks of business activities. But also, it must assure qualitative and integer reporting about results on all hierarchical levels of HEI's management and all of its segments, including University and competent Ministries (like Ministry of finance and Ministry of science, education and sport). Therefore, the authors will give some recommendations for the HEI's management, based on the conducted research about current situation of cost accounting in Croatian higher education area.

2 Possibilities and Needs for Implementation of Cost Accounting into Higher Education Area

2.1 Importance of Cost Accounting and Areas of Its Application in Higher Education Area

Contrary to private sector, which performance is measured by level of profit, performance of individual budgetary units and the whole public sector may be measured by level of satisfaction of general and common needs of individuals and the broader public. Performance has to be measured by segments and results in each budgetary unit, therefore in the HEI's too. Also, each program and project has to be measured in according to fulfillment of goals. For long term sustainability of its activities and programs, HEI's have to decrease costs and improve quality of its services. Decreasing costs is "mission impossible" without knowing the structure of each cost and different concepts of their valuation.

According to IFAC Study 12, Perspectives on Cost Accounting for Government (IFAC 2000) cost accounting has several basic managerial functions, besides its historical role which may be seen as determination of value of inventories or other form of assets for financial accounting needs, like budgeting, cost control and cost decreasing, determination of prices and remunerations, measurement of performance, program assessment and different choices for economic decisions. Costs information can be used in budgeting and cost control, effects evaluation and program assessment, performance measurement, determination of price, fees and remunerations, market research (IFAC 2000).

It is obvious that accounting goals and tasks have been evolved. In its early phases cost accounting has been considered as a technique for cost allocation on cost objects and it was "problem of accountants". Today, cost accounting in public sector is used for presenting the information on costs in such a way to fulfill managerial needs in order that such information should be used in management processes in public sector. Cost accounting becomes management tools for new public management.

Efficient managing demands from management the appliance of a wide range of managerial techniques and methods. The improvement of financial management in HEI's leans on skills of management and their capacity for usage of accounting and non-accounting information, especially for the usage of cost accounting, and financial and non-financial indicators. In their jobs and assignments, HEI's should answer on some very important questions: are the provided services aimed towards users, are the resources used in the best manner to give the best value for money and is the managing successful and headed towards stated the above. The answers for asked questions are a complex story about performance measurements in public sector.

Higher education system in a view of usage modern and traditional methods for governing costs includes their tracking and allocation. One can say that education process is in fact production process of studies (i.e., studying programs) but also students. Different trends, terms and assumptions which are appearing in Republic of Croatia are presumption for the usage and appliance of different tools which will enable competitiveness of public HEI's with private business schools. As competitive subjects they should provide the high quality of studies and highly educated students. The increase of students' number and the increase of studying quality mean more financial resources. Financial resources from all kind of sources, like from donations, state budget but also from scholarships are available to the public HEI's in Europe.

In Croatia, main source for financing public HEI's is state budget which only partially provides sources for wages, material costs and some level of scientific work. In accordance to that it is necessary to determine on national level criteria for dividing financial resources. With regard to the allocation of financial resources, the Act on Science and Higher Education (2003) defined the lump sum financing, which is still not fully implemented in practice. Mentioned financing model implies that Ministry of Science, Education and Sport is allocating funds to higher education institutions as a lump sum, and the universities are then completely

autonomous in the internal distribution of these funds for its constituents according to clearly defined criteria, having in mind the financial condition of constituents, but also the cost structure as well as the area where constituents belongs.

The main reason why this lump sum financing model is still not fully developed in Croatia lies in the lack of autonomy and integration of universities. Croatian universities have highlighted the key problems associated with the internal allocation of financial resources for the university to its constituents and it can be summarized on the fact that proposed financing model is just theoretical because such allocation is not possible in practice because most of Croatian universities are not integrated, also there is a lack of institutional autonomy and finally internal allocation from universities to constituents is unreliable due to the fact that universities do not have developed costing systems and therefore are not familiar with full costs (Doolan et al. 2012). In the last century a new financial surrounding is defined, mainly because of decreasing resources from state budget and that fact is encouraging commercial activities like researches financed out of some other source like private business subjects, foundations, international organizations and similar. Higher education costs are increasing with higher rate than the state can support and assure financial resources from budget and because of that HEI's should assure for themselves more different sources of financing. HEI's should be competent in governing strategically with their asset and finances, but also human resources especially because teachers are the key to maintain studies and programs of HEI's in future. All those information would gather easily and decision making process would be easier on a level of HEI's management but also for University management if there is developed cost accounting.

Implementing the accrual principle and cost control into the HEI's, the performance measurements and program efficiency evaluation will be made on actual relevant data and in accordance the decision making process will be based on relevant data. By doing that all HEI's can choose different methods for cost planning, cost allocation and cost control. Using different modern methods for managing costs, information about costs are significantly different. Based on that, the process of decision making in HEI's and decision made on costs could vary. Therefore, it is very important to implement the right cost allocation method. Further in the paper authors will therefore research level of implementation of cost allocation methods by Croatian HEI's with special focus on preconditions for successful development of cost accounting instruments such as accounting principle.

2.2 Significance of the Cost Accounting Implementation at Croatian Higher Education Institutions

Higher education institutions have entered a wide range of financial and institutional reforms that mostly relate to the process of internationalization,

strengthening of the institutional autonomy, increasing competitiveness and achieving financial sustainability. In order to complete successfully mentioned processes, one of very important prerequisite is developed and comprehensive accounting information systems. Accounting information systems and accountability rely on relevant information on cost, performance, standards and targets given timely to key decision makers (Pettersen and Solstad 2007). Therefore, higher education institutions are involved in the process of upgrading external reporting system with the internal reporting systems based on the developed cost accounting. According to Sordo et al. (2012) modernization of the higher education system is mainly oriented to make the financial statement more comprehensive and accountable.

Higher education institutions are not only considered as social institutions, but also as firms to which certain logic and rules apply, typical of the managerial culture in the private sector, such as the well-known principles of efficiency, effectiveness and accountability (Sordo et al. 2012). Moreover, Mitchell (1996) emphasizes the need for private sector accounting techniques and rational costing of courses, departments and other programmes, supporting the use of techniques, such as responsibility accounting, ABC (activity based costing), etc. Therefore, in addition to external or in other words statutory reporting, increasing emphasis is placed on the cost accounting that has already been established for many years in the private sector.

It is very important to highlight that the United Kingdom, Ireland, Finland and Sweden, who were first to initiate the process, are the most advanced systems in terms of development and implementation of full costing methodologies (Estermann and Clayes-Kulik 2013). Although in these countries full costing was implemented system-wide, it was done in different ways: Ireland, Sweden and the UK developed a sector-wide model through a coordinated approach based on cooperation between universities (Estermann and Clayes-Kulik 2013). By contrast, in Finland, individual universities developed full costing methodologies on their own in response to requirements by the ministry and the national research funding councils. In systems where full-costing methodologies are at a mature stage, several universities are using full costing data for strategic management and decision-making (Estermann and Clayes-Kulik 2013). Many universities in the Netherlands are also quite advanced in the implementation and strategic use of full costing, but there were no system-wide coordinated process or state requirements. Austria, Belgium, France and Germany are in the process of implementing full costing methodologies, although differences remain between these systems. The level of development also differs strongly between universities, despite the fact that discussions on full costing have been ongoing for several years.

The current accounting information system of higher education institutions in Croatia is primarily aimed at meeting the legal requirements regarding the external financial reporting while internal reporting is not sufficiently developed and is generally dependent on the current management requests of individual institutions of higher education. Croatian accounting information systems of HEI's or university in generally do not have the possibility in providing basic information about

occurred costs of special programs or international projects that are realized on HEI's what is very important information in meaning of justifying certain program or international project. It is also important regarding argument of acquiring right in recovering highest amount of indirect costs occurred in international projects. Because of that it is expected that cost allocation method would achieved efficient evaluation of economy not only for certain HEI's but also for special programs and projects and international projects which are realized on certain HEI's. Through establishment of cost accounting, demands of national and European scheme of financing will be fulfilled. But Croatian HEI's would have all kind of different benefits from model of internal cost calculation and full cost information as on international level but also on level of certain HEI.

Cost accounting could be provided as a separate tool in accounting information system which will allow tracking and recording of all occurred costs (e.g., depreciation) which are important for internal usage and decision making process for HEI's management as well as for University because they must demonstrate that benefits from their programs and activities which they provide are appropriate to the costs. For this reason, public demands for enhanced responsibility become more and more intense.

Current Croatian accounting information system for budgetary users is based on the modified accrual basis and HEI's as budgetary users are obligated to prepare their reports under mentioned basis. In relation to the application of full accrual basis this accounting model is marked with several adjustments (Vašiček et al. 2009) that are mentioned hereinafter. Revenues of public sector entities are recognized when the cash is received therefore revenues are based on cash basis. Expenses of current non-financial assets are recognized at the time of purchase, therefore not at the time of actual consumption. The costs of procurement fixed asset with small value are not capitalized, because they are entirely presented as expense at the time of purchase. The costs of procurement fixed asset are not capitalized and they are not systematically apportioned on a time or functional basis as expenses during the period of useful life. Increase in assets during the procurement fixed non-financial assets without the costs (capital received donations) are not recognized as revenue but directly increased the sources of ownership (public capital). Spending fixed non-financial assets during the administration estimated life is expressed as the expense of the sources of ownership (public capital) using proportional method of value adjustment. Residual value of fixed non-financial asset that is sold or decommissioned is not reported as an expense that arises from the fact that the total expense was recognized at the time of purchase. The changes in value and volume of assets and liabilities are not reflected in the financial result but they directly reflect on the value of sources of ownership (public capital).

From the before mentioned characteristics of accounting model based on modified accounting basis, it can be seen that this is accounting basis that puts focus on the financial assets and liabilities, and non-financial assets are in another plan and in the balance sheet are only to complete information on total resources. Existing model is based on the assumption that revenues from subjects of general

government sector are mostly non-reciprocal, or that they not include nothing in return as the basis for their acquirement (Vašiček et al. 2010). Presented national accounting system has to be upgraded for internal reporting purposes by introducing elements of full accrual and only on that way it would be possible to develop cost accounting in HEI's (Dragija 2014).

Monitoring costs provides a transparent data for determination of the total costs, but also the cost of individual activities at HEI's and the University, and particularly costs of certain educational programs and studies, what is important from the point of transparent financing. However, in order to accomplish before mentioned it is necessary to develop model of intern cost calculation for monitoring and registering of all costs related to all activities of the HEI's. To meet these requirements, it is necessary to define the basic types of costs, and set up system of their identification, collection, monitoring, registering, classifying and analyzing, which is an integral part of accounting and the overall information system, supported by computer technology. The results of cost accounting implementation, achieved through its objectives, could be manifested in (Lutilsky and Dragija 2012): improving the quality and reliability of financial statements, and significant data from which the key performance indicators are calculated and counted; effective control of resources, but also monitoring the qualitative and quantitative information; improving financial management and decision-making process by monitoring administration of constituents and the University through a reliable accounting information, both financial and non-financial nature; an attempt to apply the system of internal controls, and significant support for the introduction of external control and audit.

3 Empirical Research

In order to investigate the level of appliance of cost accounting by Croatian HEI's, authors have compared results of two empirical researches. More precisely authors compared questions that were the same in both questionnaires in order to investigate trends in development of cost accounting within accounting systems of HEI's. First empirical research was conducted in the year 2006 among all HEI's in Republic of Croatia, more precisely questionnaire was sent to the Deans of HEI's and to the Head of Accounting in HEI's (Lutilsky 2006). A response rate for the Deans of HEI's was 26.56 % and for the Head of Accounting in HEI's was 39 %. Moreover, second empirical research was conducted in the year 2014 among the same statistical population (Dragija 2014). From the total 135 HEI's in the Republic of Croatia, 40 HEI's answered on questionnaire for the Deans (responsive rate 29.63 %) and 37 answered on questionnaire for the Head of Accounting (responsive rate 27.41 %). So, for both empirical researches a response rate goes around 30 % which is remarkable high for such kind of research. Hereinafter are showed similarities of the samples from the year 2006 and 2014 according to the number of teaching staff and the number of students because those figures indicates the size of HEI's in the sample.
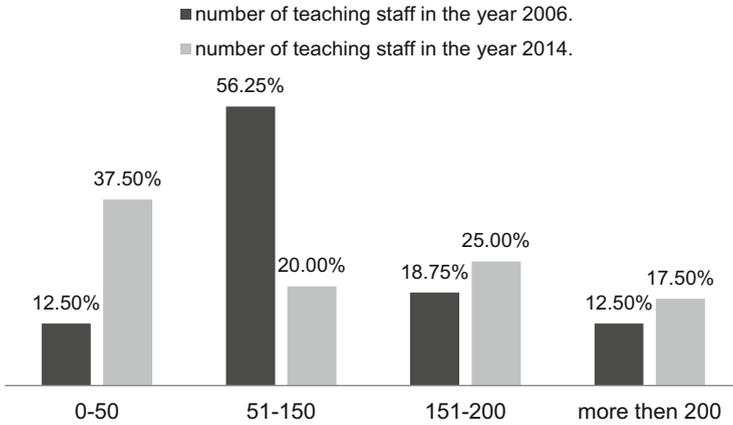
Fig. 1 Structure of HEI's according to number of teaching staff for sample of Deans. *Source*: Lutilsky (2006) and Dragija (2014)
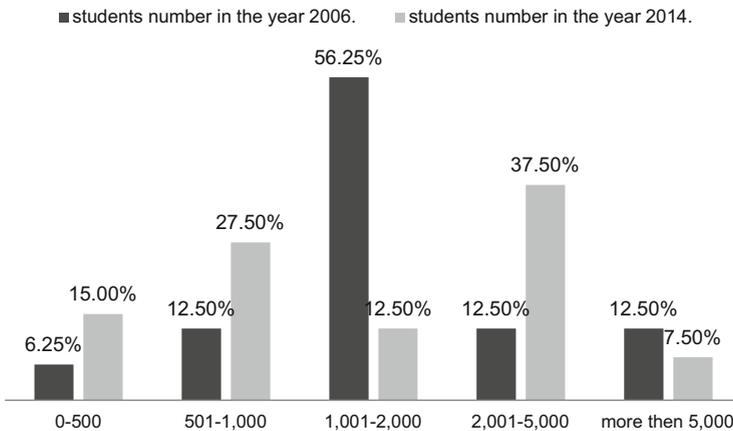
Fig. 2 Structure of HEI's according to student's number for the sample of Deans. *Source*: Lutilsky (2006) and Dragija (2014)

Firstly, we have compared higher education institutions according to the number of teaching staff for the sample of the Deans. From the Fig. 1 below it can be seen that in the year 2006 sample was mainly consist from the HEI's with teaching staff number from 51 till 150. While, in the sample in the year 2014 dominates teaching staff number from 0 till 50.

The structure of HEI's according to student's number is presented on the Fig. 2 for the sample of Deans. It is evident that in the sample in the year 2006 most observed HEI's have students number somewhere between 1001 and 2000. On the other hand, in the year 2014 dominates the group with student's number 2001–5000.

■ number of teaching staff in the year 2006.

■ number of teaching staff in the year 2014.
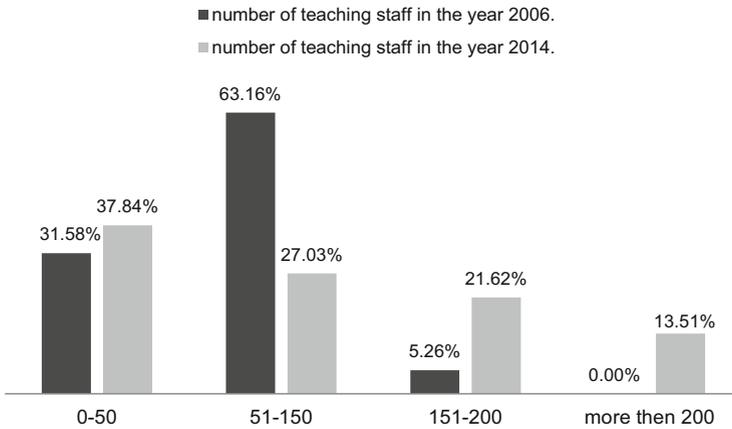
Fig. 3 Structure of HEI's according to number of teaching staff for sample of Heads of Accounting. *Source*: Lutilsky (2006) and Dragija (2014)

The same comparison has been done for the sample of the Heads of Accounting. From the Fig. 3 is obvious that in the observed sample in the year 2006 dominates the group with number of teaching staff from 51 to 150 while in the year 2014 most of Heads of accounting work at the HEI's with number of teaching staff between 0 and 50.

The structure of HEI's according to student's number is presented on the Fig. 4 for the sample of Heads of Accounting. It is obvious that in the sample from the year 2006 almost all groups are proportionally represented. While, in the year 2014 dominates the group with student's number 2001–5000.

The assumption which was confirmed with the research that was conducted in the year 2006 is that the set of instruments of cost accounting in public sector are not enough used (Lutilsky 2006). Research has shown that some instruments of cost accounting are used because they are proscribed by Budget Law and that some are not used at all. Lutilsky (2006) highlighted that in order to improve the usage of those instruments it is needed to accept accrual basis of accounting principle instead of modified accrual basis accounting principle like basic budgetary principle and for budget preparation and for financial reporting in public sector. Moreover, it is important to research the possibilities in appliance of International Accounting Standards for public sector which imply and suppose the acceptance of accrual basis of accounting principle. The benefits from cost accounting implementation in HEI's can be multiple and the aim of the research in 2006 was to point out on fields of cost and managerial accounting appliance (Lutilsky 2006).

A research conducted in the year 2014 showed that existing accounting information system of higher education sector in Croatia is still primarily aimed at complying with legal requirements of external reporting system. Dragija (2014) has investigated also usage of internal reports and it is necessary to point out that they mainly relate to revenues and expenses, and are compiled to support external

■ students number in the year 2006.   ■ students number in the year 2014.
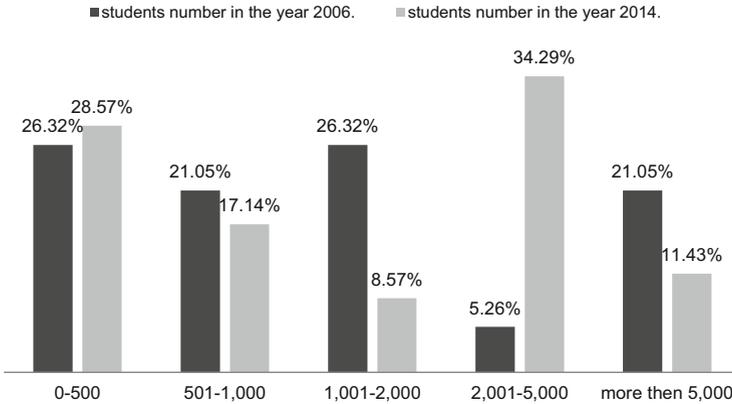
Fig. 4 Structure of HEI's according to student's number for the sample of Heads of Accounting

reporting, but not with a purpose to be in function of a more efficient and accountable higher education institutions' management but to fit external users' needs.

In order to precisely research trends in development of cost accounting within accounting systems of HEI's, authors have compared results of the same questions from the research in the year 2006 and 2014. A first question was regarding use of cost allocation methods within accounting systems of HEI's and heads of accounting were asked to state usage of cost allocation methods. This question is very important, especially in the context of recent trends of application of full costing methods within European HEI's (EUA 2008). From the Fig. 5, it can be seen that in the year 2006 more researched HEI's were using cost allocation methods then in the year 2014. For instance, in the year 2006 8.33 % of researched HEI's were using Activity Based Costing methods while in the year 2014 just 5.41 %. In the year 2014 75.68 % of researched HEI's stated that they do not use any cost allocation methods. This result is very surprising because we as authors have expected positive trend in application of cost allocation methods while these two researches indicates completely different situation.

We also tested usage of cost allocation methods by using Z test of hypothesis for the proportion for the year 2006 and 2014. The hypothesis that 60 % and more respondents answered that they are not using any cost allocation method is stated. At significance level of 5 % the null hypothesis cannot be rejected in the year 2006, while in the year 2014 the null hypothesis is rejected (see Table 1 below). From the test results the negative trend in usage of cost allocation methods is obvious because in the year 2006 more than 60 % of HEI's were using cost allocation method while in the year 2014 60 % and more weren't using any cost allocation method. It can be concluded that even though they are using some type of cost allocation methods, they do not allocate full costs since under modified accrual basis, depreciation costs are not recorded.

Further to the previous question, heads of accounting were asked to specify methods for determination of prices of higher education services. In the year 2006
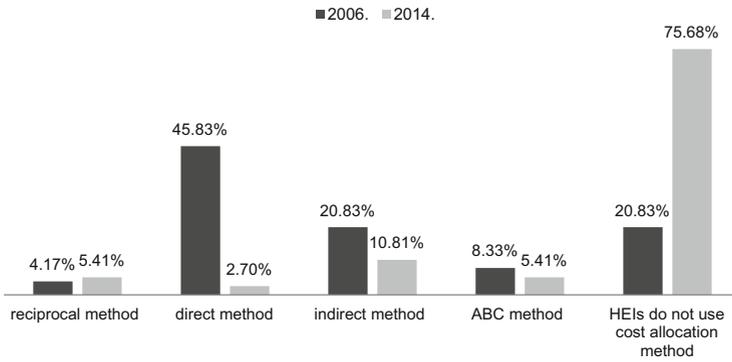
Fig. 5 Usage of cost allocation methods within accounting systems of HEI's. *Source*: Lutilsky (2006) and Dragija (2014)

Table 1 Z test of hypothesis for the proportion in the year 2006 and 2014

Z test of hypothesis for the proportion—year 2006		Z test of hypothesis for the proportion—year 2014	
Data		Data	
Null hypothesis	0.6	Null hypothesis	0.6
Level of significance	0.05	Level of significance	0.05
Number of items of interest	5	Number of items of interest	28
Sample size	24	Sample size	37
Intermediate calculations		Intermediate calculations	
Sample proportion	0.2083	Sample proportion	0.7567
Standard error	0.1000	Standard error	0.0805
Z test statistic	−3.9167	Z test statistic	1.9464
Upper-tail test		Upper-tail test	
Upper critical value	1.6449	Upper critical value	1.6449
p-Value	1.0000	p-value	0.0258
Do not reject the null hypothesis		Reject the null hypothesis	

Source: Lutilsky (2006) and Dragija (2014)

most of respondents answered that they apply full costing method or full costing plus margin method even though from the first question it is obvious that most of respondents do not allocate indirect cost and because of that real application of full costing method is questionable. The same conclusion can be drawn for the year 2014 because most of respondents also answered that they use full costing method. The data are presented in Fig. 6.

Heads of Accounting as well as Deans were asked to evaluate the importance of usage of cost and managerial accounting instruments for different purposes by using Likert five-point scale where grade "1" is fully not important and grade "5" is very important. In order to analyses answers for 2006 and 2014 authors have done Z test for Differences in Two Proportions where hypothesis were following:

Fig. 6 Methods for determination of prices of higher education services. *Source*: Lutilsky (2006) and Dragija (2014)
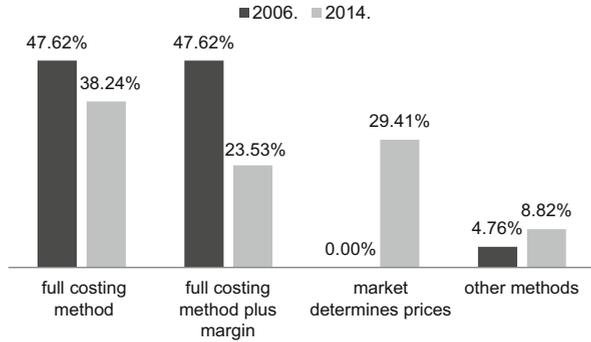
$H_0 \ldots p_1 - p_2 = 0$; $H_1 \ldots p_1 - p_2 \neq 0$. The hypothesis that different proportion of heads of accounting/deans in the year 2006 and in the year 2014 gives high importance (grades 4 and 5) of usage of cost accounting instruments is stated. At significance level of 5 % hypothesis were tested. The Z test results are given further in the paper, firstly for heads of accountants (Table 2) and then for deans (Table 3).

The Z test results for heads of accounting have shown that, at significance level of 5 %, that the same proportion of heads of accounting in the year 2006 and in the year 2014 gives high importance (grades 4 and 5) of usage of cost accounting instruments for cost planning, cost calculation, cost control and price determination (the null hypothesis cannot be rejected while p-value is higher the significance level 5 %).

The Z test results for deans have shown that, at significance level of 5 %, that different proportion of deans in the year 2006 and in the year 2014 gives high importance (grade 4 and 5) of usage of cost accounting instruments for cost planning (the null hypothesis can be rejected while p-value is lower the significance level 5 %. While for the process of calculating cost, cost control and price determination we cannot reject the null hypothesis because p-value is higher than the significance level 5 %. On that way it can be concluded that the same proportion of deans in the years 2006 and 2014 gives high importance (grade 4 and 5) of usage of cost accounting instruments for calculating cost, cost control and price determination.

The reason for those results could be fined in obligatory demands from Budget Law (2008) and Guidelines on budget classifications (2010). Budget classification are the framework in which revenues and receipts, expenses and expenditure are systematically presented by the holder, objective, purpose, type, location and source of funding. They are important for identification of the budget allocations made between budgetary users. Budgets and budgetary users are obliged to present receipt and revenues, also expenditures and expenses in the processes of planning, execution, accounting and reporting according to budget classifications. Regulation on budget classifications which is adopted by the Minister of Finance prescribes the types, content and application of budget classification. So the following budget classifications are prescribed: organizational classification, economic classification,

Table 2 Z test results for importance of usage of cost and managerial accounting instruments for decision making process for heads of accounting

Importance of usage of cost and managerial accounting instruments for decision making process for:	H_0	H_1	Z test statistic	p-Value	Decision
Cost planning	$H_0 \ldots p_1 - p_2 = 0$	$H_0 \ldots p_1 - p_2 \neq 0$	1.4117	0.1580	Do not reject the null hypothesis
Cost calculation	$H_0 \ldots p_1 - p_2 = 0$	$H_0 \ldots p_1 - p_2 \neq 0$	−0.3490	0.7271	Do not reject the null hypothesis
Cost control	$H_0 \ldots p_1 - p_2 = 0$	$H_0 \ldots p_1 - p_2 \neq 0$	−0.9269	0.3540	Do not reject the null hypothesis
Price determination	$H_0 \ldots p_1 - p_2 = 0$	$H_0 \ldots p_1 - p_2 \neq 0$	0.9543	0.3399	Do not reject the null hypothesis

Table 3 Z test results for importance of usage of cost and managerial accounting instruments for decision making process for deans

Importance of usage of cost and managerial accounting instruments for decision making process for:	H_0	H_1	Z test statistic	p-Value	Decision
Cost planning	$H_0 \ldots p_1 - p_2 = 0$	$H_0 \ldots p_1 - p_2 \neq 0$	2.8011	0.0051	Reject the null hypothesis
Cost calculation	$H_0 \ldots p_1 - p_2 = 0$	$H_0 \ldots p_1 - p_2 \neq 0$	1.0891	0.2761	Do not reject the null hypothesis
Cost control	$H_0 \ldots p_1 - p_2 = 0$	$H_0 \ldots p_1 - p_2 \neq 0$	0.7792	0.4359	Do not reject the null hypothesis
Price determination	$H_0 \ldots p_1 - p_2 = 0$	$H_0 \ldots p_1 - p_2 \neq 0$	0.3337	0.7386	Do not reject the null hypothesis

functional classification, location classification, program classification and sources of funding.

These classifications are primarily used for planning and budgeting and then for recording. So, at the end of the period users could have information about what was planned and what was used but under modified accrual basis and without all costs. More and more expressed demands for efficient public government and public management transparent work impose the need for new forms of reporting to which is impossible to satisfy without the usage of information about costs. Information about costs could be used for control purposes (planned—used) but it also may be useful as additional information for allocation of budgetary resources. It is the fact that in the process of budget preparation information about cost are insufficiently used. Instructions for budget preparation don't present and don't request such a model. Use of cost information is sporadically and on voluntary basis (without prescribed procedure).

So, we can conclude that there is a good basis in Croatian Budget Law but under wrong principle. Under accrual basis, information on cost can be used for control purposes and cost reduction. It is possible to compare real cost with different basis: with planned costs in programs (activities), with standard costs, with costs in similar programs (activities), with cost in time horizon, etc. The goal is to determine the difference, cost variances, make revision and take measures.

4   Conclusion

Today, when the costs of higher education are constantly increasing followed by growing demands on HEI's both in education and research it is very important to track and control costs in appropriate way. First step in responding on these claims is that HEI's identify the real costs of their activities and for that it is necessary to implement cost accounting instruments. The cost accounting usually stands for the ability to identify, calculate and allocate all direct and indirect costs of all HEI's activities, including projects. But, majority of Croatian HEI's does not use any cost allocation method and that reflects on their systems of funding.

Under cost accounting instruments the quality and reliability of financial statements will be improved and significant data from which the key performance indicators could be calculated and counted. It would be possible to maintain effective control of resources, but also monitoring the qualitative and quantitative information which would improve HEI's management and decision-making process. It would be possible to monitor the administration of HEI's through reliable accounting information, both financial and non-financial nature.

More and more expressed demands for efficient public government and HEI's management transparent work impose the need for new forms of reporting to which is impossible to satisfy without the usage of the set of instruments of cost accounting. Those set of instruments are unavoidable in a management process in HEI's, such as: budgeting, cost control and cost decreasing, determination of prices and

remunerations, measurement of performance, program assessment, different choices for economic decisions and taking actions to increase effectiveness and to raise quality of services by decreasing costs. Then it is necessary to define the methodological base for preparation of internal reports. They will depend on the right choice of adequate system and method for cost calculation and cost allocation.

Through this paper authors concluded that cost accounting can contribute to more effective and efficient management, but there are certain risks and costs regarding their implementation. Different methods of cost allocation based on the same input data give different information output about costs. Because of that, different information about costs influence differently on decision making process (operative, tactical and strategically decisions).

Comparison of conducted researches in 2006 and 2014 has shown negative trend in usage of cost accounting instruments in Croatian High Education Area. Precisely, statistical analysis has showed that in the year 2014 less higher education institutions were using cost allocation methods then in the year 2006. Therefore initially set hypothesis was confirmed.

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Comparing the Value Relevance of Cash Flow Ratios and DU Pont Ratios under IFRS: A Case Study

Gokce Sinem Erbuga

Abstract In this research, the main aim is to point out the importance of financial reporting from the companies' both internal and external points of view. For this reason it is good to emphasize that the accounting knowledge that will be gained by the companies' financial reports leads the way in decision making process of the internal and the external environment of the companies. Within this context, the financial ratios have been classified and described. By the reason of the fact that cash flow ratios and Du Pont ratios are the key considerations of the research, these mentioned ratios have been examined in more detail. While taking the next step, the value relevance of the cash flow ratios and Du Pont ratios have been compared. Within this value relevance comparison process, the companies that take place in BIST 100 have been taken into consideration. While comparing the value relevance of the cash flow ratios and Du Pont ratios of the BIST 100 companies, the effects of the CFFO, ROA, and ROE on the companies' stock prices and stock returns have been examined. Based on the findings that are obtained from the research, ROE and ROA are consistent with the stock price and/or return.

Keywords Financial ratios • Cash flow ratios • Du Pont ratios • Value relevance • BIST 100

1 Introduction

In international markets with the development of IT and communication facilities, there are no boundaries left in terms of accounting discipline. In financial reporting practices, there is an obvious need of setting common standards; so within these common standards which are termed as IFRS—International Financial Reporting Standards, firms should prepare their financial reports. Under favor of IFRS, it is

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possible to say that firms all around the world are talking in the same accounting language.

Decision makers who are taking part in firms' internal and external environment demand to assess the firms' financial situation and financial performance. Because of this reason, relevant and reliable accounting information about firms' financial structure, situation and performance should be provided by the decision makers. Besides this, firms' financial reports also provide transparency and accountability at a level of accounting transactions. Furthermore, financial reports play a guiding role in making economic decisions such as investment decisions and show the results of the financial and operational activities of the firms that are planned to invest.

Financial ratios that are acquired via firms' financial reports, procure accounting information about the firms' performance that put in. Analysis of the given ratios which is a really conventional way of reading the results of financial reports is being used highly by the decision makers of firms' internal and external environment. A vast majority of investors take the advantage of using accounting numbers. By means of this accounting data gained from financial reports and with the help of valuation models, investors can gain insight about the firms' stock prices and firm values. Making an appraisal of firm values correctly, enables firms to determine their own stock price.

The statistical relationship between accounting numbers which are gained from financial reports and market values of the stock prices is presented via "value relevance analysis". Although first researches about value relevance were done by Miller and Modigliani (1966) and Amir et al. (1993) was the first researcher who used the "value relevance" term.

Value relevance researches are based on the relationship between accounting numbers and market value of the stocks and in the value relevance studies the main goal is to describe the intertemporal changes of stock prices via accounting numbers. The value relevance researches which are made for this purpose deal with the value relevance of earnings, cash flows, book values, accounting and non-accounting variables. In accounting literature, a vast majority of the value relevance studies examines the impact of accounting measures such as stock prices on the market value of equity (Beisland 2009).

This study aims to compare the value relevance intensity of cash flows and Du Pont ratios within IFRS in consideration of value relevance concept. Being able to do this comparison, financial data of the firms which are traded at the BIST 100 (Borsa Istanbul), was obtained from the companies' financial reports.

2 Value Relevance Literature

2.1 What Is Value Relevance?

There is a large, extant value relevance literature in accounting discipline and the concept of "value relevance" is described in many different ways in accounting literature. Beaver (1968), Ohlson (1999) and Barth (2000) identify value relevance term over the relationship between accounting measures and capital market (Barth et al. 2001). Beisland (2009) claimed that Barth et al. (2001) characterize value relevance research elementarily as the research that inspects the connection between accounting measures and the market value of equity. On the other side, Francis and Schipper (1999) argued that the value relevance of the accounting information is the skill of accounting information due to the fact that it is used for summarizing the underlying data of stock prices. Alternatively, Karunarathne and Rajapakse (2010) describe value relevance as the capacity of the financial information obtained from financial statements in identifying the measures of securities markets. Aboody et al. (2002) derived their definition from other definitions of value relevance and concluded that the concept of value relevance is equal to the present value of expected future dividends.

2.2 Literature Review

In the last 20 years, especially in the international capital markets, value relevance researches come in to prominence rapidly. Value relevance research about the relationship between accounting information and capital markets was first commenced by Miller and Modigliani (1966). In addition Beaver (1968) created the theoretical structure to test the aforesaid relationship empirically. Ball and Brown (1968) conducted the first research which examines the relationship between the accounting performance measures such as earnings, cash flow from operations etc. and stated that earnings and return of the stocks are highly related with each other.

In the value relevance researches, value relevance of the accounting variables such as earnings, cash flows, book values etc. and non-accounting variables have been evaluated (Karunarathne and Rajapakse 2010). Value relevance researches are especially trying to reveal the relationship between the change in the market value of equity and value creation which is measured by the accounting system. In the analysis for reaching the aforementioned goal, the change in the stock price or the return of the stocks can transform into accounting earnings (Beisland 2009).

Value relevance studies are working on the connection between the stock prices and the accounting measures while trying to find out whether accounting measures have any effect on assessing the firm values (Holthausen and Watts 2001). Value relevance literature benefits from the stock prices because these prices serve cohesive information about assessment of firms by individual investors (Lambert

1996). Value relevance researches which are based on the modern capital market (CMBAR—Capital Market Based Accounting Research) were carried out by Ball and Brown (1968) and Beaver (1968). CMBAR mostly makes a choice between the price and income models. Early value relevance studies generally are based on the price model that created by Ohlson (1995) and its elaborations with improvements (Feltham and Ohlson 1995; Al-Hares et al. 2012).

Although Ball and Brown (1968) make significant contributions to the value relevance literature, there are some other supportive studies which are taking into consideration different dynamics of the relationship between accounting numbers and stock markets such as Beaver et al. (1980), Kothari and Zimmerman (1995), Easton and Harris (1991) and Ohlson (1995). In other respects, further researches handled by Ohlson (1995) and Ohlson and Zhang (1998) about value relevance, propound the conception of identifying the price of stocks by both earnings and book values. In the previous studies (Barth et al. 1993, 1998; Collins et al. 1999), the effects of earnings and book values on the price of stocks are presented clearly and empirically. According to the results of Ohlson and Zhang (1998) got, relative weights of earnings and book values can be changed depending on the accounting methods that show firms' constant earnings in a realistic way (Cheng et al. 2005).

Collaterally to the previous researches, Hung (2001) identified the value relevance of the financial statements by the way of the relationship between accounting data and market price (Chang 1998; Francis and Schipper 1999). According to Whelan (2004), there should be three standards for the financial statements that are prepared by the firms to talk about their value relevance. These standards are: earnings of a firm that can be seen in the firm's income statement, book value that can be seen in the firm's balance sheet and cash flows that are shown in the firm's cash flow statement.

2.3 An Overview of the Value Relevance of Cash Flows

Cash flows say a lot to the financial statement users about firms' capacity of creating cash and cash equivalents. IAS 7 expands on the cash and cash equivalents definitions *"Cash and cash equivalents comprise cash on hand and demand deposits, together with short-term, highly liquid investments that are readily convertible to a known amount of cash, and that are subject to an insignificant risk of changes in value."*

Cash flow statement which classifies cash flows during the period according to operating, investing, and financing activities requires the presentation of information about the historical changes in cash and cash equivalents. Cash flows from operations (CFFO), supply information about the firm's internal sources for satisfying the cash need of the firm. Cash flows from financing activities (CFFF) enable to get value relevant information about the firm's financing activities. Cash flows from investing activities (CFFI) allow for getting information about the liquidation value of the assets in hand of the firm and capital expenditure. The size of the cash

flows, in the case of the firm's limited cash flows, shows that the growth opportunities for the firm is too limited and provides the related value relevant information about the given situation (Karunarathne and Rajapakse 2010).

2.4 The Models Used in the Value Relevance Literature

As Chen and Dodd (1998) mentioned, researchers on the behalf of comparing the informational profitability of the different income and cash flows levels, develop two approaches in the value relevance literature (Ball and Brown 1968; Beaver and Dukes 1972; Patell and Kaplan 1977; Cheng et al. 1996; Biddle et al. 1997; Chen and Dodd 1998). These two approaches are the relative information content and the incremental information content.

In the relative information content, the main aim is to find out the ideal determinative of the firm's financial performance on its stock returns such as the firm's earnings or the amount of the firm's cash flows. On the other hand, in the incremental information content is interested in if additional information is obtained from the other measures to the information got from one measure. In the relative information content, it's important to single out the measure that reflects the firm's performance in the most realistic way. Besides that, having looked at the incremental information content deeper, it can be said that it helps deciding if performance measures are going to take part in the financial reports or not (Chen and Dodd 1998).

There are two main models used in the value relevance literature (Alali and Foote 2012): the income-earnings model that is developed by Easton and Harris (1991) and the price-earnings model that is set up by Ohlson (1995). In the value relevance researches, it is assumed that investors reach a consensus so that it will be reflected on the stock prices (Barth et al. 2001). A vast scale of the empirical valuation researches that are done during the recent years employ Ohlson Valuation Model while carrying out their theoretical evaluation. The researches that are carried out in the industrialized markets benefit from the price model while assessing the value relevance of the accounting information. Aforementioned these researches incorporate market value, book value, and reported earnings into the model as its function. Akbar and Stark (2003), Barth et al. (1998), Bernard (1995), Bettman (2007), Brief and Zarowin (1999), Collins et al. (1997), Green et al. (1996), Hand and Landsman (2005), Rees (1997), and Stark and Thomas (1998) instantiate especially on the value relevance of the earnings and book values.

2.5 Ohlson's Valuation Model

In this day and age, Ohlson's Valuation Model (OM) and its refinements are used in the value relevance researches (Feltham and Ohlson 1995, 1996; Ohlson 1999; Liu

and Ohlson 2000). In the OM, the main assumption is based upon the idea of firm value is the linear function of the equity book value and present value of the expected abnormal earnings to be generated in the future. The OM also hypotheses about the existence of the perfect competition market like in the other valuation models. Because of correlating observable accounting data with value, OM is playing a major role in the valuation literature (Lo and Lys 2000). The OM has a high explanatory power so that the value relevance researchers can use the model in business policy proposals. In the last 30 years, the OM enables to develop an internally consistent valuation equation for price levels and returns instead of many temporal models (Lo and Lys 2000). There is also negative criticism intended for the OM. In the value relevance literature the main assumption is the existence of efficient markets. However, if the market is not efficient, contrary to what is believed, there can be doubt in evaluating the results of the value relevance researches that accept the similar market price as a dependent variable. Bernard (1995), and Holthausen and Watts (2001) also mentioned this issue in their researches. An important point to consider about the value relevance literature is the value relevance researches are not used for estimating the firm values.

3   Financial Reporting and Financial Ratios

Until the beginning of the twentieth century, the main purpose of the firms' was to maximize their profit. But nowadays this purpose is differentiating into maximizing the shareholders' profit of the firm. In other words, at the present time the main aim is to maximize the firm's net present value in the sense of its shareholders. For this purpose, firms are reporting their financial positions and performances and benefit from the financial statements that are prepared at the end of reporting process (Birgili and Duzer 2010).

According to Haskins et al. (2000), the financial statement analysis is the process of seeing over the financial information that is obtained from the financial statements prepared by the firm to assess its operational performance and interpreting. The comparability of the accounting information that is gained by the financial statements helps to forecast about the future in a more realistic way. When considered from this point of view, it is clear to see that the financial statement users can make a comparison via financial ratios. Due to their functions, financial ratios are used in business analysis frequently.

Analyzing the financial statements with the help of the financial ratios is carried out by establishing a significant relationship between the financial statement items. In other words, financial ratios are generally calculated by dividing each of them into the other financial statement items. Mostly financial ratios are seen as information that allows for forecasting about the future and because of this reason, it is accepted that financial statement ratios are value relevant in the process of forecasting the expected future ratios (Nissim and Penman 2001). Financial ratio analysis should be conducted between homogeneous measures that have same

meanings for the financial statement users. Ratio analysis is a financial tool which should be considered with the firm's goals (Akdogan and Tenker 2007). Via financial ratios, the economic structures of the firms can be seen clearly and by using these ratios, share prices of the firms can be forecasted substantially (Tesfatsion 2004). Almost all the researches that inspect the relationship between the financial ratios and stock return assume that there is a linear relationship between the related variables (Buyuksalvarci 2010). On the other side, some studies show that the relationship between the financial ratios and stock returns is non-linear. Mramor and Mramor-Kosta (1997) conducted the first scientific research proves this nonlinear relationship.

3.1 Financial Ratios Used in the Research

In this research, the primary goal is to compare the value relevance of the cash flow ratios and Du Pont ratios; so that cash flow and Du Pont ratios should be examined in a much more detailed way amongst the other ratios.

3.1.1 Cash Flow Ratios

Financial statement users want to reach the information of the generated cash flows by the firm for assigning the position that the firm is in about the issue of creating the cash and cash equivalents. Because of the reason that the cash flow information of the firm is guiding to the financial statement users, it has a key role for the investors. It also requires a careful evaluation for making economic decisions about the firm by the financial statement users and assessing the firm's ability to generate cash and cash equivalents, their timeliness and conclusiveness. As mentioned in Fig. 1, cash flow statement classifies cash flows during the period according to operating (CFFO), investing (CFFI), and financing (CFFF) activities of the firm.

Cash flow from operational activities or cash flow from operations (CFFO) is a significant sign for having the financial power of self financing. In other words, it shows if the firm has the ability to pay its debts without any help of some external financial sources, keep going on its operations, pay dividends and make new investments. CFFO gives the chance of forecasting future cash flows in case being evaluated with other related financial statement items and information. When analyzing the cash flow ratios, cash flows and other measures are being correlated with stock prices by the regression method directly. In this approach market value (or the stock price if per share data is used) or stock return (see Dechow 1994; Francis et al. 2003; Liu et al. 2002, 2007; Barton et al. 2010) is used as a dependent variable. The variable that describes the definite market value the best is assumed as the preeminent one.
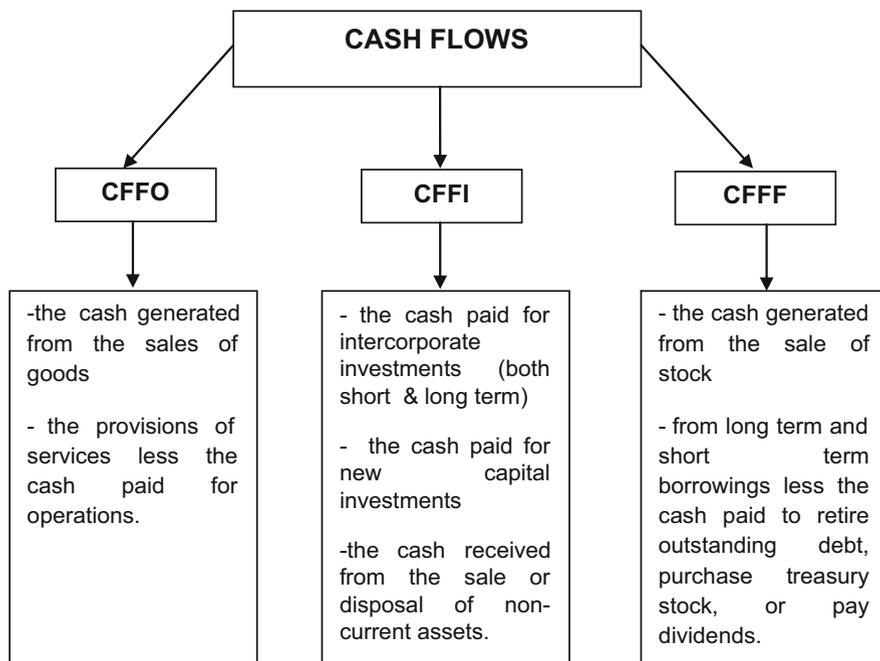
Source: Haskins et al. (2000)

Fig. 1 The components of cash flows. *Source*: Haskins et al. (2000)

3.1.2 Du Pont Ratios

At the beginning of the 20's, some big companies such as Du Pont and General Motors started measuring segmental profitability of each segment of their companies via using return on investment ratio (ROI). ROI ratio is a performance measure that provides to establish a relationship between profit and the equity that is used for generating this profit (Chen and Dodd 1998).

Du Pont Analysis aims to identify the relationships between financial ratios during the measuring process of firm's profitability. Du Pont Analysis is working up on the issue of inspecting, describing, and presenting the elements that are determining and affecting the firm's profitability (Buker et al. 1997, 2nd edn). The Du Pont System is based on the balance sheet and income statement and sets two profitability measures. They are return on assets (ROA) and return on equity (ROE) (Gitman 1997). Also Du Pont System (Bartlett and Chandler 1997) is being used at the aim of evaluating the firm's financial situation by decomposing the financial statements into its components. By the help of two measures of profitability—ROA and ROE—Du Pont Analysis handles balance sheet and income statement together (Castro and Chousa 2006). Smith (1999) states the Du Pont equation systems in Fig. 2.

$$ROA = \text{Net Profit Margin x Asset Turnover}$$

$$ROA = \frac{\text{Net Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total Assets}}$$

$$ROE = ROA \text{ x Financial Leverage}$$

$$ROE = (\text{Net Profit Margin x Asset Turnover}) \text{x Financial Leverage}$$

$$ROE = \frac{\text{Net Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total Assets}} \times \frac{\text{Total Assets}}{\text{Equity}}$$

Fig. 2 Du Pont equation system

RETURN ON INVESTMENT (ROE)		
PROFITABILITY	**ASSET TURNOVER**	**FINANCIAL LEVERAGE**
- Cost of goods sold / revenues - Gross profit / revenues - S,G & A / revenues - R&D expense / revenues - Interest expense / revenues - Income before taxes / revenues - Income taxes / revenues	- Current asset turnover - A/R turnover - Days' receivable collection period - Inventory turnover - Days inventory on hand - A/P turnover - Days payable period - Non-current asset turnover - PPE turnover	- Quick ratio - Operating cash flow ratio - Total liabilities-to-equity ratio - Long-term debt-to-equity ratio - Interest coverage ratio

Source: Haskins et al. (2000)

Fig. 3 The components of return on investment (ROE)

The Du Pont Analysis is a financial analysis that is based on the equity profitability and it is composed of three financial ratios: net profit margin, total asset turnover (ROA) and equity multiplier (Collier et al. 2010). As it can be seen from the Fig. 2, the Du Pont System that is used in the financial statement analysis process contains most of the traditional financial statement ratios in ROE (Penman 1991) (Fig. 3).

4 Data and Methodology

The main aim of this study is determining which accounting variables of the firms' are more effective and decisive. To make this detection, it is so important to specify which accounting variables will take place or how the variables will impact stock prices. So that the firms that are traded within BIST 100 (Borsa Istanbul 100) index are included in the research. 37 firms out of this mentioned list of firms that are traded at the exchange are classified as financial institutions so because of this

reason these 37 firms are eliminated from the concept of the research. In this study, non-financial institutions are being taken into consideration. Besides this, Besiktas Futbol Yatirimlari (BJKAS), Fenerbahce Futbol (FENER) and Galatasaray Sportif (GSRAY) imply different reporting period processes; so that these 3 firms are left out of the scope of the research. The accounting data will be analyzed for the years between 2005 and 2013.

After eliminating the financial institutions and the firms that have a specific reporting dates, there are 60 firms included to the research; so that for these 60 firms, the data of their total assets, total liabilities, net profit, net sales, CFFO and stock prices was collected. In addition, the stock returns were calculated over the stock prices for the term of 2005–2013. All this data is available in the official site of Borsa İstanbul. The independent variables that were used in the model are CFFO, ROE, and ROA; while the dependent variables are price and return.

4.1 The Research Model and Hypotheses

The accounting variables that used in this research are return on equity (ROE), return on assets (ROA), and cash flows from operations. The effects of the independent variables (ROE, ROA and CFFO) on the stock prices are inspected on the base of price and return. Also it is observed if the variables make any difference or if there is any significant relationship between ROA, ROE, CFFO and stock price and return. The research model that shows all this process can be shown like this (see below Fig. 4):

Assuming that there is a relationship between the financial ratios (ROA, ROE, and CFFO) and the stock price and return, the following hypotheses can be set up:

H1: There is a significant relationship between the CFFO and firm's stock prices.
H2: There is a significant relationship between the CFFO and firm's stock returns.
H3: There is a significant relationship between the ROA and firm's stock prices.
H4: There is a significant relationship between the ROA and firm's stock returns.
H5: There is a significant relationship between the ROE and firm's stock prices.
H6: There is a significant relationship between the ROE and firm's stock returns.

Fig. 4 The research model
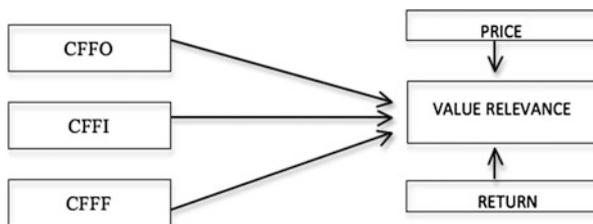
4.2 Tests of Hypothesis

The hypotheses that are determinated by the research model are tested one by one to determine if there is a significant relationship between the stock prices and returns. Panel data analysis which is also known as a cross-sectional analysis is applied for showing the firms' financial performance over the years. At the different stages of the analysis, it is possible to include several variables. This feature of the panel data analysis is one of the most important advantage that provided by the analysis. There are two methods that are used in the panel data analysis: fixed effects model and random effects model. Random effects method is used in this research. If there are some differences between the firms that are going to be used in the analysis and these differences have effects on the dependent variable of the model, the method should be used in the analysis is random effects method. Random effects method is playing an important role because it is independent from time or in other words, this method is including the variables that are not changing from time to time. It can be stated as follows:

$$Y_{it} = \beta X_{it} + \alpha + u_{it} + \varepsilon_{it} \qquad (1)$$

The random effects method assumes that the firm's error term is not related to the time independent variables and it also allows generalizing the results acquired. When the hypotheses are tested one by one according to the random effects method, the results are presented in Table 1.

According to the panel data test results, H_1, H_2, H_3, and H_4 are accepted while H_5, and H_6, are rejected. These results present that, there is a significant relationship between CFFO and the share price; CFFO and the share return; ROA and the share price; ROA and the share return. On the hand, there is no significant relationship between ROE and the share price and share return. R^2 is the main determinant of the model's explanatory power; the bigger R^2 gets, the higher explanatory power that the model will have. It can be seen from the test results that CFFO is the variable which has the most significant relationship with the stock price (CFFO overall R^2 value $= 0.0408 >$ ROA overall R^2 value $= 0.0157 >$ ROE overall R^2 value $= 0.0029$).

Table 1 The results of the hypothesis tests

Hypotheses	P-values	Results
H_1	CFFO$-$P$=0.016$	Accepted
H_2	CFFO$-$R$=0.000$	Accepted
H_3	ROA$-$P$=0.028$	Accepted
H_4	ROA$-$R$=0.018$	Accepted
H_5	ROE$-$P$=0.943$	Rejected
H_6	ROE$-$R$=0.309$	Rejected

5 Conclusions

The value relevance researches are based on the relationship between the accounting measures and the stocks' market values and in these researches the main aim is to describe the changes in years by the accounting amounts. This research is showing parallelism and aiming to shows how do CFFO, ROA, and ROE affect the price and the return of the stocks. According to the findings that are reached by the research, CFFO, and ROA have a significant relationship with the stock prices and returns. On the contrary, ROE does not have a significant relationship with the stock prices and returns.

As a conclusion, this study finds out that it is beneficial to use relevant accounting information by both internal and external financial statement users while making decisions about investments. With the help of the relevant accounting information, financial statement users will have more accurate foresight about their investment decisions. Having relevant information about return and price, will eliminate ambiguity of the stock market and help investors to be aware of possible opportunities which will be generated by the trends in the market.

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Assurance of a Credible Financial Information: A Product of Convergence Between Prudence and Continuity by Statutory Audit and a Good Corporation Governance

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Abstract The current economic world is dominated by market globalization. The economic and social development presupposes an economic balance and cultural globalization. These manifestations also influence the business common language, that of accountancy and determine the company way of thinking and expressing, the entity management, the control and administration of their resources, as well as its principles, accountancy methods and specific practices of elaborating and presenting financial statements. The business globalization recommends and obliges the entity management to implement corporation governance and calls for statutory audit to offer, in general, the users a guarantee that the financial statement is correct and credible. Moreover, the entire accountancy process, by which a financial statement is obtained and which must be transparent for the users, is totally grounded starting from the idea of investment protection and of a credible management for the users. The accountancy logic starts and permanently has in view to apply correctly the prudence principle—a basis for accountancy conventions and a condition of provisional character of accountancy offered by going concern.

Keywords Financial information • Prudence principle • Activity continuation • Corporation governance • Statutory audit

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1 Introduction

The primordial interest in economic and accountancy culture and practice in general is connected with the accuracy in accountancy. The accuracy in accountancy is no more than the product of a compromise between expectancies and exigencies in normality and for producers the report between sincerity and regularity. Truth accounting is useful to all stockholders interested and implied in the development of economic activities as long as it is reported clear, consistent and concise. The uniformity in accounting requires normalization.

The effort in normalization is made to obtain the following effects in the production of financial information: a precise and identical terminology of principles, conventions and accounting norms for all producers and users of financial information; the assurance of comparison in time and space of the relevance and credibility of financial information as a starting point, as a basis for the need of a source of control, examination, ratification (audit, management, governance) of prevision and strategy (analysis, statistics, marketing) of financial information.

2 Literature Review

2.1 Financial Information under the Empire of Uncertainty and Risk: The Prudence Principle—An Instrument of Present Social Consensus

The product—the economic reality is a complex one to which may take part the principles, the rules and procedures meant to obtain the accuracy of financial information. From this reference system all the components have a well determined role and their convergence leads to obtaining financial expectancies. Under the market economic conditions and especially in actual economic crisis, risk and prudence have got relevant valences in treating the inputs in accountancy so that the outputs be adequate.

In modern accountancy with its quality of measuring instrument, of informational instrument of social intermediation there are opinions that prudence is no longer a virtue and that evaluation is a problem of accuracy. Where there is relevance and credibility, according to Ristea et al. (2009), accountancy is likely to issue an objective message and truth and there are as many truths as there are receivers of information and as long as it does not consider quality, the reduction effect of each measurement is inevitable.

As regards to the prudence principle, IASB appreciates that many operations inevitably manifest uncertainties. It is agreed to take into account all these using the prudence test in drawing up financial situations. In the same time, prudence does not justify the making of latent or occult reserves (Petre 2013).

In the dynamics of the actual economic life, accountancy is not only a social economic science but also a management science. The relevance of financial information is defined according to three qualities: opportunity, retrospective character and predictable value. The accuracy of financial information is given by an exact, verified and neuter representation of reality. Since the financial information contributes to the wealth redistribution, the accountancy is considered today a normalized financial practice. Accountancy is a mature discipline, a component of management science due to the repositioning of scientific social disciplines.

Why should social-economic entities apply or not the prudence principle? The prudence principle is applied as long as the entity looks for obtaining some advantages in their relationship with third party. The presentation offered by accounting information is "made-up" to give a more advantageous information of the entity in its relations with the third party, and not the real one. The inherent risks and uncertainties must be taken into consideration as regards assessment methods. The changing of economic life presupposes the permanent update of assets and liabilities by real value and by recovering debts.

The prudence principle is important as regards the value estimation, since in many situations as a result of prudence, the assets value reported in financial statements is lower than the real one, at the date of balance. The plus value resulting from the fact that the asset recovering value is at the date of balance higher than the historical cost, makes some of the assets be underestimated in balance as a result of prudence principle. If tried to eliminate this informational shortcoming by using current costs the prudence principle would be broken as it presupposes the registration of value increase for assets and admission of some gains which were achieved and which might influence in a negative way the entity treasury.

All these measures are reflected in the result of the present exercise, which summarizes the effect of the future events. Prudence, under estimations of assets and overvaluation of liabilities in a period of time, leads to the overvaluation of financial performances in the periods to come, which cannot be described as prudent or neutral. Therefore prudence affects the exact representation since where there is conservationism there is lack of consistency with neutrality.

An answer to neutrality would be the estimation of assets, liabilities, capital, incomes and expenditures by real value. The evaluation of assets and liabilities held by an entity at real value, generating plus/minus value, known as elements of result or as elements of proper capital, but which breach the prudence principle. Prudence treats asymmetrically elements which concur with the presentation of financial position and of financial performance, as follows: there are registered value movements of assets, possible debts; there are not registered value rise of debts, probable assets; financial result represents the difference between the incomes acknowledged by the market (without obtained production), expenses respectively, as a sum of product cost and the constant conventional cost. The omission of the increase of assets value, the diminution of debts and of some possible profits determine the lack of accuracy of financial information; accounting amortization taken in consideration when settling costs does not tally with economic depreciations.

Moreover, prudence determines within amortization the use of some shorter periods of operation, while taxation imposes the practice and the calculus of an accounting amortization superior to economic amortization. This accounting treatment determines some differences between the result of financial accounting and that of management accounting; depending on the business development, during the periods of growth, the entities will be tempted to use prudence as a means of justifying the registration of provisions, amortizations and exaggerated adjustments, and during the periods of stagnations or decrease will use provisions and adjustments as means of improving results; starting from the relationship of the enterprise with the economic environment to maintain and develop activity, the entity will have the tendency of being inactive under the prudence empire; (inevitably in any operation developed by an entity, it will take into consideration the risk changing the desire to investments and in the same time the realist and optimistic vision of management).

In conclusion, the prudence principle acts upon financial standings as follows: financial information registered by balance does not give a real state of assets and liabilities values due to their unequal treatment of value pluses and minuses; information offered by the profit and loss account does not represent the real entity performance due to admission of all depreciations, losses and debts although they can become clear only between the balance date and the date of its drawing-up; financial information covers the accountancy juridical role (applying the prudence principle) by complementary information to those in the balance and in the profit and loss account, by explanatory notes which offer the real status of entity activity.

The prudence principle is one of the most debated principle, as it distorts the image of financial position and performance for at least two reasons: (a) it is not allowed to take into account the value increase registered by assets, even they are certain, while minuses, even if casual must be taken in consideration; (b) it is not allowed to take into consideration the diminutions of value registered by debts, while plus values, even if casual, must be considered.

The accounting normality for all countries, with some differences, contains among accounting principles and conventions, the prudence principle which is meant to offer a margin of security to all users of financial information, it does not lead to showing financial position and financial performance in a subjective way by avoiding the risks and uncertainties which occur in future. So, in Austria, Germany, Luxembourg, prudence is a principle prevailing over all the other principles which have to be applied in making financial standings. For Anglo-Saxon countries, prudence is one of the qualitative characteristics of financial information to third party.

The general accounting plan in France introduces asymmetry by which the prudence principle treats "in the reasonable estimation of facts before avoiding the transfer risk in future of uncertainties presented which are susceptible of entailing the patrimony and the entity results". This principle is the source of two fundamental treatments of actual accountancy: the asymmetric treatment of minuses and pluses susceptible of affecting the value of an asset and taking into consideration some future facts which risk to affect the patrimony. When asking

"who is the most interested of users in applying the prudence principle?", the state is an interesting user to be watched due to its double quality—of normalizer that is tax and duties collection.

By applying or not the prudence principle, the following appreciations can be made for the state-users: on a short term, the state apparently can benefit if the principle is not applied, as the overestimation of incomes, a higher profit, determines higher taxes and duties, therefore higher budget revenues; If it is taken into consideration the risk level represented by different taxes and duties, added value tax, exercises are frequent contributions with a relative certainty. Income tax and profit tax of small enterprises implies uncertainty depending on entity capacity to maintain and develop final results.

All the other users, especially the suppliers, the creditors, the employees and not only are concerned with entity being unable to make permanent payments and implicitly to go bankrupt. In this way, these users do not want the systematic breach of prudence principle as the overestimation of incomes and assets, the underestimation of expenditures and debts respectively would determine the remuneration of state and of shareholders, which would entail liquidities going out of entity, without a real coverage (Tutueanu 2015). Prudence can be interpreted in different ways. The restrictions mentioned before are present in Romanian accounting legislation, too.

The accounting mechanisms in which the prudence principle can be applied are the following: in the profit and loss account can be included only the profit achieved at the date of balance; all the debts occurred during a current financial exercise or a previous exercise will be taken into consideration even if they become evident only between the date of balance and the date of its drawing-up; there must be taken into consideration all the predictable debts and potential losses occurred during current financial exercise or a previous financial exercise even if they become evident only between the date of balance and the date of its drawing-up; thus there are taken in view the possible provisions as well as debts resulting from contractual clauses; there must be taken into consideration all the depreciations whether the result of the financial exercise is a loss or a profit; the registration of adjustment for depreciation or loss of value are made having in view the expenditure accounts, no matter their impact on the profit and loss account.

2.2   Prudence: A Pillar of Going Concern

Starting with any view as regards the prudence principle, although it must be applied during the entire period of an entity activity, it is more active when evaluating at the end of an exercise (when settling the inventory value of goods and adjustment with entering value when considering all the value adjustments caused by depreciations or value losses depending on the nature of elements evaluated). The prudence principle imposes a skeptical opinion of past, present and future actions, without creating hidden reserves or exaggerated provisions. All

this logical measure is relevant to support the logic of other accounting conventions especially that of going concern.

A first debate around this concept is represented by the integration into one of the notions of accounting postulate, concept, principle. Addressing the business continuity concept is different depending on the studied referential. The U.S. accounting standards include it into the category of postulates, The General Framework developed by the International Accounting Standards Board considers it a basic concept, together with accrual accounting and the Fourth European Directive calls it a principle.

In the accounting literature, the debates on the classification and definition of business continuity are numerous. The Accounting Referential defines business continuity as a hypothesis or an assumption that the entity will continue its activity for an undetermined period. According to the International Accounting Standard 1 "The Presentation of the Financial Statements", the business continuity principle is one of the most important principles, greatly influencing the format and values in the financial statements.

The general framework of the International Accounting Standards Board stipulates that the financial statements should be ordinarily elaborated starting from the hypothesis that the company will continue its activity in a predictable future without the intention or the need to dissolve or significantly diminish its activity. If there is such an intention or need, the financial statements could be drawn up according to a different assessment scale and, in this case, the used scale needs to be indicated.

According to the International Financial Reporting Standards, in preparing the financial statements the management must assess the entity's ability to continue its operations. An economic entity shall prepare its financial statements on the basis of business continuity unless management either intends to liquidate the entity or to cease trading, or it has no realistic alternative but to do proceed as such. If when making its assessment, management is aware of the significant uncertainties related to events or conditions that may cast significant doubt upon the entity's ability to continue its operations, the respective uncertainties shall be disclosed. When an entity does not elaborate the financial statements on the business continuity principle, it shall disclose that fact, together with the calculation basis of the financial statements and the reason why the entity is not considered to be in a position to continue its activity (Petre 2013).

The concept of going concern starts from the premise that the economic entity will continue to operate for a period of at least 12 months after the reporting date of the financial statements under normal circumstances, without going into liquidation or bankruptcy. In this respect, IAS 1, "The Presentation of Financial Statements" stipulates: "According to IFRS, if assessing whether the business continuity principle is appropriate, the management takes into account all available information about the future, which represents at least a period of 12 months since the end of the reporting period, but not being limited to it. Also if one entity had a profitable activity in the past and ready access to financial resources, the entity may reach the conclusion that the going concern assumption is appropriate without any further

detailed analysis. In other cases, management may need to consider a wide range of factors affecting the current and expected profitability, the reimbursement schedules and the potential sources of replacement of existing financing before the going concern assumption is definitely appropriate".

If the economic entity operates at normal parameters, respectively if it redeems debts and collects debts therefore it may be stated that the observance of going concern principle has been achieved. The responsibility of applying and observing this principle belongs to the economic entity which draws-up the financial statement.

The application of going concern has the following effects: Presentation of elements of assets, debts of expenditures and income at historical costing; Delimitation in time of incomes and expenditures; Structure of assets according to liquidity and their speed of rotation; Presentation of debts taking into consideration their being chargeability; Application of reevaluation in order to reduce the impact of inflation on the values kept at the historical cost; Registration of investment recovery and coverage of their depreciation by recording depreciation; Observance of prudence principle in correlation with principle of going concern by applying adjustments.

The estimation regarding the fact that entity will develop its activity in a normal way in the near future without affecting its continuity can be made by means of financial–economic information such as: the employees behavior and social dialogues; the state of capital investment used; the diminution of stocks circulating speed; the quality of turnover from the perspective of medium level of products and services quality; the assets structures; the financial structure; duration of the received credit and duration of the offered credit with the impact on net treasury; beneficiary capacity. All these factors contribute to the appreciation of financial and operational signals which may show difficulties as regards the observance of going concern, which at professional level are incorporated in analytical procedures of financial audit responsibility.

2.3 Prudence and Continuity: A Responsibility of Statutory Auditor in Estimation of an Exact Representation of Financial Statements

In order to assure the going concern principle, the prudence principle must be implicitly applied, alongside other accountancy principles. The auditor is the professional who does his job observing The Ethical Code and the Audit International Standards to reach a reasonable opinion—that is the annual financial statements are significant in all respects exactly like General framework of financial reporting. If we confront in a mirror the prudence principle and that of going concern, the former represents the image which is not distorted because of the

latter, which assures beside the temporary continuation of entity activity, a spatial continuation too.

The spatial continuity offers especially at the level of consolidated annual statements, a clear representation resulting from the reunion of all informational financial segments which contributed to the representation of a consolidated financial statement (Arndt 2008). The going concern makes the correct and logical basis to anticipate the obstacles, crises and to have enough time to take measures to reduce them or to eliminate the risks, assuring the provisional role of going concern and that of prudence.

The International Auditing Standard 570 "The Business Continuity Principle" presents the auditor's responsibility on the audit of the financial statements with the management use of the going concern assumption in preparing the financial statements. From the auditor's perspective, the going concern assumption involves the assertion that an entity is deemed to have a continuity of the activity in the predictable future, with no intention or need to liquidate or stop its operations. According with International Audit Regulations, thus, the assets and liabilities are recorded based on the presumption that the reporting entity will be able to make its assets and discharge its liabilities in the normal conduct of its business (In case the auditor has substantial doubts as regards the company capacity to aligned to the provisions of going concern principle, his opinion must be clearly mentioned in the audit report (Bhimani et al. 2009).

ISA 570 is completed by ISA 520 by which the foundation of audit opinion is achieved by some audit tests in which are mentioned the use of some analytical audit procedures such as: the rates analysis, the dynamics analysis, the regress analysis and that of the main components. In this way, in economic theory and practice a series of financial statistics methods have been elaborated, some of which being mentioned, as follows: Altman model, which is important due to its capacity of finding the bankruptcy risk—the opposite position of continuity for a business quoted at Stock Exchange. The research is also continued for the companies quoted by BSE according to Ion Anghel A model; Conan & Holder model brings its contribution to Altman model focusing on small and medium enterprises. Bailesteanu in 1998 elaborates a national model of bankruptcy risk estimation based on financial and operational rates.

According to IFAC, the auditor's responsibility is to make sure if the management of the economic company uses this principle adequately, if there are significant uncertainties regarding business continuity and whether these were presented either in the annotations to the financial statements or the financial statements were drawn up according to the liquidation values or to other appropriate values. Also according to IFAC, the auditor's responsibility is to obtain sufficient and appropriate audit evidence. These audit evidences justify the appropriateness of using the going concern assumption in elaborating the financial statements and drawing conclusions if there is a significant uncertainty regarding the entity's ability to continue its activity. This responsibility is present even if the general financial reporting framework used to prepare the financial statements does not include an

explicit requirement for the management to make a specific assessment of the entity's ability to continue its activity.

The auditor, under the condition of economic crises, must make in his report an accurate, clear and concise presentation to also testify the continuity of audited entity.

Regarding the management assessment, the auditor should consider the management assessment about the economic entity's ability to continue its operations. In this respect, IFAC mentions: according to IFAC management assessment and the entity's ability to continue its work, the auditor shall cover the same period as that used by the management to make the evaluation required by the general financial reporting framework, or by law or regulations if they specify a longer period. If the management's assessment of the entity's ability to continue its activity covers less than 12 months since the date of the financial statements, the auditor should request the management to extend its assessment period to at least 12 months since that date.

The International Accounting Standard 10 "Events after the reporting period" sets the treatment of the financial statements in the case of favorable and unfavorable events that occur after the end of the financial year and can be of two types: those providing evidence of conditions existing at the end of the reporting period (events leading to the adjustment of the financial statements after the reporting period); indicative of conditions arising after the reporting period (events not leading to the adjustment of the financial statements after the reporting period).

According to IFAC, subsequent information can confirm or infirm the hypothesis and forecasts of the management of the economic entity. The possible debts, which are not paid in due time, can raise questions for the auditor regarding the business continuity principle. In this respect, The International Standard on Auditing 560 "Subsequent Events" sets the auditor's obligations to take into consideration the incidence of the events subsequent to the ending of the financial year both upon the financial statements and his report with three distinct stages: events occurring between the date of the financial statements and the date of the auditor's report; facts which become known to the auditor after the date of the auditor's report but before the date the financial statements are issued; facts which become known to the auditor after the financial statements have been issued.

The auditor's responsibility stands in the assessment of the way in which the management used the basic accounting convention of going concern and if there are significant uncertainties as regard the entity capacity to continue its activity. The auditor must collect evidence proofs to confirm the existence of a significant uncertainty regarding the continuity of the operations. The auditor can be in one of the following situations: the basic convention on business continuity was applied but there is significant uncertainty. In this case he needs to check if the facts susceptible of questioning business continuity were properly described in the annexed notes; if so, he will issue an opinion without any reservations but he will introduce a paragraph of observations; if not, he will issue an opinion with reservations or an adverse opinion; the financial statements were set under circumstances of business continuity but in his professional judgment, the auditor notes

that the company will not be able to continue its activity; he will issue an adverse opinion; the management of the company refuses to make or supplement its analyses to completely assess the aspects of business continuity; the auditor may enter a reservation in his report as a result of limiting the scope of his operations (Toma 2007).

The auditor does not guarantee the subsequent viability of entity nor the efficiency with which the management organized the entity activities. According to International Auditing Standard 200 "General objectives of independent audit and audit development according to audit international standards", the auditor certifies the application of going concern and prudence by the assessed entity using professional skepticism and taking into consideration the framework of applicable financial report which may offer him the criteria as regards the estimation of an exact presentation of financial statements. Admitting the Framework of Financial Reporting, which he uses to issue a reasonable opinion based on professional reasoning and skepticism, the auditor will conclude if the financial reports offer an exact image of entity activity, considering all the accounting conventions, including prudence, going concern respectively.

Professional skepticism presupposes paying a certain attention to information questioning the documents reliability and investigation conclusions which will be used as audit proofs. The audit must apply the audit procedures so that the evidences be enough and adequate to detect the conditions which might indicate a possible fraud. The finding of nature of the moment and extension of audit evidences reduce the risk which the auditor is ready to accept as regards the omission of some uncommon circumstances.

Thus it is demonstrated that the principle of going concern and that of prudence, essential in accounting, were transmitted in the statutory audit, too.

3   Objectives of Study

The research made in order to obtain this approach, using series of methodological instruments has as its final result getting some objectives, that is: for companies quoted at the stock exchange, the fluctuations of the market price affects the business value; the quotation reacts more rapidly for the audited firms belonging to group Big 4, than for the audited ones non Big 4; the reasonable assurance for the financial statements offered by audit firms, certifies the application of prudence principle.

4 Study Methodology Applied

To achieve objectives, having in view the nature of problems approached there have been used the following methodological instruments: existing documentary study; the diachronically research of the evolution of the domain in general and of scientific research in particular, from firms quoted at the stock exchange and audited by Big 4 to firms quoted at the stock exchange but audited by chambers outside the group Big 4, which demonstrates the use of prudence and going concern principles; comparative study on two categories of auditor chambers; study-case.

In order to obtain some data and information there has been used the documentary study of European journals in the field, of some specialists who made studies.

5 The Results of the Study

In order to demonstrate the contribution of statutory audit and the plus of added value brought by corporate governance for the representation of financial information it is used the measuring study of correct application of prudence principle and implicitly of going concern (Toma and Robu 2014). In the study, the target population is represented by the totality of firms quoted at BSE, 1 and 2 categories, in the year 2012, under the incidence of OMFP 881/25.06.2012 (it uses international standards of financial reporting in preparing and reporting annual financial statements).

Therefore, at the end of the year 2012, at BSE there were 177 companies (quoted and unquoted), out of which 95 are transacted, 8 are suspended and 74 are unquoted. A sample was taken which contains a number of 63 companies quoted at BSE (which according to article 4 from OMFP no 881/25.06.2012, all these firms are the object of statutory audit).

Toma (2007) considers that the elements affected by the non-observance of prudence principle are: rate of total assets (RA_t); rate of total debts (RD_t); rate of net result (RR_{net}); rate of proper capital (RC_{pr}); rate of money market (RC_b). According to the type of news which may come at BSE, favorable or unfavorable, which determines the decrease or rise of market price from a period to another, the effects on the indicators reflecting the application of prudence principle registers the following rate (Table 1).

Table 1 The rate of elements from the financial statements related to the evolution of market price

Symbol	Average (%)			Test difference good/bad news	
	Sample	For good news	For bad news	Test value F.	Sig.
RAt	1.5233	5.7106	−1.4191	2.745	0.103
RDt	19.9714	35.0923	9.3459	1.861	0.177
RCpr	−10.6381	−6.6769	−13.4216	0.320	0.574
RRnet	−90.8032	−79.2538	−98.9189	0.037	0.848

Source: Toma and Robu (2014)

At the level of all companies quoted at the stock exchange, the favorable or unfavorable news sent by capital market have a significant influence only upon the fluctuation of total assets and debts (Ursianu et al. 2010). The assets dynamics, or of debts respectively is due to the rapid reaction of business partners to favorable or unfavorable news imposed by BSE rate, to which is also added the necessity of using the prudence principle. The proper capital and the net result are factors which reflect all the manager's measures taken to multiply their assets and to support business, which are from our point of view, relevant components in a credible application of prudence principle and that of going concern. It can be stated that the firms react to information sent on the stock market only by significant modifications of the level of total assets and debts, the level of the proper capital and of net result being unchanged. The firms receiving good news register an increase of the assets level with 5.71 % and that of debts with 35.09 %, and the firms receiving unfavorable news register assets decrease of 1.42 % and increase in debts of 9.35 %.

It has been demonstrated that there is also an impact depending on the category of audit chamber which certifies the quality of financial information (Table 2).

The data mentioned above reveal the role played by the importance of signature of audit firms on the credibility of financial information. At the level of analyzed sample there are differences between firms audited by audit chambers group Big 4 and firms assessed by other auditors. It has been found that there are differences between the audit of the two categories of firms only as regards the proper capitals. It could be stated that audit Big 4 confers a better trust as regards the transparency and exact representation of financial performances and implicitly there is in accounting practice of the firms under discussion a correct use of prudence convention. A decrease of the market price due to unfavorable news on market, leads to a significant decrease of the assets level by some adjustments, as a result of use of prudence in financial reporting. Moreover the debt increases due to disbelief in assets diminution and to net treasury problems and on the background of prudence application.

Table 2 Elements of financial situations under the empire of auditor belonging to Big 4

Symbol	Average (%)			Test difference Big4/Non Big4	
	Sample	Auditor Big 4	Auditor Non Big 4	Test value F.	Sig.
RAt	1.5233	2.0363	1.2847	0.026	0.872
RDt	19.9714	19.2700	20.2977	0.003	0.960
RCpr	−10.6381	−20.8300	−5.8977	1.425	0.237
RRnet	−90.8032	−127.0600	−73.9395	0.242	0.624

Source: Toma and Robu (2014)

6 Subsequent Study

The authors propose the application of the study to companies quoted at the stock exchange in Bucharest in the field of agriculture, a field which has demonstrated its rise in importance for Romania's economy in the last years. Romania's economy increased in 2013 with 3.5 %. Almost half of its increase is brought by agriculture whose gross added value has increased with 23 % as to the previous year, according to Eurostat.

While industry has a limited potential having in view the share of only one third of GDP, agriculture brought total business of 18.5 billion Euro, almost as much as the tops in the years 2011 and 2008. Gross added value, that is the plus value the farmers brought to economy, reached almost eight billion Euro, being the third best result in the last 7 years. Agriculture is a volatile component of GDP, being dependent on entropy. Although in the previous years, agriculture reduced continually its share in GDP, from about 11 % in 2003 to 6.6 % in 2008 and 5.3 % in 2012, we must admit however that Romania has the advantage of being competitive, an advantage which must be taken into account and followed closely, trying to use the internal reserves in the field (Medrega 2014).

7 Conclusions

The relevance of corporate governance and statutory audit is increased by the transparency of financial reporting in the context of harmonization with European Directive 34/2013. According with Directive 34, paragraph 4, the study presentation has in view to contribute to the necessity to apply the accounting conventions, even if they do not answer exactly to all the requirements asked by the reality of social economic life, but which are demonstrated in time to have found a balance between the interests of financial statement recipients and the organizations interests which should not be unjustly loaded with reporting requirements. It is in human nature to be covered in front of risks and so the prudence in business and annual financial statements to offer reliability and transparence for financial declarations still maintain their "doctrinal value" in accountancy practice and science.

In conclusion the statutory audit rises the value of financial reports but also the quality of internal audit, in the field of financial accounting, which brings a surplus of value in the efficiency of making decision. The complexity of economic life determines the audit to resort in its activity to study not only in audit but also to other sciences such as statistics and analysis, and to raise the audit on a new stage, the METRIC AUDIT. The statutory audit and the metric audit come to reinforce the quality of corporate governance in entity and risks management, to which contribute, besides other procedures the accounting conventions of going concern and prudence.

A good corporate governance assures economic efficiency and an interactive investment climate. The benefits of implementing some high and lasting administration standards of companies implies: the decrease of capital costs, the increase of investors trust caused by a sensible diminution of managers discrete attitude and the reduction of the level of fraud.

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The Risk Analysis Process and Its Coverage: A Requirement for Management and Governance for Achieving the Objectives

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Abstract Organizations issue on risk assessment in conjunction with the entity's attitude and its organizational culture is a major concern for economic and social environment. The risk analysis process and its coverage, is today a requirement for management and governance to achieve the objectives. The objective of this article is to enrich the specialized information on financial risk analysis process due to customers and developing a scoring analysis model and risk assessment of clients from a company portfolio to avoid non-collection of receivables. In order to fulfill the objectives it will be used a mixed research methodology specific to economics, which will combine both qualitative and quantitative methods, to assessing financial risk for companies customers by analyzing methods and techniques for reducing the risk of not collecting the receivables through: contracts only with clients presenting an acceptable risk for collaboration (low, medium, high), the adoption of some measures to deal with credit limits in each client depending on the risk result, penetration on regions with a lower risk, provisioning for high-risk customers, additional safeguards and closer monitoring of their collaboration with the company's sales department.

Keywords Risk assessment • Risk indicator • Solvency • Debt ratio • Accounting policies • The principle of prudence

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1 Introduction

As a result of poor internal and external economic environment in Romania, correlated also with difficulties induced by the global financial and economic crisis, it is possible for the company to not be able to achieve the proposed strategic and operational objectives. This is the reason why companies should implement a process to identify and assess the risks that threaten the objectives achievement, within reasonable tolerances.

Based on the risk assessment, the company may establish arrangements for management of measures to reduce the negative impact caused by their appearance. Since risks are affecting the objectives it is natural, prior to their evaluation, in the company to define the objectives to be met. You cannot implement a risk assessment process without knowing what are the objectives that the company wants to achieve at different levels of organization (Coracioni 2012).

Companies may be exposed to different types of risks. Credit risk is the risk that the company endures a financial loss due to the failure of contractual obligations by a customer or counterparty to a financial instrument. This risk results mainly from trade receivables. Liquidity risk is the risk that the company may encounter difficulties in meeting obligations associated to liabilities that are settled in cash or through another financial asset transfer. Market risk is the risk that the change in market prices, such as foreign exchange, interest rate and market demand reduction to affect the company's revenues. Currency risk is the risk of exchange rate fluctuations as a result of carrying out transactions and loans in a currency other than the functional currency (RON). Operational risk is the risk of direct or indirect loss arising from a variety of causes associated to processes, personnel, company's technology and infrastructure, and from external factors other than credit risk, market and liquidity risk, such as those from legal and regulatory requirements and generally accepted standards regarding organizational behavior. Taxation risk is the risk that in some cases the tax authorities have a different position from that of the company (CECCAR 2013a, b).

Within the company, at different levels in the organization or specific business processes, it must be implemented various "levers" to act through policies and procedures that will eliminate or minimize the risk that the objectives (strategic and operational) established by management are not reached. To reach the objectives it is necessary that relevant quality information is communicated to all levels and organizational and functional levels, horizontally and vertically, both inside and outside the organization (Nicolescu 2001).

2 Research Methodology

The objective of this article is to enrich the specialized information on the topic of credit risk analysis process and implementation of a risk analysis and assessment of a company's customer portfolio to avoid not collecting of receivables.

In order to fulfill the objectives it will be used a mixed research methodology which will combine both qualitative and quantitative methods, to assess financial risk for companies customers by analyzing methods and techniques for reducing the risk of not collecting the receivables. Quantitative measurement procedures to carry out a risk assessment model of insolvency for a sample of 100 clients in the small and medium enterprises having as main activity the distribution of alcoholic beverages.

Qualitative measurement procedures are concerning the assessment of risk scoring for three analyzed customers, comparing risk on geographical areas and accounting policies that may be adopted by companies to minimize the risks of not collecting the receivables. The testing process of investigation methodology will include: choosing the entities, the identification of the subjects, logistics preparing of testing, interpretation of results and their selection.

As a result of more often crisis period and insolvency cases, companies have become more cautious in the face of risk, more and more of them choosing to thoroughly check their business partners to eliminate losses in commercial transactions.

This research was conducted at a wine and distilled from wine producing company in Romania, which owns 17 % of the total wine market of Romania. The company distributes its products through all existing marketing channels in Romania: key accounts, retail and Horeca. The research was conducted on retail channel as a share of over 45 % of the total business of the company and present the highest risk of entering into insolvency.

2.1 The Financial Risk Analysis

Based on the financial information provided in the balance sheet and profit and loss account (Tables 1 and 2), were calculated for the years 2013, 2012 and 2011, a total of five financial indicators: rate debt, indebtedness, general solvency, current liquidity, the coverage indicator stocks (Bordeianu 2006).

These indicators were chosen because "alerts" company's straightening to a downhill, showing the company's ability to repay its external financing, capacity which can be supported by a good return of work undertaken by the company.

Depending on the obtained results these indicators received a score based on the professional judgment, as follows: current liquidity received the highest score of 25 points, as this indicator shows the company's ability to pay its debt maturity; the indicator about the cover stocks received the lowest score of 15 points since for

Table 1 Financial data, CB SRL

Balance sheet—RON	2013	2012	2011
Intangible assets	4226	5083	19,404
Tangible assets	2,793,741	2,946,360	3,252,431
Investment assets	661,052	529,164	478,642
Total permanent assets	3,459,019	3,480,607	3,750,477
Stocks	4,224,994	4,419,446	4,313,757
Cash and banks accounts	2,471,496	3,726,592	4,810,686
Receivables	6,362,333	5,054,041	4,860,902
Total floating assets	13,058,823	13,200,079	13,985,345
Expenses in advance	0	999	0
Total assets	16,517,842	16,681,685	17,735,822
Share capital	20,000	20,000	20,000
Other equity	8,766,937	8,249,000	7,873,145
Total equity	8,786,937	8,269,000	7,893,145
Total liabilities < 1 year	7,689,807	8,271,819	9,302,231
Total liabilities > 1 year	41,098	140,866	540,446
Total liabilities	7,730,905	8,412,685	9,842,677
Total liabilities	16,517,842	16,681,685	17,735,822

Table 2 Financial data, CB SRL

Profit and loss account—RON	2013	2012	2011
Turnover	54,852,605	49,636,730	53,401,834
Operating income	54,859,279	49,659,123	54,000,174
Operating expenses	53,577,721	49,160,022	52,382,490
Operating result	1,281,558	499,101	1,617,684
Financial income	193,968	305,490	560,075
Financial expenses	363,796	307,370	213,767
Financial result	−169,828	−1880	346,308
Current result	1,111,730	497,221	1,963,992
Total income	55,053,247	49,964,613	54,560,249
Total expenses	53,941,517	49,467,392	52,596,257
Gross profit	1,111,730	497,221	1,963,992
Profit tax	222,012	121,366	311,338
Net profit	889,718	375,855	1,652,654

Source: Own approach

Table 3 Analysis and risk assessment, CB SRL, for 2011

Indicators	Calculation formula	2011	Observations	Scoring risk			
1	2	3	4	5	6	7	5 × 7
Debts rate	Total debts/ Total assets	0.55	Debts rate must be < = 1	20	If (col.3 < =1; 1 if (col3 < =2; 2- col.3; 0))	1	20
Indebted-ness	Total debts/ Equity	1.25	A ratio higher than <1> implies a higher risk for creditors	20	If (col.3 < =1; 1; If (col.3 < =3; (3- col.3)/2;0))	0.875	18
General solvency	Total assets/Total debts	1.8	Total assets have to be 2 times higher than the total debt.	20	If (col.3 > 2;1; col.3/2)	0.9	18
Current liquidity	Current assets— Inventories/ Current liabilities	1.04	The value of this ratio is considered normal according to the usage of 0.8–1	25	If (col.3 > 1;1; col.3)	1	25
The indi-cator about stock covering	Profit before stocks pay-ment and profit tax/stocks	6.57	The company can cover about 6.57 times the granted stock. It is believed that the stock at the time of analysis is 251.266 RON.	15	If (col.3 > 2;1; If (col.3 < =0;0; col.3/2))	1	15
				100			96

Note: Fit scoring risk: 0–20 scoring—Very high risk, 21–40 scoring—High risk, 41–70 scoring—Medium risk, 71–100 scoring—Low risk
According to the calculated scoring the company presents *low risk*

many companies, the profit is not constant and relevant (Tables 3, 4 and 5). Depending on the score obtained, the companies were integrated into four risk categories: low risk, medium risk, high risk and very high risk.

For example it was analyzed and assessed the risk for one of the distributing companies, CB Srl (Tables 3, 4 and 5).

2.2 The Principles Underlying the Classification Scores in Scoring Risk

Customers who obtained a score of up to 20—*Very high risk* are represented by companies whose calculated indicators are not within normal permitted limits. These companies have negative equity, no assets (operating in leased premises), record loss. Customers who obtained a score between 21 and 40—*High risk*, are

Table 4 Analysis and risk assessment, CB SRL, for 2012

Indicators	Calculation formula	2011	Observations	Scoring risk			
1	2	3	4	5	6	7	5 × 7
Debts rate	Total debts/ Total assets	0.50	Debts rate must be < = 1,	20	If (col.3 < =1; 1 if (col3. <=2; 2- col.3; 0))	1	20
Indebted-ness	Total debts/ Equity	1.02	A ratio higher than <1 > implies a higher risk for creditors	20	If (col.3 < =1; 1; If (col.3 < =3; (3- col.3)/2;0))	0.99	20
General solvency	Total assets/Total debts	1.98	Total assets have to be 2 times higher than the total debt.	20	If (col.3 > 2; 1;col.3/2)	0.99	20
Current liquidity	Current assets— Inventories/ Current liabilities	1.06	The value of this ratio is considered normal according to the usage of 0.8–1	25	If (col.3 > 1;1; col.3)	1	25
The indi-cator about stock covering	Profit before stocks pay-ment and profit tax/stocks	1.49	The company can cover about 1.49 times the granted stock. It is believed that the stock at the time of analysis is 251,266 RON	15	If (col.3 > 2;1; If (col.3 < =0;0; col.3/2))	0.745	11
				100			96

Note: Fit scoring risk: 0–20 scoring—Very high risk, 21–40 scoring—High risk, 41–70 scoring—Medium risk, 71–100 scoring—Low risk
According to the calculated scoring the company presents *low risk*

represented by companies whose indebtedness is very high (have negative equity), current liquidity is far below the maximum allowed limit and record loss. Customers who obtained a score between 41 and 70—*Medium risk* are represented by companies that have a high level of debt (have either contracted large loans from banks or small equity due to not investing the profit), other indicators are near considered normal limits. Customers who obtained a score between 71 and 100—Low risk, are represented by companies which fit with all analyzed indicators within the range considered normal or near considered normal limits.

Table 5 Analysis and risk assessment, CB SRL, for 2013

Indicators	Calculation formula	2011	Observations	Scoring risk			
1	2	3	4	5	6	7	5 × 7
Debts rate	Total debts/ Total assets	0.47	Debts rate must be < = 1,	20	If (col.3 < =1; 1 if (col3. <=2; 2- col.3; 0))	1	20
Indebted-ness	Total debts/ Equity	0.88	A ratio higher than <1 > implies a higher risk for creditors	20	If (col.3 < =1; 1; If (col.3 < =3; (3- col.3)/2;0))	1	20
General solvency	Total assets/Total debts	2.14	Total assets have to be 2 times higher than the total debt.	20	If (col.3 > 2;1; col.3/2)	1	20
Current liquidity	Current assets— Inventories/ Current liabilities	1.15	The value of this ratio is considered normal according to the usage of 0.8-1	25	If (col.3 > 1;1; col.3)	1	25
The indi-cator about stock covering	Profit before stocks pay-ment and profit tax/stocks	3.54	The company can cover about 3.59 times the granted stock. It is believed that the stock at the time of analysis is 251.266 RON	15	If (col.3 > 2;1; If (col.3 < =0;0; col.3/2))	1	15
				100			100

Note: Fit scoring risk: 0–20 scoring—Very high risk, 21–40 scoring—High risk, 41–70 scoring—Medium risk, 71–100 scoring—Low risk
According to the calculated scoring the company presents *low risk*

The solvency risk analysis process continued for all 100 distributors customers from the producing company's portfolio, from small and medium companies category. Financial risk analysis was conducted for 3 years of activity and customers were divided both on risk classes and geographic regions (see Table 6).

In the risk analysis and assessment process were considered companies over which had been not opened insolvency proceedings, are not recorded in the "Payment incidence plant" and has no debts to the state budget.

Table 6 The analysis of risk coefficients of beverage distributors by geographical areas

Resulted risk	Region	Number of distributors 2013	Number of distributors 2012	Number of distributors 2011
Low risk	Central	7	6	6
	Southern	11	7	8
	Eastern	5	6	7
	Western	5	3	2
	Total	28	22	23
Medium risk	Central	7	9	10
	Southern	22	27	23
	Eastern	20	22	21
	Western	6	10	11
	Total	55	68	65
High risk	Central	1	3	2
	Southern	4	3	6
	Eastern	4	4	4
	Western	1	–	–
	Total	10	10	12
Very high risk	Central	3	–	–
	Southern	–	–	–
	Eastern	3	–	–
	Western	1	–	–
	Total	7	–	–
	Total analyzed distributors	100	100	100

3 Results

As a result of the process of risk analysis and assessment of customers there is a risk of damage to customers analyzed in 2013, the company has a portfolio of 7 % customers representing a very high risk. Also shows that the share of medium risk clients which is over 50 % in all analyzed years, which shows that the company has a portfolio of clients to be regularly monitored and evaluated (see Table 7).

Extending the risk analysis and assessment process on geographic areas, central region presents 16.67 % of customers with high risk involved, followed by the eastern and western region with 9.38 % respectively 7.69 %. However it appears that in 2013 some regions diminish their risk (in the central region in 2013 the customers with low risk are at a rate of 38.89 % compared to 2012 when it showed a rate of 33.33 %) etc. Customers who represent a low risk show high percentages in all analyzed regions (see Tables 8, 9, 10, and 11).

For customers who present a high risk, the company stops the collaboration and search for solvent customers for that area. Even if collateral securities are made for their clients to maintain cooperation, there is a very difficult risk of debt recovery in

Table 7 Assessment of risk analysis process

Resulted risk	2013 (%)	2012 (%)	2011 (%)
Low risk	28.00	22.00	23.00
Medium risk	55.00	68.00	65.00
High risk	10.00	10.00	12.00
Very high risk	7.00	–	–
Total	100.00	100.00	100.00

Table 8 Assessment of risk analysis process on Central region

Resulted risk	2013 (%)	2012 (%)	2011 (%)
Low risk	38.89	33.33	33.33
Medium risk	38.89	50.00	55.56
High risk	5.56	16.67	11.11
Very high risk	16.67	–	–
Total	100.00	100.00	100.00

Table 9 Assessment of risk analysis process on Southern region

Resulted risk	2013 (%)	2012 (%)	2011 (%)
Low risk	29.73	18.92	21.62
Medium risk	59.46	72.97	62.16
High risk	10.81	8.11	16.22
Very high risk	–	–	–
Total	100.00	100.00	100.00

Table 10 Assessment of risk analysis process on Eastern region

Resulted risk	2013 (%)	2012 (%)	2011 (%)
Low risk	15.63	18.75	21.88
Medium risk	62.50	68.75	65.63
High risk	12.50	12.50	12.50
Very high risk	9.38	–	–
Total	100.00	100.00	100.00

Table 11 Assessment of risk analysis process on Western region

Resulted risk	2013 (%)	2012 (%)	2011 (%)
Low risk	38.46	23.08	15.38
Medium risk	46.15	76.92	84.61
High risk	7.69	–	–
Very high risk	7.69	–	–
Total	100.00	100.00	100.00

the case of insolvency: high costs of court, endless lawsuits or other creditors which prevail in debt recovery such as banks or state. As a result of the solvency risk analysis process for its customers, companies can reduce the risk of not collecting by: contracts only with clients presenting an acceptable risk for collaboration (low, medium, high), the adoption of some measures to deal with lending limits at the level of each client depending on the resulted risk, penetration on regions showing a lower risk, provisioning for customers as high risk, additional safeguards and closer monitoring of their collaboration with the sales department.

We must bear in mind that both the economic situation of the country and the analyzed region, requires a continuous review of both indicators and the used sample. Also, in the analysis it was used the principle of prudence, meaning that the company has in portfolio and assess only customers that meet the following criteria: it was not open insolvency proceeding against them, have no debts to the state budget, they are not in the "Plant of Bank Risks" (Bureană and Bordea 2014).

The analysis and implementation process of risk involves the implementation of a control system regarding risk analysis. Thus, the management must implement a process of setting objectives and processes and sub-processes necessary to achieve the objectives. Also it must be identified those responsible for the assessment, monitoring removal or risk reduction.

In the company it must be a process to identify internal and external events that could affect achieving and also the separation of goals in risks or opportunities (COSO 2004). Risk assessment is one of the most important components of this process of risk analysis. The conclusion of commercial contracts should occur only after the risk analysis and only with clients of low, medium and high risk. Very high risk clients cannot be accepted (Mulford and Comiskey 2002).

After evaluating clients and conclusion of commercial contracts, clients will be monitored. Monitoring involves monthly checking clients in "bank Incident plant", the quarterly inspection debt to the state budget, monthly checking the insolvency bulletin, biannual analysis of "customer risk scoring". The monitoring of mentioned indicators shall be carried out at the terms on which information can be obtained from official websites (ANAF, ORC etc.).

Persons responsible for monitoring risk clients must identify the relevant information of risk appearance and timely communicate to the responsible persons with decision function that can act to remove or reduce the risk. Control activity involves the implementation of policies and procedures on how monitoring and solving the risks responding. The components of risk analysis process require correlation with the entity's objectives—strategic, operational, of reporting and compliance with legislative and regulatory framework.

4   Conclusions

The difficulties caused by the global financial and economic crisis and visible deterioration in profitability of companies in Romania, require further verification of credit worthiness, even for traditional trading partners. This is because, its financial difficulties can propagate "in chain" also to the supplying company, with adverse effects not only on the size of its business turnover but also on its financial balance (Ganea and Ioniță 2014).

The risk analysis process and its coverage, is today a requirement for management and governance objectives. Unfortunately, the reality shows that implementation of an integrated environment of risk management within the entities is a rarity, meeting him only on large companies especially those that apply IFRS. Financial statements prepared in accordance with International Accounting Standards require also the presentation of risk management and sensitivity analysis (Feldioreanu 2014).

Implementation of an analysis and evaluation system of customers solvency risk involves costs of hiring qualified staff, procurement of programs that include financial data about analyzed customers, budgets of which small and medium sized companies do not have. Component of operating risk, commercial risk management should be a major concern for the management of any company, selling on commercial credit representing an effective technique to increase business turnover only under a creditworthy clientele.

The analysis and hedging of solvency risk should be carried out continuously at the level of economic entities, it being the main way of identifying and monitoring the probability of materialization of the risk of not collecting the various assets to maturity.

This analysis system is a decision-effective and reliable tool for risk analysis and coverage. Depending on the level of founded risk it recommends its user to make decisions on: selecting clientele, the maximum amount of granted commercial credit, additional guarantees etc. These analyzes can create a long term commercial discipline because they will realize that to minimize the risk of not collecting partnerships will end only with creditworthy customers. On the other hand business partners will seek to be "trustworthy" by honoring all the budget and commercial financial obligations and profitable business achievement.

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Comply or Explain Approach and Firm Value on the Bucharest Stock Exchange

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Abstract This paper aims at exploring the influence of compliance with the principles and recommendations stated within the Bucharest Stock Exchange (BSE) Corporate Governance Code on firm value, for a sample of companies listed in Romania, in 2011. Firm value was proxied both through accounting measures (such as return on assets, ROA and return on equity, ROE) and market measures (such as earnings per share, EPS), all being industry-adjusted. Based on the 'Comply or Explain' Statement issued by the BSE, there was conceived a questionnaire having the purpose to develop corporate governance ratings. Thus, we report the global corporate governance rating and a set of specific ratings as regards transparency and reporting, board and committees, shareholder rights, as well as corporate social and environmental responsibility. Therefore, by estimating several multivariate linear regression models, our results provide support for a positive and statistically significant relationship between the rating related to transparency and reporting and firm value, likewise between the rating related to corporate social and environmental responsibility and firm value, but only for industry-adjusted ROA. However, there was noticed the lack of any statistically significant relationship between corporate governance ratings and firm value, when industry-adjusted ROE and industry-adjusted EPS were employed.

Keywords Comply or explain • Corporate governance ratings • Firm value • Multivariate linear regression models

1 Introduction

The Organisation for Economic Co-operation and Development (OECD 2004, p. 11) stated that 'corporate governance involves a set of relationships between a company's management, its board, its shareholders and other stakeholders'. Likewise, 'corporate governance deals with the ways in which suppliers of finance to

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corporations assure themselves of getting a return on their investment' (Shleifer and Vishny 1997, p. 737). Since there are different aims between the investors which finance the companies on the one hand and the company directors on the other hand, we notice the agency problem occurrence. Thus, corporate governance examines the mechanisms embraced by the principals in order to minimize such misconceptions. In fact, the agency theory emphasizes the ineluctable dispute between owners' interests and executive management (Fama and Jensen 1983), this hindrance being settled through the alignment of the interests between both sides (Jensen and Meckling 1976; Fama 1980; Fama and Jensen 1983). Therefore, the investigation of corporate governance is the inspection of mechanisms that deter and correct managerial slack (Triantis and Daniels 1995). The mechanisms which shall be adopted by the investors in order to come into the line the insiders' interests with their own interests are divided in two sections as follows: external, as well as internal. The external corporate governance mechanisms include the market for corporate control, laws and regulations, oversight by the investors, the competition out of product market and managerial labor market. The internal mechanisms comprise ownership concentration, monitoring by the board of directors, audit and internal control, directors' remuneration, reporting, and transparency.

The Corporate Governance Codes are instruments conceived by the legislative authorities in order to set a proper behavior as regards the investors having control rights on the corporations. Certainly their aim is on mitigating the private benefits of such investors, the limitation of expropriation related to suppliers of finance to the company, substantiate a trusted environment which will ease external financing, reducing the cost of capital, alongside generating higher returns for the involved parties. We notice a voluntary reporting of corporate information when this approach is suggested through a norm such as 'Comply or Explain'. However, when the cost related to reporting is reduced and the examination of the information is facile, then all the companies (with the exception of the companies having financial troubles) will choose to report the information (Grossman and Hart 1980; Grossman 1981; Okuno-Fujiwara et al. 1990).

The companies admitted to trading on the regulated market of the Bucharest Stock Exchange (hereinafter 'BSE') shall adopt and comply with the provisions of the BSE Corporate Governance Code (2008) (hereinafter 'BSE CGC') on a voluntary basis. BSE CGC (2008) comprises 11 articles (as regards the corporate governance framework, the share- and other financial instruments holders' rights, the role and duties of the board, composition of the board, appointment of directors, remuneration of directors, transparency, financial reporting, internal control and risk management, conflicts of interests and related parties' transactions, treatment of corporate information, corporate social responsibility, management and control systems), 19 principles, and 41 recommendations. Hence, the Issuers which decide to adopt wholly or partially the recommendations out of the BSE CGC (2008) shall forward yearly to the BSE the Corporate Governance Compliance Statement (hereinafter 'CGCS'). The CGCS will comprise information as regards the recommendations stated within the BSE CGC (2008) which have been implemented by the relative companies and how. Besides, if the Issuer fails to implement, in whole

or in part, one or more recommendations, it shall provide proper information regarding the reasons for the omitted or partial employment. The Issuers shall include in their Annual Report, starting with the fiscal year 2010, the CGCS (the 'Comply or Explain' Statement).

Current paper aims at exploring the influence of compliance with the principles and recommendations stated within the BSE CGC (2008) on firm value, for a sample of companies listed in Romania, in 2011. By designing a questionnaire based on the 'Comply or Explain' Statement issued by the BSE and reported by the selected companies, which comprises 50 items, there will be developed a global corporate governance rating, as well as a set of specific ratings. The novelty of current research consists in providing corporate governance ratings for the companies listed in Romania by taking into consideration an extensive suite of corporate governance principles and recommendations. The utility of this study emerges out the information provided to investors worldwide by the corporate governance ratings based on which the investment decisions should be taken.

The current study is structured as follows. The next section presents the results of previous studies, developing the research hypothesis. The third section describes the database, variables, as well as empirical research methodology. The fourth section provides the empirical findings. The last section concludes the paper.

2 Literature Review and Hypothesis Development

Bhagat et al. (2008) asserted that there is no consistent relation between corporate governance ratings and measures of corporate performance, unfortunately the corporate governance ratings being highly imperfect instruments. Therewith, the authors concluded that there is no one 'best' measure of corporate governance, whereas the most effective governance system is influenced by the context and company specific circumstances. Based on the data provided by the Investor Responsibility Research Center (hereinafter 'IRRC'), Gompers et al. (2003) developed a 'Governance Index' in order to assess the level of shareholder rights out of 1500 large companies between 1990 and 1999 by considering 24 governance rules. By means of the conceived rating, there was set an investment strategy that bought firms registering the strongest rights, being in the lowest decile of the rating and sold firms marking the weakest rights, located within the highest decile of the index. Therefore, previously mentioned investment strategy has earned abnormal returns of 8.5 % per year. Likewise, there was noticed the fact that the companies with stronger shareholder rights had higher firm value, higher profits, higher sales growth, lower capital expenditures, and made fewer corporate acquisitions. Brown and Caylor (2006) created the governance rating entitled 'Gov-Score' based on 51 firm-specific provisions, by considering the data provided by Institutional Shareholder Services (ISS), for 1868 US companies as of 2003. There were revealed seven provisions that drive the relation between Gov-Score and firm valuation. Bhagat and Bolton (2008) found that better governance as measured by

the 'GIM' and 'BCF' ratings, board of directors' stock ownership, and separating the board chair and CEO roles, is significantly positively correlated with better contemporaneous and subsequent operating performance. The data published by the IRRC was also used by Bebchuk et al. (2009) which designed an entrenchment index based on six provisions and found a negative relationship between the 'E index' and firm value, as measured by Tobin's Q ratio, withal large negative abnormal returns during the 1990–2003 period.

MacNeil and Li (2006) stated that the 'Comply or Explain' principle is governed by the assumption according to whom the market will monitor the compliance towards the Corporate Governance Codes and will either penalize the non-compliance through lowering share prices or will accept that non-compliance is justified in such circumstances. Consequently, we notice an incentive for the companies in order to comply with the principles out of the Codes since these represents the view of institutional investors as to best practice. Bauwhede (2009) reported a positive relationship between the extent of compliance with international best practices regarding board structure and functioning and operating performance as measured by the return on assets. Franco and Montálvan (2010) ascertained an increase of 1.53 % in return on assets after the companies have issued their Corporate Governance Codes, respectively an increase of 3.52 % in return on assets for the companies having good Codes. As well as, Tariq and Abbas (2013) found a positive association between the rating related to the compliance with the Code of Corporate Governance and firms' financial performance, as measured by return on assets, return on equity, and return on capital employed, for a sample consisting of 119 non-financial Pakistani listed firms, over 2003–2010. Therewith, there was suggested that compliance is not linearly related with financial performance, being established that high compliant companies are less profitable than average or low compliant firms.

Based on these considerations, the hypothesis tested in this study is formulated as follows: there is a positive relationship between the compliance with the principles and recommendations stated within the Bucharest Stock Exchange Corporate Governance Code and firm value.

3   Empirical Framework

3.1   Sample and Variables

The extent of compliance with the principles and recommendations out of the BSE CGC (2008) will be assessed through a global corporate governance rating and a set of specific ratings. Initially, the dataset comprised all the companies listed on the BSE in 2011, respectively 79 companies. Afterwards, we began to gather the CGCS for each company from our sample, the main data source being the websites of the companies. Unfortunately, we ascertained the fact that 55 companies reported this

Statement. Therefore, the final sample covered 41 companies since there were removed the companies managed in a two tier system (five companies, including one bank) and the companies from financial intermediation sector (ten companies: three banks, five financial investment companies, and two financial investment service companies) because the last are subject to specific regulations. The industry membership of selected sample is varied as follows: wholesale/retail (2), construction (6), pharmaceuticals (4), manufacturing (11), plastics (2), machinery and equipment (3), metallurgy (2), food (2), chemicals (3), basic resources (1), transportation and storage (2), tourism (1), and utilities (2).

Table 1 provides the definition and measurement of the variables employed within empirical research. Firm value is proxied both through accounting measures (such as return on assets, ROA and return on equity, ROE) and market measures (such as earnings per share, EPS), all being industry-adjusted, following the methodology described by Eisenberg et al. (1998) due to the diversity as regards the industry membership of selected companies. Thereby, the difference between ROA of a certain company and the median of the ratio related to the corresponding sector is ΔROA, whereas ROAadj is defined as follows: ROAadj $=$ sign(ΔROA) * sqrt($|\Delta$ROA$|$). Thus, sign(ΔROA) is the sign of the difference between ROA of the company and sector median ratio and sqrt($|\Delta$ROA$|$) is the square root of the absolute value of ΔROA. We have considered the median, instead of mean, since our data did not follow a normal distribution. Furthermore, in order to compute ROEadj and EPSadj, we have followed the same methodology as for ROAadj. Likwise, the data source for financial data used in current study is depicted by the websites of the companies.

Based on the CGCS established by the BSE, we have conceived a corporate governance questionnaire, reported in the Appendix 1, aiming at developing a

Table 1 Definition and measurement of variables

Variable	Definition
Firm value variables	
(1) ROAadj	Industry-adjusted return on assets
(2) ROEadj	Industry-adjusted return on equity
(3) EPSadj	Industry-adjusted earnings per share
Corporate governance variables	
(4) GCG	The global corporate governance rating
(5) TR	The rating related to transparency and reporting
(6) BC	The rating related to board and committees
(7) SR	The rating related to shareholder rights
(8) CSR	The rating related to corporate social and environmental responsibility
Firm-level control variables	
(9) Size	Firm size, as the annual average number of employees (log values)
(10) Lev	Leverage, as the ratio between total debt and total assets
(11) Growth	Sales growth, as the relative increase of sales from the previous year (%)
(12) Listing	Firm tenure, as the number of years since listing on the BSE (logvalues)

global corporate governance rating and a set of specific ratings. Thus, for each of the 41 companies comprised in our final sample, we have assessed every answer at the 50 questions from the questionnaire, grouped according to the specific dimension. Therefore, in case of compliance with a certain principle or recommendation out of the CGCS we have encoded with 1, otherwise 0. We have reported ratings for the following specific corporate governance dimensions: transparency and reporting, board and committees, shareholder rights, as well as corporate social and environmental responsibility. The values related to each dimension ensued by dividing the number of implemented principles and recommendations to the total number of principles and recommendations corresponding to that dimension. The value of the global corporate governance rating ensued by computing the arithmetic mean related to the four specific ratings.

Furthermore, we have considered several control variables, the data source being described by the annual reports disclosed by the selected companies. We will control for firm size through the annual average number of employees (logarithmic values) since Fama and Jensen (1983) stated that large corporations are more diversified than small corporations, moreover large companies recording a reduced business failure risk. According to Short and Keasey (1999), firm size positively influences corporate performance because large companies could achieve easier financing, both internal, as well as external. Therewith, large corporations could create barriers to entry due to economies of scale. We will account for the indebtedness by the leverage computed as the ratio between total debt and total assets because large companies could be more indebted than small companies due to the transparency in the information flow towards creditors. Likewise, indebtedness could determine the 'over-investment problem' (Jensen 1986), as well as 'under-investment problem' (Myers 1977). Sales growth computed as the relative increase of sales from the previous year is employed in order to control for growth opportunities. McConnell and Servaes (1995) concluded that an increase in leverage, estimated as the market value of long-term debt divided by the replacement value of assets, is associated with an increase in value for low-growth firms and a decrease in value for high-growth firms [to distinguish between these two types of firms, there was used the firm's price-to-operating-earnings (P/E) ratio]. We control for firm tenure through the number of years since listing on the BSE (logarithmic values). Black et al. (2006) and Balasubramanian et al. (2010) noticed that more recently listed firms are likely to be faster-growing and perhaps more intangible asset-intensive, which can lead to higher firm value.

3.2 Estimation Method

The relationship between the extent of compliance with the principles and recommendations stated within the BSE CGC (2008) and firm value will be empirically investigated by estimating several multivariate linear regression models, thereby considering the following general specification (Gujarati 2003):

$$\text{Firm\_value}_i = \beta_0 + \beta_1 X_i + \beta_2 Z_i + u_i \quad i = 1, \ldots, N \tag{1}$$

where, for the company i we consider firm value as dependent variable as proxied through ROA, ROE, and EPS, all being industry-adjusted, alongside explanatory variables, X_i being the global corporate governance rating, as well as the specific ratings regarding transparency and reporting, board and committees, shareholder rights, and corporate social and environmental responsibility, whereas Z_i reveals the firm-level control variables; u_i is called 'disturbance' or 'error'.

4 Empirical Findings

4.1 Descriptive Statistics

Table 2 provides descriptive statistics of the variables used in the empirical research. Therefore, based on the CGCS, we notice that only one company listed on the BSE has fulfilled all the principles and recommendations set by the BSE CGC (2008). Besides, by considering the minimum value, there were accomplished only 18 principles and recommendations.

The mean value corresponding to the global corporate governance reveals the fact that the companies listed on the BSE reported the compliance with 39 principles and recommendations. Likewise, most of the companies carried on activities regarding social and environmental responsibility, while the principles and

Table 2 Descriptive statistics of the variables used in the empirical research

Variable	N	Mean	Median	Min	Max	Std. Dev.
Firm value variables						
ROAadj	41	−0.0187	−0.0752	−0.5243	0.5188	0.2386
ROEadj	39	−0.0182	0.0000	−0.9325	0.5548	0.3052
EPSadj	41	0.1230	−0.0800	−1.4138	5.5676	0.9559
Corporate governance variables						
GCG	41	0.7837	0.8071	0.3315	1.0000	0.1513
TR	41	0.7578	0.8214	0.3928	1.0000	0.1849
BC	41	0.6048	0.5333	0.2000	1.0000	0.2549
SR	41	0.8455	1.0000	0.5000	1.0000	0.1763
CSR	41	0.9268	1.0000	0.0000	1.0000	0.2636
Firm-level control variables						
Size	41	2.6855	2.7283	1.1461	3.6946	0.5509
Lev	41	0.3629	0.2894	0.0117	1.1809	0.2662
Growth	41	0.0663	0.0942	−0.6051	0.5181	0.2193
Listing	41	1.0460	1.1461	0.4771	1.2041	0.2066

Notes: The description of the variables is provided in Table 1

recommendations as regards board and committees registered the lowest level of compliance.

Table 3 reports the correlation matrix comprising the Pearson correlation coefficients (the significance level or p-value in parentheses). Thus, we notice the lack of high correlations between the selected variables, with the exception of corporate governance ratings which will be employed in separate econometric models in order to avoid the multicollinearity statistical phenomenon.

4.2 Regression Results

The estimations' results towards the impact of the compliance with the principles and recommendations stated within the BSE CGC (2008) on the BSE listed companies' value are disclosed in Table 4, ROAadj being employed as proxy for firm value. The empirical results related to the first estimated econometric model provide evidence for the lack of any statistically significant relationship between corporate governance global rating and the value of the BSE listed companies. Furthermore, we found a positive and statistically significant relationship between the rating related to transparency and reporting and firm value (model 2). Likewise, we conclude that there is a positive and statistically significant relationship between the rating related to corporate social and environmental responsibility and industry-adjusted ROA (model 5). However, the empirical results of the econometric models 3 and 4 emphasize the lack of any statistically significant relationship between the rating related to board and committees and firm value, as well as between the rating related to shareholder rights and firm value.

As regards the influence of firm-level control variables on firm value, we establish a positive and statistically significant relationship between firm size, as well as growth opportunities and industry-adjusted ROA, whereas there was acknowledged a negative and statistically significant association between leverage and the BSE listed companies' value.

Withal, the estimations' results out of Table 4 underline the lack of any statistically significant relationship between the number of years since listing on the BSE and firm value. The Appendix 2 (Table 5) provides the estimations' results towards the impact of the compliance with the principles and recommendations stated within the BSE CGC (2008) on the BSE listed companies' value, ROEadj being employed as proxy for firm value, whereas the Appendix 3 (Table 6) presents the empirical results of the same econometric models, but considering EPSadj as proxy for firm value. However, when ROEadj and EPSadj were employed in order to measure firm value, we found the lack of any statistically significant relationship between corporate governance ratings developed based on the CGCS and firm value.

Hence, the hypothesis of current study is accepted only for the rating related to transparency and reporting and for the rating related to corporate social and

Table 3 Correlation matrix

	1	2	3	4	5	6	7	8	9	10	11	12
1	1											
2	0.9402 (0.000)	1										
3	0.3949 (0.013)	0.355 (0.027)	1									
4	−0.0099 (0.952)	−0.0251 (0.880)	0.1093 (0.508)	1								
5	0.1526 (0.354)	0.1376 (0.404)	0.1759 (0.284)	0.7743 (0.000)	1							
6	−0.0752 (0.649)	−0.0955 (0.563)	0.1837 (0.263)	0.6962 (0.000)	0.4979 (0.001)	1						
7	−0.1574 (0.339)	−0.1633 (0.321)	−0.1685 (0.305)	0.631 (0.000)	0.4101 (0.010)	0.235 (0.150)	1					
8	0.0466 (0.778)	0.0455 (0.783)	0.0635 (0.701)	0.6773 (0.000)	0.3373 (0.036)	0.1413 (0.391)	0.2821 (0.082)	1				
9	0.3808 (0.017)	0.3551 (0.027)	0.3961 (0.013)	−0.0063 (0.970)	0.2808 (0.083)	0.0574 (0.728)	−0.3266 (0.042)	−0.0498 (0.763)	1			
10	−0.3085 (0.056)	−0.2479 (0.128)	−0.2292 (0.161)	0.0871 (0.598)	0.1021 (0.536)	−0.0294 (0.859)	−0.0248 (0.881)	0.1735 (0.291)	0.1127 (0.494)	1		
11	0.3846 (0.016)	0.3692 (0.021)	0.1116 (0.499)	−0.5543 (0.000)	−0.3987 (0.012)	−0.3419 (0.033)	−0.57 (0.000)	−0.2941 (0.069)	0.1868 (0.255)	−0.0291 (0.861)	1	
12	0.0211 (0.899)	−0.0757 (0.647)	−0.3048 (0.059)	−0.0981 (0.552)	−0.1241 (0.452)	−0.0532 (0.748)	0.0859 (0.603)	−0.1446 (0.380)	−0.1026 (0.534)	0.0335 (0.839)	−0.1045 (0.527)	1

Table 4 Estimations' results towards the impact of the compliance with the principles and recommendations stated within the BSE CGC (2008) on the BSE listed companies' value (ROAadj—proxy for firm value)

	1	2	3	4	5
Intercept	−0.6389** (−2.1545)	−0.4975** (−2.0567)	−0.3202 (−1.3162)	−0.3855 (−1.2672)	−0.5669** (−2.1853)
GCG	0.4047 (1.6696)				
TR		0.3551* (1.8266)			
BC			0.0217 (0.1644)		
SR				0.0832 (0.3926)	
CSR					0.2250* (1.8501)
Size	0.1260** (2.1719)	0.0916 (1.4693)	0.1357** (2.2507)	0.1416** (2.3209)	0.1402** (2.4510)
Lev	−0.5569*** (−4.6911)	−0.5510*** (−4.7034)	−0.5215*** (−4.2654)	−0.5343*** (−4.2985)	−0.5740*** (−4.8154)
Growth	0.4444** (2.6100)	0.4240** (2.6654)	0.2920* (1.8646)	0.3150* (1.8843)	0.3653** (2.5052)
Listing	0.1309 (0.8842)	0.1294 (0.8829)	0.0896 (0.5893)	0.0850 (0.5622)	0.1404 (0.9530)
N	41	41	41	41	41
F-statistic	5.8209***	6.0071***	4.8841***	4.9273***	6.0363***
Adj R-sq	0.3760	0.3849	0.3268	0.3292	0.3863

Notes: ***Significant at the 1 % level; **significant at the 5 % level; *significant at the 10 % level. The t-statistic for each coefficient is stated in parentheses. The description of the variables is provided in Table 1
The bold values are statistically significant

environmental responsibility, but only when industry-adjusted ROA is employed as proxy for firm value.

5   Concluding Remarks

Current research was employed in order to develop a global corporate governance rating for the companies listed on the BSE, based on the 'Comply or Explain' Statement and aimed at investigating the relationship between the extent of compliance with the principles and recommendations out of the BSE CGC (2008) and firm value. Furthermore, we reported a set of specific ratings as regards transparency and reporting, board and committees, shareholder rights, as well as corporate social and environmental responsibility. By estimating several multivariate linear

regression models, we found a positive and statistically significant relationship between the rating related to transparency and reporting and firm value, likewise between the rating related to corporate social and environmental responsibility and firm value, but only when industry-adjusted return on assets was employed as proxy for firm value. However, when industry-adjusted return on equity and industry-adjusted earnings per share were employed as proxy for firm value, we establish the lack of any statistically significant relationship between corporate governance ratings and firm value. Therefore, we reinforce the assertion of Bhagat et al. (2008) according to whom the corporate governance ratings are highly imperfect instruments and there is no optimum measure. The limitations of our study are depicted by the reduced number of statistical observations, alongside the short period of research. As future research avenues, our purpose is to extend the research sample, respectively to develop an investment strategy similar Gompers et al. (2003).

Appendix 1: Corporate Governance Questionnaire Based on the 'Comply or Explain' Statement Issued by the BSE

- Transparency and Reporting
- **Board and committees**
- **Shareholder rights**

1. Has the Issuer drawn up a Statute/Corporate Governance Regulation which describes the main aspects of the corporate governance principles? (P1, R1)
2. Is the Statute/Corporate Governance Regulation (mentioning the date of its last update) posted on the website of the Issuer? (P1, R1)
3. In the Statute/Corporate Governance Regulation, are there defined corporate governance structures, positions, competences, and responsibilities of the Board of Directors and of the Executive Management? (P1, R2)
4. Does the Annual Report of the Issuer contain a chapter referring to corporate governance, which describes all the relevant events related to corporate governance registered in the previous financial year? (P1, R3)
5. Does the Issuer disclose on its website the information related to the following aspects of its corporate governance:

   (a) A description of the Issuer's corporate governance structures? (P1, R3)
   (b) The updated Articles of Association?(P1, R3)
   (c) The internal regulation governing the functioning/its essential aspects for each special commission/specialized committee? (P1, R3)

(d)   The 'Comply or Explain' Statement? (P1, R3)

(e)   The list of the Board of Directors members specifying which members are independent, of the Executive Management and of the special commissions/committees?(P1, R3)

(f)   A brief version of the CV of each Board of Directors and Executive Management member? (P1, R3)

6. Does the Issuer publish in a special section of its website the details of the holding of the General Meetings of Shareholders (hereinafter 'GMS'):

(a)   The GMS convening notice? (P3, R4)

(b)   The materials/documents relating to the items on the agenda, as well as any other information about the items on the agenda? (P3, R4)

(c)   The templates of the special power of attorney? (P3, R4)

7. Does the Issuer disclose in a special section of its website the shareholders' rights as well as the rules and procedures for the attendance at GMS? (P3, R8)

8. Does the Issuer provide the information in due time (immediately after the GMS) to all shareholders through the special section on the Issuer's website:

(a)   The resolutions passed by GMS? (P3, R8)

(b)   The detailed results of voting? (P3, R8)

9. Does the Issuer disseminate through the special section of the Issuer's website, which is easily identifiable and accessible:

(a)   Ad-hoc reports/official statements? (P3, R8)

(b)   The financial calendar, the annual, quarterly, and half-yearly reports? (P3, R8)

10. Has the Issuer a set of rules referring to the conduct and the reporting obligations relating to the trading of the shares or of other financial instruments issued by the Issuer ('issuer securities') made on their account by the members of the Board of Directors and other related natural persons? (P4, P5, R12)

11. Are the trades with the issuer's securities made by the members of Board of Directors, Executive Management, or any other insiders on their own account disclosed via the Issuer's website, according to applicable rules? (P4, P5, R12)

12. Is the appointment of the Board of Directors members based on a transparent procedure (objective criteria regarding personal/professional qualifications)? (P9)

13. Is the remuneration policy of the Issuer mentioned in the Statute/Corporate Governance Regulation? (P11, R24)

14. Does the Issuer disclose the information subject of the reporting requirements in English:

(a)   Periodical information (regular providing information)? (P12, P13, R25)

(b)   Permanent information (continuous providing information)? (P12, P13, R25)

15. Does the Issuer prepare and make public the financial report according to the IFRS standards? (P12, P13, R25)
16. Does the Issuer organize, at least once a year, meetings with financial analysts, brokers, rating agencies, and other market specialists with the view to presenting the financial elements relevant for the investment decision? (P12, P13, R26)
17. Does the Board of Directors or the Audit Committee, as the case may be, assess on a regular basis the efficiency of financial reporting, internal control, and the risk management system implemented by the Issuer? (P12, P13, R28)
18. Has the Issuer approved a procedure regarding the internal flow and disclosure to third parties of the documents and information referring to the Issuer, considering especially inside information? (P17, R36)
19. Does the Board of Directors meet at least once a quarter for supervising the activity of the Issuer? (P4, P5, R10)
20. Does the structure of the corporate bodies of the Issuer ensure a balance between the executive and non-executive members (and especially independent non-executive members) so that the decision-making is not to be dominated by a single person or a group of persons? (P6)
21. Does the structure of the Board of Directors provide a sufficient number of independent members? (P7)
22. In the course of its activity, is the Board of Directors supported by any consultative commissions/committees nominated by the Board of Directors, which deal with the analysis of some specific subjects in order to counsel the Board of Directors on such topics? (P8, R15)
23. Do the consultative commissions/committees submit activity reports to the Board of Directors on the specific subjects assigned to them? (P8, R15)
24. For the assessment of the independence of their members, does the Board of Directors use the assessment criteria listed in Recommendation 16? (P8, R16)
25. Do Board of Directors members permanently improve their knowledge through training/information in the corporate governance field? (P8, R17)
26. Is there a Nomination Committee within the Issuer set-up? (P10)
27. Does the Board of Directors assess the necessity to have a Remuneration Committee/remuneration policy for the Board of Directors and Executive Management members at least once a year? (P11, R21)
28. Has the remuneration policy been approved by the GMS? (P11, R21)
29. Is there a Remuneration Committee made exclusively of non-executive members of the Board of Directors? (P11, R22)
30. Is there an Audit Committee within the Issuer? (P12, P13, R27)
31. Is the Audit Committee comprised exclusively of non-executive members of the Board of Directors and is it comprised of a sufficient number of independent members of the Board of Directors? (P12, P13, R29)
32. Does the Audit Committee meet at least twice a year, with the view to draw up and disclose to the shareholders half-yearly and annual financial statements? (P12, P13, R30)

33. Does the Audit Committee make proposals to the Board of Directors regarding the selection, the appointment, the re-appointment, and the replacement of the financial auditor, as well as the terms and conditions of its remuneration? (P12, P13, R32)
34. Does the Issuer respect the rights of the holders of the financial instruments issued by the Issuer, ensuring equal treatment for them while also submitting any change of the granted rights for approval by the special meetings of such holders? (P2)
35. Has the Issuer drawn up and submitted for the GMS approval procedures for an efficient and methodical holding of the GMS according to procedure, however without prejudice to the right of any shareholder to freely express their opinion on the topics subject to the debates? (P3, R6)
36. Has the Issuer set-up a special department or has appointed a person dedicated to the relation with investors? (P3, R9)
37. Has the Issuer approved a procedure with a view to identifying and to settling any conflicts of interest? (P14)
38. Do the members of the Board of Directors inform the Board of Directors on conflicts of interests as they occur and do they refrain from debates and the vote on such matters, according to relevant legal provisions? (P15, R33)
39. Has the Issuer approved the specific procedures in order to provide procedural compliance (criteria to identify the significant impact of transactions, transparency, impartiality, noncompetition) with the view to identify the transactions between related parties? (P16, R34/R35)
40. Does the Issuer carry on activities regarding the Issuer's social and environmental responsibility? (P18, R37/38).

Appendix 2

Table 5 Estimations' results towards the impact of the compliance with the principles and recommendations stated within the BSE CGC (2008) on the BSE listed companies' value (ROEadj—proxy for firm value)

	1	2	3	4	5
Intercept	**−0.8337***	**−0.6674***	−0.3932	−0.7257	**−0.7150***
	(−1.9175)	**(−1.8744)**	(−1.1201)	(−1.5547)	**(−1.8835)**
GCG	0.5008				
	(1.4549)				
TR		0.4547			
		(1.6509)			
BC			−0.0279		
			(−0.1501)		
SR				0.2988	
				(0.9521)	
CSR					0.2623
					(1.5171)
Size	**0.1765****	0.1325	**0.1897****	**0.2103****	**0.1923****
	(2.1180)	(1.4906)	**(2.1984)**	**(2.4002)**	**(2.3220)**
Lev	**−0.4155****	**−0.4128****	**−0.3933***	**−0.3879***	**−0.4490****
	(−2.0474)	**(−2.0542)**	**(−1.8828)**	**(−1.8841)**	**(−2.1874)**
Growth	**0.6172****	**0.5964****	**0.4005***	**0.5390****	**0.5095****
	(2.5276)	**(2.6262)**	**(1.8086)**	**(2.2212)**	**(2.4362)**
Listing	0.0544	0.0545	−0.0045	−0.0039	0.0602
	(0.2586)	(0.2625)	(−0.0213)	(−0.0188)	(0.2867)
N	39	39	39	39	39
F-statistic	**3.3819****	**3.5549****	**2.7866****	**3.0379****	**3.4345****
Adj R-sq	0.2386	0.2515	0.1903	0.2114	0.2426

Notes: ***Significant at the 1 % level; **significant at the 5 % level; *significant at the 10 % level. The t-statistic for each coefficient is stated in parentheses. The description of the variables is provided in Table 1
The bold values are statistically significant

Appendix 3

Table 6 Estimations' results towards the impact of the compliance with the principles and recommendations stated within the BSE CGC (2008) on the BSE listed companies' value (EPSadj—proxy for firm value)

	1	2	3	4	5
Intercept	−0.4982 (−0.3845)	0.0364 (0.0339)	−0.1765 (−0.1740)	0.7392 (0.5740)	−0.2061 (−0.1798)
GCG	0.8808 (0.8316)				
TR		0.3510 (0.4073)			
BC			0.6289 (1.1424)		
SR				−0.5401 (−0.6017)	
CSR					0.3728 (0.6936)
Size	**0.6178**** **(2.4368)**	**0.5967**** **(2.1577)**	**0.6085**** **(2.4199)**	**0.6103**** **(2.3622)**	**0.6470**** **(2.5589)**
Lev	**−1.6599***** **(−3.2004)**	**−1.6147***** **(−3.1088)**	**−1.5248***** **(−2.9900)**	**−1.5190***** **(−2.8863)**	**−1.6711***** **(−3.1724)**
Growth	0.2673 (0.3593)	0.0547 (0.0776)	0.1927 (0.2950)	−0.2970 (−0.4196)	0.0520 (0.0808)
Listing	−1.0933 (−1.6897)	**−1.1467*** **(−1.7648)**	**−1.1227*** **(−1.7706)**	**−1.1733*** **(−1.8323)**	−1.1002 (−1.6893)
N	41	41	41	41	41
F-statistic	**3.7816*****	**3.6227*****	**3.9669*****	**3.6820*****	**3.7180*****
Adj R-sq	0.2579	0.2469	0.2705	0.2510	0.2535

Notes: ***Significant at the 1 % level; **significant at the 5 % level; *significant at the 10 % level. The t-statistic for each coefficient is stated in parentheses. The description of the variables is provided in Table 1
The bold values are statistically significant

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Application of Governance Principles in IT Projects

Ioana Beleiu and Razvan Nistor

Abstract An increased usage of projects can be observed in all fields, being a way of adapting current activities to the challenges of the economic reality. One of the most important characteristics of projects is the orientation towards objectives' achievement, which contributes to the long term development of an organization and to obtaining competitive advantage on the market. But, in order to maximize the benefits of using projects as means of organizing the activity, a special attention should be given to aspects that can influence project success. We consider project governance as being essential to project success and having a positive influence on the development of the organization. The increased frequency and importance of projects nowadays determined a significant focus on projects' governance and its relation with corporate governance. The steering group, the project owner and project manager are key roles influencing project governance. The objective of this paper is to analyse the opinions of project managers regarding the application of project governance principles when dealing with IT projects, based on structured interviews.

Keywords Project • Governance • Success

1 Introduction

Governance is related with defending stakeholders' interests (Tirole 2001). Many opinions and definitions can be identified in literature when researching corporate governance. Probably the most widely accepted and used definition is the one provided by the OECD. According to OECD, corporate governance "involves a set of relationships between the management of an organization, its board, its stakeholders and other stakeholders; [...] provides the structure through which the objectives of the company are set, the means of attaining those objectives and monitoring performance are determined" (OECD 2004, p.11).

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Governance provides a framework within an organisation needed for an accurate decision making process and an efficient management based on transparency, communication with stakeholders, accountability and clear role definition (Zwikael and Smyrk 2014). Aspects concerning governance are of great interest both for public and private companies, and in any type of organisation. Muller (2009) considers that governance is not limited to the top of an organisation, but it can be applied to all organisational levels.

Since projects are defined in the project management literature as temporary organisations (OGC 2009), it is only fair to state that project governance is needed for better managing projects, for enhancing success chances and creating long term positive effects on permanent the organisations implementing projects. International organisations, such as Project Management Institute (PMI), Association for Project Management (APM), Office of Government Commerce (OGC) or even the International Organization for Standardization (ISO), approach project governance from different points of view, more or less complex or restrictive, thus emphasizing once again the importance of project governance. According to Project Management Institute (PMI), project governance "provides a framework in which the project manager and sponsors can make decisions that satisfy both stakeholders needs and organizational strategy objectives or address circumstances where these may not be in alignment" (PMI 2013). When defining project governance, APM (2004) focuses on the correlation of the project portfolio with organisation's objectives and the information exchange between the board and other relevant project stakeholders. On the other hand, within the OGC Guidelines, governance is presented as the framework necessary for successfully managing projects (Muller 2009). International Organization for Standardization (ISO) approaches governance in a broad way as areas of organisational governance related to projects.

Biesenthal and Wilden (2014) conducted a comprehensive research on the application of corporate governance theories to project context, synthesizing several definitions of project governance such as: the focus on aligning project objectives with the organisational strategy, aiming to achieve stakeholders' expectations. Project governance refers to the connection between the project, the permanent organisation and the involved stakeholders (Muller et al. 2014). Effective project governance is mentioned in literature as a determinant factor for project success by providing the formal structure needed for a project to be implemented (Zwikael and Smyrk 2014) and to create sustainable value for all those involved (Too and Weaver 2014).

Considering the great interest on project governance in recent years, we approach this topic in the current paper, aiming to create a theoretical framework on project governance with focus on IT projects, in order to capture the current state of knowledge, and present opinions of project managers regarding the application of project governance principles when dealing with IT projects.

2 Governance of IT Projects

Modern society has become almost totally dependent on IT and its proper functioning (Walford 1999) within all economic activities and also in day-to-day life. The increased frequency of using information technology and the growing interest for transparency and efficiency, determined the need for a high level of professionalism in IT project management and good governance, contributing to the development of research in this area (Frey and Buxmann 2011).

IT projects are different from other types of projects. They are more dynamic and need extremely fast results in order to keep up with the changing environment. IT projects serve the needs of ever changing organizations, and their objectives may change depending on the strategic needs of the organizations. In this case, if projects do not achieve the desired results within 6 months of implementation, the chances of success decrease significantly (Bonham 2004). Constant communication with stakeholders and clearly defined success criteria is a must for IT projects in order to achieve the desired objectives and results. IT project management must be dynamic and flexible in order to achieve results that meet stakeholders' needs and expectations. IT projects aim most of the time implementing a change at organizational level, so the management methods used may vary depending on variables as the country, the organization or stakeholders' needs (Bonham 2004).

According to Weill and Ross (2004), the governance of IT projects can be defined as "(...) specifying the decision rights and accountability framework to encourage desirable behaviour in using IT". Different decision fields require different structures of decision-making (Frey and Buxmann 2011). Project governance in this area implies making decisions concerning the IT strategy, investment in IT projects or IT architecture (Bonham 2004). Another definition says that the governance of IT projects represents the organisational management system through which the portfolio of IT initiatives is approved, prioritized and controlled (Wilkin and Riddett 2009). There can be observed a correlation between IT projects seeking to implement changes and the strategy of the organization using the final product (project customer) on one hand, and on the other hand, their relation to the strategy of the company executing the projects, developing specific software for instance. Governance of IT projects provides an adequate framework for the decision making process, aiming to link projects' objectives with the organisational objectives and satisfy stakeholders' requirements. Top-performing companies succeed by implementing good and effective IT governance in order to support their strategies (Weill and Ross 2004).

3   Roles Influencing Project Governance

Clearly defined roles and responsibilities is one of the main principles underlying good project governance. Despite the importance of this topic, in the literature concerned with project governance, roles and responsibilities are not sufficiently explained. Mosavi (2014) studied the roles of portfolio steering committees in project portfolio governance, but did not focus on project or program steering committees.

According to Arnesson and Albinsson (2014), the steering group is an important part of the organizational structure, along with the project owner and the project manager. The steering group at project level can be associated with the board at corporate level. The steering group or steering committee is responsible for making strategic decisions when dealing with projects. Steering groups are usually used in large projects (Arnesson and Albinsson 2014) or when there are several owners involved (Karlsen 2010). The project manager reports to the steering committee. A project steering group can represent the project owner (Andersen 2008) or it can work together with the project owner, but in this case well defined responsibilities are needed (Karlsen 2010).

There are an increased number of cases when the project owner is also the sponsor of the project. One of the most important stakeholders, the project owner should have a central and active role in the project (Karlsen 2010). However, too much involvement of the owner within project implementation might burden the work of the project manager and diminish the efficiency of the project team. The project owner has a strategic orientation, represents the interest of the company related to the project and supports the project implementation (Gareis 2005). The communication between the project owner and the project manager is very important.

The project manager role is described through a set of project specific tasks, through the leadership of the project team, the responsibility for the project success and for transferring project results into the organisation (Holzle 2010). The project manager coordinates the project team, prepares project documentation, represents the interests of the project within the organisation, represents the project whenever necessary and is responsible for the achievement of project objectives (Gareis 2005). Project managers are those who know best the project and are able to influence directly the relationship between the temporary organisation of the project and the company, represented by the owner or the steering group. In the empirical part of this article, we focus our research on opinions of project managers, considering their importance and influence on project success and on good governance.

4 Methodology

The research presented in this paper makes a literature review on the concepts of project governance, the governance of IT projects and the roles that can contribute to the good governance of projects. Moreover, opinions of IT project managers regarding the application of project governance are analysed based on a qualitative research. The field of IT was selected for this research due to the importance it has over the current society based on modern technology and the challenges that need to be faced by IT governance in a constantly changing environment.

The research questions of the current research are:

- What are the approaches in the project management literature concerning project governance and the governance of IT projects?
- What are the opinions of project managers regarding the application of project governance in the IT field?

Qualitative research involves studies that do not attempt to quantify their results through statistical summary or analysis (Marczyk et al. 2005), enhancing the knowledge in a field of study by describing a current situation as it is perceived by practitioners. Qualitative research is used independently or combined with a quantitative research in order to complete the finding obtained by applying statistical methods. In the current research, structured interviews were used for data collection. Despite the extended time frame needed for conducting interviews and the reduced sample, interviews provide the opportunity to receive answers to all the questions, to have a face to face talk with the respondent, to explain certain issues whenever necessary and to approach more complex topics.

The number of analysed interviews is seven, conducted during the 24th of November and 5th of December 2014, with an average duration of 40 min. The questions discussed during these interviews referred to key aspects of project governance as:

- the relationship between projects and the organization's development strategy: the questions asked were whether the project portfolio is related to business objectives and how does it support the development strategy of the organisation.
- the relationship with key stakeholders (project stakeholders): questions refer to sponsor's involvement, the clarity level existing when defining roles and responsibilities, the relationship with stakeholders and the level of transparency.
- control and reporting: questions refer to the definition of success criteria and the information level of the board.

5 Opinions Regarding the Application of Project Governance in IT

Interviews with IT project managers, who have experience in implementing these projects, were based on three central points of discussion and seven questions. The first aspect analysed was the relationship between the project and the development strategy of the organization. It was discussed whether the project portfolio is consistent with the organization's core business, including those relating to profitability, sustainability and development. Most of those interviewed considered that projects implemented within their organizations are consistent with the general framework and correlated with company's development strategy, with particular aspects of profitability. The development framework of the company is appreciated by one of the respondents as dynamic, evolving, mentioning the existence of an internal project that is focused on the management of the project portfolio. In one of the IT companies analysed was noted that projects are associated to programs, aligned with the company's development strategy on a medium term. On the other hand, one of the respondents felt that within his organization, not all projects are linked to the main objectives of the business.

It was also discussed how the project portfolio supports the development strategy of the organization. Some received responses were: the project portfolio is closely following the ever evolving needs of the organization, pursuing continuous improvement in speed and quality of software products. On the other hand, several project managers consider that the experience and reputation gained in a variety of projects makes it easier to acquire new customers. By increasing the number of clients, increases the number of requests for development and maintenance and the number of employees. In the case of IT companies it can be observed that the project portfolio is located in the centre of the business. Thus, based on responses to the interviews, we conclude that the portfolio of projects is permanently changing aiming to optimize the use of resources in relation to the strategic objectives of the company.

The second aspect discussed through interviews was the relationship with key stakeholders of projects. The responses to the questions listed in this section are different from one case to another, showing a wide range of situations that may occur when dealing with stakeholders' related aspects.

One of the issues raised is sponsors' involvement in projects implemented within the organization. We considered important to present all the responses received in this case, grouping them according to the expressed opinions. Thus, after seven interviews five distinct situations occur:

- In the first case there is a board that includes key stakeholders together with managers of different departments. They meet and discuss strategic issues whenever is necessary. The sponsor participates in these meetings.

- In the second case it was noticed that the sponsor is involved in the project development, activity considered to be time-consuming by the respondent (project manager).
- In the third case, the sponsor has a medium level of involvement in projects' implementation. The process is briefly described as follows: a product offer is presented to the sponsor, after clarification and negotiation he/she approves it, and developers deal with the implementation. The product is presented to the sponsor only at a certain previously approved date (about 3 weeks before the end of the project). Two of the analysed cases fit within this situation.
- In the fourth case, the sponsor has a very high involvement within projects under development. Choosing the portfolio of projects and establishing company's strategy is the responsibility of the company's management team and project owners.
- In the fifth case the role of the sponsor is more of information and consultation, other directly responsible persons being designated for each project to support and supervise the project execution. Two of the analysed cases fit within this situation.

Another important issue discussed was about the level of clarity of roles and responsibilities within projects implemented in the organization. There were identified situations in which roles and responsibilities are clearly defined within the project, but also situations where the responsibility is not clear during project implementation due to changes that occur quite often. These changes in IT projects are usually caused by the changing environment or new requirements from the client. It was also noticed the situation when new roles occur during project implementation. An interesting response was received from a project manager considering that within his organization the roles and responsibilities of projects are sometimes volatile, migrating between employees, the clarity of roles being sometimes inadequate. This kind of situation disrupts the project execution, generating chaotic situations when project team members do not know what they have to do and when.

The relationship with stakeholders was also a point of discussion, more exactly if they are informed on the progress of projects, if the level of transparency is appropriate to their requirements. The relationship with stakeholders is particularly important in IT. A reduced communication can have serious negative implications on the project. In all analysed cases it can be noted that the respondents appreciate a transparent communication with stakeholders, they being regularly informed on the progress of the project.

The third aspect examined in the interviews refers to control and reporting. One of the questions was if there are clear success criteria established for the implemented projects. Based on the responses received, it can be observed that although there are quality criteria defined, most interviewees believe that the success criteria are not very clear. According to the point of view of one interviewed project manager, success is measured by increased product sales and sponsors' satisfaction. Aspects concerning success criteria when dealing with

projects are complex and of great interest, reason why several studies within the project management literature deal with this topic.

The last question of the interview referred to the information level of the board concerning the progress of projects. There were no problems identified regarding the communication between project managers and the company board. Each time the response was that they are informed regularly, depending on the level of detail required.

Based on the interviews, it can be concluded that the main problems concerning the governance of IT projects could be related to the involvement level of the sponsor, unclear definition of roles and responsibilities in projects and lack of clarity in establishing success criteria.

6　Conclusion

Organizations use projects on daily basis in order to achieve their objectives and maintain competitive advantage, which is why an efficient and effective governance framework is needed to increase the chances of project success. Governance makes a project viable (Muller and Lecoeuvre 2014), and even though different approaches and views can be identified regarding basic concepts, it is universally accepted that projects' governance generates added value for all stakeholders.

Based on the importance of IT projects in all business related fields, the project management literature gives an increased level of attention to this type of projects. Wilkin and Riddett (2009) consider the IT field inseparable from the business models. It is difficult to find an answer to the question how should IT projects be governed to achieve sustainable value for all stakeholders. Identifying the best model for governing IT projects is an impossible challenge, but a special attention should be given to aspects that can improve the governance of projects, topic approached in this paper.

Analysing the opinions of specialists in managing IT projects provides the opportunity of capturing real situations from the business environment. Although the number of interviews when conducting a qualitative research is reduced because of time and budget constraints, the discussions between the interviewer and the respondents allow to address certain topics more deeply, offering an overview of the situation to the researcher.

The interviews conducted in this study enabled the identification of problematic issues when governing IT projects: the relationship with the sponsor, the definition of roles, responsibilities and of success criteria. By giving more attention to these problematic areas, project governance can be improved. Responses received from interviews' application are an important starting point for the next stage of the research, the analysis of the correlation between success factors and the dimensions of projects' governance.

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Proactive Cost Management in a Modern Company

Lina Martirosianiene

Abstract Globalization, technological changes, intensive competition, fluctuating consumer demand, economic and political changes encourage company managers to act proactively, assume a bigger risk and choose suitable strategies. Unfortunately, insufficient cost management is a problem of most companies. A substantial part of cost in the companies is incurred "automatically", i.e., due to inertia while conducting routine work which does not demand economic substantiation and create unnecessary cost for the company. A successful and proactive cost management could be a key to business success, and an effective cost management system in a company is directly and positively related with its competitive advantage. This research solves a research question of elimination of casual cost management decisions from the business model of the company and integrating it into proactive cost management which directly correlates with benefits created by changes of current principles and practices. The necessity of demand of proactive cost management was driven by two aspects: firstly, increasing competition and global financial crisis are increasingly signaling that effective cost management system is one of the most important management issues necessary to reach strategic organizational goals; secondly, the literature and practice more often identify cost management as a representation of incurred cost and less often with cost control and proactive management.

Keywords Cost management • Proactivity • Resources • Analysis • Budget

1 Introduction

With economy growth, increase of profits and revenue companies are increasingly losing their cost control, i.e., cost management disappears from operative decision-making of most companies. However, such behavior is too dangerous as when the

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economy shrinks cost management becomes difficult or sometimes even impossible. The costs must be controlled together with growing revenue and risk because if the cost is being controlled today the company won't have to undertake reckless survival tactics once the success turns away. Lack of operative, precise and qualitative information leads to belated and irrational cost management decisions which are made without conducting comprehensive analysis and evaluating all possibilities; thus the companies need a clear and purposeful cost management policy rather than accidental decisions. Cost reduction policy integrated into organizational business model should be directly correlated with long-term benefits of changes in well-established principles and practices. Group of entrepreneurship process researchers (Floyd and Wooldridge 1999; Ucbasaran et al. 2001) have proved that integration into cooperation networks (on individual or company level) helps companies to get more acquainted with existing possibilities and access necessary resources or effectively manage current resources in order to implement a possibility which occur in its business environment.

The literature mostly analyzes and evaluates the following concepts based on research results: principles of cost accounting (Johnson and Kaplan 1987; Suthummanon et al. 2011; Adkins 2008; Horngren et al. 2011; Krumwiede and Charles 2014), advantages and disadvantages of managerial accounting (Needles et al. 2013; Tahla and Seetharaman 2010; Dumitru and Calu 2008), mistakes of budgeting and implementation control (Samuelson and Marks 1998; Libby and Lindsay 2007; Shastri and Stout 2008; Gaizauskas and Martinavicius 2013; Arlinskaite and Tamuleviciene 2014; Kalcinskaite 2006), elements of performance auditing (Mackevicius and Daujotaite 2011b; Barzelay 1997; Stefea and Nica 2012; Pollitt et al. 1999; Power 1997; Waring and Morgan 2007), cost level indicators (Alinaitwe et al. 2009; Choong 2013; Henri 2006), significance of responsibility centers (Finkler et al. 2007; Grosanu and Ramona 2009; Urbonaite and Stonciuviene 2013) and proactiveness as one of the most important features of an entrepreneur organization that helps to solve problematic situations (Stripeikis 2008; Bagdanaviciute 2012). It must be noted that no discussions regarding proactive cost management which integrates all elements of purposeful policy of cost management and directly correlates with changes which occur in internal and external environment was found.

Accordingly, the necessity of demand of proactive cost management was driven by two aspects: firstly, increasing competition and global financial crisis are increasingly signaling that effective cost management system is one of the most important management issues necessary to reach strategic goals of the company; secondly, the literature and practice more often identify cost management as a representation of incurred cost and less often with cost control and proactive management.

The research object is proactive cost management. Goal of the research is to systemize cost management methods and prepare a model of proactive cost management in a modern company. In order to reach the goal, the following tasks will be conducted: (1) analysis of a concept of proactive cost management; (2) identification and systematization of main methods of proactive cost management, that

influence the integration of proactive cost management into business models; (3) preparation of a model of proactive cost management in a modern company.

The research was conducted by analyzing previous research works, practical experience and by logically generating conclusions and recommendations. Literature was theoretically analyzed by employing the methods of analysis and synthesis. Research findings are presented by a monographic method.

2 Concept of Proactive Cost Management

Cost management is the process of effectively planning and controlling the costs involved in a business. It is considered to be one of the most challenging tasks in business management. However, globalization, technological changes, intensive competition, fluctuating consumer demand, economic and political changes encourage company managers to act proactively, assume a bigger risk and choose suitable strategies (Korsakiene 2012). In order to gain profits the company must earn revenue and while earning the revenue the company endures some cost. The competitive advantage by itself shows that companies may evaluate their competitive position and strive to improve it while conducting suitable actions (Korsakiene 2004; Ginevicius and Korsakiene 2005). Based on such concept, Karnani (1984) has presented a model which proves that competitive advantage is determined by cost and differentiation. A successful and proactive cost management could be a key to business success. This was also proved by Wallace (2013) who revealed that effective cost management system in a company is directly and positively related with its competitive advantage. In this context new factors creating the value of a company are being shaped which demands for global orientation, strategic flexibility and rapid response of top managers as the company must constantly develop and react to new technologies, new markets, new businesses and new consumers.

The literature provides various descriptions of cost management. The analysis of the literature has shown that cost management is not always directly related with cost reduction. Stefea and Nica (2012) analyze cost management as a cost optimization implementing strategic organizational goals in a most efficient way. The authors use "cost optimization" term as in their opinion cost management strategy should be the main goal of the company in order it could achieve its strategic and tactical goals. Atkinson et al. (2012) describe cost management as "the most important evaluation system of company's performance"; meanwhile Horngren et al. (2011) state that cost management is a totality of attitudes and measures of managers using company resources for implementing the goals. The necessity of systematic view towards cost management was also analyzed by McNair (2007).

If the company seeks for strategic changes and competitive advantage, proactive cost management is one of the main directions. Proactiveness is an active position of a company towards its environment, its capability to change the established order in its environment. While discussing about the main features of a modern company many management theoretics (Drucker 1997; Handy 1990) specify a capability to

change and tolerate the changes as one of the most important features. Drucker (1997) and Handy (1990) agree that a company which is not able to create innovations and change will sooner or later face some problems. In current time, which is also described as a period of rapid changes, proactiveness becomes an essential and mandatory feature. In order to survive, the companies must be capable of tolerating the changes and more actively create innovations which are not limited to an invention of a new product or service. It is most clearly defined by capability to make creative decisions based on a principle of "economic compromise" (Stripeikis 2008).

Therefore, a proactive cost management is a search for new possibilities without waiting until aroused problems will force to search for non-optimal and reckless decisions; it is an activity which prevents from facing the problems; it is a routine work in which the managers actively search for ways which help to reach best results with the lowest cost; it is an acceptance of full responsibility for results of company activities in a long-term.

3 Directions of Proactive Cost Management

In a time of rapidly changing economy traditional and individual methods of cost management become poorly effective and changing environment raises more and more new requirements for modern organizations (Bagdanaviciute 2012). Capability to adapt to new business paradigm—to use all accessible actual and planned information, to decentralize company's activities and responsibilities for those activities, and to improve company accountability and reasonable resource management—is one of the most important conditions of competitiveness and survival of a modern company.

In order to reach the intended organizational goals it is necessary to analyze past events but also at the same time it is crucial to monitor newly arising business possibilities while implementing a culture of constant changes. It is also crucial for the company to change not only due to radical changes in its environment (Stripeikis 2008) but also due to effectiveness of its proactive cost management system. Therefore, the directions of proactive cost management include a structure of company activities which are both preplanned previously and also promoting and supporting changes.

A modern company must create a system of proactive cost management in order to receive relevant and correct information. While summarizing the results of research analysis the author states the main directions of proactive cost management are the following: (1) precision and timeliness of managerial accounting information; (2) application of modern methods of cost management (correct allocation of overhead costs); (3) role of cost responsibility centers in allocating and managing costs; (4) implementation and management of a budgeting system; (5) identification of processes which create value and which do not (internal

auditing); and (6) identification of effectiveness areas in company activities which have to be improved while calculating the indicators of cost level.

Precise and comprehensive information of managerial accounting is crucial in making management decisions. Imprecise or insufficient information raises doubts and leads to incorrect decisions. The literature provides various descriptions of managerial accounting: often it is describe as a system which collects, processes and provides information in order the managers could make decisions and manage the company; other sources state it is a calculation of time costs and evaluation of activities effectiveness of a company and its departments, meanwhile others state it is a preparation of the information for managing the production. According to Needles et al. (2013) managerial accounting can be described as a collection and rationalization of internal information about company activities and forecasting of such activities. The author relates managerial accounting to control, analysis and systematization of usage of company resources and evaluation of performance effectiveness of a company and its departments providing the management suitable and comprehensive information related with company status which allows the management to make specific managing decisions, plan and control the activities of a company and monitor the implementation of the decisions made. Managerial accounting, oriented especially towards providing information to managers, being considered "an informational tool necessary to the management for taking decisions, to maximize profitability" (Dumitru and Calu 2008), perform three functions of management, as follows:

- planning: managerial accounting helps in setting future goals (strategic planning) providing information necessary in making decision on the adopted production systems, the company's price policy, the trade policy, and the appreciation of the invested capital;
- organization: the interaction of the managerial accounting and the organizational process is presented as follows: the identification of the organizational structure and a better understanding of the methods for determining the authority and the distribution of responsibility are essential in the determination of information in an economic entity;
- control: managerial accounting sustains the verification process of the method and the extent to which the proposed objectives have/have not been accomplished, elaborating the reports that should indicate the actual performances opposed to the proposed objectives (Breuer et al. 2013).

Therefore the companies which have implemented managerial accounting system solve such problems as resource management, stock, labor and other resources management, pricing, performance analysis and presentation of detailed results, planning and control of activities. In the opinion of Tahla and Seetharaman (2010) modern companies must have new attitude towards the structure of managerial accounting, which must include the possibilities of changing the accounting method based on the newest information technologies and introduce new areas. Tahla and Seetharaman (2010) emphasize that managerial accounting should be directed to

the management of activities, assets, business control, financial indicators and quality.

Proactive cost management is inseparable from modern methods of cost accounting and its application in the companies. In order to increase the competitive advantage in a constantly changing business environment the company must choose such system of cost accounting which would provide information which is relevant for management. Cost accounting is an important information system for profit-oriented companies. Traditional methods of cost accounting allow precise calculation of direct costs of production and, depending on accounting policy chosen by the company, to approximately calculate and allocate non-direct costs to finished production. Johnson and Kaplan (1987) have presented a method of activity-based costing (ABC) as an alternative to traditional method of cost accounting. The fundamental difference between traditional and activity-based costing is that the traditional method states that cost is created by the product which is being produced; meanwhile ABC system states that the cost is created by the activities (Suthummanon et al. 2011). Taking into account the critics of the literature and listed disadvantages of this method, Kaplan and Anderson (2007) presented and substantiated their new concept called time-driven activity-based costing method. Adkins (2008) has stated that this new concept is more useful and effective.

According to Krumwiede and Charles (2014), the activity-based costing (ABC) literature suggests that it provides "strategic" benefits through improved information for strategic decision making as well as "operational" benefits from a better understanding of customers, production activities and cost drivers.

A very important factor which influences the proactive cost management of a company is correct cost accumulation. After dividing a company into smaller segments—responsibility centers, the activity of each center is directed towards seeking a common result of a company as a united system, cost accumulation and control becomes clearer and more informative. The concept of responsibility centers was firstly introduced by Higgins (1952): only those revenue and cost are attributed to a specific responsibility center for which such center is responsible and which it is able to control. The theoretical background for creating responsibility centers was made by the Agency Theory and the Principal—Agent Model based on this theory. The main principle of this theory is a formulation of a request to conduct a specific activity by a customer and correct execution of this activity by an executor (Mitnick 2012). The literature defines responsibility centers in various ways: as smaller elements of a company responsible for specific activity areas (Finkler et al. 2007), as separate segments of a company which have a defined complex of tasks (Grosanu and Ramona 2009). Therefore in order to increase the performance effectiveness decentralization of company activities and responsibilities for it, i.e., decomposing the company into cost responsibility centers which goal is to strengthen the control of cost experienced by the company and the responsibility for them becomes very useful (Urbonaite and Stonciuviene 2013). According to Grosanu et al. (2011), once the business subject is divided into responsibility centers its management becomes simpler and more effective.

Every modern company that desires to successfully operate in the market and develop its business must plan its activities, i.e., create strategic and tactical goals, determine its implementation process and measures and foresee the results of its activities. According to Kalcinskaite (2006), if a company wants to implement an effective budgeting system, at first it must formalize its management structure and budgeting system becomes vital only when the company implements managerial accounting. The author of this article agrees with the opinion of Samuelson and Marks (2006) who assert that while making forecasts much useful information must be collected which has to be taken into account while making future decisions regarding the activities and management of a company; and the result of forecasting gains three forms: firstly, it is a forecast itself, secondly—a relation between forecast and economic variables which influence it is determined, and thirdly, the precision of the forecast is being evaluated. Reasonably created cost budgeting system would allow the companies to purposefully plan their activities and effectively use material and other resources, help to optimize costs of the company and maximize gained benefits. However, no planning system can be effective without an effective control system (Arlinskaite and Tamuleviciene 2014). In general, the control is understood as a strive to ensure the goals of organization while monitoring and supervising all areas of company activities. Control of budget implementation is a process in which deviations from budget indicators are determined and measures to eliminate such deviations are foreseen. Gaizauskas and Martinavicius (2013) analyze two essential aspects which influence the performance of budget control—the distribution of responsibilities and assessment of deviations level analysis.

The companies must prepare such budgeting system which would allow to determine occurred deviations in their primary stage which in turn would allow to find the reasons of deviations and adjust the plans or even directions of company activities (Libby and Lindsay 2007; Shastri and Stout 2008). Most companies think that the budgeting system works effectively only when company employees (responsibility centers) responsible for preparation and implementation of specific budgets are interested in this.

Objectivity of received information is very important in the analysis of proactive cost management directions. The author agrees with Mackevicius and Daujotaite (2011a) who state that performance audit is one of the most important control measures (other measures might include strategic planning, budget programming, etc.) which help to improve the accountability and ensure adequate resource management of organizations. Basically performance audit include identification of weak areas in main activities which lie in processes, inappropriate management or weak internal control, revelation of improvement possibilities and providing the recommendations. Performance audit motivates the audit subject to pay more attention to economy, effectiveness and performance of activities and provided recommendations help to improve the performance, save resources, reduce costs, improve quality of service, strengthen management, administration and organizational processes and reach predetermined goals. Besides three mentioned elements of performance auditing (economy, effectiveness and performance) Barzelay

(1997) adds verification of information, risk evaluation, review of best practice and review of managerial audit. Performance audit is an essential part of regulation system which allows to reveal how companies organize and conduct their activities and implement tasks which are dedicated for them. Revealed deviations from established standards or violation of principles of legitimacy, economy, performance or effectiveness allow the companies to undertake specific actions and improve the situation (Mackevicius and Daujotaite 2011a).

Barzelay (1997), Pollitt et al. (1999), Power (1997), and Waring and Morgan (2007) state that performance audit is an added-value creating supervising and evaluating function which, based on systematic view, enables the companies to improve the effectiveness of management, control and supervision processes. Performance audit: (a) is a process which includes consecutive realization of supervising and evaluating function; (b) highlights problematic performance areas; (c) analyzes and evaluates the efficiency of resources, effectiveness of performance processes and (or) results performance and its impact; (d) creates added value which occurs in evaluations, conclusions and recommendations provided by performance auditors that allow to improve the activities of the company and modernize the management (Daujotaite 2011).

The dictionary of international words define the term "effectiveness" as a ratio between a result and cost necessary to reach it or a level of its conformation. Effectiveness is understood as a criterion which is used to evaluate company performance using its resources. The resources must be distributed in such way which would bring maximum possible net benefits. Alinaitwe et al. (2009) define effectiveness as company's capability to implement its mission through strong management, leadership and dedication towards the goals. While talking about the effectiveness Jewell (2002) insists that costs of resources must be taken into the account and analyzed. In the opinion of Mackevicius and Daujotaite (2011b) the evaluation of resource usage effectiveness should include the comparison of performance results with the resources which were necessary to obtain these results. Henri (2006) analyzes following main functions which are common for all systems of performance measurement:

- Control which is understood as a classical feedback, a comparison of predetermined goals and performance results and adjustment of activities once it is necessary.
- Concentration of attention—signals which help to answer the question about where the problem is.
- Strategic decision making. Measurement information together with determined reason consequences, determined goals and links of internal processes allows choosing the most suitable decision option.
- Justification. Systems of performance evaluation can be used to substantiate or justify made decisions.

Traditional economy models analyze cost while calculating main relative indicators which are provided below:

- Analysis of cost structure and its changes which allows determining the changes in costs and its structure.
- Costs of sold production for one turnover Eur is a significant indicator because the lower its level the bigger profit company gains for the production sold. This indicator helps to evaluate the effectiveness of company business and shows its capabilities to control the costs.
- The trend of reducing the indicator of activity costs for one turnover Eur might show that the company has a well prepared policy of cost reduction (more detailed indicators might be calculated, including the ratio between turnover cost and turnover revenue, or the ratio between total and administration cost and sales revenue).
- Performance costs for one profit Eur show what part of profit from main activities is used to cover the costs.
- Degree of operating leverage is defined as a percentage change of company's profit before interest and taxes when turnover changes by one unit. This indicator shows business risk of a company: the higher the degree of operating leverage, the bigger the business risk of company, because even a small decrease on turnover amount might lead to a big decrease in business profit.

4 Model of Proactive Cost Management

After analyzing the literature regarding proactive cost management the research author have concluded that in a modern company proactive cost management is directly related with: implementation of managerial accounting system; decentralization of company activities and responsibilities for them, i.e., creation of responsibility centers; planning of activities; choice and application of modern accounting methods; usage of control measures; measurement of performance effectiveness. While summarizing the results of the research a model of proactive cost management in a modern company was created (Fig. 1).

Model of proactive cost management which is provided in this work shows the correlation between the concepts of strategic goals of the company, levels of cost management and external environment. The proactive cost management presupposes active company position in terms of environment, its ability to change current order in its business environment, search for possibilities rather than wait till problems arise which will force to search for non-optimal and reckless decisions, accepting full responsibility for results of the company activities in a long term.

Strategic company goals presupposes goals which are created for specific cost responsibility centers which implementation directions and measures must be predetermined in the processes of budget preparation, which are further integrated into a unified system of company budget. When business environment condition changes or strategic goals of the company are being adjusted, the goals of cost responsibility centers must be altered as well. When the company uses accounting based on responsibility areas, depending on variety of production technology and
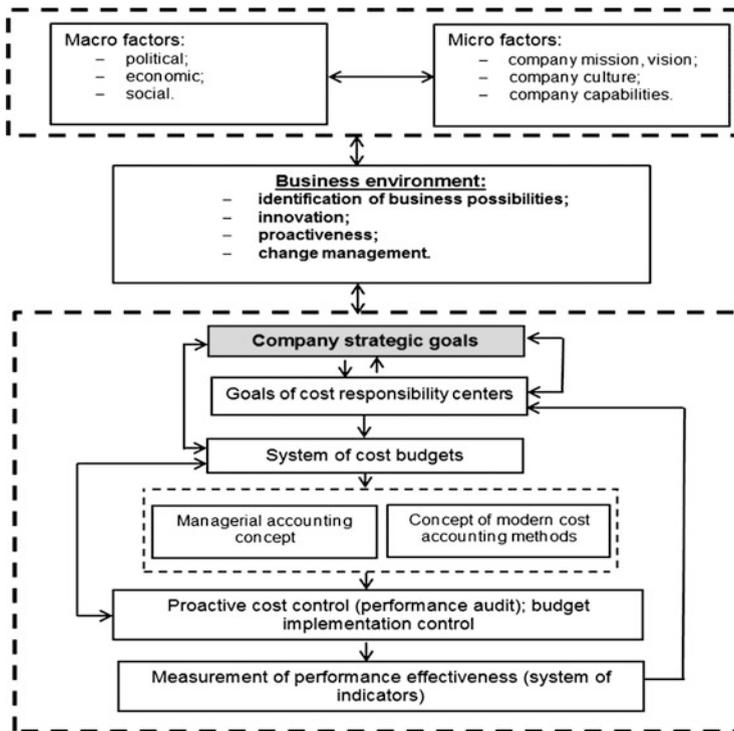
Fig. 1 Model of proactive cost management

production range, such amount of separate responsibility centers are created which would allow to control all the activities. Due to this reason, Grosanu et al. (2011) state that the number of responsibility centers is determined by a desire to reach planned effectiveness of cost usage and control all the costs.

In order a company wants to ensure the vitality of budget system it is crucial to have a flexible and open for changes managerial accounting and modern methods of cost accounting which would allow collecting information necessary for management. Objectivity, timeliness and precision of information helps to control and reveal how economy, performance and effectiveness principles are being implemented and also creates opportunities to notice possible directions of changes in business environment in a timely manner, which in turn enables the company to adjust its strategic goals and plans.

The process of budget implementation control starts before confirming the budgets and lasts during all the implementation period including reviews and adjustments (Arlinskaite and Tamuleviciene 2014). Preparation and control of cost budgets becomes an important measure ensuring successful performance of the company as it allows to operatively monitor business status and results, and constant comparison of actual results to planned results helps to reveal the deficiencies in time and effectively solve arising problems. Performance audit in this

model of proactive cost management is understood as an effective measure of control which is dedicated to promote companies to pay more attention to economy, effectiveness and performance of their activities; and provided recommendations help to save resources, reduce costs and reach predetermined goals. From the other side, performance audit helps to identify not only present but also possible future problems which can have a negative impact to the performance of the company (Mackevicius and Daujotaite 2011b).

Measurement indicators of performance effectiveness identify current situation and determine main areas of improvement. With changing business environment conditions and internal potential of the company, the importance of performance evaluation (measurement) increases. I agree with Choong (2013) who states that in today's knowledge economy one is looking for the best way of evaluating the performance which could improve the effectiveness of the company. All companies must be interested in developing and implementing an efficient performance evaluation system which would help to maintain company position in the market.

5 Conclusion

The analysis of literature has shown that cost management is not always directly related with cost reduction. Cost management strategy must be a goal of every company which wants to achieve its strategic and tactical goals, and if company seeks for strategic changes and competitive advantage proactive cost management is one of the main areas of activities. In the period of rapid changes proactiveness becomes essential and mandatory feature of the companies.

Volatile environment forces companies to accept strategic orientation which is defined by innovation, proactivity, search for possibilities and flexibility. Proactive cost management integrates all elements of purposeful cost management policy and directly correlates with changes which are driven by internal and outer environment.

Main directions of proactive cost management system in a modern company are:

- Decentralization of company activities and responsibilities, creation of centers which are responsible for cost, and which goal is to control cost incurred by the company and strengthen the responsibility for such cost.
- Planning of activities which allows purposefully planning the activities and efficiently using material and other resources, helps to optimize cost of the company and to maximize benefits which it brings.
- Flexible and open for changes management accounting, orientated to control the activities, assets and business, management of financial indicators and quality, and modern methods of cost accounting.
- Auditing of activities as an effective control measure dedicated to promote companies to pay more attention to economy, effectiveness and performance

of their activities, and providing recommendations which include fund saving, reduction of cost and seeking determined goals.

• Indicators measuring the effectiveness of activities identify present situation and foresee main directions of improving the activities.

• Created model of proactive cost management in a modern company eliminates casual and reckless management decisions and works as a precautionary measure which helps to avoid problems.

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The Impact of Adopting Corporate Governance Principles in Romania: Economic Performance or Just Good Practices?

Seria Crina

Abstract The paper intends to capture the importance Romania gives to corporate governance domain. The study wants to outline the extent to which listed companies on the Bucharest Stock Exchange respect the principles of corporate governance, whether they offer explanations and whether this compliance leads to a better performance of the companies. Another objective is to capture the capacity of the entities to attract more investors through the compliance with corporate governance. The study is based on a sample of 16 listed non financial companies from Romania. When referring to the results, the computations show that the companies from the sample respect more than 70 % the code of corporate governance, as these entities declare. Using the regression analysis, it was concluded that less than a third of the compliance with corporate governance principles leads to a higher performance, but it seems there is no clear relationship between the level of compliance with corporate governance principles and the attractiveness of the companies.

The analysis of the "Comply or Explain" statement for the selected companies from Romania highlighted some weaknesses related to the attitude towards the conformity with corporate governance principles.

Keywords Corporate governance • "Comply or Explain" statement • Profitability • Romania

1   Introduction

Corporate governance is a subject that is considered as being more and more interesting, many articles being written in this matter. Nowadays, the importance of intensifying the good corporate governance implementation efforts is

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highlighted in the literature and also in practice. Companies started to include many information related to the elements of corporate governance on their web sites in order to be more transparent and to attract more investors.

It can be observed that organizations become oriented towards the corporate governance principles implementation and usually, they focus on maximizing their perfomance. This paper intends to briefly analyse the content of the Romanian corporate governance code, to capture the importance the companies from Romania offer to corporate governance by examining the "Comply or explain" statement and to see if the compliance with principles is only a good practice, in line with nowadays demands and requirements or it is a road that leads to an improvement in the performance of the company. The originality of this paper consists in its attempt to observe whether the degree of compliance with corporate governance principles, as it is understood by companies, has an impact on the performance of the company and on its ability to attract investors and to provide a deeper analysis on the causes that lead to non compliance, as companies declared.

2 Literature Review

2.1 *Corporate Governance in Romania*

It is considered that in Romania the year 2000 was a starting point for corporate governance existence and incorporation in the Romanian economic life. It was a beginning from different point of views, both regulatory and conceptual (Feleagă et al. 2011). The first Romanian code of corporate governance was adopted by Bucharest Stock Exchange in 2001, but at that point, only one company decided to respect the code, the target being the public companies listed on the Bucharest Stock Exchange. Feleagă (2008) mentions some causes for the failure in adopting the code before 2008, like the insufficient implication of stakeholders in the decision-making process, deficient control mechanisms. A recent attempt to create the basis for a corporate governance climate in Romania was made in 2008, when a new code of corporate governance was adopted by the Bucharest Stock Exchange, the landmark being the OECD principles and entered into force in 2009 (Feleagă et al. 2011). The code is applied on a voluntary basis (Grosu 2011).

Considering the main aim of the paper, namely to observe the link between the compliance with corporate governance code and the performance of the company, it is relevant and important to present the corporate governance principles. The Romanian Code of Corporate Governance contains 19 principles that companies should respect. The first principle states that companies should adopt a transparent corporate governance framework that will be presented in an adequate manner to the public. Principle number 2 mentions that companies should respect shareholders' rights and guarantee an equitable treatment. Companies will settle a policy of effective and active communication with shareholders, according to the third

principle. Principle number 4 mentions that companies are administered by a Board of Directors that meets on a regular basis and makes decisions that give it the possibility to fulfill its functions in an efficient way. Principle 5 states that the Board of Directors is accountable for its management and will ensure the sustainable development and progress of the entity by acting in the best interest of the company. Principle 6 is related to the need for ensuring an equilibrium of executive and nonexecutive directors, while the next principle refers to the independence of non-executive directors. In this regard, it is important that a sufficient and proper number of non-executive directors shall be independent. According to the eighth principle, the members of the Board of Directors will ensure the assessment of the activity of executive directors. Principles 9 and 10 are referring to the appointment of directors that must be a transparent and rigorous procedure. Principle 11 is related to the remuneration policy for directors that must be in line with the long term interests of the company. Principles 12 and 13 are related to transparency, financial reporting, internal control and risk management. They state the fact that information related to corporation such as ownership and governance, financial situation and performance of the company must be disclosed on a timely, precise and correct basis, so that all stakeholders can have access to them. Moreover, strict rules will be designed by the board in order to guard the interests of the company in fields like internal control, risk management and financial reporting.

The Romanian Code of corporate governance presents elements regarding conflicts of interests and related parties transactions through describing the principles 14, 15 and 16. The members of the Board of Directors must take decisions considering the interests of the company, without creating a conflict of interests between their individual interest and the entity's interest on the whole. The 17th principle is related to the treatment of the corporate information, considering that managers and directors have the responsibility to respect the confidentiality of documents and information related to the company, while the 18th principles is related to the corporate social responsibility. The last principle is related to management and control systems. It is considered that a culture of transparency, responsibility and continuous development is created and shaped through the code of corporate governance (Chiper 2010).

2.2 Relevance of the Statement "Comply or Explain"

The corporate governance principles are not obligatory, being in the form of recommendations. Accordingly, every country and company can implement after adapting these recommendations considering the specific features (Todorovic 2013). In the literature is considered that the "Comply or Explain" model offers flexibility translated into the capacity to stimulate entities to adopt the spirit of the code, more than the letter and leads to a better governance (Faure-Grimaud et al. 2005). The "comply-and explain" principle is seen as being a core element of the majority of corporate governance models (Seidl et al. 2009). It is considered

that flexibility provided by the "comply and explain" approach can improve the quality of corporate governance. International best practices consider relevant and useful the adoption of the "comply or explain" principle-based corporate governance (Reddy and Sharma 2011).

2.3 Corporate Governance and Performance: Relevance for Investors

It is considered that corporate governance has an impact on maintaining the confidence of investors and in attracting foreign investments (Tchouassi and Nosseyamba 2011). Moreover, an important aspect is the maximization of the value for shareholders as a social aim for companies. From the investors point of view, corporate governance can be seen in the same time a pact to pay back a fair return on the invested capital and an agreement to administer a company in an efficient manner (Tchouassi and Nosseyamba 2011). Moreover, it is stated that good corporate governance can strengthen the notoriety and prestige of an entity. Subsequently, this fact can make the organization more attractive to stakeholders, including here also investors.

Many researchers support the idea that well governed firms attract more investors. Todorovic (2013) mentions that there are two main aspects representing the basis for the investors decision to provide resources for a company: profitability which guarantees the return on investment and the degree of implementation of the principles of corporate governance. The impact of the implementation of corporate governance on performance of companies was a matter of concern for many researchers. Todorovic (2013) concluded that organizations with a greater degree of implementation of corporate governance principles will have a higher net profit margin and an increased earnings per share. Many specialists include in their articles the idea that good corporate governance increase the profitability, such as Velnampy (2013), Yusoff and Alhaji (2012), or Lama (2013).

3 Methodology

In order to observe whether there is a connection between the compliance with corporate governance and the performance and profitability, quantified through return on equity and return on assets, it was considered as being relevant and useful to analyse the Declaration "Comply or Explain". Return on assets is the ratio between the net profit and total assets, while the indicator return on equity is the rate between the net profit and the shareholders equity and shows the efficiency of managing the equity of the company. Analysing these declarations is important, because they are a way of assessing the attempt and ability to comply with

corporate governance standards and principles. In order to observe the degree of respecting the guidelines the Romanian code of corporate governance proposes, it was computed for each corporate governance principle a percentage of compliance. Afterwards, it was computed the level of compliance with corporate governance principles for each company on the whole.

The study is based on a sample of 16 listed non financial companies from Romania, being considered only entities that presented on their official web sites the declaration "Comply or Explain" for the year 2013, in order to describe the nowadays reality in this emerging country, in terms of corporate governance. The methods used are the direct observation of the available documents related to corporate governance, entity performance and also the indicators included on the Bucharest Stock Exchange web page for identifying variables like the number of trades per year, price per book value and earnings per share. Through this empirical study, the author focuses on a quantitative assessment in order to test the way the compliance with corporate governance is translated into a higher performance.

In order to observe the degree of respecting the guidelines the Romanian code of corporate governance proposes, it was computed for each corporate governance principle a percentage of compliance. As mentioned earlier, the Romanian code of corporate governance comprises 19 principles, each principle consisting in different numbers of recommendation, and more than that, some recommendations are explained through a number of questions. It was built a rating system, with a point if the answer at the questions was "yes", or a score of zero when the answer was "no". Afterwards, it was computed the level of compliance with corporate governance principles for each company on the whole, the results being presented in the Table 1.

It can be observed that on the overall, the companies from the sample respect in a proportion of 77 % the corporate governance principles. The next step for the analysis was to observe whether there is a connection between the degree of compliance with the principles of corporate governance and the performance of the company, measured through return on equity and return on assets.

The aim was to observe whether the compliance with corporate governance principles can influence the performance of the company. In this regard, there were made regression statistics. There are some previous studies where the influence of compliance on the financial performance is measured through regression analysis (considering the dependent variable the return on equity and afterwards, the return on assets). The coefficient of determination R-squared indicates the percentage of the dependent variable that is explained by the regression equation selected indicators. As it can be seen from the Table 2, R square is 0.2768, showing that only 27 % of the return on equity variable variation is explained by the independent variable the degree of compliance with the principles of corporate governance. The p-value is useful in determining the significance of the results. Considering the fact that p-value level is 0.03 when testing the relationship between the compliance with corporate governance principles and the return on equity, it can be considered that the test is statistically significant, considering the fact that is lower than 0.05.

According to Table 2, this relationship is the only one statistically significant.

Table 1 Companies from the sample and their index of compliance with the corporate governance principles

Company	Index of compliance with the corporate governance principles (%)	Company	Index of compliance with the corporate governance principles (%)
Petrom	88.24	Impact developer and contractor	82.68
SNTGN Transgaz SA Mediaş	80.39	S.C. Electromagnetica S.A.	50.82
S.C. Biofarm S.A.	74.74	Grupul industrial electrocontact S.A.	72.32
S.C. Vrancart S.A.	75.65	S.C. Dafora S.A.	52.78
C. N. T.E. E. Transelectrica S.A	85.59	S.C. Compa S.A. Sibiu	86.76
S.N.G.N. Romgaz S. A.	68.43	Boromir Prod S.A.	84.12
Prefab SA Bucuresti	92.81	Sc Alumil Rom Industry Sa	70.36
S.N. Nuclearelectrica S.A.	90.69	S.C. ALRO S.A.	79.15
Overall degree of compliance with the principles of corporate governance	77.2 %		

Table 2 Summary output for regressions analysis

Variables		Summary output for regression analysis	
Independent variable	Dependent variable	R square	p-value
The compliance with corporate governance principles	Return on equity	0.27683262	0.036301278
	Return on assets	0.207649026	0.076088449
	Number of trades per year	0.019531127	0.605704632
	Price per book value	0.037169417	0.474378088
	Earnings per share	0.00780227	0.744955803

On the other hand, the regression where it was tested the connection between return on assets as a dependent variable and the independent variable the degree of compliance with the principles of corporate governance is not statistically significant, because the p-value is $0.076 > 0.05$. Moreover, I considered as dependent variables the number of trades per year, price per book value and earnings per share, the independent variable remaining the degree of compliance with the principles of

corporate governance, because the intention is to observe if there is a relationship between the level of compliance with corporate governance principles and the attractiveness of the companies. After using the regression analysis, I observed that the resulted coefficients of determination, meaning the percentage of the response variable variation that is explained by a linear model, are very low for each of the dependent variables referring to attractiveness of the organizations. This shows that there is no visible influence of the degree of compliance with the principles of corporate governance on the attractiveness of the company, as Table 2 demonstrates. However, the test is not statistically significant, considering that the p-value is much higher than 0.05. This might mean that the results might change if the study is extended on more companies.

4 Conclusions

In the literature it is mentioned the idea that corporate governance is a tool to promote economic growth and to increase the performance of the companies. The main aim of the paper was to observe whether better governed Romanian non-financial organizations as measured by the compliance with corporate governance principles indicator have a greater financial performance for the year ended 2013. The starting point of the study is the idea that a strong corporate governance leads to an effective and valuable usage of resources and diminishes the risk of fraud, this aspect being translated into an increase in the performance. However, after conducting this study, it was concluded that only the indicator return on equity seems to be influenced by the implementation of corporate governance principles in a statistically significant manner.

The computations made reveal that the companies from the sample respect more than 70 % the code of corporate governance on the overall, considering the answers and explanations included in the Comply and Explain Statement. However, a limitation is the narrow sample, being included only companies that disclosed on their web site the "Comply or Explain" Statement.

The research revealed that less than a third of the compliance with corporate governance principles results in a higher performance, but it seems there is no evident relationship between the level of compliance with corporate governance principles and the attractiveness of the companies. The implementation of corporate governance principles should increase the attractiveness of the entities, considering aspects like an increased transparency, compliance with shareholders' rights, fair treatment of shareholders.

The paper also intends to shed light on the reasons behind the non-compliance because, according to the computations, on the whole, almost a third of the corporate governance principles are not obeyed. A conclusion was that usually, companies from Romania do not have a specific set of rules referring to the reporting conduct and obligations of the transactions of the shares made on their name by the directors and other persons. Moreover, some companies from the

sample affirm that the Board of Directors has not passed specific procedures in the sense of providing their procedures accuracy (identification criteria of the significant transactions which are relevant for transparency, non-concurrence and objectivity) for defining the transactions, because it considers the existing and suitable law and legislation is sufficient, being the case of SNTGN Transgaz SA Mediaş. S.N.G.N. Romgaz S.A. is a special case, having a low index of compliance with the principles of corporate governance because the company did not have a corporate governance regulation, due to the admission to trading that was made at the end of the year 2013. For this reason, many recommendations were not considered in the year ended 2013.

The conducted research shows there is a well known company, namely S.C. ALRO S.A., which surprisingly has no special department dedicated to the relation with the investors, this function being externalized. Moreover, there are companies that do not respect the balance between dependent and independent members, like S.C. Electromagnetica S.A. and S.C. Dafora S.A. In case of S.C. Electromagnetica S.A., not only the public cannot receive an explanation for the incapacity of the company in ensuring a sufficient number of independent members of the Board of Directors, but there is disclosed the information that not even one member is independent.

The companies from Romania seem to have a problem in understanding and acknowledging the benefits of developing an Audit Committee and consultative committee, like Remuneration and Nomination Committee. Some disclosed reasons are the lack of necessity of creating consultative committees and the belief that the managerial experience and the professional training of the members of the Board allow them assess periodically aspects related to internal audit. Prefab SA Bucuresti company declares that the organization discloses the information only in Romanian language, but it mentions that in the future will consider the information presentation in English.

It can be relevant to extend this study in order capture the attempt to comply with the provisions of the corporate governance by companies from different countries and considering more years, not only one, in order to make a snapshot of the efforts organizations are making when referring to corporate governance culture.

Based on the previous mentioned aspects, it appears that companies from Romania should be more involved when referring to corporate governance context.

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The Importance of Marketing and Its Influence on a Company's Financial Performance

Jurijs Kuznecovs and Tatjana Tambovceva

Abstract Recent years have seen an increased appreciation of the importance of marketing and of its significant contribution to financial performance. This paper uses mixed methods research in order to analyse the results collated from a survey and from secondary research in order to evaluate the contribution which is made by marketing to the financial performance of ice-hockey club Dinamo Riga. A random sample of ice-hockey Arena visitors was invited to the survey and there were 1200 respondents involved. The survey and research covers the time period of September 2014 to present time. It is argued that effective marketing strategies are likely to have a positive effect on the financial performance of an organization, by acting as a resource which can be utilised by the firm in order to create competitive advantage, thus increasing market share and profitability, and as a competency which can be used in order to improve financial performance by means of increasing customer satisfaction.

Keywords Effectiveness • Marketing • ROMI • Measurement • Financial performance

1   Introduction

Marketing constitutes a system for gathering knowledge about the market, in which companies try to distribute and promote products, identify trends and predict or influence the behavior of competitors and consumers (Sychrova 2012). Marketing know-how is essential for the successful commercialization of ideas, and in the current globalizing and fragile market, companies cannot afford to ignore its importance (Jaakkola 2006). Various studies have highlighted a correlation

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between marketing; for example, Kotler (1999) argues suggests that marketing is central to the achievement of general growth revenues in the company through the achievement of long term competitive advantage. Despite this, marketing has traditionally been considered less strategic than the operational-functional elements in companies, although Hunt and Lambe (2000) argue that marketing has becoming increasingly holistic in its scope in recent years, with marketing approaches involving the analysis and selection of product, target markets, promotion, brand development and channels of distribution. The aim of this paper is to analyze both theoretical and empirical perspectives into the extent to which a firm's marketing strategy can contribute to its financial performance, and to apply these theories to the analysis of statistics pertaining to the existing marketing policy of the HC "Dinamo" in Riga, Latvia.

2 Literature Review

Authors try to provide a detailed overview of the research, which has been published concerning the extent to which the marketing activities, which are adopted by company, can contribute to its financial performance. It begins with an overview of the theoretical perspectives in this area, discussing the ways in which marketing activities can be conceptualized as either a competence or a resource. It then examines a variety of empirical studies, which have been conducted which examine the correlation between marketing and financial performance, and discusses the difficulties, which are associated with measuring the effectiveness of marketing activities.

Proponents of resource allocation theory argue that marketing plays the role of an organizational resource, in that it has the potential to allow an organization to produce more efficiently and therefore represents a significant contribution to the overall value of a firm (Hunt and Arnett 2006). This is expanded upon by Sanchez et al. (1996) who argue that marketing can be viewed as a 'competence', in other words, it consists of the ability to 'sustain the coordinated deployment of assets in a way that helps a firm to achieve its goals'. Proponents of this theoretical framework argue that a firm's marketing strategy is comprised of highly complex, interconnected networks of both intangible basic resources (a range of organizational procedures and policies, as well as the knowledge and skills of employees) together with tangible basic resources (relating to specific machinery) which interact in a synergistic manner and make it possible for market offerings to be made available by the firm in an effective manner (Hunt and Arnett 2006).

It is argued by Kim and Richarme (2010) that the principal way in which marketing can contribute to financial performance is therefore through the creation of competitive advantage for the firm, because it gives rise to the creation of marketplace offerings which are valued by consumers within that market segment and can be used as a resource which is used by a firm in competition with its rivals. However, the proponents of the 'marketing as a resource' framework frequently fail

to discuss in detail the mechanisms by which marketing can contribute to financial performance, since competences are, by nature, 'difficult to accurately describe and are deeply rooted in action, commitment and involvement in a specific context' (Kleinaltenkamp and Ehret 2006). A variety of other theoretical studies have succeeded in explaining the nature of the relationship between financial performance and marketing. For example, Srivastava et al. (1998) argue that an effective marketing strategy has a positive effect on shareholder value by creating valuable brand equity, increasing customer satisfaction, contributing to the value of research and development activities, and building up product equity.

These arguments have been supported by various empirical studies. For example, Fornell et al. (2006) find that customer satisfaction is significantly positively correlated with stock prices, with higher levels of customer dissatisfaction also being likely to reduce the future stock returns of a company. Mizik and Jacobson (2008) also demonstrate in their analysis of a sample of two hundred firms that the value of a firm's brand equity, as measured by familiarity with brand name and brand attitude, has a significant impact in explaining the stock return of a company. It is important to bear in mind, however, that these arguments are complicated by the fact that finance activities can also affect the outcomes of marketing strategy, thus confusing the causal direction of the relationship, since it may be possible for increased cash flow volatility or stock returns to reduce marketing expenditures, thus reducing expenditure on R&D and advertising activities (Kleinaltenkamp and Ehret 2006). Furthermore, capital markets may also affect the decisions which are made by companies concerning whether they abandon, change, or maintain various marketing initiatives (Markovitch et al. 2005).

Several other empirical studies have been conducted which examine the contribution that marketing has to financial performance, although the effectiveness of these studies is complicated by the difficulty of measuring marketing effectiveness. Solcansky and Simberova (2010) define marketing effectiveness as the quality with which managers apply their knowledge on the market in order to optimize their spending in order to achieve positive results. However, Kao et al. (2006) finds that assessment of the efficiency of expenditures for distribution, promotion and other marketing action variables requires models of consumer response often not very well represented by standard economic production functions. This issue has been dealt with by some researchers who have chosen to adopt standardized tools of marketing performance measurement (MPM) which measure the efficiency of marketing, performed through aligned focus on strategies, marketing activities and metrics with business goals (Collins 2007). Another metric which has been used within studies, which focus on measuring the effectiveness of marketing is the indicator of Return of Marketing Investment (ROMI)[1] which describes the quality of both short and long-term processes of optimization in the expenditure of

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[1] ROMI is the quantifiable contribution that can be attributable to marketing, divided by the quantified cost of marketing. Marketing spending is usually expressed in the current period quantified expense.

marketing based approaches leading to the achievement of palpable results for the company.

Performance management is one of the most important processes applied to operations such as logistics, manufacturing and product development. The goals of these processes are the achievement of key outcomes leading to optimization of company's performance. MPM, by way of contrast, is more focused on detailed measuring, analyzing and managing marketing performance to maximize the return of investment (ROI) of marketing (Ament 2008), with three elements in the mire: the data, metrics and analytics.

Sychrova (2012) considers the measuring of effectiveness of market activities between the most important activities of each company and analyzes it with help of statistics. These methods study the influence of the company's size on the choice and measure of the effectiveness of marketing activities, while finding that when searching for business opportunities, companies in the first place opt for marketing activities such as definition of marketing goals, monitoring of the needs of target customers, or measuring customer satisfaction. This study highlights an interesting feature of marketing effectiveness measurement, namely that there is no direct relationship between the marketing effectiveness measurement methods and the size of the company, while the basics of commercial success of all companies is continuous orientation to customers.

An empirical study conducted by Park and Bai (2008) examines the financial contribution which is made by marketing strategy by focusing specifically on brand loyalty. Smith and Wright (2004) argue that firms which have strategies in place which ensure a higher level of brand loyalty are significantly more likely to have higher levels of customer loyalty, and consequently higher levels of revenue growth and profitability, thus creating a competitive advantage. This is expanded upon by research conducted by Kroenert et al. (2005) within the information technology industry, which finds that those companies which have more valuable brand equity are also likely to have higher levels of customer loyalty, as measured by repurchase intentions, future purchase levels and reference ability, and find that these factors are also correlated to the percentage of revenue growth during the period. The correlation between brand equity and financial performance is not only confined to information technology, and has also been highlighted by Kim et al. (2003) who examine the relationship between brand loyalty, brand image, perceived quality and brand awareness with financial performance within twelve luxury hotels. Their findings indicate that the factors of brand image, brand awareness and brand loyalty are the elements which are most likely to be correlated with increased revenues, with perceived quality having the smallest effect (Kim and Richarme 2010).

Other studies have examined the relationship between marketing and financial performance using different channels. For example, Tellis and Johnson (2007) argues that firms with more effective marketing strategies are more likely to affect shareholder value when new products are launched due to the higher perceived quality of such products. This is reiterated in a study conducted by Pauwels et al. (2004), which find that marketing actions have a significant impact on

top line, bottom line and stock market performance when sales promotions are adopted to promote new product launches.

McAlister et al. (2007) concludes that marketing affects the share price of a firm by means of research and development, since firms which have more effective marketing strategies are more likely to have effective R&D activities which will have a positive impact on investors' beliefs about its long term value. This is confirmed in a regression analysis conducted by Eberhart et al. (2004) who nevertheless argue that, while increased R&D has a long term positive effect on operating performance stock return, typically, several months elapse before it is possible for the market to reflect the full value of these R&D activities. McAlister et al. (2007) argue that marketing can have a positive impact on firms' financial contributions since the concomitant increases in R&D and advertising can lower the firm's overall level of systematic risk.

Tsoutsoura (2004) link effective marketing activities to corporate social responsibility (CSR), arguing that those firms which have more effective marketing strategies in place are more likely to have strong commitments to CSR, which in turn increases the market value of the firm by increasing customer satisfaction and fulfilling shareholder expectations in governance transparency and in the belief that corporations should report on their economic, environmental and social performance.

The close correlation between marketing and financial performance can also be seen in the cases of large corporations such as Nike and Adidas. Nike, which owns more than 47 % of the market share for athletic ware, has adopted a marketing strategy which is based upon working with elite athletes in order to sponsor specific sporting brands, with celebrities including Michael Jordan, Rafael Nadal and Kobe Bryant (Nike Annual Report 2013). In 2013, they increased their marketing spend by 33 %, focusing on attracting a younger audience through the use of social media. During the same year, Nike experienced positive financial performance, with a 57 % increase in profitability and a doubling of marketing capitalization. This was also accompanied by an increase in annual revenue to USD 24 billion (Nike Annual Report 2013). While it is unclear whether there is any causal relationship between the increases in marketing spend and the increase profitability, comments which were made by Parker, the Nike CEO, directly attribute their improved performance to the 'effectiveness of their marketing strategies' (Nike Annual Report 2013).

A similar correlation between increased marketing activities and financial performance can be seen in the case of another large athletic wear corporation, Adidas. In 2013, Adidas launched and successfully marketed its new Nitrocharge 1.0 football boot, which was supported by its largest ever (non World Cup) integrated marketing campaign (Adidas Annual Report 2013). This was accompanied by a campaign to increase the extent to which users en gaged with the company's social media platforms, with the launch of its jump challenge (which stated that those people who could leap up to grab the Nitrocharge football boat from a shelf ten feet above the ground would be able to walk away with them for free) (Adidas Annual Report 2013).

3   Hypotheses

As has been mentioned before, this study is based on the attendance and existing marketing policy of the HC "Dinamo" (Riga, Latvia, EU). A number of hypotheses have been formulated, based on the review and previous analyses in sport marketing. In order to conduct an analysis of the behavior of the consumers, five hypotheses were prepared for the study which will be tested within the article.

H1: The largest proportion of the event's visitors is middle-aged men, who support one favorite team.

This hypothesis is necessary to understand the potential market of the sport event (age, gender) and gives the opportunity to adopt the marketing policy for this market in order to ensure that it is tailored to meet the social and demographic characteristics of the target consumer.

H2: The team's current performance influences the number of people who will attend matches in the future.

It is important to understand the key factors that influence the attendance of a sport event. The preferences of the visitors are the key factor that should be considered in any marketing strategy which is formulated.

H3: The result of the hockey match has an impact on the visitor's attitude towards the next event.

It is highly important to understand the loyalty of the visitors to predict the likely attendance at the next event.

H4: The more interaction with the public there was in the club, the better the commercial results.

If the hockey match is the core of the event, than the second most profitable section is "sub-performance", in other words additional services which Club offers for the consumer/visitors. It is therefore essential to be able to analyze whether the company is fully promoting its additional services in order to increase customer loyalty and to boost its financial performance.

H5: There is a real need for different entertainment, beverages and shops during the game.

This hypothesis comes together with H4, but reflects the more specific wishes of the visitors. As mentioned before, the additional services which are provided at the event constitute the second most valuable part of company's income and being aware of the preferences of consumers would allow the company to determine how its services can be improved in order to better meet the requirements of customers and to further improve its financial performance.

H6: Existing marketing model has demonstrated high-level of customers' satisfaction and does not need any improvements.

It is highly important to understand the attitude of the visitors towards marketing strategy of the Club. This hypothesis does not demonstrate the level of satisfaction, but facilitates an overall review of the attitudes of customers. All of the aforementioned hypotheses are based upon the behavior of visitors and their attitudes towards sports events. The results of the hypotheses will be

utilized to adjust the marketing strategies which are adopted in the future, and to thus improve future financial performance. The hypotheses will be tested by carrying out statistical analysis into the responses which were received to the survey using the tools provided by MS Excel.

4 Results

The authors outline the data analysis results which has been collated and their implications concerning whether or not the aforementioned hypotheses have been proven or refuted. This is complemented with secondary research which has been conducted into the type of marketing strategies which are currently adopted by Dinamo Riga, and the current financial performance of the team.

4.1 The Testing of Hypotheses

Hypothesis 1 was tested by counting the number of men who were aged between the 40 and 44. While it would have been preferable to have included men who were slightly older, up to their early fifties, within this category, unfortunately, the categories which were available for people to answer did not include this option, and it was only possible for respondents to select that they were aged between 40 and 44, or 45 and older. The results of the analysis reveal that, of the 90 respondents, just seven respondents consisted of middle aged men, comprising just 8 %. This is significantly lower than the proportion of young men aged between 25 and 29, which at 22 %, consisted of the largest proportion of attendants. A review of the survey responses reveals that, of the seven middle aged men who attended the game, all but one of them followed Dinamo Riga Away games, which suggests that they were strong supporters of the team. Despite this, the fact that 71 % of the individuals who were surveyed stated that they attended other sporting events apart from Dinamo Riga games suggests that they are fans of sport in general, rather than only being fans of Dinamo Riga. However, the fact that middle aged male supporters only make up 8 % of the total number of supporters suggests that it would not be advisable for the future marketing strategies to focus on individuals within this age group as their target consumers, and that it would be more useful for them to focus on targeting younger male consumers.

Considering Hypothesis 2, the results of the analysis reveal that the 96 % of respondents feel that the result of the game is important to them, suggesting that the vast majority of the people who attend the show are keen fans of the team and that the outcome of the match and how the team perform is a significant reason for their attendance. Furthermore, the findings of the analysis also reveal that, if 'Dinamo Riga' were to lose their match, 97 % of the survey respondents would attend the game another time. This suggests that, although the majority of the attendants are

keen fans, their attendance is not dependent on their team winning. This is useful information for the development of the marketing strategy, since it appears that the decision which is made by supporters about whether to attend is affected not only by the performance of the team, but by other factors. Consequently, it is necessary to ensure that the overall experience of attendants is as appealing as possible in order to ensure attendance in the future. This is a favorable outcome, since it suggests that the level of attendance at matches is unlikely to fluctuate significantly based upon the performance of the team throughout the season.

H3 is very similar to H2 and, the fact that 97 % of survey respondents stated that they would attend the game another time even if the team were to lose suggests that, the result of the hockey match is unlikely to affect their attitude to the extent that it will influence their decision about whether to attend the following game. However, while it could be argued, therefore, that the result of the hockey match does not have a significant impact on visitors' attitudes towards the next event, the questions which were included in the survey were not sufficiently detailed as to allow a detailed evaluation of visitors' attitudes to be examined. In other words, it may be that, if Dinamo Riga were to lose, visitors would feel more pessimistic and less willing to attend a future match, although this change of attitude would not be enough deter them from attending. On the other hand, it may be that this loss might encourage visitors to feel more supportive of Dinamo Riga and more willing to attend their future games in the hope that they would win. These issues were not addressed in the questions which were asked and therefore it is not possible to ascertain whether the hypothesis has been refuted or proved.

While it could be argued that, the fact that a loss would not produce attitudes in visitors which would be enough to stop them from attending a future game means that any resulting change in attitude would not be relevant to the design of future marketing strategy, this would be mistaken. For example, the questions do not address the possibility that, although attending a single game where Dinamo Riga loses may not be enough to deter visitors from attending a future game, attending multiple matches where Dinamo Riga loses might be enough to deter them.

The findings of the analysis of the results are mixed, with 54 % of those surveyed saying that the club needed improvements. This suggests that, if improvements were made to the club, this would increase levels of customer satisfaction, although the fact that the survey was multiple choice and thus did not provide any opportunity for more in depth insights to be achieved means that it is not possible to decide the nature of the improvements which need to be made in order to increase satisfaction, and whether these improvements involve increasing the interaction with the public. Furthermore, even if it were possible to make such improvements, it is unclear whether this would result in an improvement in commercial results—in other words, it is uncertain whether such improvements would be effective in encouraging more individuals to attend matches or whether it would simply increase the satisfaction of the existing visitors.

The range of entertainment, sales and catering services, which are offered to visitors are of relevance to the majority of visitors, with 86 % of respondents stating that these are things which are relevant to them. It is clear, therefore, that, in

addition to watching the team play, such services are an important factor in ensuring that the experience of visitors is as positive as possible. Consequently, it is necessary to ensure that these services are of as high a quality, and as broad a range, as possible. However, the closed nature of the question means that it is not possible to ascertain whether visitors feel that improvements need to be made to these services or whether they are sufficient as they are. This is an issue which could arguably have been explored more effectively with the use of a semi structured interview in which it would have been possible to probe more deeply into the attitudes of individuals and into any suggested improvements that they had.

This does not appear to be the case, given that 54 % of those surveyed stated that there was a need for improvements to be made to the club. This suggests that improvements do need to be made in order to increase the level of customer satisfaction, although the fact that visitors were not directly asked about their level of customer satisfaction means that it is difficult to ascertain whether such improvements are urgently needed and whether they are having a significant impact on the level of attendance. It is suggested that the results of the survey be complemented with a more detailed focus group in order to highlight, in greater detail, the nature of the improvements which would need to be made.

It is important to bear in mind, however, that there are significant methodological limitations to the research which impose restrictions on the extent to which the findings of this research can be useful. Firstly, the size of the sample of individuals who filled in the research was very small, thus limiting the extent to which these findings can be extrapolated to apply to the general population. Secondly, as has been discussed above, the fact that the research methodology consisted only of a multiple choice questionnaire meant that it was difficult to obtain any detailed insights into the opinions of those who were surveyed, and consequently, it is difficult to base any changes in marketing strategy on the responses which have been received from the surveys. Finally, the survey which was conducted does not reflect the fact that marketing and finance affect each other in a bidirectional manner; in other words, it is not only likely that the marketing activities which are adopted by Dinamo Riga will affect its financial performance, but it is also highly likely that the financial performance of the team is in turn likely to affect the effectiveness of its marketing activities. For example, higher levels of profitability within the organization will increase the resources which are available for the conduct of marketing strategies, thus making it possible for a wider range of marketing activities to be adopted, as well as increasing the likelihood of their success. Furthermore, it is possible that a better financial performance is likely to increase the confidence that consumers have in the company and is therefore likely to increase the level of satisfaction that they will derive from the company's marketing activities, thus further increasing the effectiveness of marketing activities.

4.2 Marketing Strategies Which Are Adopted by Dinamo Riga

Originally, Dinamo Riga was founded in 1946 and was one of the eleven ice hockey teams which took part in the Soviet ice hockey championship which took place in 1946 (Brencis and Ozols 2010). The team experienced a brief dip in its fortunes during the 1960s when they played within the USSR's third league, but the team regained success from 1973 when it returned to playing in the strongest league until the Soviet Union collapsed in 1991 (Balakrishnan 2009). The team's most successful season was in 1987 when they achieved second place in the Soviet championship while playing against Moscow CSKA (Balakrishnan 2009). After the Soviet Union's collapse, the decline in the popularity of ice hockey in Soviet Union resulted in a sharp decline in the team's popularity and its eventual collapse in 1995 (Brencis and Ozols 2010).

The marketing strategies which were adopted by Dinamo Riga were forced to change after Latvia gained independence in 1991, when Latvia became a member of the IIHF (International Ice Hockey Foundation) and formed a national team which was largely made up of members of Dinamo Riga (Moutinho 2007). However, the performance of the national team was such that it was restricted to playing in eighth place, although an invitation which was made to the Latvian Hockey Foundation from the Kontinental Hockey League resulted in the establishment of new Dinamo Riga in 2008 (Moutinho 2007).

In recent years, Dinamo Riga has attracted significant popularity due to the success of the national team within the world's championship (Anholt 2006). This is resulted in the implementation of several marketing strategies which have been aimed at increasing loyalty to the brand. Specifically, Dinamo Riga has launched a wide range of merchandise, including T-shirts, hats, shoes, drums, mugs and scarves (Brencis and Ozols 2010). In addition, Dinamo Riga has struck deals with local producers, allowing them to include the Dinamo logo on a range of 35 products, including beer, mineral water, picas, pelmeni, chips, ice cream and bread in order to increase the number of consumers who are exposed to the Dinamo Riga logo (Moutinho 2007).

Dinamo Riga has also recently adopted a marketing strategy which involves partnering with various clothing chains and fashion labels. One of its most recent partnerships was with the male clothing chain, Stockmann which is aimed at male consumers aged between 25 and 35, and whose major advertising period is during the Kontinental Hockey League season (Banga 2010). In 2010, Stockmann therefore agreed to partnership with Dinamo Riga—this as announced publicly and a fashion show was held in which Dinamo Riga players were featured wearing Stockmann clothing (Banga 2010). All media photo sessions which were held with Dinamo Riga players featured them wearing Stockmann clothing, with print media sessions featuring in high profile men's magazines such as FHM and KLUBS, whose readership consisted largely of the target consumers of both Dinamo Riga and Stockmann—namely, young male consumers (Anholt 2006).

4.3 The Financial Performance of Dinamo Riga

The amount of information which is available concerning the financial performance of Dinamo Riga is limited. However, its financial statements suggest that it had a total sales of 13,306,809 EUR in 2012, which represents an increase of 17 % over its previous profits in 2011. Despite such a positive increase, sales in 2013 fall down to 10,906,177 EUR (JSC Dinamo Riga Annual Report 2011, 2012, 2013).

The reasons for these improved performance in 2012 and decrease in 2013 are unclear, since a range of different initiatives have been established in recent years, including increased investment in facilities, and thus it would not be possible to determine with this information whether it arose as a result of the marketing strategies which have been employed.

5 Discussion

The authors evaluate the extent to which the results which were collated in the last chapter either reiterate, or diverge from, the results of the Literature Review. In addition, authors also discuss the extent to which the findings of the primary research support the findings of the secondary research concerning the marketing strategies and financial performance of the team, and whether the marketing strategies which are practised by Dinamo Riga act as a competency or a resource in the way that they affect financial performance.

The results of the research suggest that, although it is not possible to ascertain with any degree of certainty whether the marketing strategies which were adopted by Dinamo Riga were responsible for the team's financial performance, it appears that those marketing strategies have contributed to the formation of a competitive advantage for the team. It could be argued, therefore, that marketing has been used as a competency in order to establish the team's brand as a national team. It is possible that the team's improved financial performance may be due to the adoption of these marketing strategies and the fact that its establishment as a national brand has served to effectively differentiate Dinamo Riga from its competitors.

In addition, the strength of the Latvian brand and the fervent support shown by fans suggests that the way in which the team's marketing activities affect its financial performance is through customer satisfaction, as highlighted by Fornell et al. (2006). In particular, it appears likely that the national branding of the team, together with the conversion of large Dinamo Riga matches into significant events with political import, mean that the experience of Dinamo Riga matches are elevated from that of merely attending a sporting event to something which is of national significance. This is supported by the findings of the survey which demonstrate that the majority of individuals attend the match with their friends or family (42 % attend the match with their family and 32 % attend with friends, with just 7 % of those surveyed stating that they attend the games alone), thus underlining the fact

that Dinamo Riga matches are perceived to be large scale events which unite people. This is supported by Guntis Ulmanis, the former president of Latvia, who stated that it is 'already safe to say that Dinamo Riga is no longer just a sports project, but it has already become one of the national symbols' (Roarke 2014). The satisfaction which fans experience at events is likely to boost future attendance, by not only encouraging them to attend future events in the hope of replicating their past positive experiences, but is also likely to encourage them to spread positive word of mouth to acquaintances, thus encouraging them to also attend Dinamo Riga events (Roarke 2014). It appears, therefore, that the financial performance of Dinamo Riga is buoyed by the positive experiences that fans have of attending the team's events, and their desire to return to attend future events, almost irrespective of the actual outcome of the match (Strauss 2007).

The results of the primary research largely reflect the findings of the secondary research. The results of the primary research suggest that, contrary to the initially stated hypothesis, the largest proportion of individuals who were attending the event consisted of male consumers aged between 25 and 35. This supports the findings of the secondary research, which indicates that the target consumers of Dinamo Riga are young and male (Brencis and Ozols 2010); this is further supported by the fact that Dinamo Riga has entered in several partnerships with fashion labels which are aimed at young male consumers. This is also reflected in the marketing channels which have been used by Dinamo, which has featured articles in magazines such as FHM and KLUBS in an attempt to appeal to its young, male, fashion conscious audience.

The results of the primary research also suggest that the outcome of the match is unlikely to affect the decision which is made by visitors about whether or not they want to attend future matches, although the design of the survey was such that it was not possible to determine whether the outcome of the match would have any impact at all on the attitudes of visitors. This again supports the findings of the secondary research. As has been discussed above, the key aim of the marketing strategies which have been implemented by Dinamo Riga has been to establish its brand as being closely associated with Latvian. It is clear, therefore, that the marketing measures which have been adopted by Dinamo Riga have all been aimed at creating a competitive advantage for Dinamo Riga which is linked to Latvia as a country, rather than being directly related to the fortunes of Dinamo Riga as a team. It is therefore not surprising that the intentions of the people who were surveyed were not closely tied to the outcome of the match. It is important to acknowledge, however, that the majority of the people who responded to the survey were strong supporters of Dinamo Riga and went to their away matches, and that the fact that the questions in the survey did not directly ask respondents about how their attitudes were affected by the outcome of the match means that it is difficult to draw any rigorous conclusions about this.

However, the fact that approximately half of the respondents stated that they felt that the entertainment, shops and beverages which were available at the event were of relevance to them suggests that their support for Dinamo Riga is not only related to the performance of the team itself but is a result of their overall experience at the

sporting event. Again, this supports the hypothesis that the marketing strategies which are adopted by Dinamo Riga are aimed at conceptualizing the team as a national brand. The need to ensure that sporting events meet customer preferences means that it is essential to ensure that, in addition to the match itself, all of the secondary services which are provided are also tailored to the tastes of the target consumer. Implementing these initiatives would reinforce the Dinamo Riga brand and would help to ensure that the level of attendance at team games are, to an extent, constant and do not fluctuate according to the performance of the team. The fact that it is not only the performance of the team, but also the secondary services that are provided, which affect the decision of supporters as to whether to attend matches or not, suggests that any suggestions which are made by supporters concerning improvements to the secondary services should be carefully considered. This will help to further strengthen the link between the effectiveness of the firm's marketing activities and its financial performance, by helping to reduce the volatility of its cash flow. This supports the theoretical research, which was conducted by Fornell et al. (2006) into the channels through which a firm's marketing activities may affect its financial performance, and specifically, his argument that effective marketing activities may have a positive impact on financial performance by increasing levels of customer satisfaction and thus encouraging them to engage in further consumption of the product. If the suggestions which are made by consumers concerning changes to the secondary services which are provided by Dinamo Riga are responded to, this may have a positive impact on the financial performance of the team in the long term.

Finally, the results of the primary research are unclear as to whether the people attending the match were of the opinion that any improvements were necessary in the way that the matches were organized. However, the fact that roughly fifty per cent of the survey respondents felt that the Club activity was in need of some improvement suggests that it should be possible for further steps to be taken in order to further increase the level of customer satisfaction that consumers have. Further research would need to be conducted in order to determine the type of improvements which would need to be implemented, since the use of multiple choice questions within the survey means that it was not possible to obtain a deeper insight into the attitudes and preferences of respondents. In addition to the requests for Club improvements, the responses which were received to other questions included in the survey also suggest that there is room for increasing the level of satisfaction among those attending matches, given that just 46 % of those who were surveyed said that they would consider the possibility of purchasing tickets/membership as a present, and that only 3 % of those surveyed had actually already bought membership. Given that one of the biggest sources of income to the club is the purchase of long term memberships (Brencis and Ozols 2010), it seems likely that the marketing strategies which are adopted by Dinamo Riga need to be adapted in order to ensure that they increase the appeal of purchasing long term memberships.

6   Conclusion

The research which has been conducted within this paper suggests that several of the research hypotheses which were established have been disproven. Firstly, H1 which stated that the greatest proportion of attendees consisted of middle aged males was disproven when it was shown that the largest segment of consumers were actually younger males. Secondly, H2 which stated that the team's current performance influences the number of people who attend matches in the future was disproven when people responded that, even if Dinamo Riga were to lose a game, they would still attend future games. This suggests that the reasons for people to attend the match are not only related to the outcome of the match itself. The findings of the survey were insufficient to establish whether H3 could be proven or disproven, since none of the questions were aimed at identifying the attitudes that individuals had towards future events.

Furthermore, the data obtained was insufficient to demonstrate whether H4 could be proven or disproven—although the results of the survey suggest that there was room for improvements to be made concerning the club, the results did not establish whether these improvements were related to the need for more interaction with the public. Again, it was not possible to either prove or disprove H5 since, although the majority of consumers stated that the entertainment, beverages and shops which were on offer during the game were of importance to them, their level of satisfaction with the current services on offer was not specified, nor was it stated that different services were needed from what was currently on offer. Finally, H6 was disproved—the fact that the survey responses suggested that further changes could be made concerning club activities indicate that the amount of customer satisfaction which is currently being provided could be increased.

The research suggests that there is a positive correlation between marketing activities and financial performance, with the marketing activities which are currently in place helping to link Dinamo Riga with Latvian national identity, thus creating a competitive advantage which helps to differentiate the club from its competitors. Furthermore, it appears that the marketing activities also have a positive contribution to the overall financial performance by increasing the customer satisfaction of customers, thus increasing the likelihood that they will attend, and that their friends will attend due to positive word of mouth.

It is important to acknowledge, however, that further research needs to be conducted before any rigorous conclusions can be drawn. Specifically, in order to achieve a more detailed insight into the attitudes and the level of satisfaction of research participants, it is suggested that a series of semi structured interviews be conducted. Furthermore, it would also be useful to conduct interviews with the marketing managers at Dinamo Riga in order to learn about their perspective concerning the financial contributions which are made by marketing, and to complement this with a regression analysis which could be conducted on a longitudinal sample of data in order to examine the extent to which marketing activities have

made a statistically significant contribution to financial performance during the last few years.

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Part II
Energy Studies and Growth and Development

Macroeconomic Impacts of Electricity Generation on Croatian Real GDP: Causality Analysis

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Abstract This paper examines the causal relationship between electricity genera-
tion and economic growth in Croatia using data for the period 1966–2010. The
analyzed time span includes the periods of both the socialist and market based
economy. Based on a detailed review of previous empirical studies it is possible to
conclude that this issue has not been systematically explored and analyzed using
Croatia as an example. In our analysis, we use a multivariate model (a conventional
multifactor neoclassical aggregate production function) of real GDP and electricity
generation together with capital stock, employment and technological progress. In
order to get robust results this paper applies the autoregressive distributed lag
(ARDL) cointegration procedure with a time break as an appropriate quantitative
method when analyzing small samples. The empirical results provide clear support
of a unidirectional causality that runs from electricity generation to real GDP in
both short- and long-term. Electricity generation has a positive and statistically
significant impact on Croatian real GDP. This means that stable, adequate and
uninterrupted electricity supply is one of the crucial determinants of Croatia's
economic growth. Croatia should adopt a more vigorous economic policy that
should aim to increase investments in the electricity infrastructure.

Keywords Economic growth • Electricity generation • Causality analysis •
ARDL • Croatia

1 Introduction

According to the neoclassical economic theory, energy is not considered as a
primary input. Instead, it is looked upon as an intermediate good while members
of the so-called ecological economics claim just the opposite. In the modern world,
efficient energy supply, particularly electricity as its most flexible, commercial and
cleanest form represents an important basis for economic growth and development.

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Uninterrupted and sufficient electricity supply is one of the most crucial determinants of stimulating economic growth for any economy. Theoretical and practical correlation between electricity generation and economic growth does not imply that there exists a causal relationship at the same time. This thematic area has been the subject of empirical research for the last decade, although with no consensus on whether economic growth causes electricity generation or whether electricity generation acts as a stimulus of economic growth. The reasons for inconclusive results can be attributed to differences among countries, statistical techniques employed, time horizons and data sets. In the context of adjusting the Croatian electricity sector to the EU's internal electricity market knowing the direction and intensity of causal relationship represents an important foundation for design and implementation of the appropriate economic and energy policy.

Based on a detailed review of previous empirical studies it is possible to conclude that this issue has not been systematically explored and analyzed using Croatia as an example. This fact is the basic motive for choosing a topic of this paper. Therefore, the main aim of this paper is to determine the direction and intensity of the causal relationship between electricity generation and real GDP within a multivariate framework (together with capital stock, employment and technological progress) for the period 1966–2010. The econometric analysis was conducted using the conventional multifactor neoclassical aggregate production function and an appropriate quantitative method (ARDL approach) when analyzing small samples.

The rest of the paper is organized as follows: Sect. 2 reviews the empirical literature on electricity generation-economic growth nexus. Section 3 presents the data and explains the model while Sect. 4 discusses the empirical results and policy implications. Final section gives conclusions and recommendations for the future research.

2   Literature Review

Stable, adequate and uninterrupted supply of electricity is one of the crucial determinants of economic growth of any country. Total energy production, which also includes electricity as its most flexible, commercial, purest energy form, and key infrastructural input in socio-economic development (Udovicic 2004), is placed in the same group of important activities such as production of food and raw materials as well as adequate water supply. Lagging behind in these forms of production limits the overall economic growth and development. However, the causal relationship between electricity generation and economic growth has rarely been subject to empirical analysis. The reasons are as follows: in most (developing) countries where the empirical research on interconnectedness of electricity generation and economic growth was indeed conducted (see Table 1), the data on electricity consumption are grossly underestimated due to large losses in electricity transmission and distribution.

Table 1 Review of empirical studies regarding causality between electricity generation (ELECGEN) and economic growth (GDP)

Authors (year)	Country	Period	Methodology	Results
Morimoto and Hope (2004)	Sri Lanka	1960–1998	Engle-Granger; no cointegration; VAR	GDP ← ELECGEN short-term
Yoo and Kim (2006)	Indonesia	1971–2002	Engle-Granger and Johansen-Juselius; no cointegration; granger causality test (Hsiao's version)	GDP → ELECGEN short-term
Ghosh (2009)	India	1970–2006	ARDL approach; cointegration; VEC	GDP → ELECGEN short-term
Lean and Smyth (2010)	Malaysia	1970–2008	ARDL approach; cointegration; Toda-Yamamoto causality test	GDP → ELECGEN short-term
Sarker and Alam (2010)	Bangladesh	1972–2006	Johansen-Juselius; no cointegration; VAR	GDP ← ELECGEN short-term
Bayraktutan et al. (2011)	30 OECD member countries	1980–2007	Pedroni and Kao-Fisher; cointegration; Holtz-Eakin panel causality test (VAR)	GDP ↔ ELECGEN short-term
Cheng et al. (2013)	China	1953–2010	Engle-Granger and Phillips-Ouliaris; no cointegration; VAR	GDP ← ELECGEN short-term
Zeshan (2013)	Pakistan	1975–2010	ARDL approach; cointegration; VEC	GDP ← ELECGEN short- and long-term

Note: *VAR* vector autoregression model, *ARDL approach* autoregressive distributed lag bounds testing approach of cointegration, *VEC* vector error correction model

According to Lean and Smyth (2010), losses in electricity transmission and distribution in developing countries are two to four times higher than in OECD countries. The reasons behind this huge electricity loss include theft and pilferage by both metered and unmetered consumers, illegal connection, inappropriate operation of meter and illegal use and manipulation by utility personnel (Sarker and Alam 2010). However, except for the technical losses, all electricity made available contributes to GDP of these countries. This gives a plausible reason for using electricity generation as a variable rather than consumption (Ghosh 2009).

After reviewing the empirical studies listed in Table 1 it can be stated that in the case of Pakistan, China, Bangladesh and Sri Lanka results support the growth hypothesis (GDP ← ELECGEN) while conservation hypothesis (GDP → ELECGEN) is supported in Indonesia, India and Malaysia. The results regarding panel sample of 30 OECD member countries support the so-called feedback hypothesis (GDP ↔ ELECGEN).

Morimoto and Hope (2004) using the Engle-Granger test determined that there is no cointegration between electricity generation and economic growth in the case of Sri Lanka during the period 1960–1998. By using vector autoregression (VAR) they

found that in the short-term an additional MWh of generated electricity increases Sri Lanka's GDP in the amount of 1120–1740 US$. Sarker and Alam (2010) analyzed the nexus between economic growth and electricity generation using Bangladesh data covering the period 1973–2006. Using Johansen-Juselius procedure, they did not determine the existence of cointegration between the analyzed variables. Applying the VAR model, they found that causality runs from electricity generation to economic growth in the short-term. However, they did not analyze the intensity of the causal relationship. In the case of China, there is also no cointegration between electricity generation and GDP. Based on an econometric analysis of the annual growth data for China's GDP and electricity generation from 1953 to 2010, Cheng et al. (2013) found that in the short-term electricity generation growth Granger causes GDP growth. Cheng et al. (2013) also found that the GDP elasticity of electricity generation is about 0.6 implying that a 1 % increase in China's electricity generation growth would increase GDP growth by 0.6 %. On the Pakistan's example, Zeshan (2013) covered the period 1975–2010 and using the ARDL approach to cointegration found a long-term relationship between the variables. Unlike other studies, Zeshan (2013) used private investment as an indicator of long-term economic growth. Using the vector error correction model (VEC) Zeshan (2013) determined a unidirectional causality running from electricity generation to private investment in both short- and long-term. Taking into consideration the impact and the intensity of the causal relationship Zeshan (2013) found that an increase in electricity production by 1 % leads in short-term to a fall in private investment of 1.16 %. In the long-term, an increase in electricity production by 1 % leads to an increase in private investment of 1.58 %. Yoo and Kim (2006) used two tests to determine the existence of cointegration (Engle-Granger test and Johansen-Juselius procedure) and found no cointegration between electricity generation and GDP in Indonesia for the period 1971–2002. Using Hsiao's version of the Granger causality test Yoo and Kim (2006) concluded that there is a unidirectional causality running from economic growth to electricity generation in the short-term. The intensity of the causal relationship, however, was not determined. Ghosh (2009) probes the nexus between electricity generation and real GDP for India and using autoregressive distributed lag (ARDL) bounds testing approach of cointegration establishes long-term equilibrium relationship among these variables for the time span 1970–2006. This study further establishes, using VEC model, short-term Granger causality running from real GDP to electricity generation. The intensity of the causal relationship also was not determined. Lean and Smyth (2010) analyzed the causal relationship for Malaysia using annual data from 1970 to 2008. Using the ARDL bounds test, they found that a cointegration relationship exists between the variables. The results of the Toda-Yamamoto approach to Granger causality indicate that there is unidirectional Granger causality running from economic growth to electricity generation in the short-term while the intensity of the causal relationship has not being analyzed. Taking into account the concept of sustainable development and the fact that energy production and consumption have significant effects on the environment and human health, Bayraktutan et al. (2011) analyzed the interconnection between electricity generation from renewable

resources (one of the goals of sustainable development) and economic growth. They used a panel sample of 30 OECD member countries for the period 1980–2007. The analysis indicates that there is a long-term positive relationship between renewable electricity generation and economic growth according to Pedroni and Kao-Fisher cointegration tests. In addition, a bidirectional (reciprocal) causality exists between these variables according to Holtz-Eakin causality test reflected in VAR model.

In addition, we cite two studies that primarily do not explore the causal relation between electricity generation and economic growth but are relevant for this topic. For example, Rao (2013) investigated whether (better) electricity access and supply increases household enterprise income in India. Using the data from the India Human Development Survey, namely a sample of 8125 non-farm enterprises (NFE),[1] and a multivariate regression analysis together with the propensity-score matching technique, Rao (2013) determined that electricity access and stable supply is associated with at least 18 % higher NFE's income. Halkos and Tzeremes (2009) investigate the effect of electricity generation on countries' economic efficiency. By using a sample of 42 countries for the period 1996–2006, Halkos and Tzeremes (2009) employ Data Envelopment Analysis (DEA). The results reveal that there is an inverted U-shape relationship between electricity generation and countries' economic efficiency depending on the economic structure of a particular group of countries. The turning point for the European countries (421 TWh) is much smaller compared to the East Asian countries (1467 TWh) or the entire sample (2955 TWh). These results indicate that East Asian countries, compared to European countries, are oriented more towards industry than the service sector that is less energy intensive.

When it comes to whether electricity generation is a result of, or a perquisite for, economic growth, there are no clear trends in the literature. Depending on the methodology used, and country and time period studied, the direction of causality between electricity generation and economic growth has remained empirically elusive and controversial (Mehrara 2007). According to Payne (2010a, b) and Ozturk (2010), diverse results arise due to different data sets, alternative econometric methodologies and different countries' characteristics. The actual causality is different in different countries and this might be due to different countries' characteristics such as different indigenous energy supplies, different political and economic histories, different political arrangements, different institutional arrangements, different cultures and different energy policies. Karanfil (2008) also states that the problem of conflicting results is especially highlighted in developing countries due to high levels of the so-called unrecorded economy

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[1] According to Davis (2003), the non-farm enterprise (NFE) may be defined as comprising all those activities associated with waged work or self-employment in income generating activities (including income in-kind) that are not agricultural but which generate income (including remittances etc.). Rao (2013) uses this indicator because NFE's are a significant generator of income in both rural and urban areas.

which is why the official GDP deviates from its actual value making it harder to get reliable results regarding causality analysis.

Taking into consideration the empirical research regarding electricity generation-growth nexus, we found that 60 % of aforementioned studies use bivariate framework. With the exception of studies such as Morimoto and Hope (2004), Cheng et al. (2013), Rao (2013) and Zeshan (2013), other studies lack the in-depth analysis regarding the impact (positive or negative) of electricity generation on economic growth (and vice versa), nor they analyze the intensity of the causal relationship.

Therefore, the intention of this research paper is to fill the gap in the empirical literature when it comes to the causal relationship between electricity generation and economic growth in Croatia since this issue has not been systematically explored and analyzed using Croatian economy as an example. An effort will be made in terms of correcting the deficiencies of majority of the published studies. This primarily relates to the use of multivariate framework and appropriate quantitative method when dealing with relatively small samples.

3   Data and the Model

All the data used in this paper consist of annual time series for the period 1966–2010. The variables for electricity generation-economic growth hypothesis are real gross domestic product (GDP), capital stock (K), employment (L), technological progress (TP) and electricity generation (ELECGEN). The real GDP data (in millions of US$ at 2000 constant prices) was originally obtained from Druzic and Tica (2002) and Tica (2004). Figures covering real GDP were subsequently expanded with the data on real GDP growth rates from the Croatian Bureau of Statistics and the Croatian Chamber of Economy. Capital stock variable (K) was generated using linear perpetual inventory method (PIM) since there is no readily available data for Croatia's capital stock.[2] Employment (L) data, due to methodological issues in the pre- and post-transition periods, present the number of employed people (in thousands) without those employed in public administration, police and defense as well as without insured private farmers performing agricultural activity as the sole or main occupation. These figures were retrieved from the Croatian Bureau of Statistics together with Raguz et al. (2011) as well as Druzic and Sirotkovic (2002). We also included technological progress (TP) since this variable

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[2] For the initial capital stock, we divided real fixed investment in the first period (1966—the first year of our analysis) with the sum of depreciation rate (5 %) and average growth rate of investment (Kyriacou 1991; Hall and Jones 1999). In order to increase the realism of the estimates, we divided the depreciation of new investment (namely, δ) in the standard linear PIM equation by 2 since new investment is assumed to be placed in service at midyear instead of at the end of the year. According to Kamps (2004), investment typically occurs throughout the year, not only at the end of the year.

through its impact on energy efficiency (Smulders and de Nooij 2003) and energy saving (Popp 2001) has an important role in electricity generation and consumption and as such is important in explaining the causal relationship between the observed variables. This variable was generated using the principal component analysis (PCA).[3] Electricity generation data (ELECGEN, in GWh) was obtained from the Energy Institute Hrvoje Pozar-EIHP (2009, 2011) and it includes total electricity generated from domestic generating capacities.

For estimation purposes, all variables are transformed into natural logarithms to reduce heteroscedasticity and to obtain the growth rate of the relevant variables by their differenced logarithms (Chang et al. 2001; Fatai et al. 2004; Ozturk and Acaravci 2010).

Given the political and economic turmoil in the late 1980s and early 1990s, it is reasonable to expect that there would be a structural break in the data. In this situation, one approach in further analysis would be to divide the time series into two sub-samples with the aim of observing the causal relationship between GDP and electricity generation before and after the structural break. This, in turn, would result with two periods not long enough for a sound causality analysis. Technically speaking, the analysis could be carried out but at the cost of inconsistent and incorrect results, which would then result in erroneous conclusions and policy implications. By using the Chow breakpoint test (Chow 1960) we recognize that lnGDP and lnELECGEN are "broken" in the year 1990 at the 1 % and exactly 5 % significance level, respectively.[4]

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[3] One of the main indicators of country's commitment to technological progress are expenditures for research and development (R&D). In addition, good output measures of R&D process (in terms of legal protection of the innovation process) are registered and approved patents (OEDC 2010). Accordingly, these indicators should be used as proxy variable for technological progress. Since the data on patent activity and R&D expenditures in Croatia are available since 1990 and 1997 respectively, we have taken into account several other variables that approximately reflect Croatia's research and development capacity. As an input indicator of R&D activities, according to OECD (2002), we used the figures on *legal scientific and research entities* and *total research, technical and other supporting staff* as a convenient proxy for R&D personnel and R&D organizations. Especially for R&D personnel since this indicator perfectly complements R&D expenditures which are not available prior to 1997. In addition, we used the figures on *published research works* as an output indicator of R&D process (a sort of proxy for patents). Furthermore, we used the variables such as *average years of schooling* (as an aggregate measure of national economy's level of education) and *public expenditure on education* with an argument that (highly) educated and skilled workforce is important in creating, acquiring, transferring and using relevant knowledge (Sundac and Fatur Krmpotic 2009). These proxies had to be statistically processed using several tests (Kolmogorov-Smirnov test for normality, linear regression and VIF (variance inflation factor) test for multicolinearity) to determine whether indeed all the variables could be used in the PCA analysis. In conclusion, a combination of PCA analysis and Cronbach alpha (c-alpha) test of internal consistency (Nardo et al. 2005) resulted in a homogeneous construct comprised of remaining two variables (*total research, technical and other supporting staff* and *published research works*) and with 83.04 % of explained variance. Detailed results on PCA analysis are available from the authors upon request.

[4] We use several test statistics and most of them, namely Log LR (likelihood ratio) and Wald statistic, confirm the existence of a structural break in the year 1990. For lnGDP, the results of the

Several reasons can be attributed to this break in data. In 1990, Croatian economy was faced with negative growth rate, hyperinflation and the collapse of the so-called self-managing (market) socialism (or workers' self-management) as the dominant economic system in ex-Yugoslavia. GDP decreased as the result of the transition depression and Croatian Homeland War that started in 1991 after Croatia terminated all state and legal relations with the former Socialist Federal Republic of Yugoslavia. Some estimates (Pasalic 1999) indicate that in the period from 1990 to 1993 indirect damage to the Croatian economy, due to the war, was equivalent to the loss of 109 % of annual average GDP. The Homeland War inflicted huge direct and indirect material damage estimated at 27 billion US$. Half of this amount, 13.8 billion US$ (or 51.34 %) refers to damage caused to the economy alone. Damage to the economic infrastructure constitute around 34.3 % (or 4.74 billion US$) of the total damage in the economy. Nearly half of that amount (47 % or 2.23 billion US$) refers to the damage done on the energy infrastructure. Furthermore, the direct damage to the Croatian national electricity company (Hrvatska Elektroprivreda-HEP Group) was estimated at 519 million US$ (by the end of September 1992). Electricity generation, transmission and distribution objects were destroyed and/or damaged including 11 thermal and hydro power plants, 40 high-voltage transmission lines, about 50 % of key electrical substations and the Peruča dam [for more detailed overview see Moser (2003)]. Taking into account the value of lost/stolen property in the republics of ex-Yugoslavia, the total damage to HEP Group was estimated to 1.68 billion US$ (Pasalic 1999; Druzic and Sirotkovic 2002). By the end of 1980's and especially after 1990, primary energy production entered a downward path until 1995 after which (with occasional variations) continued to grow. Similar tendencies in the years before and after the structural break were also observed in the case of electricity generation (EIHP 2009, 2011).

In order to account for the mentioned structural break, to keep the time series intact and to make the results more robust, variable D90 (dummy variable equal to 0 for the period 1966–1989 and 1 for the period 1990–2010) is introduced in the analysis.

In this study we employ the ARDL cointegration procedure introduced by Pesaran et al. (2001) which has several advantages over Engle-Granger and Johansen's cointegration techniques: (a) it can be applied irrespective of whether underlying regressors are I(0), I(1) or a combination of both (with no need for unit root pre-testing); (b) it allows the variables to have different optimal lags; (c) the error correction model can be derived from ARDL through a simple linear transformation which integrates short-run adjustments with long-run equilibrium without losing long-run information; (d) the small sample properties are superior to those of the Johansen cointegration technique; (e) endogeneity is less of a problem in the ARDL technique because it is free of residual correlation; (f) the ARDL

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test statistics are: F-statistic = 1.657946; Log LR = 79.59803; Wald statistic = 29.84303. For lnELECGEN, the results of the test statistics are: F-statistic = 1.707184; Log LR = 80.62788; Wald statistic = 30.72932.

procedure employs a single reduced form equation while the conventional cointegration procedures estimate the long-run relationship within a context of system equations. The ARDL testing procedure consists of estimating an unrestricted error correction model (ECM) with the following generic form in which each variable comes in turn as a dependent variable:

$$\Delta \ln GDP_t = \alpha_{10} + \alpha_{11}D90_t + \sum_{i=1}^{n} \alpha_{12}\Delta \ln GDP_{t-i}$$
$$+ \sum_{i=1}^{n} \alpha_{13}\Delta \ln KSM_{t-i} + \sum_{i=1}^{n} \alpha_{14}\Delta \ln LSM_{t-i} + \sum_{i=1}^{n} \alpha_{15}\Delta \ln ELECGEN_{t-i}$$
$$+ \sum_{i=1}^{n} \alpha_{16}\Delta TP_{t-i} + \delta_{11} \ln GDP_{t-1} + \delta_{12} \ln KSM_{t-1} + \delta_{13} \ln LSM_{t-1}$$
$$+ \delta_{14} \ln ELECGEN_{t-1} + \delta_{15}TP_{t-1} + \varepsilon_{1t} \tag{1}$$

An F-test for the joint significance of the lagged level variables coefficients will be conducted to examine whether a cointegrating relationship exists among the variables.[5] The F-test has a non-standard distribution and Pesaran et al. (2001) have provided two sets of critical values. One set refers to I(1) series and the other to I(0) series which are known as upper bounds and lower bounds critical values, respectively. Given that Pesaran et al.'s (2001) critical values are computed for a large sample (namely, 500–1000 observations), Narayan (2005) estimated a new set of critical values for a small sample ranging from 30 to 80 observations. Since our sample size is 45 observations, we use the critical values provided by Narayan (2005).

A decision on whether cointegration indeed exists between the dependent variable and its regressors is then made as follows: (a) if the computed F-statistic is higher than the upper bound of the critical value, the null hypothesis of no cointegration (H_0) is rejected; (b) if the computed F-statistic is lesser than the lower level band, we fail to reject (H_0), which signifies the absence of cointegration; (c) when the computed F-statistic falls inside the upper and lower bounds, a conclusive inference cannot be made.

4 Empirical Results and Policy Implications

Since many macroeconomic series are non-stationary (Nelson and Plosser 1982), unit root tests are important and useful in examining whether the variables in question are stationary (or not). In other words, unit root tests are needed in order

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[5] The null hypothesis of no cointegration (H_0) against the alternative (H_1) for each equation is as follows: $H_0 : \delta_{11} = \delta_{12} = \delta_{13} = \delta_{14} = 0$ and $H_1 : \delta_{11} \neq \delta_{12} \neq \delta_{13} \neq \delta_{14} \neq 0$.

to investigate the order of integration of the variables. This is also important in obtaining an unbiased estimation from the Granger causality tests. Because there is no uniformly powerful test of the unit root hypothesis (Gujarati and Porter 2009), and in order to determine the order of the series in more robust manner, we conducted five different unit root tests. We used the Augmented Dickey-Fuller (ADF) test (Dickey and Fuller 1979), Phillips-Perron (PP) test (Phillips and Perron 1988), Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test (Kwiatkowski et al. 1992), Elliot-Rothenberg-Stock Dickey-Fuller GLS detrended (DF-GLS) test (Elliott et al. 1996) and Ng-Perron MZt (NG-P (MZt) test (Ng and Perron 2001). Both "intercept and trend" and "intercept" regressors were included in the test equation in all five tests. All unit root tests have a null hypothesis (H_0) stating that the series in question has a unit root against the alternative that it does not. The null hypothesis (H_0) of KPSS, on the other hand, states that the variable is stationary.

The reason why five different tests are used is to establish, without any arbitrary decisions, the order of integration bearing in mind the size (the level of significance) and power (the probability of rejecting the null hypothesis (H_0) when it is false) of these tests. We do not discuss the very details of the unit root tests here. See Maddala and Kim (1998) for a review of ADF, PP, KPSS, DF-GLS and Ng and Perron (2001) for more on NG-P test. The results of all five unit root tests are summarized in Table 2.

According to the results presented in Table 2 there are some exceptions when it comes to determining the order of integration. For example, variables lnELECGEN and TP are stationary in levels (according to KPSS test) while other tests show that these variables appear to be I(1) process. Since the ARDL approach allows variables to be I(0) and/or I(1), the variables lnELECGEN and TP can be used in further empirical analysis. However, potential problem arises with variables lnK and lnL. These two variables, according to ADF and PP tests, remained non-stationary even after first difference. Although most unit root test show that lnK and lnL are indeed integrated of order 1 we have additionally smoothed these two variables using Holt-Winters multiplicative model (Winters 1960) in order to set a clean and definite conclusion regarding the overall order of integration. Exponential smoothing resulted with the (new) variables, namely lnKSM and lnLSM. The variable lnKSM again remained non-stationary after first difference but this time according to DF-GLS and NG-P (MZ_t) tests. Since the DF-GLS test requires a sample size of at least 50 observations, the results after exponential smoothing are therefore not surprising. In the case of lnLSM all tests now show that the variable is I(1).

In conclusion, the combined results of all five unit root tests suggest that no single variable, even after subsequently applied smoothing technique, does not have the order of integration greater than I(1) which is extremely important for further application of the ARDL approach and testing the existence of cointegration.[6]

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[6] Most widely used methods to empirically analyze the long-run relationship and dynamic interactions between two (or more) variables include Engle and Granger's (1987) two-step procedure and multivariate maximum likelihood based approach of Johansen (1988) and Johansen and Juselius (1990). These procedures however have some limitations: (a) Engle-Granger's procedure

Table 2 Unit root test results

	Variables	ADF	PP	KPSS	DF-GLS	NG-P (MZ_t)
Panel A: Levels						
Intercept and trend	lnGDP	-2.7983 (1)	-1.9983 (4)	0.1205^c (5)	-2.3646 (1)	-2.332 (1)
	lnK	-3.4677^b (1)	-1.9730 (5)	0.1619^b (5)	-3.0057^b (1)	-2.658^b (1)
	lnL	-2.4088 (1)	-1.5311 (4)	0.1652^b (5)	-1.9833 (1)	-2.099 (1)
	lnELECGEN	-2.3657 (0)	-2.3748 (3)	0.1087 (5)	-2.0805 (0)	-1.815 (0)
	TP	-1.6839 (0)	-1.9491 (4)	0.0975 (5)	-1.7159 (0)	-1.621 (0)
	lnKSM	-2.5054 (2)	-1.6835 (4)	0.1598^b (5)	-2.1081 (2)	-2.194 (2)
	lnLSM	-1.6736 (1)	-1.6051 (3)	0.1603^b (5)	-1.4080 (1)	-1.444 (1)
Critical values	p = 1 %	-4.1864	-4.1809	0.2160	-3.7700	-3.420
	p = 5 %	-3.5180	-3.5155	0.1460	-3.1900	-2.910
	p = 10 %	-3.1897	-3.1882	0.1190	-2.8900	-2.620
Panel B: First differences						
Intercept	lnGDP	-2.6757^c (0)	-2.8543^c (2)	0.1793 (4)	-2.6884 (0)	-2.312^b (0)
	lnK	-1.7942 (1)	-1.5101 (1)	0.2746 (5)	-1.6588^c (1)	-1.697^c (1)
	lnL	-2.3396 (0)	-2.3396 (0)	0.2510 (4)	-2.2595^b (0)	-2.014^b (0)
	lnELECGEN	-7.6040 (0)	-7.5367 (3)	0.1270 (3)	-7.5266 (0)	-3.196 (0)
	TP	-6.5956 (0)	-6.6298 (3)	0.0804 (3)	-6.3891 (0)	-3.241 (0)
	lnKSM	-3.8721 (0)	-4.1619 (3)	0.2378 (4)	-1.5717 (1)	-1.183 (1)
	lnLSM	-4.5025 (0)	-4.5038 (2)	0.2358 (3)	-4.5681 (0)	-2.973 (0)
Critical values	p = 1 %	-3.5924	-3.5924	0.7390	-2.6198	-2.580
	p = 5 %	-2.9314	-2.9314	0.4630	-1.9486	-1.980
	p = 10 %	-2.6039	-2.6039	0.3470	-1.6120	-1.620

Optimal lag lengths are in parenthesis. The maximum lag length was automatically set at 9. The superscript b and c indicates 5 % and 10 % significance level, respectively. For the purposes of ADF, DF-GLS and NG-P unit root test, the Schwarz information criterion (SIC) is used to determine the number of lags whereas Newey-West method is applied to choose the optimal lag length (or bandwidth) for the purposes of PP and KPSS unit root test. The critical values for ADF and PP test are taken from MacKinnon (1996). For KPSS, the critical values are from Kwiatkowski et al. (1992). The critical values for DF-GLS are from Elliott et al. (1996) while NG-P (MZt) critical values are taken from Ng and Perron (2001)

An important issue in applying the ARDL approach is the selection of the optimal lag length. We set the maximum lag length at 3 years which is sufficiently long enough for annual data to capture the dynamic relationship (Tang and Shahbaz 2011) and then the AIC statistic is used to choose a best ARDL model (Lütkepohl 2005). The results of the ARDL cointegration procedure are presented in Table 3.

According to the ARDL cointegration test results the null hypothesis of no cointegration (H_0) can be rejected (at the 10 % level of significance) when lnGDP is treated as the dependent variable since the calculated F-statistic (4.1718) is higher than the upper bound critical value (3.772) suggested by Narayan (2005). However, if we consider electricity generation as the dependent variable, the calculated

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is only appropriate when the analysis is carried out on two variables; (b) Johansen's multivariate approach has a problem with the degree of freedom when applied to a small sample (Toda 1994).

Table 3 ARDL cointegration test results

Dependent variable	lnGDP	lnELECGEN
Function	F_{lnGDP}(lnGDP|lnKSM, lnLSM, lnELECGEN, TP)	$F_{lnELECGEN}$(lnELECGEN|lnGDP, lnKSM, lnLSM, TP)
F-statistic	4.1718	2.0676
Decision	Cointegration	No cointegration

Critical values of the F-statistic for 45 observations are taken from Narayan (2005), case III: intercept and no trend with k = 2 regressors

F-statistic (2.0676) is lower than the lower bound critical value (2.638) at 10 % significance level. This indicates that there exists only one cointegration relation between GDP and electricity generation (and other forcing variables).

Having found that there is a long-run relationship between the variables when real GDP comes as dependent variable, the long-term and short-term coefficients are estimated using the associated ARDL and ECM. According to AIC statistics, the specification selected ARDL (2,0,1,0,0) as the best model. The research results are presented in Table 4.

The short-term impact of electricity generation on real GDP is positive and statistically significant at the 5 % level as indicated in Table 4 (Panel A). A 1 % increase in the electricity generation leads to 0.11184 % increase in the real GDP. The results of the long-term dynamic coefficients are presented in Panel B. Again, the electricity generation is statistically significant at the 5 % level and is around 0.40274. According to the results presented in Table 4, electricity generation has a greater impact on Croatian real GDP in the long-term. These results confirm the importance of domestic electricity generation on long-term growth of the Croatian economy. Findings in Table 4 also reveal that capital stock and technological progress have a positive and statistically significant impact on the dependent variable in both short- and long-term. The coefficient regarding dummy variable has the expected negative sign and is statistically significant as well. The same conclusion is also valid for the error correction term (ECT) which was found to be negative and statistically significant. The ECT estimate of (-0.27771) implies that 27.77 % of the preceding period's disequilibrium is eliminated in the current period. The coefficient of determination (adjusted R^2) shows that the electricity generation (and other statistically significant variables included in the regression equation) accounted for 75.81 % of the changes in the economic growth.

According to standard diagnostic test results (Panel C) and parameter stability tests (see Fig. 1), the overall goodness of fit of the ARDL (2,0,1,0,0) model is satisfactory with two minor exceptions. The selected model passed the residual serial correlation test using only the F-test while CUSUMSQ test shows that the cumulative sum of squares of recursive residuals lies exactly on the upper critical threshold at a significance level of 5 %.

Table 4 Long-term and short-term estimates (lnGDP as dependent variable)

Regressor	AIC (2,0,1,0,0)		
	Coef.	SE	T-ratio[Prob.]
Panel A: short-term results Dependent variable: ΔlnGDP			
ΔlnGDP(−1)	0.36956	0.14321	2.5805[0.014][b]
ΔlnKSM	0.18764	0.10195	1.8405[0.074][c]
ΔlnLSM	0.091570	0.15019	0.60971[0.546]
ΔlnELECGEN	0.11184	0.050206	2.2277[0.033][b]
ΔTP	0.025779	0.013381	1.9265[0.062][c]
INPT	1.2867	0.62783	2.0494[0.048]
D90	−0.12626	0.022732	−5.5545[0.000][a]
ECT_{t-1}	−0.27771	0.081823	−3.3940[0.002][a]
Adj. R^2	0.75814		
F-statistic	F(7,34) = 19.5029[0.000][a]		
DW-statistic	2.6314		
RSS	0.030423		
Panel B: long-term results Dependent variable: lnGDP			
lnKSM	0.67565	0.37754	1.7896[0.083][c]
lnLSM	−0.76852	0.53244	−1.4434[0.158]
lnELECGEN	0.40274	0.18887	2.1323[0.041][b]
TP	0.092825	0.051296	1.8096[0.079][c]
INPT	4.6331	2.6135	1.7727[0.086]
D90	−0.45466	0.11813	−3.8489[.001][a]
Panel C: Diagnostic test results			
LM-test statistics	χ^2_{SC}	$\chi^2_{SC}(1) = 7.9133[0.005]$	
	χ^2_{FC}	$\chi^2_{FC}(1) = 0.34505[0.557]$	
	χ^2_N	$\chi^2_N(2) = 1.0187[0.601]$	
	χ^2_H	$\chi^2_H(1) = 0.25399[0.614]$	
F-test statistics	F_{SC}	$F_{SC}(1,32) = 7.4289[0.010]^a$	
	F_{FC}	$F_{FC}(1,32) = 0.26507[0.610]$	
	F_N	not applicable	
	F_H	$F_H(1,40) = 0.24337[0.624]$	

The superscript a, b, c indicates 1 %, 5 % and 10 % significance level, respectively. *Coef.* Coefficient, *SE* Standard error, *Prob.* Probability, *INPT* Intercept, *Adj R²* Adjusted coefficient of determination, *DW-stat.* Durbin-Watson statistic, *RSS* Residual sum of squares, *LM-test statistic* Lagrange multiplier test statistic, *SC* Test of residual serial correlation, *FC* Ramsey's RESET test using square of the fitted values; *N* Normality test based on a test of skewness and kurtosis of residuals, *H* Heteroscedasticity test based on the regression of squared residuals on squared fitted values

When lnELECGEN was considered as a dependent variable in the ARDL cointegration procedure, we found no evidence of a long-run relationship. Therefore, the Granger causality test in a vector autoregressive (VAR) framework was
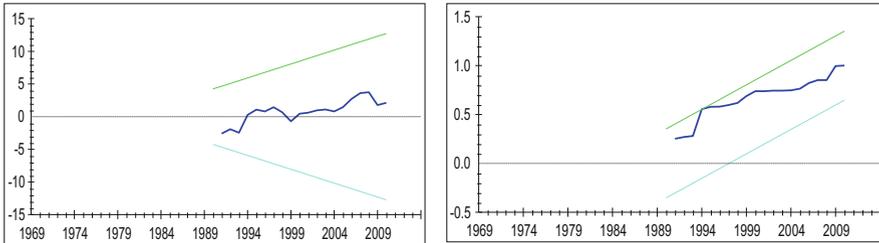
Fig. 1 CUSUM (*left*) and CUSUMSQ (*right*) test results. *Note*: *CUSUM test* Cumulative Sum of Recursive Residuals, *CUSUMSQ test* Cumulative Sum of Squares of Recursive Residuals. *Straight lines* indicate the critical threshold at a significance level of 5 %

conducted (see Table 5). The variables were transformed in first differences and an optimal lag was set to 1.[7]

According to the multivariate VAR model results presented in Table 5 we found that real GDP has a positive but statistically insignificant effect on electricity generation in Croatia. Other regressors are also not statistically significant. Although the VAR model passed all diagnostic tests (Panel B), the coefficient of determination (adjusted R^2) indicates that the analyzed VAR model explains only 5.44 % of the variation in the dependent variable.[8] Such result is somewhat expected given the underinvestment of electricity generating capacities (namely, obsolescence of existing power plants and infrastructure as well as lack of investment in new generating capacities) as a result of low electricity prices policy, which led to high import dependence on electricity. In 23 years since Croatia's independence, only two new electricity-generating facilities were built: hydro power plant Lesce and thermal power plant Plomin (Block B).

A systematic analysis and the combined results from Tables 4 and 5 therefore indicate unidirectional causality from lnELECGEN to lnGDP in both short- and long-term. These results further confirm the fact of electricity as an integral part of economic growth. Although electricity itself is not sufficient it is however an essential production input which, as a complement to labor and capital, affects Croatia's economic growth. Additional confirmation of macroeconomic importance of electricity sector's role in the Croatian economy, along with the results of the causality analysis, can be found in the data on energy sector's gross value added. For instance, the total gross value added (GVA) of the energy sector in Croatia in 2010 amounted to 13.8 billion kunas (HRK) and the energy sector's share in GDP was 4.27 %. Nearly half the amount of generated GVA (i.e. 6.2 billion HRK) refers to electricity (gas, steam and air conditioning) supply.

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[7] Detailed results regarding lag order selection criteria prior to multivariate VAR estimates are available from the authors upon request.

[8] The results remained unchanged when the analysis was repeated with the optimum lag set to 2. To conserve space we do not present these results but are available from the authors upon request.

Table 5 Results of the multivariate VAR estimates

Regressor	Coef.	SE	T-ratio[Prob.]
Panel A: short-term results			
Dependent variable: ΔlnELECGEN			
ΔlnELECGEN(−1)	−0.20812	0.16356	−1.2725[0.211]
ΔlnGDP(−1)	0.18591	0.27835	0.66792[0.508]
ΔlnKSM(−1)	0.38592	0.45473	0.84868[0.402]
ΔlnLSM(−1)	0.098528	0.33222	0.29658[0.768]
ΔTP(−1)	−0.046573	0.057758	−0.80635[0.425]
INPT	0.022718	0.024006	0.94634[0.350]
D90	0.0051236	0.028793	0.17795[0.860]
Adj. R^2	−0.054443		
F-statistic	F(6,36) = 0.63857[0.699]		
DW-statistic	1.9229		
RSS	0.26333		
Panel B: Diagnostic test results			
LM-test statistics	χ^2_{SC}	$\chi^2_{SC}(1) = 0.30586[0.580]$	
	χ^2_{FC}	$\chi^2_{FC}(1) = 0.090121[0.764]$	
	χ^2_{N}	$\chi^2_{N}(2) = 1.6828[0.431]$	
	χ^2_{H}	$\chi^2_{H}(1) = 0.078778[0.779]$	
F-test statistics	F_{SC}	$F_{SC}(1,35) = 0.25074[0.620]$	
	F_{FC}	$F_{FC}(1,35) = 0.073509[0.788]$	
	F_{N}	not applicable	
	F_{H}	$F_{H}(1,41) = 0.075252[0.785]$	

Since no root lies outside the unit circle, the estimated VAR model satisfies the stability condition

Proper functioning of the electricity sector is responsible for creating large share of GDP in other economic sectors. The importance of the electricity sector also stems from its impact on the efficiency and competitiveness of most companies and the economy as a whole through quality of supply and electricity price levels. The obtained causality analysis results imply that electricity generation bears the burden of the short-term adjustments to re-establish the long-term equilibrium. In other words, high electricity generation tends to lead high economic growth, especially in the long-term. Consequently, such a connection between electricity generation and economic growth represents a significant challenge and has several important implications for Croatian economic and energy policy.

According to the results presented in this paper, it is evident that the economic growth of the Croatian economy is not neutral in relation to the dynamics of the electricity sector, namely electricity generation. It is therefore necessary to implement development policies with a focus on: (a) providing stable and secure electricity supply as a stimulus to economic growth; (b) diversification of electricity supply with an increased share of renewable energy resources (solar, wind, biomass, small hydro power plants) in order to reduce import dependence. In other words, increasing the stability and security of electricity supply is of great

importance for the functioning of the Croatian economy. With its own electricity generation, Croatia cannot fully meet its own consumption. The difference (approximately 30 %) is covered through imports, which in turn makes Croatian electricity sector and the economy itself vulnerable in terms of electricity supply. In the long-term, stable and secure electricity supply can be compromised due to a further increase in import dependence, geopolitical instability in region with energy resources and electricity surpluses, reduced levels of reliability of existing systems and the lack of investment in the generation-supply chain. Due to Croatia's relatively high dependence on electricity imports, there is a reasonable doubt that any disturbances on the electricity markets in neighboring countries will negatively affect the functioning of the Croatian electricity sector. Therefore, the degree of vulnerability of the Croatian electricity sector[9] should be reduced by increasing investments in the electricity infrastructure primarily through construction of new and revitalization of existing electricity generating capacities. Unrealistic electricity prices, which were administratively edited by the Croatian government up to the adoption of the new Energy Act and the Act on the Regulation of Energy Activities, could not encourage new investments. Through artificially low electricity prices, the government led the social policy and protected the standard of living. This hindered the arrival of competition but also created direct damage to HEP in terms of reducing maintenance costs and the overall underinvestment that in turn resulted in outdated power plants and infrastructure. Cost-reflective electricity prices are therefore essential for sending positive signals to strategic private investors since Croatia does not have sufficient capital accumulation. Private capital should be then directed towards electricity generation (to influence the price stability through increased competition) and supply (to enable the consumers to switch their electricity supplier). While doing so, Croatia's economic, energy and environmental interests must be clearly identified and truly advocated (Vlahinic-Dizdarevic 2011).

Necessary investments in the Croatian energy sector are estimated at 15 billion euros (EUR), and according to the Energy Strategy (Official Gazette 130/2009) the electricity sector alone will require 9 billion EUR (or 60 % of total investments). Therefore, appropriate active strategic planning is a necessity bearing in mind these facts: (a) that approximately 1100 MW of existing thermal power plants (30 % of the installed capacity of the Croatian electricity sector and 65 % of installed capacity in thermal power plants) will go out of operation by the year 2020; (b) the construction of new electricity facilities lasts 4–5 years.

According to Boromisa (2011), investment opportunities in hydro power on unused water resources (medium and larger water streams) are sufficient to build 62 hydro power plants and generate around 5.9 TWh of electricity. The Croatian Government identified (only) 10 projects for the construction of hydro power plants

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[9] According to the information given at the Energy Institute Hrvoje Pozar, last vulnerability analysis of the entire Croatian energy sector was carried out at the end of 2008, it included the time horizon from 1995 to 2006 and according to that analysis, the vulnerability indicator had an increasing trend.

(approximately 900 MW). Due to restrictions related with investments in hydro power plants (i.e. duration of preparatory work, the uncertainty regarding the results of environmental impact studies and unresolved property relations) the target set in the Energy Strategy (300 MW) could be difficult to achieve. The adoption of the Regulation on Ecological Network, enacting the Croatian ecological network and also the Natura 2000 ecological network which covers 29 % of Croatian territory (37 % of land and 16 % of coastal waters), will further hamper investment possibilities especially in hydro power plants (Ombla, power plants on the Sava river, Molve 1 and 2, Kosinj and Senj). Since the validation process of the ecological network in the European Union (EU) takes 2–3 years, not a single investment can be realized before 2016, except possibly the thermal power plant Plomin (Block C).

Investments in thermal power plants on natural gas and coal are dependent on the commercial risks and uncertainties associated with these fuels. In the case of natural gas, commercial risks are related with the ability to supply sufficient quantities of gas at reasonable prices. Croatia's decisions concerning supply routes are inconsistent and changes in standpoint regarding international infrastructure projects confirm the weakness of Croatia's negotiating position and limited impact on decisions regarding supply routes.[10] In the case of coal, uncertainties are associated with international obligations related to climate change, which in turn affect project's risk assessment and profitability. In this regard, the planned 500 MW coal-fired thermal power plant Plomin (Block C) makes HEP's largest investment project rather controversial because of the choice of coal as a fuel. According to the gas proponents, this power plant, under a very negative scenario, might incur a total loss of 15.1 billion EUR (CO_2 emission quotas, inflation, fuel prices, technology and credit costs included) (see Bioncina and Bohutinski 2014). According to Sunic (2008), Croatia should build natural gas based power plants (cleaner and more efficient energy resource and the potential construction of the LNG terminal (but not before 2018 or 2019) would ensure a reliable gas supply). This is also pronounced by the consensus about the forthcoming golden era of natural gas.

Recently, renewable energy resources have become the fastest growing segment in energy production, especially electricity (Corum and Arsenyan 2014). However, renewables are relatively unstable and expensive. They are considered additive rather than alternative source of energy and are very dependent on the financial

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[10] Both big projects, Russia's South Stream and Nabucco (which had the support of both the EU and USA but in the meantime will be replaced by the so-called Trans Adriatic Pipeline (TAP), which will deliver gas from the Caspian basin using 500 km shorter route) were designed to pass through Croatia. Participation in the South Stream was offered in 2007 but no answer was given to the Russians. Subsequently an agreement was concluded on Croatia's connection on South Stream but outside the main route leaving Croatia without the income from gas transfer. Meanwhile, the representatives of Azerbaijan, Albania, Bosnia and Herzegovina, Croatia and Montenegro at the end of 2013 signed a Memorandum on cooperation regarding the realization of the Southern Gas Corridor in southeastern Europe. They also committed to work on the realization of all the preconditions necessary for the realization of the Adriatic-Ionic Pipeline (as a part of TAP).

support (subsidies) that are given to renewable energy producers. Renewables can have a positive, multiplicative economic impact on the country's economy in the case that domestic components, labor force and supporting services are used during development and production of such equipment and construction of such facilities (Granic 2010). Nevertheless, due to renewables' volatile supply, lack of domestic equipment production and the need to preserve the safety and resilience of the electricity sector, a coordinated construction of power plants on both permanent and non-permanent energy resources is required (HEP 2012).

In Croatia, renewables are not yet sufficiently exploited because it is a relatively young sector. Financial support began in 2007 with the introduction of the so-called feed-in tariff (FIT) model. The biggest interest was recorded for wind power (a total of 3800 MW according to the Register of renewable energy resources) since Croatia has significant wind potential and had (until recently) extremely high quota of planned installed capacity (1200 MW) in wind power plants by 2020. In October 2013, the National Action Plan for renewable energy by 2020 was adopted. In that Plan, the quota for wind power plants has been reduced to 400 MW since almost all of the necessary equipment was imported (cables, transformers, steel reinforcement, poles and cement blocks) and the domestic industry did not get a proper boost. The Ministry of Economy point of view is that power plants on biomass and biogas, cogeneration plants and small hydro power plants will give much greater social and economic contribution.

5   Conclusion

This paper examines cointegration and the causal relationship between economic growth and electricity generation in Croatia using annual data for the period 1966–2010 within a multivariate framework that includes capital stock and employment input together with a homogeneous construct representing technological progress. Since we determined the existence of a structural break in 1990, a dummy variable was introduced in the analysis in order to get results that are more robust. The research results, according to the ARDL approach, fully support the existence of a positive long-term relationship between the variables when real GDP comes as dependent variable. We found a unidirectional causality running from electricity generation to real GDP in both short- and long-term. These results further confirm the important role of electricity generation in Croatia's economic growth. The obtained results imply that electricity generation bears the burden of the short-term adjustments to re-establish the long-term equilibrium. In other words, electricity generation (together with other statistically significant production inputs) tends to trigger economic growth, especially in the long-term. The causality analysis results indicate that a 1 % increase in the electricity generation leads to 0.112 % increase in the real GDP in the short-term while in the long-term a 1 % increase in electricity generation leads to around 0.40 % increase in Croatia's real GDP. Consequently, such a connection between electricity generation and

economic growth has several important implications for Croatian economic and energy policy. It is necessary to implement development policies with a focus on: (a) providing stable and secure electricity supply as a stimulus to economic growth; (b) diversification of electricity supply with an increased share of affordable energy resources (hydro power, gas and biomass) in order to reduce import dependence. Increasing the stability and security of electricity supply, while keeping low costs, is of great importance for the functioning of the Croatian economy. Therefore, Croatia should adopt a more vigorous economic policy that should aim to increase investments in the electricity infrastructure primarily through construction of new and revitalization of existing electricity generating capacities.

This is, as far as is known, the first analysis on the causal relationship between electricity generation and economic growth in Croatia. The obtained results have important policy consequences for similar new EU Member States that are going through a similar development path especially in the context of harmonization with the EU electricity directives and regulations. In order for the results to be as robust and as representative as possible (and to determine as precisely as possible the causal relationship between electricity variables and GDP), additional research is needed using longer time series and other control variables. In the future, it may be interesting, depending on the data availability and reliability, to use data on financial development, carbon dioxide (CO_2) emissions and an additional dummy variable as a reflection of the current economic crisis. In addition, other econometric approaches (newer and more sophisticated) could be utilized such as the leveraged bootstrap technique suggested by Hacker and Hatemi (2006, 2010) especially when dealing with small samples. Until present and future researchers get sound, robust, uniformed and non-conflicting empirical results, governments have to be careful in implementing the appropriate policies.

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In Search of the New EU Energy Reforms: Assessing the Financial Performance of the EU Energy Companies

Djula Borozan and Dubravka Pekanov Starcevic

Abstract To unveil the challenges the European energy industry faces, this paper looks at the financial performance of energy companies that are different in terms of the energy generation mix in the period 2011–2013. Furthermore, the paper aims to draw general conclusions on how the share of conventional power plants in the companies' generation mix has affected their operation as a whole. Finally, the paper discusses the trends in the energy industry, in particular regarding gas-fired power plants, as well the opportunities and threats facing them in the context of achieving the EU strategic energy goals. The results show that companies with a higher share of conventional thermal power plants in their energy mix operate with a significant decrease in profit, and generally face a decrease in their asset value. This is opposite to companies with large diversified portfolios and shares of hydropower and new renewables. Since conventional power plants, especially high-performing and flexible gas-fired cogeneration ones, may play a key role in producing the peak load and even the base load power, as well as in maintaining high quality in the electricity grid, this situation might jeopardize the achievement of the EU strategic energy goals. Hence, it calls for new energy reforms.

Keywords Energy security • Energy generation mix • Financial performance • Energy companies

1 Introduction

The European energy industry, especially the one based on conventional, natural gas-fired power plants, or even high-efficiency combined heat and power (CHP) plants, has been facing many types of challenges (The Economist 2013a; Caldecott and McDaniels 2014). Two trends contribute especially thereto: first, a decrease in energy demand due to, on the one hand, unfavorable economic trends that have started in the second half of 2007, and on the other hand, de-industrialization,

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modernization of industrial plants and fostering energy efficiency in all spheres of business and public life that started much earlier; second, an excess in energy supply because of overinvestment in generating capacities from fossil fuels in the 1980s and 1990s, and the growth of new renewable energy sources (e.g. wind and solar power, biomass, geothermal energy) that has become highly subsidized and got "grid priority". Consequently, the wholesale prices of electricity in the European electricity markets have dropped significantly, what together with an increase in operating costs due to changing fuel prices (especially high and unstable gas prices and lower prices for coal) and CO_2 emission rights as well as the established merit order caused that electricity generation from conventional power plants, including gas-fired thermal ones, has become financially unattractive for investment, and their future financial outlook more uncertain and pessimistic.

The challenges the European energy industry faces, especially the ones based on conventional, natural gas-fired thermal power plants, affect unfavorably not only its operation and future, but also the European energy security, affordability and competitiveness of electricity prices (Capgemini 2013; Auverlot et al. 2014).

The main aim of this paper is to assess the financial performance of three European energy companies [Hrvatska Elektroprivreda Group (HEP), Verbund Group and N.V. Nuon Energy] that are relatively similar either considering their size in terms of employed persons or installed electricity capacity, but different in terms of the energy generation mix in the period 2011–2013. The main criterion for choosing these companies was the structure of their fuel energy production mix, i.e., they should have a small, moderate and large share of conventional power plants. Hence, the share of installed capacities of conventional power plants in the HEP's, the Verbund Group's and the N.V. Nuon Energy's energy mix accounts for 46.85 %, 25.56 % and 87.16 %, respectively.

The financial performance analysis derived from the companies' financial statements is conducted as the analysis of the main financial ratios: liquidity, debt, operating performance and profitability. Furthermore, by comparing them, the paper aims to draw more general conclusions on: (i) how the share of conventional power plants of energy companies in their energy generation mix has affected their operation as a whole, and (ii) what implications the financial performance may have on the companies' ability and willingness to invest in new thermal power plants. Finally, the paper discusses the trends in the energy industry, in particular regarding gas-fired power plants, as well the opportunities and threats facing them in the context of achieving the EU strategic energy goals, mainly security of energy supply, affordability and competitiveness.

The remainder of the paper is organized as follows. By outlining the recent trends in the EU energy industry, Sect. 2 provides a snapshot of the situation facing the European energy companies. Section 3 explains the methodologies used, while Sect. 4 examines the financial performance of the selected companies. It also draws on and discusses the main implications that affect the current and future position of conventional thermal power plants with regard to the EU strategic energy goals. The conclusions are given in Sect. 5.

2   The Implications of the Recent Trends in the EU Energy Industry

Faced with the energy policy and market failures, the EU energy industry has been in the process of great transformations (see, e.g., The Economist 2013a; CEZ 2013; de Clercq and Lewis 2013). As already mentioned in the introduction, as far as electricity consumption is considered, two trends coming from both the supply and the demand side contribute thereto.

The electricity demand reflects the level of economic development, as well as the industrial, residential and services ones. The adverse trends from the demand side have been accelerated not only by the financial and economic crisis in the EU that started in the second half of 2007, but also by the processes of deindustrialization, as well as modernization of the industry and increasing energy efficiency in all spheres of business and private life that started much earlier. Due to these trends described in detail in different reports (e.g., see Capgemini 2013; EEA 2013; Auverlot et al. 2014; EC 2014a, c; Honore 2014), electricity consumption has been decreasing continuously. Figure 1 indicates that electricity consumption in the EU-28 did not manage to reach its level from 2007. According to data from the Eurostat, the annual average growth rate accounted for 0.4 % in the period 2001–2012, meaning that final energy consumption decreases annually, on average by 0.4 %.

Several processes caused significant changes on the supply side. Some of them started in the 1980s, as overinvestment in generating capacities from fossil fuels, and some of them are more recent, as the growth of new renewable energy (especially due to increasing wind and solar capacity installations in the EU) that has become highly subsidized and got "grid priority". For example, according to
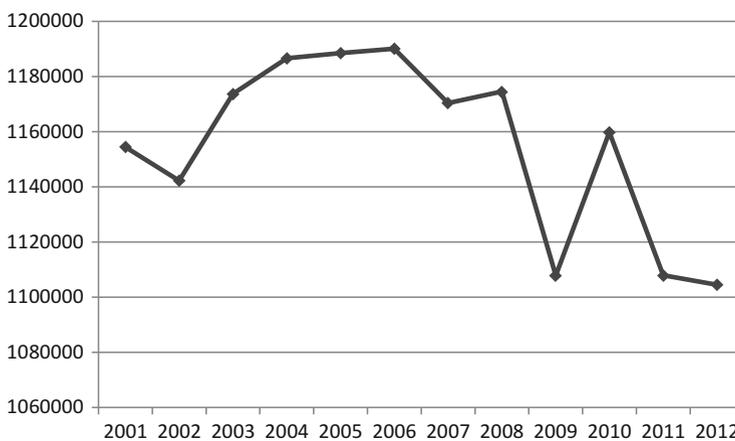
Fig. 1 Final energy consumption in the EU-28 in the period 2001–2012 (in 1000 tons of oil equivalent). *Source*: Eurostat
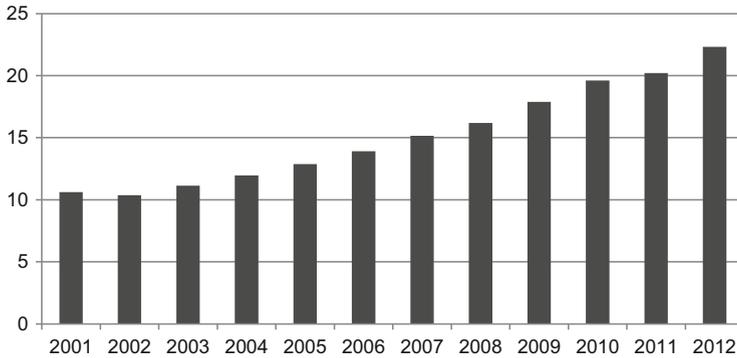
Fig. 2 The share of primary production of renewable energy in total primary energy production (in %). *Source*: Eurostat

The Economist (2013a), during the 2000s, European utilities overinvested in generating capacity from fossil fuels, boosting it by 16 % in Europe as a whole and by much more in some countries (up to 91 % in Spain, for example).

The share of primary production of renewable, low-carbon energy in total primary production of energy (expressed in 1000 tons of oil equivalent) increases continuously, as can be seen in Fig. 2; more precisely, from 10.62 % in 2001 to 22.23 % in 2012. According to Eurostat's statistics, this is because total primary energy production decreased in the same period by an average of 1.54 % per year, while primary production of renewable energy increased by 5.33 %.

However, 14 % of final energy consumption over all sectors and 23.5 % of the electricity produced in the EU comes from renewable energy sources (EC 2014c). Although this is far from the EU target for 2020, the Commission set a new renewable target for 2030 of at least 27 % of renewables (EC 2014a). Such present and expected future movements of the share of renewable energy undoubtedly represent a great success especially from the ecological point of view, and certainly mean a step forward in achieving the EU energy strategic goals regarding the increase in the share of renewable energy in the EU's gross final energy consumption (to 20 % by 2020) and the greenhouse gas emissions reduction (CO_2 emission reduction by at least 20 %) set in the EC (2009, 2010, 2011) (to 80–95 % below 1990 level by 2050).

Thus, according to the EU Directive 2001/77/EC, in order to achieve the energy policy goal of sustainability, the EU Member States are obligated to increase the share of the renewable energy sector using national support mechanisms. Although across Europe there exists "the variety of regimes and the different basis on which they assess their respective levels of support" (CMS 2013), three main mechanisms have prevailed: feed-in tariffs, tax incentives and tradable green certificates (Abolhosseini and Heshmati 2014). As highlighted in the comparative study "Renewables support mechanisms across Europe" (CMS 2013), the variety "has led to arbitraging by investors between jurisdictions as they search for the most

attractive return". Certainly, some of them, like green certificates, enhanced competition and economic efficiency (Herzeg 2012); however, they also contributed to dropping the wholesale prices for electricity and led to the increase in retail energy prices (EC 2014b) reducing the realization of the benefits for final consumers. For instance, in the Verbund's Annual Report (2013), it is stated that wholesale trading prices for electricity were below the prices for the year 2012 by 11.3 % (to 37.8 euros/MWh) for the base load and 8.9 % (to 48.7 euros/MWh) for the peak load.

In a nutshell, from the producers' point of view, the results of these trends on the supply and the demand side are the decline of the wholesale prices of electricity in the European electricity markets by 35–45 % from 2008 to 2012 (EC 2014b). This sharp decline in prices to persistently low and even negative levels, together with the changing fuel prices (lower prices for coal and CO_2 emission rights, and at the same time high gas prices due to long-term purchase agreements linked to the oil prices) and the established merit order that will be explained in Sect. 4, had to have certain important short- and long-term consequences on the electricity generating system of some country and the EU in general, financial performances of the established and new energy companies, financiers' decisions and supply-chain providers. Moreover, the ten leading energy companies also stress the lack of a clear, foreseeable and objective energy policy framework (CEZ 2013).

In the continuation of this paper, the consequences of these trends on the financial performance of the selected EU energy companies are evaluated and discussed.

3 Materials and Methods

3.1 Methodology

The paper employs financial statement analysis that is a technique of comparing data from multiple financial statements and comparing them over time (data from the same company) or space/geography (data from different companies in different countries). This kind of analysis enables us to study the effects of a large share of thermal power in the total energy generation mix on the business results and company's future outlook and strategic intention. Two financial statements, the balance sheet and the income statement, were analyzed for the 3-year period of interest (2011–2013) by calculating financial ratios clustered in four groups: liquidity ratios, debt ratios, operating performance ratios, and profitability ratios. Table 2, column 2 shows formulas for their calculation.

Liquidity ratios provide information about a company's ability to pay off short-term debt obligations as they fall due by cash or equivalent current assets. Generally, a higher value is desired as this indicates a greater company's ability to meet short-term debt obligations and therefore a lower financial risk. *Debt ratios* measure the extent to which the company utilizes long-term debt to finance growth, i.e., its

ability to raise capital and pay its obligation. Hence, they are an indication of the company's long-term solvency. The information on liquidity and debt ratios are of particular interest to banks when they are asked to extend or approve a short- or long-term loan to the company.

Operating performance ratios provide information about how efficient and well run a company is, i.e., how efficient it is in using its resources. They measure the ability of a company to convert various asset, liability and capital accounts into cash or sales. Therefore, they indicate how well company's management is running the business, i.e., if it is doing well in generating revenues, cash and the like from its resources. The higher the ratios, the better and more efficient the management is in using inventory or assets to generate sales or income.

Profitability ratios provide information about a company's performance and its ability to generate profit from its operation. Hence, they indicate the overall effectiveness of management with regard to returns generated on sales, equity or assets. Since profits are important for funding new investment, business development and paying dividends to shareholders, and they are also an indication of management quality, information thereon are of particular interest to shareholders.

The financial statements used are reported in the annual reports of the HEP Group, Verbund Group and N.V. Nuon Energy (hereinafter referred to as: HEP, Verbund and Nuon) for 2012 and 2013, available online on their web sites. All information and data about these companies used in this paper are published online, on their respective web sites or in their annual reports and are therefore available to the public. Besides them, the source for Verbund Group is also Verbund A.G. (2014).

3.2   Energy Companies: Basic Information

Three European electricity companies in the focus of this paper differ in the energy generation mix, what may be an important source of difference in profitability. Table 1 shows their installed capacities and production per energy source. HEP and Nuon are relatively similar in terms of installed capacity, while Verbund and Nuon are relatively similar in terms of the total number of employees. Verbund and Nuon Energy have the highest and the lowest share of installed capacities for hydropower and new renewables, respectively. HEP produces approximately 44 % of electricity from hydropower, and is positioned between Verbund and Nuon. The consequences of such energy mix will be analyzed after an introduction to the companies.

Verbund is the Austria's leading electricity company founded in 1947 with 51 % of the share capital owned by the Republic of Austria. It is managed by a holding company, Verbund AG, while operating activities are concentrated in subsidiaries with different focuses and tasks. Verbund power plants cover more than 40 % of the annual Austrian electricity requirements, what is approximately 70,000 million kWh. Although its main markets are Austria and Germany, Verbund trades electricity in 12 countries. In 2013, with approximately 3250 employees, Verbund

Table 1 Installed capacities and production per energy source

	HEP group				Verbund group				N.V. Nuon Energy			
	Installed capacity (2013)	Electricity generation			Installed capacity (2013)	Electricity generation			Installed capacity (2013)	Electricity generation		
		2011	2012	2013		2011	2012	2013		2011	2012	2013
	MW	GWh	GWh	GWh	MW	GWh	GWh	GWh	MW	GWh	GWh	GWh
Hydro power	2127	4577	4773	8054	7745	24,216	30,485	30,943	24	42	75	74
Thermal power	1527	5147	4699	4077	2790	5410	4500	4031	5084	13,250	13,266	16,556
Nuclear power	348	2951	2622	2518								
New RNW					380	127	242	565	725	1466	1409	1532
Total	4002	12,675	12,094	14,649	10,915	29,753	35,227	35,539	5833	17,758	14,750	18,162

Source: for HEP: HEP d.d. (2013, 2014); for Verbund: Verbund AG (2012, 2013); for Nuon: N.V. Nuon Energy (2012, 2013)

achieved annual revenue of 3.2 billion euros, as well as a profit from continued operation after tax of 996,979,000 euros. Over the period of interest, i.e., 2011–2013, its asset value increased per year, on average by 3.93 %, from 11,859.3 million euros in 2011 to 12,808.6 million euros in 2013.

The energy generation mix of Verbund consists of hydropower, thermal power and wind power. Hydropower is the most important source of electricity generation; in the period 2011–2013, 85 % of electricity originated from this source. Verbund has 127 hydropower plants with a combined maximum capacity of 7745 MW, and an average annual production of 28,548 GWh in the same period. Most of the hydropower plants are located in Austria (approximately 98 %), while the rest are situated in Germany. It is the leading supplier of hydropower in Europe. The second most important new renewable energy source for Verbund is wind. It has 154 wind power stations, 37 of which are in Austria, 21 in Germany, one in Bulgaria and one in Romania. Together with solar power, they have a maximum capacity of 380 MW, and record an average annual production of 311.3 GWh, what is 0.9 % of total electricity generation.

The second most important energy source for Verbund is thermal power. Verbund has eight thermal power plants, six of which are in Austria (two of them have been shut down or leased out), and two in France, with a total capacity of 2790 MW. An average annual production in the period 2011–2013 amounts to 4647 GWh, i.e., 14.1 % of total electricity generation. Thermal power plants have an important role in the energy generation mix since their generation compensates for fluctuations in the production of new renewables. However, they are under pressure from a financial point of view.

By comparing the year 2013 with the year 2011, an important trend can be noticed in the operation of Verbund that is in line with its strategic intention, i.e., an increase in hydropower and wind generation (it rose by 7165 GWh), while due to market conditions thermal power generation decreased by 1379 GWh. The company intends to do business in the South Eastern European countries as well. As stated in its Annual report (2013), by 2018, Verbund plans to invest 1.5 billion euros in wind farms, grids and efficiency improvement of the existing hydropower plants. The company will continue to invest in hydropower and wind in future, because it finds that this is the most important and efficient source of renewable energy which is economical even without funding.

HEP is a leading Croatian electricity company engaged in electricity production, transmission and distribution for more than one century, and in heat supply and gas distribution for the past few decades. HEP is in 100 % state ownership. It is managed by a parent company, HEP d.d., that is the founder and only owner of the dependent companies. The operating activities are concentrated in the divisions. Some of them are regulated (transmission and distribution), but some are non-regulated ones (generation and supply).

HEP Group has 4000 MW of installed capacity for electricity generation. Considering its electricity generation source mix, almost half of it is related to conventional power, while the second half refers to hydropower. In the period 2011–2013, its average production of electricity amounted to 13,139 GWh and

covered approximately 82 % of the Croatian electricity market as its only market. In 2013, with approximately 11,840 employees, HEP achieved annual revenue of 1.9 billion euros, as well as a net profit of 171,205,000 euros. The asset value of the HEP Group increased in the period 2011–2013 on average by 2.65 % per year, i.e., from 4440 million euros in 2011 to 4679 million euros in 2013. As far as electricity production is considered, HEP owns 24 hydropower plants located in Croatia, and one in Bosnia and Herzegovina. Although 53.15 % of HEP's installed capacity is related to hydropower, its average annual electricity production from this source amounted to 43.5 % in the period 2011–2013. One should note significant oscillations from this source of electricity generation that is in line with electricity generation from thermal power plants, but certainly in the opposite direction.

HEP is a 100 % owner of seven thermal power plants fired by oil, natural gas or coal. Four of them are of condensing type, while three are cogeneration plants which produce both electricity and heat in a combined cycle. They form the backbone of the district heating system in the cities of Zagreb and Osijek. Apart from HEP Production, electricity within HEP is produced by TE Plomin d.o.o., a company co-owned by HEP d.d. and RWE Power which operates a 210 MW thermal power plant. All thermal power plants are located in Croatia and make HEP's second important energy source. The average annual production from this source is almost identical to the Verbund's electricity generation (4641 GWh). HEP d.d. is a co-owner (50 %) of Krsko Nuclear Power Plant in Slovenia. 50 % of installed capacity (348 MW) and electricity production (on average, 2700 GWh annually) from this power plant belongs to HEP.

HEP investment plans include a number of construction projects of hydro, solar, biomass and conventional power plants in Croatia. It seems that this company intends to keep its production mix almost unchanged.

N.V. Nuon Energy is part of the Swedish parent company Vattenfall AB, one of the Europe's largest generator of electricity and the largest producer of heat. It was founded in 1994, although its roots date back to 1845. With 5833 MWe and 3167 MWth of installed production capacities, it is engaged not only in the production and supply of electricity, gas, heat, and cooling in the Netherlands, where it is based, but also it has activities in Germany and the United Kingdom. In 2013, with approximately 4800 employees serving 2.1 million customers, Nuon achieved annual net sales (revenue) of 3.7 billion euros, and a loss of 419 million euros, specifically on the value of its gas-fired production assets. Despite this, it holds a top-three position in the Dutch energy market. In the period 2011–2013, its asset value decreased on average by 3.65 % per year, i.e., from 6848 million euros in 2011 to 6357 million euros in 2013.

The Nuon's energy generation mix consists of thermal power, hydropower and new renewable power (mainly wind, but also solar and biomass). Thermal power is the most important source of electricity generation; in the period 2011–2013, 91 % of electricity originated from this source. The majority of electricity is produced by gas-fired power plants, what significantly affected its business financial results.

Hydropower makes only a modest contribution to the energy supply. Its share in the Nuon's energy generation mix amounts to only 0.4 %. The most important new

renewable source is wind power. In 2013, the total installed wind power capacity, including externally contracted wind farms, amounted to 716 MW, while the total installed capacity for wind power, solar power and biomass together amounted to 725 MW. An average annual renewable electricity production (without hydropower) was 1469 GWh in the period 2011–2013. In the future, Nuon is oriented towards cost efficiency and development of new and sustainable products and services, including, for instance, investment in renewable energy.

4 Results and Discussion

4.1 The Financial Performance

Financial analysis performed through the analysis of financial indicators should provide information on the financial performance of the companies over the period of interest. Four groups of ratios are calculated and presented in Table 2 for the selected European energy companies. Thereby, liquidity and debt ratios indicate the level of estimated financial risks and to some extent financial stability of the operating performance, while profitability ratios indicate the effectiveness of management and returns generated by sales, assets or capital. The reference values are derived from the rule of thumb. The ratios used were chosen as they are considered to be the most important and the most commonly used ones in financial analyses.

4.2 Discussion

A lot of thermal power plants operate dramatically less days in the year (especially in the peak load time), and some of them have been prematurely closed down or conserved in the EU, as noted by Caldecott and McDaniels (2014).

Although the results of the financial ratio analysis are limited to three companies, they provide a basis for drawing two indicative conclusions connected to the EU energy strategic goals.

First, it seems that profitability of the EU companies is highly related with the share of hydropower and new renewables in their energy generation mix. Companies with a higher share of hydropower and renewables operate profitably, while the ones with a higher share of conventional or even the high-performing CHP plants operate with reduced profitability, or even with losses. This is predominantly a consequence of a drop in the wholesale price of electricity, the established merit order and an increase in the prices of natural gas. A lot of thermal power plants operate dramatically less days in the year (especially in the peak load time), and some of them have been prematurely closed down in the EU, as noted by Caldecott and McDaniels (2014). According to them, 60 % of the total gas-fired capacity in

Table 2 Financial indicators for HEP group, Verbund group and Nuon Energy

Financial indicator	Formula	HEP group			Verbund group			N.V. Nuon Energy		
		2011	2012	2013	2011	2012	2013	2011	2012	2013
I. Liquidity measurement ratios										
1. Current ratio	Current assets/current liabilities	0.699	0.800	0.979	1.493	1.026	1.076	1.296	0.952	0.908
2. Quick ratio	(Current assets—inventories)/current liabilities	0.479	0.588	0.722	1.391	0.922	1.020	1.197	0.842	0.798
3. Cash ratio	(Cash+cash equivalents)/current liabilities	0.084	0.131	0.074	0.319	0.098	0.055	0.159	0.067	0.064
II. Debt ratios										
1. Debt ratio	Total debt/total assets	0.429	0.442	0.403	0.585	0.588	0.567	0.401	0.512	0.540
2. Debt-equity ratio	Total debt/total equity	0.753	0.793	0.675	1.411	1.429	1.309	0.670	1.051	1.176
III. Operating performance ratios										
1. Total asset turnover ratio	Total revenue/total assets	0.390	0.433	0.452	0.262	0.264	0.364	0.678	0.576	0.591
2. Non-current assets turnover ratio	Total revenue/total non-current assets	0.433	3.887	3.804	0.301	0.334	0.422	1.053	0.941	1.024
3. Current assets turnover ratio	Total revenue/total current assets	3.887	12.306	14.282	1.991	2.566	2.868	1.902	1.482	1.400
4. Inventory turnover ratio	Total annual sales/inventory cost	12.306	11.867	13.881	28.818	25.076	40.333	24.887	12.782	11.521
IV. Profitability ratios										
1. Profit margin	Net income/net sales	0.06 %	0.51 %	8.82 %	15.02 %	15.26 %	21.38 %	9.44 %	−18.20 %	−11.14 %
2. Return on assets (ROA)	Net income/total assets	0.02 %	0.20 %	3.66 %	3.93 %	4.03 %	7.78 %	6.40 %	−10.48 %	−6.59 %
3. Return on equity (ROE)	Net income/shareholder equity	0.04 %	0.37 %	6.13 %	9.47 %	9.78 %	17.97 %	10.69 %	−21.50 %	−14.35 %

Source of data for ratio calculation: Annual reports of the companies [for HEP: HEP d.d. (2013, 2014); for Verbund: Verbund AG (2012, 2013); for Nuon: N.V. Nuon Energy (2012, 2013)]

the EU is not recovering fixed costs and may face closure within the next 3 years. Hence, many of them generate losses, and the whole industry is in an existential trap (see The Economist 2013a). This situation raises a concern about the achievement of the EU energy strategic goals, i.e., to ensure security of electricity supply, affordability and competitiveness.

The wholesale electricity prices depend significantly on the capital and operating expenditures, market structure characteristics and elasticity of electricity demand to prices. The expenditures, especially the operating ones, are strongly connected to the generation mix. Electricity can be produced from a number of different energy sources (such as natural gas, oil, coal, nuclear, hydro, wind, sun and biomass) that have numerous advantages and disadvantages in relation to security of electricity supply, competitiveness, the impact on climate change and the environment. The electricity generating system of some country is an ordered system composed in a way that provides base load, regulating and peak load power (Vattenfall AB 2012). Base load power (the minimum electricity demand for day-to-day operations) is usually generated by nuclear, hydro or coal-fired power plants that generate electricity at low variable costs and can (generally) only be regulated with difficulty. Peak load (that arises when the demand for electricity is especially high) and regulating power supply extra electricity, and hence maintain a high standard of power quality in the electricity grid. They are predominantly covered by hydro and particularly gas-fired power plants. New renewable energy sources are intermittent sources highly dependent on climate conditions.

The electricity generating system is usually organized according to the merit order, i.e., in a way that power plants produce according to the marginal cost of electricity, meaning that the electricity from the power plant with a lower marginal cost will be given priority by the grid. The merit order of conventional base load thermal power plants is nuclear, coal and lastly CHP plants in general. However, recently renewables have been given grid priority. Certainly, one should bear in mind that since the marginal cost of wind and solar power is zero, grids would take their power first anyway (The Economist 2013a). Furthermore, considering the fact that renewables are highly subsidized by different financial support schemes, their production accounts for an ever-greater share. Consequently, the established conventional utilities, especially gas-fired, are forced to reduce their annual production, especially in the peak time, what altogether (a decline in wholesale prices and running hours) leads to the decrease in profitability. The effects of the merit order on profitability of base load power plants and the functioning of energy markets are discussed in Nicolosi and Fursch (2009), Tveten et al. (2013), and Sensfuss et al. (2008). Another fact additionally contributes to this decrease when the high-performing CHP plants are in question—high, unstable and uncertain prices of natural gas (e.g., see Honore 2014).

Caldecott and McDaniels (2014) additionally stress the importance of changes in coal-gas fuel prices spreads that shifted the balance of profit towards coal plants at the expense of CHP plants, and at the same time led to increasing emissions. They also raise doubt that the gas-fired power plants will not be able to regain competitiveness against coal power on the basis of fuel price changes alone if the gas prices

remain high (see also The Economist 2013b). The ten leading energy companies have therefore urged the EU to adopt reforms to prevent blackouts and help the indebted sector adapt to future demand (de Clercq and Lewis 2013).

Second, companies with a higher share of conventional thermal power plants have faced a significant decrease in asset value, what weakens their potential role as investors in constructing new and more efficient and effective power plants (see The Economist 2013a). Since their credit rating has also significantly deteriorated, their ability and willingness to invest in new thermal power plants are additionally depressed. Furthermore, decreasing profitability has the same adverse effect on new investors, financiers and supply-chain providers (for exceptions, see Schaps 2013). Capital expenses are huge, operation expenses are changeable, but the reward is uncertain.

However, thermal power plants, especially CHP plants, are needed considering their role in generating peak power and even base load, i.e., in ensuring grid stability when wind and solar generators run out due to natural conditions. Additionally, the fact that the efficiency of electricity and heat production from conventional thermal power plants in the EU-27 improved by 5.8 percentage points (from 45.4 % in 1990 to 51.2 % in 2010) in the period between 1990 and 2010, according to the European Environment Agency (EEA 2013), strengthens their role in the electricity generating system of each country. Furthermore, the same source states that a CHP reduces the need for additional fuel combustion for the generation of heat and provides a large potential for reduction of CO_2 emissions, what is also important from the ecological point of view.

By further increasing the share of new renewables, disincentives for new investment in base load and regulating power will strengthen, and grid stability as well as security of electricity supply, affordability of electricity and competitiveness of prices will be additionally jeopardized. Certainly, as Caldecott and McDaniels (2014) highlight, energy companies will significantly reorient their investment strategies, cutting back on planned EU base-load capacity investments and relocating new investments to developing markets.

To prevent that, more policy-coordination and new energy reforms are needed. Implementation of a capacity remuneration mechanism aimed to ensure generation system adequacy is only one mechanism that facilitates the operation of a high efficiency CHP plant (see De Vries and Heijnen 2008; Battle and Rodilla 2010; IHS CERA 2013); however, comprehensive, consistent and transparent energy policy reforms from national to the EU level are still needed. This is important since the EU evidence indicates that wholesale electricity markets have failed to provide adequate incentives to develop the proper generation mix consistent with security of supply criteria (Joskow 2006).

5 Conclusion

This paper addresses two main issues conventional power plants have been facing—the reduction in profitability and asset value. These issues are noted from the analysis of financial performances of three European energy companies (HEP Group, Verbund Group and N.V. Nuon Energy), having some similarities, such as the number of employed persons or installed electricity capacity, but also dissimilarities, such as a different share of conventional power plants in their energy generation mix.

The issues are a consequence of two trends that have been developing especially from 2000s. One of them is attributable to the electricity demand side—a decrease in electricity demand due to unfavorable economic trends, de-industrialization and modernization of industrial plants as well as fostering energy efficiency, and the other one is attributable to the electricity supply side—an excess of energy supply because of overinvestment in generating capacities from fossil fuels, growth of highly subsidized new renewable energy sources and the established merit order according to renewables have "grid priority". A consequence of these trends is a decrease in the wholesale electricity prices, what together with the changing fuel prices and especially high and unstable gas prices led to the decrease in profitability, or even to losses, and to the decrease in the asset value of energy companies with a high share of conventional power plants.

Since conventional power plants, especially high-performing and flexible CHP plants, have a key role in producing base load, regulating and peak load power, as well as in maintaining high quality in the electricity grid, these trends may jeopardize not only their future, but also the EU security of electricity supply, affordability and competitiveness. Namely, they have become unattractive compared to new renewables whose share in the energy generation mix has started to grow, especially due to different and abundant financial support schemes. However, new renewables are intermittent sources highly dependent on climate conditions, and they cannot change the role of conventional power plants yet, i.e., CHP plants in generating base load and regulating power.

This situation does not have only adverse consequences on the established energy companies with a high share of conventional power plants and their investment potential, but also on the intentions of new potential energy companies, investors, financiers and supply-chain providers. Hence, insufficient financial interest in taking new investments may jeopardize security of energy supply in the short- and long-run. The capacity remuneration mechanism is welcome; however, comprehensive, consistent and transparent energy policy reforms from national to the EU level are still needed.

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Specific Risk Dimensions in the Wind Energy Field: Case Study—Romania

Maria Alexandra Nichifor

Abstract The wind energy industry has represented one of the main focus points in the case of business and political discussions in the last decade. The wind energy has often been described as the most favorable type of renewable energy source towards a sustainable future in the European Union due to its minimal impact on the environment. However, the associated risks and risk strategies have scarcely been mentioned in these discussions, remaining a subject worthy of attention for scientific literature. The present study aims to research the hampering factors of the wind energy business in Romania and the strategic methods of risk mitigation. The threats of the wind energy sector have been a major concern of the last 2 years in Romania, as the companies in the field have striven to overcome the green certificates subsidy crisis from 2013. By using the Delphi method based on questionnaires and interviews with 26 experts in the field, the current paper offers an overview of the most significant risks that have been associated with wind energy and of the risk mitigation strategies. The study revealed major threats in the case of political and regulatory risks and the risks associated with the authorization phase of wind energy projects. The relevance of the study lies in the correlation of the risks and risk mitigation strategies of the wind energy companies and the legal and economic environment in Romania that has brought adverse shift in the development of the wind energy field in the last year.

Keywords Wind energy • Risk • Risk mitigation • Renewable energy

1 Introduction

The renewable energy sector has become one of the main issues of a sustainable energy development for the next decades to come. The renewable energy accounted for 19 % of the global final energy consumption in 2012 (Renewable Energy Policy

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Network for the 21st Century 2014), but had encountered a declining shift in 2013 as many European support policies decreased simultaneously with the uncertainty of the field. Simultaneously with the development of the wind energy field in the European Union, certain risks for wind energy producers have emerged and have become current issues of their business.

Several studies have investigated the threats wind energy companies have to face in the current renewable energy market. While Agrawal (2012) distinguished nine types of risks for wind energy, respectively: political risk, regulatory risk, credit risk, market risk, construction risk, performance risk during operation, financial risks, legal risks and the natural disasters risk, Michelez et al. (2011) divided the risks associated to wind energy into on-shore and offshore wind energy risks. These risks were also confirmed by other authors (Small 2012; Babu and Jithesh 2008; Cleijne and Ruijgrok 2004). However, the mitigation solutions for these wind energy risks have not gained generally efficient solutions and still represent a subject to debate for experts in the field, as well as for the scientific research.

The main risks perceived as having the lowest chances of being controlled and mitigated are the political and regulatory risks, which depend mainly on the national government policies that can change over time (Agrawal 2012). Changes in regulations in favour of the renewable energy producers can also contribute to increasing a country's attractiveness for investors in the field as negative changes can contribute to the discouragement of investments in the sector (Lüthi and Prässler 2011). A suitable example of how legal changes can impact on the development of a renewable energy sector is the wind energy landscape in Romania. The renewable energy field was altered into a business environment lacking opportunities perspective due to the cuts in the subsidies system in July 2013, especially in the case of the wind energy field, that was mostly affected (EY 2014). This represented a strong motive for foreign investors to avoid the country due to its high risk profile despite of the proper climate conditions. The risks in the wind energy field have increased significantly ever since and some have become a permanent threat for wind energy companies today.

The main objective of the present paper was to offer an overview of the specific current risks perceived by companies in the wind energy field. The case study focuses on Romania and emphasizes the consequences of the legal changes on July 1st, 2013, on the companies in the wind energy field that represented the main risk factor for this sector. The second objective was to describe potential measures of risk mitigation preferred by the investigated firms in the case of diverse risks, depending on the external renewable energy environment of the analysed country.

The assumptions were made based on the unstable renewable energy environment in Romania in 2014 that affected the activity and the development of the wind energy field in the last year and has led to the reluctance of financial institutions to provide resources for new projects in the field.

The paper is structured as follows: the next part will present the main theoretical perspectives on risks and risk mitigation measures in the wind energy field. The study continues with the methods implemented and the main findings and analysis. Finally, conclusions are presented.

2 Risks and Risk Mitigation Methods in the Wind Energy Field

Over the last decade, the wind energy sector encountered multiple risks that originate from the internal and external business environment of the companies active in the field. According to Ferraris et al. (2014), risk is associated with the future, with possibilities, with events, that have not yet happened. Holton (2004) mentions that risk entails two elements, exposure and uncertainty and is related to objective probabilities, as opposed to the concept of uncertainty. Rivza and Rivza (2011) emphasize the fact that modern society faces a higher risk than in previous centuries and thus, points out the concept of risk society. Risk is a natural part of the business field and can lead to damaging consequences, but it can be managed and often even predicted through a good planning and proper risk management strategies.

Many authors have identified multiple risks of the renewable energy field. Rambo (2013) emphasizes the following risks that are associated with the renewable energy: market risk, technological risk, reputational risk, changing legislation, financing and the high cost of lending. Furthermore, the author states that the heavy risk profile of a country can be the first obstacle for renewable energy investors to enter in the renewable energy market of a country. Michelez et al. (2011) divided the wind energy risks into on-shore wind projects risks and offshore wind project risks, whereas the permitting phase and the transport and logistics complexity of blades are the two common threats in both on shore and off shore wind parks, as shown in Table 1.

A complex overview of the wind energy risks was defined through a report of the Economist Intelligence Unit (2011), respectively: political/regulatory risk, operational risk, weather-related risk, building and testing risk, strategic risk,

Table 1 Risks of on-shore and off-shore wind energy projects

Risks of off-shore wind energy projects	Risks of on-shore wind energy projects
Permitting issues	Transport and logistics complexity of blades (in the phases of operation and maintenance and transport)
Policy changes	Permitting issues
High operation and maintenance costs	Conflicts with interest groups
Difficulty of maintaining the wind parks in windy areas offshore	
Failure of grid connection	
Transport and logistics complexity of blades	
Delay and higher costs in the installation phase in case of bad weather conditions	
Delay of production in case of missing or unavailable construction vessels	

Source: Michelez et al. (2011, pp. 44–45)

environmental risk, financial risk. The study also indicated that the earlier phases of the wind energy project development are considered riskier than the latter stages.

The regulatory risk are caused by changing government policies for supporting the renewable energy (Cleijne and Ruijgrok 2004), while the financial risk usually refers to difficulties in gaining access to capital, especially in developing countries. The operational risk is defined by the risk of plant closure due to different causes, such as plant damage or component failure (Economist Intelligence Unit 2011), while the market risk refers to the increase in commodities price and other inputs or the decrease of the price in the case of sold electricity. Weather related risks originate in the speed of wind, which can fluctuate and reduce the productivity of wind parks. Building and construction risks may occur if a project does not meet the specifications, as well as cost and time overruns, according to Agrawal (2012).

Small (2012) and Babu and Jithesh (2008) also point out the high probability of wind turbine components failure, such as cable or nacelles damage, that represent a great risk to the business and can cause high costs to the company. Natural hazards, such as lightning, tornadoes or ice are other factors that should be considered when analyzing the possibilities of risk mitigation.

The mitigation solutions differ depending on the type of risks the wind energy company has to meet. Some authors differentiate between the risks of producers and suppliers and suggest specific methods of risk mitigation for each situation. As Fig. 1 indicates, Cleijne and Ruijgrok (2004) suggest hedging and pricing policies for lower demands in the case of a market risk, while the regulatory risk imposes long term contracting and fixed pricing, such as in the feed in tariff policy, where the same price is ensured for a period of 15–20 years. For the construction risk mitigation, Agrawal (2012) indicates standard insurance covers and a good reputation of the construction contractor, which would minimize the risk of not meeting the necessary steps for construction of the project or the delay and costs risks.

Further issues of wind energy projects are landscape damage, noise and bird or bat killings, which are usually overcome or reduced mainly by bird detection radars or studies of the fauna frequency in the region where the wind turbine is placed (Smales 2014). These negative impacts of wind energy turbines have been a main cause of resistance from interest groups or animal protection associations in the last years and are an important part of risk analysis for wind energy projects.

3 Methodology

In order to ensure a practical approach of the present research, 26 experts active in the wind energy field were selected to participate in our study. The participating experts were interviewed in two phases through the Delphi method. The Delphi process was based on a thorough structure of questioning preparation and implementation, starting from the recognition and definition of the inquired subject, the preparation of the questionnaire with the support of wind energy experts and University professors in the field, selection of the experts and the two phases of
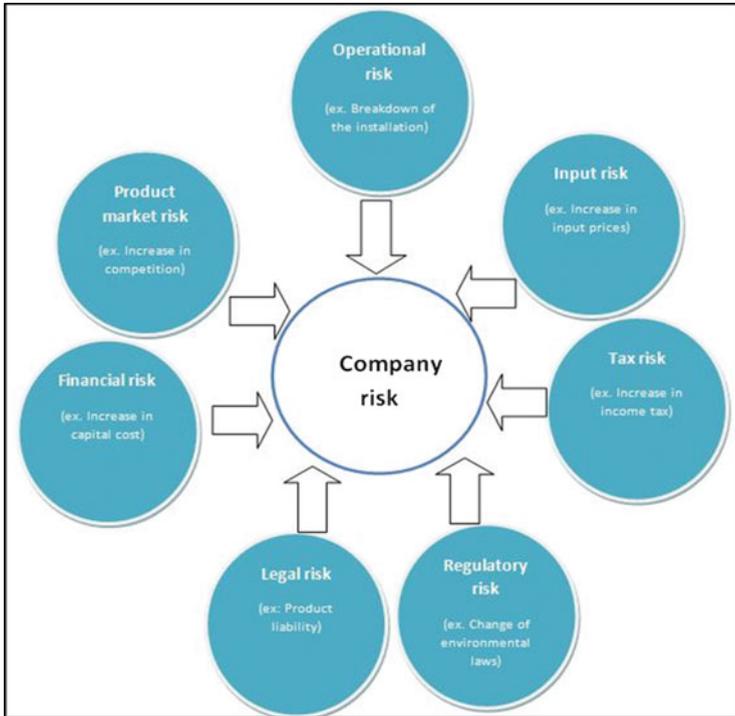
Fig. 1 Renewable energy risks. *Source*: Cleijne and Ruijgrok (2004, p. 14)

interviews and questionnaire filling followed each by the analysis of results and the informing of the experts, according to the Delphi process scheme of Adler and Ziglio (1996). The last phase of the Delphi method was the results report that was also shared with the experts. The questionnaires were distributed to the participating wind energy experts online or personally during scheduled appointments, when interviews were also conducted in order to detail the information for the present study. During the interviews the main objective was to gain a complex overview of the risk and risk mitigation methods used in companies in the wind energy field in Romania depending on impact of the risks on companies' business, as described by the experts.

Regarding the size of the participating companies, the majority had a maximum of 50 employees (46 %). 34 % of the firms were large scale companies with more than 500 employees, of which 27 % had employed more than 1000 people. 12 % has a number of 100–500 employees. The rest of the experts that contributed to the research were working for firms with 500–1000 employees (8 %), while 7 % were involved in projects with 50–100 employees. All companies were active in the wind energy industry in Romania. The majority of the large companies, that were interviewed, were also active in other countries, mostly in Germany and Austria.

The research questionnaires were divided in two parts: the first part referred to the risks associated with the wind energy field, while the second part inquired the mitigation methods used to reduce or avoid the impact of these risks. The objective of the second phase of questioning was to investigate the specific methods of risk mitigation for the types of risks described in the first part of the questionnaires.

The present study was based on two hypotheses that were observed in the Romanian environment in the wind energy industry, respectively:

H1: The highest ranked risks in the wind energy field in Romania in 2014 are the political and regulatory risks. This hypothesis was based on the fact, that most companies active on the wind energy market in Romania announced investment minimization for the future period or orientation of the investments towards other countries due to the green certificates cuts on July 1st, 2013.

H2: The wind energy management stage with the highest degree of risk is the financing stage. This hypothesis was considered based on the fact that credit institutions are reluctant on offering companies in the renewable energy field financing because of the industry lack of security and predictability.

The research was conducted between 1st May-15th September 2014.

4   Findings and Analysis

The first part of the interviews inquired the risks in the wind energy field and the degree of their influence on the participating wind energy companies according to the selected experts.

The most important observation regarding the perception of the experts on high risks associated with the business of the wind energy field was the political/regulatory risk. The majority of the experts (96 %) described it as the highest risk for their business, while the other 4 % ranked it as an average risk, as shown in Fig. 2.

All the experts mentioned the radical impact the legal changes regarding cuts in the green certificates subventions by 50 % from July 1st, 2013 had on their business. The new regulations of the Romanian government reduced the number of green certificated granted to the wind energy producers from two certificates for each produced MW to only one certificate per produced MW (Emergency Ordinance 57/2013 regarding the modification and addition of the Law 220/2008 2013). Furthermore, the new law has imposed a construction tax on all the constructions of the wind energy projects, including wind turbines. The wind energy specialists affirmed these two measures have led to the decline of the wind energy industry in Romania and to an adverse shift that will reduce future investments dramatically and orientate new projects to more stable countries, such as Bulgaria.

The lack of predictability of the political measures in order to sustain renewable energy was defined as an obstacle for new entrepreneurs to invest in the wind energy field in Romania, as they cannot do an efficient planning of costs and
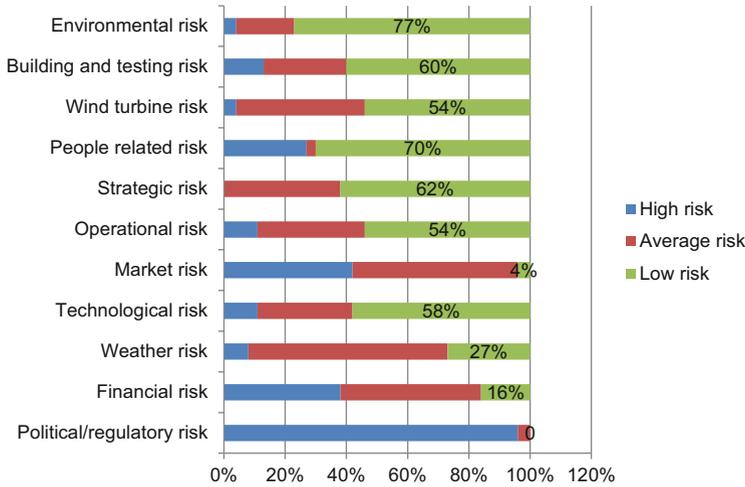
Fig. 2 The overall degree of risk associated with the responding wind energy companies

potential profits due to the introduction of new taxes and regulations and the cuts of subsidies. The regulatory threat is a key factor in deciding whether to invest in a country or not, as profits depend on the amount of support companies in the field receive in terms of subsidies and price support. Many experts that participated in the present study were active in other markets from Germany or Austria and have emphasized the tendency of foreign investors in their country to avoid entering the Romanian wind energy market or even of relocating existing projects to other countries as to eliminate the threat of legal changes in terms of the support scheme. They mentioned the impossibility of planning their business on a medium or long term and the high risk of losses due to the lack of transparency and predictability of the regulatory environment.

The second risk was related to the market, mentioned by 42 % of the experts. The market risk usually refers to fluctuations in energy prices or increase in commodity prices, but can also refer to increase in the competition of the companies in the field. The lowest ranked risks were the people related risks (70 % of the respondents) and the environmental risk (77 %). The people related risks referred to potential losses or damages regarding the personnel, such as, personnel fluctuations and occupational injury, while the environmental risk regarded possible environmental damages, such as natural hazards and the liability of the company in that case.

Contrary to the anticipated expectations, the wind turbine risk was mostly classified as a low risk by the wind energy specialists (54 %). Another 42 % of the respondents defined it as an average risk, while only 4 % stated it represents a high risk to the business. Besides the above mentioned wind energy threats, the interviewed experts mentioned other risks, that have a significant impact on their activity in Romania, such as the grid capacity limitation (TSO) of maximum
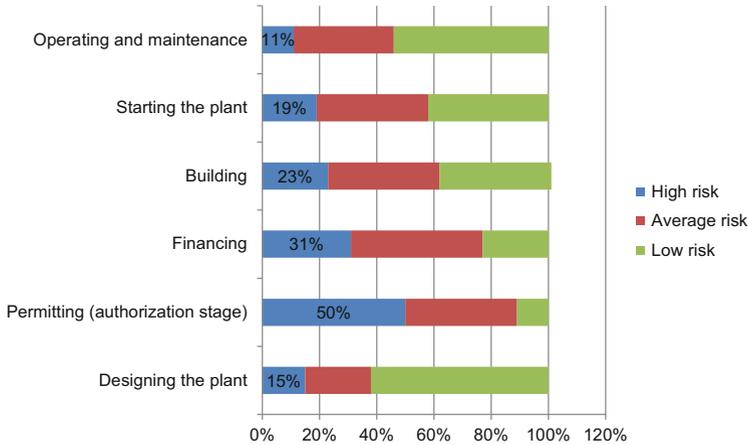
Fig. 3 The overall degree of risk associated with the development phases of a wind energy project

4000 MW or the lack of trust for the investments climate, that are obstacles for starting new projects or even developing the production of the existing wind farms.

Although the wind turbines risks have been generally ranked as low risks for the business many experts take precaution measures against them. Regarding the stages of the wind energy projects administration, the authorization stage or the permitting stage was defined as a high risk stage by half of the responding experts, which classifies it as the stage with the highest risk, as shown in Fig. 3. On the opposite side, the least risky phase was the plant design stage that was chosen by 62 % of the experts. Operating and maintenance was the second less risky phase in the case of 54 % of the companies. The financing stage was regarded as a stage with an average risk and was classified as a normal risk by the majority of the experts (46 %). The second part of the research referred to the risk mitigation measures experts use in order to reduce or avoid the described risks. For almost all risks, experts mentioned multiple strategies in order to minimize threats.

In the case of operational and construction risks 96 % of the specialists use at least two methods of risk mitigation and only one expert used insurance as the only barrier against this type of threat. 58 % of the experts mentioned they used simultaneously three methods of risk mitigation for operational and construction risks, respectively: using only proven technology in construction, regular maintenance of plant and equipment and training employees and testing the recovery plants. Another alternative was the improvement of the supply chain management (in the case of 54 % of the experts), while an equal percentage improve the analysis of weather data at the location ahead of the investment decision. Other options included: improvement of the analysis in market data, improvement of monitoring methods of industry and market trends, improving scenario planning. Insurers have been the most frequently involved actors for risk mitigation in the case of 65 % of the respondents, while lawyers and litigation experts were the second alternative (62 %), as shown in Fig. 4.
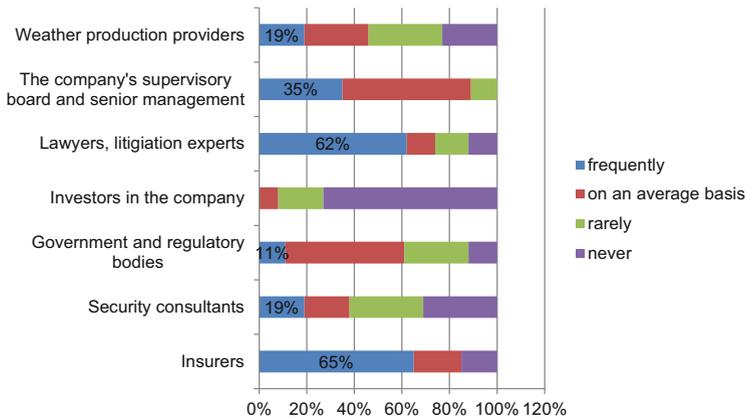
Fig. 4 Implementation frequency of company resources for risk mitigation

Although the wind turbine risks have been mostly classified as low impact risks, the majority of the companies (77 %) use certain mitigation methods against these threats, as well. Wind turbine risks have been classified as: noise, bird or bat killings and landscape damage. The experts mentioned blade aerodynamics and noise investigation as the main strategies against the noise risks, while for the protection of birds and bat killings companies used the following methods:

- Environmental studies,
- Bat friendly radars for diminishing the number of killed bats,
- Improving monitoring methods.

The experts pointed out the significant number of bats killed in comparison to that of birds and stated that the measures taken for the protection of bat killing is also efficient in the case of birds. In order to avoid landscape damage the wind energy companies develop projects far from residential districts or use geotechnical studies in order to find a proper location for their projects. The experts mentioned they had had no resistance from interest groups or locals regarding noise or landscape damage, as most of the projects are situated in isolated areas, far away from the residential locations. The wind energy parks in Romania are generally located in regions with few if any inhabitants.

Another part of the second phase of the interviews inquired the company resources that are used to minimize risk and the frequency of their implementation. The experts further detailed the risk mitigation strategies in case of financial and market threats, the majority of them opting for hedging against the fall in the price of power.

Other methods of risk minimization included:

- Access to capital at a reasonable cost (42 %),
- Continued access to financing (42 %),

- Improving corporate governance practices and policies to ensure continued access to financing (31 %),
- Hedging against weather conditions and the resulting fall in the volume of electricity (23 %),
- Hedging against the rise in the price of inputs (19 %).

If there is a lower demand on wind energy, companies can also use pricing policies to balance their revenues.

In order to avoid weather risk, specialists use weather forecast to foresee potential natural hazards or climate conditions that can cause damages to wind turbine systems. Another method is the scenario planning, while others contract a specific insurance for the weather risk.

The interviews and questionings revealed that experts mostly focus on taking measures against the political and regulatory risks, the financial and market risks and the operational and construction risks. The experts were not significantly concerned with the wind turbine or weather risks that were generally perceived as less threatening for the business as the other risks. Some experts stated they do not take any measures against these types of risks, as they encountered no such obstacles in their activity.

5   Conclusion

As a conclusion, the first assumption of the study regarding the high impact of the political and regulatory threat on wind energy companies has been confirmed by the participating experts, who have ranked it as the highest risk for their business. The decreasing trend of new wind energy turbines installations in Romania, as well as the focus on other countries, was the two main tendencies mentioned by the specialists as consequences of the green certificates cuts. Experts indicated the lack of predictability and transparency of the Romanian governments regulations for renewable energy producers, that contribute to the orientation of foreign investors on other countries, that offer more stable support schemes for renewable energy.

Thus, the wind energy field finds itself at a critical point of discouraging new investments and is facing a major risk of downfall, as well as the issue of not fulfilling the 2020 obligation of the European Union member states of ensuring a certain energy quota from green energy sources. The second assumption of the study regarding financing as the phase of a wind energy project that is most risky, was not confirmed by the experts. The interviews revealed, that the permitting or authorization phase is considered as the most risky phase, while financing occupied the second position. The wind energy specialists indicated that the highest challenge for new wind energy projects are the authorizations required for the installation and functioning of the wind energy projects. The delays and costs associated

with this phase are major reasons of uncertainty for potential wind energy entrepreneurs to enter the market besides the unpredictable legal subsidies system.

The expected trends for 2014, as well as for the next year are lagging projects in the field and the diminishing number of wind energy parks, as many producers in the field from Romania have already announced their withdrawal. The lack of stability of the legal support system appears to represent the major threat of developing the renewable energy system on a national level, especially in the case of wind and solar energy that outpaces all other explored risks in the study. The responding companies have mentioned efficient methods of risk mitigation in the case of all type of risks, except the political and regulatory risk, which can be minimally controlled through internal company strategies and is perceived mostly as a least controllable influence factor on the wind energy business. These two risks represent the main threats in the current business environment of the wind energy field in Romania.

The present study provides an overview of the specific wind energy risks and possible solutions to risk mitigation in the field, which can be used by experts active in the sector, as well as in the scientific literature. Furthermore, the paper can be used by European government institutions as a documentation of political and regulatory risks, caused by legal changes without considering the perspectives of wind energy experts. Thus, the present research can support future improvements in legal changes in Romania and in other member states of the European Union for encouraging future investments in the sector and the development of wind energy. The results obtained in this paper suggest that the direction for future research might be the observation of the political and regulatory development in the field for other member states of the European Union, as well as the evolution of the associated risks. Another significant direction would be the observation of wind energy technology and activities that will bring new types of risks in the field depending on external and internal factors of influence for the business.

The wind energy sector finds itself on a growth path that is likely to bring new challenges for the producers in the field, as technology, market competition and regulatory standards evolve. Romania has followed the growth tendency of the European member states until 2013, but is exposed today towards an adverse shift of decline in the wind energy field, having numerous consequences for wind energy companies, a subject worth analyzing for the years to follow.

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Is There a Necessity for an Alternative Energy Source Instead of Natural Gas in the Industrial Sector of Turkey?

Mehmet Samet Erdem, Mustafa Kemal Beser, and Hakan Acaroglu

Abstract This paper examines the causality relationship between natural gas consumption in industry sector and industrial growth within Granger causality technique and ARDL (autoregressive distributed lagged) model, testing for the period of 1976–2013 in Turkey. We have three main factors to choose this subject as a study. First of all, energy is a vital production factor related to economic growth. Secondly, because of industrial sector is one of the main sector in developing countries and Turkey is one of the developing countries in the world, industry takes the priority in our research. Lastly, natural gas is the most used primary energy source at industry. During analyzing these three factors, we tried to find the answer of necessity of an alternative energy sources at industry in Turkey. According to results, it is found that there is no causality relationship between natural gas consumption in industry sector and economic growth. As a conclusion, we offer an economic policy that, Turkey should find an alternative energy sources to continuing its growth.

Keywords Economic growth • Energy • Natural gas • Industry sector • ARDL

1 Introduction

Associated with industrialization, countries energy dependence are on the increase. Countries are bound for alternative energy sources due to shortage of energy sources and increasing demand. 1973 oil shock, pushed countries to awareness of energy and obligate them to develop policies and reconfigure their establishment. At the implemented study for some developing countries period for 1981–2000 by

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International Energy Agent, which is founded 1973/4, energy has been added to the production function because of its huge effects on economic growth and deduced the energy has an important role at the countries where the intermediate stage of economic development (Ertugrul 2011).

Energy, which is the main factor of development of society, everyday life and production, bring responsibility to the countries and officials for the management of the energy sector to serve the required energy sufficient, quality, sustained, affordable and environment-friendly (Guner and Albostan 2007). This responsibility requires picking and choosing the pursue policies. In this sense, due to extremely important the planning of energy and management, especially energy or energy feedstocks crisis, which is frequently become a current issue in the World, head towards to countries edit their energy policies considering these factors, careful sourcing and take measures of increase the energy dependence of economy. In this frame, effective and rational uses of national resources are very important for countries energy managements (Torun and Tamzok 2005).

2 An Overview of the Possible Relationships Between National Gas Consumption and Industrial Growth

There are many studies which search for a proper causal relationship between energy consumption and economic growth. A huge amount of empirical investigations within these studies are synthesized into four testable hypotheses which point out some different macroeconomic energy policies among each other. From the point of view of national gas consumption the four hypotheses could be concerned as the same.

If there is causality running from national gas consumption to industrial growth then we can say "growth hypothesis" is valid. It says that, national gas consumption constitutes a key position, both as a direct input the production process and as a complement to labor and capital inflows indirectly. According to this hypothesis, an increase in national gas consumption causes an increase in industrial GDP. If the direction of causality relationship from national gas consumption to industrial growth, it is reached the industry is national gas energy dependent. Apergis and Payne (2009), argues this idea from point of view under general energy consumption and economic growth variables.

It should be considered that a decrease in the price of national gas affect negatively to industrial growth and employment level as well. Policies should not be aimed to reduce national gas consumption or increasing national gas prices and due to cheap energy resources is one of the main factor of economic growth, economic policies needs to be run to cheap energy resources or keep prices low at determined policies. A brief result of this hypothesis is that the energy saver policies have a negative effect on economic growth.

Although the causality runs from national gas consumption to industrial growth supports the growth hypothesis, the adverse unidirectional causality supports "conservation hypothesis" oppositely. According to it, national gas conservation policies have no opposite effects on industrial growth. In other words, conservation hypothesis is valid if a reverse direction of causality can be found in the energy consumption function which points out industrial growth is not dependent on national gas consumption. Thus, restrictions on energy consumption or energy conservation policies have no adverse effect on economic growth (Yoo 2006).

If energy consumption is ineffective on economic growth and vice versa, "neutrality hypothesis" is valid. This hypothesis points out no any causal relation between national gas consumption and industrial growth. Any policy to change national gas consumption does not take importance for industrial growth.

Therefore, it would be reasonable for policy makers to adopt conservative and more environment friendly policies. Energy conservation policies such as taxes on national gas can be aimed to limit national gas consumption without any negative effect on industrial growth. Governments may also encourage industries to use more technological methods that reduce pollution and environment-friendly production techniques. This situation could be originate from energy costs in GNP which is too small to affect economic growth or the economy is dominant at less energy using sectors such as service sector (Ozturk 2010).

If the direction of causality relationship is bidirectional between national gas consumption and economic growth "feedback hypothesis" is valid. In this case, an energy policy aiming to improve national gas consumption efficiency will not adversely affect industrial growth. Besides, policy makers should take into account the feedback effect of real industrial GDP on national gas consumption by implementing rules to reduce energy use. In addition, industrial growth needs to be differing from the point of energy consumption in order to avoid a negative impact on industrial growth due to reduce of energy consumption. A shift from less efficient energy sources to more efficient while preferring less polluting options may generate a stimulus effect on economic growth (Belke et al. 2011). Overcoming the energy needs with different energy generations come into prominence in countries which has that kind of relationship. In feedback hypothesis, it can be reached that the sector is energy dependent in order to grow and besides, growing economy in industry sector induce energy consumption increment.

The four hypotheses discussed above which mention possible causal relationships among energy consumption and growth are described in brief in Fig. 1 below. Moreover, the appropriate policies underlying the associated hypothesis are also figured.

A huge number of studies have been done for examine the relationship between energy consumption and economic growth. Among these studies; Kraft and Kraft (1978), Rasche and Tatom (1977), Akarca and Long (1980), Berndt (1978), Proops (1984) and Yu and Hwang (1984) are the first relevant studies. Oh and Lee (2004) examined the relationship between electricity consumption and GNP of Korea by using Granger causality and error correction model from the period 1970–1999. According to their findings, there is bidirectional causality in long term and
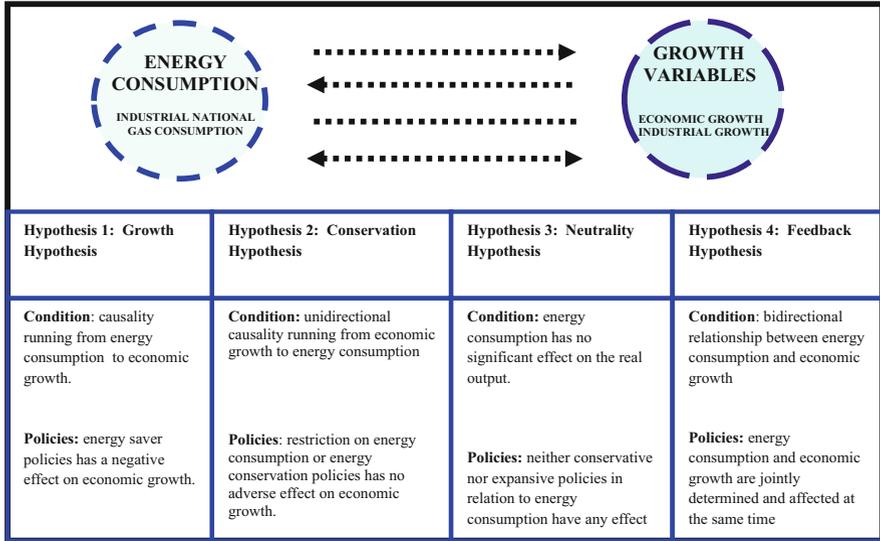
Fig. 1 The possible relationships among energy consumption and growth variables and the underlying policies according to the associated hypothesis

electricity consumption cause GNP increase in short term. Jumbe (2004) found that there is bidirectional causality relationship between electricity consumption and economic growth existed in Malawi. Altinay and Karagol (2005) revealed the causal relationship between electricity consumption and economic growth for Turkey. They found that there existed a unidirectional causality from electricity consumption to real GDP. In addition to this, while Jobert and Karanfil (2007) examined sectoral energy consumption by source and economic growth in Turkey, Morimoto and Hope (2004) examined the impact of electricity supply on economic growth in Sri Lanka.

It is known that the main purpose of the development is transition to the industry and service sector rather than the agricultural sector. While developed countries are more intensely in transition to the service sector rather than industry sector, developing countries are less frequently in this transition. As far as industrial sector is one of the main sector in developing countries and Turkey is one of the developing countries in the world, industry takes the priority for our research. In terms of energy consumption, the distribution of primary energy consumption by sector at 2012, industry sector takes the first rank by 27 %, residential sector comes second by 26 %, and then network sector 24 %, transportation sector 14 % and agriculture 5 % and other sectors 4 % (PPC 2013). The main causes of examination has been through the industrial sector are; industry become prominent because of the energy is most consumed in industry sector and the expectation of the more accurate results can be achieved when this sector examined.

When examined the overall energy balance report, which is published by The Ministry of Energy and Natural Resources, natural gas takes the first rank by

8,122,000 toe, electric energy comes second by 8,013,000 toe. It shows that natural gas is the most consumed energy source in industry. When examined the Turkey's natural gas consumption by the period of August 2014, industry sector takes the first rank by 48 %, power plant consumptions 46 %, city consumption 6 % comes then (Turkey Energy Statistics Report, August 2014).

When examined the 2007 data, electricity consumption takes the first rank by 56 % and industry sector and residential sector shares second by 22 % (DEKTMK 2008). The data shows us that industry share of natural gas consumption increased sevenfold compared to others. This increase shows us the natural gas consumption in industry increasing day by day and become one of the reasons of selecting natural gas for examined energy sources than the others.

Natural gas, which is located in primary energy sources, is one of today's most popular energy source due to economic, transport and installation ease, low risk and environmental causes. Whereas these specifications, it is preferred because of lowering the production cost as well as adapt environmental policy. Natural gas consumption starts at 1976 and become the most commonly used energy source in Turkey.

There is also studies are implemented for examine the relationship between natural gas consumption and economic growth. Shahbaz et al. (2013) examined the relationship between natural gas consumption and economic growth of Pakistan by ARDL testing approach. They emphasized that natural gas consumption, capital, labor force and export has a positive effect on economic growth and deduced natural gas saving policies slow down the economic growth. Kum et al. (2012) tested the relationship between natural gas, energy consumption, capital and economic growth for G-7 countries by bootstrapped simulation techniques and found different results for different countries. Apergis and Payne (2010) analyzed relationship between natural gas consumption and economic growth of 67 countries by panel data analysis. Their results showed there is a positive relationship between GDP, natural gas consumption, real gross domestic capital formation and labour in long term.

This paper analyzed the relationship between natural gas consumption in industry and economic growth over the period from 1976 to 2013 in Turkey. This study can be defined as complementary to the previous empirical papers. It differs from the existing literature, which is examined the relationship between energy consumption and economic growth, because it attempts to discover the relationship between natural gas consumption in industry and economic growth for Turkey. Previous studies analyzed the relation in general energy consumption not in specific sector. It is thought that industry sector has a direct effect on economic growth by production and usage. In this frame, the relationship between natural gas consumption in industry sector and real economic growth rates are examined in period of stated years.

Natural gas consumption rates in industry and real economic growth rates are used as data in period of 1976–2013. In other studies, real GDP is commonly used in comparison rather than real economic growth rate. It is observed that in response

to the differ in emerging numbers due to flat rates vary from years to years, when it comes to economic growth rate this alteration is very little or not. Therefore, it is preferred that using real economic growth rates.

3   Data, Methods and Results

The relationship between NGC and the growth variables which are the general economic growth and the industrial growth have been much debated in energy economics literature. The four hypothesis based under this relationship which are mentioned above are generally analyzed by causal techniques depended on restricted models or traditional time series models. In this section we examine the causal implication based on the methodologies Granger causality technique and ARDL (autoregressive distributed lagged) model. In this study, natural gas consumption is abbreviated as NGC, the growth variable is abbreviated as GRW while the industrial growth variable is abbreviated as IGRW.

The hypotheses are tested using annual Turkish data on energy consumption and economic growth. The annual data are obtained from Republic of Turkey Ministry of Energy and Natural Resources, Republic of Turkey Energy Market Regulatory Authority, Republic of Turkey Ministry of Development, Turkish Statistical Institute, Petroleum Pipeline Corporation and Word Bank cover the period 1976–2013.

The direction of the relations state the condition one of the relevant hypothesis is significant where the others are not. These controversies for Turkish energy data are best settled by examining the available empirical evidence. This investigation is based on causality approach which supports ARDL model findings. Causality analysis was introduced by Wiener (1956), Granger (1969), Sims (1972) and others. Granger's definition of causality states that X_t, is causing Y_t, if we are better able to predict Y_t, using all available information than if the information apart from X_t had been used.

$$Y_t = f\left(\sum Y_{t-i}, \ \sum X_{t-i}\right) \tag{1}$$

$$X_t = f\left(\sum Y_{t-i}, \ \sum X_{t-i}\right) \tag{2}$$

If the prediction improves by incorporating the past values of X_t, that is, $\mathrm{var}(\varepsilon_Y|X_t)$ from Eq. (1) is statistically smaller than $\mathrm{var}(\varepsilon_Y)$, then we say that X_t has a causal influence on Y_t. Similarly, we may consider and say that Y_t has a causal influence on X_t if $\mathrm{var}(\varepsilon_X|Y_t)$ from Eq. (2) is smaller than $\mathrm{var}(\varepsilon_X)$. Moreover, if the variances are equal, then X_t/Y_t is said to be noncausal for Y_t/X_t respectively.

ARDL model is another approach to search the cointegration between variables. An advantage of this method which gives its popularity is the condition that all variables should not be integrated in order one. Without having any prior

Table 1 Granger causality and block exogeneity Wald test results

Causality	Granger causalities						Block exogeneity	
	For 1 lag		For 2 lags		For 3 lags		Wald test	
Direction	F-stat	Prob	F-stat	Prob	F-stat	Prob	Chi-sq	Prob
GRW to NGC	1.01250	0.32	0.46611	0.63	0.40086	0.75	0.16546	0.68
NGC to GRW	0.04446	0.83	0.10237	0.90	0.12085	0.95	0.13913	0.71
IGRW to NGC	1.61005	0.21	0.72964	0.49	0.54901	0.65	0.73057	0.39
NGC to IGRW	0.08713	0.77	0.47601	0.63	0.32108	0.81	0.11126	0.74

information about the integration orders[1] or direction of the long run relationship between energy consumption and growth, following regressions can be constructed in the first step. Thus,

$$\Delta Y_t = \alpha_0 + \alpha_{1i}t + \sum_{i=1}^{p}\alpha_{2i}\Delta Y_{t-i} + \sum_{i=0}^{q}\alpha_{3i}\Delta X_{t-i} + \alpha_4 Y_{t-1} + \alpha_5 X_{t-1} + u_t \quad (3)$$

where Y_t represents the energy variable, and X_t denotes growth. The parameters α_2 and α_3 in Eq. (3) are the short run coefficients and α_4 and α_5 are the corresponding long run multipliers of the underlying ARDL model. Under $H_0 : \alpha_4 = \alpha_5 = 0$ of "no cointegration" in Eq. (3) "cointegration" is tested by the alternative hypothesis by computing the general F-statistics and comparing them with critical values in Pesaran and Pesaran (1997) and Pesaran et al. (2001).

Having rejected the null, the *second* step is to estimate the coefficients of the cointegration relationships identified in the first step which can be represented in Eq. (4). The long run relationship coefficients can estimated using the following ARDL(*p,q*) models.[2] Taking into consideration the limited number of observations, a maximum of five lags was used.

$$Y_t = b_0 + \sum_{i=1}^{p}b_{1i}Y_{t-i} + \sum_{i=0}^{q}b_{2i}X_{t-i} + u_{2t} \quad (4)$$

The ordinary Granger causality test and the block exogeneity Wald test results among GRW and NGC variables are represented in Table 1. The findings according to two similar models indicate that there is no evidence of a causal relationship running from GRW to NGC and vice versa consistent among the two test results from Table 1. This situation as absence of evidence of causal relationship among national gas consumption and industrial growth supports neutrality hypothesis.

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[1] To conserve space, we do not discuss the details of the unit root tests here. National gas consumption variable is found to be integrated in order one while the growth variables are found to be stationary. The results of these unit root test statistics are available from the authors upon request.

[2] According to Pesaran and Pesaran's (1997) suggestion, the lag lengths *p and q* are determined by Schwartz Bayesian Criteria (SBC).

Table 2 Bounds test F statistics

Dependent variable	Independent variable(s)	F_3	F_4
NGC	GRW and IGRW		0.94143
GRW	NGC	20.22597	
IGRW	NGC	15.61746	

Note: The critical lower and upper bounds for unrestricted intercept without trend and restricted trend with unrestricted intercept are (3.23;4.35) and (3.88;4.61) respectively

Table 3 Long term coefficients from ARDL model

	Indep. Var.	Coefficient	Std. error	t-Statistic	Prob
Dependent	LNGC	−0.15476	0.395605	−0.39121	0.6979
Var. (IGRW)	C	6.01076	2.699726	2.226434	0.0323
Dependent	LNGC	0.055785	0.305603	0.18254	0.8562
Var. (GRW)	C	3.838101	2.085525	1.840352	0.074

However possible causal relations can also be searched by cointegration model in order to support the finding of neutrality hypothesis. A cointegration relationship with significant slope coefficients also shows a causal relationship running from exogen variables to the endogen variable. However the theory requires all the variables should be integrated in order one which can be denote as I(1). The departure from the cointegration theory with the consideration of the I(1) and I(0) variables together, conducts the empirical part to bounds testing procedure within the ARDL model. Findings of bounds tests and the long term coefficients among NGC, GRW and IGRW variables under the evidence of cointegration conditions are represented in Tables 2 and 3 respectively.

According to the bounds test results, the null hypothesis of "*no cointegration*" through the relationship running from growth variables to national gas consumption could not be rejected. The result is consistent with the former finding. Although the bounds F_3 test statistics are higher than the upper bound 4.61 which mentions that the null is rejected in a higher probability, before checking the significance of the long term slope coefficients the findings point out the validation of growth hypothesis. However the tail probabilities of slope coefficients clear off the discussion about the causal relationship running from national gas consumption to either industrial growth or economic growth. The long term coefficients are represented in Table 3.

According to Table 3 there is no significant coefficient running from national gas consumption to neither industrial growth nor economic growth. Although, the Turkish data for national gas consumption and industrial growth catch cointegration relationships running from national gas consumption, the t-statistics are below the t-distribution critical values that points out the slope parameter estimations are insignificant. All the findings together support the neutrality hypothesis in the industrial sector for the energy source of national gas.

Although the results appear to offer evidence that, growth has a cointegration relationship with energy consumption without any significant coefficients, final findings consistent with the former causality results do not support to the view that national gas consumption as an energy source does not have influence on neither industrial growth nor macroeconomic growth and vice versa as suggested in the neutrality hypothesis.

4   Discussion of Results

According to Republic of Turkey Ministry of Energy and Natural Sources, Industry is the main consumer in primary energy sources by 27 %. As the biggest energy consumer sector, industry causes much more environmental impact than the others. Natural gas is also the main energy source in primary energy source consumption by 41.1 %. This rate is shared out by industry consumption by 48 %, power plant by 46 % and city consumption by 6 %. The 47.82 % of energy consumption in power plant is supplied by natural gas (ETKB 2014). As it seems in the ratios, natural gas is the main energy sources both directly and indirectly usage. Therefore, industry sector and natural gas have been chosen the main sector and main energy source for the study.

The results show us the causality relationship between natural gas consumption in industry and economic growth in compliance with neutrality hypothesis. On this basis, these variables are independent of each other. The cost of industry natural gas consumption in GNP is too small to affect the economic growth or economic structure is mainly the agriculture or services sector, which is use less energy, may cause this result.

Sectorial distribution of GDP in Turkey realized as agriculture 8.9 %, industry 27.3 %, services 63.8 %. Hence, Turkey's services sector dominated economic structure corroborates these arguments. On the other hand, having lower possibility to access the advanced technologies, which needs more energy, can be cause this result too. According to Turkish Statistical Institute, Turkey's industrial structure mainly consists of low-tech by 68.7 % and lowly consists of medium-tech based by 22.7 %. High-tech based production number at marginal level by 8.6 %. Therefore, it can be support that the cause of industry natural gas consumption affectless on economic growth in Turkey model.

5   Conclusions

This study examines between natural gas consumption in industry and economic growth within the context of ARDL model over the period from 1976 to 2013 in Turkey. The bounds test findings from ARDL model indicates there is no long-run equilibrium relationship between, natural gas consumption in industry sector,

growth rate and industry growth rate. The results imply that natural gas consumption in industry sector, economic growth and economic growth in industry are neutral with respect to each other.

According to the neutrality hypothesis, energy saving programs can be followed at the industrial sector without harming economic growth in long run. Moreover, that would be a chance to decrease the energy dependence and improving environmental energy policies. The results may help to improve Turkey's EU negotiation process as a future member. According to The 2020 climate and energy package (European Commission 2014), EU target is reduction in EU greenhouse gas emissions from 1990 levels, raising the share of EU energy consumption produced from renewable resources, improvement in the EU's energy efficiency by 20 %. These targets are also known as the "20-20-20" targets. Based on our results, direct measures at reducing energy consumptions in industry may also be taken into account without effect economic growth in long term. By this way, it could be possible to reach the EU goals about energy.

Turkey government announced a plan to boost Turkey's economy through wide-ranging structural reforms in various sectors, including energy. "Improving energy efficiency" and "Energy production based on domestic resources" are the main energy titles. In this frame, reduction of foreign dependence in energy production and focuses more on domestic resources and to reduce Turkey's energy density from $0.26 to $0.24, which means consumed amount of energy to create one unit of the GDP and reduce government building energy consumption to 10 % until 2018 by increasing productivity are the main target of the structural reforms. By increasing the energy taxes or following energy efficiency programs in the industry sector may help to apply these reforms without effect economic growth.

After 1973 oil shock, energy conservation policies become much more important for the countries. Turkey is highly dependent on external energy resources by 72 % in primary energy sources. Therefore, rapidly rising energy prices have been an important factor at current accounts deficit. Due to high prices, energy imports, increases exchange need of Turkey and approximately 30 % of export revenues are losing. Increasing industry energy taxes, may help to decrease the dependent on external energy resources and decrease the exchange need without effect economic growth. Rising taxes force to capital owners to use energy more efficient. Therefore, due to the dependent on external energy resources fall, energy cost will fall and the competitive capacity will improve. Thus, it is avowable that energy saving induce a cost-reducing effect in long term. If this policy is supported by using Turkey's own eco-friendly alternative energy sources, this effect can be out both faster and ecologist.

Due to energy, economic growth has a huge effect on environmental pollution. Fossil fuels, which is the most consumed energy type, is the main cause of pollution. Turkey has rich disused renewable energy sources to solve this problem. Turkey's geothermal energy, biomass energy, wind energy and solar energy sources may be opened for use in production. By diversifying its energy consumption with eco-friendly renewable resources, Turkey may decrease external energy resources

dependent, reduce cost by producing cheaper energy, carry out national and international environmental protocols.

In addition to them, Turkey is 98.5 % dependent on external natural gas and Word's natural gas reserve life is 55.7 years (Turkiye Petrolleri 2014). In the frame of these results, when it is thought that there is no causality between natural gas consumption in industry and economic growth, it is clear that Turkey may use cheap and local alternative energy sources instead of natural gas in industry. If the alternative energy is supplied by renewable energy resources, it may also help to improve other economic and environment indicators. By using alternative energy sources, Turkey may also improve its energy supply security policies in long term without effect economic growth. In this paper, we only emphasize on natural gas and industry relationship. It may be useful for future work to take other sectors usage and its effects into account as well.

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Non-Keynesian Effects of Fiscal
Consolidations in Central Europe
in the Years 2000–2013

Adam P. Balcerzak and Elżbieta Rogalska

Abstract Last two decades were a period of significant discussion concerning determinants of effectiveness of fiscal policy. After some cases of expansionary episodes of fiscal consolidations in eighties of XX century, an intensive international research on the possibility of non-Keynesian effects of fiscal contractions in highly developed countries has started. The aim of the article is to analyze the possibility of obtaining non-Keynesian effects of fiscal consolidations in post-transformation countries of Central Europe. An important aim of macroeconomic policy in the analyzed economies is to benefit the advantages of convergence process. Thus, the empirical analysis is made within conditional β-convergence framework. The verification of hypothesis of β-convergence enables to identify the long term tendency of output per capita, in the same time it enables to identify non-Keynesian effects of fiscal prudence and to assess their role in the process of reducing GDP gap between the analyzed economies. Then the potential transmission channels for non-Keynesian effects of fiscal policy were analyzed. In the research the data from Eurostat and European Commission for the years 2000–2013 was used. The paper provides arguments in favor of the existence of non-Keynesian effects of fiscal consolidations in Central Europe that support the process of conditional convergence.

Keywords Fiscal policy • Fiscal consolidations • Non-Keynesian effects • β-Conditional convergence • Central Europe

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1 Introduction

Utilizing potential of convergence process is one of the most important economic long term problem of post-communist countries. In the same time, after global financial crises that started in the year 2008 almost all Central European economies face the problem of high government debt (see: Balcerzak 2009, 2013). As a result, these countries must prepare middle and long term strategies for fiscal deleverage process. Based on the traditional Keynesian approach, it is commonly believed that fiscal consolidations, which lead to significant macroeconomic deleverage, usually result in high short term cost in term of current product growth. However, some episodes of expansionary fiscal consolidations in Denmark and Ireland in eighties of XX century have started vigorous research on the possibility of obtaining non-Keynesian effects of fiscal negative adjustments. Thus, the question on the possibility and conditions of implementing fiscal consolidations, which do not result in negative influence on current product, should be considered as one of the most important macroeconomic policy problems for Central Europe. Successful application of fiscal austerity plans, which in the same time does not harm significantly short term GDP growth, would have important positive consequences for the convergence process in the region. As a result, the main aim of the article is to analyze the possibility of obtaining non-Keynesian effects of fiscal contractions in case of ten countries of Central Europe that joined European Union in 2004 and 2007. Thus, the following countries were analyzed: Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia.

In this context the most important novelty of the research presented in this work, which also distinguish the paper from previous articles on non-Keynesian effects in new European Union members states (Rzońca and Ciżkowicz 2005; Borys et al. 2014), is the analysis of the possibility of non-standard effects of fiscal consolidations within theoretical and empirical convergence framework.

The article consists of two parts. In the first one the theoretical background concerning non-Keynesian models and its potential common ground with the long term models of endogenous growth is discussed. In this part also the potential channels for transmission of fiscal shocks are pointed. The aim of this part is to find potential linkages between short term fiscal shocks resulted from consolidations and their potential influence on convergence process. The second part of the article is strictly empirical with econometric panel analysis. The analysis consists of two steps. First of all, the influence of fiscal austerity on current growth within conditional β-convergence framework is analyzed. Then the potential channels for transmission of the fiscal shocks and their role in creating non-Keynesian effects of fiscal policy is verified.

The empirical econometric analysis was done for the years 2000–2013. In spite of relatively short time series, the year 2000 was chosen deliberately as the starting point of the analysis. The nineties of XX century in case of Central and Eastern European countries made a period of fundamental institutional changes resulted from the process of transformation from communism to market economy. It is very

difficult to point the exact year when these countries finished the transformation process. However, it is commonly stated that the transformation from communism to market economy was successfully finished in the end of nineties when the countries started negotiations with European Union on its enlargement. The data from Eurostat, European Commission Rapports and World Bank was used.

The research is a continuation of the analysis concentrating on the non-Keynesian cases of fiscal consolidations within conditional β-convergence framework for the first eleven Eurozone countries (Balcerzak et al. 2014a, b, c).

2 The Theoretical Common Ground for Non-Keynesian Models of Fiscal Consolidations and Convergence Process

The question concerning the influence of fiscal policy on the short and long term growth belongs to the core of contemporary macroeconomics from its very beginning. Based on the traditional dichotomy in macroeconomics it can be said that responsible (usually understood as restrictive) fiscal policy from the long term perspective tend to provide fundments for long term growth, whereas in short term fiscal consolidations rather decrease aggregate demand and result in lower GDP growth (see more Balcerzak and Rogalska 2014). However, the experiences of Denmark and Ireland in the eighties of XX century have brought new insight on the possibilities of unconventional effects of fiscal contractions, where fiscal austerity under some circumstances even in the short term can result in increase of aggregate demand. As a result in the last decade of XX century intensive research on the possibilities of expansionary—non-Keynesian—effects of fiscal consolidations was started (Giavazzi and Pagano 1990, 1995).

The research that has been done for last two decades resulted in two complementary groups of models providing theoretical explanation for stimulating results of fiscal contractions. The demand side models concentrate on the expectations of private agents concerning the positive influence of fiscal consolidations on their future tax burden. The second group demand side models attribute the non-Keynesian effects of fiscal policy to the influence of possible lower fiscal burden, which is the result of fiscal consolidation, on cost level of enterprises and thus their competitiveness (Rzońca and Ciżkowicz 2005; Rogalska 2012).

In case of demand side models the transmission mechanism depends on the possible wealth effects of households. The households expecting that their future tax burden can be lower, in order to smooth their consumption during the lifespan, can increase current consumption, which under some positive circumstances can offset the negative impulse resulting from lower government expenditures. Both the theoretical and empirical literature provide three groups of factors that may be necessary for obtaining the positive wealth effects of fiscal contractions. These are scale of consolidations, credibility of authorities and budget situation before the

consolidation episode. The scale of consolidations must be significant enough, which is crucial for convincing the households that the fiscal austerity will result in lower taxes in the future. In case of the credibility of government, the household must be sure that the government will not change discretionary its fiscal policy in case of some political factors. The difficult situation of the government budget can be a factor supporting the credibility of plans of fiscal consolidation. With unsustainable level of public debt the private agents expect the inevitable increase of fiscal burden. In that case significant and strict fiscal consolidations can convince the households to change their negative expectations (Alesina and Ardagna 1998, 2009; Perotti 1999).

On the other hand, the demand side models concentrate on the composition of fiscal adjustments. In that cases, the consolidations that are mostly the result of increase of government budged revenues through tax increases can lead to increasing wage pressure in enterprises, which depending on the situation on labor markets, can result in higher labour costs of enterprises. Thus, it can decrease their international price competitiveness. The negative influence of adjustment on enterprises can be the source of negative supply shock decreasing the chances for successful fiscal consolidation. However, in case of consolidations that are mainly the result of budged expenditure cuts obtained through lower expenditures on wages in public sector can additionally lead to lower wage pressure in private sector. This can increase the cost effectiveness of enterprises, support their investment capabilities and international competitiveness, which in some circumstances can be the source of positive supply shock leading to non-Keynesian effects of fiscal austerity (Alesina et al. 1999; Lane and Perotti 2001; Alesina and Ardagna 2009; Alesina and Perotti 1997).

To sum up, based on these two groups of models explaining non-Keynesian effects of fiscal consolidations one can point two transmission channels for not-standard fiscal impulses: (a) the domestic channel with the reaction of private investment and private consumption; (b) the external channel with reaction of export (see also Rzońca and Ciżkowicz 2005; Borys et al. 2014).

The models of non-Keynesian effects of fiscal contractions have some important common ground with the theoretical literature on convergence process. The possible positive influence of fiscal consolidations, which are based on effective change of structure of public expenditures, on the long term convergence process is deeply rooted in the models of endogenous growth (see more Barro and Sala-I-Martin 1991). In these models it is commonly assumed that the government revenues and expenditures can be classified to opposite categories: (a) distortionary taxation and non-distortionary taxation; (b) productive and non-productive expenditures. The distortionary taxation negatively influences middle and long term steady state rate of growth as they can discourage private agents from saving and investing both in physical and human capital. Thus, distortionary taxation decreases the speed of convergence process. On the other hand, the productive expenditures are usually defined as the once that can be included as arguments in the private production function. Thus, they can positively influence of steady state rate of growth (Kneller et al. 1999). As a result, the models of endogenous growth theory support the

argumentation for the change of structure of government expenditure form non-productive to productive expenditures and avoiding the distortionary taxation, which can be obtained during fiscal consolidation actions. This is especially important in case of countries that face the problem of closing the development gap and using the potential of convergence process such as Central European economies. From that perspective one can talk about the common theoretical ground for concept of long-term conditional convergence and the short-term models of non-Keynesian fiscal consolidations (see also Balcerzak et al. 2014c).

3 The Econometric Estimation of *Conditional β-Convergence with Fiscal Policy and* Transmission Channels of Fiscal Consolidations

The aim of the econometric analysis is the evaluation of influence of fiscal adjustment on GDP and the verification of basic transmission channels of fiscal impulses. Based on the theoretical models of non-Keynesian effects discussed in previous section, the following potential transmission channels were pointed: the domestic channel with the reaction of private investment and private consumption; the external channel with reaction of export. The econometric procedure of estimation consists of two steps. In the first stage, the influence of fiscal adjustment on GDP with special concentration on non-Keynesian effects of fiscal consolidations and its potential influence on convergence process was tested. To fulfill this aim, conditional *β-convergence* framework was applied (Sala-I-Martin 1996; Pietrzak 2012)[1] In the second stage the pointed potential channels for fiscal non-Keynesian impulses with panel models were evaluated.

The phenomena of β-convergence means that the analyzed countries in the long term converge in terms of income per capita within the long term steady state. In case of conditional β-convergence one assumes that every country tends to reach his own steady state, which is determined by economic processes that characterize the fundamental conditions of economy. Among these fundamental conditions one can find for example the investment rate, the depreciation, the population rate of growth, the quality of human capital, and the technology (Mankiw et al. 1992; Levine and Renelt 1992). In case of conditional β-convergence the countries can reach the same income level but only provided that they are similar in terms of economic variables that determine the output in the steady state (Balcerzak et al. 2014a, b).

The hypothesis of conditional β-convergence was tested by estimation of parameters of dynamic panel model that is described with the Eq. (3). As dependent

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[1] Similar empirical approach was used for estimation of non-Keynesian effects of fiscal consolidations in case of first 11 members of Euro Zone in the years 1995–2013 (Balcerzak et al. 2014a, b, c).

variable GDP per capita in purchasing power standards was used. As independent variable one could find primary balance defined as government net lending or net borrowing excluding interest. The primary balance makes the variable that characterizes the fiscal policy approach. The positive value of the variable is equivalent to government surplus whereas negative means the government deficit. In the context of the theoretical background described in Sect. 2 of the paper the parameter α_1 should be positive and statistically significant.

$$GDP^*_{it} = \beta_0 - \beta_1 \ln GDP_{it-1} + \alpha_1 DEF_{it} + \eta_i + \varepsilon_{it} \qquad (1)$$

$$GDP^*_{it} = \ln(GDP_{it}/GDP_{it-1}) \qquad (2)$$

$$\ln GDP_{it} = \beta_0 + \gamma \ln GDP_{it-1} + \alpha_1 DEF_{it} + \eta_i + \varepsilon_{it} \qquad (3)$$

$$\gamma = (1 - \beta_1) \qquad (4)$$

where:

GDP_{it}—the vector of GDP per capita,
GDP^*_{it}—the vector of the rate of growth of GDP per capita,
DEF—the vector of primary balance describing fiscal prudence,
$\beta_0, \beta_1, \alpha_1, \gamma$—the structural parameters of the model,
η_i—the vector of individual effects of a panel model,
ε_{it}—the vector of disturbances.

All the variables are determined for i-country in the period t. Variables DEF is the potential variable that determine the output in the steady state.

Obtaining statistically significant value of parameter γ and its estimation at the level $\gamma < 1$, which is equivalent to positive value of parameter β_1, verifies the hypothesis of conditional β-convergence for the analyzed countries. The convergence process occurs provided that all the countries are characterized with similar level of variables that determine the output in the steady state. In this case it is fiscal policy variable. The lower value of γ (higher positive value of parameter β_1) the faster convergence process occur (Pietrzak 2012).

In the model of convergence described with the Eq. (1) the growth rate of GDP per capita depends on the fiscal policy prudence which is understood as restrictive fiscal policy approach. The positive estimate of the parameter α_1 means that there is a positive influence of fiscal consolidations in a given period t on the rate of growth of GDP per capita during all the period of analysis. It can be interpreted as the occurrence of non-Keynesian effects of fiscal policy for analyzed countries.

To estimate the parameters of model (3) the system GMM estimator was used (Blundell and Bond 1998), which is a development of first-difference GMM estimator (Holtz-Eakin et al. 1988; Arellano and Bond 1991). The idea of system GMM estimator is the estimation of both equations in first differences and equations in levels. The results of two-step estimation with asymptotic standard errors are presented in the Table 1.

Table 1 The estimated conditional β-convergence model

Parameter	Parameters estimation	p-Value
γ	0.997506	$\approx$0.000
α_1	0.00946393	$\approx$0.000
Statistical tests		
Sargan test	9.24463	1
AR(1)	-2.6036	0.0092
AR(2)	-1.20526	0.2281

The Sargan test enables testing of over-identifying restrictions (Blundell et al. 2000). The obtained statistic of the test was equal to 9.2, which means that the null hypothesis is rejected. All instruments were proper. Autocorrelation of the first-differenced of disturbances was tested too. The statistic of the test for first-order serial correlation was equal to -2.6, which means that the null hypothesis that there is no first-order serial correlation is rejected. The statistic of the test for second-order serial correlation was equal to -1.20526, which means that the null hypothesis of no second-order serial correlation is not rejected (Baltagi 1995; Arellano and Bond 1991). It means that the system GMM estimator is consistent and efficient.

The parameter γ is statistically significant. The estimate of the parameter γ which is below 1 verifies the hypothesis of convergence. The parameter α_1 is statistically significant. It means that variable *DEF* significantly determine the convergence process for central European countries. The positive estimate of the parameter α_1 suggests positive influence of restrictive fiscal policy on the convergence process and it can be interpreted as a confirmation of non-Keynesian effects of fiscal consolidations.

In the second stage of the econometric analysis the verification of the transmission channels of fiscal impulses was done. The estimation procedure was close to the approach applied by Rzońca and Ciżkowicz (2005) who were researching the possibilities of non-Keynesian effects of fiscal policy in case on new European Union members for the years 1993–2002. As a result three simple panel models were estimated: the Eq. (5) for the domestic channel with the reaction of private investment, the Eq. (6) the domestic channel with the reaction of private consumption, the Eq. (7) the external channel with reaction of export. In case of Eqs. (4) and (6) for controlling the most important determinants of private consumption and private investments beside the fiscal variable the GDP per capita and real interest rate were used. In case of Eq. (7) and determinants of export for the same purpose real effective exchange rate and the value of import in so called "old" European Union (UE-15) were used. The condition for positive verification of potential influence of every channel is obtaining positive and statistically significant value of estimation of parameter α_2. All three models were estimated with pooled ordinary least squares (OLS) and fixed effects (FE) estimators. The models for all channels were estimated with the data from Eurostat and the data for real interest rate from World Bank.

The domestic channel—reaction of consumption

$$\Delta CON_{it} = \alpha_0 + \alpha_1 \Delta GDP_{it} + \alpha_2 DEF_{it} + \alpha_3 RIR_{it} +_i + \varepsilon_{it} \qquad (5)$$

The domestic channel—reaction of investments

$$\Delta INV_{it} = \alpha_0 + \alpha_1 \Delta GDP_{it} + \alpha_2 DEF_{it} + \alpha_3 RIR_{it} +_i + \varepsilon_{it} \qquad (6)$$

The external channel with reaction of export

$$\Delta EXP_{it} = \alpha_0 + \alpha_1 \Delta GDP_{it} + \alpha_2 DEF_{it} + \alpha_3 \Delta IMP_{it} + \alpha_4 REER_{it} +_i + \varepsilon_{it} \qquad (7)$$

where:

ΔCON_{it}—vector of the first difference of private consumption per capita estimated with purchasing power standard in the i-country in the period t.

ΔGDP_{it}—vector of the first difference of GDP *per capita* estimated with purchasing power standard in the i-country in the period t.

DEF_{it}—vector annual change of primary balance in the i-country in the period t.

RIR_{it}—vector of real interest rate in the i-country in the period t.

ΔINV_{it}—vector of the first difference of investments *per capita* estimated with purchasing power standard in the i-country in the period t,

ΔEXP_{it}—vector of the first difference of export *per capita* estimated with purchasing power standard in the i-country in the period t,

ΔIMP_{it}—vector of the first difference of import in European Union countries (EU-15) per capita estimated with purchasing power standard in the i-country in the period t,

$REER_{it}$—annual change of real effective exchange rage (deflator: CPI) in the i-country in the period t,

η_i—the vector of individual effects of a panel model,

ε_{it}—the vector of disturbances.

Tables 2, 3 and 4 presents the results of estimations for Eqs. (5), (6) and (7) respectively. It can be seen that in case of both estimators the differences in results

Table 2 The estimated model for the domestic channel—reaction of consumption

Parameter	OLS		FE estimator	
	Parameters estimation	p-Value	Parameters estimation	p-Value
α_0	50.8022	0.1022	50.7724	32.0888
α_1	0.601220	$\approx$0000	0.601275	0.0338885
α_2	−37.6493	$\approx$0.000	−37.9617	0.0011
Statistical tests	Breusch-Pagan test		*F*-test for the null hypothesis that the cross-sectional units all have a common intercept	
	Test statistics	p-Value	Test statistics	p-Value
	3.94	0.05	0.15	0.99

Table 3 The estimated model for the domestic channel—reaction of investments

Parameter	OLS		FE estimator	
	Parameters estimation	p-Value	Parameters estimation	p-Value
α_0	−431.408	≈0.000	−439.956	≈0.000
α_1	0.803640	≈0.000	0.816544	≈0.000
α_2	24.1210	0.0506	24.6501	≈0.000
Statistical tests	Breusch-Pagan test		F-test for the null hypothesis that the cross-sectional units all have a common intercept	
	Test statistics	p-Value	Test statistics	p-Value
	0.02	0.9	1.05	0.41

Table 4 The estimated model for the external channel with reaction of export

Parameter	OLS		FE estimator	
	Parameters estimation	p-Value	Parameters estimation	p-Value
α_0	98.8554	≈0.000	94.1441	0.2857
α_1	0.817676	≈0.000	0.824875	≈0.000
α_2	113.328	≈0.000	111.047	≈0.000
Statistical tests	Breusch-Pagan test		F-test for the null hypothesis that the cross-sectional units all have a common intercept	
	Test statistics	p-Value	Test statistics	p-Value
	0.28	0.6	0.83	0.59

of estimates of parameters are minor. In order to use the proper estimator Breusch-Pagan Test was used. It enables to verify the hypothesis on the existence of individual effects, which can point whether the pooled ordinary least square or estimator for individual effects should be used. In case of all the three models based on the results of Breusch-Pagan test it can be concluded that the implementation of individual effects is not necessary. Thus, simple pooled model with OLS estimator is adequate. This conclusion is confirmed with the results of F-test for the null hypothesis that the cross-sectional units all have a common intercept.

The results of estimation presented in Table 2 with statistically significant but negative estimate of the parameter α_2 does not confirm the influence of domestic channel with the reaction of consumption in case of Central European countries in the year 2000–2010. It can be said that in the analyzed period the negative fiscal impulse was resulting in typical Keynesian reaction of private consumption. In case of domestic channel with the reaction of private investments the situation was different. The results of estimation in Table 3 with statistically significant (but in case of OLS estimator only with 10 % level of significance) and positive estimate of the parameter α_2 can be considered as confirmation of the influence of domestic channel with reaction of investment. Also in case of external channel with reaction of export in Table 4 one can find statistically significant and positive estimate of the parameter α_2, which can be considered as an argument in favour of the influence of export channel.

4   Conclusions

The conducted research on the influence of fiscal austerity on convergence process shows that in case of Central European countries in the years 2000–2013 restrictive fiscal policy was a significant factor of conditional β-convergence. From the policy point of view, it can be said that necessity for more restrictive middle term fiscal policy, under some circumstances, can become not an obstacle for current product growth, but it can be considered as a chance and possible factor supporting growth.

The obtained results in the sphere of potential transmission channels of non-Keynesian fiscal impulses are coherent with the analysis of Rzońca and Ciżkowicz (2005) for Central European countries for the years 1993–2002. They also identified unambiguously only one of the channels for non-Keynesian effects of fiscal adjustments, which was the external export channel. Contrary to the results in this paper they found some evidence confirming the existence of domestic consumption channel, but no evidence for influence of the domestic investment channel. On the other hand, the results obtained in this paper are very close to the estimation of Borys et al. (2014) for the same group of countries for the period 1995–2011. These researchers also found that investment and export were increasing after fiscal consolidation, whereas private consumption was not responding to the fiscal negative impulse in non-Keynesian way.

The empirical part of the article does not cover the problem of episodes of consolidations and strategies for their implementation. However, in case of future deleverage plans for Central European economies the verification of influence of both investment and export channels in the context of theoretical models, which were discussed in the first part of the article, can be considered as an argument for strategies of consolidations that focus on government expenditure cuts instead of increasing the budget revenues. This conclusion is also coherent with the results of analysis of strategies of consolidations with non-Keynesian effects in case of the first euro zone countries in the years 1995–2013 (Balcerzak et al. 2014a, b).

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Tax Burden and Economic Development: The Case of the European Union Countries

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Abstract The paper presents the research results on the relationship between the tax burden and economic development. The research methods: systemic, logical and comparative analysis of scientific literature, and statistical methods: descriptive statistics analysis, hierarchical cluster analysis, correlation analysis. Empirical analysis of this study focuses on the data of the European Union countries. Implicit tax rates are used to measure the tax burden. The study covers the period from 2003 to 2012 using annual data. The results of this study show that there are large differences in the tax burden in the European Union countries. The tax burden on capital and consumption is higher in the very high economic development countries; but implicit tax rate on capital is higher in the case of countries with lower GDP growth, high government sector and high government debt. Joining the EU in 2004 or 2007 did not have a strong effect on the change in the joined countries tax burden. However, the tax burden on labor has declined, and the tax burden on consumption has increased or remained in the similar level in the majority of countries.

Keywords Economic development • Tax burden • The European Union

1 Introduction

A high tax burden and an inadequate tax structure may cause weak growth of investment and consumption, decrease foreign direct investment inflows, and determine lower growth of country's economic development. In recent years, arising problems of public finances and low economic growth in the majority of the European Union countries motivate scientific and policy debates on the tax burden and taxation structure, raise questions about the impact of the tax burden on

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economic development. The taxation system should fulfill not only government's demand, but it should also meet the changing needs of society and business.

Arnold (2008) argues that the differences in distortions created by different taxes may be substantial, and the negative effect of taxes may depend on what exactly is taxed. It is very important for the state to have well designed, growth-oriented tax system. According to Kremmidas (2010), properly used tax policies could create the conditions for stronger economic growth, higher incomes for citizens and higher returns for businesses. Therefore, it is very important to assess how the changes of the tax burden are related to economic development, and whether these changes of the tax system are growth-oriented.

The objective of the study is to assess a link between the tax burden and economic development. The research object: the link between the tax burden and economic development. The research methods: systemic, logical and comparative analysis of scientific literature, and statistical methods: descriptive statistics analysis, hierarchical cluster analysis, correlation analysis. Empirical analysis of this study focuses on the data of the European Union countries. Implicit tax rates are used as a measure of the tax burden. The study covers 2003–2012 years using annual data.

2 The Tax Burden and Economic Development: Literature Review

The modern state could not exist without taxes. Therefore, an inevitability of taxation is something that does not need to be argued in society (Abuselidze 2012). According to Silberztein (2004), taxation is essential to sustainable development because it provides governments with the necessary finance to effectively implement development policies.

The tax burden has a direct as well as an indirect impact on the economic activity and production capacity. The impact of taxation on the economy is bidirectional. The tax burden influences production technologies, effective usage of resources and production capacity. However, the change in the tax burden influences government tax revenue that could be used to stimulate economic activity (Abuselidze 2012).

According to the aggregate demand and aggregate supply model (AD-AS), a reduction of the tax burden could stimulate economic growth through multiplier effect. According to Laffer model, excessive tax burden decreases government revenue from taxes and has a negative effect on economic activity. Krumplytė (2010) argues that excessive tax burden may cause an increase of a shadow economy and determine decrease of government revenue from taxes, especially in the case of lower economic development countries.

Negative effects of higher public spending and higher taxes on economic growth can be explained by a number of considerations. Barrios and Schaechter (2008) point out that, when the public sector is very small, higher economic growth in the

long-run can be achieved through the provision of public goods that increases the marginal productivity of the capital and labor. But, when the public sector has reached a level where the additional taxes needed to finance the growing public sector causes distortions in the market, labor and capital marginal productivity decreases determining the decline of economic growth. Nuta (2008) argues that when the state tax increases, it not only reduces the private sector funds for productive activities, but the redistribution of funds reduces the incentives to work, save and invest. The aim of the government intervention in the economy through public spending or taxation is greater economic stability. However, the overall impact on economic growth depends on the productivity of public expenditure and distortionary tax effect (Soli et al. 2008).

Classification of taxes in growth models to distortionary and non-distortionary allows predicting the impact of government expenditure and its financing methods on economic growth. According to Barro (1990), Barro and Sala-i-Martin (1992), Soli et al. (2008), Ferreiro et al. (2008):

- distortionary taxes are taxes which reduce the incentives to invest in physical/human capital, thereby reducing economic growth.
- non-distortionary taxes are taxes which do not affect the investment incentives, and, therefore, economic growth.

Arnold (2008) points out two reasons of tax systems' distortive impact on the economy:

- the tax level—a tax system withdraws more or less resources from the private agents;
- the tax structure—a given amount of revenue is raised in more or less distortive ways.

In recent years, researchers have paid a lot of attention to the tax structure and its impact on the economic growth. This issue was very important in the context of economic recovery after the financial crisis. However the research results are ambiguous. For example, Kremmidas (2010) made conclusion that the most economic growth damaging taxes are taxes on income and profit. The author noticed that it should be ensured that taxes mix and structure should be efficient as possible. Zipfel and Heinrichs (2012) state that raising consumption taxes while at the same time lowering taxes on labor and capital can stimulate economic growth because taxes on labor may distort the decision to participate in the labor market, and may lead to less entrepreneurial activity. Taxes on capital influence household decisions on investment and savings, and decisions on the part of companies leading to pronounced capital outflows from individual countries. However, Deskins and Hill (2010) argue that there is evidence that the distortions of a state and local tax policy have diminished during past years due to better-designed tax policies. Recent empirical research results on the impact of various taxes on economic development are presented in Table 1.

After summarization of various empirical research results, it may be concluded that the corporate taxes and personal income taxes have a negative effect on the

Table 1 Empirical research results on the impact of taxes on economic development

Authors	Research sample	Research method	Non-distortionary taxes	Distortionary taxes
Arnold (2008)	21 OECD countries, 1971–2004	Panel regressions	Taxes on property and consumption	Income taxes (corporate income taxes have the most negative effect). Negative relationship exists between the progressivity of personal income taxes and growth
Ilzetzki (2011)	28 countries, till 2009Q3	Panel data methods		Personal income taxes (cuts in personal income taxes are more effective in stimulating growth than cuts in corporate or value added tax rates)
Arnold et al. (2011)	21 OECD countries, 1971–2004	Panel regressions	Consumption and property taxes	Corporate taxes and personal income tax
Muinelo-Gallo and Roca-Sagales (2011)	43 upper-middle and high income countries, 1972–2006	Panel data methods	Indirect taxes	Direct taxes
Acosta-Ormaechea and Yoo (2012)	21 high income, 23 middle-income and 25 - low-income countries, 1970–2009	Pooled Mean Group (PMG) estimation approach	Consumption and property taxes	Income taxes (social security contributions and personal income taxes have a stronger negative association with growth than corporate income taxes)
Stoilova and Patonov (2012)	the EU countries (27), 1995–2010	Regression analysis	Direct taxes	
Ferede and Dahlby (2012)	Canadian provinces, 1977–2006	Panel data estimators	Value-added sales tax	Corporate tax
Canicio and Zachary (2014)	Zimbabwe, 1980–2012	Granger Causality test, Johansen's cointegration test and vector error correction	There was no causal relationship between taxes and economic growth	There was no causal relationship between taxes and economic growth

economic growth while the taxes on property and consumption are more growth-friendly. Despite these results, there is still a lack of empirical research on the relationship between the tax burden and economic development. The tax burden in majority of empirical studies is measured as government revenue from taxes as a percentage of GDP. But such measurement is inaccurate and may cause incorrect results.

3 Research Methodology

The link between the tax burden and economic development is investigated in this paper. It was mentioned that the tax burden in majority of empirical studies is measured as the revenue from taxes as a percentage of GDP; and that such measurement is inaccurate. According to European Commission (2010), the consideration of tax revenue as a proportion of GDP provides limited information as no insight is given as to whether, for example, a high share of capital taxes in GDP is a result of high tax rates or a large capital tax base. In this paper, implicit tax rates, which do not suffer from this shortcoming, are used as a measure of the tax burden.

This study is carried out using annual data of the EU countries (except Croatia) ranging from 2003 to 2012. The cross–sectional data is used. Arithmetic average is used for calculation of the cross–sectional data. In order to evaluate the link between the tax burden and economic development, following indicators are used: real GDP per capita, implicit tax rates, government debt and government revenue. The description of indicators used in this research is presented in Table 2. The source of the data is the European Commission's Eurostat database.

In order to assess the link between the tax burden and economic development, following statistical methods are used: hierarchical cluster analysis, descriptive statistics, correlation analysis (Spearman's rho correlation). Microsoft Excel and IBM SPSS Statistics 17.0 software packages are used.

There are three stages in the empirical analysis. In the first stage, classification of the EU countries using cluster analysis is performed. A grouping variable is GDP per capita. Analysis of descriptive statistics is performed in the clusters and in all countries' sample. In the second stage, investigation of the link between the tax burden and country's economic development is performed. Analysis of spearman's correlations between indicators is performed in the clusters and in all countries' sample. In the third stage, investigation of the tax burden changes in the case of countries, which joined the EU in 2004 or 2007, is performed. In order to evaluate whether the tax burden has changed in particular country after the joining the EU, the tax burden in 2004 or 2007 (for Hungary, Bulgaria and Romania) is compared with the tax burden in 2012.

Table 2 Description of indicators

Indicator	Notation	Definition
Implicit tax rate on consumption (%)	ITR_Con	All consumption taxes divided by the final consumption expenditure of private households on the economic territory
Implicit tax rate on labor (%)	ITR_L	The sum of all direct and indirect taxes and employees' and employers' social contributions levied on employed labor income divided by the total compensation of employees working in the economic territory
Implicit tax rate on capital (%)	ITR_Cap	The sum of revenue from all capital taxes divided by the all potentially taxable capital and business income in the economy
Government debt (% of GDP)	Government debt	The total consolidated gross debt at nominal value at the end of the year (in the following categories of government liabilities: currency and deposits, debt securities, and loans) divided by the GDP
Government revenue (% of GDP)	Government revenue	The sum of all general government revenue divided by the GDP
GDP per capita (constant 2005 EUR)	GDP per capita	Real GDP per capita divided by the average population of a specific year
Growth rate of real GDP (%)	GDP growth	The GDP at current prices are valued in prices of the previous year and the thus computed volume changes are imposed on the level of a reference year

Source: European Commission (2010) and Eurostat

4 Research Results

The descriptive statistics of the EU countries data (see Table 3) shows that there are large differences between the EU countries economic development, the tax burden, and government finance indicators. The very high dispersion of the data shows the need for clustering all sample in smaller groups.

The cluster analysis was used in order to assess the link between the tax burden and country's economic development. Three clusters were obtained using the hierarchical cluster analysis (see Table 4).

The first cluster is characterized as high economic development cluster where GDP per capita ratio is significantly higher than in the case of the second cluster. The second cluster is described as lower economic development cluster. The third cluster consists only of one country—Luxembourg, which GDP per capita is very high. Despite the fact that Luxembourg's GDP per capita is very high and government debt is very small, the indicator of government sector size (government revenue to GDP indicator) and the tax burden are very similar to all sample's mean values.

In the case of the second cluster, countries' economic growth is more volatile but higher, government sector size and government debt are smaller on average compared with the other clusters (except the case of Greece, Portugal, Italy) (see Appendix, Table 8). The tax burden of the second cluster countries is lower on

Table 3 Descriptive statistics of the EU countries data

Indicator	N	MIN	MAX	Mean
ITR_Con	27	15.0	32.6	21.3
ITR_L	27	22.1	42.8	33.9
ITR_Cap	22	9.2	43.7	24.7
Government debt	26	7.4	131.0	53.3
Government revenue	27	33.2	55.8	42.3
GDP per capita	27	3310	64,990	21,209
GDP growth	27	−0.7	5.7	1.7

Table 4 Descriptive statistics of the clusters

Cluster	First cluster				Second cluster				Third cluster	
Countries	Finland, United Kingdom, Belgium, Germany, Denmark, Sweden, Austria, Netherlands, Ireland, Spain, Italy, France				Czech Republic, Portugal, Malta, Greece, Slovenia, Cyprus, Bulgaria, Romania, Estonia, Hungary, Slovakia, Latvia, Poland, Lithuania, Spain, Italy				Luxembourg	
Indicator	N	MIN	MAX	Mean	N	MIN	MAX	Mean	N	Value
ITR_Con	10	18.1	32.6	23.6	16	15.0	26.6	19.6	1	26.8
ITR_L	10	25.5	42.8	36.5	16	22.1	42.1	32.5	1	31.0
ITR_Cap	10	16.4	43.7	29.1	12	9.3	32.0	21.1	0	
Government debt	10	39.5	96.8	60.1	15	7.4	131.0	51.5	1	12.3
Government revenue	10	35.2	55.8	47.6	16	33.2	45.5	39.0	1	42.1
GDP per capita	10	27,470	38,000	31,984	16	3310	24,100	11,738	1	64,990
GDP growth	10	0.2	1.6	0.8	16	−0.7	5.7	2.4	1	0.4

average compared with the first cluster: the tax burden on consumption is the lowest; the tax burden on capital is also relatively low.

It is very interesting fact that implicit tax rates on consumption are relatively small in the case of the second cluster's highly indebted countries (Greece, Portugal, Italy) compared with the other countries of this cluster (see Appendix, Table 8).

The results of Spearman's correlations (see Table 5) confirm the results of the cluster analysis.

The results of Spearman's correlations in the case of all sample show that economic growth is lower in the high developed countries. In these countries, government sector is larger. The results show that there is a negative statistically significant relationship between government debt and GDP growth, and high government debt is related to high tax burden on capital. There is a positive statistically significant relationship between the size of the government sector (government revenue to GDP ratio) and the tax burden (in the case of all taxes). In the case of higher economic development countries, the tax burden on consumption and capital is higher compared with lower GDP per capita countries. The results also show that a negative relationship between the tax burden on capital and GDP growth exists.

Table 5 Results of Spearman's correlations: The case of all sample

		GDP per capita	GDP growth	ITR_Con	ITR_L	ITR_Cap	Government revenue	Government debt
GDP per capita	Coeff.	1.000	−0.637[a]	0.465[b]	0.270	0.500[b]	0.699[a]	0.303
	Sig.		0.000	0.015	0.172	0.018	0.000	0.132
	N	27	27	27	27	22	27	26
GDP growth	Coeff.	−0.637[a]	1.000	0.066	0.049	−0.698[a]	−0.472[b]	−0.656[a]
	Sig.	0.000		0.744	0.807	0.000	0.013	0.000
	N	27	27	27	27	22	27	26
ITR_Con	Coeff.	0.465[b]	0.066	1.000	0.333	−0.046	0.518[a]	−0.251
	Sig.	0.015	0.744		0.090	0.840	0.006	0.216
	N	27	27	27	27	22	27	26
ITR_L	Coeff.	0.270	0.049	0.333	1.000	0.189	0.640[a]	0.221
	Sig.	0.172	0.807	0.090		0.399	0.000	0.278
	N	27	27	27	27	22	27	26
ITR_Cap	Coeff.	0.500[b]	−0.698[a]	−0.046	0.189	1.000	0.658[a]	0.605[a]
	Sig.	0.018	0.000	0.840	0.399		0.001	0.004
	N	22	22	22	22	22	22	21

[a]Correlation is significant at the 0.01 level (2-tailed)
[b]Correlation is significant at the 0.05 level (2-tailed)

Table 6 Results of Spearman's correlations: the case of first and second clusters

		GDP per capita	GDP growth	ITR_Con	ITR_L	ITR_Cap	Government revenue	Government debt
				First cluster				
GDP per capita	Coeff.	1.000	−0.236	0.709[b]	−0.297	−0.115	0.115	−0.733[b]
	Sig.		0.511	0.022	0.405	0.751	0.751	0.016
	N	10	10	10	10	10	10	10
GDP growth	Coeff.	−0.236	1.000	0.030	0.552	−0.321	0.176	−0.030
	Sig.	0.511		0.934	0.098	0.365	0.627	0.934
	N	10	10	10	10	10	10	10
ITR_Con	Coeff.	0.709[b]	0.030	1.000	0.200	−0.006	0.661[b]	−0.794[a]
	Sig.	0.022	0.934		0.580	0.987	0.038	0.006
	N	10	10	10	10	10	10	10
ITR_L	Coeff.	−0.297	0.552	0.200	1.000	0.152	0.576	0.261
	Sig.	0.405	0.098	0.580		0.676	0.082	0.467
	N	10	10	10	10	10	10	10
ITR_Cap	Coeff.	−0.115	−0.321	−0.006	0.152	1.000	0.576	0.006
	Sig.	0.751	0.365	0.987	0.676		0.082	0.987
	N	10	10	10	10	10	10	10
				Second cluster				
GDP per capita	Coeff.	1.000	−0.882[a]	−0.232	0.168	0.825[a]	0.747[a]	0.736[a]
	Sig.		0.000	0.387	0.535	0.001	0.001	0.002
	N	16	16	16	16	12	16	15
GDP growth	Coeff.	−0.882[a]	1.000	0.153	−0.003	−0.867[a]	−0.818[a]	−0.807[a]
	Sig.	0.000		0.572	0.991	0.000	0.000	0.000
	N	16	16	16	16	12	16	15
ITR_Con	Coeff.	−0.232	0.153	1.000	0.165	−0.238	0.253	−0.275
	Sig.	0.387	0.572		0.542	0.457	0.345	0.321
	N	16	16	16	16	12	16	15

Table 6 (continued)

		GDP per capita	GDP growth	ITR_Con	ITR_L	ITR_Cap	Government revenue	Government debt
ITR_L	Coeff.	0.168	−0.003	0.165	1.000	−0.133	0.321	0.014
	Sig.	0.535	0.991	0.542		0.681	0.226	0.960
	N	16	16	16	16	12	16	15
ITR_Cap	Coeff.	0.825[a]	−0.867[a]	−0.238	−0.133	1.000	0.713[a]	0.882[a]
	Sig.	0.001	0.000	0.457	0.681		0.009	0.000
	N	12	12	12	12	12	12	11

[a]Correlation is significant at the 0.01 level (2-tailed)
[b]Correlation is significant at the 0.05 level (2-tailed)

Table 7 Changes in the tax burden in the case of countries that joined the EU in 2004 or 2007

Country	ITR_Con			ITR_L			ITR_Cap			GDP per capita		
	X 1[a]	X 2[b]	Av.	X 1[a]	X 2[b]	Av.	X 1[a]	X 2[b]	Av.	X 1[a]	X 2[b]	Av.
Czech Republic	20.8	22.5	20.9	41.5	38.8	40.1	21.8	18.0	19.3	9600	11,500	10,870
Estonia	19.7	26.0	23.1	35.8	35.0	35.0	8.4	8.1	9.3	7600	9500	8670
Cyprus	19.4	17.6	19.1	22.7	28.8	25.1	24.5	26.0	29.4	18,000	17,400	18,450
Latvia	18.1	17.4	18.2	36.7	33.0	32.8	9.2	9.9	11.1	5200	6800	6140
Lithuania	16.1	17.4	17.2	36.0	31.9	33.5	10.5	9.8	11.8	5800	8100	6980
Malta	17.5	18.7	18.6	22.1	23.3	22.1				11,900	13,500	12,820
Poland	18.5	19.3	20.0	32.7	33.9	32.7	19.0	19.0	20.3	6200	8500	7280
Slovenia	23.7	23.4	23.6	37.6	35.6	36.3	19.3	19.6	21.4	13,800	15,000	15,020
Slovakia	20.8	16.7	19.0	34.5	32.3	32.5	18.9	16.7	17.5	6700	9400	8150
Bulgaria	22.6	21.5	21.9	30.4	24.5	29.0				3400	3700	3310
Hungary	26.3	28.1	26.6	41.0	39.8	39.5	20.3	21.4	19.5	9200	8800	8810
Romania	18.0	20.9	16.4	30.2	30.4	26.7				4400	4700	3890

Notes: *X1*[a] year of country's entrance the EU; *X2*[b] 2012 year; *Av.* average tax burden during 2003–2012

The results of Spearman's correlations in the case of the first and second clusters are presented in Table 6.

The results of Spearman's correlations in the case of the first cluster confirm conclusion that higher tax burden on consumption is related to higher country's economic development and lower government debt. Therefore, the results show that higher tax burden is related to higher government sector. However, the relationship between tax burden on consumptions and government debt is negative. The results of Spearman's correlations in the case of the second cluster show that there is strong negative relationship between GDP per capita and economic growth. Higher developed countries, in which economic growth is slower, have larger government sector and higher government debt, and the tax burden on capital is higher in these countries.

The results of cluster and correlation analysis have shown that the tax burden is lower in the lower economic development countries. Therefore, it is important to assess whether the tax burden has changed after the countries joining the EU in the case of countries that joined the EU in 2004 and 2007. The comparison of the tax burden is presented in Table 7.

There is a tendency that, in higher developed countries, the tax burden on capital is higher, but the joining the EU did not has a strong effect on change in the tax burden on capital. There is the tendency that the tax burden on labor has declined or remained at the similar level in the majority of countries (in the case of Poland and Malta was observed about 1–2 percentage points increase in the tax burden on labor in 2011–2012). There is the tendency that the tax burden on consumption has increased or remained at the similar level in the majority of countries. In the case of Slovakia, overall tax burden decline was observed (including the tax burden on consumption). The decline of the tax burden in Slovakia is proved by decreased size of government. The unique situation was in the case of Cyprus: it was observed sharp increase in the tax burden on labor; the tax burden on capital also increased, but the tax burden on consumption decreased. According to economic literature, these changes are negative because it distorts incentives to work and invest.

5   Conclusion

The results of this study show that there are large differences in the tax burden in the European Union countries. The tax burden on capital and consumption is higher in the high economic development countries compared to the lower economic development countries. Implicit tax rate on capital is higher in the case of low GDP growth, high government sector and debt countries. The higher tax burden on consumption is related to the higher economic development in the case of very high economic development countries' group.

The joining the EU did not have a strong effect on the change in the countries' tax burden. There is a tendency that the tax burden on labor has declined in the majority of countries (except Cyprus), and the tax burden on consumption has

increased or remain at the similar level. The tax burden on capital has not changed significantly and remained at the low level.

The conducted analysis allows making conclusion that the tax burden on consumption is relatively small in the case of highly indebted countries. Therefore, governments of high indebted countries could raise taxes on consumption in order to stabilize the growth of government debt.

Appendix

Table 8 Average countries' data in 2003–2012

Country	Government revenue	Government debt	Implicit tax rate on consumption	Implicit tax rate on labor	Implicit tax rate on capital	GDP per capita	GDP growth
Belgium	49.2	96.8	21.6	42.8	31.7	29,350	0.7
Bulgaria	37.4	22.2	21.9	29.0		3310	4.3
Czech Republic	40.1	32.8	20.9	40.1	19.3	10,870	2.7
Denmark	55.8	39.5	32.6	36.1	43.7	38,000	0.2
Germany	44.1	69.8	19.4	37.9	20.5	28,380	1.3
Estonia	37.8	7.4	23.1	35.0	9.3	8670	4.1
Ireland	35.2	55.7	23.7	26.0	16.5	37,970	0.2
Greece	40.2	131.0	15.8	33.0		17,380	−0.2
Spain	38.1	51.5	15.0	32.5	31.0	20,890	0.2
France	50.1	72.7	19.8	39.0	41.1	27,470	0.5
Italy	45.5	107.3	17.5	42.1	32.0	24,100	−0.7
Cyprus	40.7	60.4	19.1	25.1	29.4	18,450	0.0
Latvia	35.1	24.4	18.2	32.8	11.1	6140	5.0
Lithuania	33.8	25.2	17.2	33.5	11.8	6980	5.7
Luxembourg	42.1	12.3	26.8	31.0		64,990	0.4
Hungary	45.4	69.9	26.6	39.5	19.5	8810	1.4
Malta	39.0	67.4	18.6	22.1		12,820	1.3
Netherlands	45.5	53.5	24.8	35.3	16.4	32,480	0.8
Austria	48.5	72.5	21.6	40.9	25.2	30,900	1.2
Poland	38.7		20.0	32.7	20.3	7280	4.2
Portugal	41.2	81.3	18.5	23.7	31.2	14,710	−0.2
Romania	33.2	21.8	18.2	29.7		4220	4.3

Slovenia	43.2	32.2	23.6	36.3	21.4	15,020	1.6
Slovakia	34.0	37.7	19.0	32.5	17.5	8150	4.5
Finland	53.3	42.1	26.7	40.9	28.5	30,660	1.2
Sweden	53.7	41.3	27.3	41.2	29.7	33,790	1.6
United Kingdom	40.3	56.7	18.1	25.5	37.5	30,840	0.7

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Current Account Dynamics
and Determinants in the European Union

Maria-Isadora Lazar and Ramona-Mihaela Paun

Abstract European Union economies are facing important internal and external imbalances, as highlighted by the recent crises. Although progress has been made in order to reduce the gaps, the situation is still worrying. In this paper we aim at identifying the main determinants of current account balance in the European Union, as competitiveness is one of the major issues that need to be resolved regarding the European economies, aside with fiscal sustainability. We analyze the dynamics of current account balance in the European Union and test the effects of some economic imbalances, as highlighted by the current crises, considering data for the European Union member states covering years 2000–2013. Based on the results of panel data analysis we make considerations on future dynamics of the European Union economies.

Keywords Competitiveness • Current account balance • Macroeconomic imbalances

1 Introduction

European sovereign debt crisis has drawn attention on the sustainability of public finances and external debts. However, analyzing the causes that led to accumulation of debt without real coverage in terms of sustainability, a number of key factors are outlined. Competitiveness issues are highlighted as the main cause of such unfavorable dynamics in many European countries, especially those located at the

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periphery of the euro zone (Spahn 2013). Although during the last years important progress has been made in order to reduce the gaps, the situation is still worrying.

In this paper we aim at identifying the main determinants of current account balance in the European Union, as competitiveness is one of the major issues that need to be resolved regarding the European economies, aside with fiscal sustainability. Taking into consideration data for the European Union (EU) member states, during 2000–2013, we analyze the dynamics of current account balance in the European Union and test the effects of some economic imbalances, as highlighted by the current crises. Based on the results of panel data analysis we make considerations on future dynamics of the European Union economies.

2   Literature Review

Current account imbalances were highlighted as one of the main causes of the Euro Area sovereign debt crisis, along with the competitiveness gaps between some Euro Area member states and the need to cover private sector debt (Lazar and Andreica 2013).

Gros (2012) identified macroeconomic imbalances focusing on intra-euro area current account disequilibria and the role of competitiveness. It is concluded that the major imbalance within the euro area is the one arising between the group of countries with a current account surplus, mostly North of the Alps and rated AAA by the rating agencies, and the countries with current account deficits, except for Ireland. The situation in Ireland in slightly different, as a significant role was played by the financial sector that accumulated large shares of liabilities (Lazar and Andreica 2013).

Current account development were previously analyzed by Jaumotte and Sodsriwiboon (2010), that focused on the causes, the effects, but also on possible solutions for improving current account balances. They found that current account deficits were mostly driven by a decline in private saving rates. But it was the European Monetary Union and the Euro, which enabled these countries to maintain investment rates, and thus run larger current account deficits, by improving their access to the international pool of saving.

Rahman (2008) analyzed current account (CA) developments in ten EU members states: Czech Republic, Bulgaria, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia and highlighted the fact that during the last 15 years, these countries, on average, have run current account deficits that are considerably higher than the average current account deficit of other developing countries. However, more recently, a diverging pattern has emerged among these countries with one group, consisting of the Baltic countries, Bulgaria and Romania, experiencing rapid widening, while the others seeing a stabilization in their current account balances. Also, a fundamental, comprehensive paper on current account sustainability was prepared by Milesi-Ferretti and Razin (1996).

Jordá et al. (2011) studied the involvement of external balanced on financial crises. They showed that recessions associated with crises lead to deeper recessions and stronger turnarounds in imbalances than during normal recessions but also highlighted the fact that external imbalances help predict financial crises. Moreover, their analysis showed the fact that credit growth emerges as the single best predictor of financial instability, but the correlation between lending booms and current account imbalances has grown much tighter in recent decades.

Due to the influence of both internal and external imbalances on the economic outputs of the last years, the new European governance includes a procedure of macroeconomic surveillance regarding such imbalances (European Commission 2014) that takes into consideration, among others, the real effective exchange rate, financial sector liabilities, house price index, nominal unit labor costs and private sector debt (European Commission 2012). Holinski et al. (2012) provide a systematic review of internal and external imbalances in the Euro area. They argued that the importance of monitoring external imbalances and of implementing better coordinated policies to prevent the emergence of unsustainably large imbalances, due to the potential adverse effects that may occur.

3 Comparative Analysis of Current Account Dynamics in the European Union

Economic developments registered during the last 2 years highlight the significant results generated by the efforts conducted in order to reduce current account deficits. The results are however outside the limits imposed through the Macroeconomic Imbalance Scoreboard. In order to analyze the evolution of competitiveness in the European Union in terms of this indicator, we studied the dynamics of the current account balance for the period 2000–2013. For a better understanding of the dynamics of this macroeconomic indicator, we divided the European Union member states into two categories, depending on their membership status in the monetary union for the year 2014.

The comparative analysis of the dynamics of the current account balance in Euro Area member states reveals important differences among the countries participating in monetary union and highlights increasing gaps during the period prior to the economic crisis, but also during the acute period of the crisis (see Fig. 1). The period before the economic crisis was a time of increasing competitiveness gaps between the northern Euro Area member states and those of the periphery (Gros 2012). The peaks of these differences, as well as the increasing in current account deficits were registered in 2008.

This is the year in which the effects of the crisis were felt most profoundly, both in terms of competitiveness and soundness of public finances. All EU member states have suffered a deterioration of current account balances, but for countries in southern euro zone the situation was even more problematic. In 2008, in Cyprus
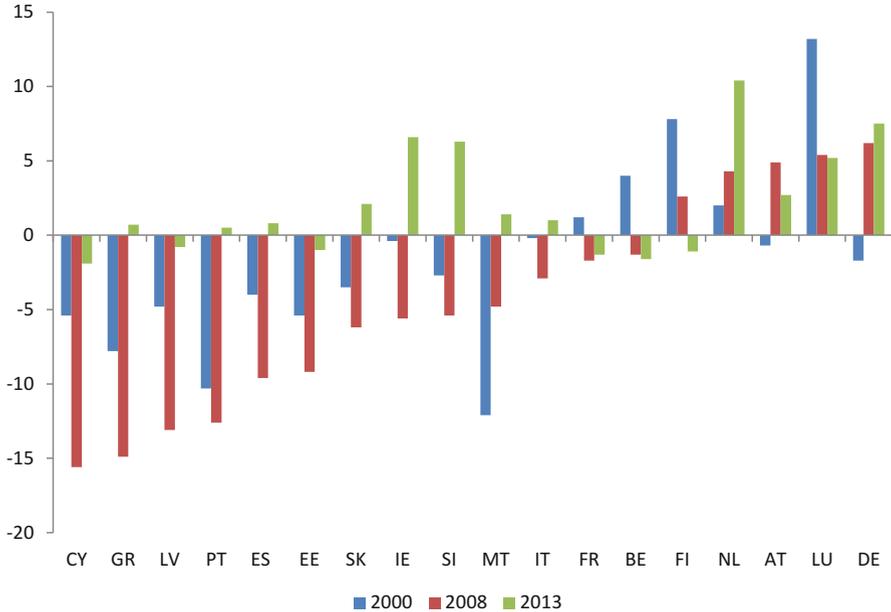
Fig. 1 Current account dynamics in Euro Area countries. *Source*: EUROSTAT. *Note*: *CY* Cyprus, *GR* Greece, *LV* Latvia, *PT* Portugal, *ES* Spain, *EE* Estonia, *SK* Slovakia, *IE* Ireland, *SI* Slovenia, *MT* Malta, *IT* Italy, *FR* France, *BE* Belgium, *FI* Finland, *NL* Netherlands, *AT* Austria, *LU* Luxemburg, *DE* Germany

(15.6 % GDP), Greece (14.9 % GDP), Latvia (13.1 % GDP) and Portugal (12.6 % GDP) current account deficit has exceeded 10 % of GDP.

Euro Area member states registered in 2008 trade deficits over the target of 4 % of GDP, set by the standards of the Macroeconomic Imbalance Scoreboard, as follows: Spain (9.6 % GDP), Estonia (9.2 % GDP), Slovakia (6.2 % GDP), Ireland (5.6 % GDP), Slovenia (5 % GDP) and Malta (4.8 % GDP). These major external imbalances that were registered in countries like Portugal, Spain, Greece and Cyprus were the main cause of increasing public debts to unsustainable levels, leading to adverse developments highlighted by the European sovereign debt crisis (Gros 2012). The period 2008–2013 was a period of recovery in terms of trade, common to all Euro Area member states. In 2008, only five countries registered current account surplus. However, in 2013 the situation was completely different and most countries recorded current account surpluses. Remarkable results were registered by Greece, Portugal and Spain, that during the economic crisis recorded the most unfavorable developments, and whose exports in 2013, exceeded the imports of goods and services.

Considering the fact that during the economic crisis the competitiveness gap could be explained by a transfer of competitiveness between north and south (Holinski et al. 2012), taking into account recent macroeconomic developments, can be concluded on a balance between the northern countries and the periphery in
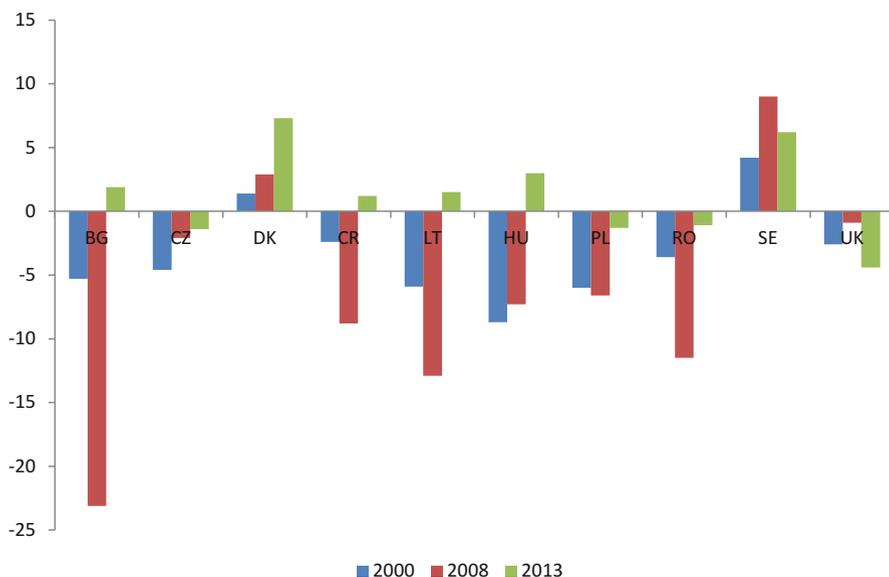
Fig. 2 Current account dynamics in the European Union member states (non-Euro Area). *Source*: EUROSTAT. *Note*: *BG* Bulgaria, *CZ* Czech Republic, *DK* Denmark, *CR* Croatia, *LT* Lithuania, *HU* Hungary, *PL* Poland, *RO* Romania, *SE* Sweden, *UK* United Kingdom

terms of competitiveness. The comparative analysis of the current account balance in the European Union member states that are not part of the Euro Area highlights significant differences between these countries, and also from one year to another (Fig. 2).

The general trend is similar to Euro Area member states, as, from this perspective, the period 2007–2008 was represented by widening trade deficits, while subsequent period, 2010–2013 constitute a period of recovery; all countries recorded positive developments compared with the previous period. Bulgaria, Lithuania and Romania had the most negative developments regarding the current account balance, as the deficit exceeded 10 % of GDP in 2008. These three countries were also most vulnerable to global macroeconomic conditions, as the gap was much higher than the one registered by other European Union, non-Euro Area member states. Hungary, the Czech Republic and the United Kingdom are member states that managed to register an improvement in the current account balance during the financial and economic crisis, compared to the first year of analysis, year 2000. However, in the case of the United Kingdom the situation worsened afterwards.

4   Econometric Results and Discussions

Based on panel data analysis we tested the influence of some macroeconomic imbalance indicators on current account balance. We have taken into consideration both internal and external imbalance indicators, as highlighted to being important by the economic crisis and as considered through the Macroeconomic Imbalance Procedure.

We conducted panel data on data provided by EUROSTAT. We used data covering years 2001–2013, and applied a fixed effects regression, as it was more suitable for our model.

The results of the panel data analysis evidenced the fact that current account dynamics can be explained through the variation of the variables that we have taken into consideration, as per the following equation (see Eq. 1):

$$CC_{it} = 5.49 - 0.11*FINS_{it} - 0.15*HPR_{it} - 0.04*NULC_{it} - 0.19*REER_{it} - 0.03*PRDT_{it} \tag{1}$$

where, for each 28 E.U member states:

– $FINS_{it}$ represents total financial sector liabilities, y-o-y change (%);
– CC_{it} is the 3 year average of current account balance as % of GDP;
– HPR_{it} is the house price index relative to a Eurostat consumption deflator, year-on-year changes;
– $NULC_{it}$ represents the nominal unit labour cost, 3 year percentage change;
– $REER_{it}$ refers to the three-year percentage change of the real effective exchange rates based on, and
– $PRDT_{it}$ stands for the private sector debt in percent of GDP.

The output of the panel data analysis highlights the influence of total financial sector liabilities, private sector debt, real effective exchange rate, nominal unit labor cost and house price index on the current account balance in the European Union. All indicators had been highlighted by the recent crises as playing an important role. The results show their dynamics are still important, having a significant influence on current account balance for the European Union economies. The results of the analysis also demonstrate that all indicators taken into consideration have had a significant, negative influence on the current account balance.

Total financial sector liabilities drawn attention during the last years, especially due to the fact that in some countries, as Ireland, such liabilities increased the level of government debts to unsustainable levels, as national authorities decided to help the financial sector recover, in an attempt of avoiding unbalancing of the entire economy. A one percent increase in financial sector liabilities would lead to a decrease of 0.11 percentage points in the current account balance, if all the other variables remain constant. The situation is similar for private sector debt that also has a negative influence on current account balance, a one percent increase of

private sector debt leading to a decrease with 0.03 percentage points of exports relative to imports of goods and services.

The rationale for including an indicator on housing price developments is that large movements in real asset markets have been traditionally associated with a number of economic crises and have also figured prominently in the recent financial crisis (European Commission 2012). The still recent case of real estate market and financial crisis is a very clear proof in this respect. The panel analysis evidenced a negative influence of house price index on the current account, as an increase with one percent of HPR would result in a decrease of 0.15 percentage points in the current account balance.

We have included the nominal unit labor costs in our analysis, due to the fact that it played an important role in some countries, as Greece, in which increasing nominal unit labor costs (that had a higher growth rate than productivity), resulted in losses of competitiveness. The regression output evidenced the negative influence of nominal unit labor costs on the current account balance.

5   Conclusion

The external imbalances registered during the last years highlighted the increased vulnerability of many European Union member states during the financial and economic crisis, being also one of the main causes of worsening macroeconomic indicators during 2007–2009. The general trend in the European Union is of deepening current account deficits during 2000–2008 and their subsequent reduction as a result of significant efforts made by the member states. The economic recession represents a reference period for the study of competitiveness gaps, as it highlighted the transfer of competitiveness between the northern Euro Area countries and the periphery. Statistical analysis reveals, however, a general trend of reducing these gaps and balancing trade relations between the participating states.

The output of the fixed effects regression model highlights the influence of total financial sector liabilities, private sector debt, real effective exchange rate, nominal unit labor cost and house price index on the current account balance in the European Union and evidences the fact that current account dynamics can be explained through the variation of the variables that we have taken into consideration. Therefore, due to the negative influence of the variables on the current account balance, as evidenced through our analysis, in order to reduce current account deficits and rebalance trade relations within the European Union, additional efforts should be made in order to reduce both internal and external imbalances.

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Prediction Models for High Versus Less Performant Economies in the European Union

Madalina Ecaterina Popescu and Ramona-Mihaela Paun

Abstract In the current unstable economic environment the European Union countries seem to be facing real challenges that distinctly affect their economic performances. Although there are several attempts in the international literature in building efficient macroeconomic prediction models, the subject still remains of great relevance and it is mostly believed that automated correction in any decision process should be based on proper prediction models.

Therefore, we draw on the main macroeconomic performance indicators, such as economic growth, current account balance and labour market indicators, such as labour productivity, employment and average net earnings for the year 2013 to propose several prediction models for the European Union countries. Thus, by applying both econometric analysis and classification trees methodology we will attempt to extend the empirical research in the field. A distinction between high performant and less performant European Union economies will be highlighted, and several CHAID classification trees will be elaborated, followed by a sensitivity analysis. The main findings of the study will consist of several efficient prediction models for which the prediction ability will be tested and compared.

Keywords Economic performance • Prediction models • Classification trees • Panel data model

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1   Introduction

In this unstable economic environment the European Union countries are currently facing real challenges that may affect their economic performances. Although there are several attempts in the international literature in building efficient macroeconomic prediction models, the subject still remains of great relevance and it is mostly believed that automated correction in any decision process should be based on proper prediction models.

Therefore, we draw on the main macroeconomic performance indicators, such as economic growth, current account balance and labour market indicators, such as labour productivity, employment and average net earnings for the year 2013 to propose several prediction models for the European Union countries. Thus, by applying both econometric analysis and classification tree methodology we will attempt to extend the empirical research in the field.

The choice of the macroeconomic indicators that were used in this study was made under the consideration of the main findings of previous empirical studies upon competitiveness, macroeconomic risk management and real convergence within the European Union (see Rahman 2008; Spahn 2013; Orszaghova et al. 2013; Gros 2012; Holinski et al. 2012; Lazar 2010 and Lazar et al. 2012).

A distinction between high versus less performant European Union economies will be highlighted with the help of a Hierarchical Cluster Analysis that will allow checking for the major differences registered in 2013 between the 28 E.U. member states. After classifying the 28 E.U. member states into two main country clusters, one corresponding to high economic performance countries and the second one to the E.U. countries with lower economic performances, a binary variable will then be built, by associating 1 for each high performant country and 0 for all the less performant ones. The binary variable will then be used in elaborating prediction models based on decision tree models.

The choice for using decision tree models was grounded on several previous empirical findings in the field of efficient classification. According to Zheng and Yanhui (2007) and also to Koyuncugil and Ozgulbas (2007), who used decision tree methodologies for corporate financial distress prediction, the classification tree model is more suitable in comparison to a neural network model (Tam and Kiang 1992; Jain and Nag 1998; Yim and Mitchell 2005), or to a statistic model such as logistic regression (Ohlson 1980; Shumway 2001) and multivariate discriminate regression (Altman 1968), where the patterns need to be linearly separable and samples are assumed to follow a multivariate normal distribution. The main disadvantage of neural network models consists in the difficulty of building up a neural network model, the required time to accomplish iterative process and the difficulty of model interpretation.

Moreover, compared to neural networks, decision trees are actually non-linear architectures able to discriminate patterns that are not linearly separable by allowing data to follow any specific probability distribution. They also require little preparation of the initial data and perform well with large data in a short time.

Based on these arguments, we decided to use decision tree models in our study and to test for their prediction ability in order to determine the most efficient model

that can correctly classify the 28 E.U. countries into high and low performant economies. After a sensitivity analysis of the prediction ability of several classification trees, the main findings of the study will be drawn, consisting of the most efficient prediction model with the highest prediction ability.

The paper is structured as follows: Sect. 2 is dedicated to the data description, Sect. 3 presents the prediction models for high versus less performant economies based on decision tree models, while in Sect. 4 we summarize the econometric results. The conclusions are presented in the last section.

2 High Versus Less Performant Economies Classification

In order to measure the economic performances of the 28 European Union countries for the year 2013, we drew on the following macroeconomic variables: economic growth (GDPgr), current account balance (CA) and labour market indicators, such as labour productivity (W), employment (EMPLOY) and average net earnings (EARN). The main data source was the Eurostat databases.

We started the analysis of the competitiveness gaps between the 28 European Union member states, by applying a Hierarchical Cluster Analysis. For that we used an unsupervised learning method that assigns a set of observations into subsets based on their similarities. The cluster technique was built on the Ward's method, whereas the intervals were calculated using the squared Euclidean distance. Based on labour productivity, current account balance and GDP growth rate levels, we were able to classify the 28 E.U. member states into two main country clusters, one corresponding to high economic performance countries and the second one to the E.U. countries with lower economic performances, as presented below in Table 1.

Based on this classification, a binary variable was then built, by associating 1 for each high performant country and 0 for all less performant ones. We then used it in elaborating prediction models based on decision trees.

3 Prediction Models for High Versus Less Performant Economies

A decision tree represents a prediction model built in the process of learning from instances where each branch of the tree is actually a classification question and each leaf of the tree becomes a partition of the dataset. Because of their tree structure and

Table 1 The classification of the 28 E.U. member states

High performant economies	Less performant economies
Denmark, Sweden, Ireland, Spain, United Kingdom, Germany, Netherlands, Belgium, France, Austria, Finland, Italy and Luxembourg	Bulgaria, Romania, Latvia, Lithuania, Hungary, Poland, Croatia, Slovakia, Czech Republic, Estonia, Cyprus, Portugal, Greece, Slovenia and Malta

their ability to easily generate consistent rules for segmentation of the initial dataset, decision trees can become an efficient method for classification and are highly used as prediction models (Andreica and Tapus 2008; Andreica 2013).

In general, there are several useful decision tree algorithms, out of which the Chi-square Automatic Interaction Detector (CHAID) has the advantage of generating non-binary trees. As a rule, CHAID model finds the pair of values that is least significantly different with respect to the target attribute. The significant difference is then measured by the p-value resulted from a Pearson chi-square test., Next, CHAID checks for each selected pair if the p-value obtained is greater than a certain merge threshold. If the answer is positive, it merges the values and searches for an additional potential (Andreica 2009). In our case, the two alpha levels: α_{merge} and α_{split} values were set at a 5 % level.

In this study, two CHAID models were built. The first one was based on macroeconomic indicators, while the second one was built based on the first principal components of the initial data set. For that, a Principal Component Analysis (PCA) was performed in order to cumulate the relevance of all of the initially considered explanatory variables: GDP growth rate, current account, labour productivity, employment rate and real average net earnings, based on a reduced dimensionality of the original data space with minimum loss of information. The eigenvalues obtained from the PCA are shown in Table 2.

The first two principal components that have values higher than 1 are the following: $\lambda_1 = 2.46$ and $\lambda_2 = 1.18$, with a minimum loss of information of approximately 27.14 %. According to the Rotated Component Matrix based on the Varimax with Kaiser Normalization the first principal component is highly correlated to the current account balance, the labour productivity, the employment rate and the average net earnings, being a trade and productivity indicator, while the second principal component is correlated to the GDP growth rate offering information about economic growth.

After applying the principal component analysis we noticed that the 28 E.-U. countries tend to form two distinct groups. The PCA allowed us to reduce the dimensionality of the initial data space with minimum loss of information so that the two types of E.U. member states could be easily identified. With this in mind, we built the second CHAID model based on the principal components. The two CHAID models (see Figs. 1 and 2) tend to have similar characteristics. More precisely, both CHAID models have two layers and have split just one time, indicating that there is only one variable that is relevant to classify the 28 E.-U. countries into high and less performant economies.

The first CHAID model is presented in Fig. 1 and was built assuming GDP growth rate to be the best predictor of economic performances between the E.U. member states. The fact that the CHAID model does not have more layers can be justified by the low number of observations that were used in order to build the decision tree.

The second CHAID model, presented in Fig. 2, was based on principal components and has also split just one time, indicating that there is only one variable relevant to classify the 28 E.U. countries into high and low performant economies.

Table 2 Total variance explained

Component	Initial Eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.46	49.239	49.239	2.462	49.239	49.239	2.44	48.726	48.726
2	1.18	23.620	72.859	1.181	23.620	72.859	1.21	24.133	**72.859**
3	0.702	14.034	86.893						
4	0.522	10.431	97.324						
5	0.134	2.676	100.00						

Note: Extraction method: Principal component analysis

Fig. 1 The CHAID
prediction model using
GDPgr predictor
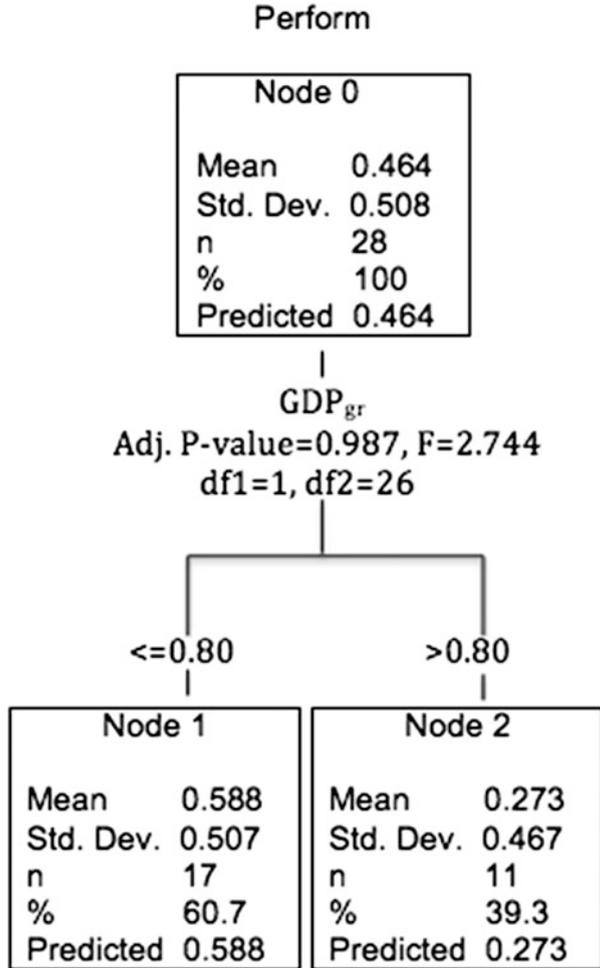
As expected, the first principal component turned out to be the best predictor of economic performance for the 28 E.U. countries. This decision tree model has however the particularity that in comparison to the previous decision tree model it has 5 terminal nodes, indicating that the classification rules are more rigorous and sensitive.

More precisely, the decision tree assigns an E.U. member state to the high economic performance group in case the first principal component is higher than -0.37. In the other case, the country is considered to have low economic performances. However, the presence of three more terminal nodes of the decision tree indicates that the 14 countries considered to have low economic performances can be classified into four subgroups based on their similarities (see Fig. 2). This

Perform

Node 0	
Mean	0.464
Std. Dev.	0.508
n	28
%	100
Predicted	0.464

REGR factor score 1 for
analysis 3
Adj. P-value=0.000, F=37.375
df1=4, df2=23

<=-1.0108	(-1.0108, -0.7716]	(-0.7716, -0.6307]	(-0.6307, -0.3675]	>-0.3675

Node 1		Node 2		Node 3		Node 4		Node 5	
Mean	0.000	Mean	0.000	Mean	0.000	Mean	0.000	Mean	0.929
Std. Dev.	0.000	Std. Dev.	0.000	Std. Dev.	0.000	Std. Dev.	0.000	Std. Dev.	0.267
n	5	n	3	n	3	n	3	n	14
%	17.9	%	10.7	%	10.7	%	10.7	%	50
Predicted	0.000	Predicted	0.000	Predicted	0.000	Predicted	0.000	Predicted	0.929

Fig. 2 The CHAID prediction model using principal components

information can be of real use when determining the prediction ability of the decision tree, since in general prediction errors are to be expected for these precise cases, where the classification is less obvious. It is however also obvious that these rules are very sensitive to the initial data set.

In order to measure the decision tree models' efficiency, the prediction values for each country were calculated and then compared to the original ones. We counted the number of correct and incorrect matches separately for both the high and low performance country clusters, and determined the general prediction ability of the two decision tree models, as presented in Table 3.

The decision tree model based on GDP growth rate was less efficient, with a prediction ability of only 64.3 % after having incorrectly predicted 35.7 % of the initial sample. On the contrary, the CHAID model based on the first principal component has incorrectly predicted only 6.7 % of the lower performant countries.

Therefore we can conclude that when replacing the macroeconomic indicators of the prediction model with the first principal component of the initial data matrix, the prediction performance of the new CHAID model improved and reached an accuracy of prediction of 96.4 %.

Table 3 Results of CHAID models performances

	CHAID model based on GDPgr			CHAID model based on principal components		
	High performance	Lower performance	Total	High performance	Lower performance	Total
Total	13	15	28	13	15	28
Incorrect	3	7	10	0	1	1
Correct	10	8	18	13	14	27
% Incorrect	23.1	46.7	35.7	0.0	6.7	3.6
% Correct	76.9	53.3	64.3	100.0	93.3	96.4

4 Econometric Results

Further on we continued the study with an econometric analysis. Based on the two E.U. country groups that were previously determined in Sect. 2, we decided to extend the period of analysis and to build two distinct equations that could explain the economic growth variations for both the case of highly performing and less performing E.U. countries.

For that we drew on the same macroeconomic data set extended for the period 2000–2013 and also on panel data methodology in order to model the robust dependencies between economic growth and competitiveness between the 28 E.U. countries.

According to Baum (2001) and to Wooldridge (2002), a Hausman test allows us to check whether we are dealing with a fixed-effects model (FE) or a random-effects model (RE), where the individual effects are assumed to be no longer correlated with the explanatory variables as compared to the FE. In our case, the results of the Hausman tests confirmed in both cases of highly performing and less performing E.U. country clusters that the FE model is more appropriate than a random-effects model.

Moreover, we checked the validity of the two panel data models, by controlling if the standard errors are independent and identically distributed (Cameron and Trivedi 2009), homoskedastic and not autocorrelated. The following tests were used in order to check these assumptions: a modified Wald test, implemented in STATA by Baum (2001) used for group wise heteroskedasticity in the FE model and a serial correlation test proposed by Drukker (2003) in order to check the autocorrelation hypothesis.

The results of both tests were similar for the cases of high performant and less performant economies and indicated, however, that the errors were both autocorrelated and heteroskedastic. In order to overcome these problems, the regression models were then re-estimated based on robust fixed-effects (within) technique, using Driscoll and Kraay standard errors (Hoechle 2007).

Table 4 Results of the robust estimation for high versus less performant E.U. countries

Explanatory variables	Highly performant economies		Less performant economies	
	Coefficients	Driscoll and Kraay std. errors	Coefficients	Driscoll and Kraay std. errors
Constant	−26.79	9.29***	205.455	56.599***
Current account (t−1)	0.246	0.095**		
Employment rate (t)	0.239	0.084***	0.353	0.115***
Labour productivity (t)	0.159	0.085*	1.269	0.404***
logEarnings (t)			−29.91	8.205***
N	169		181	
F statistic	10.07***		8.5***	
Within R squared	0.146		0.340	

Notes: where ***, ** and * stand for a 1 %, 5 % or a 10 % significance level

The results of the robust fixed-effects estimation describing the GDP growth rate equations for the two E.U. country groups are presented in Table 4. The comparative econometric analysis of the two cluster equations indicates that the main similarities between the two country clusters consist in the positive impacts of both the employment rate and the labour productivity. These findings are consistent with the economic theory, since an increase in productivity naturally stimulates economic growth, by inducing a growth in the autonomous supply of goods and services at an either unchanged or even lower level of inputs, such as capital, time and human resources. Moreover, an increase of the employment rate should normally improve the labour market equilibrium by stimulating the production of goods and by contributing therefore to the economic growth.

When considering the relationship between labour productivity and economic growth it seems the effect to be more pronounced for the case of the less performant economies, were also the real net earnings fluctuations play a disincentive role, as an increase in earnings that is not properly correlated to the labour productivity could lead to negative effects on the economic growth. The relation between the two indicators can easily by explained by the situation of some European Union member states, such as Greece, in which although the productivity increased, the pace was surpassed by the higher increase in labour costs, that eventually resulted in low competitiveness and lower economic growth.

Another conclusion that can be drawn from the econometric results consists in the fact that the current account balance has a positive influence upon economic growth, with a 1 year delay and only for the case of the highly performing E.U. country cluster. According to the statistical significant coefficient for the first cluster equation, we can state that the GDP growth rate will be expected to rise with 2.46 percentages points in case the current account balance increases with 10 % in the previous year, while keeping all the other variables constant.

5   Conclusions

In the current unstable economic environment the European Union countries seem to be facing real challenges that distinctly affect their economic performances. Therefore it becomes an urgent necessity to build efficient macroeconomic prediction models, since it is mostly believed that automated correction in any decision process should be based on proper prediction models.

Therefore, we draw on the main macroeconomic performance indicators, such as economic growth, current account balance and labour market indicators, such as labour productivity, employment and average net earnings for the year 2013 to propose several prediction models for the European Union countries.

Thus, by applying both econometric analysis and classification trees methodology we tried to extend the empirical research in the field. A distinction between high performant and less performant European Union economies was highlighted and several CHAID classification trees were elaborated, followed by a sensitivity analysis.

The main findings of the study consisted in the fact that the prediction ability of the decision tree model based on GDP growth rate improved considerably when replacing the macroeconomic indicators of the prediction model with the first principal component of the initial data matrix, in which case the prediction ability reached 96 %.

Moreover, the econometric analysis consisting in building two panel data equations allowed us to model the robust dependencies between economic growth and competitiveness between the 28 E.U. countries and to explain the economic growth variations for both the case of highly performing and less performing E.U. countries. The main findings suggest a positive impact of both the employment rate and the labour productivity for both country clusters, although the relationship between labour productivity and economic growth seems to be more pronounced in the case of the less performant economies.

Secondly, the current account balance has a positive influence upon economic growth with a one year delay for the case of the highly performing E.U. country cluster, but turned out to be statistically insignificant for the case of the less performing countries.

Our study could further on be extended by considering other aspects related to economic performance as well and the econometric models could further on be used in order to formulate scenarios regarding the future evolution of the E.U. economies.

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Correlating Local Recreation Specialization to Prosperity: Study on European Union Countries

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Abstract The purpose of the present study is to assess, contrast and compare the degree of specialization of local recreation industries and to determine whether it exists a correlation between local recreation specialization and prosperity. To this end, the paper proposes an index for calculating the level of specialization of local recreation industries. This formula aggregates the influence of three major factors, namely the local recreation sector's contribution in GDP, the share of employment in the local recreation sector, and the share of government spending allocated to recreation within total government expenditure. The index was calculated for 11 - European Union member states for the year 2011. Results showed that, within the sample, the most specialized countries in terms of local recreation services provision are the Czech Republic and Netherlands, whereas the lowest degree of specialization is registered in Romania and France. The regression analysis performed on the given sample showed a moderate correlation between local recreation specialization and prosperity. Notwithstanding the limitations imposed by the rather small sample on which this study was conducted, the findings open up new research avenues concerning the macroeconomics of recreation industries.

Keywords Local recreation specialization • Specialization index • Prosperity index • Local recreation industries • European Union

1   Introduction

Sectoral specialization generally refers to the degree to which economic sectors attract larger shares of output or employment in one country relative to another (European Central Bank 2004). A country can be considered specialized in an activity if the corresponding economic sector accounts for a relatively large share of the country's GDP, employment, or exports as compared to other countries.

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Over the years, researchers have constructed numerous instruments for measuring sectoral specialization. The Organization for Economic Co-operation and Development uses the Hannah-Kay index to capture a country's sectoral composition calculated on 20 industrial aggregates (OECD 2013). The Central European Bank measures sectoral specialization by the Krugman index that portrays the structure of a country's economy in relation to the structure in the European Union (European Central Bank 2004). The National Bank of Slovakia uses, aside from the Krugman Specialization Index, the Concentration index that reflects for a given country the sector's share in the European Union sector's output, in relation to the share of its whole economy in the output of the European Union, and the Lilien indicator that measures the speed of structural changes in employment (Čutková and Donoval 2004).

Sectoral specialization studies mostly focus on key economic sectors such as the manufacturing industry, banking, or tourism. This paper has as primary objective to assess a sector generally overlooked in research studies concerning sectoral specialization—the local recreation sector. This sector is depicted in the Statistical classification of economic activities in the European Community under Section R—Arts, entertainment and recreation (Eurostat 2008). It comprises a rather heterogeneous group of activities, such as arts, culture, sports and entertainment, which have two common characteristics: partaking during the daily leisure time (i.e., local) and the restoration outcome (i.e., recreation), therefore excluding tourism and hospitality related activities. Commercial recreation activities are considered part of the so-called upstream creative industries (Volintiru and Miron 2015). As creative services, commercial recreation shares more common characteristics: input of human creativity, symbolic messages drivers and potential intellectual property (UNDP 2010)

The second section of this paper will study in more detail sectoral specialization, and more specifically tertiary specialization and, will finally focus on proposing an index for measuring local recreation specialization. Based on the proposed formula, specialization scores for 11 countries from the European Union will be calculated to facilitate cross-country comparisons. The values obtained by calculating the Local Recreation Specialization Index are then going to be plotted against retrieved values of the countries' prosperity indices in order to determine whether a correlation between the two variables exists. Results of this analysis will be presented in Sect. 3.

Prosperity used to be associated strictly to superior economic performances, therefore making countries to concentrate all of their efforts into achieving economic growth. For 2 years, researchers of the Sustainable Development Commission's project Redefining Prosperity have looked into the connections and conflicts between sustainability, wellbeing and growth. Jackson (2009) proposed reconsidering what prosperity means and shed some light into what adds to people's wellbeing. Three different conceptions of prosperity were therein presented—prosperity as opulence, as utility, and as capabilities of flourishing. Prior to the report's publication, in 2007, the Legatum Institute developed an instrument for assessing wealth and wellbeing—the Legatum Prosperity Index™. This index uses a holistic definition of prosperity to include both material wealth and quality of life. Instead of replicating measurements that rank countries by their actual levels of

wealth, life satisfaction, or development, the Prosperity Index™ creates rankings based on the prosperity fundamentals (Legatum Institute 2009).

The secondary objective of the present paper is to determine whether there exists a correlation between the degree of specialization of the local recreation sectors across EU countries and their level of prosperity (that aggregates as stated previously measures of wellbeing and wealth). Wellbeing is considered to depend on various subjective aspects of life (Rojas 2009) one of which being leisure (along with education, community and consumer skills). The idea of correlating local recreation to prosperity is based on the assumption that prosperous countries should be more likely to have flourishing recreation sectors, while common sense also dictates that high development of the local recreation sector should result in an increased wellbeing of the population, which can also result in increased work productivity, and in the end in a higher level of prosperity.

2 Proposing an Index Suited for Calculating Local Recreation Sector Specialization

Sectoral specialization is closely linked to the sector's level of development. Usual indicators concerning the development of an economic sector comprise the sector's contribution to the GDP expressed through gross production, the number and concentration degree of enterprises operating in the sector, the employment across the sector, the sector's share of exports, the government expenditure allocated to the sector, the amount of private investments in the sector, or the expenditure with research and development activities within the sector. The most relevant assessments regarding sectoral specialization aggregate as many aspects that influence an economic sector' level of development as possible. A simple and useful approach for aggregating multiple factors' weight is by means of an index. Ioncica et al. (2010) proposed an index for calculating the degree of specialization regarding services sectors. Their tertiary specialization index takes into account the share of services in GDP, in employment and in exports. As it is constructed, it can be applied for determining how specialized is a country's entire tertiary sector, or one of its key services industries.

Although the tertiary specialization index can be calculated for the local recreation sector, due to the fact that the sector's exports amount to zero, its outputs become less prevailing than in the case of other service sectors. For this reason, in order to determine the specialization degree of a country's local recreation sector, the tertiary specialization index developed by Ioncica et al. (2010) will be adapted by substituting from the formula the factor exports with government expenditure, a more noteworthy aspect in this situation.

Therefore, the Local Recreation Specialization Index (Sp_{rec}) proposed herein accounts for a compound assessment of the following three factors:

- gross output of the local recreation sector in GDP ($\frac{GP_{rec}}{GDP}$);
- number of occupied persons in the local recreation sector within total employment ($\frac{E_{rec}}{E}$);
- share of government expenditure on recreation within total government spending ($\frac{GE_{rec}}{GE}$).

Gross output measures a sector's sales; it is calculated as the sum of the enterprises' turnover, which includes sales to final consumers as well as intermediate inputs. Gross output is considered a suitable measure of an individual sector's output, while gross output at the level of an entire economy is unreliable for evaluating business growth due to the fact that it double-counts sales between industries. In contrast to gross output, the gross domestic product measures the sum of all industries' value added, which is a non-duplicative aggregation measure, therefore representing a trustworthy instrument of analyzing economic growth (United States Department of Commerce 2014).

Human resources can be considered one of the most important elements of competitiveness in the tertiary sectors. Wright et al. (1993) stated that human resources always represent a potential source of sustained competitive advantage. A high occupation rate is considered a reliable indicator concerning the health of an economy or of an economic sector.

Government expenditure primarily comprises the intermediate consumption, gross capital formation, compensations of employees, subsidies, interests and adjustments, social payments, capital transfers and investments and taxes on production, income and wealth (Eurostat 2014). Government expenditure is calculated as percentage of GDP allocated per function, such as social protection, health, education, economic affairs, recreation etc. Even though relevant comparisons between countries could be made directly by comparing government spending by function (as percentage of GDP), in the present analysis, comparing the share of government expenditure by function (in this case, recreation activities) within total government expenditure ought to give more meaningful results.

The formula (1) proposed for calculating the Local Recreation Specialization Index is:

$$Sp_{rec} = \frac{\frac{GP_{rec}}{GDP}^n + \frac{E_{rec}}{E}^n + \frac{GE_{rec}}{GE}^n}{3} \tag{1}$$

where Sp_{rec} is the Local Recreation Specialization Index;

$\frac{GP_{rec}}{GDP}^n$ is the normalized value of the *gross output of the local recreation sector in GDP* factor;

$\frac{E_{rec}}{E}^n$ is the normalized value of the *number of occupied persons in the local recreation sector within total employment* factor;

$\frac{GE_{rec}}{GE}^n$ is the normalized value of the *share of government expenditure on recreation activities in total government spending* factor.

The factors' normalized values can be calculated by employing formula (2):

$$X_{rec}^n = \frac{X_i - \min(X_i)}{\max(X_i) - \min(X_i)} \qquad (2)$$

where X_{rec}^n is the normalised value for the factor ($\frac{GP_{rec}}{GDP}$, $\frac{E_{rec}}{E}$, or $\frac{GE_{rec}}{GE}$);

X_i is the factor's value at time i;
$\min(X_i)$ is the factor's minimum value at time i within the compared countries;
$\max(X_i)$ is the factor's maximum value at time i within the compared countries.

The Local Recreation Specialization Index (Sp_{rec}) takes values between 0 and 1. According to Ioncica et al. (2010), the specialization intervals are the following:

- [0, 0.1) specialization values indicating its absence;
- [0.1, 0.5) average specialization level;
- [0.5, 0.9) high specialization level;
- [0.9, 1] intense specialization.

The next section will present details regarding the computation of the Local Recreation Specialization Index by applying it for calculating specialization scores for 11 European Union member states for the year 2011.

The first step involves data collection and homogenization. Macroeconomic indicators regarding whole economies such as GDP, total employment or total government expenditure are usually easy to retrieve from online global databases. On the other hand, the process of collecting sectoral data—especially data concerning often disregarded sectors such as the local recreation sector—can be rather disheartening.

Table 1 presents the sources from which data was collected for computing the Local Recreation Specialization Index. It should be noted that at this stage, for some indicators, data is still inhomogeneous and further processing is generally necessary before calculating the index. Due to the fact that data has been collected from multiple sources, it required undergoing a homogenization process to standardize measurement units. Table 2 shows the homogenized values of the six indicators necessary for computing the Local Recreation Specialization Index.

The next stage in computing the Local Recreation Specialization Index supposes calculating the real values of the following three factors: the gross output of the local recreation sector in GDP, the number of occupied persons in the local recreation sector within total employment, and the share of government expenditure allocated to recreation within total government spending for each country.

Once all values are known, the subsequent step consists of calculating the each factor's normalized values based on formula (2) previously presented in this section. Finally, each country's local recreation sector specialization index can be computed by averaging the three factors' normalized values, as indicated by formula (1). Table 3 shows the intermediate results, as well as the final output.

The factors' real values (Table 3, columns 2–4), as well as their normalized values (Table 3, columns 5–7) show that no country outranks the others in all

Table 1 Data sources for computation of the Local Recreation Specialization Index

Indicators	Sources	Comments
GDP	• Eurostat—GDP and main components (*Gross domestic product at market prices*)	• For all countries
Gross output of the local recreation sector	• Institut National de la Statistique et des Études Économiques • Le Portail des Statistiques du Grand-Duché de Luxembourg • Instituto Nacional de Estatística de Portugal • Institutul Național de Statistică din România • Knoema—STAN Database for Structural Analysis ISIC Rev. 4 (*Arts, entertainment and recreation*)	• For France • For Luxembourg • For Portugal • For Romania • For all other countries
Total employment	• Eurostat—National Accounts by 64 branches—employment data (*Total*)	• For all countries
Employment in the local recreation sector	• Eurostat—National Accounts by 64 branches—employment data (as sum of *Creative, arts and entertainment activities*; *libraries, archives, museums and other cultural activities*; *gambling and betting activities*; *Sports activities and amusement and recreation activities*)	• For all countries
Total government spending	• Eurostat—General government expenditure by function (*Total*)	• For all countries
Government expenditure on recreation activities	• Institutul Național de Statistică din România • Eurostat—General government expenditure by function (as sum of *Recreational and sporting services*; *Cultural services*; *R&D Recreation, culture and religion*; and *Recreation, culture and religion n.e.c.*)	• For Romania • For all other countries

Sources: Eurostat (http://ec.europa.eu/eurostat), Institut National de la Statistique et des Études Économiques (http://www.insee.fr/en/), Instituto Nacional de Estatística de Portugal (https://www.ine.pt/xportal/xmain?xpgid=ine_main&xpid=INE), Institutul Național de Statistică (http://www.insse.ro/cms/), Knoema (http://knoema.com/), Le Portail des Statistiques du Grand-Duché de Luxembourg (http://www.statistiques.public.lu/fr/index.html)

aspects, nor exists a country that is outranked in all aspects. Also, there are quite large disparities between a given country's indicators. For instance, Luxembourg registers the highest share government expenses allocated recreation activities, while being at the very bottom of the ranking concerning the local recreation sector's contribution to GDP and employment share. Other similar situations, but not as extreme, are encountered in the case of Portugal or the Czech Republic. In a completely different position is Austria, which shows the most balanced values regarding the three analyzed aspects.

The usefulness of the Local Recreation Specialization Index lies in the fact that it performs a compound assessment of the three factors' influences. The final output (Table 3, column 8) shows that there is only one country that can be undoubtedly considered highly specialized in local recreation—the Czech Republic, and that there is no country registers an intense specialization in this field. Borderline

Table 2 Homogenized data necessary for computing the Local Recreation Specialization Index (year 2011)

Country	GP_{rec} (millions EUR)	GDP (millions EUR)	E_{rec} (persons)	E (persons)	GE_{rec} (% of GDP)	GE (% of GDP)
Austria	5142.7	308,675.0	60,500	4,144,200	0.9	50.8
Czech Republic	3916.6[a]	163,579.1	67,600	5,057,200	1.2	43.2
Denmark	5432.4[a]	245,988.1	46,000	2,776,000	1.1	57.7
Finland	4081.0	196,869.0	47,900	2,519,600	1.1	55.1
France	2090.0	133,305.9	72,000	9,082,000	0.7	39.4
Germany	52,510.0	2,699,100.0	649,000	41,152,000	0.7	45.2
Italy	31,670.3	1,638,857.0	301,200	24,739,100	0.5	49.8
Luxembourg	506.9	42,410.4	3800	369,800	1.5	42.6
Netherlands	11,445.0	642,929.0	151,200	8,698,600	1.4	49.9
Portugal	2602.7	176,166.6	188,300	4,861,200	0.8	49.3
Romania	2090.0[a]	133,305.9	71,900	9,082,200	0.7	39.4

[a]For the non-eurozone member states (for which the gross production was expressed in national currency), the conversion was made based on the average annual euro foreign exchange reference rates

Table 3 Computation of the Local Recreation Specialization Index (year 2011)

(1) Country	(2) $\frac{GP_{rec}}{GDP}$ (%)	(3) $\frac{E_{rec}}{E}$ (%)	(4) $\frac{GE_{rec}}{E}$ (%)	(5) $\frac{GP_{rec}{}^n}{GDP}$	(6) $\frac{E_{rec}{}^n}{E}$	(7) $\frac{GE_{rec}{}^n}{GE}$	(8) Sp_{rec}
Austria	1.67	1.46	1.77	0.393	0.217	0.305	0.305
Czech Republic	2.39^{max}	1.34	2.78	**1.000**	0.177	0.705	**0.627**
Denmark	2.21	1.66	1.91	0.845	0.281	0.359	0.495
Finland	2.07	1.90	2.00	0.732	0.360	0.394	0.495
France	1.57	0.79^{min}	1.78	0.311	*0.000*	0.307	*0.206*
Germany	1.95	1.58	1.55	0.626	0.255	0.216	0.366
Italy	1.93	1.22	1.00^{min}	0.615	0.138	*0.000*	0.251
Luxembourg	1.20^{min}	1.03	3.52^{max}	*0.000*	0.077	**1.000**	0.359
Netherlands	1.78	1.74	2.81	0.488	0.307	0.716	0.504
Portugal	1.48	3.87^{max}	1.62	0.235	**1.000**	0.246	0.494
Romania	1.57	0.79^{min}	1.78	0.311	*0.000*	0.307	*0.206*

Note: min marks the minimum value within the sample for that factor, max marks the maximum value within the sample for that factor, **bold** highlights values that indicate the highest degree of specialization, *italic* highlights values that indicate the lowest degree of specialization

between being considered highly or moderately specialized are Netherlands, Denmark, Finland and Portugal.

The analysis also showed that within the sample there is no country that lacks specialization in local recreation. Nevertheless, some countries register rather low specialization scores, namely France, Romania and Italy, which indicate poor development of the local recreation sector.

3   Correlating Local Recreation Specialization
to Prosperity

Correlation assesses the degree of association between variables by measuring the extent to which two or more variables vary together (Quality Research International 2013). This section focuses on testing whether it exists a correlation between local recreation specialization and prosperity.

The measure of prosperity employed in this analysis is the Legatum Prosperity Index™—more exactly the normalized values of the overall country rankings. The Local Recreation Specialization Index proposed in the previous section will be used to quantify local recreation specialization.

It ought to be noted that whereas a high Local Recreation Specialization Index score denotes a high degree of specialization (it can range between 0 and 1), a large value for the Legatum Prosperity Index™ means a low level of prosperity (it can range between 0 and 80).

Plotting Legatum Prosperity Index™ normalized values against Local Recreation Specialization Index scores in Microsoft Excel creates the following representation:

The first thing to be observed from the scatter plot is the fact that almost all points are situated in the two upper quadrants, as shown in Fig. 1. This suggests the fact that the analysis has been made on countries that have above average (or borderline average in the case of Romania) prosperity levels.

The trend line associated to the scatter plot seems to indicate an inverse relationship between the two variables, meaning that countries more specialized
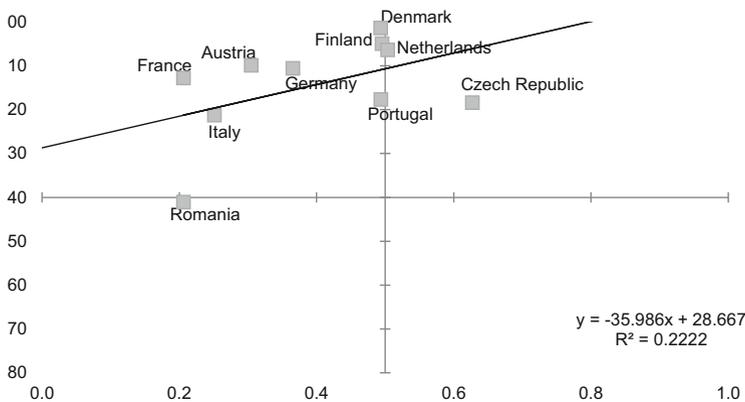
Fig. 1 Scatter plot of Legatum Prosperity Index™ normalized values against Local Recreation Specialization Index scores with fitted trend line

in local recreation (that have higher Local Recreation Specialization Index scores) also appear to be more prosperous (register lower Legatum Prosperity Index™ values).

However, the graphical output only provides a first insight towards validating the hypothesis. Further analysis performed in SPSS shows that the Pearson coefficient (−0.472) reveals a moderate and negative correlation between the Local Recreation Specialization Index scores and the Legatum Prosperity Index™ values for the given sample. However, the significance level of the correlation (0.086) indicates that there is not strong evidence that local recreation has an effect on prosperity, but nor does it rule out.

A non-conclusive significance level could be due to the small size of the sample on which the analysis has been performed. For this reason, the assumption that local recreation specialization is correlated to prosperity should not be rejected at this point. In order to more accurately test the hypothesis, research should be continued and performed on a larger and more varied sample.

Being aware and accepting the limitations of this research, a linear regression analysis performed has been, however, performed. The R-squared value (0.22) reveals that the Local Recreation Specialization Index accounts for more than one fifth of the Legatum Prosperity Index™ variability.

In order to assess the appropriateness of the regression model employed, three residual plots have been examined. Figures 2, 3 and 4 show the results of plotting residuals in SPSS. Figure 2 shows that residuals are normally distributed.

Fig. 2 Histogram of residuals
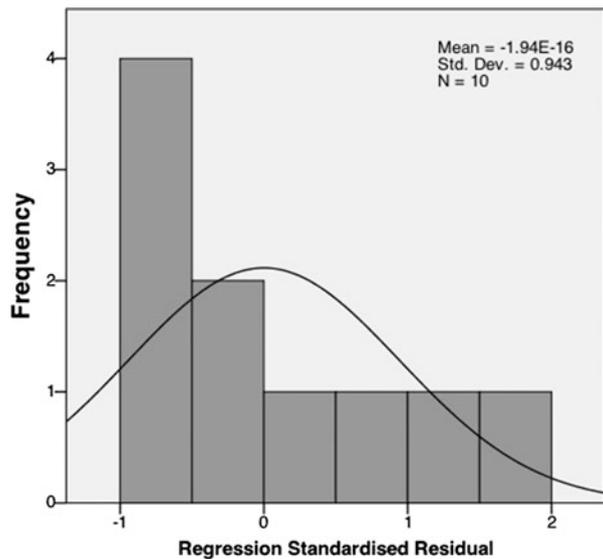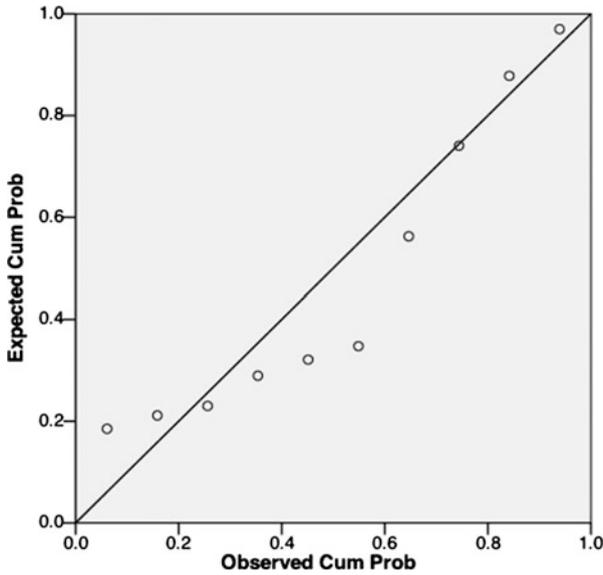
Fig. 3 Normal P–P plot of residuals
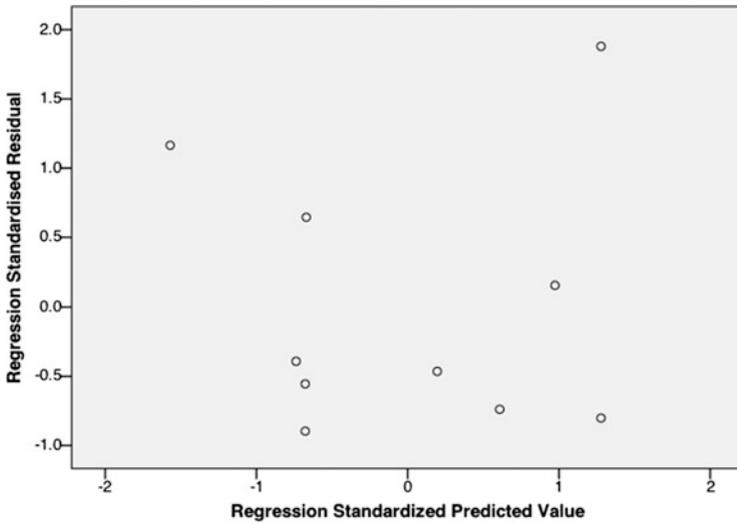
Fig. 4 Scatter plot of residuals against predicted values

The normal P–P plot in Fig. 3 shows values that are roughly hovering across the regression line. The scatter plot of residuals against predicted values in Fig. 4 shows a fairly random pattern. All three graphical representations are good evidence that the linear model provides a decent fit to the data.

4 Discussion

This paper's principal aim is to develop an instrument suited for assessing specialization in the local recreation sector. Thus, after reviewing more indexes advanced in the economic literature, the Local Recreation Specialization Index was created by adapting Ioncica et al. (2010) tertiary specialization index.

The Local Recreation Specialization Index assigns the same weight to three factors: the gross output of the local recreation sector in GDP, the number of occupied persons in the local recreation sector within total employment, and the share of government expenditure allocated to recreation within total government spending. Further regression analysis could be performed in order to determine whether variables should be assigned different weights. Also, the index could become even more powerful in determining local recreation specialization if it were to aggregate the influence of more factors, such as the number and concentration degree of enterprises operating in the sector, the amount of private investments in the sector, or the expenditure with research and development activities within the sector.

The index is very useful for comparing and ranking countries based on sectoral specialization. Although it is created to measure specialization in the local recreation sector, it can be applied for other economic sectors, thus transforming it into an instrument of cross-sectoral comparisons.

Equal specialization scores obtained by two countries—or two sectors—does not necessarily mean equal specialization levels. This situation can occur on account of performing the analysis on a small sample. In such cases, however, detailed cross-country—or cross-sectoral—comparisons could be made in order to establish the final hierarchy.

Regarding the correlation between the Local Recreation Specialization Index and the Legatum Prosperity Index™, this study represents merely a starting point for further analysis. The number of countries on which this sort of analysis is performed remains a crucial aspect—the higher the number of countries, the more statistically significant the results.

The implications of increasing the sample size are not limited to getting more significant results. Increasing the number of analyzed countries automatically leads to modifications of index scores because the index does not measure an absolute degree of specialization, but a relative degree of specialization compared to other countries.

Despite the study's limitations, research has shown that there seems to exist a correlation between local recreation specialization and prosperity. A country's level of specialization regarding local recreation can therefore be considered a fairly meaningful indicator of a country's prosperity level, accounting to more than one fifth of its variance. These results open up new avenues for investigation for research scholars interested in the field of macroeconomics, services economy, or even leisure studies.

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Part III
Economics

Supply–Demand Equilibrium for the Goods and Services Market: A Dynamic Model on Romania's National Economy

Bianca Ioana Popescu and Emil Scarlat

Abstract The present paper proposes a cybernetic approach to the national economy system of Romania in order to give the basis for identifying, describing and modeling of the main feedback mechanisms of regulation that appear at macroeconomic level. We have built in STELLA—Modeling and Simulation Software a dynamic feedback model for the demand–supply equilibrium. The stock-flow dynamic model allows empirical analysis of the system's states offering insight on its endogenous characteristics and behavior over time. The model also permits sensitivity analysis to exogenous stimuli. The data used for initialing the state variables of the model and parameters were taken from the official stats of Romania between 2007 and 2011, just before the economic crisis and the years of economic recovery. The results of the model simulations on extreme conditions, such as in which the scales of production do not change significantly in relation to profitability, have revealed that the model outlines a predictive reaction of the system, entering in decline—the national output having a descending trend. The structure of the model and its simulations sustain the rationality and validity of the purpose and we can conclude that it may become a useful instrument in macroeconomic governance.

Keywords Dynamic model • AD AS equilibrium • Feedback processes • Macroeconomic modeling • Simulation

1 Introduction

Taking into consideration limits on neoclassic theory, markets in or close to stable equilibrium, perfect liquidity, total clearance of markets or the idealistic assumption that there aren't important differences between markets comprising few individuals and the reality in which markets are formed by millions of individuals (Smolin et al. 2008) and in the context of the global economic crisis felt in Romania

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beginning with 2008, it has been highlighted more and more the need of introducing into the macroeconomic analysis a new method of modeling capable of explaining systemic problems. We feel the need for a new theoretic framework and thus new instruments (models) that will emphasize the role of auto-adjusting mechanisms of national economies in order to study the chain reaction effects that are transmitted into the interior of the cybernetics system of the national economy.

The cybernetic approach for the system of the national economy has the objective of identifying and describing the fundamental feedback processes of regulation that appear at macroeconomic level. The reason behind such an approach of the national economy and the study of these feedback processes lays in the need of setting a theoretical base for the design of performance methods and instruments to be used in the development of preventive and corrective e mechanisms and policies in order to create the means by which macroeconomic governance can intervene and prevent with enough time before internal imbalances and external divergences can pose systemic threats.

The novelty of the paper consists in the new approach of the structure of the economy as a system and the design of the presented dynamic model beginning with the need of introducing the properties of the economy as a complex adaptive system, the description of the way in which the economy is redesigned in specific subsystems that allow the identification of fundamental adjustment processes and the descriptive analysis of the way these adjustment processes work.

2 The National Economy as Complex Adaptive System

Handling economic crisis or striving for economic growth, both of these aims are essential for the governments of national economies and for the welfare of each individual or nation that are functioning and developing in a continuous process of economic and social globalisation. In everyday life, dynamic management problems are in general feedback problems, governments take action, observe the results, evaluate, take new actions looking for new results and further actions emerge and so on and that is a "feedback loop" (Barlas 2002). Nevertheless feedback is found not only in action taking or external impulses on the system in focus, but it is formed also between elements of the system causing problems or features that are of systemic nature. "The main purpose of system dynamics methodology is to understand the causes of undesirable dynamics and design new policies to ameliorate/eliminate them" (Barlas 2002).

Into any given national economy a series of material, financial and informational flows are generated between the principal components of the economy. These components can be classified as we already know them into economic sectors that interact on aggregated markets or we can classify a new set of subsystems taking into account their functionality in relation with the fundamental feedback processes that occur at macroeconomic level. Later, in the present paper we will present the redesign of the national economy elements as we see fit for the purpose of

describing the functioning of the fundamental feedback process and also for modeling purposes.

As a complex adaptive system the economy has a set of properties that permit such a classification. The economic system is characterized by networks of connections and interdependencies generated by material flows, information, exchange of goods, services and resources, including work and capital; complex networks of worldwide transactions. These interdependencies are easily confirmed if we assume examples such as the way in which a slight modification on the aggregated market of inputs generates modifications on the market for goods and services.

Being an open system, any national economy evolves consistently with other economies with which it has established links. The context of globalization, outsourcing and online transactions have made co-evolution possible and an important feature of the cybernetic system of the national economy.

When rhythms of consumption and production on hierarchically organized markets accumulate systemic coherence the economy can grow on a coordinated and balanced route but a perfect equilibrium state with perfect liquidity will never be achieved as the system of the national economy functions far from equilibrium.

Even in the in the absence of a centralized mechanism for emptying the markets, the economy has the tendency of self-organization to a spontaneously order which is characterized depending on the market and the time horizon of persistent unemployment, unsold production or an excess in demand.

The behavior of complex adaptive systems is determined in time of the structure of feedback mechanism within the system which are activated both on external impulses at on endogenous changes and a series of fundamental feedback processes can be thus identified.

In a national economy, the real economy is dominant and the intensity with which the exchange of material flows in the economy are essential for growth and financial flows are determined by the real economy. This is why we will approach the subsystems of the real economy, leaving the two subsystems of the monetary economy for an ulterior analysis.

3 The Feedback Adjustment Process of the Aggregated Demand: Aggregated Supply Ratio on the Market for Goods and Services

The redesign of structure of the Cybernetic System of the National Economy (Scarlat and Chiriță 2003) includes seven cybernetic subsystems, each realizing a series of functions in the national economy. These subsystems have been defined as follows:

- S1—the production subsystem
- S2—the aggregated supply—aggregated demand ratio subsystem
- S3—the market of scarce resources subsystem

- S4—the profitability subsystem
- S5—the subsystem of income formation and distribution
- S6—the subsystem of the financial market
- S7—the subsystem of the capital market.

3.1 The Production Subsystem of the Cybernetic System of the Real Economy

The production subsystem, S1, is the nucleus for the other subsystems of the real economy. As we have mentioned before, in the economic system there are a multitude of production processes (companies, industries and technologies), each one of them using various work units and various intermediate products. The output of these production processes can be used further as intermediate products (they reenter intro the production process) or they will be destined to final consumption for the economic sectors—households, public consumption and export.

Thus, we will have a diversity of production processes which at unit scale they will use different quantities and types of inputs (different types of work force, different units of materials and intermediate products). On a given period, the different production processes will function at different scales, and the sum of these scales satisfy the closing conditions representing practically the share of a production process in the total national production.

More, any production process it will be influenced in time by innovation, or what we will denote from now on as technical/technological progress. Technological progress can be represented on one hand by the introduction of a new production process or by the efficiency of an existing one represented by the usage of reduced quantities of work force or intermediary products.

The new production processes can by introduces by the hypothesis that these production processes already exist but their share is equal to zero. As these new production processes are introduced into the subsystem, technological changes occur in other scales associated with the production processes. The producing processes that incorporate technological progress will increase as share into national production while the production processes that have on output of outdated goods will gradually reduce their share until total elimination.

The production subsystem highlights the central role of the production scales which determine on one hand the total output of different products and services from the economy and on the other hand the way by which the inputs of intermediary products are obtained. Thus, the outputs at the end of the period, will represent both products for final consumption and also products destined for intermediary consumption.

3.2 The Subsystem of the Aggregated Supply: Aggregated Demand Ratio

Largely, the dynamics of the real economy is determined by the ratio between the aggregated demand and supply of goods and services. This ratios is formed and in direct connection with the market for goods and services. In this case we refer to the aggregated supply as being the total potential supply of products and services while the aggregated demand is the effective demand of products and services.

If the aggregated supply is different of the aggregated demand, even for a single product, this is transposed into two immediate consequences. On one hand the stock for this product will change and on the other hand it will produce a disequilibrium in the supply–demand ratio for this product. Adjustment by stocks (quantities) is one of the most important ways in which the markets adjust to equilibrium. Consequently, in the first situation, the stock of the earlier mentioned product will increase or decrease depending on the supply–demand ratio in the limit of the existing stock on the market of this good or service. In the situation in which the supply–demand disequilibrium is too large to be covered by stocks then it may appear on one hand an excess of demand or supply or on the other hand an deficit of demand or supply. The recognition of this disequilibrium will be realized by a comparison mechanism between real stocks and wanted stocks. The wanted stocks will be those that can cover the current disequilibrium between aggregated demand and aggregated supply.

The excess of demand appears when the different between wanted stocks and current stocks is positive, this being the signal for the production subsystem to raise the intensity of the production processes. The deficit of demand appears when the difference between the wanted stock and the current stock is negative, which will represent the signal for the production subsystem for reducing the intensity of the production processes for those products associated with the negative difference of stocks. By the influence that the adjustment mechanism exercises on the intensity of the production processes, it is determined this way the permanent search for an equilibrium ratio between the aggregated demand and aggregated supply on the market of goods and services.

The Feedback Adjustment Process of the aggregated demand—aggregated supply ratio on the market for goods and services is formed by a series of feedback mechanisms that have main objective the achievement of a relatively stable ratio between the aggregated supply and demand of goods and services from an economy. The feedback process proposed is formed between S1, S2, S4 and S5 defined earlier. The first negative feedback loop that represents the formation of the aggregated supply is formed between S1, S2 and S4 while the second negative feedback loop, representing the formation of aggregated demand is formed between S2, S4 and S5.

4   A Dynamic Model for the Supply–Demand Equilibrium on the Goods and Services Market

The model was designed using STELLA 9.0 and the data used for initialing the state variables of the model and parameters were taken from the official stats of Romania between 2007 and 2011.

4.1   Model Hypothesis and Functioning

Taking into consideration the theoretical framework described earlier in the present paper, a series of assumptions were made in order to design the model and capture the transmission effects of the feedback loops forming the adjustment process in focus:

The aggregated supply depends, as size, on the scales of the production processes, S_a, S_b, . . .

While the scales of the production processes are influenced by the net profitability associated with each production process and by technical progress, denoted by T^*.

The price is formed depending on the excess of wanted stocks $(\overline{J} - J)$. If at a moment in time there will be registered an excess of wanted stock then the prices will increase, the equation for prices being:

$$P(t+1) = P(t) + \beta\big(\overline{J}(t) - J(t)\big) \tag{1}$$

The excess of wanted stocks is depended on one hand of the size of the aggregated supply, Y, realized in the current and previous years and on the other hand by the size of the aggregated demand.

The first feedback loop, denoted with I in Fig. 1, is associated with the formation of aggregated supply and has a principal resulting variable, Y, the total output in the economy.

The total output of the economy is represented here as being a measure or value of all the current activities of the economy as a whole—a measure of "a multitude of fluxes of products" (Pokrovskii 2012). Let us say it is a measure of the multitude of production processes taking place into the economy and the method for calculating the total output has been designed giving an aggregated interpretation for the production processes, thus using the "value of created products" (Pokrovskii 2012) classifying them into seven categories: agriculture, construction, industry, trade, financial services, services and net taxes, as it can be seen later in the paper in Eq. (6).

The transmission effect associated with the Feedback Loop I is:

Fig. 1 The functioning diagram of the model. *Source*: Scarlat and Chiriță (2003, p. 402)
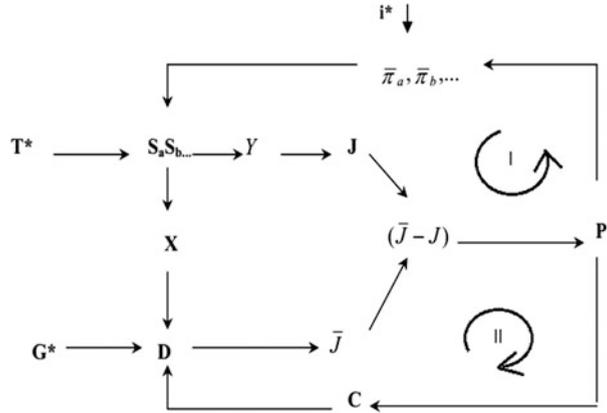
$$S \uparrow \Rightarrow Y \uparrow \Rightarrow (\overline{J} - J) \downarrow \Rightarrow P \downarrow \Rightarrow \overline{\pi} \downarrow \Rightarrow S \downarrow$$

The second feedback loop, denoted with II in Fig. 1, corresponds with the formation of the aggregate demand of products and services and has as resulting variable, D. The transmission effect associated with Feedback Loop II is:

$$D \uparrow \Rightarrow \overline{J} \uparrow \Rightarrow (\overline{J} - J) \uparrow \Rightarrow P \uparrow \Rightarrow C \downarrow \Rightarrow D \downarrow .$$

The size of the aggregated demand, D, is formed by the demand for final consumption of households, the demand for public consumption and the demand for intermediate consumption, X, which is determined also by the production scales (intensities) at which the production processes unfold. The size of the aggregated demand structured this way determines the size of the wanted stocks, $\overline{J}$, and also the size of the real products and services stocks by equation:

$$J(t+1) = J(t) - [Y(t-1) - D(t)]. \tag{2}$$

To stock formation, producers will compare the current demand with the output realized in the previous period.

4.2 Dynamical Equations and Implementation

The elements of system dynamic diagrams are feedback loops, accumulation of flows into state variables and delays. As shown in Fig. 2, the states variables of the model are the total output Y, Real Stock, Price, the aggregated demand, D, Final Consumption and Intermediate Consumption. The state variables will describe the systems state at each point in time and will give the general overview on the behavior over time.
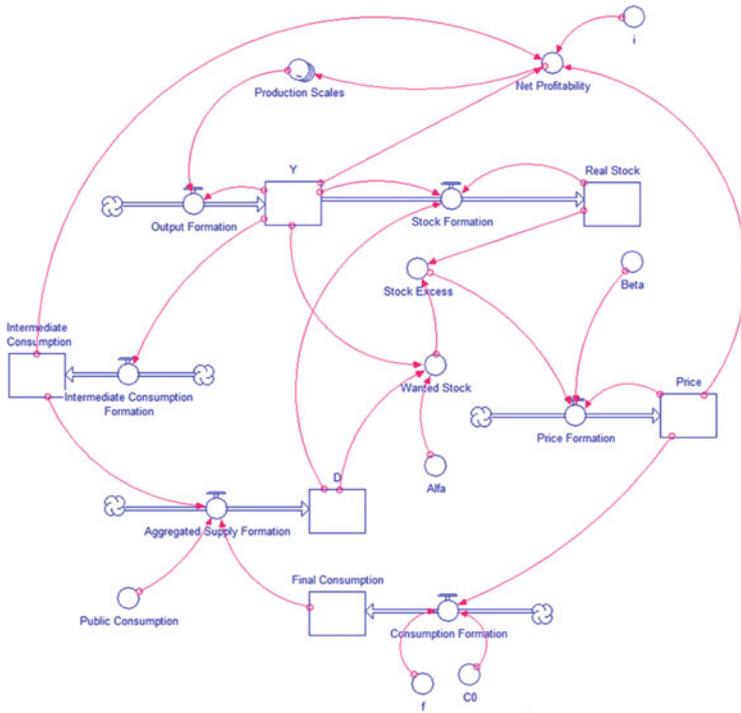
Fig. 2 Stock—flow diagram generated in STELLA 9.0 for the model

Dynamical Equations transformed by STELLA 9.0 are as follows:

$$D(t) = D(t - dt) + (Aggregated\,Supply\,Formation)*dt \tag{3}$$

$$\begin{aligned} Aggregated\,Supply\,Formation = {}&Final\,Consumption \\ &+ Intermediate\,Consumption \\ &+ Public\,Consumption \end{aligned} \tag{4}$$

$$Y(t) = Y(t - dt) + (Output\,Formation - Stock\,Formation)*dt \tag{5}$$

$$\begin{aligned} Output\,&Formation \\ = {}&(Production\,Scales[Agriculture]*Y + Production\,Scales[Industry]*Y \\ &+ Production\,Scales[Construction]*Y + Production\,Scales[Trade]*Y \\ &+ Production\,Scales[Financial\,Activities]*Y \\ &+ Production\,Scales[Services]*Y + Production\,Scales[Net\,Taxes]*Y) \\ &\times /100 \end{aligned} \tag{6}$$

$$\begin{aligned} Final\,Consumption(t) = {}&Final\,Consumption(t - dt) \\ &+ (Consumption\,Formation)*dt \end{aligned} \tag{7}$$

$$Consumption\,Formation = C_0 + f*Price, f < 0 \tag{8}$$

$$
\begin{aligned}
Intermediate\,Consumption(t) = {} & Intermediate\,Consumption(t - dt) \\
& + (Intermediate\,Consumption\,Formation)*dt
\end{aligned}
\tag{9}
$$

$$Intermediate\,Consumption\,Formation = 0.4*Y \tag{10}$$

$$Price(t) = Price(t - dt) + (Price\,Formation)*dt \tag{11}$$

$$
\begin{aligned}
Price\,Formation = {} & DELAY(Price, 1) + Beta*DELAY(Stock\,Excess, 1), \\
& Beta > 0
\end{aligned}
\tag{12}
$$

$$Real\,Stock(t) = Real\,Stock(t - dt) + (Stock\,Formation)*dt \tag{13}$$

$$
\begin{aligned}
Stock\,Formation = {} & DELAY(Real\,Stock, 1) \\
& - (DELAY(Y, 2) - DELAY(D, 1))
\end{aligned}
\tag{14}
$$

$$
\begin{aligned}
Net\,Profitability = {} & Price*Y - (1 + i)*DELAY(Price, 1) \\
& *DELAY(Intermediate\,Consumption, 1)
\end{aligned}
\tag{15}
$$

$$Stock\,Excess = Real\,Stock - Wanted\,Stock \tag{16}$$

$$Wanted\,Stock = IF\,D > Y\,THEN\,Alfa*D\,ELSE\,0, 0 < Alfa < 1 \tag{17}$$

$$Production\,Scales[Industrii] = Net\_Profitability \tag{18}$$

4.3 Model Simulations and Sensitivity Analysis

We have run several simulations of the model over the period of 5 years, 2007–2011, with a *dt* step of 0.1 and the initial values of the state variables being the 2007's stats of Romania as published by the National Institute of Statistics. For the production scales we have used the standard classification of Romania GDP and we have calculated weights of each category (Agriculture, Industry, Constructions, Trade, Financial Activities, Services and Net Taxes) in the total GDP for every year of the simulation, i.e., 2007–2011.

Having in mind that the objective that stays at the core of the present study is to build an useful instrument in macroeconomic governance, we feel the need to take special consideration for a certain standard for verification, validation and accreditation, VV&A (Pace 2004), of the models used to build such an instrument. In regard with verification, the design and implementation of the model will always be put under careful review, and it can suffer slight modifications as no solely academic feedback may appear. Although, we are not in the phase of trying to acquire some sort of accreditation, the present form of the model permits one aspect of validation, that is conceptual validation—"when the anticipated fidelity of the model or simulation conceptual model is assessed" (Pace 2004).

The structure of the model is comprised by a number of system components translated to different state variables that capture the behavior over time in response to the system's structure. This way the system modeled here becomes rather closed than open as it is in reality, as we are unable to simulate some of the infrequent or dramatic changes in its environment. Thus it is unlikely for a model to produce results close to those produced by the real system. It is fair to assume that there may be environmental situations that led the real system of the national economy to behave in a different manner than the proposed model.

Even with a correct structure of the model, the type of circumstances that may be omitted can appear continuously as models are built in an objective-based manner, trying to capture some of the characteristics of the system in focus. This being the case, the conceptual validation of the model has been done in regard to the consistency or logical accuracy, of its internal structure (Matthias and Hannon 2013). For this matter, we have run several simulations on extreme situations in order to see if the results display a predictive reaction.

As seen in the Fig. 3, the results of the model simulations on extreme situations, such as in which the scales of production do not change significantly in relation to profitability have revealed that the model outlines a predictive reaction of the system, entering in decline—the total output having a descending trend as seen in Fig. 4.
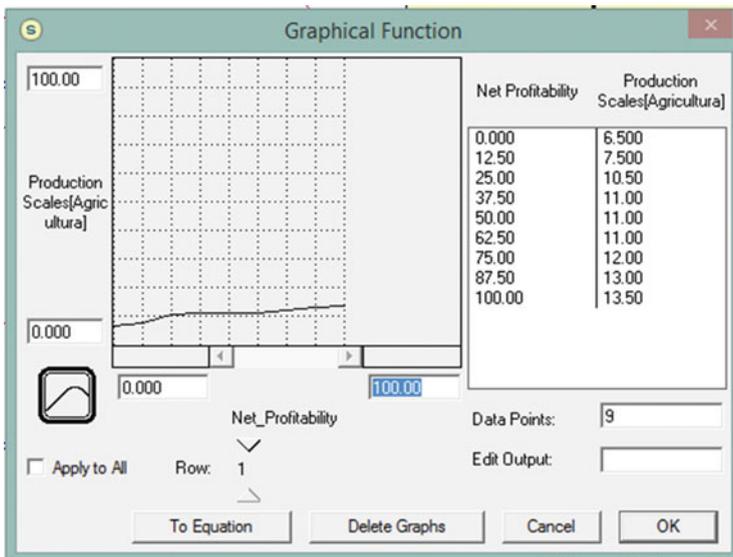
Fig. 3 Graphical functions for scales of production versus net profitability
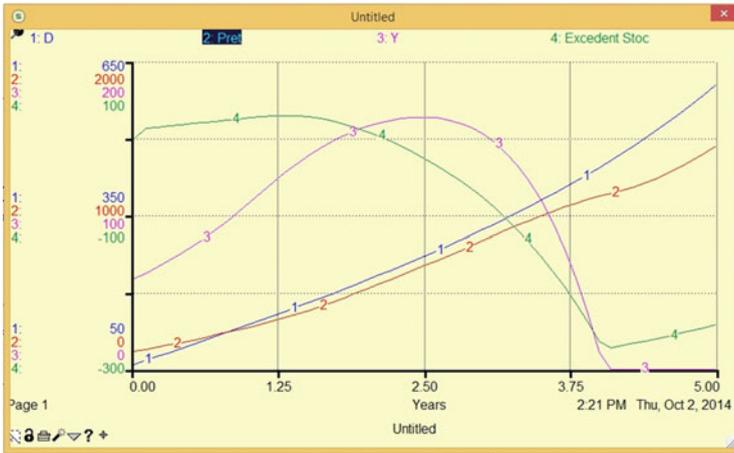
Fig. 4 Results on production scales associated with low productivity

5 Conclusion

The empirical data has shown that because of the introduction of a one-step delay into *Price Formation*, the system needs a longer period for the price to adjust to stocks. Even in cases of the perception of quality, it has been argued that trough incomplete knowledge a gap will be created, that can grow or shrink depending on the system's resistance and in conclusion a delay will take place between taking action and the adjustment of the system to these actions (Caulfield and Maj 2002).

Because of the way *Real Stock* is dependent by total output and total demand and, as seen in Eq. (14), the *Stock Formation* is formed taking into account previous periods, two *dt* steps for the total output, Y, and one *dt* step for aggregated demand, D, a cascade delay takes place into the system. These type of delays cannot be easily perceived by an economic authority but only can be estimated for example by simulation of proper models that can give insight on the magnitude of the systemic delays that will influence a timely or not reaction of certain elements of the system to diverse actions took by the economic authority, i.e., government or the authorized body. The data will show that even if the *Stock Excess* is decreasing, the *Price* will continue to increase until a certain level, for about 5–7 *dt* steps.

The simulations of the model have revealed until now predictive behavior in the case of high productivity associated with high scales of production, total output having an ascending trend. The empirical data and the simulations of the model sustain the rationality of a cybernetic approach in dynamic modeling and sustain its usefulness in building governance policies.

For further work we are considering to add to the model the formation of Intermediate Consumption by the balance connections between technological branches and to develop models for the other three adjustment processes found at macroeconomic level—the allocation of disposable income, allocation of scarce resources and profitability.

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The Determinants of Foreign Direct Investment Under Climate Change

Piyaphan Changwatchai

Abstract Foreign direct investment is very important for the economy of both host countries and home countries, especially for host countries in terms of employment and technology transfer. Many previous researches focused on economic determinants, both micro and macro level, rather on climate-related determinants which become important currently. As a result, this research analyzes the determinants of foreign direct investment under climate change using secondary panel data and fixed effect model. The results show that, real GDP of home countries, real GDP of host countries, and the degree of trade openness of host countries are positively related to foreign direct investment. Conversely, CO_2 emissions per capita of home countries and wage rate of host countries are negatively related to foreign direct investment

Keywords Foreign direct investment • Climate change • CO_2 emission

1 Introduction

Foreign direct investment plays an extraordinary and growing role in global economy. In 1990, total FDI inflows and total FDI outflows accounted for 207 and 241 billion US dollars, respectively, and then both FDI inflows and FDI outflows increased dramatically to 1452 and 1411 billion US dollars in 2013. In 2013, the foreign affiliates of MNEs had sales of 34,508 billion US dollars, accounting for 46.4 % of world GDP, while their value of exports was 7721 billion US dollars, accounting for 33.34 % of total value of world exports. Transition countries and developing countries have been important host countries of foreign direct investment. Namely, in 2012, FDI inflows to transition countries and developing countries accounted for 6.5 and 52.0 % of total FDI inflows, respectively (UNCTAD 2013, 2014).

Foreign direct investment is very important for the economy of both host countries and home countries, especially for host countries in terms of employment

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and technology transfer. Most developing countries implement the FDI attracting policies. As a result, to analyze the determinants of foreign direct investment is very important issue. However, many previous researches focused on economic determinants, both micro and macro level, while only few researches included climate-related determinants which become important currently. Climate change is already having significant and costly effects on worldwide economy. Many countries have engaged in climate change adaptation and mitigation measure. In 1997, The Kyoto Protocol, which is an international agreement linked to the United Nations Framework Convention on Climate Change, was created. Under the Kyoto Protocol in 1997, most developed nations agreed to cut their greenhouse gas emissions to a certain percentage below 1990 levels. The commitment to comply with the Kyoto protocol of developed countries, which are the major source of foreign direct investment, may results in carbon leakage to developing countries through foreign direct investment. As a result, climate-related determinants of foreign direct investment should be one of important factors affecting foreign direct investment.

This research aims to (1) examine the trend of foreign direct investment outflow of OECD countries and global CO2 emission by descriptive analysis using secondary data and to (2) analyze the determinants of foreign direct investment under climate change using secondary panel data and fixed effect model.

2 Literature Review

2.1 Eclectic Paradigm or OLI Paradigm

The eclectic paradigm of Dunning (1980) is an important framework for analyzing the determinants of foreign direct investment. The eclectic paradigm contends that in order for the enterprise to engage direct investment in a foreign country, three advantages must be present. The first advantage is ownership-specific advantages (O). An enterprise that can possess or acquire certain assets, which their competitors cannot possess, will have capability producing abroad. These assets include both tangible assets and intangible assets such as natural resources, capital, manpower, and proximity to markets, information and technology, marketing and entrepreneurial skills, managerial skills, organizational skills, proprietary rights of use, an exclusive control over specific market outlets, and favored market access for intermediate or final goods. Secondly, location-specific advantages (L) explain the enterprise's decision on where foreign direct investment occurs. The location-specific advantages are related to the host countries' endowment such as availability of natural resources, skilled workers, unskilled workers, or technology as well as market access. Lastly, internalization advantages (I) provide firms an option to exploit ownership endowments and location endowments by producing in foreign locations. The enterprise can avoid the risk and disadvantage arising from imperfection of market and price system or the fiat of public authority.

3 Incentives for Foreign Production (Dunning 1993)

Considering motives for foreign production, the foreign direct investment can be categorized into four groups as follows: (1) Resource-seeking FDI, (2) Market-seeking FDI, (3) Efficiency-seeking FDI, and (4) Strategic Asset or Capability-seeking FDI.

The motive of resource-seeking FDI is to acquire certain resources abroad with lower prices. There are three main types of resource-seeking FDI: FDI seeking for physical resources that the MNEs need, such as fuel, mineral, and agricultural commodities; FDI seeking for unskilled labor or semi-skilled labor; and FDI seeking for technological capability or other skills such as management, marketing, or organizational skills.

Some MNEs engage market-seeking FDI in the host countries that are their main existing markets or new target markets. There are four main reasons for engaging Market-seeking FDI as follows: to retain business relationships with their suppliers and customers; to reduce disadvantages to local competitors; to exploit lower production and transaction costs; and to serve as counter move in oligopoly market. Market-seeking FDI is usually the horizontal integration.

The MNEs engage in efficiency-seeking FDI in order to raise cost efficiency through economies of scale, economies of scope, and risk diversification. As a result, the MNEs can enhance their competitiveness in the market. Efficiency-seeking FDI allows the MNEs to take advantage of difference in factor endowment, consumer taste, culture, economic policies, and market structure.

The motives of strategic asset or capability-seeking FDI are to acquire the assets of foreign corporations and to sustain their international competitiveness in the long run. The MNEs may purchase foreign companies with high performance, which allows the MNEs to create new markets, to synthesize R&D, to create market power, to reduce transaction cost and operational expenses, as well as, to get access to certain materials.

3.1 Related Studies

There are many studies examining the determinants of foreign direct investment inflows. To begin with, Krifa-Schneider (2010) explores the effect of political risk and business climate on foreign direct investment inflows for 33 developing and transition countries during the period of 1996–2008. The study exploits a fixed effect model and a dynamic panel model and finds that FDI inflows are negatively related to political risk, while they are positively related to favorable business climate. Moreover, Talamo (2003) employs gravity equation to estimate the determinants of direct foreign investment flow from 29 source countries to 60 host countries during the period of 1980–2001. The results show that FDI flows are positively related to population, development, openness to foreign investors,

common language, and shareholder protection. Conversely, FDI flows are negatively related with distance and corporate tax.

Some studies include environmental issues as one of determinants of foreign direct investment. List et al. (2004) examine the location decisions of domestic and foreign firms in New York State from 1980 to 1990 and estimate the influence of environmental standard on capital flows by using fixed effect model. The study finds that the environmental standards do influence domestic firms while they do not influence foreign firms. Conversely, Xing and Kolstad (2002) estimate the effect of the laxity of environmental regulations on the capital flows of polluting industries from the US. The results show that the laxity of environmental regulations in a host country is a significant determinant for highly polluting industries, while it is insignificant for less polluting industries. Furthermore, List and Co (2000) estimate the effects of state environmental regulations on foreign multinational corporations' new plant location decisions in the US from 1986 to 1993 by using a conditional logit model. The results show that there is a negative relation concerning environmental stringency and attractiveness of a location and foreign firms are more sensitive to environmental regulations than domestic firms.

4 Research Methodology

4.1 Data

Data used in the model are secondary panel data collected from the World Bank, the Organization for Economic Co-operation and Development (OECD), KPMG International Cooperative, and Foreign Affairs, trade and development Canada (DFATD). The research includes data of foreign direct investment from 21 home countries in 26 host countries from the period 2005–2012 (post-Kyoto Protocol). These 21 home countries are countries in the Annex of the Kyoto Protocol in 1997, while these 26 host countries are transition or developing countries (see Table 3 in Annex for list of home and host countries).

4.2 Variables Definitions and Model Specification

The following model specification is used for investigating the determinants of foreign direct investment under the concern of climate change:

$$\ln FDI_{i,j,t} = \beta_0 + \beta_1 \ln MGDP_{i,t} + \beta_2 \ln GDP_{j,t} + \beta_3 \ln Wage_{j,t} + \beta_4 Open_{j,t}$$
$$+ \beta_5 Tax_{j,t} + \beta_6 \ln MCO2_{i,t} + \beta_7 \ln HCO2_{j,t} + \beta_8 Tre_{j,t} + \varepsilon_{i,j,t} \quad (1)$$

wherei, j, and t represent home country, host country, and year, respectively. $lnFDI_{i,j,t}$ refers to net foreign direct investment form home country i to host country j at period t in logarithmic form. $lnMGDP_{i,t}$ refers to real GDP of home country i at period t in logarithmic form, which is used as an proxy of capacity of home country to invest abroad and its sign is expected to be positive. $lnGDP_{j,t}$ refers to real GDP of host country j at period t in logarithmic form, which reflect market size of host country and its sign is expected to be positive. $lnWage_{j,t}$ refers to wage rate in host country j at period t in logarithmic form, which reflect cost of labor factor in host country and its sign is expected to be negative. Labor productivity is used as proxy of wage rate. $Open_{j,t}$ refers to degree of trade openness of host country j at period t, which is measured by the sum of exports and imports as a percentage of GDP and its sign is expected to be positive. Trade openness could facilitate MNEs' international business, especially for the case of that the host countries are MNEs' production base or that affiliates need to import some materials or machine from their parent companies. $Tax_{j,t}$ refers to corporate tax of host country j at period t, whose sign is expected to be negative. $lnMCO2_{i,t}$ and $lnMCO2_{j,t}$ refers to CO_2 emission per capita in home country i and in host country j, respectively, at period t in logarithmic form. Their expected signs are ambiguous. $Tre_{j,t}$ is index of environmental treaty participation of host country j, (Kheder 2005). This index ranges between 0 and 7 and its sign is expected to be negative. There are seven environmental treaties that are taken into account in this research, which are the United Nations Framework Convention on Climate Change UNFCCC, the Kyoto Protocol in 1997, the Vienna Convention, the Stockholm Convention on Persistent Organic Pollutants (POPs), the United Nations Convention on Biological Diversity CBD, the Cartagena Protocol on Biosafety, and the Convention on International Trade in Endangered Species of Wild Fauna and Flora: CITES. β_0–β_8 are coefficients and ε is an error term. The descriptive statistics of all variables used in the model are reported in Table 1.

Table 1 Descriptive statistics for dependent and independent variables

Variables	Mean	Minimum	Maximum	S.D.	Obs.
lnFDI	4.99	−4.27	9.97	2.33	2678
lnMGDP	13.41	10.54	16.47	1.30	4368
lnGDP	12.44	10.70	15.32	1.05	4368
lnWage	9.77	8.48	11.08	0.59	4368
Open	88.32	17.70	397.93	80.46	4368
Tax	26.35	3.00	55.00	8.79	4347
lnMCO2	2.23	1.53	3.21	0.41	4368
lnHCO2	1.57	−0.78	4.15	0.98	4158
Tre	5.67	4.00	7.00	0.71	4368

5   Empirical Fidings

5.1   Trend of Foreign Direct Investment of OECD Countries

Total net FDI outflows of OECD countries during period of 1995–2004, or before the Kyoto Protocol in 1997 was implemented, accounted for 661,697 million US dollars on yearly average. The US is the largest investor, whose net FDI outflows were 158,482 million US dollars on yearly average. After the Kyoto Protocol in 1997 was implemented, during period of 2005–2012, total FDI outflows of OECD countries increased to 1220.934 million US dollars on yearly average. The US was still the largest investor, whose net FDI outflows accounted for 304,130 million US dollars on yearly average.

   Considering the net FDI outflows of 21 OECD countries by industry, the data show that, during pre-Kyoto protocol (2005–2012), net FDI outflows were highest in manufacturing sector, accounting for 133,871.15 million US dollars on yearly average, or 22.08 % of total net FDI outflows. On the other hand, net FDI outflows were lowest in agriculture and fishing, which accounted for −53.86 million US dollars on yearly average, which implied that, on average, at least one of the components of FDI is negative and not offset by positive amounts of the remaining components. Post-Kyoto protocol (2005–2012), net FDI outflows in financial services were highest, account for 370,729.01 million US dollars on yearly average, or 29.20 % of total net FDI outflows.

   Among 26 host countries, the major recipients of 21 OECD countries during pre-Kyoto Protocol (2002–2004) were Mexico, Singapore, and Brazil whose net FDI inflows were 16,860.93 (15.86 %), 12,345.41 (11.61 %), and 10,551.91 (9.93 %) million US dollars on yearly average, respectively. During post-Kyoto Protocol (2005–2012), Brazil became the biggest recipient, whose net FDI inflows were 38,043.66 million US dollars on yearly average, accounting for 14.53 % of net FDI flows from 21 OECD countries to 26 host countries. The second and third recipients of FDI inflow were China and Singapore, whose net FDI inflows were 27,282.87 (10.42 %) and 24,382.02 (9.31 %) million US dollars on yearly average, respectively. The study also find that been CO_2 emission has been increasing for non-Annex I countries such as China and India, while CO_2 emission have been decreasing for Annex countries such as USA and European Union.

5.2   Trend of CO2 Emission

Global CO_2 emission has been increasing from 23,485.04 million metric tons in 1995 to 34,464.65 million metric tons in 2012. The largest source of CO_2 emission is Asia Pacific that emitted CO_2 about 36 % and 46 % of global CO_2 emission in 1995 and 2012, respectively. Comparing CO_2 emission of OECD countries to non-OECD countries, the proportion of CO_2 emission of non-OECD countries

has been increased during the enforcement of Kyoto Protocol; namely, it increased from 49 % in 1995 to 60 % in 2012. In 1995, the US was the largest source of CO_2 emission, accounting for 5791.90 million metric tons or 24.66 %. However, in 2012, China has become the largest source of CO_2 emission, accounting for 9,165.98 million metric tons or 26.60 %, while the proportion of CO_2 emission of China was only 13.44 % in 1995.

5.3 The Determinant of Foreign Direct Investment

The results of test for multicollinearity are shown in Table 4 and show that there is no multicollinearity among explanatory variables. Hausman test is used to determine the efficient model. The results in Table 5 show that fixed effect model is suitable for the model.

Table 2 summarizes the results of the model estimations. Real GDP of home countries has a significantly positive impact on FDI inflow to the host countries; namely, richer countries tend to engage more in FDI. Home countries' real GDP increase of 1 % will result in an increase in FDI flow of 2.86 %. Real GDP and degree of openness of host countries are positively related to FDI inflows. If host countries' real GDP or the degree of openness of host countries increase by 1 %, FDI inflows will increase by 2.98 % or 0.0066 %, respectively. As a result, the government in the host countries should enhance market factor such as developing market system and encouraging competitive and fair environments. Also, the government in the host countries should promote international trade through

Table 2 FDI determinants analysis

Variables	Coefficient	Probability
constant	−58.35879	0.0000[a]
$lnMGDP_{i,t}$	2.856364	0.0009[a]
$lnGDP_{j,t}$	2.978818	0.0000[a]
$lnWage_{j,t}$	−0.971912	0.0286[b]
$Open_{j,t}$	0.006593	0.0012[a]
$Tax_{j,t}$	0.00798	0.2292
$lnMCO2_{i,t}$	−1.917282	0.0000[a]
$lnHCO2_{j,t}$	0.074857	0.6622
$TRE_{j,t}$	−0.073527	0.2308
R-squared	0.828860	
Adjusted R-squared	0.788991	
F-statistic	20.78946	
Prob (F-statistic)	0.000000	
Observation	2111	

[a]Refers to significance level of 0.01
[b]Refers to significance level of 0.05

international trade negotiations and trade facilities such as trade solution center and amendment of related laws.

Conversely, wage rate of host countries has negative effect on FDI inflows; namely, a wage increase of 1 % will result in a decrease of FDI inflows by 0.97 %. This implies that if the government wants to implement any policies to raise wage rate in the countries, the wage raise should reflect labor productivity. As for climate-related determinants, only CO_2 emission per capita of home countries is a significant determinant. CO_2 emission per capita of home countries is negatively related to FDI outflows to foreign locations. Namely, low CO_2 emission can reflect strictness of environmental regulations in home countries. Home countries with low CO_2 emission per capita tend to engage more in FDI. As a result, host countries should concern that there may be CO_2 leakage through FDI inflows and should have any measures for restricting high carbon FDI.

However, corporate tax, CO_2 emission per capita and participation in international environmental treaties of host countries are insignificant determinants of FDI inflows. Despite most host countries participate in many international environmental treaties, an insignificant of treaty participation can reflect low enforcement of these treaties. As a result, they should be strengthened in terms of compliance enforcement.

6   Conclusion

Foreign direct investment is very important for the economy of both host countries and home countries, especially for host countries in terms of employment and technology transfer. Most developing countries implement the FDI attracting policies. Previous researches focused on economic determinants, both micro and macro level, rather on climate-related determinants. As a result, this research aims to analyze the determinants of foreign direct investment by including climate-related determinants such as CO_2 emission and treaty participation.

The results show that, for foreign direct investment from 21 OECD countries in 2012, USA was the largest investor; foreign direct investment was highest in financial service sector; and Brazil was the largest receiver. As for CO_2 emission in 2012, the proportion of CO_2 emission was highest in Asia-Pacific region. After the enforcement of Kyoto Protocol, the proportion of CO_2 emission of non-OECD countries became higher. Furthermore, the volume and the proportion of CO_2 emission have been increasing for non-Annex I countries such as China and India, while those of CO_2 emission have been decreasing for Annex I countries such as USA and European Union. As for determinant analysis, real GDP of home countries, real GDP of host countries, and the degree of trade openness of host countries have positive relation with foreign direct investment. On the other hand, CO_2 emissions per capita of home countries and wage rate of host countries have negative relation with foreign direct investment. Corporate tax rate, CO_2 emissions

per capita, and treaty participation of host countries do not affect foreign direct investment.

The recommendations of this research are that host countries should promote trade openness and market factor. If it is necessary to raise wage rate, the adjustment should be consistent with labor productivity. Furthermore, host countries should have measure for restricting high carbon FDI. Finally, international agreement of environment issue should be strengthened in terms of compliance enforcement.

Annex

Table 3 Lists of home countries and host countries

Home country	Host country
Australia	Argentina
Austria	Brazil
Belgium	Chile
Canada	China
Denmark	Hong Kong
Finland	Colombia
France	Croatia
Germany	Egypt
Greece	India
Ireland	Indonesia
Italy	Kazakhstan
Japan	Republic of Korea
Luxembourg	Malaysia
Netherlands	Mexico
Norway	Nigeria
Portugal	Peru
Spain	Qatar
Sweden	Russia
Switzerland	Saudi Arabia
United States	Singapore
United Kingdom	South Africa
	Thailand
	Turkey
	Ukraine
	United Arab Emirates
	Vietnam

Table 4 Results of multicollinearity test

Variable	lnGDP	lnHCO2	lnMCO2	lnMGDP	OPEN	TAX	lnWAGE	TRE
lnGDP	1.0000							
lnHCO2	−0.0257	1.0000						
lnMCO2	−0.0113	−0.0036	1.0000					
lnMGDP	0.0012	0.0003	0.0131	1.0000				
OPEN	−0.3026	0.3218	0.0023	0.0007	1.0000			
TAX	0.1608	−0.2381	0.0051	0.0004	−0.2362	1.0000		
lnWAGE	0.0118	0.4958	−0.0073	0.0009	0.4231	−0.3386	1.0000	
TRE	−0.1416	−0.2670	−0.0342	0.0037	−0.0235	0.0411	−0.2789	1.0000

Table 5 Result of Hausman test

Test summary	Chi-Sq. statistic	Probability
Cross-section random	144.122891	0.0000

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The Evolution of School Textbook Supply Systems: Cost, Supply Procedures and State Policies

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Abstract School textbooks have been significant components of educational systems since the nineteenth century. Traditionally, in most countries the supply of school textbooks has been funded by the state. However, in recent years the role of publishers has become dominant within this area and this has affected the level of prices, often leading to the formation of worldwide oligopoly dynamics. In turn, school textbook supply costs are born either by the state or citizens directly or indirectly. In this paper we explore the evolution of the production and distribution system of school textbooks in several European countries and briefly compare dynamics and outcomes generated by different educational systems. We particularly explore the case of the Greek system based on collected data and we estimate/compare cost results under the general assumption of adopting mainstream European school textbook supply models. To this purpose we outline and use an abstract model relying on simulation methods.

Keywords Public finance • Education • Schoolbooks • Microeconomics

1 Introduction

"Why do textbooks cost so much?" In recent years textbooks have become more and more expensive. Most countries operate free market systems with regard to textbook production and supply. On the other hand, textbooks are produced by the state in Greece and Cyprus, some schoolbooks in Japan, in Korea, Singapore, New Zealand and by the Cantons in Switzerland.

According to International Review of Curriculum and Assessment Frameworks, prescribed textbooks are a means of controlling curriculum and structure in Japan. Textbooks are not intended to replace official guidelines on teaching style, according to the French educational system, while they have no considerable

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influence on the breakdown of subject matter and course sequencing within the German educational system. According to the same report the large number of students in California, Florida and Texas in combination with the specific requirements of these states, exercise a considerable influence on the content of textbooks throughout the USA, entailing that commercial considerations may have an unintentional impact at the level of textbook production.

In Japan books to be used in individual schools are prescribed by local school boards. In France, Germany, Hungary, Singapore, Switzerland, and other countries, books are chosen from official lists by teachers. Under other selection schemes books are chosen without restrictions, e.g., in Italy, the Netherlands, New Zealand, Sweden, Switzerland and elsewhere.

As regards supply schemes, books are provided at the expense of the state, free of charge on a loan basis by central or local authorities, e.g., in France, Germany, the Netherlands, New Zealand, Sweden and Switzerland. School books are also provided free of charge in Japan for students at the compulsory level of education. In Greece and Cyprus students receive their books free of charge for all levels of primary and secondary education.

Since the 1990s the most significant trends in national learning and teaching material policies have been (a) the development of public private partnerships to replace state textbook provision systems, (b) the transition from state to textbook provision systems utilizing private sector involvement, (c) the introduction of competing alternative textbooks to replace monopoly textbook provision, (d) the decentralization of textbook selection based on choices made at the level of individual schools, (e) a significant improvement in the quality of textbooks and teachers' guides resulting from competitive pressures, (f) reduced prices and/or increased value for money as a result of competitive price pressures and extended book life, through the widespread use of minimum production specifications as a condition of approval for sale to schools, and finally (g) the rapid development of national authorship and publishing capacity.

2 Transformation in Educational Systems

The terms of production and provision of textbooks belong to the broader context of the operation and funding of the educational system of each country. After the 1970s the operational and funding model of educational systems changed drastically.

The policy issues abovementioned reflect and refer to the current official theoretical and political background that developed throughout the 1970s. Until then, the prevailing model was based on the prosperous welfare state that was established after the end of World War II. This model suffered much criticism. Various surveys criticized the low level of public social services, demonstrating that in critical areas of the welfare state the middle classes enjoy the same or more benefits than the poor, both in terms of quantity and in terms of the quality of the social services provided (Le Grand 1982).

During the 1960s and 1970s education systems were developed within frameworks that aimed towards the generalized creation of a welfare state. These two decades are distinguished firstly by the accessibility to secondary education that was now open to the middle classes and to the broader lower social classes and secondly by extending compulsory school attendance up to the first cycle of secondary education, until approximately the age of 16.

The fundamental proclamation of social educational policies was founded on the equality of educational opportunities by means of the public provision and control of educational goods and the assurance of a minimum of educational standards.

In accordance to the prevalent theoretical approach and policy during that time period, the social provision of educational goods refers to the resolution of instances of inequitable distribution of resources and hence the practice of policies for redistribution, under the term "compulsory education". Thus the approaches rooted in social welfare and the consequent policies at the time, acknowledged education as a matter of public interest that ensured the elemental conditions of a social consensus for the smooth replication of the political system and thus they justified state intervention. Whether directly or indirectly, these approaches transfer to the state the obligation to cover the costs and to a certain degree they validate the public and free provision of educational needs to all citizens.

Specifically for the educational system, the consensus supporting a general and "one for all" education began to fail. The argument against the authority of the teachers, against the centralized design of teaching material and in favor of the ability to choose knowledge domains as school subjects, in favor of conventional teaching methods, and in favor of stressing students' high academic achievements constantly gained ground (Timmins 1995).

Many analysts and politicians became skeptical, and viewed with a certain amount of distrust whether the bureaucrats, the public servants and the professionals of the public sector services were actually working for the common good and if in fact they were interested exclusively in the collective welfare of the public (Glennerster 1995).

During the same period the arguments put forward by the economists in support of public choice increasingly gained ground. Public choice advocated that the public sector officials and professionals function in a way which serves their personal interests and not the collective interests of the public (Mueller 1989). What is systematically obscured by the theory of public choice are the outbreaks of fiscal and economic crises that arose during the 1970s, which also affected the private sector market that by this time had already been organized in large-scale businesses which nevertheless began to experience profit losses and in many cases viability difficulties.

Consequently, the neoliberal approaches that emerge during the 1970s express harsh criticism of the social welfare educational model and challenge its proclaimed goals and its anticipated results.

These approaches ideologically modify education as an individual right in contrast to the social welfare model which recognizes education as a collective interest. Hayek, the chief instigator of the neoliberal approach, by introducing the

theoretical concept of the individual right to educational goods, considers as acceptable an elementary measure of state intervention towards the fulfilment of individual needs that concern public goods as an inferior and deficient institution (he defines the education system as such), in the event and to the degree that these needs cannot be satisfied by the more effective methods of the market (Hayek 1998). In analyzing education in economic terms he considers it as an external effect, from which the individual benefits. Thus in a vague manner he accepts a minimum level of state intervention, exactly because of his position regarding this external effect. At the same time he questions the value of the public educational system, which he describes as a state monopoly and he proposes types of educational policies that enhance the practice of individual freedom and choice. Other neoliberal approaches claim that public education is organized according to bureaucratic principles that deliver ineffective and inefficient services and that it does not allow the control of educational institutions nor does it enable accountability to the real users and consumers of the educational services. They also consider that the social welfare policies are a waste of valuable resources towards non-productive targets, which did not even manage to achieve the goal of equal opportunities (Denison 1984; West 1970).

These approaches consequently support that the rationalization of the educational institutions will be achieved with the introduction of institutions that will derive from the market and by conceding educational authority to the parents (parental choice). From the 1980s and onwards the neoliberal policies that incorporate fundamental doctrine of the neoliberal theoretical approaches have been making headway. These policies initially emerged in England and the US, but they have been progressively surfacing in other western countries.

These policies aim at the deregulation of the public aspect of education through the acceptance of neoliberal arguments such as "accountability to the parents", "parental choice" and the circumvention of "state bureaucracy". In various ways and by ever intensive degrees the following are being pushed forward: privatization in education policies, reduction of public expenditure and the introduction of different forms of competition within the framework of the public education system.

Two main elements for the structural transformation of the character of education with respect to its public character and state interventionism are the doctrine for the provision of educational goods via the market mechanism on the one hand and on the other, the implementation of a flexible redistribution policy via the mechanism of the voucher scheme.

In 1979 the election of the neoliberal conservative government of Margaret Thatcher marked a change in course. The public sector was confronted with great suspicion and it was considered that its employees remained in their positions in order to serve their own personal interests.

These changes regarding the theoretical conception, the convictions and the practice of policy in the end resulted in the prevalence of the quasi market mechanism, by which the state maintains the control of funding the services, but

it does not directly provide the services to the beneficiaries, assigning the provision of services to independent producers—procurers, who compete with each other.

Studies concerning quasi market operation in education systems illustrate the possible occurrence of a downward spiral effect. Accelerated competition between schools under certain management procedures cause increasing difficulty in attracting students with high educational performance which in turn causes difficulties in attracting highly qualified teachers. Finally, this effect causes social segmentation and therefore produces social exclusion effects (Ball et al. 2004).

3 The Demand Side and the Selection Mechanism of Schoolbooks

The textbook market does not operate in exactly the same way as most consumer markets. Firstly, the end consumers (students) do not select the product and the product is not purchased by faculty or professors. Therefore, the price issue is removed from the purchasing decision, giving the producer (publishers) disproportionate market power to set high prices. Similarities are found in the pharmaceutical industry, which sells its wares to doctors, rather than the ultimate end-user (patients). What is mentioned here relates mainly to the pricing circumstances in tertiary education, but they also apply respectively to primary and secondary education.

Textbooks in today's world are produced and promoted mainly by private publishing companies under the predominant assumption that the way the market operates ensures better results in the quality of educational material, in full and efficient supply and in price control. In many cases, the state undertakes to fund the supply of textbooks but without a centralized provision of textbooks.

The schools possess a measure of self-governance that allows them to choose the textbooks that they will obtain and in the event that they receive funding, to provide the books free of charge to their student body in total or in part (in the cases where certain criteria apply for the support of financially disadvantaged students). Moreover, the schools that receive funding are subject to a budget ceiling in their subsidy, which implies that their overall operational costs must not exceed a fixed budget limit. The schools or the teachers also choose the books in education systems where the parents directly bear the cost of buying the textbooks.

In almost all European countries where the production and distribution of textbooks is predominantly undertaken by private publishers, the teachers are responsible for choosing the textbooks each year. This selection approach follows two basic types of procedures:

(a) The teacher freely chooses the textbooks that are made available by the publishers on the commercial market.

(b) The teacher chooses textbooks listed in catalogues of approved books that are published by a competent official state authority.

In both cases diverse processes apply, where: each teacher has the individual right to her/his final selection of the textbooks; the selection of books is carried out by of the school council or the school principal; a group of principals from different schools cooperate and undertake to select textbooks, ensuring a high level of uniformity and consistency in the content and quality of the educational material over a wider geographical administrative or educational area (region, district, county, municipality, etc.); the final choice is made by a local authority, based on recommendations by a school or a group of schools.

The teachers are thus the intermediate links who by various ways and methods decide which textbooks will be bought and therefore they indirectly determine the consequent cost of purchase of the books.

It is typical that in Ireland the cost of a textbook as a selection criterion is ranked by teachers as low as seventh or eighth on their list of selection criteria. In a School Books report in Ireland (Cooney/Carey 2006) it is observed that in theory teachers decide what texts to use. In practice, they are subject to a variety of parental, school and marketing pressures which are all designed to influence them towards different directions.

Throughout Great Britain teachers choose textbooks after they have reviewed the free samples of textbooks that publishers mail them, or after examining the textbook samples online, uploaded on the publishers' websites.

In France, according to the web site of the French education publishers' association Savoir Livre, the following conclusions are cited from the survey conducted for the association by Louis Harris with respect to the selection of textbooks in primary education (Harris 2004): 89 % of teachers consult with their colleagues, 69 % of teachers consult with the principal of their school, 40 % consult with the school council, 9 % consult with the State Education school inspector, 1 % seek help and advice at the university education faculties, 72 % express the need for better training and support in order to choose their teaching aids.

In Germany, depending on the particular policy implemented by each state (Land) of the federal union of states comprising Germany, the choice of books made by the teachers is endorsed by the educational inspectorate, the members of the parents' association and the student representatives.

The textbook selection system that relies on the choice of the teacher can function well on the condition that many different books are in circulation on the commercial market for the same school subject. If this is the case, the teacher can theoretically act as a selection specialist, a fact that equates the teacher with the rational agent within a typical model of rational behavior. The factors that can be used in order to accredit the teacher with the authority to select the textbooks are:

1. The educational benefit maximization which is entailed by the teacher's choice.
2. The consideration of the educational benefit in conjunction with the cost of purchase of the textbook.

The first factor implies that the teacher is suitably trained and able to select among a number of candidate books that are available for purchase those books that lead to the maximization of the educational result and thus ensuring the benefit of

the specific selection. Moreover, according to this hypothesis the teacher is considered to be unencumbered by parental pressures or the influence of marketing that might lead her/him to an inappropriate selection. Finally, by using this factor the cost of each textbook purchased is no longer a selection criterion. And in fact studies show that teachers usually do not take into account the cost of purchase of a book when they select the textbooks they wish to use in their classrooms. These and other studies also show that in reality teachers are constantly subjected to pressures mainly by the marketing practices of the publishers, but also by the parents who in the end influence their selections, whereas the teachers complain that they have neither the appropriate tools, nor potentially the full capacity to choose books based on an entirely rational choice with respect to their suitability. This usually happens in situations where many modifications occur in the available textbooks or in cases where an exceedingly large number of books for a specific knowledge domain are offered. It also appears in cases where the composition of the student body in the classroom in terms of performance, potential and financial situation are such, that parents with a higher income and a high educational profile impose books which they consider suitable for their children, but which cannot be adapted to the needs of the class.

As a result of the second factor the teacher acts as the key component that will determine the cost that will be borne by either the parent or the state and by extension the tax payer.

In the event that the final purchaser bearing the cost is the parent, then the teacher acts as an intermediary distorting the conditions that would otherwise exist in a financial model replicating market operation. Then again, if the final purchaser is the state then the teacher acts as a public functionary thus assuming a role that we could liken to a public procurement service. In this case as well, there are no application factors to ensure that the teacher's choice determines the best possible value for money for the purchase of textbooks with the minimum possible cost and the greatest educational benefit.

4   The Supply Side

In almost every country within Europe (with the exception of the educational systems of Greece, Cyprus and certain Swiss Cantons), as well as the US and other developed Asian countries, schoolbooks are provided by the private publishing industry.

Principally, in the free market model publishers face no limitations or barriers in preparing, producing and selling schoolbooks even if these books are subject to evaluation by educational authorities. Schoolbooks are sold through a network of retailers either directly to parents or indirectly to schools which then in accordance to established policies provide them to students without charge or on a loan basis.

Accordingly, it is theoretically and politically foreseen that free market processes deliver value for money products and lower prices because of the effects of

market competition. Especially in Europe, the tradition of private publishers goes back to the sixteenth century. The role of publishers in the formation of capitalism is considered crucial. Anderson (2006) proposed the term "print capitalism" to emphasize the process. Anderson has also shown that books and newspapers where crucial factors that decisively enhanced the formation of both national and nationalist concepts, in a premature publishing industry. Pioneering publishers established branches throughout Europe.

There is a long tradition concerning active publishing businesses in the area of school books in Europe. In France for instance the Belin publishing house was founded in 1777 and has printed schoolbooks since 1850. Hachette was founded in 1826 and ever since, it has been active in printing schoolbooks and educational prints for both primary and secondary levels of education. Several other publishers were founded during the nineteenth century.

For almost all European educational systems, therefore, the free market operation comprises a long tradition accompanied with the confidence that it entails the supply of educational systems with suitable learning materials under competitive processes.

But, a central question is whether the assumption or confidence in the performance of the free market is validated and in particular, the extent to which free market performance involves price control. As a rule, with respect to the quality level of the educational and printing aspects it is a given that publishers apply high standards. It has been verified that the implementation of high standards have promoted content and printing quality. On the other hand, evidence ensuing from selected data shows that schoolbook prices are continuously increasing.

We selected data concerning price lists of schoolbooks in most developed European countries and in turn we compared selected prices with the total cost of each schoolbook title provided to Greek and Cypriot students gratis. It should be noted that in Greece and Cyprus the state is obliged to finance, produce and provide students free of charge with all necessary schoolbooks at the beginning of each school year. Production and distribution are undertaken by private sector enterprises under public procurement procedures. On the other hand, in other European educational systems publishers determine and set prices and either parents or schools buy the necessary schoolbooks.

Median total cost per title in Greece and Cyprus corresponds to 25–30 % of the median price of a similar book title in most other countries in Western Europe. It should be noted that per unit, schoolbook cost in Greece and Cyprus do not involve marketing—promotion expenses and gross profit, while royalty fees are paid directly to qualified authors under contractual and public procurement procedures.

Content and printing quality of schoolbooks are considered as high. Print runs usually concern a 4–6 year time cycle. In Greece and Cyprus printing infrastructure and know—how of the private sector follows high standards.

Concerning schoolbook prices and the amount spent by parents in Ireland, the Cooney/Carey report (Cooney/Carey 2006, p. 6) mentions:

... the cost of a schoolbook is determined by the number of copies printed, use of color, binding, whether it is being reprinted and the price of competing books. The following chart indicates the allocation of the average pound spent by Irish parents on schoolbooks.

Cost allocation

- authors royalties
- originations and planning
- typeseting/pre press
- printing
- binding
- marketing/sample copies
- distribution
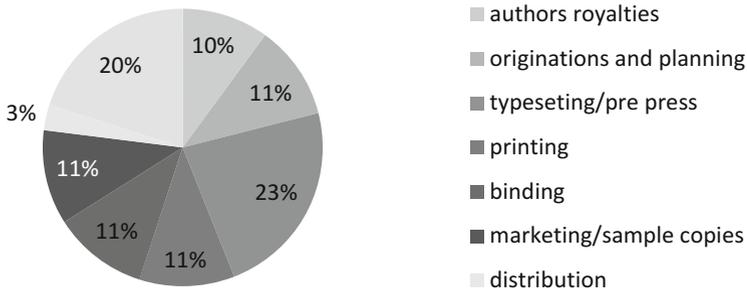
A national survey of textbook prices in USA (The State PIRGs 2005) refers that textbook prices are increasing at more than four times the inflation rate for all finished goods. The report analyses the continuing upsurge in textbook prices and includes recommended actions for students, faculty, state legislatures and publishers.

A 2005 report (GAO Report 2005) shows that the average rise in college textbook prices was 6 % per year since the 1987–1988 academic year and that prices in December of 2004 were 186 % higher than they were in December of 1986.

The above studies as well as others have illustrated that textbook publishers drive up the cost of textbooks by "bundling" texts with materials that are seldom used, such as CDs and DVDs. They also forced cheaper used books off the market by publishing revised editions with little enhanced content, or by modifying the format and page numbers to render older editions obsolete. In general, price inflation in schoolbook and textbook prices common to all educational levels took place in recent years.

These trends forced most national governments to introduce new legislation acts, in order to set barriers against price inflation such as:

– Revised versions are allowed after the completion of a 4 year time span. Such a policy facilitates reusability but also tries to avoid the introduction of unnecessary content revisions and heightened prices.
– The German Government introduced acts facilitating compulsory rating in schoolbook prices.
– Under law, publishers are obliged to publish price lists.

Finally, in order to legally protect small sized retailers, governments usually do not allow discounts under a certain percentage with the exception of direct sales to schools. In this case discounts can be higher. But all these anticipated legal actions and rules to date have no effective impact on price control. Hence, what must be

explored are the determinants for this price inflation trend. Three main determinants are detected: (a) the publisher's cost, (b) the distortion of supply–demand operation and price equilibrium because of the intervening role of the teacher, in the sense that the teacher and not the end consumer decides on the purchase, (c) the monopolistic and or oligopolistic competition circumstances which dominate the schoolbook publishing industry. All these factors interact and dynamically generate recurrent price growth outputs.

As concerns the key factors that determine the publisher's cost the following apply: (a) print run size which defines the printing and material cost level. In general, low level print run size entails higher costs, (b) the number of print runs of each particular title and edition. It is noted that usually publishers do not provide for profit until the second or third run, (c) total market share for each particular publisher, the number of different titles they print, capital sufficiency, hired technology and the depreciation rate concerned determine unit and total cost, (d) successful sales are determined by the amounts paid for marketing purposes. Therefore marketing expenses should be added to the total cost, but in general they form lower total cost percentages to the extent that marketing contributes to attain sales plans, and finally, (e) royalties paid to authors, as well as retailing discounts add indirect costs.

In general, one could conclude that the enterprise's size and the operational efficiency of each particular publisher are the means to control and achieve the reduction of productive costs in the long run. Besides, marketing expenses determine sales levels. Concerning schoolbook sales, publishers' unions influence the state authority's decisions about budget levels. On the other hand, marketing determines or influences individual teachers, or semi-collective board decisions at school, college or university level.

Since teachers are not equipped with effective support mechanisms or procedures for schoolbook decisions, marketing exerts pressure on teachers and parents towards book selection directly or indirectly.

It is noted that because of the transformation of educational systems into quasi market forms, centralized state procedures for book selection are no longer available and therefore schools have become quasi customers. In terms of the theory of economics this emerged market operates under imperfect competition circumstances.

In general, it takes the form of monopolistic competition which in many cases is transformed to oligopolistic competition. Oligopolistic forms could operate even if certain oligopolies coexist with a series of small sized publishers. In such a case small publishers follow product differentiation strategies to survive.

Main factors for the existence of monopolistic and oligopolistic competition are a relatively large number of competitors, differentiated products, and free entrance/withdrawal to the market in the long run. Such conditions seem to be often found in the publishing industry and particularly in the schoolbook and textbook supply system. Concerning product differentiation we subsequently cite some examples.

In Denmark ForlagMalling Beck, a respected Danish publisher specializes in printed and digital school material for primary and secondary educational levels

Schoolbook market in Austria/publishers' market shares

7 authors
3%

8 publishers
11%

7 publishers
35%

4 publishers
51%
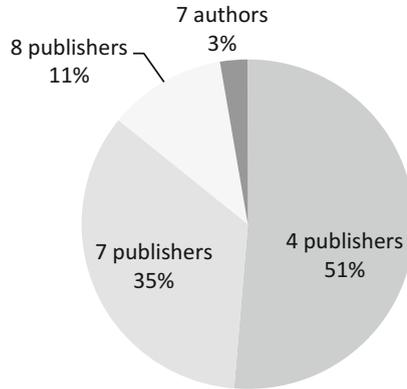
respectively. The company particularly specializes in the field of mathematics and exact sciences.

Gyldendal specializes in native language printed material, as well as literature and cultural education. DELC and MikroVaerkstedet mainly produce digital content. Alinea is the leading schoolbook Danish publisher. The company is a subsidiary of the Lindhardt and Ringhof group which in turn is a subsidiary of the Egmont Publishing Group.

In France publishers specializing in schoolbook production comprise two trade unions, namely the Syndicat National de l' Edition (SNE) with 20 members and the association Savoir Livre with six members. These publishers hold 80 % market share in schoolbook sales.

Concerning for instance the Austrian publishing market Fig. 1 shows the market breakdown:

In principle, under monopolistic competition circumstances producers sell their products at higher prices compared to those operating under perfect competition conditions. In fact, under monopolistic competition conditions the selected price Pmc for the quantity Qmc that maximizes profit is in principle higher than the marginal production cost MCmc as shown in Fig. 2. On the contrary, under perfect competition conditions price Ppc, corresponding to quantity Qpc which maximizes profit, is equal to marginal cost (Krugman and Wells 2009).

Product differentiation is a strategy assisting market influence through advertising and marketing in general. According to Krugman and Wells the appropriate answer to the question "'Why consumers are affected by marketing?' is maybe because consumers are not as rational as economists assume". On the other hand, another appropriate reply is that consumer response to marketing does not imply irrational behavior since advertising and marketing serve as special signals to certain conditions of imperfect information (Krugman and Wells 2009).
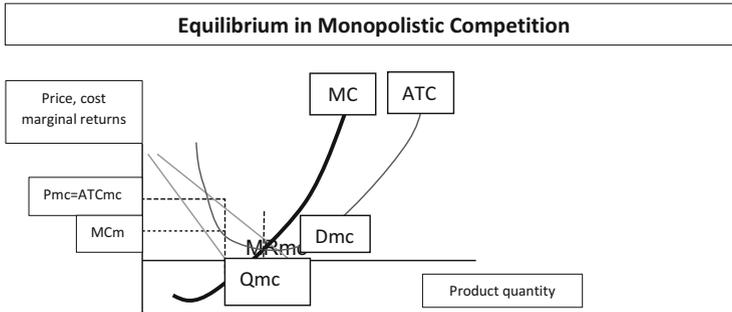
Fig. 2 Equilibrium in monopolistic competition

In the case of schoolbooks this remark is more obvious since the school textbook market is extraordinary because the primary individuals who choose textbooks, teachers and professors accordingly, are not the people who pay for these textbooks. In fact it is the students or state authorities who purchase them. Attempting marketing focus on teachers and faculty, publishers promote titles by sending the faculty free copies. It is worth noting that the students' demand for textbooks is what economists label as price inelastic.

In most cases where the state is the final purchaser or provides financial aid to financially needy students, budget formulas usually include textbook costs. When textbook prices increase, the financial budget also increases (Koch 2006). Since the state is no longer a large scale purchaser (in the sense that each school or university faculty makes individual choices) then it no longer has the capacity to control price increases.

The dynamics which then transform the publisher's competition into oligopolistic forms rely on the ever increasing concentration of the textbook publishing industry through hundreds of acquisitions resulting in the relaxing or elimination of price competition.

One common strategy that appears in both the abovementioned forms of the publishing industry within the ever changing nature of the textbook product is to keep producing new editions of successful textbooks rendering inexpensive used books obsolete, thus promoting sales of new books. Changes are so significant that price comparison over the years is of small relevance. For example, today we have the practice of bundling textbooks with other items such as CDs, DVDs, manuals, etc. (Koch 2006).

5   The Greek Schoolbook Supply System and a Simulation Experiment

In Greece the established policy concerning the provision of schoolbooks to students distinguishes between a single book for some subjects (mathematics, physics, Greek language, etc.) and the teacher's option for certain other subjects. Production and distribution processes take place under a public procurement system. Median per title cost in Greece is about 0.5 euro, which is very low compared with median prices in other European countries.

The whole supply process is facilitated by state of the art technological and operational methods. A large scale central web portal is available for each school to order schoolbooks each year. Logistics and transportation facilities through outsourcing services guarantee "on time" delivery to schools at the beginning of each school year. Delivery is confirmed through web services. The print run of each particular title is based on total student population estimation. Book quality is high.

The digital school web portal[1] contains a series of digital books, guides and supporting material for teachers, applets, videos and other digital educational content. So, one could infer that the Greek schoolbook supply system differs from those previously outlined in that it is state based.

In order to test possible outcomes under the assumption of privatization (free market operation) we ran a series of simulation experiments based on a simulation model developed. The analysis was focused on primary level education. Parameters for the experiment were set as follows:

– Eleven publishers were responsible for the supply of schoolbooks.
– Cost included direct production cost, as well as indirect expenses (royalties, retailing discounts, marketing costs, etc.).
– Prices were set equal (or higher) to marginal costs.
– Print runs sizes were reduced due to the involvement of several publishers.
– In case of sale and profit fail a publisher will withdraw from the market and therefore this niche will be covered by titles offered by the remaining publishers.
– The total number of candidate titles was set to 400 (while under the present system it concerns 160 titles).
– Initial demand was set as equal for every title and publisher.

Figure 3 illustrates the outcome of the simulation process.

The simulation outcomes illustrate the gradual transformation towards a monopolistic competition form. While at the initial step all publishers experience equal market shares in the third step of the simulation experiment four publishers represent a total 72.87 %, while the remaining seven publishers 21.64 % in total. Besides, due to raised costs, prices were also raised accordingly.

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[1] http://dschool.edu.gr
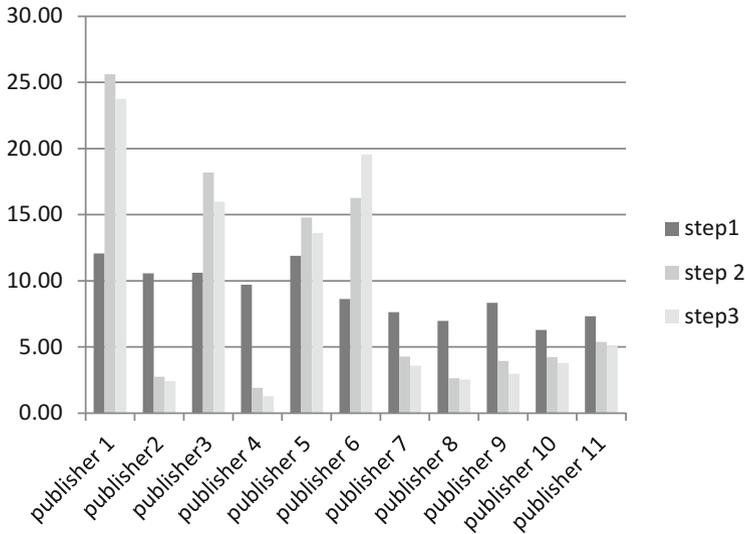
Fig. 3 Outcome of the simulation process

It is true that a simulation analysis concerns progression derived from assumed (hypothetical) conditions. But on the other hand, one can conclude that dominant market dynamics force such markets towards monopolistic competition forms. The authors of this paper do not of course imply that the market in general takes these forms and that the free market does not exist. Price competition takes place even in oligopolistic market forms.

On the contrary this is the case for the provision of social goods and in particular when selection mechanisms other than final consumers intervene in supply-demand processes. In such cases, efficiency of public finance, as well as effective educational systems are the main issues for discussion. Ball and Youdell (2008) show that not only schoolbooks but diverse secret forms of privatization follow accelerated trajectories of substitution in public educational systems. Some of them are the particular outcome of certain policies, which are usually labeled as "educational reform". Many others are introduced in the absence of previous social discussions, mainly concerning school management outlined as a necessary adaptation to modern social needs, but in fact they reflect the political orientation towards the purely marketable and consumer based practices of our modern societies. These reforms are strongly correlated to the general context of structural state reform (roles, forms, outcomes). Education services are theorized as an evolving new market which attracts direct foreign investments. The Emmet report (Emmet 2006) shows that 18–20 counties receiving loans from the World Bank consented to the obligation to privatize social or state operations.

6   Conclusion

The main issue then is the optimum allocation of resources, effectiveness and efficiency levels of an education system which formerly operated under the principle of the welfare state while today it is forced toward quasi market alternatives.

In truth, this transformation, as is always the case, has caused a number of positive and negative effects. In part, it enhanced student achievement as PISA results illustrate and besides, it improved the accountability of teachers and schools.

Meanwhile, it has created conditions for the increase of costs for the parents and the state. There is no certainty that it is moving toward the provision of equal opportunities and as long as this does not happen, it generates social inequality and it impairs the fundamental mandates of the state. Gibbons and Silva (2006) argue that while the quasi market in education is continuously growing we observe a certain cost and no obvious benefits.

Concerning in particular schoolbooks, a structural market transformation is observed towards monopolistic and oligopolistic competition. This transformation affects price leveling. And in no way can it be considered as free competition.

The theoretical perception of the quasi market, as well as its practical application did not manage to avoid placing the teachers in the position of the intermediary for the selection of schoolbooks and thus rendering them vulnerable to parental and marketing pressures.

At the same time, the physical aspect of educational material is changing by the socialization of innovation. Innovation can in principle bring about crucial improvements, while reducing the social cost.

Finally, with respect to the schoolbook, one must be aware that the dominant technological transformation observed in recent years, is drastically changing the landscape and it foreshadows the demise of the printed book.

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Empirical Verification of the Scale Measuring Patient Service Quality in Integrated Health Care in Poland

Iga Rudawska

Abstract The aim of the paper is to discuss the psychometric propertiesof a new instrument that assesses the patient service quality in Polish integrated healthcare. In the study the scale was composed of 32 statements. The examination of its validity was carried out on a sample of 320 patients. To measure the homogeneity of the scale α-Cronbach was applied. Next, the confirmation factor analysis was conducted based on PCA. In the study α-Cronbach coefficient for the entire scale amounted to 0.891, which is a very good result according to Nunnaly criterion. Moreover, individual items of the scale featured a high degree of validity. The confirmation factor analysis of 32 items demonstrated that the values of factor loading for nearly all test items are high. The study demonstrated that the developed instrument for measuring quality of care, comprised of nine areas and 29 test items, and it has a one-dimensional structure. The set of factor variables used allows to "aggregate" the seven initially distinguished dimensions and two new ones of the analysed quality of care.

Validity and reliability tests of the scale demonstrated that the instrument allows an accurate diagnosis of the quality of care perceived by chronically ill patients.

Keywords Integrated health care • Perceived quality • Patient service • Assessment • Principal component analysis

1 Introduction

The idea of integrated healthcare is associated with the provision of healthcare services through the co-ordination of different activities (diagnostics, therapy, rehabilitation, health promotion), with the patient being the final beneficiary (Stranberg-Larsen and Krasnik 2009). A coherent set of services is planned, managed and delivered to individual service users across a range of healthcare organizations and by a range of co-operating professionals.

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The quality of healthcare, also within integrated health care models, has become a priority on the agenda to improve the healthcare systems. Evaluating quality is the first step towards improving quality and thus value in healthcare. Health care is becoming more patient-centered and, as a result, the experience of users of care and evaluation of their experience is taken more seriously (Vrijhoef et al. 2009).

The need for a brief, validated patient self-report instrument to assess the extent to which patients with chronic illness receive high quality care has been expressed by many researchers (Schmidt et al. 2008; Naithani et al. 2006; Clark et al. 2008). The most common instrument to assess patient service quality in integrated health care settings has been developed by Glasgow et al. (2005b). It is called Patient Assessment of Chronic Illness Care (PACIC) and is widely used to among diabetic patients (Glasgow et al. 2005a) and other chronic patients in the United States. This instrument has been adjusted to the American and Canadian health systems and does not suites the Polish one. Therefore, in order to measure the perceived quality of care in integrated health care settings in Poland, a new instrument has been developed.

Determining the usefulness of a measurement instrument in new conditions requires that its validity and accuracy is examined. Validity constitutes a measure of the degree to which a test result reflects the real value of an analysed property and to what extent this measure is affected by a measurement error coming from various sources (Sagan 2004). Validity informs a researcher about the extent to which the items comprised in a given scale are similar to one another, whether they measure the same construct. Operationally, validity is defined as repeatability of results. The higher the validity of a test measurement is, the closer the results of two measurements taken with it. It means there is a high correlation between them. Therefore, the validity of a given scale is understood as the accuracy of its measurement. Since repetition of tests on the same sample of respondents is problematic, typically validity measures are based on a single test conducted on a given group of individuals.

2 Purpose, Materials and Methods

In the study the scale measuring the patient service quality was composed of 32 statements. It was worked out using Q-sort procedure that enabled recreating the dimensions of care quality over chronically ill patients. Consequently, the indicators defining the quality of care of this segment of patients with the use of associations of the target group have been isolated. As a result, it enabled the author to develop a research instrument in the form of a survey questionnaire, in which seven central categories (dimensions) were assigned with individual statements. Their division on the grounds of Q-sort is presented in Table 1.

The above list of seven groups of indicators was translated into a final scale and it was used to develop a research instrument for the evaluation of the quality of care over chronically ill patients from the demand side (patients' side). 5-point Likert

Table 1 Division of indicators into dimensions (central categories) based on Q-sort

Central category and its description	Indicator of the quality of care over chronically ill patients
A. Patient activation—patient's conscious, active participation in the treatment process (six statements)	1a. My attending physician takes into consideration my opinion on the treatment applied, its course and effects 2a. My attending physician has enough time to hear me out and answer my questions 3a. My attending physician discusses with me subsequent stages of treating my disease 4a. My attending physician gives me a possibility of choosing the method of treatment, if there are different methods of therapy (treatment) of my disease 5a. My attending physician wants me to tell him/her about various matters related to the condition of my health, such as side effects of the medication taken, course of other diseases 6a. My attending physician, or another person of medical personnel (nurse) encourages me to participate in prophylactic programmes
B. Support given to patients in decision-making—support to the patient provided by medical personnel in making decisions regarding patient's own health (five statements)	7b. My attending physician informs me of additional tests and consultations recommended in case of my chronic disease 8b. My attending physician or another person of medical personnel helps me to define what needs to be changed in my lifestyle in order to better deal with my chronic disease 9b. My attending physician or another person of medical personnel gives me informational material (brochures, leaflets) explaining how to proceed in the case of my disease 10b. I have access to psychological support in the disease, the possibility of contacting a clinical psychologist, therapist and/or organizations of patients suffering from the same diseases 11b. I have free access to my medical documentation
C. Continuity—continuity of contacts with the same attending physician, the awareness of the attending physician as to the advice given and medication prescribed by other physicians (four statements)	12c. I have one permanent attending physician 13c. I have the ability to continue specialist treatment without the need for repeated visits in order to obtain a referral from a general practitioner 14c. My attending physician has got information on the advice given to me by other physicians, what medication they prescribe me, what procedures were performed on me at other medical facilities 15c. I have regular diagnostic tests performed and systematic follow-up visits resulting from my chronic disease.

Table 1 (continued)

Central category and its description	Indicator of the quality of care over chronically ill patients
D. Coordination of actions—coordination of care over patient with different physicians and various medical facilities (four statements)	16d. I have a designated person from medical personnel (a physician, a nurse), who organizes for me the entire care within the health care system 17d. The physicians who treat me do not contradict one another; I receive consistent/the same medical recommendations from different medical professionals 18d. My attending physician consults with other physicians with regard to the condition of my health 19d. I received comprehensive health care related to my chronic disease—I have the ability to have many, different consultations at the same medical facility (e.g., with a dietician, physical therapist)
E. Solving patient's problems—solving patient's health and organizational problems by medical personnel, building the feeling of safety (five statements)	20e. My attending physician explains to me the objectives of my treatment, the process of treatment and its expected results 21e. My attending physician or another person of medical personnel explains to me what will happen next in my treatment, where to go, what to do, who to contact, etc 22e. My attending physician or another person of medical personnel gives me instructions on how to proceed in case the condition of my health rapidly deteriorates, there is an exacerbation of disease symptoms 23e. I can order a home visit of a physician or a nurse 24e. I can contact the person responsible for the care over me (community nurse, attending physician) by phone or e-mail
F. Flexibility and availability—direct access to medical services, ability to choose a service provider (four statements)	25f. I can choose my attending physician 26f. I can select a suitable date for a visit 27f. I have access to the information regarding the services offered and the time I need to wait for them (e.g., by phone, at the facility's web site) 28f. The results of my laboratory tests are available on time, i.e., before my next appointment with the attending physician
G. Orientation on the patient—taking into consideration patients' opinions and suggestions, reacting to them; respecting patient's rights, sensitivity to patients' needs (four statements)	29g. The facility's personnel reacts quickly to my needs; I can feel that the personnel is interested in me 30g. At the medical facility there is access to information on patient's rights, including the possibility and the procedure in case I want to file a complaint, or contact superiors (e.g., the

Table 1 (continued)

Central category and its description	Indicator of the quality of care over chronically ill patients
	outpatient clinic manager) 31g. The facility in which I am treated is interested in what patients think of it; it conducts satisfaction assessments 32g. The facility in which I am treated introduces changes, which in my view will improve patient care

scale was applied for that purpose, which defined the frequency of the occurrence of individual phenomena, described with 32 indicators, where: 1—never, 2—in rare cases, 3—sometimes, 4—in a majority of cases, 5—always. The devised questionnaire underwent a pilot study in the field in order to develop its final version.

The examination of its validity was carried out on a sample group of 320 chronically ill patients. The sample selection for the study was made on a quota-stratum basis. A stratum-based selection was made in cross-sections of the number of chronic conditions (one chronic condition, two or three chronic conditions, more than three chronic conditions). Within the framework of strata control variables of patient's gender and age were introduced. The selection of quotas for the research sample concerning the value of demographic distributions in the West Pomeranian District was conducted on the basis of the reports prepared by the Main Statistical Office (2011, 2012). The choice of sample size was decided on the grounds of a formula for a minimum size for stratum weight sample (Mynarski 1990), assuming a confidentiality coefficient of 0.95 and a maximum admissible error of estimation of 0.05. The study was conducted at out-patient healthcare clinics located in the territory of the West Pomeranian District.

53.13 % female patients and 46.87 % male patients participated in the study. More than 45 % of the surveyed patients meeting the preliminary criterion of suffering from at least one chronic disease are seniors (65+). 43.75 % of the respondents suffer from one chronic condition, 34.06 % from two or three such conditions, while 21.56 % are patients suffering from three chronic diseases. The greatest number of patients in the analysed sample have secondary school education (44.06 %), next was the group of patients with vocational school educations (23.75 %). A little more than 1/3 of the respondents subjectively assessed their health as being average (36.75 %), 38.13 % claimed being in good health, 10.63 % in very good health, and 13.13 % in poor or very poor health (1.55 %). Detailed characteristics of the analysed patient population are presented in Table 2.

The aim of the study was to measure the homogeneity (internal coherence) of the scale. The method used is one of the most popular ones and at the same time a method recognized as the best way of validity estimation (Sagan 2004) namely α-Cronbach method. The formula for calculating the coefficient is as follows:

Table 2 Characteristics of the research sample

Characteristics	Divisions	Value (in%)
Age	Up to 35 years old	10.31
	36–50 years old	11.56
	51–65 years old	32.50
	Over 65 years old	45.63
Gender	Female	53.13
	Male	46.87
Education	Primary	15.63
	Vocational	23.75
	Secondary	44.06
	Higher	16.56
Number of chronic conditions	One chronic condition	43.75
	2–3 chronic conditions	34.06
	Over 3 chronic conditions	21.56
Subjective health condition in a patient's view	Very good	10.63
	Rather good	38.13
	Average	36.56
	Poor	13.13
	Very poor	1.56

$$\alpha = \left(\frac{k}{k-1} \right) \times \left[1 - \sum \left(s_i^2 \right) s_{sum}^2 \right] \tag{1}$$

Where:

k—number of test (scale) items

s_i^2—variance k of individual items of the scale

s_{sum}^2—variance of the sum of all items of the scale

3   Results and Discussion

In accordance with Nunnaly criterion properly constructed scales feature the value of α-Cronbach coefficient of over 0.7. The coefficient assumes the values from 0 to 1 (Nunnaly 1978). Internal consistency demonstrates the degree to which a given test (scale) is uniform, that is to which extent all the items in a test refer to the same factor (property).

In the conducted study α-Cronbach coefficient for the entire scale amounted to 0.891, which needs to be recognized as a very good result in light of Nunnaly criterion. Moreover, individual items of the scale (32 statements) featured a high degree of validity. α-Cronbach coefficients for individual items ranged from 0.884 to 0.896 (Table 3). Furthermore, it was analysed whether a removal of any of the 32 items of the proposed scale results in reducing its validity. After a withdrawal of

Table 3 Analysis of the scale validity

No. According to the survey	Average (with a statement removed)	Variance (with a statement removed)	Standard deviation (with a statement removed)	Correlation (the entire value to the value of a statement)	α-Cronbach (with a statement removed)
1a	122.0503	287.3748	16.95213	0.559847	0.886998
2a	122.1195	287.8348	16.96569	0.507087	0.887527
3a	122.1667	284.0257	16.85306	0.590452	0.886025
4a	122.7076	282.9491	16.82109	0.460461	0.887705
5a	122.217	286.5473	16.92771	0.514822	0.887232
6a	123.0849	278.4865	16.68791	0.481752	0.887315
7b	122.4214	278.5583	16.69007	0.599647	0.884997
8b	122.4371	281.6611	16.78276	0.518418	0.886597
9b	123.5	280.0865	16.73578	0.427957	0.888679
10b	124.6698	293.2778	17.12535	0.174155*	0.894023
11b	122.522	278.1048	16.67648	0.512304	0.886581
12c	121.7013	299.8573	17.31639	0.277546*	0.891281
13c	124.1415	295.0523	17.17709	0.113717*	0.896292
14c	122.5786	281.074	16.76526	0.529793	0.886362
15c	122.2862	283.569	16.83951	0.572503	0.886118
16d	123.9528	282.5041	16.80786	0.322578*	0.892066
17d	122.695	288.1428	16.97477	0.401374	0.888847
18d	123.4497	289.889	17.02613	0.240255*	0.892774
19d	122.9025	280.415	16.7456	0.409875	0.889199
20e	122.1352	284.7207	16.87367	0.524527	0.886845
21e	122.1447	284.7212	16.87368	0.569124	0.886366
22e	122.3176	282.1161	16.79631	0.561745	0.886012
23e	122.2799	289.5915	17.01739	0.305179*	0.890712
24e	122.6069	281.0939	16.76586	0.488989	0.887109
25f	121.8019	297.2344	17.24049	0.237273*	0.891169
26f	122.4937	278.772	16.69647	0.539415	0.886032
27f	122.8962	281.9609	16.79169	0.466372	0.887582
28f	121.8962	295.4389	17.18834	0.338845*	0.89014
29g	122.5535	277.6056	16.6615	0.658512	0.884045
30g	122.2327	286.2855	16.91997	0.476981	0.887632
31g	123.3994	286.2399	16.91862	0.43304	0.888273
32g	123.2327	287.0716	16.94319	0.423348	0.888461

Notes: The values that do not satisfy Kline criterion were marked with "asterisk"

individual items, α-Cronbach coefficients remain high. It means that none of the 32 statements decreases the validity coefficient of the entire scale.

Eight items of the scale (the values marked with "*" in the table below) failed to satisfy Kline criterion [i.e., correlations of particular variables between the total result of the scale ought to be higher than 0.4 (Kline 1986)], but they met Nunnaly

criterion (analysed scales should feature α-Cronbach coefficient value of over 0.7). The indicated items of the scale will be subjected to further evaluation.

In order to complete the description of the psychometric properties of the scale, further study of the scale accuracy was conducted. The accuracy of a given scale (a given test. a given measure) is the most important characteristics in psychometrics. It provides information on whether a given scale indeed does measure an assumed variable and not a different one, a similar one. Therefore, accuracy concerns the extent to which a given empirical measuring instrument adequately reflects the true significance of a given concept (Babbie 2009). A scale is accurate if it measures what it is designed to measure, irrespectively of the accuracy—since it is known as the validity of scale.

A set of coefficient variables can be interpreted in terms of an analysed construct, if they identify one common phenomenon (Nowak 1985). Therefore, a confirmation factor analysis was used to verify whether the coefficient variables can be "aggregated" in one coefficient, in line with the adopted methodology (Sztemberg 2000). This analysis permits to assess the quality of a proposed measurement model for a phenomenon directly non-observable. Thus, it concerned an evaluation of the theoretical accuracy of the applied set of coefficient variables for individual items of the scale in seven different dimensions (areas A., B., C., D., E., F., G., according to the designations from Table 4).

The confirmation factor analysis was conducted on the data set acquired by way of a quantitative study (N = 320) based on the method of principal components. It was assumed that the variables constituting the scale will correlate at the level of at least 0.6 (in respect of the absolute value) with the first main component, representing an assumed, theoretical property of the dimension (area) measured by the scale.

The analysis of items demonstrated that the values of factor loading (a correlation between a questionnaire item (statement) and a factor) for nearly all test items are high. They exceed the assumed threshold of 0.6 in respect of the absolute value (Table 4). The items of higher factor loading are the best indicators of such factors. Only in the case of three of the items on the scale (6a, 10b and 25f) were the factor loading values lower than 0.6. This result suggests that the above-listed statements need to be rejected from the final version of the scale in order to improve the its accuracy. It is worth mentioning that two of the enumerated items of the scale (10b and 25f) additionally did not meet Kline criterion (validity analysis), which confirms the decision to withdraw them. In turn, in case of five of 32 initial items of the scale the factor loading values exceeded 0.8 in terms of the absolute value. Hence, it must be recognized as a satisfactory result.

All of the isolated factors satisfy Kaiser criterion, according to which the characteristic values of factors (clarified variance) ought to be higher than 1. Thus, each factor distinguishes as much as one original variable does.

On the grounds of the conducted factor analysis it can be concluded that in the first dimension (sub-scale A) one factor was isolated. Five first statements describe it perfectly, while statement 6a fails to fulfil the assumed criterion. The same is true with regard to the second area, i.e., B (statement 10b was rejected), the fourth one,

Table 4 Analysis of theoretical (factor) accuracy of the scale

Analysed areas (sub-scales)	Items of the scale (statements acc. to questionnaire numbers)	Factor 1	Factor 2	Variance clarified for factor 1 (% share was given in brackets)	Variance clarified for factor 2 (% share was given in brackets)
A. Patient's active participation in treatment process	1a	−0.706	–	2.874 (47.90 %)	–
	2a	−0.691	–		
	3a	−0.812	–		
	4a	−0.677	–		
	5a	−0.715	–		
	6a	−0.514*	–		
B. Support to the patient in decision-making	7b	−0.758	–	2.040 (40.81 %)	–
	8b	−0.736	–		
	9b	−0.646	–		
	10b	−0.364*	–		
	11b	−0.610	–		
C. Continuity of care	12c	0.456*	0.642	1.584 (39.60 %)	1.039 (26.98 %)
	13c	0.232*	−0.790		
	14c	0.835	−0.045*		
	15c	0.839	−0.009*		
D. Coordination of care	16d	−0.677	–	1.711 (42.78 %)	–
	17d	−0.612	–		
	18d	−0.618	–		
	19d	−0.702	–		
E. Solving patient's problems	20e	−0.754	0.469*	2.463 (49.27 %)	1.030 (20.61 %)
	21e	−0.851	0.209*		
	22e	−0.779	0.145*		
	23e	−0.527*	−0.630		
	24e	−0.531*	−0.689		
F. Flexibility and availability	25f	−0.491*	–	1.745 (43.64 %)	–
	26f	−0.758	–		
	27f	−0.682	–		
	28f	−0.680	–		
G. Patient-oriented care	29g	−0.812	–	2.139 (53.47 %)	–
	30g	−0.740	–		
	31g	−0.664	–		
	32g	−0.699	–		

Notes: The factor loading values that do not meet the assumption of >0.6 are marked with "asterisk"

i.e., D (all the statements ideally define factor 1), the sixth one, i.e., F (statement 25f was rejected) and the seventh one, i.e., G, but in areas D and G all the items of those sub-scales describe them very accurately (both dimensions are characterised by one factor).

A second, hidden factor appeared in the third (C) and the faith (E) dimension. It demonstrates that sub-scale C is ideally described by only two statements (14c and 15c). While the two remaining items (12c and 13c) form a new dimension. It shows that area C (Continuity of care) needs to be described by two factors and not by one, as was originally assumed. Factor 1 explains over 39 % of the entire variance, while factor 2—over 26 % of the entire variance. A similar situation applies to area E (Solving patient's problems). Factor 1 explains over 49 % of the entire variance (the first three statements). Factor 2 appears here as well (statements 23e and 24e), clarifying over 20 % of the entire variance.

On account of the above it was decided that dimension C should be defined by two factors, i.e., C1 (statements 12c and 13c)—relational continuity and C2 (statements 14c and 15c)—informational continuity. Dimension E was divided into E1 (items 20e, 21e and 22e)—solving patients' health and organizational problems and into E2 (items 23e and 24e)—building patient's sense of safety.

4   Conclusions

The above empirical findings permit one to conclude that the proposed scale of evaluating patient service quality—after rejection of the items not satisfying the assumed criteria—constitutes a uniform (homogeneous) set of statements highly correlated to one another. Therefore, the proposed scale feats high internal compatibility (coherence). It may thus be deemed as an instrument enabling a reliable measurement of the quality of care over chronically ill patients in terms of demand.

The study further demonstrated that the devised instrument for measuring quality of care over patients, comprised of nine areas (two additional ones were supplemented in relation to the original assumption) and 29 test items (three items were removed), and it has a one-dimensional structure. The set of factor variables used allows to "aggregate" the seven initially distinguished dimensions and two new ones (in areas C and E) of the analysed latent phenomena (here: quality of care over chronically ill patients).

Recapitulating, validity and accuracy tests of the scale demonstrated that the instrument allows an accurate diagnosis of the quality of care perceived by chronically ill patients.

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Project Orientation in Institutions of the Public Sector: Key Methodological Assumptions

Jacek Strojny

Abstract Project Management Method (PM) is a holistic approach, defining contextual, procedural and behavioral aspects of project performance. Its genesis could be associated with the Manhattan Project (construction of the atomic bomb), and thus the time of World War II. In the 1960s PM was spreading in business ventures, especially in the developed countries of Western Europe and the USA. In today's world, the following approaches are popular—linear: IPMA, PMI and PRINCE2 and light, based on the AGILE manifesto (e.g., Scrum). The aim of this paper is, to present chosen methodological assumptions of the implementation of project orientation in institutions of public administration. It focuses on the model of the project life cycle, confronting the assumptions of the method (mainly the requirements for the techniques of initiation, planning and controlling) with the conditions of the implementation, in terms of the Polish public administration. In the article a case study method of research was employed, referring to certain aspects of the implementation of the pilot project orientation, in one of the localities in southern Poland. Acceptance of the project orientation of public administration institutions should be treated as an innovation process, which is a response to the current challenges of the environment. It means often introducing a specific solution in many areas of the organization. In local government, this type of solution allows for the implementation of effective planning and controlling, at both the strategic and operational levels. Additionally, it promotes financial management through the judicious use of so-called task budgeting.

Keywords Project orientation • Project management • Public institutions • New public management

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1 Introduction

In the literature, there is disagreement as to the definition of public administration (Aderibigbe and Olla 2014). In this work, this term is understood as institutions established for the implementation of processes for the community of the country, region or other territorial structures (United Nations (UN) 2006). In Poland, it can be divided into the central, regional and local governments. Decentralization of the nation began after the end of 1989. During the times of a centrally planned economy (the period of communism), territorial structure was included in the central government. On the basis of the regulations from 1990 (Municipality Act 1990), local municipalities were introduced. In the subsequent years, the autonomy of these municipalities increased. In 1999 a further reform was conducted, introducing regions (voivodship) and districts (District Act 1998; Voivodship Act 1998). Operating in conjunction to the local government, at the regional level, operates the central administration, subordinate to the Prime Minister. Its mandate has been gradually reduced to the responsibilities of upholding the quality of local law, public security, crisis management, etc. Increasing competencies of local government, accompanied by changes in their financial activities (Szewczuk et al. 2011) progressively increased their income, by increasing the amount of income taxes. Within the structure of local government, 16 regions, 380 districts and nearly 2.5 thousand municipalities can be found in Poland.

Polish accession to the European Union in 2004 opened a new chapter in the development of both local and regional government in Poland. Pre-accession funds and structural funds forced the local government to significantly redefine the principles of the operation and management of socioeconomic development. An influx of significant resources facilitated many infrastructure and social projects. Institutions learned to carry out their projects, while they were preparing proposals and applying for the financing. Simultaneously, in order to seize the opportunity of development, many governments applied for various external sources, without examining the validity and effectiveness of the projects. Therefore, many current researchers refer to the dysfunction of the absorption of EU funds in financing, during the period 2007–2013 (Bober et al. 2013). This has led to over-investment, which has caused two serious consequences for development in the future. Firstly, the objects built with EU support are covered only by the project life-span, which limits and hinders their use. In addition to this, institutions are burdened with the substantial costs of maintaining the infrastructure (Misiag et al. 2013). The second issue is the incurrment of critical levels of debt, which blocks the possibility of greater involvement in the co-financing of projects in the new term of funding in 2014–2020 (Surówka 2014). It is, therefore needed, a significant qualitative change in the way of strategic management and project management. It is in this area where action needs to be taken, which will have a strong impact on the process of management and improve their rationality (efficiency and effectiveness).

One of the answers to these problems can be found in the field of management science. It is in the project management. According to studies, the adoption of the project orientation increases the probability of achieving a positive result of the project (Fuessinger 2006). This concept, in the literature, is treated as a process to ensure the achievement of the objectives of the project (Munns and Bjeirmi 1996). It is also an approach that defines the principles of project management in the organization (Rodney and Muller 2003). The origins of it can be generally associated with the Manhattan Project (Seymour and Hussein 2014), that is with the period of World War II. The aim of the aforementioned project was to be the first to create the atomic bomb. Due to its vast scale, inter-discipline, complexity and time pressure, many innovative organizational solutions and techniques were applied to see the project to fruition. In business practice, this approach began to be implemented in the 1960s (Kwak 2003). As evidenced by the establishment of organizations such as the International Project Management (IPMA) and Project Management Institute (PMI) (Kwak 2003). The effectiveness of the method also justified its implementation in the public sector. This is reflected, among others, in management standards commissioned by the government in the United Kingdom. It was the foundation of one of world's most popular methodologies—PRINCE2 (Kwak 2003). Within the framework of these standards, new concepts of project-oriented organizations are being created. They can be used to evaluate the level of project orientation and to implement the principles of project management. In the literature they are often called, "project maturity models" (e.g., Gareis 2005; Lianyinga et al. 2012; Andersen and Jessen 2003; Kerzner 2011). Optimizations of the course of a project are also attempted by the defining of phase models (life-cycle models) (IPMA 2013). This is the aspect which will be most broadly discussed in this article.

This article presents the assumptions of the phase model of the project, implemented in one of the districts in Southern Poland[1]. The primary research method used here, was the case study. It was the most suitable, from the standpoint of the described issues (Yin 2013). The study included the institution, in which the design approach has been implemented; that being the District Office. The main source of data was the documentation of the implementation, which was established during the introduction of the project orientation. The article brought closer the specificity of the project management, and then incorporated descriptions of the Project Phase Model, implemented in the surveyed institution. On this basis, and based on the observations in the course of implementing the theoretical and practical aspects, conclusions were reached and prepared.

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[1] The author was the project manager on the contractor site. He was responsible, among others, for the preparation and implementation of the objectives of project orientation, including the models of both the program and project phases.

2 Project Management: A Short Review of the Method

Project management describes both, the manner of managing projects as well as the conditions in which the organization must maintain to ensure that the process runs smoothly (Kerzner 2013). According to the Organization of Government Commerce (OGC) project management can be described as planning, delegating, monitoring and control of all aspects of the project and the motivation of those involved, to achieve the project objectives within the expected performance targets for time, cost, quality, scope, benefits and risk (OGC 2009). According to the PMI analyzed term, is understood as the application of knowledge, skills, tools, and techniques to the activities in project to meet the project requirements (PMI 2013). However, in the IPMA approach, project management is defined as the application of methods, tools, techniques and competencies to a project, including the integration of the various phases of the project life cycle (IPMA 2013). These approaches represent a very similar interpretation of this concept. Based on these, it is possible to define the two main dimensions of project management: (a) functional (course design) and (b) context (environment project), which provide for the achievement of the project's success. The article focuses on the first of these dimensions.

Explaining the functional aspect, should provide some definition of the project. The methodology PRINCE 2 defines a project as a temporary organization that is created for the purpose of delivering one or more business products according to an agreed business case (OGC 2009). Very similar interpretation of this term can be found in the PMI approach. Project is defined as temporary endeavor undertaken to create a unique product, service, or result (PMI 2013). Similarly, the IPMA defines project as a time and cost constrained operation to realize a set of defined deliverables (the scope to fulfil the project's objectives) up to quality standards and requirements (IPMA 2013). In the literature, can also be found other definitions of the term project. It is emphasized the fact that the project is a demanding and unique undertaken, requiring special responsibility. In practice, separation of the projects from the field of normal activity often requires some assumptions and definitions, characteristic of a particular organization.

Introduction of project management should result in an increase of the probability of success of the projects. According to the PMI, project success is measured by product and project quality, timeliness, budget compliance, and degree of customer satisfaction (PMI 2013). In other approaches, it is defined in the following dimensions: (a) the success of the product, (b) the success of the project (Baccarini 1999) or (a) customer satisfaction, (b) the budget and schedule, (3) the success of the business, (4) future prospects (Shenhar et al. 1997). The success of the project, therefore, can be divided into two areas. The first is associated with the proper carrying out of the operation (passing through the phase). While the second area of success, that are the effects that the project brought to the company and to the customer. The presented analysis assumes that the conditions to achieve success of the project also affect the success in the dimension of its effects. This approach is

presented often in literature (Jugdev and Muller 2005). Providing quality for the customer and benefits for the company is therefore possible if the project is carried out properly in terms of budget, time, and scope (Baccarini 1999).

Success in project management depends on the quality of the management of the project course. The model describing this is usually called Project Phase Model or Project Life-Cycle Model. It could be defined as a series of phases that a project passes through from its initiation to its closure (PMI 2013). There are commonly distinguished by several phases: conceptual, planning, execution and final, related to the creation of value to the project (Pinto and Prescott 1990). The PRINCE2 comprises the following element of such a model: starting up a project, directing a project, initiating a project, controlling a stage, managing product delivery, managing and stage boundary, closing a project (OGC 2009). According to the PMI, phase model includes: starting the project, organizing and preparing, carrying out the project work, and closing the project (PMI 2013). There is also a similar classification of IPM. Four-phase model, comprising: initiation, planning, implementation, closing, used in the approach presented in the research section of the paper.

Management of the project course is obviously only one of the dimensions of project orientation. A full analysis of the conditions of the implementation of such projects therefore requires a comprehensive view. Project-based organizations stand out from others in many ways (Brookes and Clark 2009). They have a specific organizational culture, structure, and use a variety of techniques for planning, controlling and control. According to one approach, referred to as the Maturity Model of the Project-Oriented Company, eight dimensions are remarkable: project management, program management, the assurance of the management quality in a project or program, assignment of a project or program, the project portfolio coordination and networking between projects, the organizational design of the project-oriented company, management staff in the project-oriented company and finally business process management in the project-oriented company (Gareis 2005). Of course, the literature mentions a number of other proposals, describing project orientation. It may also be mentioned that these concepts were aided in their creation by PMI model OPM3® (PMI 2003) or model Kerzner (Kerzner 2011). In assessing the course of the project, a comprehensive approach to the organization should be considered. This makes it possible to identify any inter-organizational factors that can significantly determine the course of the project. In particular, when creating detailed procedures for the phases of the project, it should be taken into account the specifics of the solutions in the organization, which are to be implemented in connection with project orientation.

3 Optimization of the Performance of a Project: Case Study in Polish Local Government

3.1 Basic Information

An example of the implementation of the project management method, in public administration, references one of the Polish local governments at the district level. It is located in Southern Poland, in the Malopolska region. Implementation was the result of actions taken by the authorities of the district, with a view to improving the quality of management. They were especially required to raise standards in the management of the district budget, and the quality of public services. Changes were complex, and meant adopting a project-orientation approach. It included the following elements: matrix structure, schemes of phase models of program and project, defining, planning and controlling techniques, principles of coordination of the project portfolio, templates of documents (Strojny 2012).

The starting point was the preparation of a definition of the project. It was assumed that the project is a one-off undertaking with determined time, scope and budget (Strojny 2011). Also distinguished were three types of projects: reorganizational, infrastructure and social. It was assumed that, regardless of the type of project, it will be carried out according to a standardized, general phase model, including the phases: initiation, planning, realization and closure (Strojny 2011).

The first of these stages—initiation phase serves to create and establish the concrete concept of the project. So this is the initial stage of planning activities. Information collected is used to assess the suitability of the project for the organization, and to decide whether to get involved in the project, both in terms of organization, as well as in cost. The planning phase is the main stage of planning. Its start is possible when the concept of the project was assessed positively. This stage is used to prepare the complex project plans (base plan). This entails, of course, the costs associated with the work of employees, but also oftentimes includes the costs of certain external services (e.g., the preparation of technical documents). The realization phase is the basic phase of the project life cycle, during which work is performed related to project management and other works (substantive), appropriate for the type of project. During this phase, it is necessary to provide continuous control, in order to determine the effect of deviations in the course of the project, and to put the changes into operation. Closure phase is the last phase of the project life cycle. It consists of the summary of the project and an assessment of how much the outputs have met its parameters.

3.2 Optimization of Project Initiation

In the studied organization, it was assumed that the start of the project occurs at the emergence of the idea of the project. In practice, this can be e.g., a preliminary idea

of making an application to a competition or problem observed, that will require the introduction of a solution. It was considered that this very initial stage of work on the project is important to the organization, and can provide useful information to management. Therefore a software was introduced that allows for the registration of projects in the early stages of agreements. The first group activity that appears here is *Registering a design concept*. It should be known that in public institutions, as in many other modern organizations, knowledge management is an important success factor. Although a large part of the ideas in this phase do not continue, managers should monitor emerging ideas and come back to them in due time.

It is worth noting that the rest of the work on the project requires a certain amount of work that needs to charge a certain unit of the organization. If the idea seems interesting, line managers may authorize the preparation of the so-called "Card of project concept". Such a decision, however, means that the line unit (e.g., office or division) will pay the costs of hours that an employee will spend only to prepare the project, not to do tasks (processes). They may be reclassified to a temporary unit (project team), only when the operation approves such a unit, and thus there occurs a transition to the planning phase.

An important innovation was the introduction of the obligation to assess the objectives of the project, including an assessment of compliance with the strategy. In Polish realities of public administration, both at the central and local government levels, there does not appear to be consistent use of strategic tools. Many projects are undertaken under the influence of lobby groups or political motives, without any consideration for the strategic objectives.

Positive evaluation of the project, both in the strategic area, as well as in terms of implications for institutions (financial, organizational, etc.) gives the rise to the start of the project. Here follows a series of technical activities related to its registration. At the same time it is worth noting that the matrix structure has been used. It includes a hierarchical organization and temporary project teams. In the majority of local governments, even if project teams were created, they are placed in the hierarchical structure of the institution. Moreover, introduced regulations allowed for a role reversal situation to occur. Subordinate in hierarchical system, can be the project manager and a line manager as a project team member. The introduction of such an approach, in the institutions with traditions of hierarchical culture, is very difficult. However, it creates significant potential for the advent of creative change and flexible action. The pattern of the initiation phase is shown in Table 1.

3.3   *Optimization of Project Planning*

The second phase of the project life cycle is also significantly changed in relation to the practice of public administration. In most of these types of institutions the basic planning process was based on the activities related to creation applications in the context of competition from EU programs. Local governments do not use conventional techniques of planning, developed under the project management methods.

Table 1 Optimal scheme of project initiation phase in implemented life-cycle model

Ph.1	Tasks in project initiation phase	Task type
Ph.1.1	Idea of the project	Milestone
Ph.1.2	The registration of the project concept	Task
	(1) giving a working name and code of the project, (2) identification of the unit substantive of the project concept, (3) identifying the person responsible for formulating the concept, (4) preparation of the project description, (5) estimating the cost of concept preparation, (6) giving the project status "Concept", (7) authorization to prepare a *Project Concept Card*[a]	Actions
Ph.1.3	Registered *Project Concept*	Milestone
Ph.1.4	Preparation of the *Project Concept Card*[a]	Task
	(1) description of the project (description needs, general description of the scope of the project, preliminary analysis of the stakeholders, the initial project risk analysis), (2) initial project plan (schedule, budget)	Actions
Ph.1.5	Completed *Project Concept Card*[a]	Milestone
Ph.1.6	Internal evaluation of the concept	Task
Ph.1.8	Evaluation of the project assumptions	Task
	(1) assessment the compatibility of the project with the strategy (assigning the project to the strategic goal and development program), (2) preliminary assessment of the impact of the project on the portfolio (on portfolio schedule, resource allocation, budget and liquidity)	Actions
Ph.1.9	Completed *Project Initial Assessment Card*[a]	Milestone
Ph.1.10	Reconciliation candidate for Project Manager	Task
Ph.1.11	Registration of the project	Task
	(1) giving a name to the project, (2) indication of the type of project, (3) assigning the code of the project, (3) obtaining the project manager, (4) indication of the merits unit for the project, (5) allocation of the planning budget of the project, (6) giving the project status "In preparation", (7) agreement for the registration of the project	Actions
Ph.1.12	Project registered	Milestone
Ph.1.13	Launching of the project	Task
	(1) preparation of the "Ordinance on the project start", (2) appointment of the Project Manager, (3) reconciliation of the Project Team, (4) establishment of the Project Team, (5) appointment of the Project Steering Committee, (6) settlement of the initiation phase	Actions
Ph.1.14	Project started	Milestone

Source: Own work based on Strojny (2011, pp. 12–15)
[a]Systemic document

Described organizational innovations embrace implementation methods, including Work Breakdown Structure, network diagrams, Gantt charts, histograms of resource allocation, and budgets in various spreadsheets. A very important part of the planning process is also a risk analysis. It has been implemented in both the initiation phase (initial risk analysis), as well as in the planning phase.

The basic document used during the planning phase is the studied institution "Project card". On the basis of the information gathered in the "base plan" a

Table 2 Optimal scheme of project planning phase in implemented life-cycle model

Ph.2	Tasks in project planning phase	Task type
Ph.2.1	Planning kick-off meeting	Task
Ph.2.2	Preparation of substantive documentation of the project	Task
Ph.2.3	Ready substantive documentation	Milestone
Ph.2.4	Obtaining funding	Task
	(1) preparation of the application, (2) application, (3) gaining a formal and substantive assessment, (4) signing of the contract	Actions
Ph.2.5	Funding obtained	Milestone
Ph.2.6	Preparation of the baseline plan	Task
	(1) stakeholders analysis, (2) risk analysis, (3) project objectives assuming, (4) preparation of the WBS, (5) development of the project schedule, (6) preparation of the planned resources allocation, (7) preparation of the project budget (8) preparation liquidity plan of the project, (9) preparation effectiveness plan of the project, (10) setting the baseline plan	Actions
Ph.2.7	Saved baseline plan (*Ready Baseline Report*[a])	Milestone
Ph.2.8	Preparation of *Project Card*[a]	Task
	(1) inclusion of baseline plan to *Project Card*[a], (2) preparation of the organizational structure of the project, (3) preparation of the Responsibility Matrix, (4) preparation of *Communication Plan*[a], (5) preparation of the *Project Effects Card*[a], (6) transfer *Project Card*[a] for consultation	Actions
Ph.2.11	Evaluation of the *Project Card*[a]	Task
	(1) assessment of the impact on the portfolio of projects, (2) assessment of the impact on the program, (3) assessment of the overall impact on the organization of work in the District Office, (4) assessment of the overall impact on the finances of the District	Actions
Ph.2.12	Ready *Project Card*[a] before the Realization Phase	Milestone
Ph.2.13	Approval of the project for realization	Task
	(1) transfer *Project Card*[a] for approval, (2) approval of the *Project Card*[a], (3) issuance of the *Order of the Starost to Start the Project*[a], (4) change in the status of the project to "Implemented"	Actions
Ph.2.14	Settlement of the Planning Phase	Task
	(1) the approval of the *Work Time Cards*[a], (2) preparation of the *Project Realization Report*[a], (3) verification of the *on Project Realization Report*[a], (4) preparation of the *Project Controlling Report*[a]	Actions
Ph.2.15	Project realization started	Milestone

Source: Own work based on Strojny (2011, pp. 12–15)

[a]Systemic document

decision is made to continue the project (start), to halt, or to enact a complete cessation of activities. Full scheme of tasks within the discussed phases is shown in Table 2.

3.4   Optimization of Project Realization

The realization phase often in practice depends not only on the approval, but especially on the funding to begin launching. Here again reported implementation significantly changed the philosophy of the approach to the project. The local Polish governments processes of operational controlling, are significantly reduced. It often comes down to an assessment of the level of work realization and product quality during the calculation of partial receipts. Standards for controlling also are determined by the institution providing a source of financing for the project.

In the described district, a controlling system was implemented. It has been standardized and is independent on the sources of funding used. An organizational approach was introduced here as the PMO (Project Management Office), which was placed in the Treasurer Department. Thanks to the controlling techniques used (including EVT) authorities have the ability to continuously track the progress of the project. Within this system can be used any reporting period (e.g., week, month), which they consider appropriate from the point of view of the quality of managerial information.

In addition to this, the PMO also introduced a temporary unit, the Project Steering Committee. Its job is to make decisions concerning significant changes in the project. It was assumed that the Chairman of the Committee is delegated by Starost from the highest level of management representative (Deputy Starost, Treasurer, Secretary of the District).

It is also important that the tasks performed by employees of public institutions, in the project, are mainly associated with the management and operation of the project. Substantive tasks (e.g., construction services, specialized implementation services, etc.) are largely outsourced. Thus, there is an enhanced, greater role for controlling the project, both in terms of the provided scope and schedule realization. Pattern of management actions in the framework of the realization phase are presented in Table 3.

3.5   Optimization of Projects Closing and Evaluating

Significant changes also concern the closing phase of the project. The common practice is narrowed to the signing of the final acceptance protocols, and settlement projects in relation to the financing institution. In the studied district there have been introduced a large number of measures to gather important management information for the future. Firstly, the introduction of the evaluation of the project by the people involved. In addition, also implemented was the *Project Completion Report*. This document is meant to build a body of knowledge based on the project manager's experience. This means incorporating W.E. Deming's Loop, and so therefore the process of continuous improvement. This phase scheme is shown in Table 4.

Table 3 Optimal scheme of project realization phase in implemented life-cycle model

Ph.3	Tasks in project realization phase	Task type
Ph.3.1	Realization launch meeting	Task
Ph.3.2	Start of project realization	Milestone
Ph.3.3	Substantive tasks realization	Task
	(1) performance of the substantive work, (2) procedure of purchase, (3) signing of an agreement with the supplier, (3) acceptance of the delivered product/service, (4) the execution of delivery, (5) accounting of the project	Actions
Ph.3.4	Project coordination	Task
	(1) Project Team meeting, (2) *Work Time Card*[a] approval	Actions
Ph.3.5	Monitoring of the project	Task
	(1) preparation of the *Project Realization Report*[a]	Actions
Ph.3.6	Controlling of the project	Task
	(1) review the *Project Realization Report*[a], (2) preparation of the *Project Controlling Report*[a], (3) project portfolio optimization	Actions
Ph.3.7.	Change management in project	Task
	(1) preparation the *Exceptions Report*[a], (2) preparation of the *Change Application*[a], (3) Project Steering Committee meetings, (4) approval of a *Change Application*[a]	Actions
Ph.3.9	Preparing the *Project Completion Report*[a]	Task
	(1) Settlement of the *Work Time Cards*[a], (2) the settlement of the *Project Effects Card*[a], (3) preparation of the information about the difficulties, (4) preparation of the *Project Team Members Evaluation Card*[a], (5) preparation of the *Suppliers Evaluation Card*[a], (6) transfer of the *Project Completion Report*[a]	Actions

Source: Own work based on Strojny (2011, pp. 12–15)
[a]Systemic document

4   Conclusions

The problem presented in this paper is primarily of a practical nature. Introduction by the Polish government of the project approach and improving projects realization is one of the key elements for the further transformation of the country. The main problem in Polish public administration is the lack of systemic solutions in this area. Projects are initiated without reference to their strategic context. In addition to this, their implementation is not sufficiently monitored. For these reasons, in a number of projects carried out by the public administration, we may observe significant deviations from the planned methods effectiveness (highway projects, development of energy infrastructure, the implementation of the central IT systems, etc.).

Presented in the article is the scheme approach to the progress of the project, which is a proposal which is incorporated into a system solution, addressed to the local government (municipalities and districts). The various stages of the life cycle model have been embedded in a number of other changes that led to the introduction of a comprehensive project orientation. It is also an attempt to transfer business

Table 4 Optimal scheme of project closing phase in implemented life-cycle model

Ph.4	Tasks in project closing phase	Task type
Ph.4.1	Verification of the *Project Completion Report*[a]	Task
	(1) assessment of the Program Manager, (2) assessment of the Portfolio Manager, (3) evaluation of the Treasurer, (4) assessment of the Secretary of the District	Actions
Ph.4.2	Ready *Project Final Evaluation Card*[a]	Milestone
Ph.4.3	Settlement of the project	Task
	(1) closure of accounts of the project, (2) accounting summary of the project's budget	Actions
Ph.4.4	Final control of the project	Task
	(1) preparation of the *Project Final Evaluation Report*[a], (2) approval of the *Project Final Evaluation Report*[a], (3) compiling the project documentation	Actions
Ph.4.6	Settlement of the closing phase of the project	Task
	(1) approval of the *Work Time Card*[a]	Actions
Ph.4.7	Changing the status of the project on the "Finished"	Task
Ph.4.8	Project finished	Milestone
Ph.4.9	The premiums for the project	Task

Source: Own work based on Strojny (2011, pp. 12–15)
[a]Systemic document

standards on the level of public administration. It allows for a significant increase in the quality of the management process and, consequently, its effectiveness and efficiency. The literature often emphasizes the implementation of private sector solutions to public needs, to take into account a number of boundary conditions (Raza Abbas Shah et al. 2011; Pūlmanis 2014). From the observation of the implementation described in this article that must be given to: formal and legal framework, cultural aspects, the preparation of competence of employees.

Analysis of the case study also allows to draw some theoretical conclusions. First of all, despite widespread criticism in the literature, the concept of New Public Management seems to be valuable in certain circumstances. Especially in developing countries (such as Poland), the potential implementation of business standards for public administration has not been exhausted. Therefore, there should be undertaken further analysis of this kind, searching for methods which would act to increase the efficiency and effectiveness of the public sector. Secondly, project management in public administration must be based on a very extensive stakeholder analysis. This is due to the mission of such institutions. This ideal adheres to the current concept of Good Governance. In addition to this, it is necessary to extend the research, within the scope of the identification of stakeholders, in relation to the various types of public institutions. Thirdly, most of the literature on project management methodology refers to the business sector. These concepts cannot always be applied to the sectors of public administration. It is therefore necessary to extend and elaborate the research in this area.

Consideration of the case study also allows one to define a number of conclusions, which are requisite to its application. First of all, increasing the efficiency of

the implementation of projects in public administration requires the adoption of project orientation, taking into account the following aspects: organizational (structure, procedures, documents), legal (budgeting, public procurement, responsibility), cultural (resistance to change, getting used to the hierarchy), methodological (introduction defining, planning, and controlling techniques) and technology (introduction of specialized project management software). Only within this context is it possible to effectively implement a new project phase model. Secondly, formulating of the phase model, the following aspects should be considered. The initiation phase should entail mandatory assessment of the project, in terms of the strategy. Managers should remember that the major problems in the initiation and planning phase create difficulties in defining objectives, stakeholder and risk analysis. They have also remember, that during the realization phase, controlling the project should be done in periods not longer than one month. Furthermore, in the closing phase, problems within the project should require mandatory reporting (Deming's Loop).

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Development of Municipal Solid Waste Generation and Expenditures: Case of Czech Municipalities

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Abstract Municipal solid waste generation represents an important current environmental issue of modern societies. This paper presents trend in municipal solid waste generation, corresponding expenditures, and compares differences between various sizes of municipalities. Analyzed data covers almost 200 main municipalities from the Czech Republic during 2008–2012. Second part of the paper explores relationship between municipal waste volume, expenditures and selected social demographic parameters of municipalities using linear regression techniques and presents several models and discussion of the effects of considered variables. Results show that there is, without surprise, very strong relationship between the amount of municipal solid waste and related expenditures. Both these values are also strongly affected by the population level or alternatively amount of flats within the municipality. Either of them can thus serve as a proxy for municipal solid waste generation prediction. Additional estimated models explore effects of considered social demographic data on per capita development of expenditures and waste generation in order to estimate their marginal effects. Results presented in the models can have policy utilization regarding municipal solid waste collection fee differentiation, or serve as a supporting tool for municipal authorities when predicting development of waste volume and expenditures.

1 Introduction

Waste generation represents an important and complex current environmental issue. From its definition, waste is something that has no longer a use for its owner or producer, as something that people do not want to possess anymore, or as something they want to get rid of. For its owner or producer it is basically a commodity with no or even negative value, for instance in cases when it causes

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health risks. Waste can be divided into many categories based on its characteristics, how it has been generated, who has generated it, where it has been generated, etc. One of the most problematic types of waste, obviously besides hazardous waste, is municipal solid waste (MSW) which is also the main focus of this paper. There are two basic problems with this kind of waste. First, unseparated MSW can contain almost anything that people dispose of, ranging from harmless biodegradable waste through various kinds of inert waste, even to small amounts of hazardous waste. Therefore the treatment process has to consider that it would have to deal with a wide range of waste types. And second, due to the nature of MSW, which is a by-product of consumption that generally keeps increasing as the societies get richer, there is rather a little chance that there will be a decrease in overall waste production.

If we look at the Fig. 1 representing generated municipal solid waste (MSWG) per capita in EU countries, we can see the trend that the richest countries tend to produce largest amounts of MSW. On average MSWG per capita in Europe in 2012 was around 500 kg per year, what is approximately 10 kg of MSW produced per week for a single person. Some countries produce even as much as 700 kg of MSW per capita per year, especially the richer ones, while some countries, including the Czech Republic on which is this paper focused, produce less than half of that. However, in absolute terms it is still a large quantity of almost 1 kg of solid waste per day per person.

In order to deal with these huge amounts of MSWG, a necessary service of municipal solid waste management (MSWM) has been created and today it is considered as one of the standard public services in modern societies. MSWM represents a complex process of collecting, transporting and finally treating the produced MSW, which happens usually somewhere out of the public sight, usually in an incinerator or a landfill. This might create illusion that MSW does not represent an important problem, as once it is transported away, people do not see it anymore and thus do not consider it as a problem at all or perceive it as a rather insignificant issue.

However, as was shown in the Fig. 1, huge quantities of MSWG represent an important issue that requires a significant sums of money from public budgets that
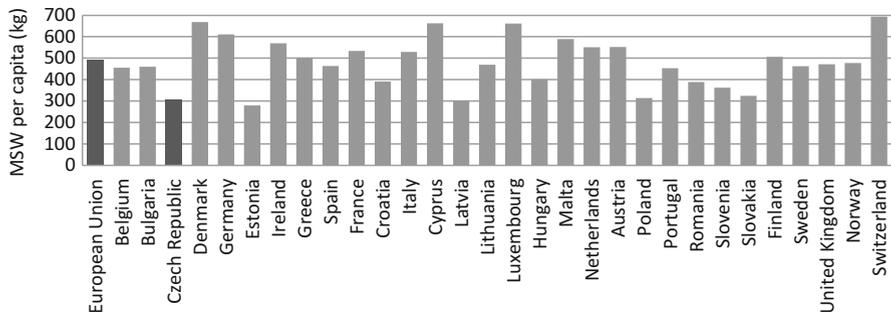
Fig. 1 Municipal solid waste generation in Europe, 2012. *Source*: Eurostat (2014)

needs to be spent in order to deal with it. But so far we have said rather little about what causes all this MSW generation. We have already said that it is a by-product of consumption. But what actually determines how much MSW is produced in a municipality? It is obvious that this is mainly affected by the size of the municipality in terms of population. But using just the population levels for explaining the MSW and related expenditures (MSWE) might be a too imprecise method. And examining more closely the factors behind amounts of MSWG and MSWE is what this paper is focused on.

The goal of this paper is twofold. First we use the data from a selected sample of municipalities form the Czech Republic to examine whether there are some trends in MSWG and MSWE between various sizes of the municipalities, and to examine how the MSWG and MSWE change in time by analyzing the data from a 5 year period. Then we use the more detailed data from a selected year and examine the relations between various sociodemographic parameters and the actual levels of both MSWG and MSWE.

Questions like what determines the quantity of MSWG and how these factors exactly contribute to the amounts of MSW have been already examined in several studies. A good and comprehensive overview is Beigl et al. (2008) who provide a review of 45 modeling approaches for MSW generation, although there is usually focus just on MSW and related municipal expenditure are not considered. Most common factors that are related with the amounts of generated MSW are often identified as population and income level, for instance by Mazzanti and Zoboli (2009) or Mazzanti et al. (2008) in Italy, Bandara et al. (2007) in Sri Lanka, Miller et al. (2009) or Hockett et al. (1995) in the USA, Buenrostro et al. (2001) or Benítez et al. (2008b) in Mexico, or Lebersorger and Beigl (2011) in Austria. Considering income levels, Mazzanti and Zoboli (2005, 2008) identified also delinking of MSW generation with increasing income. However, this starts to happen only at relative high income levels which might suggest that clean environment is actually perceived as a luxury good. Benítez et al. (2008b) identified also education levels as significant when predicting MSWG, supporting the idea of clean environment as being a luxury good. As an alternative to the population, household characteristics can be used as MSWG determinants, as was shown by Dangi et al. (2008) or again Lebersorger and Beigl (2011). Especially in fast growing regions of both developed and developing countries, studied by for instance Khajuria et al. (2010) or Dyson and Chang (2005), becomes sufficient MSWM very important issue, as rapid growth of population is often accompanied by fast economic growth, meaning that two of the generally considered most important factors influencing amounts of MSWG meet at once. Next group of studies included weather and climate effects on the MSW generation, for instance Abdoli et al. (2011), Dayal et al. (1993) or Keser et al. (2012). However, such studies require quite detailed time-series data which are often not available and thus they have to rely on small sample studies from a selected location. Another approach to MSW generation modeling is through spatial distribution of population and density by for instance Karadimas and Loumos (2008), again Keser et al. (2012), or Mazzanti et al. (2012). There exist also international comparisons of MSW generation factors based on economic and

demographic data at the macroeconomic level from Johnstone and Labonne (2004) or Daskalopoulos et al. (1998). Finally, with all these kinds of analyses, reliable relevant data become crucial. However, it is often not available which causes often substantial difficulties for municipal solid waste planning, as was highlighted by Chowdhury (2009). This is a problem also in the Czech Republic, although situation is improving. Sociodemographic data is relatively well available from the Czech Statistics Office, together with the data on municipal expenditure provided by Czech Ministry of Finance. On the other hand, data about MSW generation or solid waste at all are published only at aggregate levels, making municipal analyses difficult. And one last thing to mention here, even though the relevant data might be available, there is still a risk that this data contains some kind of error, whether due to the problems of data processing or inaccurate data reporting. In better cases are such errors clearly visible and such data can be dropped right away, but in other cases errors might not be that obvious. One way to deal with this risk is to double-check right at the source of the data, the municipality, but with highly fragmented municipalities, as is the case of the Czech Republic, this might not be a very viable option.

Benefits of such analyses, as well as of this study, is among other to perform a comparison between various municipalities which might help to identify differences regarding MSW generation and approaches to MSWM while still taking into consideration unique specifications of individual municipalities. Such comparison has the potential of identifying municipalities that are performing well in MSWM and might serve as an example or as a benchmark to those with worse performance, possibly leading to the potential cooperation and improvements in this area. Knowledge of the best practices as well as factors hidden behind them can also be helpful when planning new environmental policies regarding MSWM, or just at the day-to-day decision making of municipalities in this area. Either way, such policies will have much higher chance of more efficiently dealing with the issues of MSWM if they will be able to include individual characteristics of municipalities instead of treating them as a homogenous group.

2 Material and Methods

2.1 Dataset

Our dataset consists of a sample of 169 municipalities from the Czech Republic from years 2008–2012. This dataset is a subset from 205 municipalities serving as the "county capitals"—municipalities with extended powers. Full sample was reduced due to the several reasons: (1) some municipalities reported no or extremely low/high MSWE (most likely an incorrect value inserted into the database or due to reporting these expenditure in a non-standard way); (2) some municipalities reported no or extremely low amounts of generated MSW (again

due to some specifics of MSWM provision or, more probably, an incorrect value in the database); (3) statutory cities use slightly different way of MSWM provision compared to the rest of the sample. These reductions decreased the initial sample to 169 municipalities. General problem of availability of credible data regarding MSWM as was mentioned in the previous subchapter is here clearly present.

This final sample contains municipalities from every part of the Czech Republic with population varying from 3000 up to 100,000 (mean 20,000 and median 12,000). As was mentioned, we have excluded four statutory cities that are also the largest cities in the country, having population of several hundred thousand. If excluding first and last decile from this dataset, we get municipal population variation from 6000 up to 45,000 and if we consider just two middle quartiles we get population variation from 8000 to 23,000. Altogether, our final sample of 169 municipalities covers population of 3.4 million, which is approximately one third of the total Czech population. Needless to say here is that there is very high fragmentation of municipalities in the Czech Republic with over 6000 municipalities having total population of 10 million, resulting in average municipality having population under 2000.

Next variable covered in our analysis is current municipal expenditures on solid waste. These expenditures basically cover day-to-day costs of municipal solid waste management service and are typically determined from the actual contract with the company providing MSWM for a given municipality. We use only the current expenditure (e.g. solid waste collection and disposal) and not capital, because capital expenditure (e.g. expenditure on infrastructure) typically does not occur regularly, which would make the comparison rather incorrect.

Along with the expenditures comes the actual amount of generated municipal solid waste in tons per year for each municipality in our sample. This stands for basically any waste that a household produces and puts into a standard waste bin. MSW represents the waste that either does not fall into any categories of waste separation (plastics, paper, glass, etc.) or has not been (for whatever reasons) separated appropriately. MSW also does not cover waste produced from standard commercial activities, as such waste falls under the category "business waste" and is usually not included in the MSWM system.

For the purpose of more detailed analysis of the MSWG and MSWE we used more detailed data about the municipalities that are available for the year 2011, which is the year when national census occurred. These data cover variables like municipal area, density, counts of males and females, age structure separated by decades, flats structure, economic activity status, or number of students and retired people.

All of the acquired data come from central public databases provided by Ministry of Finance, Czech Statistical Office, or CENIA agency under the Ministry of Environment (data about MSWG). These data are officially published by state authorities, therefore should be considered as correct. However, occasionally some data might be incorrectly reported, and in such cases (if identifiable) we exclude such data from the analysis.

Table 1 Division of municipalities into groups according to population

Septile	First	Second	Third	Fourth	Fifth	Sixth	Seventh
Municipality—smallest Ø	2900	6500	8900	11,300	14,600	22,100	34,300
Municipality—largest Ø	6400	8400	11,000	14,600	21,700	34,000	101,700

2.2 Size Comparison and Trend Development

At first we use the collected panel data from 2008 to 2012 to determine how do the waste generation and related expenditure vary between various sizes of municipalities and how do these variables develop during time. In order to do that we calculate ratios of MSWE per capita and MSWG per capita for each municipality for each year. We have sorted the sample of municipalities based on their size and created seven septiles (seven groups with equal number of municipalities). For each septile we present average values of both MSWE per capita and MSWG per capita ratios for each analyzed year (Table 1).

Such comparison allows us to both see the development of the ratios in each size group throughout the analyzed timeline as well as the ratios between the various sizes.

2.3 Regression Models

The second goal of the paper is to estimate relationships between the MSWE and MSWG and various sociodemographic factors of analyzed municipalities that have been listed earlier in the dataset subchapter. For doing that we use standard OLS regression method. We estimate two kinds of models—first we explore how various sociodemographic factors affect MSWG and then we explain effects of these factors on MSWE. Formally we estimate two following kinds of models:

$$MSWE = f(x_1, x_2, \ldots, x_n) \text{ and } MSWG = f(y_1, y_2, \ldots, y_n) \tag{1}$$

where $x_1, x_2, \ldots, x_n$ and $y_1, y_2, \ldots, y_n$ stand for various relevant sociodemographic variables like population size, area, etc. Selected econometric models with significant results for explaining both MSWE and MSWG are presented later. As we are dealing with the sample consisting of municipalities with large span between their sizes, we are very likely to encounter heteroskedasticity in the error variance. Therefore in all estimated models we use robust standard errors instead of regular ones.

Once we have estimated significant models able to explain the levels of MSWE and MSWG, we provide a commentary for each model with possible explanation of the effects of considered variables on the dependent variable. This methodology follows the study performed by Struk (2015) on a sample of municipalities from a single region in the Czech Republic.

Needless to say is that both MSWE and MSWG are highly correlated in each individual year with correlation coefficient reaching values of 89–93 %, although this is rather trivial finding, as it makes sense that more MSWG results in more MSWE. However, interesting finding is that MSWE and MSWG values tend to develop in the opposite way in time, which will be shown and discussed in results subchapter.

3 Results

In this part of the paper we present at first results of MSWE and MSWG between various sizes of municipalities in our analyzed sample and the development of their levels in time. After that we present several OLS models estimating MSWE and MSWG and discuss the results of the models and the possible explanation behind the results and the parameters of the models.

3.1 MSWE and MSWG Trends and Municipality Size

In this subchapter we present the development on both MSWE and MSWG in time for seven size categories of analyzed sample of 169 municipalities from South Moravia Region in the Czech Republic. Figure 2 depicts average values of MSWE per capita for seven septiles of municipalities from our sample for years 2008–2012.

In Fig. 2 we can see differences between MSWE of municipalities of various sizes expressed in per capita terms (in CZK). There is no clear general trend of either decreasing or increasing per capita expenditures in relation to the municipality size. However, we can see that municipalities from the first three septiles and
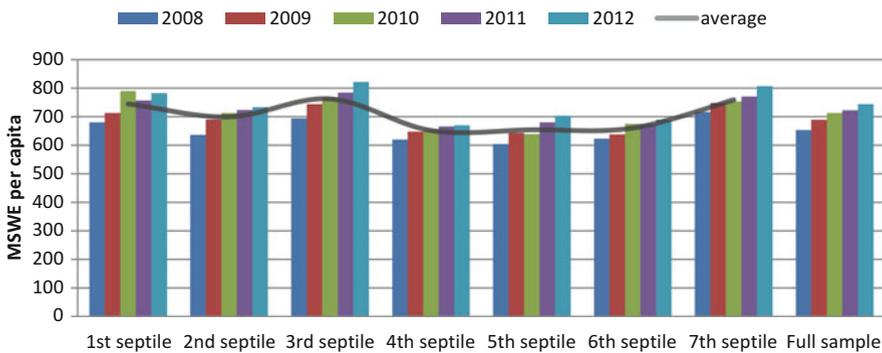
Fig. 2 MSWE per capita development according to size categories, CZK, 2008–2012. *Source*: Own calculations
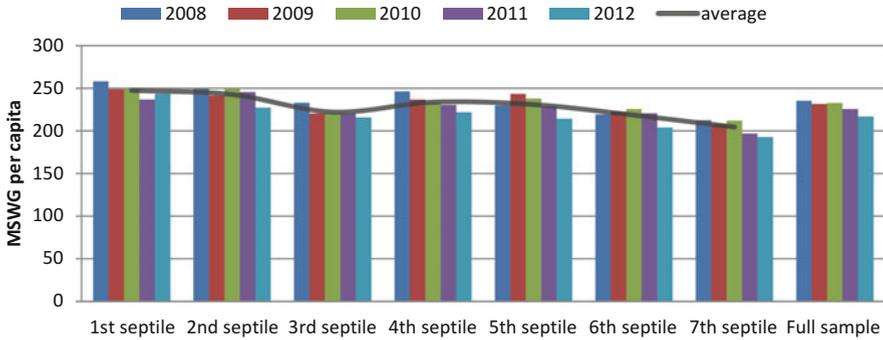
Fig. 3 MSWG per capita development according to size categories, kg, 2008–2012. *Source*: Own calculations

from the last septile tend to have highest per capita expenditures. This might be a sign that there exists something like an optimal municipality size in terms of MSWM. First three septiles contain municipalities with population up to 11,000, next three septiles contain municipalities with population from 11,000 up to 34,000 and the last septile contains municipalities larger than 34,300.

Next information about the MSWE per capita levels from Fig. 2 is the general trend of expenditure increase over the years. Basically in almost all size categories of municipalities we can observe gradual MSWE increase. If we compare average MSWE per capita in 2008 with average MSWE per capita in 2012, we get a notable increase of 13.9 %, or almost 3.4 % per year. Part of this is most likely due to the inflation, but the rest of the increase is caused probably by the increasing costs in this area of services, which might be attributed to for instance broader waste separation options or new more costly technologies used for waste treatment. Moreover, if we consider this information together with information from Fig. 3, MSWE for a comparable amount of MSWG per capita in 2008 were more than 20 % lower than in 2012, which is a bit alarming.

In Fig. 3 we can see different trends compared to the MSWE development in Fig. 2. In terms of various municipality sizes, we can see that the larger the municipality, the less MSW per capita is generated. A possible explanation for this observation is that larger municipalities generally offer better and closer options for waste separation and thus less waste ends up as municipal solid waste.

Another observation from this figure is that generated MSW per capita tends to decrease in time almost in all considered size categories. If we compare average generated MSW per capita in 2008 with average generated MSW per capita in 2012, we get a notable decrease of 7.8 %, or almost 2.0 % per year, which can be perceived as a positive trend towards reduction of MSW. This can be explained by generally increasing environmental awareness, constant education of people in terms of recycling possibilities, and also increasing options for recycling that are easily available for a growing amount of people. According to EKO-KOM (2014), average distance to the separation drop-off site in the Czech Republic was

approximately 100 m in 2014 and decreases slightly each year. Czech Republic is among the top EU countries in this parameter. However, we need to consider that this calculated distance is strongly affected by very short distances to the drop-off sites in the largest municipalities where a lot of people live in condominiums and population density is there very high. On contrary, in smaller towns where there are not that many drop-off sites for the whole municipality due to the lower population density this distance would be most likely more than few hundred meters. This might partially explain higher MSWG in smaller municipalities for the simple reason that people are not willing to put that much effort in when they compare distance to the MSW bin and closest drop-off site.

3.2 MSWE and MSWG Models

Tables 2 and 3 contain four models for estimating MSWE (thousands CZK) and MSWG (tons) per capita.

MSWE and population are generally highly connected. If we perform a regression of MSWE just on population in our sample, we get result of:

$$MSWE = -361.368 + 0.749*(Population)^{***} \qquad (2)$$

with R^2 of 0.8970 and population coefficient p-value <0.001 (robust standard errors considered), which is consistent with results in Fig. 1 and tells us that additional person in population increases total MSWE by approximately 749 CZK. Slightly higher value can be attributed to the fact that in this estimate values from larger municipalities (where MSWE tends to be higher) have higher weight compared to the results presented in Fig. 1, where values from individual municipalities have the same weights.

We can do the same calculations for MSWG and show that that also these values are strongly related with the population level:

$$MSWG = 457.802 + 0.193*(Population)^{***} \qquad (3)$$

with R^2 of 0.9379 and population coefficient p-value <0.001 (robust standard errors considered), which is again consistent with results in Fig. 1. Additional person in population raises MSWG by approximately 193 kg per year. The fact that both MSWE and MSWG are strongly connected is also supported by very strong correlation between them, reaching coefficient of more than 0.947. Such strong result makes sense as MSWE are used for dealing with the MSWG, thus with more MSWG should MSWE obviously increase. This observation has been confirmed also in other countries, for instance by Mazzanti and Zoboli (2009), or Lebersorger and Beigl (2011).

Table 2 Municipal solid waste expenditure and generation models and age structure

Model	(1) MSWE	(2) MSWE	(3) MSWE	(4) MSWG
Const	1312.49**	2745.80***	3840.64***	−73.169
	(641.244)	(913.768)	(934.139)	(224.834)
Age group 0–14	−56.258***	−18.668***	−61.605***	6.447**
	(20.267)	(3.963)	(20.374)	(2.989)
Age group 15–19	−31.326	14.323	−36.030*	6.172
	(20.492)	(8.780)	(20.556)	(4.284)
Age group 20–29	−48.567**	−9.934**	−53.773**	5.130*
	(20.926)	(4.054)	(20.977)	(3.017)
Age group 30–39	−42.383**	−0.429	−48.253**	6.335*
	(20.881)	(3.013)	(21.254)	(3.384)
Age group 40–49	−52.325**	−14.532***	−57.340***	5.570*
	(21.117)	(4.590)	(21.105)	(2.960)
Age group 50–59	−50.923***	−10.662***	−55.968***	6.015*
	(19.217)	(3.429)	(19.403)	(3.226)
Age group 60–64	−58.580**	−16.233***	−62.588***	5.065
	(23.437)	(5.457)	(23.427)	(3.223)
Age group 65–69	−45.192**	−9.136*	−50.892***	5.089
	(19.090)	(5.509)	(19.354)	(3.219)
Age group 70–79	−52.189**	−10.882**	−57.562***	7.475**
	(21.345)	(3.525)	(21.637)	(3.131)
Age group 80+	−53.269**	−14.945**	−57.687***	4.663
	(20.668)	(7.022)	(20.472)	(3.269)
Males	40.821**		43.496**	−4.973
	(19.725)		(19.743)	(3.067)
Females	58.509***	19.978***	65.996**	−6.303**
	(20.856)	(3.435)	(21.174)	(3.153)
Females to males % difference		−765.359***	−853.906***	92.658
		(272.708)	(258.230)	(64.131)
Adjusted R^2	0.9353	0.9331	0.9382	0.9406
Observations	169	169	169	169

Note: *, **, *** stand for result valid on 10 %, 5 % and 1 % significance level, values in parentheses stand for robust standard errors of coefficients

When interpreting results from the models in Table 2, we need to take into account several things. First of all we include both males and females variable. Although intuitively this suggests possible multi-collinearity problem, it is not actually present in our dataset because during the census it was not possible to acquire data about the age of the whole sample. Including both of these variables thus adds to the explanation power of the estimated model.

Second, as we include both males and females variables, coefficients for each age group should be interpreted only combined with whether we are considering a male or a female in given age group. Or alternatively we can just compare the relative proportions of the coefficients and interpret differences between the groups in terms of which age group tends to cause more expenditure which is also the approach that we choose in this paper.

Table 3 Municipal solid waste expenditure and generation models and housing structure

Model	(5) MSWE	(6) MSWE	(7) MSWE	(8) MSWG
constant	−21.779 (1166.84)	710.841 (1259.94)	129.610 (1377.55)	580.948*** (154.409)
Flats in houses	2.054*** (0.708)	2.252*** (0.684)	2.646*** (0.758)	0.633*** (0.093)
Flats in condominiums	1.700*** (0.144)	1.657*** (0.143)	1.667*** (0.140)	0.409*** (0.027)
Flats for recreation		−14.268** (6.734)	−41.539** (17.533)	
Flats for recreation %			888.385* (453.260)	−61.087** (26.704)
Adjusted R^2	0.8953	0.8966	0.8996	0.9358
Observations	169	169	169	169

Note: *, **, *** stand for result valid on 10 %, 5 % and 1 % significance level, values in parentheses stand for robust standard errors of coefficients

Third, we need to consider that we are dealing with data from municipalities that have rather great variety in terms of size, and therefore it is natural to expect some level of heteroskedasticity. In the model we deal with this issue by considering robust standard errors, nevertheless, estimated R^2 should be interpreted rather with caution and we should focus more on, signs of the coefficients, relative values of the coefficients and relations between them.

We have estimated models also using other sociodemographic characteristics of the municipalities like area, density, economic activity status, or number of students and retired people, but none of them in our models proved to be consistently statistically significant, therefore these characteristics are not included.

First three estimated models are based on the age structure of the municipalities. Municipal population in these models is divided into age groups by decades and according to their sex. General result from the models is that females tend to cause more MSWE than males. An interpretation of this observation might lie in the fact that females are usually ones who spend more time at home, for instance with children, and thus tend to produce more MSW compared to men, who do not necessarily produce less waste overall, just that they tend to spend on average more time away from home, and thus produce waste that does not classify as MSW but rather as business waste, etc. When considering differences between individual age groups, we see the lowest coefficients for MSWE next to the youngest age group 0–15. This group tends to cause rather low MSWE, what makes sense, as children usually rely on their parents, and thus do not consume that much, which would otherwise results in MSW generation and subsequent expenditure. Next age group tends to cause notably more MSWE, but the result is not statistically significant in first two models. Nevertheless, this suggests that people in this group start to consume notably more, resulting in increased MSWE attributed to this age group. Increased tendency to MSWE is also visible among next age groups of 20–29 and especially 30–39. The interpretation behind this is that people in these

age groups usually start to work, earn money, and therefore are able to consume much more than in younger age. This higher consumption obviously results in more MSWG causing more expenditure. However, after that in next three age groups of 40–49, 50–59 and 60–64 we can observe a decrease in MSWE tendencies. This might be interpreted as that people in these age groups do not consume that much anymore as they did when they were younger, and thus they do not cause that much MSWE. In next age group of 65–69 we can on the other hand see the opposite tendency of increasing MSWE. This sudden change has been observed also by Struk (2015) and might be attributed to something like a "clean-up" once people reach this age when they usually retire. Retiring is often connected with preparation to a significant change in one's lifestyle, and performing something like a revision of what will be needed and what will not be used anymore, and resulting in a sudden increase in a waste generation and subsequent expenditure. Interesting is that this suggested effect has been in cited study observed in age group 60–64 and not 65–69. Possible explanation for that might lie in the difference between the analyzed samples of municipalities. Our current sample consists of rather larger municipalities while the sample in cited study consisted of rather smaller municipalities. This might suggest that people in small municipalities tend to retire on average few years earlier than people in larger municipalities, which would make sense considering our observations. Finally, people in last age categories 70–79 and 80+ tend to cause less MSWE, comparable with age groups 40–59, which is most likely caused by people in these groups not consuming that much anymore, resulting in lower MSWG. Another reason behind that might be also the fact that these people usually live from a pension, which is typically notably lower than their previous earnings, limiting them in their consumption. In addition, in models 2 and 3 we have included value of difference between the percentage of males and females in the municipality. Value of this regressor tells us that with each additional percent of females in the municipal population over male percentage, total MSWE tend to decrease. But as there is usually not more than 2–6 % difference between the portion of females and males in the population, in absolute terms this does not cause notable differences in total MSWE between municipalities, as shares of males and females are not that different.

Model 4 is different from previous three models in the fact that it estimated the values of MSWG instead of MSWE. We have tried multiple model including those with regressors from other three models, but find them to be statistically little significant. Model with statistically mostly significant regressors is present, but due to the little or no statistically significance of regressors we will not interpret the estimated coefficients of the model.

Second set of models estimates MSWE and MSWG through housing structure. We differentiate between a flat in a single house and a flat in a condominium where there are multiple flats in one house. In addition we consider also the parameter of number of flats used for recreation that are not permanently inhabited. Number of flats is strongly related with the actual municipal population, so we can perceive it as a kind of proxy which can be used as an alternative to the population values. The relationship between the two follows:

$$Population = 798.283^{***} + 2.331*(Totat\,flats)^{***} \qquad (4)$$

telling us that with each additional flats population increases by 2.331 with Total flats coefficient p-value <0.001 (robust standard errors considered).

Models 5, 6 and 7 estimate MSWE as a function of amount of flats in houses, in condominiums and recreational flats. In model 5 we can see that including just the number of flats has already high explanation power and tells us that flats in houses tend to cause more MSWE than flats in condominiums (both coefficients are highly significant). Such result is not surprising, as houses compared to flats in condominiums are usually bigger and accommodate more people, which obviously results in more MSWE per such housing unit.

In next two models we include also variables with the number of recreational houses and their share on the total amount of flats. From the results we can see that additional flats used for recreation tend to cause notably less MSWE. The acquired negative coefficient cannot be taken literally, as additional recreation flat in reality obviously cannot cause MSWE to decrease, but within our considered model it tells us that municipalities with more such flats have lower MSWE. This makes sense as such recreational flats are inhabited usually only for a period of time during the year and thus people living there do not produce that much MSW that would result in subsequent MSWE—they already produce MSW in the flat where they reside permanently and by living in multiple flats their waste production would most likely not increase that much or even at all, as it just would most likely just split between the flats.

Finally, model 8 tells us how much MSW is produced by additional flats in considered categories. Each flat in house causes approximately 633 kg of MSW per year, and each flat in condominium causes 409 kg of MSW per year. With the results of regression between MSWG and population, this can be interpreted as that on average, three persons live in a flat in a house while two persons live in a flat in a condominium, which seems appropriate. Additional included variable is percentage of recreational flats on the total amount of flats, and as in previous model we get the results that higher share of recreational flats causes less MSWG, which is consistent with our previous explanation behind this observation.

4   Discussion

In the first part of the results we have presented the trends of development in MSWG and MSWE from recent years. In case of MSWE it is possible to see a certain bit economies of scale effect. Highest MSWE per capita have been observed among the group of smallest and largest municipalities, while those in the middle seem to be generally more efficient in this area. This higher efficiency of mid-sized municipalities in the Czech Republic has been observed also by Soukopová et al. (2014) in other areas of municipal expenditures.

Interesting results come from the largest municipalities. On one hand they tend to have highest MSWE per capita, while on the other hand they produce lowest MSW per capita. There might be two reasons behind this which are actually connected. First, larger municipalities generally offer much better options for waste separation and therefore subsequently producing less mixed waste, and second, as larger municipalities generally offer better waste separation options, run multiple scrap yards, provide other related infrastructure and have full-time employees in the area of MSWM, it is natural for them to have higher expenditures despite the possibility for the economies of scale suggesting lower per unit costs.

Second part of the results presents several regression models for estimating MSWE and MSWG. At first we present regression models estimating MSWE and MSWG based on the data about age structure of the population and then based on housing structure of the municipality. In both group of models we have identified significant parameters that can be used for estimating total levels of MSWE and MSWG in municipalities. However, in case of MSWG estimation, we would prefer using housing structure for better estimation compared to the age structure, as the estimated coefficients in case of models using age structure are less statistically significant. Overall, calculated results provide a good idea of the effects of each considered parameters on total MSWE and MSWG levels. Findings of the various contributions of different age groups to the MSWE and MSWG levels can used in further more detailed studies.

Generally effects of population on MSWG have been examined by multiple studies, but to our knowledge there is very little amount of research examining relationships between housing structure and MSW generation, although this can be to the certain level substituted by studies using households as an explanatory variable.

Furthermore, examined studies focus either on the MSWG or MSWE, but none of them links them together. Our opinion is that estimating MSWE has the same importance as estimating MSWG, because in the end municipal authorities are more interested in how much MSWM would actually cost than how much MSW is generated.

Results of our studies can be further utilized by public authorities when designing or adjusting their policies regarding MSWM. Such models can be used for MSWE and MSWG prediction which would provide the municipality better option for preparing its plans and budget in order to keep up with the changing trends. Results from individual municipalities can be used together with the model in a comparison or a benchmarking process. Municipalities performing worse than the model prediction could contact better performing municipalities in order to search for possibilities for improving their MSWM. Other possibility is to differentiate MSWM fees more according to the housing structure or age structure, but this might encounter political problems. Nevertheless, charging people or households more precisely according to how much MSW they generate or alternatively how much MSWE they cause could lead to a potentially more efficient solution when those households or people causing more expenditure would be also contributing more to the budget. Besides increased efficiency might such scheme be perceived as

more just, but as we have mentioned, implementing such policy would be politically very delicate and would require careful interpretation to the public in order to have any chance of succeeding.

Results presented in our study can be also used for comparison with other countries. Although absolute values would be most likely different (take for instance variability of MSW per capita generation among countries in Fig. 1) due to various reasons like different price levels, historical reasons, level of MSWM, waste-related habits of population, etc., observed trends should applicable. Possible adjustment for different countries can be inspired by findings such as those from Johnstone and Labonne (2004) about MSW generation and their determinants in 30 OECD countries.

Presented study can be further extended using more detailed data about age structure, additional sociodemographic data like family status and education [identified as significant by Benítez etal. (2008a, b)], size of the flat or type of household [identified as significant by Lebersorger and Beigl (2011) or Buenrostro et al. (2001)], or alternatively income levels [identified as significant by for instance Beigl et al. (2004)]. However with income levels in Czech Republic exists a problem that Statistics Office estimates this based on representative survey for whole country and therefore such data are not available at municipal level. It is also possible to use panel data instead of cross-sectional, but with this comes the question the data availability. We have used relatively detailed data based on the 2011 census, but in case of other year only aggregated data might be available.

5   Conclusions

Goal of the this paper was to examine municipal expenditures on solid waste together with the amount of generated municipal solid waste, their relationship and factors that affect these variables. We have used 169 Czech municipalities (county capitals) as our sample. At first we have analyzed levels of expenditure and generated waste for various municipal sizes during period of 2008–2012. In case of expenditures we did not find any significant differences between municipalities of different sizes, besides the observation that the smaller and the largest municipalities have on average higher per capita expenditures on municipal solid waste. What is clear, on the other hand, is increasing trend of expenditure throughout the years in whole sample. Per capita municipal expenditures on solid waste in analyzed period increased by 13.9 %, or in other words by almost 3.4 % per year. Part of that might be explained by the fact that larger municipalities usually offer better infrastructure in the field of solid waste management which of course comes with additional running costs. In case of per capita municipal solid waste generation we have observed the opposite trend. On average, this variable has decreased by 7.8 % or almost 2.0 % per year. Here we have also observed trend towards lower per capita generation of municipal solid waste in larger municipalities. This trend is probably caused by generally better availability of options for waste separation in larger

municipalities which allows people to separate more waste with less remaining mixed waste that counts as a standard municipal solid waste. Together this means that average per unit expenditure for municipal solid waste has increased by more than 20 %, which is a bit alarming.

In the second part we have estimated several models estimating effects of various sociodemographic factors separately on municipal solid waste expenditures and waste generation. We have observed that there is obviously strong relationship between population, level of generated waste and related expenditure. In both cases of municipal expenditure and waste we have identified that age structure and housing structure of the municipality have significant effects on these variables. Observed different contributions of various age groups might serve as an idea for future research focusing on waste-related behavior of people throughout their life. Considering housing structure, we have identified that amount of flats in houses and flats in condominiums can act as a good proxy for estimating total levels of examined variables.

Results of this study can be further utilized for comparison of the municipal solid waste management and its trends in other countries (absolute values will be obviously different, but the trends should not). Moreover, such results can be utilized also when planning policies regarding municipal solid waste, for instance creating more differentiated fee schemes that would be more just by charging higher fees to those that cause more expenditure and produce more waste, leading to higher overall efficiency in this area of public expenditures.

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Determinants of Success and Failure in the Internationalization of the Cork Business: A Tale of Two Iberian Family Firms

João Carlos Lopes, Amélia Branco, Francisco Parejo, and José Francisco Rangel

Abstract The main purpose of this paper is to identify the facilitating and restricting factors during the internationalisation path of family firms, considering their competitive advantages, ownership structure, management attitudes and other intangible assets, as well as external factors to the firms, like location. The research involved a long run analysis (of more than one century) of two cork producing firms operating in Spain and Portugal: *Mundet & C.ª, Lda* and *Corticeira Amorim*. One of these companies—*Mundet*—was closed down in the 1980s and the other—*Corticeira Amorim*—became, and still is, the leading firm worldwide in the cork industry. A detailed comparison of these two histories—one of failure, the other of success—allows an accurate identification of the determinants of successful internationalisation. This comparison is useful for understanding several characteristics of both firms and testing several hypotheses within the context of the theoretical approach to the internationalisation of family firms, as well as the location choices they made, which were an important cause of the opposing destinies of these two emblematic Iberian cork family firms.

Keywords Family firms • Internationalisation • Cork • Business history • Portugal • Spain

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1 Introduction

Family firms are crucial for economic growth and in the European context they represent over 60 % of the total number of European companies, and 40–50 % of all jobs, numbering over 100 million employees (European Commission 2009). The Iberian Peninsula is no exception: family firms represented over 60 % of GDP during the period of 1959–2000 (Colli and Rose 2008).

There is no single definition of "family firms", as they present a variety of features in terms of size, ownership, financial framework, etc. According to Colli and Rose (2008, p. 194), a family firm "is one where a family owns enough of the equity to be able to exert control over strategy and is involved in top management positions".[1] By emphasising the proportion of family-owned shares and the corresponding voting rights and the aspects of management, the above definition also includes intergenerational succession, whereby the founder or a member of the family has to be the chief executive of the company.

Whether they be small, medium or large in size, most of the family firms have exhibited a resilient pattern through all three industrial revolutions and have maintained long-established international businesses, without losing the family character, as the families managed to keep the control and leadership of the business.

The evolution of the internationalisation of family firms through time can be viewed from several theoretical approaches. This paper follows a historical approach, which allows for the integration of several theoretical frameworks, particularly with regard to the internationalisation theory and the family business theory. Its main purpose is to identify the facilitating/restricting factors behind the success of two family firms, both of which have international business in the cork industry, by considering the creation/absence of competitive advantages in terms of ownership structure and management attitudes and intangible assets and other relevant factors, whether they be internal and/or external to the firm, like the location choice.

This paper describes a long run analysis (over almost one century) of two firms operating in the cork business in the Iberian Peninsula: *Mundet&Cᵃ, Lda.*, and Corticeira *Amorim*. One of these firms—*Mundet*—was closed down in the 1980s, and the other—*Corticeira Amorim*—became the leading company worldwide in the cork business and still maintains this leadership. Although they both followed different models of internationalisation, *Mundet* resembled a "born again global firm", whilst *Amorim* is a "traditional firm". The careful comparison of their two histories, one being of failure and the other of success, enables an accurate identification of the determinants of successful internationalisation.

Furthermore, both firms had a similar business framework. Firstly, the Iberian Peninsula reunites the perfect natural conditions for growing the cork oak tree

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[1] See also Colli et al. (2013); Colli and Larson (2014); European Commission (2009); Graves and Thomas (2008); Zahra (2003) and La Porta et al. (1999).

(*Quercus Suber*), and Spain and Portugal are the most important producers of cork in Iberia. Both firms explored this natural competitive advantage. Secondly, the international dimension of the cork business was always present in Spain and Portugal. The major buyers of cork products have been those developed countries that do not possess this raw material (or at least in abundance) although, up until the 1950s, they concentrated most of the value added activities. Spain and Portugal, being economically less developed, did not possess enough capital to develop the processing industry (with the exception of Catalonia), and the only activities carried out were restricted to cork preparation and the export of cork planks for the production of cork finished products. Thirdly, up until the late nineteenth Century, this industry was essentially based on the manufacture of natural cork stoppers. However, at the end of the nineteenth Century, a radical innovation occurred—the agglomerated cork—, which changed the industrial landscape. The larger and more capital-intensive firms started to use the waste materials that originated from the natural cork industry. The location strategies of these firms reflected the role of more developed countries, whose foreign investments were concentrated in those countries which produced the raw material. M*undet* was one of these cases. Initially it was owned by Spanish capital and exported agglomerated cork products. Conversely, *Amorim* exported natural cork stoppers up until the 1960s.

Considering past research about the context of the cork business and bearing in mind the theoretical approach, the research questions are:

1. What were the main characteristics of the family business that boost the competitive advantages of *Corticeira Amorim*?
2. Were these characteristics absent in *Mundet's* case, causing the failure of the company?
3. Regarding the success of *Corticeira Amorim*, were the family firm characteristics reinforced by other features, such as for instance, the location of the firm?

In order to answer these three questions, we consider two hypotheses. Firstly, that the success/failure of a multinational family firm is related to those features of a family business that boost/constrain a competitive advantage in foreign markets. These features are related to ownership structure and to top management. Secondly, the regional roots of the firms reinforce the following features of a family business: trust, reputation, cohesion and altruistic behaviour, which means that the "family effect" can be reinforced by the "regional effect". Following Puig and Pérez (2009), the small size of firms can be compensated by collaboration with other family firms within the same industrial district, which suppresses limitations in terms of economies of scale and maintains much-needed flexibly in the context of growing uncertainty in international markets.

The paper is structured as follows. Section 2 presents the theoretical framework, and has three sub-sections, namely: internationalisation models; determinants of success in a family business internationalisation process and the location of family firms in industrial districts or clusters. In Sect. 3, a detailed empirical analysis is carried out of the determinants of success/failure of the two firms in a comparative perspective. Finally, in Sect. 4, the concluding remarks are made. We concluded

that both family and district effects mutually reinforced each other in building success in the internationalisation process. On the one hand, slowness and the exercise of caution during the internationalisation process can be advantageous at an early stage. This slowness may be a result of not only risk aversion, which is typical of a family business, but also of the role of the firm within the industrial district. Secondly, district effects can also lead to greater success in internationalisation, in terms of the presence of relationships based on trust within the region and with its institutions.

As a means of better supporting the comparative analysis of the evolution of the two firms studied in this paper, as well as their relative economic performance over the long run and their failures and successes, a useful and detailed chronology is provided (in an appendix at the end of the paper) which marks the main events and milestones of these emblematic Iberian cork industry firms, the first, and now extinct, leader, *Mundet*, and also *Corticeira Amorim,* the current undisputed world leader.

2 Theoretical Framework

2.1 Internationalisation Models

The decision to internationalise a business is a risky option which requires time to become effective. The process presents different characteristics amongst firms, which makes it difficult to reproduce a common model for them in terms of the scope and scale of internationalisation.

The Uppsala Model[2] explains the incremental internationalisation during the 1970s of multinational firms and defends that firms internationalise gradually, in an incremental form, passing through several, sequential stages. Along these stages, commitment to the international strategy keeps growing as does the resources involved and the scale and scope of internationalisation becomes greater. The most relevant research in this area is that of Johanson and Wiedersheim-Paul (1975), which distinguishes between four different modes of entering an international market, according to the degree of involvement. Firstly, a firm starts with no regular export activities. During a second stage, it exports via independent representatives (agents) and then, it establishes an overseas sales subsidiary. Finally, builds overseas production/manufacturing units.

To explain internationalisation across country markets, it was hypothesised that firms would enter new markets with a successively greater psychic distance, looking for countries with similarities to the nationality of the firm in terms of language, culture, political system, level of education and level of industrial

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[2] Johanson and Wiedersheim-Paul (1975); Johanson and Vahlne (1977, 2009). Critiques of this model can be found in Andersen (1993).

development (Johanson and Vahlne 1977). The authors presented a more dynamic model which incorporates state aspects (resources and knowledge in a given time) and changing factors (current activities and decisions to commit resources to foreign operations) for the several stages of the internationalisation process. Their model contemplates the "knowledge ownership advantage" of the Dunning Paradigm, with regard to foreign markets. Better knowledge about markets reinforces the commitment and resources involved in a greater number of markets.

The internationalisation of the International New Ventures (INV) theory (Oviatt and McDougall 1994) is related to opportunity-seeking behaviour and is centred on the entrepreneur and their willingness to explore a competitive advantage from the use of resources and sales in several countries. In the case of "international from inception" firms, founders seek growth opportunities in several foreign markets, exploring the resources of those countries and their network structure, whilst skipping stages of the Uppsala model and exploiting the "first mover" advantage. The firms are classified as "born global".

In the research of Bell et al. (2003), an integrative model was developed in order to explain the internationalisation process of small businesses, combining the ideas of the Uppsala model and the INV theory.

The variety of strategies adopted by firms in the internationalisation process defines their pathway and can be classified according to several dimensions: time—the rapidity and pace of internationalisation; scale—in terms of weight of foreign sales, and; scope—which refers to the number of countries in which the firm operates.

Traditional Firms internationalise slowly, in an incremental form that resembles the Uppsala Model. "Born-again global" firms internationalise in several foreign markets simultaneously and very rapidly, exploring market niches by developing a product that is well adapted to international demand, and through maximising industry knowledge and existing networks. Over a period of 2–5 years, foreign sales reached 25 % of turn-over with operations in at least five countries. These firms have previously tended to focus on the domestic market, but internationalisation occurs suddenly as a result of a critical event/s. Focus on the domestic market for a period of up to 28 years is acceptable, or sometimes firms started by following a path similar to that of traditional firms, but as a result of a critical event, they end up experiencing a more rapid process of internationalisation.

2.2 Determinants of Success in the Internationalisation Process of Family Businesses

The success of the internationalisation process can be determined by the characteristics of internationalised firms. The study of internationalised family businesses becomes very relevant, as it is characterised by special features, some of them can

be strong points in the international field or, on the contrary, they can be weak points.

In the study of the family business it is essential to consider the "3-circle" model: ownership, family and business (Tagiuri and Davis 1992). Ownership is a key element, and is connected to the presence of one or more family members in the governance structure with a key management role. Related to this, is the importance of succession: the continuity factor ensures that more than one generation is actively involved with the family business. The intergenerational transfer of a family business is, in effect, the transfer of ownership, and this involves a strong "personal" factor (European Commission 2009).

Miller and Le Breton-Miller (2006) consider that a family firm's governance structure can contribute to a competitive advantage. A firm managed by the founder, or by a family descendent, reduces agency costs, as the interests of management coincide with those of the owners. Attitudes of stewardship emerge more easily in a family business, as owner-managers are driven more by economic self-interest and the search for the collective good of their firm. On-the-job learning is possible, as they remain for many years in the business and the family name and reputation is in their hands and they are more committed to maintaining the firm for a long time. Owner-managers resist being goaded into risky short-term ventures and tend to prefer commitment to long-term investment, thus avoiding opportunistic decisions. Furthermore, concentration of ownership reduces the costs of monitoring.

These aspects can permit the transfer to the international field of a business model based on trust (for instance, by dividing tasks and management among family members or long-serving employees) and a long-term horizon perspective and a network with external stakeholders (based on a solid reputation in terms of commitment). However, according to these authors (Miller and Le Breton-Miller 2006), the opposite effects can be verified through the pay-out of extraordinary dividends, the abuse of power by taking resources out of the firm and by irresponsible leadership characterised by excessive risks taking.

Gallo and Pont (1996) highlight the internal and external factors that can enable, or restrict, the internationalisation process. Such external factors include: environmental factors connected with the competitive framework of the firm; business opportunities abroad or at home, and; the fit between the technological level of the firm and foreign competition and financial resources.

With regards to internal factors, the authors highlighted the internal organisation of the family firm (for instance, a lack of experience of foreign markets, resistance to the internationalisation process or to increasing the internationalisation process, members of the family residing abroad and the preparation of the younger generations) and also the attitudes of top management (internal power struggles, speed of decision making, alliances; etc.).

As boosting factors, Gallo and Pont (1996) emphasise long-term perspective and strong management. The preparation of the following generations for the international process is crucial for success, and maybe the very process of internationalisation will lead to the detachment of younger members of the family abroad,

which accordingly reduces international uncertainty through the involvement of foreign-based family members. These authors also highlight the fact that it is multi-generational family firms that demonstrate a higher level of internationalisation.

Graves and Thomas (2008) also recognized three major factors can be recognised as being a huge contribution to the success of the internationalisation strategy of a family firm: long-term commitment; managerial capacities; and financial resources.

Considering family multinationals to be international entrepreneurs that explore a competitive advantage, Colli et al. (2013) stress four specific sources of competitive advantage for family businesses: human capital; social capital; patient financial capital; and low agency costs. Human capital results from the accumulation of know-how and managerial expertise that emerges from more stable top management, thus reinforcing the coherence of the business model through generations. Social capital accumulated over time by members of the family results from their relationship with stakeholders. Patient financial capital is expressed as being the long-term orientation of the business.

According to Simon and Hitt (2003), the involvement of family resources in family firms can also reveal some negative results, such as: the limited availability of capital for investments, a lessened capacity to attract highly qualified human resources and also a lack of networks.

Kontinen and Ojala (2012) highlight the commitment and dedication of managers in family firms and their sense of duty, emphasising the development of attitudes of stewardship as means of maintaining a business for future generations. Conversely, limited managerial capabilities and a lack of a bridging network ties may also be in evidence.

Patel et al. (2012) focus on the internationalisation process and the inherent boosting and constraining characteristics of family firms during this process. The boost factors identified are: altruism, stewardship and trust. The constraining factors are: risk aversion and family conflicts. Altruism means that they all act by thinking as family members. Stewardship implies that they not only take care of family members, but also of clients, employees, suppliers and the community as a whole. The stewardship attitude leads family members to considerer the longevity of the firm and thus to take decisions that facilitate the success of the business across generations. These two attitudes can engender trust, thus increasing cohesion. Cohesion is important for collective action, as it allows for being better prepared for risk and uncertainty, which is a natural component of the internationalisation process.

Owner-manager coincidence can be a key asset for family firms, as ownership gives managers the power to make decisions about the level and scope of the internationalisation process. Family firms can also provide essential resources for the business, both tangible (financial resources and a low payroll as firms use family members as employees) and intangible (social networks, altruism and stewardship, attitudes which contribute to cohesion and a long-term approach). Within this scope, those characteristics that can hamper the process of internationalisation include: resource restrictions (human and financial), risk aversion (delay or a

slowdown in international presence) and family conflicts (about controlling the destiny of the family firm, about reinvesting earnings in international expansion, etc.).

In terms of management, the prevalence of internal succession (Colli et al. 2013) and a context of union between the interests of both family and the firm, may provide the foundation for long-term strategies. However, if the leader's experience within the firm is not complimented by the presence of networks and contacts at several levels—e.g. at the commercial and financial levels, then the intangible resources of a family firm may be lower.

Family firms can be seen as being capable of building a network of trust, but this network can also be extended to the local community where the business is located (Colli et al. 2013). Although the family may supply labour, financial resources and information, the boundaries of the family firm go far beyond family ties and also embrace the values and culture of a larger group. Family firms are embedded within social networks of trust, sharing the values and attitudes of a larger group that influences not only family behaviour, but also the business. In the next section a connection is made between the family firm and its location.

2.3 Clusters, Industrial Districts and the Location of Family Firms

The choice of location by family firms can be a relevant determinant of their economic performance and, in a long run perspective, of their ultimate failure or success. Clusters and industrial districts are spatial concepts that need to be taken into consideration in order to understand these choices.

Alfred Marshall was the first author to use the term industrial district, in his book entitled *Principles of Economics* (1890), defining it as a "concentration of specialized industries in particular localities", which allows the benefits of external economies due to spill-overs as, in his own words—"in districts in which manufactures have long been domiciled, a habit of responsibility, of carefulness and promptitude in handling expensive machinery and materials becomes the common property of all. The mysteries of industry become no mysteries, but are, as it were, in the air, and children learn many of them unconsciously". This definition is particularly well-suited to family businesses that contribute with internal family ties to external relations and common trust, playing a central role in socializing values and work practices among small local firms over many generations.

The notion of *marshallian* industrial districts was many decades later improved by Giacomo Becattini (1990) and applied to the reality of the "Third Italy", which is a set of northeastern and central regions in this country that evolved from local ethnic communal cultures based on trust and cooperation among firms and between bosses and employees, where families once played more a central role.

Given the existence in Italy of important industrial conglomerates that do not accomplish all the criteria of an *Industrial district*, Garofoli (1992) coined the term *Local Productive Systems*, which allows for a more encompassing definition of these realities (Climent 1997).

Previously, the notion of *Industrial district* had also been used and popularised by Michael Porter (1990), with a similar content, but under a different guise, which was the concept of the *"cluster"*, which was defined by this author as—"a geographical concentration of interconnected companies, specialised suppliers, service providers, firms in related industries, and associated institutions (e.g., universities, standard agencies, trade associations) in a particular field that compete and also cooperate" (Porter 1998). Apparently this concept is not so well fitted to (small) family firms, but it may become very important for these kinds of businesses to be immersed in a cluster located in a geographical area, in order to benefit from its external economies.

Although criticized by some authors as being somewhat vague, or fuzzy notions (Martin and Sunley 2003), clusters and industrial districts can all be operational concepts that are useful for understanding the relative performance of family firms, both internally and externally.

In the particular case of the two cork family firms studied in this paper, economic performance was certainly conditioned, among other factors, by the different kind of regional clusters chosen: Setubal, a southern district of Portugal was chosen by *Mundet*, and Santa Maria da Feira, a northern district, was the choice of *Corticeira Amorim*.

The implications of these different choices of location and of the influence of the characteristics of the two families—*Mundet* and *Amorim*, in the evolution of the businesses will be addressed in the next section.

3 Determinants of Success and Failure in the Internationalisation Process: Two Case Studies—*Mundet & Cᵃ* and *Corticeira Amorim*

3.1 Main Features of These Firms and Their Internationalisation Model

The cork business has always had an international character. The two leading countries in this business, Spain and Portugal, export most of their production of cork worldwide (both manufactured and as raw material). A longitudinal study, of almost one century, that considers two of the most relevant Iberian family cork firms, is of interest for the research field of internationalisation and family firm features.

In fact, *Mundet & Cᵃ, Lda* and *Corticeira Amorim* emerge as two paradigmatic cases of entrepreneurship during the twentieth Century, as they both followed a

strategy from the beginning that explored the natural competitive advantage of the Iberian Peninsula. The two firms are contemporaneous, and faced the same alterations in the institutional and technological framework of the cork business.

To test the hypothesis mentioned in the introduction and to answer the research questions, we opted for a qualitative research method by analysing the historical trajectory of the two firms, highlighting the way in which the family character of the firms, and also their location, were critical to the creation of a competitive advantage that reinforced the natural advantage of the Iberian Peninsula.

A systematic analysis and comparison of a collection of chronological data on the life of the two firms was made, from their establishment, up until the 1980s, taking into consideration the most important events that allow the identification of their international pathways and the familiar context which influenced the choice of those paths (generations, successions, conflicts, etc.). The internationalisation strategies of the two firms suggest that both, the Uppsala and the Innovation models are useful for explaining the internationalisation process.

3.1.1 *Mundet&Cᵃ*, Lda. (1865–1988)[3]

Mundet resembles a "born-again global firm". In 1865, Lorenzo Mundet, the founder, already had two factories, one in San Antonio de Calonge and the other in Palamós (Catalonia).

In 1895, one of his sons, José Mundet, opened a new factory in Brooklyn (New York), and in 1902, his other son, Arturo Mundet, opened a factory in Mexico and José Mundet opened a business in Canada that same year. The causes for that decision came from business difficulties in the natural cork business, facing during that time the severe completion of agglomerated cork.

In 1905, a new factory was opened in Seixal (Portugal) and with this, 30 years after the foundation of the factory in Catalonia and well into the second generation, *Mundet* was already a multinational with four overseas production plants (United States, Canada, Mexico, Portugal).

In 1906 *Mundet* underwent a complete relocation and the company headquarters were moved from Catalonia to Portugal, and at the same time it changed its specialisation from natural cork stoppers to agglomerated cork.

During the 1930s, *Mundet & C.ᵃ* already had 12 factories—located in Portugal, Spain, Algeria and England (Mundet Cork & Plastics)—and the Mundet Cork Corporation had two units, one in the United States and the other in Canada (Mundet Cork & Insulation).

The manager of the Portuguese and Algerian units was Luis Gubert i Cappelá, the son-in-law of the founder. The units in the United States and Canada were managed by José Mundet (second generation) and later by Joseph Mundet Jr (third generation), who, at the end of the 1940s, also assumed total control of *Mundet &*

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[3] The facts about Mundet were collected in Filipe and Afonso (2010).

Table 1 Characteristics of the internationalisation behaviour of Mundet

Issue	Mundet
Trigger/Motivation	Initially reactive (due to difficulties in the Catalonian cork business) and then proactive
Internationalisation patterns	First exporting, and then creating production units in several countries
Pace of Internationalisation	At the beginning, the firm only exported and then after more than 20 years of existence, it followed an exponential growth of internationalisation, becoming a multinational
Method of entry into foreign markets	Established overseas processing plants whilst maintaining total control (concentration of ownership and management)
International strategies	Adaptation to the United States market, production of cork disks (the development of a new product for the international market)
Method of financing internationalisation	Internally-generated funds and new shareholders (non-family members)

Source: Author's elaboration, based on Graves and Thomas (2008) and Falize and Coeurderoy (2012)

C^a. In 1946 a new plant was opened in Jimena de la Frontera (near Cadiz, in Andalucia, Spain), and by 1958 the firm had almost 4000 employees. The main characteristics of the internationalization behaviour of Mundet are presented in Table 1.

3.1.2 *Corticeira Amorim*[4] 1922–...

All the aspects of the internationalisation pathway of *Corticeira Amorim* are similar to those of traditional firms. A synthesis of these aspects is presented in Table 2.

The origins of *Corticeira Amorim* go back to 1908, when the Amorim family established a small workshop producing cork stoppers at Santa Maria de Lamas (in the county of Santa Maria da Feira, in the north of Portugal). The older sons of António Alves Amorim (the founder), and six employees comprised the total man-power of the workshop, which produced cork stoppers for the Port wine trade, the English market being the most important client.

By 1917 the Amorim family already had a factory in Cortinhas (also in Santa Maria da Feira), but *Amorim & Irmãos* was only founded in 1922, and it became a family business that would project the export of Portuguese stoppers to the whole world. In the 1930s, *Amorim & Irmãos* was already the largest manufactured cork producer in the north of the Country, with 150 employees. During this decade, the

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[4] The first company of the *Amorim Group*, as it is known nowadays, was the firm *Amorim & Irmãos*, which was founded in 1922. *Corticeira Amorim* was founded in 1963. In 1969, the partners of this company purchased 40 % shares form their cousins in *Amorim & Irmãos* and also acquired an interest in the shares of the remaining shareholders (uncles and aunts from the second generation), and the firm became *Corticeira Amorim, CA*. For further details about the firm and family Amorim history see also Santos (1997), and Branco and Parejo (2011).

Table 2 Characteristics of the internationalisation behaviour of *Corticeira Amorim*

Issue	Corticeira Amorim
Trigger/Motivation	Reactive and related to the succession by the third generation with managers, strongly committed to internationalisation
Internationalisation patterns	Grow incrementally by progressively entering foreign markets with greater psychic distance markets Target low-tech/less sophisticated markets. Limited evidence of networks at the beginning
Pace of Internationalisation	Gradual internationalization, becoming more intense since the 1960s, almost 50 years after the foundation of the firm (focus on a small number of key markets, as only one family-member had contact with the clients
Method of entry into foreign markets	Conventional. The use of agents/distributors or wholesalers for direct sale to customers. Direct foreign investment was only adopted later
International strategies	Initially only stoppers were produced, and then agglomerated products
Method of financing internationalisation	With generated funds until the 1980s, and then with stock market and bank finance

Source: Author's elaboration, based on Graves and Thomas (2008) and Falize and Coeurderoy (2012)

firm adopted a strategy of backward vertical integration, by acquiring a small store in Abrantes (Portugal), near one of the biggest areas of cork oak forest, which was also near the railway line. In 1939 this store became a factory, producing planks for the main factory. In the 1940s, *Amorim & Irmãos* already employed 321 staff and had a production capacity of 70,000 cork stoppers a day. Using a definition by Chandler (1990), the firm could be classified as a "big business".

The firm followed a path of incremental and gradual international expansion, starting with the use of agents/distributors or wholesalers. Although it was founded in 1922, it was only in the third generation that it adopted a more aggressive form of internationalisation, by opening plants abroad. Until then, the most important diversification of the international market for natural cork stoppers had been the emigration of the two sons of the founder to Brazil. The firm also had a sales agent in France, located close to the distribution channels of champagne.

Together with *Corticeira Amorim*, which was also located in Santa Maria da Feira, from the 1960s onwards, the business went through a process of partial relocation and vertical integration, but maintained the production of natural stoppers as its main area of specialisation. *Corticeira Amorim* had 40 employees and also employed an expert from *Mundet*. This partial relocation resulted in the firm opening several new units, but nonetheless it retained its pre-existing unit, i.e. it became a multi-plant company that differentiated its production in spatial terms. The vertical strategy was followed-up by a more intensive process of internationalisation, with some relocation of production, both inside the domestic market and also abroad. This type of relocation does not necessarily affect the whole production process, but instead affects just one branch, and it can arise from different types

of agreements between the firms involved, ranging from joint ventures to subcontracting, or even the acquisition of a small part of the share capital.

3.2 The Family Firm Determinants of Success and Failure

When *Mundet* started on its course for internationalisation, the ownership base was sole-ownership by its founder, Lorenzo Mundet. With the opening of three production units, in the United States, Mexico and Canada, the ownership was divided—but not in equal parts—among the two brothers (each with 1/3 of the shares each) and the remaining shares were divided in equal shares between the father and the son-in-law. In 1920s, the ownership was also divided between outside shareholders, when *Mundet* embarked on a spectacular expansion plan, which ended up putting the firm under financial and management stress.

José Mundet, the son of the founder, became the major shareholder and owner-manager in the American branch of the business, and when he died, Joseph Mundet Jr assumed control. In Portugal, the manager was the son-in-law of Lorenzo Mundet, Luis Guibert i Cappelá. These two managers (Joseph and Luis) certainly had different visions about the family business, and they disputed the ownership of the family business in court, jeopardizing the harmony of the family, as the division of shares was not equal, and Joseph Mundet held the majority. Together with the presence of non-family shareholders, the possibility of disagreement was increased. Luis did not agree with Joseph having the majority of the shares.

One of the questions that certainly led to disagreement was problems in the American market, where substitutes for natural cork emerged faster, which made it hard to define the future steps of the family business. The lack of trust and the absence of strong family bonds caused greater management costs. One of the causes of failure was indisputably the absence of "familiarity", or features of a family firm that would allow for the survival of the firm in adverse economic times.

In the case of *Corticeira Amorim*, up until 1988—when it was quoted on the stock market—all the shareholders were family members with equal shareholdings in the firm. Firstly, in 1908, there was one owner, the founder, and then in 1922 his sons (second generation) became partners (all nine of the brothers, although in 1939, the number of shareholders was reduced to just five brothers[5]). The second and third generations were groomed from an early age to work in the family cork business.

The firm next entered into a phase of being a "cousins consortium", with the creation of *Corticeira Amorim* in 1963, whereby four brothers (third generation) and one uncle (second generation) divided the ownership of the firm, each holding 20 % of the shares. Even when the firm went public, the majority of shares were retained by the family.

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[5] Three brothers went to Brazil and one died.

This comparison suggests that ownership structure is important for success. An unequal ownership seems to lead to greater disagreement on the way forward with regards to internationalisation, whereas an equal distribution of shares between family members may contribute to success, as well as the concentration of ownership amongst family members.

In the case of the *Amorim Group*, clarification regarding the different positions of the family members regarding the path to internationalisation led to the creation of a new and highly internationalised unit of production—*Corticeira Amorim*—which was just owned by those family members who were in agreement about the intensity and direction of internationalisation that was defended by Américo Amorim (the grandson of the founder, third generation). Any radical decision about the international strategy of the firm was impossible if family members were in disagreement about that strategy, as harmony reigned and was the dominant behaviour. The shares of *Amorim & Irmãos* that belonged to the brothers and cousins who were in disagreement with Américo Amorim, were sold to *Corticeira Amorim*, which enabled the development of solid cohesion and leadership for many years, which, up to now, is based on the charisma of Américo Amorim.

The business was divided into two production units, both highly connected, yet producing different products (*Amorim &Irmãos*—natural stoppers, which was the original business of the family, and *Corticeira Amorim*—agglomerated cork).

Regarding stewardship characteristics, substantial differences occur between the two family firms. In the case of *Mundet*, considerable investments were made in Portugal to meet the needs of the American market, which led the company to adopt a very risky strategy in terms of dependence on a single market. However, the expansion of this market did not live up to expectations as the demand for agglomerated cork slowed down. This option reveals a weaker attitude to stewardship, which resulted from the dual management of the firm, with one manager in the United States and the other in Portugal. When Joseph Mundet started to own most of the business in Portugal, and yet was absent from the production units located there, the failure of the firm's strategy was inevitable. As the owner–manager, he started to take very risky options for the firm, without perceiving the drop in demand, which ended up placing the firm in financial stress.

The lack of strong family bonds and the absence of trust resulted in larger management costs, and growing disagreement between the grandson of the founder and the son-in-law of the founder. Although there were several other managers who were shareholders of the Portuguese branch, they had unequal voting power to that of Jospeh Mundet Jr, who revealed a selfish style of management and direction of the firm's future. A growing number of shareholders—all non-family members and in-laws—became a source of conflict and a potential source of a bias in favour of family candidates for the succession of the founder—namely his son, and afterwards his grandson, which alienated other talented managers.

On the contrary, good stewardship was very evident in the *Amorim Group*. From the beginning, the second generation was involved with the various operations of the firm, and each family member had a mission within the firm. When the firm's interests differed from personal interests, family members chose to leave the

company. Prudent international expansion was the dominant strategy, which revealed characteristics of a path similar to that shown in Uppsala model—an entry mode with high control that meant that any risky decision was impossible, as everyone had the same number of shares. The sense of duty towards the firm was very high, as was cohesion and trust.

Similar in both cases was the social network built by the families. However, in the case of *Mundet*, these in-family relationships led to the creation of new businesses (in the form of foreign direct investment) in the U.S. (controlled by Jose Mundet) and México (controlled by Arturo Mundet). The higher costs involved made it more difficult to respond to adverse levels of demand.

In the case of *Amorim*, the internationalisation process was started by using sales agents and the family maintained very close relationships with them. Members of the Amorim family frequently visited the firm's customers, thus strengthening the relationship of trust between buyer-seller through face-to-face relationships. The lower fixed costs involved in this form of international trajectory made possible a rapid response to falls in demand.

3.3   *The Effects of Location Choices of* Mundet *and* Corticeira Amorim

The location choices of firms are important determinants of its economic performance and resilience, or lack of it, as the case studies of *Mundet* and *Amorim* both clearly show.

In the case of *Mundet*, the choice of starting the business in Portugal in the southern district of Setubal, near the river Tagus and the capital, Lisbon, was a reasonable one as for a start, the cost of land for building the first factory was low, as it belonged to a soap firm that had closed. It was a good location for two other reasons: its relative proximity to the raw material suppliers (the best cork in Portugal, and by far the largest quantity, comes from the Alentejo and the Ribatejo, two southern regions of the country), and also its close proximity to the port of Lisbon, the main outlet for exporting cork products, which were essentially stoppers (Sala and Nadal 2010).

The firm *Amorim & Irmãos* chose another, very different location to develop its cork activity—Santa Maria da Feira, in the north of Portugal. The main reason was essentially that of a family nature: the wife of the firm's founder, António Alves Amorim, was born there (in Santa Maria de Lamas, which has been an iconic location for the firm ever since) and maintained strong family ties with the region. This region is not far away from Oporto, a city which has a well-established and strong tradition with the wine business, and the important port of Leixões. Yet other regions are better located than Santa Maria da Feira from this point of view, such as Vila Nova de Gaia, close by, which proves that the family element was crucial in this case (Santos 1997).

But this choice of Amorim had an apparent, and potentially strong, disadvantage relative to Mundet's choice, being the much greater distance of Santa Maria da Feira from the major cork-producing regions of Portugal, particularly at a period of time and in a country characterised by high transport costs.

One of the major curious and interesting aspects of these case studies is that what appeared to be a strong disadvantage in the early phase of the business—up until the 1930s, and then actually turned out to be a determinant advantage for *Amorim* over *Mundet*, for several reasons, which up to now have not been studied much, and deserve a paper on their own, which we synthesise below.

The first comparative advantage of Santa Maria da Feira versus Setúbal, relates to labour costs, as the wage policy of the Estado Novo benefitted northern industries, as wages were fixed by law and were lower in this region (see, e.g., Branco and Parejo 2008, 2011; Lopes and Branco 2013).

Another important advantage of Santa Maria da Feira was the low incidence of political, social and labour conflict, which was an important determinant during the post-Revolution period after 1974, which marked the re-instauration of democracy in Portugal, as this region was mainly rural with small firms, whereas Setubal was a region populated by large firms, with a strong union movement and a tradition of resistance to the dictatorship that was characterised by a tendency to stand up and fight for labour rights.

But perhaps the most important and lasting advantage of Santa Maria da Feira, which is highly applicable to the *Corticeira Amorim* versus *Mundet* comparison, relates to the different kind of cluster, or Industrial District, between the two locations. In Santa Maria da Feira the tradition of the cork industry is much stronger (using the original terms of Marshall, "it is in the air. . ."), as demonstrated by a family nature of keeping and handing down very small firms, some of which even operate out of a garage, which gave precious support and flexibility to the anchor firm of *Amorim*, but none of this was felt by *Mundet* in Setúbal (Mira 1994; Ruivo 1995, 1996).

The *Amorim Group* gained tangible and intangible benefits from just being located in an established industrial district: lower wages, social networks, the reinforcement of trust and cohesion and reputation, which are all essential characteristics that were later transposed to the international area of the firm. The concentration of highly specialised small firms which bonded with each other, permitted a high degree of cooperation in both the vertical and the horizontal sense (Bonaccorsi 1992). There was a better response to fluctuations of demand without the need for additional investment in production capacity, as the firm could subcontract the production of stoppers out to small workshops, which were often owned by the firm's employees, who thus earned some additional income.

A more careful, detailed, historical and empirical analysis is required to measure to what degree these location aspects were determinant for the economic performance of both the firms and eventually the collapse of *Mundet* and the success of *Amorim*, deserves. However the fact that they played an important role in this context is beyond any reasonable doubt.

4   Conclusions

The economic performance of firms and, ultimately in the long run, their failure or success, depends on many economic, financial, technological, social and even political factors, which are difficult to incorporate in just one sole paper, as we have attempted to do in this study of *Mundet* and *Corticeira Amorim*. This research must then be understood to be a contribution towards the study of this question, which consisting of a comparative perspective of the evolution of these two firms, which emphasises three essential factors: their internationalisation strategies, their family business behaviour and their choices of location.

The theoretical framework is accordingly based on the internationalisation models, the business family theory and the economics of clusters and industrial districts. The internationalisation models used were the Uppsala Model, the Born Global Firm and the Newborn Global Firm. The family business aspect that were considered were: ownership, succession, management, stewardship and decisions about financing. The clusters and industrial districts analysis is based on a well-known regional science study, which is reminiscent of Alfred Marshall's pioneering approach and is subsequently elaborated and expanded by Becattini (1990) and Porter (1998).

Although the histories of the two important Iberian cork industry firms are well studied in many books and articles, up to now they have only been studied independently and thus, to the best of our knowledge, this is the first attempt to make an all-encompassing comparative analysis of the two firms, using well documented historical and empirical sources, supported by a strong theoretical framework.

The main purpose of this paper is to investigate the main determinants of the economic performance of these two firms, which ultimately led to the closure of *Mundet* in the 1980s, after having being one of the most important firms in the cork business during almost all the previous century, and to the enormous success of *Corticeira Amorim*, which became, and still is, the undisputed world leader in the cork business.

After a brief description of the main characteristics of the cork industry, which is essentially a business restricted to Iberia, as Portugal and Spain possess the bulk of the raw material, the main section of this paper starts by identifying the internationalisation models of the two firms. *Mundet* is best described by the Born Global model, with a strong initial expansion in the USA and other countries, whereas *Amorim* is more a kind of Traditional model, where the first exports were made through foreign agents, before embarking on a strong expansion of production and trade through affiliates. This prudent strategy of the Portuguese company may prove to be an advantage in the fight for the worldwide dominance of the cork business.

The family facets of these two companies were also very important in determining their relative economic performance and resilience to economic and other shocks, and once more, *Amorim* demonstrated more advantages. The Amorim

family has always been more united, cohesive and more cautious, and yet at the same time it has proved to be more ground-breaking in terms of business. It has wisely sought to keep ownership and control of the firm from the first to the fourth generation of the family and is better at managing the problems of succession and shareholding. The role of outsiders (i.e. non-family members) in management and financing decisions were much less important than in the case of *Mundet*. The three mechanisms of family ownership that created a competitive advantage were absent in the case of *Mundet*, which led to the emergence of tensions and conflicts.

Finally, *Corticeira Amorim* gained a competitive advantage over *Mundet* with regards to the choice of location. Although the initial site for *Mundet's* operations in Portugal in 1905, appeared to be a very good choice, in that the southern district of Setubal was close to both raw material producers (located mainly in the Alentejo and the Ribatejo) and the large export facility of the port of Lisbon, it ultimately became a source of trouble for the business. The main reasons were the politico-economic decision of the Estado Novo to establish higher wages in the southern regions of the country in order to protect the small firms of the north, and also the turbulence of the period after the Revolution of 1974, which was much greater in the south of the country, than in the north.

The location of *Corticeira Amorim* at Santa Maria da Feira, which is a northern region of Portugal, was based mainly on a family motive which has been explained previously, which ultimately proved to be a crucial advantage, not only from the labour point of view as mentioned above, but also because this firm has been successful in creating a well-functioning Marshallian type industrial district, which has the cork industry tradition "in the air", which is passed from generation to generation, through a myriad of small and very small firms, which gave flexibility and a subcontracted production base which led to the ingenious dominance of the *Amorim* family business.

In conclusion, the family character of a firm is not always an advantage. If the family that owns the firm is united, then the firm benefits from the resulting trust and cohesion. If the case is the opposite, then a family firm becomes a source of conflict and tension, as demonstrated by the case of *Mundet*. Maybe such harmony is also derived from the "district effect", as the family in this case, has a commitment to the region and to its people. This was the case for the *Amorim* family.

Appendix: Chronology

Mundet & C.ª, *Lda: 1865–1988*

1865—Lorenzo Mundet i Corominas (first generation, founder) came from a long line of cork industrialists. His wife, Teresa Carbó i Saguer, was the daughter of a small-scale cork industrialist from Catalonia, for whom Lorenzo began to work in 1865, in the town of San Antonio de Calonge, in the province of Girona (Catalonia, Spain).

1895—José Mundet, the son of Lorenzo (second generation), opened a small cork factory in Brooklin (New York)—*Mundet & Sons*, a subsidiary of L. Mundet & Hijos in Catalonia.

1898—A new factory was opened in Palamós (Catalonia), a few kilometres from San Antonio de Calonge.

1902—Arturo Mundet, son of Lorenzo and brother of José, opened a new cork factory for the group in Mexico—*Casa Mundet Mexico*. José Mundet opened a new unit in Canada—*Mundet Cork & Insulation*, and was also the Chairman.

1905—*Mundet* open a new factory in Seixal (Setúbal, Portugal), close to the Lisbon harbour, on the south bank of the Tagus River. L. *Mundet & Sons* had four partners: José Mundet i Carbó, Arturo Mundet i Carbó (each with 1/3 of the shares), Lorenzo Mundet and Luis Gubert i Capellà (married to Carolina Mundet i Carbó, daughter of Lorenzo and sister of José and Arturo) held the remaining shares, which were divided in equal parts. The first managing director of the Portuguese unit was Luíz Gubert i Cappelà. This unit produced cork stoppers, cork discs and other cork artefacts as well as leftovers. The unit in Seixal employed 200 workers in 1905; 430 workers in 1913 and a total of 600 workers in 1916. It closed its doors in 1988.

1906—*L. Mundet & Hijos* was liquidated and became *L. Mundet & Sons*, a family firm with four partners which was a multinational company has it possessed four sales and productive units (in the United States, Canada, Mexico and Portugal).

1907—Opening of a new factory of cork planks at Vendas Novas (Portugal)

1908—The company changed its name to *L. Mundet & Sons Incorporated,* and also moved its headquarters from Catalonia to Portugal, opting for a full delocalisation strategy from Spain to Seixal, in Portugal. Firstly José Mundet, and then his son, Joseph Mundet Jr, were the majority shareholders.

1914—Opening of a new cork factory for the preparation of raw materials in Mora (Évora, Portugal), which was in operation until 1963.

1915—Creation of the paper cork section at the Seixal unit.

1917—Opening of a new unit in Amora (Seixal, Portugal) for the production of discs and stoppers. This factory was closed in 1967.

1917—Opening of a new unit in Vendas Novas (Portugal), to produce prepared cork. Closed its doors in 1952.

1920—A new factory was opened in New Jersey, to produce agglomerated cork.

1921 and 1924—Opening of two new factories in Montijo (Portugal) to produce granulated cork and agglomerated cork (black; pure and composite agglomerated cork). They both closed their doors in 1988.

1922—The units in Portugal were all integrated into a new firm—*Mundet & Companhia, Lda*, with three partners: José Mundet, Luis Gubert i Cappelá and Joaquim de Sousa (a non-family partner), all of them working as managers of the firm. This new firm maintained close relations with *Mundet & Sons* in the United States, selling the Portuguese cork production (stoppers, raw material and agglomerated cork) to the American market through *Mundet & Sons*. The American and Canadian branch and the English branch had the same managing director—José Mundet.

1924—Opening of a new factory for cork preparation in Algeria. The manager of *Mundet Africa SA* was Luis Gubert.

1926—Opening of a sales warehouse in Croydon (England)—*Mundet Cork Products*, Ltd (England), which was also an affiliate of *Mundet & C.ᵃ*.

1927—The share capital of *Mundet & C.ᵃ* was reinforced.

1927—Opening of a new factory at Ponte de Sor (Portalegre, Portugal), and another in Algeria.

1928—Another factory was opened in San Vicente de Alcántara (Extremadura), for processing cork from this Spanish region—*Corchos Mundet España, S.A.* (San Vicente de Alcantara) was affiliated to *Mundet & C.ᵃ*, which was managed by Joaquim de Sousa.

1930—*L. Mundet & Sons, Inc.* became *Mundet Cork Corporation* with two units, one in New York and the other in New Jersey. This firm had exclusivity for the sale of the cork that came from *Mundet & C.ᵃ* and also had exclusivity in other markets. In 1962 it was sold to Crown Cork & Seal.

1936—The management team of *Mundet & C.ᵃ* consisted of: José Mundet (second generation), Luis Gubert (married with the daughter of the founder); Joaquim de Sousa; José María Genis Arolas; Antonio Iglesias Cruz and Luis Gubert i Mundet (ground son, third generation).

1938—Was a turning point in terms of the management of *Mundet & C.ᵃ*, as José Mundet gave his son the majority of shares and others to José Genis and Antonio Iglesias. By doing so, he allowed Joseph Mundet of the third generation to become the majority partner and he was nominated managing director of *Mundet & C.ᵃ* until his death in 1962.

1939—The mandate of Joseph Mundet was suspended and the management of the company was carried out by Luis Gubert, Joaquim de Sousa and Luis Gubert i Mundet.

1940—José Mundet dies and Joseph Mundet, his son, assumed the role of Chairman of the *Mundet Cork Corporation*. Since that date only conflict took place, culminating in a court case in which the shares and managerial powers were transferred to Joseph Mundet, José María Genis, Antonio Iglesias and Henry Cant.

1946—A new unit was opened in Jimena de la Frontera (Andalusia/Spain).

1947—Luis Gubert and Joaquim de Sousa sued Joseph Mundet Jr. and the remaining partners. They lost and the partnership was dissolved.

1949—Joaquim de Sousa, Luis Gubert, Luis Gubert i Mundet and Teresa Gubert Gomes sell their shares.

1951—António Iglesias sell his shares to Joseph Mundet Jr. and José María Genis.

1953—Joseph Mundet Jr, José María Genis and José Azeredo Perdigão were the managers of *Mundet & C.ª*.

1958—The company had several new partners: José Azeredo Perdigão, José Genis Gorgot, Antonio Costa Guerra and Miguel Antonio Horta e Costa.

1962—Joseph Mundet Jr died and his wife became the major shareholder.

(…)

1986—Paula Mundet died.

1988—The Seixal and Montijo units were closed down.

1992—Bankruptcy was declared for *Mundet & C.ª*.

The Amorim Group*: 1908–*…

1908—The Amorim family moved to Lamas (Feira /Portugal) and opened a factory. The founder of this factory, António Alves Amorim, his wife, Ana Pinto Alves, and their eleven sons were the main employees of the factory, together with six other employees. They only produced stoppers.

1922—The family built a new factory at Lamas (Feira/Portugal) and founded the firm of *Amorim & Irmãos*, with the nine sons of António Alves Amorim as partners (second generation). Three of the brothers went to Brazil and two of then also founded firms connected to the cork business (*Amorim & Pinto* and *Amorim & Coelho*).

1935—Opening of a new unit in Abrantes (Portugal) to produce their own cork planks.

1939—The firm was reduced to five shareholders (five brothers), who were the brothers who remained in Portugal. At this time the firm had 150 employees.

1940s—The firm *Amorim & Irmãos* had 321 employees and produced daily almost 700,000 stoppers and almost 200 firms were dependent on it in terms of raw material and credit. The third generation entered the business and the various tasks within the company were divided among members of the family.

1960—The *Sociedade de Isolamento de Cortiça* (agglomerated cork) was founded in Brazil.

1963—*Corticeira Amorim* was founded in Mozelos (Feira/Portugal). There were five shareholders: four brothers (third generation) and one uncle (second generation). They were also shareholders of *Amorim & Irmãos*, which had 600 employees. This new firm produced agglomerated cork with the cork leftovers from *Amorim & Irmãos*.

1968—The firm *Inacor* was founded, which belonged to the cousins (third generation), which also produced agglomerated cork.

1966—*Corticeira Amorim Algarve* was founded, also producing agglomerated cork.

1967—*Gerard Schiesser Gmbh* in Vienna was founded as a sales agent for the Eastern market.

1969—The sons of Américo Alves Amorim (third generation) bought the firms of *Amorim & Irmãos* and *Itexcork* in Vendas Novas (Portugal) from their cousins, as well as *Inacor*. The firm became *Corticeira Amorim CA*.

1970s—The importance of the American market was reduced and the European market became more important. Santa Maria da Feira (Portugal) became the centre of cork stopper production, but there was some diversification in terms of cork products.

1972—The group bought *Comatral* (production of cork planks) in Morocco (Africa).

1976—The group bought *Samec* (planks production) in Seville (Spain)

1978—Opening of a new unit at Santa Maria da Feira (Aveiro,Portugal)—*Ipocork*.

1982—*Champcork* was founded in Lamas (Aveiro,Portugal), producing stoppers for sparkling wine.

1983—Creation of *Labcork*.

1984—Creation of the *Hungarokork-Amorim* partnership between *Corticeira Amorim* and two Hungarian publically quoted firms.

1984—José Amorim, one of the shareholders, did not agree with his brothers about the firm's strategy and left the firm, selling his share to his brother.

1988—The group opened the share capital to other shareholders, but the family kept the majority. The firm is now called *Corticeira Amorim SGPS*.

1990s—The fourth generation enters the business with degrees in management.

(. . .)

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Portugal and Poland: Two Different Tales on Export Performance to the European Union in the 2000s

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Abstract   European Union's enlargement to eastern and central Europe's countries imposed a challenge to southern Europe's countries. With similar labor intensive specialization patterns, but much lower production costs and better qualified human capital than eastern and central Europe's countries, southern Europe faced serious threats to their competitiveness. This chapter compares the export performance of these two groups of countries in the period 2000s through the analysis of two specific representative countries: Portugal and Poland. The study is based on a Constant Market Share analysis, which allows to decompose the export growth into several components; and a combination of revealed comparative indexes with a geographical orientation measure. We conclude that while Poland registered a great and impressive export performance across the analyzed period, increasing around 100 % the country's market share to the EU15, Portugal has evolved in the opposite direction, with an average market share decrease of 7 %. Although it was not the only factor, we conclude that Poland's competitiveness effect was essential to explain Poland's increasing industries export share. Several reasons are proposed for the different course taken by the two countries.

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1   Introduction

European Union's enlargement to eastern and central Europe's countries imposed a challenge to southern Europe's countries. With similar labor intensive specialization patterns, but much lower production costs and better qualified human capital than eastern and central Europe's countries, southern Europe faced serious threats to their competitiveness. This chapter compares the export performance of these two groups of countries in the period 2000s towards the first 14 Member-States of the European Union, in which Portugal is not included (the term EU15 will be used to designate these 14 Member States, from here on in) through the analysis of two specific representative countries: Portugal and Poland.

The choice of these two specific countries, Portugal and Poland, can be easily understood. Despite the fact the Polish economy is much larger than the Portuguese, their specialization pattern in production is rather similar. Therefore, when Poland became an European Union member, in 2004, it was expected a loss of competitiveness from southern Europe's countries. This explains, partially, the need to study the period dividing it in three subperiods: the first subperiod 2001–2003 is characterized by being prior to Poland's entry in the EU, while Portugal was already a member; 2004–2008 is when the first possible effects of Poland in the EU can be observed; 2009–2013 is the period marked by the economic and financial crisis.

An additional reason to compare these two countries is the different path they followed in terms of their export performance. While in the period between 2001 and 2013 Portugal had an exports total growth of 45.6 %, Poland registered 215.8 % (see Table 6 in Appendix). In what concerns the market share in the European Union, Portugal has experienced a decrease of −7.3 % in the period of 2001–2013, (regaining 5.3 % from 2012 to 2013) while Poland has had an increase of 101.1 % in the same period. As Portugal's exports to the European Union were 0.9 % of the Union's total imports in 2001, by 2013 they fell to 0.8 %. Inversely, Poland's market share in the EU15 represented 1.1 % in 2001, by 2013 it reached 2.2 %. Several reasons will be scrutinized that may explain this difference in the trend of exports, based in part on the economic policies implemented in these two countries.

The study is based on (1) a Constant Market Share analysis, which allows to decompose the export growth into several components, including one usually related to competitiveness after controlling the contribution of the specialization pattern and the geographical orientation of trade; and (2) a combination of revealed comparative indexes with a geographical orientation measure, which also allows to identify the products in which Portugal and Poland reveal potential to expand their exports to the EU15 market according to these two characteristics.

The present study's database comprises 1256 industrial products, with an aggregation level of 4 digits, grouped into 30 groups, from the International Trade Centre Trade Map Database for the period of 2001–2013. The selection of groups was based on Coutinho and Fontoura (2012) adaptation of Harmonized System (HS) Rev. 3 from International Trade Centre. The values for exports and imports are expressed in thousands of Euros. The list of groups as well as the range of products comprising each group is available in Table 4 of Appendix.

The analysis will be developed as follows: Sect. 2 provides an overview of the export performance of both countries in terms of their revealed comparative advantage; Sect. 3 presents the methodology used in this chapter and Sect. 4 the empirical evidence obtained; finally, Sect. 5 concludes.

2 Similarities That Frame the Export Performance of Portugal and Poland

In order to evaluate and compare both countries specialization pattern in trade with EU15, the following Balassa's Revealed Comparative Advantage index was used:

$$\text{RCA}_{i,a} = \frac{\frac{X_{i,a}}{X_i}}{\frac{M_{i,a}}{M_j}} \tag{1}$$

where, a is the group of products (defined in Table 4 in Appendix); i is the exporting country (either Portugal or Poland); j is the importing area (UE15); X are the exports; and M are the imports. If the revealed comparative advantage is greater than one, it means that the exporting country has comparative advantage in exporting that group of products to the EU15. The results are shown in Table 1.

In all the 30 groups, both countries did not had similar comparative advantages in only 8 groups in the period of 2001–2003 (groups 6, 15, 18, 19, 21, 24, 25 and 30); 8 groups in the period of 2004–2008 (groups 1, 6, 7, 12, 18, 21, 27, 30); and 7 groups in the period of 2009–2013 (group 7, 18, 20, 21, 27, 30). Taking in account that some differences are the result of a transition to a greater specialization in those groups of products, such as group 1 and 12 in the period of 2004–2008, the results point to a similar specialization pattern in the products exported by these two countries to the European Union. The relative exports of Portugal and Poland to the EU15 also confirms these similarities, as shown in Table 5 in Appendix.

Table 1 RCA's of Portugal and Poland to the EU15

	Portugal			Poland		
	2001–2003	2004–2008	2009–2013	2001–2003	2004–2008	2009–2013
Group 1	0.68	0.87	1.29	0.93	1.69	1.75
Group 2	0.86	1.15	1.26	0.58	1.67	1.35
Group 3	0.49	0.63	0.74	0.75	0.78	0.79
Group 4	0.37	0.45	0.78	0.26	0.76	0.82
Group 5	0.76	1.02	1.29	0.82	1.17	1.29
Group 6	1.50	2.06	1.94	0.24	0.59	1.28
Group 7	0.81	1.90	1.42	0.22	0.11	0.05
Group 8	0.13	0.20	0.23	0.57	0.33	0.25
Group 9	0.35	0.57	0.51	0.47	0.32	0.26
Group 10	0.27	0.30	0.36	0.20	0.24	0.35
Group 11	0.44	0.65	0.63	0.47	0.78	1.15
Group 12	0.62	0.96	1.08	0.97	1.12	1.70
Group 13	0.57	0.38	0.51	0.13	0.17	0.48
Group 14	0.96	1.34	1.71	1.06	1.28	1.56
Group 15	0.50	0.46	0.57	1.53	0.93	0.63
Group 16	3.91	3.55	4.06	2.54	2.27	2.14
Group 17	1.34	1.06	2.26	1.21	1.20	1.60
Group 18	1.94	2.06	2.41	0.72	0.75	0.61
Group 19	3.42	2.28	2.48	0.90	1.07	1.35
Group 20	4.04	3.34	2.71	1.96	1.01	0.88
Group 21	6.84	5.61	5.35	0.61	0.36	0.36
Group 22	2.99	3.85	3.99	1.72	1.71	1.85
Group 23	0.20	0.12	0.85	0.42	0.46	0.62
Group 24	0.85	1.08	1.07	2.04	1.68	1.59
Group 25	0.81	1.17	0.92	1.17	1.01	0.96
Group 26	1.27	1.29	1.33	1.06	1.16	1.41
Group 27	0.74	0.70	0.66	0.99	1.20	1.29
Group 28	1.37	1.35	1.41	1.35	1.53	1.64
Group 29	0.34	0.27	0.38	0.20	0.30	0.35
Group 30	0.37	0.81	0.71	1.23	1.04	1.03

Source: Own calculations from INTRACEN Database (http://www.trademap.org)

3 Methodological Approach

3.1 Constant Market Share

We use a constant market share (CMS) analysis with the aim of analyzing Portugal and Poland's export performance from 2001 to 2013. In spite of some criticism to the method (see, for instance, Milana 1988), CMS analysis is a traditional tool in applied international economics based on disentangling the export performance of a

country into several effects, considered to have a relevant economic meaning. Several versions have been produced and we follow Jepma (1981), also used, for instance, by Coutinho and Fontoura (2012). This version allows the statistical decomposition of a country's export variation—the so-called Total Effect (TE)— into four effects: a Scale Effect (SE), which shows the variation of a country's exports when its growth is equal to the world export growth; a Product Effect (PE), which shows the contribution of the export specialization pattern for the total export variation; a Market Effect (ME), which measures the impact of the geographical specialization on the variation of total exports and, finally, a residual effect, associated to a "pure" Competitiveness Effect (CE) related to the exporter's price and non-price competitiveness.[1]

Taken together, export performance can be written in the following identity:

$$\underbrace{\Delta q}_{TE} = \underbrace{S_0 * \Delta Q}_{SE} + \underbrace{\left(\Sigma_i S_{i0} * \Delta Q_i - S_0 * \Delta Q\right)}_{PE}$$

$$+ \underbrace{\left(\Sigma_i \Sigma_j S_{ij0} * \Delta Q_{ij}\right) - \Sigma_i S_{i0} * \Delta Q_i}_{ME} + \underbrace{\Sigma_i \Sigma_j \Delta S_{ij} * Q_{ij1}}_{CE} \quad (2)$$

where $\Delta q = \Delta[\Sigma_i \Sigma_j q_{ij}]$ is the total variation of country's exports to the destiny market j (EU15) in the time period; $S_0 = q_0/Q_0$ is the share, per product i, of country's exports over the total world exports at the beginning of the time period; $\Delta Q = \Delta[\Sigma_i \Sigma_j Q_{ij}]$ is the variation in total world exports to j in the time period analysed; $S_{i0} = q_{i0}/Q_{i0}$ is the share, per product i, of country's exports to the world over the total world exports at the beginning of the time period; ΔQ_i is the variation in world total exports per product i in the time period; $S_{ijo} = q_{ij0}/Q_{ij0}$ is the share, per product i, of country's exports to market j over the world exports to market j at the beginning of the period; ΔQ_{ij} is the variation in world exports to market j per product i in the time period; ΔS_{ij} means the variation in the share, per product i, of the country's exports to market j over the world exports to market j; and Q_{ij1} is the value of world exports to market j at the end of the time period.

3.2 Complementarity and Geographical Bias

In addition to the CMS analysis, we have also adopted a methodology proposed by Flôres (2005) which combines an analysis based on the revealed comparative

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[1] A limitation of this analysis is that it is not possible to disentangle the influence of the price and volume competition. For instance, the export data is generally in USD value, instead of domestic currency. Hence variations in market share are influenced by variations in USD exchange rate. It means that, *ceteris paribus*, an appreciation of the USD will result in a decline in the market share of the country analysed.

advantage indexes with a "geographic orientation" dimension. The methodology is based in two indexes, the *Trade Complementarity Index* (TCI) and the *Geographical Orientation Index* (GOI).

The Trade Complementary Index allows to understand if bilateral trade flows are complementary, i.e., if the comparative advantage in products exported by Portugal and Poland is complemented by a comparative disadvantage in the same products by the EU15 countries. It analyses the correspondence between the supply from the exporter country with the demand from the trade partner. The Trade Complementary Index is defined as follows:

$$\text{TCI} = C_{ij}^{S} = \frac{\frac{X_{iW}^{S}}{\sum_{S} X_{iW}} * \frac{M_{jW}^{S}}{\sum_{S} M_{jW}}}{\left(\frac{M_{WW}^{S}}{\sum_{S} M_{WW}^{S}}\right)^{2}} \tag{3}$$

where, S is the group; i is the exporting country (either Portugal or Poland); j is the importing area (EU15); W is the World; X are the export; and M are the imports. If TCI is greater than 1 it means that there is trade complementarity, as the exporter country shows a superior competitiveness and satisfies the demand of the trade partner. The Geographical Orientation Index is defined as the ratio, for a specific product, between the country's share of exports to the trade partner and the partner's share of the world imports (excluding from the world imports those that are from the exporter country). It aims to verify the existence of geographical bias, i.e., if the export capacity for the trade partner is undervalued, meaning that the exporter country has room to increase exports to the trade partner. The index can be written as follows:

$$\text{GOI} = I_{ij}^{S} = \frac{\frac{X_{ij}^{S}}{X_{i}^{S}}}{\frac{M_{j}^{S}}{M_{W-i}^{S}}} \tag{4}$$

where, once again, S is the group; i is the exporting country (either Portugal or Poland); j is the importing area (UE15); W is the World; X are the export; and M are the imports.

If GOI is higher than one it means a "positive" geographical bias, since for a specific product the exports made by the country i in the total exported are superior to the imports made by the partner from the world. If it is negative, it means that there is room to expand exports to the specific market. The indexes results can be combined, creating two different scenarios in the presence of Trade Complementary: (1) if the Trade Complementarity Index and the Geographical Orientation Index are greater than 1, it means the positive geographical bias reflects the complementarity between both countries; (2) If the Trade Complementarity Index is greater than 1 and the Geographical Orientation Index is smaller than 1, it means there is complementarity, but there is still room for additional trade—this is a trade potential situation.

4 Empirical Results

4.1 CMS Analysis

In the whole period, Portugal's exports grew 45.6 %. Between the sub-periods there are important differences in the exports variation: while in 2001–2003 the exports growth was 4.1 %, in 2004–2008 it rose slightly to 7.7 %, and in 2009–2013 it increased notably 42.6 % (see Table 6 in Appendix).

Figure 1 (and Table 7 in Appendix) presents the CMS results for Portugal, regarding all the periods. A main conclusion is that export growth was mainly led by the scale effect with a residual positive or even negative (as in the 2004–2008 sub-period), competitiveness effect. The exception is the sub-period after the 2008 crisis—which has a positive competitiveness effect with a significant weight, although still below the scale effect—a result of the sharp decrease of the unit labor costs following the adoption of an "adjustment program" on the verge of bankruptcy of state finances between 2011 and 2013, under the supervision and financial assistance of the European Central Bank, European Commission and International Monetary Fund.

In Fig. 2 (and Table 7 in Appendix), which disaggregates the effects by groups, it is shown that in Portugal the groups that had a greater positive export variation, in the whole period of 2001–2013, were Mineral Fuels (group 8) and Rubber and Plastic (group 14). In these groups, the competitiveness effect played a key role. It is also worth highlighting the significant positive performance of the machinery and automobile industries in Portugal the final period of 2009–2013 (see Table 7 in Appendix). Although both industries had a poor performance in the period of 2004–2008—due to a profoundly negative competitiveness effect, which led, to a small positive variation in the overall period of 2001–2013—in the sub-period after the 2008 crisis both industries were able to take advantage of the growing global

Source: Own calculations from INTRACEN Database (http://www.trademap.org)
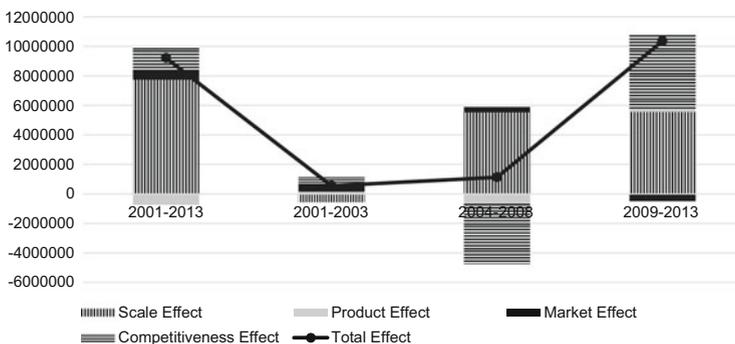
Fig. 1 CMS for Portugal to EU15 (group 30 was excluded due to the heterogeneity of products included, which led to a distorted Product Effect in the period of 2009–2013). Source: Own calculations from INTRACEN Database (http://www.trademap.org)

Source: Own calculations from INTRACEN Database (http://www.trademap.org)
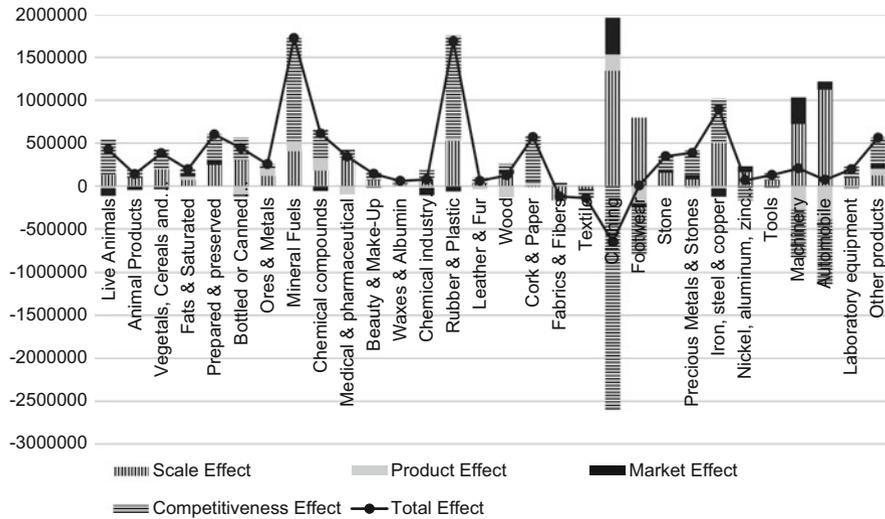
Fig. 2 CMS for Portugal to EU15 from 2001 to 2013. Source: Own calculations from INTRACEN Database (http://www.trademap.org)

demand in the EU15 market (represented in the scale effect). Note, however, that the competitiveness effect remains little dynamic.

Results by groups also show that Portuguese traditional sectors (groups 18–21) were the most negatively affected in the period of 2001–2013. Exception made to Fabric and Fibers (group 18), competitiveness played a key role in the negative export performance in these groups. The clothing and footwear industries (group 20 and 21) show an interesting pattern along the period. Both industries suffered an intense decrease in the period of 2001–2003, mostly due to the competitiveness effect—although the scale and market effect had also a small but negative contribution, in this period, to the footwear industry. In the period of 2004–2008 competitiveness played, again, a determinant role in both industries negative performance. However, in the final period, from 2009 to 2013, both industries reveal a positive performance, mostly due to the scale effect. From 2009 to 2013 the footwear industry regained the volume of exports of 2001; justified by a greater added value in the industry's production (APICCAPS 2012).

Focusing now the case of Poland, a spectacular exports' growth of 215.8 % in the period analyzed is worth highlighting. With a positive growth of 17.1 % from 2001 to 2003, the entry to the European Union just accelerated exports' growth, increasing 77.7 % in 2008, relatively to 2004. Exports' growth decelerated in the next period of 2009–2013 but still had a very positive growth of 40 % in those 4 years. Attending to the market share, the country doubled its European Union's market share from 2001 to 2013 (see Table 6 of Appendix). Interestingly enough, the CMS
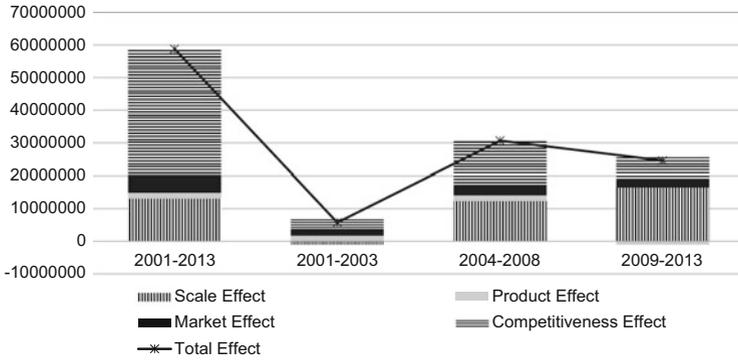
Fig. 3 CMS for Poland to EU15. Source: Own calculations from INTRACEN Database (http://www.trademap.org)
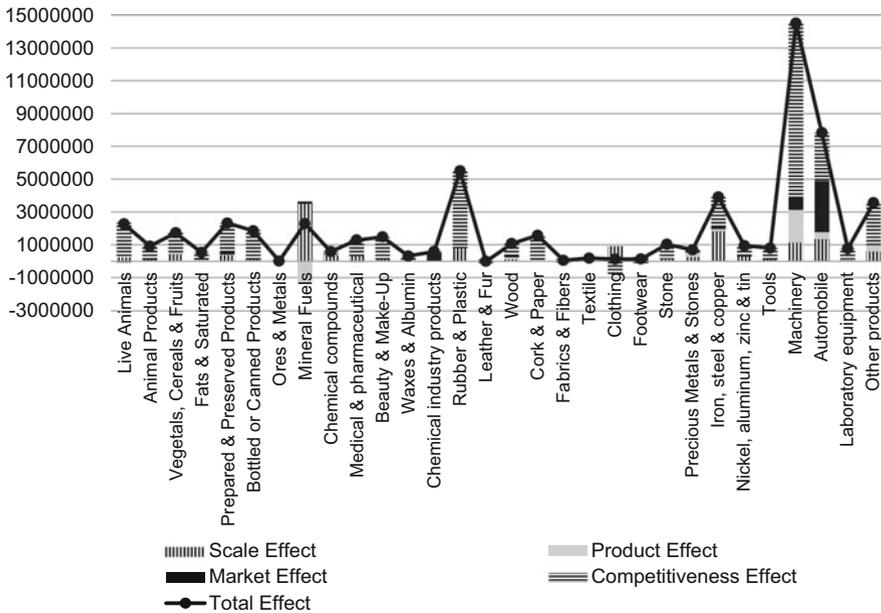
Fig. 4 CMS for Poland to EU15 from 2001 to 2013. Source: Own calculations from INTRACEN Database (http://www.trademap.org)

analysis (Fig. 3 and Table 7) shows the predominant effect of competitiveness to explain this export performance, in contrast with the case of Portugal.

Disaggregating now the analysis of Poland by groups (Fig. 4 and Table 7), once again unlike Portugal (which witnessed a decrease in the exports of its traditional sectors in the overall period) Poland only saw a slight decrease of exports in the fur

and leather industry (group 15) in the period between 2001 and 2013. All the other industries saw their exports grow over this period. The groups that registered the highest positive performance were the machinery and automobile industries (groups 27 and 28), with the automobile industry registering a positive variation over 7 billion euros and the machinery industry registering a positive variation over 14 billion euros. A relevant result is that the positive performance in both groups can be accounted for all effects, being the competitiveness effect the one which accounted the most for the machinery industry and the market effect the one which most accounted for the automobile industry (due to the proximity and importance in the industry of Germany). Rubber and Plastic industry must also be highlighted for its positive variation, mostly due to the competitiveness effect, in the period of 2001–2013.

4.2 Trade Complementarity Index and Geographical Orientation Index

We now turn our attention to the analysis of the geographical orientation index when there is trade complementarity between the exporter country and the importer EU15 partner. In the case of Portugal (Table 2 and Table 9 in Appendix), most groups have a geographical orientation index above 1 to the EU15, which is consistent with the inexistence of trade barriers in the European Union's territory. Indeed the trade potential situation ($TCI > 1$ and $GOI < 1$) is practically inexpressive. Only the fats and saturated products (group 4) register, in all periods, a geographical orientation index below 1 while complementarity is greater than 1; the geographical position of Portugal may be the reason for such geographical orientation index result in the group.

Table 2 GOI with TCI over 1 Crossover for Portugal

2001–2013	2001–2003
TCI > 1 and GOI > 1	**TCI > 1 and GOI > 1**
Groups 1, 2, 5, 6, 12, 14, 16, 17, 18, 19, 20, 21, 22, 25, 26, 28, 30	Groups 2, 5, 6, 14, 16, 17, 18, 19, 20, 21, 22, 26, 28
TCI > 1 and GOI < 1	**TCI > 1 and GOI < 1**
Group 4	Group 4
2004–2008	2009–2003
TCI > 1 and GOI > 1	**TCI > 1 and GOI > 1**
Groups 1, 2, 5, 6, 12, 14, 16, 17, 18, 19, 20, 21, 22, 25, 26, 28	Groups 1, 2, 5, 6, 12, 14, 16, 17, 18, 19, 20,21, 22, 24, 25, 26, 28, 30
TCI > 1 and GOI < 1	**TCI > 1 and GOI < 1**
Groups 4, 30	Group 4

Source: Own calculations from INTRACEN Database (http://www.trademap.org)
The bold values are statistically significant

Table 3 GOI variation with TCI over 1 Crossover for Poland

2001–2013	2001–2003
TCI > 1 and GOI > 1	**TCI > 1 and GOI > 1**
Groups 1, 5, 6, 12, 14, 16, 17, 20, 22, 24, 25, 26, 28, 30	Groups 1, 12, 14, 16, 17, 20, 22, 24, 25, 26, 28, 30
TCI > 1 and GOI < 1	**TCI > 1 and GOI < 1**
Groups 2, 11	Groups 2, 5, 11
2004–2008	2009–2013
TCI > 1 and GOI > 1	**TCI > 1 and GOI > 1**
Groups 1, 2, 5, 6, 12, 14, 16, 17, 20, 22, 24, 25, 26, 28, 30	Groups 1, 2, 5, 6, 11, 12, 14, 16, 17, 19, 20, 22, 24, 25, 26, 28, 30
TCI > 1 and GOI < 1	**TCI > 1 and GOI < 1**
Group 11	No Groups

Source: Own calculations from INTRACEN Database (http://www.trademap.org)
The bold values are statistically significant

In turn, Poland's entry to the European Union in 2004 is expected to be accompanied by an increase of the geographical orientation index, especially in the groups where it is observed an higher than 1 complementarity index, leading from a situation of trade potential (with complementarity index above 1 but a geographical orientation index below 1) to a full accomplished complementarity of trade, with both indexes greater than 1 (see Table 3 and Table 10 in Appendix). Still, due to previous trade agreements with the European Union, the rise of the group's value in the geographical orientation index seems to be limited. Accordingly, only animal products and prepared and preserved products (groups 2 and 5) gain a geographical orientation above 1 from 2001–2003 to 2004–2008. Poland's entry to the European Union seems to have had a direct impact on Animal Products (group 2) regarding the influence of the Common Agricultural Policy.

5 Concluding Remarks

Throughout this study we observed that although Portugal and Poland have a similar specialization pattern and display comparative advantages in many of the same groups, there are notable differences to be pointed out in terms of their export performance.

Basically, the overall export performance of Poland to the EU15 was clearly superior to the one of Portugal in the analyzed period. This is, to a large extent, explained by the competitiveness effect. In the case of Portugal, the export performance was impaired by the increased competition of emerging countries, including the countries of the 2004 EU's enlargement; but it is also related to the loss of competitiveness, reversed only in the last sub-period. Besides, while some of the most dynamic sectors in Poland, as machinery and automobile, owe their growth to

the competitiveness effect, in Portugal this effect has a low contribution in these sectors and even negative in important sectors, such as the traditional ones. Indeed, in Portugal the groups that had the least positive performance were the Traditional Sectors (groups 18–21). Such performance is not related to Portugal's comparative advantages, as these groups have comparative advantages in all periods, but instead to a loss of competitiveness, which was later regained in the final period, basically due to greater added value. On the other hand, machinery and automobile, which, like in Poland, also experienced significant growth in exports in Portugal in the final period, benefited from the scale effect, i.e., driven by global growing demand in the EU15 countries, not by competitiveness. In sum, Poland followed a different course, displaying a notable export performance, largely supported by the competitiveness effect.

An explanation for the different tales on the export performance of these two countries is the adoption in Portugal of a strong currency in 1999 (the euro) and the subsequent rise in unit labor costs; and Poland's adopted policies to improve competitiveness.

The participation in the Economic Monetary Union and the end of the competitive devaluations caused Portugal a notable appreciation of the effective exchange rate (of more than 20 % between 1988 and 2006).[2] Joining the euro also produced an expansionary monetary shock which greatly stimulated domestic demand and created an excess of expenditure on domestic production capacity (Blanchard 2006). While the channeling of excess demand for imports worsened the external current of the country, another part of the demand was addressed to the non-tradable goods sector, raising real wages above productivity growth, reducing the competitiveness of exports and further aggravating the current account. Between 1999 and 2007, unit labor costs showed a positive difference of 24 % compared to Germany and 12.5 % compared to the euro area average (Bento 2009; Mendonca 2012).

With the structural adjustment forced by the external intervention of the European Commission, the European Central Bank and the International Monetary Fund in 2011, Portugal regained some international competitiveness, with unit labor costs experiencing a large fall in 2013 (OECD 2014a). Though a large part of such fall was attained with decreases on labor wages,[3] which was made possible by an intense increase in unemployment, some reforms enhanced productivity (Idem). According to OECD's Product Market Regulation Database, Portugal's network sector barriers lowered between 2008 and 2013, overtaking Germany and positioning itself as the second country, in the OECD, with the lowest regulation. Transport sectors regulation also decreased during this period. Reforms on employment protection also affected labor wages (Idem). Exports ratio to GDP grew since 2009, attaining by the end of 2013 a value over 40 % (Idem).

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[2] See Amador et al. (2009).

[3] OECD (2014a) points the raise of the regular work week of central government employees from 35 to 40 h with no pay rise in September 2013.

In Poland, in turn, the communist heritage left deep marks in the market dynamic and until the end of 1990s, despite the fast economic growth, its competitiveness performance was weak (Glebocka 1997). However competitiveness gradually rose. European policies, especially regional ones, were very important to modernize the polish economy and strengthen regional competitiveness (Bronisz et al. 2008). In 2005, 1 year after the integration, Poland had already improved its competitiveness towards the EU15 in 10 % and in 2007 had already accomplished 53.4 % of the EU average (Bronisz et al. 2008). According to World Economic Forum (2013), some of the components that have contributed to this positive competitiveness performance were: the labor productivity per working hour, that reached 73.4 % of the EU average in 2013 (European Commission 2014); the low pressure in labor costs; and, unlike Portugal, the current account deficit low levels, which was 1.3 % GDP in 2013 (5 % and 3.7 % in 2011–2012) (Idem), giving a significant slack to the economy. Another positive point is the gross fixed capital formation, clearly above the EU average—despite the recent slowdown tendency (Idem). Poland is also in a good position related with access to finance, being in second place of the World Bank Doing Business 2014 Report rank (European Commission 2014). Since competitiveness is achieved with public authorities creating framework conditions to their enterprises (Glebocka 1997), Poland seems to have chosen the right track. Despite the complex process for companies' registration, Poland is in the fourth place in what concerns to the high-growth companies in EU ranking, with 4 % (European Commission 2014). As for skill levels, Poland has a tertiary education higher than EU average, improved by the 2010–2011 Higher Education Reform (OECD 2014b).

Considering the possibility of Poland affecting profoundly Portugal's export performance, we find limited evidence for such hypothesis. Although Poland's entry to the European Union could have a major impact on Portugal's export performance, as both countries have a similar specialization pattern and revealed comparative advantages, it is acknowledgeable that the entry of such large economy did not have the expected negative impact in Portugal, at least in Portugal's worst performing groups—the traditional sectors. Portugal's traditional sectors, groups 18–21, had a minor impact on Poland's export growth. Such can be explained by two reasons: first, excluding particular periods (such as the period of 2001–2003 in the clothing industry (group 20) or period 2009–2013 in the textile industry (group 19) Poland did not have comparative advantages on such groups. Secondly, Poland's entry to the European Union did not have impact on the geographical orientation of such groups as trade with the EU15 was already basically free from tariffs when Poland adhered to the EU project. On the other side, we verify that Poland's very positive performance in the machinery and automobile industries (groups 27 and 28), with a positive contribution of the competitiveness effect, was accompanied by a timid positive performance in Portugal, with a sounding negative competitiveness effect, in the period of 2001–2013. Comparing the competitiveness effect in these two industries, Portugal and Poland present a contrasting pattern in the sub periods of 2004–2008 and 2009–2013.

Appendix

Table 4 List of groups

Groups	Designation	Products code
Group 1	Live animals	0101-0308
Group 2	Animal products and derivates	0401-0511
Group 3	Vegetals, cereals and fruits	0601-1404
Group 4	Fats and saturated products	1501-1603
Group 5	Prepared, preserved or extracts of products	1604-2106
Group 6	Bottled or canned products	2201-2501
Group 7	Ores and metal products	2502-2621
Group 8	Mineral fuels	2701-2715
Group 9	Chemical and organic compounds	2716-2942
Group 10	Medical and pharmaceutical products	3001-3202
Group 11	Paints, varnishes and other beauty and make-up preparations	3203-3403
Group 12	Waxes, albumin and other substances	3404-3507
Group 13	Powders, fireworks, photographic plates and film, artificial graphite and residual products of the chemical or allied industries	3601-3826
Group 14	Natural and modified polymers, rubber and rube products and plates and plastic products	3901-4017
Group 15	Raw, leather, artificial fur and articles thereof	4101-4304
Group 16	Wood and its products	4401-4706
Group 17	Cork products, paper and others	4707-4911
Group 18	Silk, wool, cotton, fabrics, synthetic fibers	5001-5609
Group 19	Rugs, tulle, padded, textile coatings	5701-5911
Group 20	Clothing	6001-6310
Group 21	Footwear and other accessories	6401-6704
Group 22	Slate, natural stone, brick, porcelain, glass and its products	6801-7020
Group 23	Precious metals and stones	7101-7118
Group 24	Iron products, steel and copper	7201-7419
Group 25	Articles of nickel, aluminum, zinc, tin and others	7501-8113
Group 26	Tools and brass instruments	8201-8311
Group 27	Machinery and other equipment	8401-8548
Group 28	Automobiles and other transport, and their accessories	8601-8908
Group 29	Optical fibre, electro-medical apparatus, laboratory equipment and other instruments	9001-9305
Group 30	Other products	9306-9999

Table 5 Relative exports of Portugal and Poland to the EU15

	Portugal				Poland			
	2001 (%)	2004 (%)	2008 (%)	2013 (%)	2001 (%)	2004 (%)	2008 (%)	2013 (%)
Group 1	1.08	1.15	1.52	2.10	1.47	1.99	2.52	3.10
Group 2	0.66	0.83	1.01	0.91	0.43	0.94	1.22	1.19
Group 3	1.15	1.43	1.69	2.02	1.90	1.85	1.80	2.60
Group 4	0.19	0.20	0.35	0.76	0.09	0.25	0.51	0.65
Group 5	1.29	1.64	2.35	2.81	1.51	1.91	2.37	3.17
Group 6	2.37	2.38	3.42	3.05	0.38	0.55	1.07	2.33
Group 7	0.54	1.12	1.94	1.18	0.15	0.12	0.06	0.05
Group 8	0.83	1.44	3.57	6.09	5.63	4.70	3.74	4.48
Group 9	1.24	1.84	2.08	2.81	1.79	1.61	1.17	1.26
Group 10	0.95	1.00	1.36	1.75	0.69	0.62	1.46	1.71
Group 11	0.54	0.99	0.91	0.82	0.57	0.89	1.40	1.89
Group 12	0.13	0.23	0.22	0.28	0.23	0.25	0.30	0.44
Group 13	0.74	0.76	0.37	0.75	0.16	0.18	0.18	0.73
Group 14	3.67	5.11	6.23	7.93	4.20	4.75	5.81	7.72
Group 15	0.36	0.25	0.24	0.44	1.12	0.77	0.38	0.34
Group 16	5.80	5.45	4.16	4.38	3.70	3.49	2.43	2.41
Group 17	3.01	3.17	2.06	3.89	2.72	2.57	2.25	2.69
Group 18	2.65	2.03	1.50	1.43	1.00	0.79	0.50	0.37
Group 19	1.48	0.63	0.64	0.56	0.32	0.31	0.30	0.31
Group 20	15.72	13.04	9.70	8.72	8.40	4.81	2.87	2.80
Group 21	7.24	5.33	4.65	4.99	0.68	0.38	0.26	0.37
Group 22	3.30	3.65	4.20	3.38	1.94	1.74	1.69	1.80
Group 23	0.28	0.35	0.18	1.43	0.72	0.48	0.65	1.03
Group 24	3.17	5.18	6.55	5.04	9.00	9.42	9.93	7.39
Group 25	1.38	1.39	2.18	1.16	1.80	1.60	1.62	1.66
Group 26	0.90	1.02	0.95	1.03	0.80	0.85	0.99	1.18
Group 27	18.24	17.12	14.18	13.19	22.50	24.00	26.92	23.97
Group 28	17.75	16.66	15.02	12.40	16.56	18.83	18.05	14.33
Group 29	0.98	1.12	0.83	1.30	0.59	0.79	0.90	1.08
Group 30	2.33	3.50	5.93	3.40	8.94	8.56	6.66	6.96

Source: Own calculations from INTRACEN Database

Table 6 Portugal and Poland's market share in the European Union

	Portugal		Poland	
	Total Exp. to the EU	Market share in the EU (%)	Total Exp. to the EU	Market share in the EU (%)
2001	21,441.140	0.8793	27,257.018	1.1178
2002	21,791.302	0.9056	29,105.090	1.2095
2003	22,313.658	0.9292	31,925.301	1.3295
2004	23,351.572	0.8891	39,521.568	1.5047
2005	22,520.560	0.7833	45,160.509	1.5706
2006	24,679.723	0.7529	54,252.843	1.6551
2007	26,242.698	0.7643	62,382.353	1.8170
2008	25,158.650	0.7092	70,216.656	1.9793
2009	21,889.111	0.7597	61,473.442	2.1335
2010	25,842.231	0.7552	74,486.752	2.1767
2011	29,403.390	0.7743	82,680.735	2.1774
2012	30,265.966	0.7739	81,888.365	2.0940
2013	31,215.181	0.8153	86,084.584	2.2484

Source: Own calculations from INTRACEN Database

Table 7 Constant market share for Portugal to EU15

	2001–2013					2001–2003				
	Total	Scale	Product	Market	Comp.	Total	Scale	Product	Market	Comp.
G1	423,306	130,101	−27,026	−88,499	408,731	5041	−1588	−13,474	5512	14,591
G2	140,172	96,106	−9439	−37,155	90,660	15,817	5134	529	−13,962	24,116
G3	382,417	196,436	−16,344	−23,184	225,509	39,444	6432	−569	186	33,395
G4	195,400	70,095	38,575	31,995	54,736	−4294	7365	5334	4800	−21,792
G5	600,760	244,543	−468	60,020	296,665	78,039	33,193	−1053	8240	37,658
G6	442,175	302,485	−101,617	−20,373	261,679	59,757	2467	12,389	2102	42,800
G7	253,396	116,851	90,211	−2180	48,514	14,165	−11,212	795	1033	23,548
G8	1,723,203	404,190	120,449	379	1,198,185	80,251	−407	16,679	3820	60,158
G9	610,811	179,686	125,462	−58,952	364,615	83,197	−6088	32,500	2824	53,962
G10	342,193	334,491	−98,916	7057	99,561	4405	90,684	−8434	−41,886	−35,960
G11	140,836	68,262	−13,106	−7396	93,075	73,060	7654	−1426	7566	59,265
G12	59,284	13,254	10,669	3197	32,164	15,175	−48	3424	968	10,831
G13	75,401	83,666	−22,986	−85,150	99,871	20,735	−1402	711	16,998	4428
G14	1,688,483	525,304	38,757	−64,836	1,189,258	244,737	11,159	7038	20,711	205,829
G15	59,921	27,526	−36,190	982	67,603	−11,268	−10,401	−13,954	2642	10,445
G16	122,554	137,352	−134,874	35,769	84,307	−245	−47,899	−29,124	39,244	37,533
G17	570,430	−14,384	41,422	11,335	532,057	135,350	−13,339	72,369	5119	71,200
G18	−121,733	−168,065	16,657	5893	23,781	−58,993	250,497	−347,347	16,388	21,468
G19	−140,926	−36,712	8791	−12,366	−100,639	−179,773	−21,903	−12,257	502	−146,114
G20	−649,101	1,343,934	188,674	429,449	−2,611,158	−169,507	23,390	2582	111,082	−306,562
G21	4992	795,739	−200,392	−56,740	−533,616	−220,935	−17,568	21,897	−27,592	−197,672
G22	348,033	153,445	993	39,377	154,219	72,354	−15,399	15,403	50,826	21,523
G23	385,412	75,711	−26,847	55,712	280,836	15,422	−4185	8716	−14,229	25,121
G24	892,171	504,435	−27,567	−99,240	514,543	207,515	12,415	29,165	50,716	115,219

(continued)

Table 7 (continued)

	Total	Scale	Product	Market	Comp.	Total	Scale	Product	Market	Comp.
	2004–2008					**2009–2013**				
G25	66,884	160,759	−8763	70,381	−155,493	−40,557	−18,745	−5624	34,250	−50,438
G26	128,435	65,528	2682	−17,808	78,032	54,949	−10,444	8967	4779	51,647
G27	205,157	722,810	−280,270	311,072	−548,456	27,671	−396,829	37,198	83,723	303,580
G28	71,808	1,123,703	−396,505	92,965	−748,355	−74,444	−436,233	316,141	116,704	−71,055
G29	196,440	91,188	−21,849	−7862	134,963	67,847	−10,244	−4085	−2337	84,512
G30	563,393	121,662	81,261	63,029	297,440	230,618	−15,243	40,469	41,144	164,247
ALL	9,781,705	12,226,434	−5,014,888	636,871	1,933,288	871,862	−324,869	309,745	467,363	419,623
G1	113,060	68,387	−655	−29,525	74,853	308,972	76,250	9069	−26,888	250,541
G2	62,181	46,940	−7544	50,324	−27,539	65,712	83,112	9610	−64,612	37,602
G3	91,358	137,327	−12,285	51,675	−85,359	213,839	139,799	−20,584	−27,534	122,158
G4	41,522	38,283	12,814	12,711	−22,286	142,871	39,337	14,073	9889	79,572
G5	207,774	127,349	45	23,654	56,726	230,601	153,668	15,651	51,080	10,202
G6	304,935	142,802	−53,113	36,880	178,367	167,118	185,956	−81,979	−40,011	103,152
G7	230,331	184,226	12,495	4610	29,000	72,929	194,781	16,668	−66,408	−72,112
G8	561,801	394,258	−35,396	81,954	120,985	1,435,148	371,833	105,895	21,454	935,966
G9	93,066	129,449	49,393	−7486	−78,289	605,670	96,258	101,033	−13,247	421,627
G10	108,248	96,004	16,749	−4841	336	217,334	51,308	−12,617	45,890	132,753
G11	−943	45,871	−439	−5528	−40,846	40,273	61,900	−12,678	−6387	−2562
G12	1437	10,149	3167	1114	−12,994	32,025	17,277	−3817	−1866	20,431
G13	−84,720	57,274	29,560	92,568	−264,121	153,617	20,057	4052	413	129,095
G14	375,003	375,173	−5165	−25,090	30,085	978,002	629,024	−19,696	−37,716	406,390
G15	2568	13,291	−6725	230	−4229	98,048	22,746	6856	−614	69,060
G16	−225,098	186,542	−134,297	34,044	−311,387	369,615	252,733	18,888	39,862	58,133
G17	−223,051	72,504	−24,340	12,238	−283,453	400,257	16,011	−14,169	−8408	406,822

G18	−96,100	−55,098	33,390	4566	−78,959	98,721	94,233	−25,175	21,101	8562
G19	13,881	−307	5988	1626	6574	49,478	12,315	5110	36	32,017
G20	−603,867	613,355	10,128	255,997	−1,483,347	642,640	358,861	41,222	18,955	223,602
G21	−74,735	256,706	−15,736	6424	−322,129	487,840	308,899	−67,862	9594	237,209
G22	203,446	205,456	−3341	51,651	−50,320	157,430	137,064	−34,017	−58,836	113,218
G23	−36,806	31,494	−23,759	−7804	−36,737	331,223	112,894	75,808	−71,062	213,583
G24	436,271	817,189	−116,415	−239,407	−25,096	526,803	376,387	−27,833	−153,029	331,278
G25	223,937	154,651	−7620	38,684	38,222	33,399	178,636	−17,026	−17,685	−110,526
G26	−107	76,786	−14,628	−17,523	−44,742	130,797	52,263	−8144	−18,012	104,690
G27	−430,718	749,705	−294,761	9895	−895,556	1,285,671	684,568	62,267	8826	530,010
G28	−112,081	502,907	−52,660	−60,098	−502,230	900,834	762,049	96,489	−114,956	157,252
G29	−51,159	41,149	2320	3757	−98,385	184,078	66,686	1583	6463	109,346
G30	675,868	339,110	−151,062	87,877	399,942	−1,027,378	66,937	44,575	33,538,125	−34,677,015
ALL	1,807,302	8,188,736	−3,113,696	465,175	−3,732,914	9,333,566	7,197,510	−1,290,415	33,044,415	−29,617,944

Source: Own calculations from INTRACEN Database

Table 8 Constant market share for Poland to EU15

	Total	Scale	Product	Market	Comp.	Total	Scale	Product	Market	Comp.
	2001–2013					2001–2003				
G1	2,268,615	224,535	−48,422	−29,458	2,121,960	122,728	−2741	−8093	−37,303	170,865
G2	908,782	79,904	−12,011	−4436	845,325	56,997	4268	−7457	4790	55,396
G3	1,722,552	413,007	13,189	21,718	1,274,639	105,002	13,524	50,826	4149	36,504
G4	532,037	42,583	−8804	−13,392	511,650	29,432	4474	−6757	−294	32,009
G5	2,317,256	365,275	42,726	172,689	1,736,567	101,554	49,581	−29,534	48,039	33,467
G6	1,851,448	60,847	−24,137	−17,002	1,831,740	7971	496	−10,195	−6835	24,505
G7	2394	39,854	−14,696	−9119	−13,645	2800	−3824	377	−6561	12,808
G8	2,289,099	3,487,807	−1,338,808	157,398	−17,298	−397,122	−3510	−79,652	1,452,076	−1,766,036
G9	580,917	330,185	63,001	47,158	140,572	128,013	−11,188	32,715	−43,340	149,826
G10	1,287,414	308,804	−101,456	5665	1,074,401	58,058	83,720	−67,404	−6682	48,425
G11	1,473,208	91,017	1288	21,540	1,359,362	123,904	10,205	4639	7563	101,498
G12	314,466	28,839	16,721	5656	263,250	25,507	−104	3260	−817	23,167
G13	581,482	22,852	3662	479,095	75,873	12,847	−383	79	311,308	−298,157
G14	5,502,031	764,751	15,971	112,577	4,608,732	419,052	16,245	13,829	−7060	396,038
G15	−16,179	107,963	−70,252	−10,820	−43,070	25,591	−40,794	1962	15,750	48,673
G16	1,068,824	111,371	116,160	111,271	730,022	186,340	−38,838	60,035	−21,218	186,361
G17	1,572,902	−16,540	−27,110	24,606	1,591,945	221,285	−15,338	−5085	−4840	246,548
G18	46,772	−81,099	6096	−8795	130,571	2493	120,876	−157,233	−419	39,269
G19	179,463	−10,004	19,748	−6039	175,758	24,487	−5969	10,581	−4006	23,880
G20	121,246	913,521	−53,851	−93,776	−644,647	−294,147	15,899	23,244	−125,089	−208,202
G21	129,592	94,763	7478	151,728	−124,377	−22,007	−2092	1901	−8673	−13,143
G22	1,019,731	114,519	11,623	18,394	875,195	106,302	−11,492	23,099	−9736	104,431
G23	691,748	243,049	281,036	155,919	11,745	−39,296	−13,434	−39,587	12,585	1140
G24	3,907,430	1,819,394	134,460	162,741	1,790,835	193,820	44,779	−25,083	−95,288	269,412
G25	938,813	266,688	−26,678	55,207	643,596	88,059	−31,097	8824	4848	105,484

G26	798,168	73,938	−10,021	3727	730,523	85,856	−11,785	5370	−66	92,337
G27	14,503,460	1,133,581	1,987,478	824,076	10,558,325	1,822,857	−622,346	634,270	132,254	1,678,678
G28	7,825,311	1,332,743	431,902	3,137,263	2,923,403	1,987,861	−522,314	1,065,195	650,515	794,465
G29	764,548	69,633	37,116	33,538	624,262	80,561	−7822	12,068	−5,943	82,257
G30	3,553,256	594,359	375,503	62,240	2,521,155	470,726	−74,466	201,838	−85,116	428,470
ALL	58,736,787	13,028,138	1,828,912	5,571,369	38,308,368	5,737,532	−1,055,468	1,718,033	2,174,591	2,900,376
	2004–2008					**2009–2013**				
G1	978,233	201,106	−3306	155,078	625,354	999,846	367,560	−13,937	42,420	603,803
G2	482,405	90,513	−33,024	22,868	402,048	408,513	237,034	−12,405	−10,793	194,677
G3	533,910	300,912	−55,333	52,202	236,129	915,437	447,079	−17,085	26,407	459,036
G4	256,489	82,148	114,546	109,332	−49,538	228,113	138,970	40,760	28,858	19,525
G5	910,535	250,742	5154	54,325	600,314	1,223,017	358,215	6181	39,809	818,812
G6	535,916	55,547	−37,827	2528	515,667	861,652	265,481	308,829	64,989	222,353
G7	−7159	34,567	−751	18,706	−59,680	17,229	16,387	−3769	−836	5447
G8	750,443	2,176,092	−799,942	413,985	−1,039,691	2,444,947	1,109,881	−379,744	−13,462	1,728,273
G9	185,953	191,323	77,148	152,181	−234,699	558,791	183,652	63,127	−7208	319,220
G10	782,848	100,860	129,654	12,967	539,368	697,856	121,285	31,933	49,824	494,814
G11	628,500	70,197	11,670	7063	539,570	669,555	273,680	−12,384	13,913	394,346
G12	116,659	18,133	20,649	20,576	57,300	148,997	70,591	−15,717	−2122	96,246
G13	52,246	23,402	3936	−1817	26,726	472,249	37,564	−251	6334	428,602
G14	2,197,788	590,982	−50,968	98,916	1,558,858	3,098,619	1,489,946	−63,922	147,741	1,524,853
G15	−36,511	69,244	−69,785	4213	−40,183	63,701	128,803	122,655	1,169,834	−1,357,591
G16	325,341	202,089	84,298	50,144	−11,191	626,200	367,838	−105,835	134,000	230,198
G17	566,582	99,305	4189	−5417	468,506	696,943	31,766	−52,087	50,173	667,091
G18	36,541	−36,232	6933	15,326	50,513	97,441	60,611	−1696	−7497	46,023
G19	85,483	−258	20,166	−8907	74,482	99,192	16,271	−4973	11,126	76,769
G20	113,673	382,871	−11,956	−26,135	−231,107	416,639	344,537	−10,291	159,502	−77,109

(continued)

Table 8 (continued)

	Total	Scale	Product	Market	Comp.	Total	Scale	Product	Market	Comp.
G21	31,997	31,222	−17,246	3401	14,619	123,030	55,272	20,545	66,122	−18,908
G22	498,179	165,581	−1203	25,889	307,913	509,277	158,458	90,009	17,280	243,530
G23	266,018	72,784	138,231	85,970	−30,967	442,190	431,702	−24,539	−39,154	74,181
G24	3,249,894	2,511,983	312,319	692,908	−267,315	2,151,364	1,515,297	−212,337	225,842	622,562
G25	500,810	302,003	−16,697	47,488	168,016	582,993	456,915	−96,158	115,822	106,414
G26	361,942	108,079	−7141	116,465	144,538	533,659	132,154	−53,212	15,090	439,627
G27	9,420,233	1,778,624	1,691,872	139,243	5,810,493	3,462,821	4,153,726	−954,625	380,402	−116,682
G28	5,225,733	961,761	860,824	1,068,202	2,334,947	−197,509	3,212,848	−198,635	−192,418	−3,019,304
G29	318,683	49,296	24,895	42,012	202,480	343,178	174,225	−12,508	7576	173,885
G30	1,296,326	1,405,119	−617,460	−75,596	584,263	1,870,572	131,969	556,767	193,246	988,590
ALL	30,665,688	12,289,994	1,783,846	3,294,115	13,297,733	24,566,510	16,489,716	−1,005,307	2,692,819	6,389,282

Source: Own calculations from INTRACEN Database

Table 9 Trade complementary index and geographical orientation index for Portugal—European Union

	2001–2013		2001–2003		2004–2008		2009–2013	
	TCI	GOI	TCI	GOI	TCI	GOI	TCI	GOI
Group 1	1.238	2.066	0.723	2.200	1.075	1.945	1.710	2.107
Group 2	2.332	1.633	1.841	1.586	2.180	1.636	2.778	1.658
Group 3	0.612	2.421	0.516	2.271	0.595	2.308	0.687	2.624
Group 4	1.584	0.799	1.251	0.682	1.468	0.671	1.899	0.998
Group 5	1.617	1.801	1.175	1.739	1.503	1.723	1.997	1.917
Group 6	3.267	1.567	2.601	1.569	3.272	1.571	3.662	1.562
Group 7	0.670	3.191	0.659	2.399	0.824	3.305	0.524	3.551
Group 8	0.292	1.273	0.165	1.381	0.248	1.374	0.413	1.108
Group 9	0.611	2.034	0.462	1.873	0.626	2.126	0.687	2.037
Group 10	0.633	1.530	0.612	1.377	0.548	1.514	0.730	1.637
Group 11	0.863	1.748	0.669	1.676	0.888	1.706	0.955	1.834
Group 12	1.199	1.960	0.807	1.963	1.236	1.858	1.398	2.061
Group 13	0.496	2.222	0.557	2.380	0.377	2.135	0.580	2.214
Group 14	1.349	2.338	1.018	2.207	1.261	2.244	1.635	2.510
Group 15	0.494	2.130	0.413	2.321	0.391	2.133	0.647	2.012
Group 16	4.546	1.989	4.499	1.959	3.982	1.924	5.139	2.073
Group 17	2.264	1.887	1.931	1.820	1.321	1.888	3.406	1.925
Group 18	1.093	2.951	1.206	2.680	1.060	2.727	1.059	3.338
Group 19	2.239	2.252	2.708	2.493	1.952	2.156	2.245	2.204
Group 20	3.665	2.224	3.981	2.302	3.555	2.154	3.585	2.247
Group 21	6.080	2.367	6.265	2.470	5.593	2.285	6.457	2.388
Group 22	3.761	2.229	3.401	2.028	3.702	2.183	4.036	2.395
Group 23	0.154	3.557	0.122	2.796	0.058	2.915	0.270	4.655
Group 24	0.968	2.310	0.823	2.317	0.928	2.407	1.096	2.209
Group 25	1.008	2.394	0.879	2.280	1.036	2.460	1.058	2.395
Group 26	1.462	2.084	1.422	2.092	1.380	2.018	1.568	2.144
Group 27	0.537	2.340	0.599	2.371	0.564	2.091	0.472	2.570
Group 28	1.540	2.244	1.575	2.190	1.501	2.104	1.558	2.417
Group 29	0.292	2.217	0.316	2.274	0.217	2.171	0.353	2.229
Group 30	1.767	1.387	0.588	1.808	2.968	0.823	1.273	1.698

Source: Own calculations from INTRACEN Database

Table 10 Trade complementary index and geographical orientation index for Poland—European Union

	2001–2013		2001–2003		2004–2008		2009–2013	
	TCI	GOI	TCI	GOI	TCI	GOI	TCI	GOI
Group 1	1.238	2.066	0.723	2.200	1.075	1.945	1.710	2.107
Group 2	2.332	1.633	1.841	1.586	2.180	1.636	2.778	1.658
Group 3	0.612	2.421	0.516	2.271	0.595	2.308	0.687	2.624
Group 4	1.584	0.799	1.251	0.682	1.468	0.671	1.899	0.998
Group 5	1.617	1.801	1.175	1.739	1.503	1.723	1.997	1.917
Group 6	3.267	1.567	2.601	1.569	3.272	1.571	3.662	1.562
Group 7	0.670	3.191	0.659	2.399	0.824	3.305	0.524	3.551
Group 8	0.292	1.273	0.165	1.381	0.248	1.374	0.413	1.108
Group 9	0.611	2.034	0.462	1.873	0.626	2.126	0.687	2.037
Group 10	0.633	1.530	0.612	1.377	0.548	1.514	0.730	1.637
Group 11	0.863	1.748	0.669	1.676	0.888	1.706	0.955	1.834
Group 12	1.199	1.960	0.807	1.963	1.236	1.858	1.398	2.061
Group 13	0.496	2.222	0.557	2.380	0.377	2.135	0.580	2.214
Group 14	1.349	2.338	1.018	2.207	1.261	2.244	1.635	2.510
Group 15	0.494	2.130	0.413	2.321	0.391	2.133	0.647	2.012
Group 16	4.546	1.989	4.499	1.959	3.982	1.924	5.139	2.073
Group 17	2.264	1.887	1.931	1.820	1.321	1.888	3.406	1.925
Group 18	1.093	2.951	1.206	2.680	1.060	2.727	1.059	3.338
Group 19	2.239	2.252	2.708	2.493	1.952	2.156	2.245	2.204
Group 20	3.665	2.224	3.981	2.302	3.555	2.154	3.585	2.247
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Group 23	0.154	3.557	0.122	2.796	0.058	2.915	0.270	4.655
Group 24	0.968	2.310	0.823	2.317	0.928	2.407	1.096	2.209
Group 25	1.008	2.394	0.879	2.280	1.036	2.460	1.058	2.395
Group 26	1.462	2.084	1.422	2.092	1.380	2.018	1.568	2.144
Group 27	0.537	2.340	0.599	2.371	0.564	2.091	0.472	2.570
Group 28	1.540	2.244	1.575	2.190	1.501	2.104	1.558	2.417
Group 29	0.292	2.217	0.316	2.274	0.217	2.171	0.353	2.229
Group 30	1.767	1.387	0.588	1.808	2.968	0.823	1.273	1.698

Source: Own calculations from INTRACEN Database

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EU Customs Logistics and Global Supply Chain

Danutė Adomavičiūtė

Abstract Customs administrations play a vital role in the growth of international trade and the development of the global marketplace. The role of customs has now expanded to include national security, in particular the security and facilitation of legitimate trade from the threats posed by terrorism, trans-national organized crime, commercial fraud, counterfeiting and piracy. Being a part of the governmental organizations that monitor and manage a cross-border movement of goods, customs administrations appear in a unique position, as they ensure an increased security of the global supply network as well as contribute to the social and economic development through the revenue collection and the trade facilitation. In the article the customs logistics importance to the defense of the society and markets has been revealed integrating security aspects to the customs control. After conducting the analysis of the EU customs audit's model, used for the assessment of business enterprises activities, the evaluation of this model has been introduced, its fundamental drawbacks lying in the identification of the appropriate indicators of the activities' assessment have been revealed. The aim of research is to identify the most risky and the most significant areas of the business activities' assessment.

Keywords Trade security • Customs • Enterprises activities' assessment • AEO concept

1 Introduction

In the twenty-first century customs has been faced with contradictory demands arising from the globalization of trade. World trade grew more rapidly than world production. Transportation and travelers have also increased significantly. It is projected that they will continue to expand in coming years. On the one hand, there is a need for effective security and control of international supply chains while

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on the other hand, there are increasing demands for greater facilitation of legitimate trade. This infers that customs is required to work more for goods, transport and travelers crossing borders with the same or less resources especially of fiscal austerity. Trade facilitation has attracted significant political and commercial interest. The World Trade Organization's new Agreement on Trade Facilitation (World Trade Organization 2013) was concluded in December 2013. Recognizing the importance of simple border measures whilst to fostering an attractive environment for business and to prepare to implement the WTO Agreement on Trade Facilitation, customs administrations requirements in terms of capacity building for trade facilitation programmes in coming years are expected to increase. Customs reforms and modernization forms an essential pillar within these programmes. In order to implement such trade facilitation measures effectively and efficiently, customs is required to become more actively involved in trade facilitation programmes.

According the Community Customs Code (1992), which was replaced in 2005 year, the customs of the EU countries began appreciating the activities of the business enterprises, seeking to gain the status of the authorised economic operator (AEO). In order to implement this, the need of the exploration of business enterprises activities' evaluation appeared, at the same time paying attention to the aspects of the international trade supply network. Simplified customs procedures are becoming more and more important. Customs provides the assumptions to go deeper into the assessment processes of the business activities. The assessment processes of the business activities performed by the customs are a multiple process that involves more than just the field of customs matters.

There are not a lot of researches in the scientific literature analyzing the matters of customs logistics and international supply network. In this chapter the focus was made on the analysis of the legal acts regulating customs activities and global trade liberalization in the contexts of the international supply network. It is important to point out that until 1990 there was almost no researches concerning the aspects of the supply network and logistical barriers that inevitably arise during the international trade process. Time required for the customs inspection are extremely serious logistical barriers for the business enterprises performing customs procedures. Later the number of researches in this area has grown rapidly, all of them emphasized different researches aspects in their works (Heide and John 1990; Hendrick and Ellram 1993; Ganesan 1994; Lambert et al. 1996; Atkinson 1998; Pearson et al. 1998; Whipple and Gentry 2000; Ellram et al. 2002; Bourne et al. 2002; Halachimi 2002; Gutierrez and Hintsa 2006; Saiz et al. 2007; Morgan 2007; Bento and White 2010).

This chapter tries to highlight the importance of customs logistics in the present day business development. The object of research is AEO model of the customs audit used for the assessment of business enterprises' activities. The aim of research is to identify the most significant and the most risky areas of the business activities' assessment.

In order to achieve the aim of research, the following tasks are met: (1) to reveal the role of customs for the protection of the interests of the society and the socioeconomic development; (2) to introduce the assessment of the EU customs audit's model; (3) to identify the link between the current and target business

aspects of the business enterprises activities' assessment; (4) to prepare a new model of the business enterprises activities' assessment. To reach the aim and tasks of this research the analysis and systematization of the scientific literature and legal acts, the data analysis and the comparison were combined. The assessment of business enterprises' activities is being analyzed in the context of the customs activities.

2 Analysis of Customs Operations

Nowadays we are living in an era of competition which is increasing day by day. Customs comprises of key area where processes of logistics can truly differentiate themselves, reduce costs and build real competitive advantage. Logistics activities have existed since ancient times. Logistics allowed people to move raw material as well as finished goods. The concept of starting business near to the raw material availability location was replaced due to the comfort of shifting the required material from one place to another with the help of research done on the logistics related problems. The geographical distance between the point of manufacturing and point of consumption increased, this shows how logistics gained importance. Customs comprises of key area where processes of logistics can truly differentiate themselves, reduce costs and build real competitive advantage. Logistics outsourcing can offer business with measurable cost and efficiency advantages. Customs logistics describes as material flow processes that are controlled by the customs authorities. Each country's economy is influenced by the ongoing international trade, the volume of which depends on the efficiency of logistical operations—from the modelling and management of the logistics process, helping to control the flow of goods crossing national borders.

Given this role, the efficiency and effectiveness of customs procedures can significantly influence and advance economic competitiveness and social development by promoting international trade and investment in a safer trading environment. According the survey which was conducted by TNS Political and Social at the request of the European Commission, Directorate-General for Taxation and Customs Union a majority of respondents think that costs related to customs operations have increased over the last 5 years (European Commission 2014). Respondents were then asked to consider the way in which various aspects of customs operations have evolved over the last 5 years.

In six countries, a majority of respondents think that the costs related to customs operations have increased over the last 5 years, most strikingly in Belgium (50 %), Spain (44 %) and Italy (41 %). Majorities also take this view in Portugal (38 %), France (34 %) and Estonia (33 %). However, elsewhere a majority of respondents say that costs have remained the same, in particular in Sweden (57 %), Latvia (50 %), Romania (49 %) and Greece (47 %). The highest proportion of respondents who think that the costs related to customs operations have decreased over the last 5 years can be observed in Lithuania, followed by Greece, the Netherlands and

Portugal (all 14 %). A sizable minority of respondents in most countries say they don't know, notably France (30 %), Estonia (26 %) and Italy (26 %).

Spain (40 %) is the only country in which a net majority of respondents think that the frequency of controls has increased over the last 5 years, though relatively high numbers of respondents also take this view in Portugal (35 %), the UK (32 %) and Greece (32 %). Everywhere else a majority of respondents say that the frequency is unchanged, notably in Sweden (63 %), Romania (59 %) and Bulgaria (56 %). Respondents in Latvia (30 %) are most likely to think that the frequency of controls has decreased over the last 5 years, followed by Lithuania (21 %) and Estonia (20 %). Over a fifth of respondents don't know in France (27 %), Estonia (26 %), Denmark (25 %) and Sweden (22 %).

In all countries, a majority of respondents say that the frequency of enquiries and audits has remained the same over the last 5 years. This view is most widespread in Sweden (63 %), Latvia (61 %) and Belgium (58 %). Respondents in Spain (31 %), Italy (30 %) and Greece (29 %) are most likely to say that the frequency of enquiries and audits has increased over the last 5 years, while those Latvia (17 %), Romania (17 %) and Germany (16 %) are most likely to report that the frequency of controls has decreased. Over a third of respondents in Estonia (34 %) answer 'don't know', as do 28 % in Bulgaria and 27 % in France.

In five countries, a majority of respondents say that the time required to clear customs has decreased over the last 5 years: Poland (51 %), Lithuania (50 %), Latvia (48 %), Romania (43 %) and Estonia (42 %). Elsewhere, a majority of respondents think the time required to clear customs has remained the same, most notably in the UK (58 %) and Sweden (56 %). The highest proportion of respondents who say that the time required to clear customs has increased can be found in Germany (28 %), followed by Denmark (21 %) and the UK (21 %). At least a fifth of respondents answer 'don't know' in Portugal (31 %), France (29 %), Denmark (24 %), Italy (23 %) and the Netherlands (22 %).

According to the survey results six out of ten companies imported from China in 2013—making it the most common source of imports. Over 50 % of companies in all but four countries imported from China, the exceptions being Estonia, Romania, Bulgaria and Latvia. While 88 % of companies make import declarations in their own country, 16 % make them in another EU country. Over three-quarters of companies used seaports as points of entry, 61 % used airports, and 43 % used land borders. A majority of importers bring in goods for their own company or affiliates. A majority of importing companies carry out customs procedures several times a month.

Six in ten respondents say that their company *exported* to Russia or other European countries outside the EU in 2013. Over 50 % of respondents in all but four Member States did this, the exceptions being Portugal, Romania, Spain and France. While almost all companies use their own country as a point of exit when exporting goods, over a quarter use another EU country. Half of exporting companies carry out customs procedures several times a month.

Reviewing the flow of goods, it can be said that the process of the worldwide transportation of goods is very long and complicated. The rapidly growing

international trade as well as new technologies of the production and transport requires the goods to be delivered to the recipient exactly at the time when they are needed. The customs are involved in the procedures of the international trade regulation control. For this reason, customs formalities must be carried out as quickly as possible, without disturbing the flow of goods and at the same time not reducing the efficiency of the customs control. Therefore, inconvenient or inflexible customs procedures have a negative impact on the business competitiveness. The demands of growing trade volumes and global competition have put extreme pressure on the Customs Union to better facilitate and encourage the flow of goods across external borders, while at the same time protecting the integrity of the EU market and its societies from the various risks related to the international movement of goods. This requires efficient, effective controls as well as close cooperation among the different stakeholders: the customs authorities, other authorities, business and international partners. After analyzing, it can be stated that a long time required for the customs procedures can be named as one of the international trade's barriers.

3   Supply Chain Security Initiatives in the Customs Activity

Globalization has influenced the changes in customs procedures and inspection processes. In the last decade, the role of customs has significantly changed from the collection of customs duties to the protection of citizens due to reduced duty rates and increased concerns for safety and security. Customs are engaged not only in the control, breach prevention and administration of duties and taxes, but also carry out the broader tasks, such as security assurance, simplification of trade conditions and protection of the economic interests of the countries. The global trading system is not secured against the terrorism which can cause a serious damage to the global economy. The main task of customs nowadays in all administrations is the protection of citizens and their interests while facilitating legitimate trade.

The World Customs Organization (WCO), as the global centre of customs excellence, plays a central role in the development, promotion and support for the implementation of modern customs standards, procedures and systems. The WCO initiative has been deliberately focused on the entire international trade supply chain, rather than restricting customs' interest to that aspect of the international trade transaction when goods move across a border. The basic principle underpinning WCO's work has been to create an international mechanism for customs administrations to gain access to relevant information relating to international trade well in advance, for the purposes of risk management and risk assessment. The World Customs Organization has established the Frameworks of Standards to Secure and Facilitate Global Trade (SAFE Framework) (World Customs Organization 2005) to global security and trade facilitation (see Fig. 1).

The WCO SAFE Framework of standards provides the global standards for launching an AEO programme. In addition, many customs administrations having
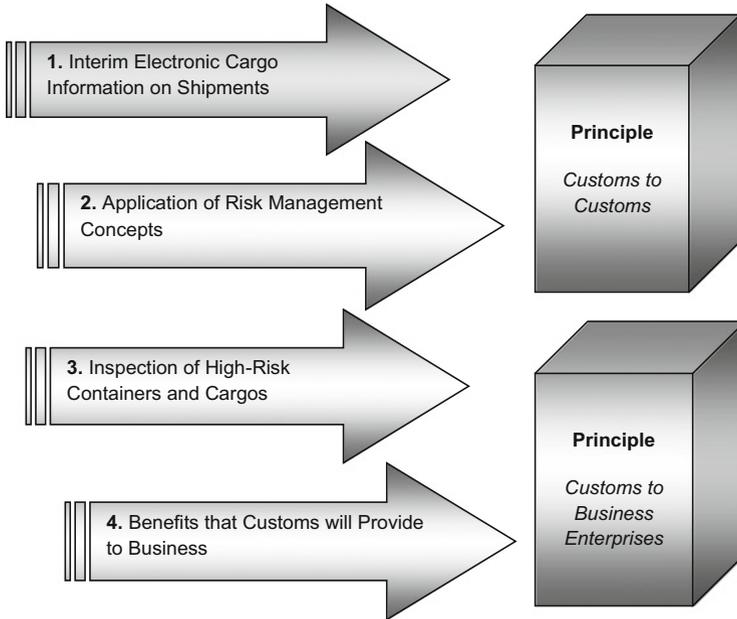
Fig. 1 Framework of standards to secure and facilitate global trade, SAFE framework. Source: compiled by the author on the basis of the framework of standards to secure and facilitate global trade (World Customs Organization 2005)

established AEO programmes are now seeking to formalize AEO mutual recognition agreements with other customs administrations. The System, based on four essential elements, is focused on two equal principles: "customs to customs" and "customs to business enterprises". The System harmonizes the pre-electronic cargo information about shipments. In order to be against the security threats, each country joining the System is obliged to apply the comprehensive approach of the risk management. The System requires the inspection of the high-risk containers and the cargo inspection. The System also defines benefits that customs will provide to the business enterprises matching the minimum supply network security standards and the best practices. The principles are composed of series of standards that must be implemented at the international level and that are presented as minimum requirements obligatory for WCO members to carry out.

The European Commission recognizes that security is one of the primary expectations of European citizens. EU citizens will be better protected against security threats through a coordinated response at the external borders of the European Community. The customs authorities of the member states play an important role in the fight against cross-border crime and terrorism. Customs expertise in controlling goods, backed up by the use of modern IT systems and an efficient risk assessment, is vital to detect illegal goods such as drugs, explosive materials or nuclear and chemical weapons.

The EU Customs Security Programme covers activities supporting the development and implementation of the security measures mentioned above. In particular, introducing proper security controls to ensure the protection of the internal market and, in close cooperation with major trading partners in the world, the securing of international supply chains, and providing assistance to traders who show compliant efforts to secure their part of the internationals supply chains.

In order to respond to security concerns relating to the international trade in goods, the European Commission presented a series of measures designed to provide a coordinated and effective response. This package brings together the basic concepts underlying the new security-management model for the EU's external borders, such as a harmonized risk assessment system. The EU Customs Security Programme covers activities supporting the development and implementation of measures enhancing security through improved customs controls. The programme introduces proper security controls to ensure the protection of the internal market and, in close co-operation with major trading partners in the world, secure the international supply chain. The programme balances controls with trade facilitation. Traders demonstrating compliant efforts to secure their part of the supply chain will be rewarded by benefits such as fewer controls. Security amendments to the Community Customs Code (1992) which entered into force in April 2005, provides the legal framework for the measures introduced in the EU Customs Security Programme: (1) traders are required to provide customs authorities with information on goods prior to import to or export from the European Union; (2) reliable traders will benefit from trade facilitation measures through the Authorized Economic Operator (AEO) programme. These two approaches are interlinked and provide enhanced security through a combination of measures. With the new security initiative, customs are enabled to carry out more targeted controls on high risk shipments. The concept of AEO was introduced as one of the main elements of the supply chain security.

AEO programmes which embrace risk management provide member administrations added flexibility in the efficient use of limited resources. Achieving AEO programme compatibility and mutual recognition is in essence a harmonization and simplification of customs procedures, and thus contributes to balancing supply chain security and facilitation. The establishment of an end-to-end secure supply chain is supported by opening the AEO programmes for more supply chain actors as potential AEO applicants. An AEO can be defined as an economic operator who is deemed reliable in the context of his customs related operations, and, therefore, is entitled to enjoy benefits throughout the EU. According the Authorized Economic Operator programme it is important to evaluate the business enterprises' activities. The assessment of business enterprises' activities in EU customs is carried out taking into consideration the issuing/non-issuing of the AEO status when the customs audit assesses the activities of the economic operator and its compliance with the established criteria. After analyzing the enterprises activities quality's AEO certification process of the EU customs, it can be affirmed that this is a positive phenomenon, which can be considered as a first customs' step towards the positive assessment of the enterprise, taking into consideration its reliability.

This process of certification provides a competitive advantage over other companies.

4 Analysis of Business Enterprises Activities' Assessment Process

The AEO status can be granted to any economic operator meeting the following common criteria: (1) record of compliance with customs requirements, (2) satisfactory system of managing commercial and, where appropriate, transport records, which allows appropriate customs controls, (3) proven financial solvency and, (4) where appropriate, security and safety standards.

According the Authorised Economic Operators Guidelines (European Commission 2012) the EU customs audit model, assessing the activities of business enterprises seeking to gain the AEO status, include the following fields of enterprise's activities: (1) evaluation of the available information about the company, (2) details about the requirements met, (3) company's accounting and logistics system, (4) company's financial solvency, (5) safety and security requirements. After the customs audit carried out the evaluation of business enterprise's activities and defined that the enterprise met the fixed criteria, a decision was made to grant the AEO status and to issue a certificate. The Authorised Economic Operators Guidelines (European Commission 2012) were developed for both customs authorities and economic operators to ensure common understanding and uniform application of the new customs legislation related to the AEO concept, and to guarantee transparency and equal treatment of economic operators. These Guidelines purpose is to ensure a common understanding for both customs authorities and economic operators and to provide a tool to facilitate the correct and harmonized application by member states of the legal provisions on AEO.

The assessment processes of the business activities performed by the customs are a multiple process that involves more than just the field of customs matters. An appropriate identification of the indicators to be evaluated is an extremely important thing that should be taken into consideration while assessing the activities. Comparing the process of the activities' assessment in different fields, its differences on the applicability and use become clear. The phenomenon of the business activities' assessment in the area of customs is relatively new. For this reason, it is necessary to examine and analyze this process of activities. The assessment of business activities itself is associated with the application of simplified customs procedures. Therefore, it contributes to the formation of the new business environment, encourages businesses enterprises to take advantage of customs provided benefits and to create a competitive advantage in an integrated market.

In most cases the main problem related to the activities' assessment, lies in the identification of the appropriate activities assessment's indicators. After analyzing the models of the business activities' evaluation, it has been found out that the

majority of them include the enterprises strategy's aspects. Therefore, in order to carry out the evaluation of the activities, the organization's mission, policies and objectives should be combined. It has also been found out that today's models of the business activities' assessment are characterized by the fact that the activities' assessment includes not only traditional business activities assessment's indicators but also the assessment of the entire supply network and inter-operational procedures.

It was found out that the greatest influence in the process of business' assessment is done by the use of non-financial indicators. This has the greatest effect on business results. One of the activities' assessment models, including the assessment of the supply network, is a model of Saiz et al. (2007). After analyzing this model it was found out that the process of activities' assessment is also characterized by the fact that it includes not only the evaluation criteria of a business unit but also of the supply network and the business network. An essential feature of the model is a particular requirement: first of all to consider and assess the organization's strategy and only then to evaluate the ongoing processes. The assessment process of the customs audit of business enterprises' activities can be made on the basis of this model. The authors of this model stressing the importance of the strategy's implementation have identified its two components: a strategic framework and a process framework.

After carrying out the analysis of the customs activities in various countries, it has been defined that the models used for the assessment of business enterprises activities' were started to be created only at the beginning of the twenty-first century. The first ones were the Swedish customs officials. The model was called "Stairway". In 2001 they developed a model of the quality assurance and the simplification of the customs procedures. Customs administrations of other countries have also developed a number of different programmes to define the business enterprises' activities. On the basis of these programmes specific activities' assessment models have been designed: programmes of Customs-Trade Partnership against Terrorism (C-TPAT) and Containers Security Initiative (CSI) in the United States, AEO Programme in Japan, Partnership in Protection Programme in Canada, Secure Export Programme in New Zealand, Frontline Programme in Australia.

After analyzing theoretical models of the business activities' assessment and after carrying out the analysis of the models of the business enterprises activities' evaluation—used in various countries—it is clear that the EU customs audit's model does not include one of the most important elements of the assessment—the company's vision, goals, strategy and related to these elements business risk's assessment. While assessing the company's activities, the analysis of external factors is very important. This helps the customs authorities to better assess possible risks and business perspectives. In this case, after identifying the external factors, it is extremely important to assess potential threats and possible changes in the enterprise. Recommended model of customs audit for assessment of business enterprises' activities is depicted in Fig. 2.

The model is supplemented with new assessment areas: (1) business activities' continuity and development opportunities (indicators to be evaluated: an industry/a
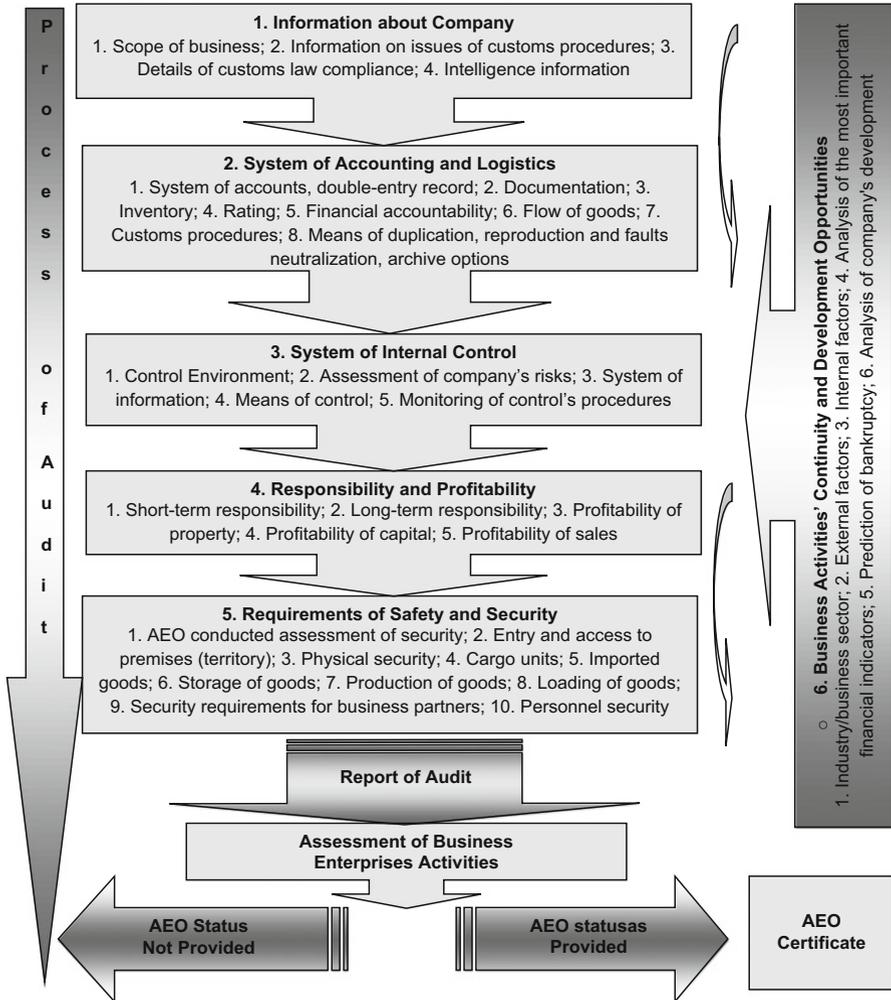
Fig. 2 Recommended model of customs audit for assessment of business enterprises' activities

business sector, external and internal factors, the analysis of the most important financial indicators, a bankruptcy prediction, the analysis of the company's development); (2) the internal control system (indicators to be evaluated: the control's environment, the business risk's assessment, the system of the information, control's activities, the monitoring of the control's procedures). An assessment area "Responsibility and Profitability" is added by the new indicators of the property profitability, capital profitability and sales profitability. The analysis of the assessment's indicators in the model is carried out by connecting these indicators with the company's vision, goals and the implementation of the strategy. This additionally

evaluated information provides the customs auditor with the opportunity to view the evaluated enterprise wider and in a more detailed way.

The developed model allows to comprehensively measure and evaluate business enterprise's activities—at the same time contributing to the realization of the challenges faced by the customs activities.

5   Conclusion

The World Customs Organization, as the global centre of customs excellence, plays a central role in the development, promotion and support for the implementation of modern customs standards, procedures and systems. The WCO initiative has been deliberately focused on the entire international trade supply chain. Customs comprises of key area where processes of logistics can truly differentiate themselves, reduce costs and build real competitive advantage.

In most cases the main problem related to the activities' assessment, lies in the identification of the appropriate activities assessment's indicators. After analyzing the models of the business activities' evaluation, it has been found out that the majority of them include the enterprises strategy's aspects. It can be said that the modern activities' assessment systems include and evaluate the policy issues of organizations. Therefore, in order to carry out the evaluation of activities, the organization's mission, policies and objectives should be combined together. Most of the authors creating the models of activities' assessment emphasize the importance of enterprises' strategy and long-term goals.

The supply network is influenced by a broad set of environmental factors. That is why, this assessment area is quite tricky and complicated, requiring a broad understanding of the importance of a global context.

After analyzing theoretical models of the business enterprises activities' evaluation and after carrying out the analysis of the models of the business enterprises activities' assessment used by the customs of various countries the author recommend to customs auditors to add new evaluation indicators of business activities. The analysis of the assessment's indicators in the model is carried out by connecting these indicators with the company's vision, goals and the implementation of the strategy. This additionally evaluated information provides the customs auditor with the opportunity to view the evaluated enterprise wider and in a more detailed way.

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Does the Impact of Trade Openness on Income and Income Inequality Differ in Developed and Developing Countries?

Asli Yenipazarli and Hatice Kucukkaya

Abstract It is mostly believed that the trade openness creates a competitive environment resulting in economic growth. But, trade often produces losers as well as winners. According to the theoretical framework, trade liberalization is associated with narrowing or widening income disparities within countries. Empirical studies both support and oppose trade openness. Studies can be divided into two categories. In this study, we underline the link between foreign trade and income inequality in developed and developing countries by such these explanatory variables. For this purpose we use panel data to investigate the trade's impact on levels and distribution of income.

1 Introduction

The impact of trade on the level and distribution of income is a topic of considerable debate among academics and policy makers, especially in developing countries. It is widely believed that the trade openness creates a competitive environment which results in quality products leading to the economic growth. Empirical support for the view that trade openness promotes economic growth can be found in a number of studies though trade does not appear to be a particularly robust predictor of economic growth (Ravallion 2004). Trade and income distribution in different countries can be analyzed in a model composed of explanatory variables such as, democracy, corruption, geographical, demographic and income indicators etc. This study tries to find out the relationship between trade openness, income and Gini coefficient in both selected developing and developed countries throughout a panel data evidence for the period 1998–2011.

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2 Literature

There are several studies on the relationship between openness and income distribution, specifically on inequality. Lora and Londono (1998) underline the effects of the liberalization on income distribution are quiet varied and opposite. It is finally difficult to predict their direction. On the one hand, the opening to foreign trade may worsen income inequality (1) by displacing (at least temporary) domestic production and employment (2) by cheapening luxury consumption with mass consumption items, or (3) by making it possible to introduce capital—intensive techniques of production which require more skilled labor, but decrease the demand of unskilled labor (Ehrhart 2005).

Trade openness may reduce income concentration for following reasons. (a) Liberal trade policies stimulate export development of those good, using especially unskilled labor. (b) Liberalization policies tend to reduce rents of importers. It leads a protection on producers on higher income levels. (c) Trade openness increases the purchasing power of low income groups through lowering tariffs. (d) Liberalization increases investment, production and employment opportunities for marginalized groups in economic activity (Ehrhart 2005).

Milanovic (2002), shows that the effects of trade openness on country's income inequality depend on its initial income level. When a country is relatively poor, greater trade openness raises the income share of top deciles, and decreases the income share of the poor groups and as well as of the middle class. However, at some medium—level of development, income shares of the poor and the middle class begin to be positively affected by trade openness while the income share of the rich begins to decline (Ehrhart 2005).

According to Maelan and Singh (2013), following the static approach, the Stolper–Samuelson Theorem, in its simplest form, suggests that the abundant factor should see an increase in its real income when a country opens up to trade. If the abundant factor in developing countries is unskilled labor, then this framework suggests that the poor (unskilled) in developing countries have the most gain from trade. From a dynamic perspective, economic growth is key to sustained poverty alleviation and trade liberalization is argued to lead to the needed increases in productivity to sustain growth. Freer trade provides greater incentives for investment, the benefits of scale and competition, limitation on rent—seeking activities favored by trade restrictions and openness to new ideas and innovations (Berg and Krueger 2003; Grossman and Helpman 1991; Lucas 1988).

Szekely and Samano (2012) concluded that, greater trade openness is associated with contemporaneous increases in inequality in the region. Trade openness in Latin America, contributes—together with other factors—to the increase in inequality during 1980s and 1990s but once fully implemented, it did not lead to further rises in inequality and did not represent a permanent obstacle to improvements in income distribution triggered by other factors such as greater education levels across the population. In Latin America, drastic reductions in average tariffs observed during 1980s and 1990s mirror the sharp deterioration in income

distribution over the same years. Inequality—reducing forces generated by the secular increases in the skill level of the population, effective during 2000s. This point of view is the reason of our study using human capital as a determinant of income and income distribution.

Frankel and Romer (1999) studied on 150 countries for the year 1985. They used Instrumental Variable techniques. As a result, trade has statistically significant impact on income. Irwin and Tervio (2002) tested robustness with OLS IV techniques on trade and income. The sample is composed of 150 countries for 1913, 1928, 1938, 1954. They found that while raising productivity trade affects income. Srinivasan and Bhagwati (1999) evaluated various research papers. They found a positive link between trade openness and growth performance. Pointed out the lack of good theoretical foundations, appropriate econometric methodology and good data with cross country regressions. Ehrhart (2005) studied panel evidence on Latin American and East Asian countries. This study resulted in association of openness to foreign trade with decreasing income inequality.

3 Empirical Analysis

3.1 Data and Methodology

In this study, the link between trade openness and income inequality was analyzed by panel data analysis based on annual data for the period of 1998–2011 for 37 developed and developing countries. The dependent variable is real per capita Gross Domestic Production (constant 2005) and explanatory variables are; openness to trade, which is defined as percentage of GDP that is accounted by (Import + Export); indice of human capital per person (based on years of schooling and returns to education), population of the countries and Gini[1] coefficients for countries. For examining the effects of trade on income levels and income distributional effects of trade, related data sets are separated into two models according to dependent variables.

$$Log(g) = \beta_o + \beta_1 log(hc) + \beta_2 \log(opn) + \beta_3 \log(\text{pcap}) \tag{1}$$

$$Log(\text{pcap}) = \beta_o + \beta_1 \log(hc) + + \beta_2 \log(opn) + \beta_3 \log(g) \tag{2}$$

Through calculating the average annual growth rates, countries are categorized as fast and low growing Countries.

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[1] Income inequality is measured by the Gini coefficient (GINI), which ranges from 0, when the income distribution is perfectly equalitarian to 1, representing the highest level of inequality. This index is not necessarily the best and the latest measure available for such an analysis; nonetheless, both the set of countries included in our sample are the widespread use of GINI in literature, have strongly influenced the choice of this measure with respect to others.

$$Y_t = Y_0 + (1+r)^t$$
$$lnY_t = lnY_0 + tln(1+r)$$
$$\beta_1 = lnY_0$$
$$\beta_2 = \ln(1+r)$$
$$lnY_t = \beta_1 + \beta_2 t$$
$$lnY_t = \beta_1 + \beta_2 t + u_t$$

By this way, according to Gujarati (2004, pp. 178–179) model is like any other linear regression model, in that the parameters β_1 and β_2 are linear. Those countries which have higher growth rates than the average of annual growth rates are referred as fast growing countries[2], while those which have lower rates are low growing countries[3]. After grouping countries, determinated equation models are set up for both country groups. By this way four set of models are obtained as follows:

$$Log(g) = \beta_o + \beta_1 \log(hc) + \beta_2 \log(opn)$$
$$+ \beta_3 \log(pcap) \text{ Fast Growing Countries (Model 1a)}$$

$$Log(g) = \beta_o + \beta_1 \log(hc) + \beta_2 \log(opn)$$
$$+ \beta_3 \log(pcap) \text{ Low Growing Countries (Model 1b)}$$

$$Log(pcap) = \beta_o + \beta_1 \log(hc) + +\beta_2 \log(opn)$$
$$+ \beta_3 \log(g) \text{ Fast Growing Countries (Model 2a)}$$

$$Log(pcap) = \beta_o + \beta_1 \log(hc) + +\beta_2 \log(opn)$$
$$+ \beta_3 \log(g) \text{ Low Growing Countries (Model 2b)}$$

The data per capita GDP, human capital and population have been obtained from Penn World Table 8.0. Data openness to trade has been collected from World Bank. The data of Gini coefficients for countries is obtained from various sources namely World Institute of Development Economics Research (WIDER) website, and World Bank.[4] By the reason of lack of data, the Gini coefficients for some years which had more than one estimate have been averaged and then used in the model.

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[2] Fast growing countries selected are; Argentina, Bulgaria, China, Czech Republic, Estonia, France, Latvia, Poland, Portugal, Romania, Russia, Singapore, Slovak Republic, Ukraine.

[3] Low growing countries selected are; Austria, Belgium, Bolivia, Brazil, Canada, Costa Rica, Denmark, Ecuador, El Salvador, Finland, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Norway, Spain, Sweden, Switzerland, Turkey, United Kingdom.

[4] Resources for Gini coefficients: http://www.wider.unu.edu/, http://data.worldbank.org/, http://www.indexmundi.com/, Sarangi and Panda 2008.

3.2 Cross-Sectional Dependence Tests

Taking into consideration cross-sectional dependence between countries makes a significant impact on results of panel data analysis (Breusch and Pagan 1980; Pesaran 2004). For this reason, before the analysis, the presence of cross-sectional dependence of model and variable is tested, because, unit root tests should be chosen with respect to cross-sectional dependence results. In this study, the presence of cross-sectional dependence is tested by *CDLM tests* developed by Pesaran et al. (2008). The results are presented in Tables 1 and 2.

According to the results presented in Tables 1 and 2, there is a strong cross-sectional dependence among these countries. It means that when a Gini, human capital, trade openness or per capita GDPshock occurs in a country, this shock affects the others. Thus, while countries determining their economic policy, they should take into consideration policies implemented by other countries and shocks affecting these countries.

3.3 Panel Unit Root Tests

In this study, stationarity of variables is examined by Hadri and Kurozumi (2012) panel unit root tests. This test takes into consideration not only cross-sectional dependence, but also unit root arising from common factors. The results are presented in Tables 3 and 4.

The results driven from Tables 3 and 4, show that level values of all series for both country groups are stationary. After determining that series are constant on level values, the prediction phase of models (I, II, III and IV) started. Furthermore, there are heteroskedasticity and autocorrelation problems of error terms of all models. Results of diagnostic tests are submitted in Tables 5 and 6. Despite of these problems resistant prediction methods are utilized for the prediction of all models.

Table 1 The results of cross-sectional dependence tests for fast growing countries

Variables	CDLM1	CDLM2	CDLM3	CDLM4
G	1291.384 (0.000)	15.692 (0.000)	−2.020 (0.022)	6.093 (0.000)
hc	1317.051 (0.000)	16.376 (0.000)	−2.194 (0.014)	14.419 (0.000)
opn	1776.079 (0.000)	28.618 (0.000)	−2.060 (0.020)	4.992 (0.000)
pcap	1311.114 (0.000)	16.218 (0.000)	−2.403 (0.008)	4.357 (0.000)
Model 1	1385.362 (0.000)	18.198 (0.000)	−1.048 (0.147)	2.377 (0.009)
Model 2	1193.595 (0.000)	13.084 (0.000)	3.068 (0.001)	−3.258 (0.999)

Table 2 The results of cross-sectional dependence tests for low growing countries

Variables	CDLM1	CDLM2	CDLM3	CDLM4
G	1054.293 (0.000)	9.369 (0.000)	−1.985 (0.024)	40.668 (0.000)
hc	1043.007 (0.000)	9.068 (0.000)	−1.850 (0.032)	42.264 (0.000)
opn	1136.977 (0.000)	11.574 (0.000)	−1.182 (0.119)	44.467 (0.000)
pcap	1066.782 (0.000)	9.702 (0.000)	−1.727 (0.042)	50.719 (0.000)
Model 1	1341.334 (0.000)	17.024 (0.000)	−1.283 (0.100)	1.276 (0.101)
Model 2	1305.294 (0.000)	16.063 (0.000)	−1.519 (0.064)	0.960 (0.168)

Table 3 The results of Hadri and Kurozumi (2012) panel unit root test for fast growing countries

Variables	Levels	
	Z_A^{SPC}	Z_A^{LA}
G	−0.6482 (0.7416)*	−0.1982 (0.5786)*
Hc	0.3304 (0.3706)*	0.0173 (0.4931)*
opn	0.0265 (0.4894)*	0.5685 (0.2848)*
pcap	−0.7696 (0.7792)*	−0.8642 (0.8063)*

* denotes statistical significance at the 1 % level of significance

Table 4 The results of Hadri and Kurozumi (2012) panel unit root test for low growing countries

Variables	Levels	
	Z_A^{SPC}	Z_A^{LA}
G	1.2210 (0.1110)*	1.1867 (0.1177)*
Hc	−0.3577 (0.6397)*	0.5117 (0.3044)*
opn	0.2073 (0.4179)*	−0.2155 (0.5853)*
pcap	1.2595 (0.1039)*	1.4224 (0.0775)*

* denotes statistical significance at the 1 % level of significance

Table 5 Results of diagnostic tests (fixed effects model)

Tests	Model 1	Model 2	Model 3	Model 4
F_{group}	49.55221 (0.000000)	2439.197 (0.000000)	91.11519 (0.000000)	4405.730 (0.000000)
F_{time}	3.034115 (0.000490)	8.533020 (0.000000)	1.611785 (0.080851)	22.06563 (0.000000)
F_{twoway}	25.74581 (0.000000)	4026.569 (0.000000)	96.71643 (0.000000)	4238.648 (0.000000)
$LM_{h\text{-fixed}}$	200.3779 (0.000000)	32.12632 (0.002301)	60.76159 (0.000030)	132.9154 (0.000000)
LM_{stat}	46.95966 (0.000000)	124.8358 (0.000000)	37.03738 (0.000000)	175.9334 (0.000000)

Table 6 Results of diagnostic tests (random effects model)

Tests	Model 1	Model 2	Model 3	Model 4
LM_{group}	1790.230 (0.000000)	1953.664 (0.000000)	1790.230 (0.000000)	1953.664 (0.000000)
LM_{time}	5.369139 (0.020496)	1.055379 (0.304272)	5.369139 (0.020496)	1.055379 (0.304272)
LM_{twoway}	1795.599 (0.000000)	1954.720 (0.000000)	1795.599 (0.000000)	1954.720 (0.000000)
$Honda_{group}$	42.31111 (0.000000)	44.20028 (0.000000)	42.31111 (0.000000)	44.20028 (0.000000)
$Honda_{time}$	−2.317140 (0.989752)	−1.027316 (0.847864)	−2.317140 (0.989752)	−1.027316 (0.847864)
$Honda_{twoway}$	28.28001 (0.000000)	30.52789 (0.000000)	28.28001 (0.000000)	30.52789 (0.000000)
Hausman	11.59586 (0.008904)	18.61765 (0.000328)	11.59586 (0.008904)	18.61765 (0.000328)
$LM_{heteroskedasticity}$	169.0534 (0.000000)	394.2091 (0.000000)	169.0534 (0.000000)	394.2091 (0.000000)
$LM_{autocorrelation}$	1904.720 (0.000000)	1967.488 (0.000000)	1904.720 (0.000000)	1967.488 (0.000000)

It seems that there is no clear distinction between any models in order for the prediction of panel data regression. Therefore, in this study, results of both fixed effect model and random effects model are included. Under the assumption of both fixed and random effects, primary test results for all models are reported in Tables 7 and 8. Results obtained from primary tests show that bilateral fixed and random effects models are valid for all models and thus in order for prediction, both of the models can be utilized

4   Findings

In this panel study, results of both fixed effects model and random effects model are analyzed. In Table 7, according to model 1a, human capital, trade to openness and per capita GDP are statistically significant and positive. In fast growing countries, increase in these variables raise Gini coefficient. So, it means that the income inequality increases with increase in trade openness, high level of human capital and economic growth.

In model 1b, human capital and Gini coefficient are statistically significant and positive. In fast growing countries 1 % increase in human capital creates 62 % increase in per capita GDP at the 1 % level. In these countries Gini coefficient is also positive correlated with per capita GDP.

In model 2a, per capita GDP is statistically significant and negative at the 1 % level. In low growing countries, 1 % increase in per capita GDP reduces the Gini coefficient about 0.42 % at the 1 % level. This means that in low growing countries,

Table 7 Model estimations with fixed effects model

Variables	Coefficient	Asytstat	Period PCSE
Model 1a			
Hc	0.545978	0.214067	0.0144**
opn	0.110553	1.955286	0.0549***
Pcap	0.120959	1.774449	0.0918***
Model 1b			
Hc	0.625714	2.593046	0.0258*
opn	−0.075401	−1.173751	0.2534
G	0.153894	1.774449	0.0918***
Model 2a			
Hc	−0.077528	−1.038046	0.3863
opn	−0.056853	−1.389040	0.2108
Pcap	−0.421030	−5.021185	0.0000*
Model 2b			
Hc	0.081161	1.637486	0.1440
opn	−0.071644	−2.653007	0.0174*
G	−0.186427	−5.021185	0.0000*

Note: *, **, *** denotes statistical significance at the 10 %, 5 %, 1 % level of significance respectively

Table 8 Model estimations with random effects model

Variables	Coefficient	Asytstat	Period PCSE
Model 1a			
Hc	−0.225367	−2.166850	0.0312*
opn	0.060507	1.346343	0.1815
pcap	0.013845	0.575621	0.5737
Model 1b			
hc	2.544868	17.01176	0.0000*
opn	0.109718	1.574069	0.1399
g	−0.145511	−1.498724	0.1653
Model 2a			
Hc	0.014641	0.304876	0.7774
opn	−0.041300	−1.366895	0.2054
Pcap	−0.166787	−5.463923	0.0000*
Model 2b			
Hc	0.650756	16.14067	0.0000*
opn	0.120143	3.895401	0.0003*
G	−0.173986	−3.454717	0.0034*

Note: *, **, *** denotes statistical significance at the 10 %, 5 %, 1 % level of significance respectively

increase in income positively respects on Gini. In low growing countries which are mostly a part of developed world (leading economies) increasing economic growth decreases income inequality.

In model 2b, openness to trade and Gini coefficient are statistically significant and negative at the 1 % level. In low growing countries, openness to trade and Gini coefficient are negatively correlated with per capita GDP. For leading economies, referring low level of average growth rate in period 1998–2011, trade openness decreases Gini coefficient. This means that liberalization in leading economies decreases income inequality.

According to model estimations with random effects model in Table 8, according to model 2a, human capital is statistically significant and negative at the 1 % level. In fast growing countries, 1 % increase in human capital is associated with about a 0.22 % decrease in Gini coefficient. Education leads income inequality to decrease in developing world.

In model 1b, human capital is statistically significant and positive at the 1 % level. In fast growing countries, 1 % increase in human capital raises per capita GDP about 2.54 %. It means that in fast growing countries with higher education ratio ends up with higher income.

In model 2a, per capita GDP is statistically significant and negative at the 1 % level. In low growing countries, 1 % increase in per capita GDP is associated with about a 0.16 % decrease in Gini coefficient. In leading economies, economic growth as 1 % increase leads lowering income inequality.

In model 2b, human capital, trade to openness and per capita GDP are statistically significant at the 1 % level. In low growing countries, human capital and openness to trade are positively correlated with per capita GDP. In these countries, 1 % increase in Gini decreases per capita GDP about 0.17 %. As to conclude for developing countries, as far as income distribution worsens, economic growth slows down.

5   Conclusion

Trade liberalization process is mainly promoted for development in open economies. Any increase in indicators of trade openness, (trade volume, trade balance or export/import ratio) tended to change relative prices in favor of the more abundant factor. If low level of income stems from abundance of labor, greater trade openness is expected to increase wages, so increase of income.

In low income countries higher human capital and greater trade openness lead higher income levels. In these countries, higher per capita income decreases income inequality. For example, in 23 countries such as US, Canada, Turkey increase in income levels leads lower Gini coefficient. But education level and trade openness do not indicate any significant effect on Gini coefficient.

In fast growing countries (mostly developing world) high levels of trade openness increases Gini coefficient. This means income distribution worsens. This result conflicts with Heckscher-Ohlin and Stolper Samuelson Models of Classical Economy. Moreover, increase in income levels decreases income equality. In these countries, as education level and Gini coefficient increase, per capita income gets

higher relating with worsening of income distribution. Because trade liberalization process leads an increase in welfare of skilled labor in developing countries. In developing countries (14 countries) trade volume is negatively but insignificantly related with income level. As a conclusion, trade openness in fast growing countries (which are mostly developing part of the world) leads the income distribution to worsen.

Finally, for the rich countries, openness to trade is associated with increasing returns for the bottom and the middle deciles, and decreasing returns for the top deciles. At low income levels, trade openness involves greater income inequality, at intermediate and high income levels, it induces a more equalitarian distribution of income. In conclusion, trade liberalization effects on total income distribution are more complex, and probably influenced by the countries' relative factor endowment by technology changes and by recomposition of world trade patterns.

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Application Methods AHP
and Benchmarking in the Strategic
Management of Local Development: The Key
Procedural Aspects Through the Example
of Polish Districts

Jacek Strojny

Abstract Public administration institutions, as well as other organisations, must currently face many challenges (opportunities and threats). The following can be mentioned among them: high public debt, increasing competition in the area of mobile resources or—in the case of new EU countries—the need to absorb substantial funds from EU structural funds. Growing external demands require improvement of management processes. In this context, one of the most current issues is the effectiveness of strategic management. Not only is it important to properly define long-term goals, but also to properly implement them into actions—strategies, programs and operational tasks. The problem of strategic management optimisation is in line with the demands of current theoretical concepts, such as the New Public Management (NPM) and Good Governance. However, it primarily has a practical significance. Therefore, specific conditions of the country should be concerned. This chapter is part of a series of empirical studies and theoretical deliberations that aim to identify solutions useful for the management of socioeconomic development and public administration institutions as well. Its aim is to present the specifics of the AHP and benchmarking methods in the process of strategic management. The focus is not only on the description of the methods. The results of research carried out in one of the Polish local governments were also cited. The case study consisted of the experimental implementation of the mentioned methods in real conditions of strategic management.

Keywords AHP • Benchmarking • Decision making • Strategic management • Public administration

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1 Introduction

The development of contemporary economies (countries, regions, other territorial structures) takes place in a competitive, complex and extremely turbulent global economy. It is characterized by the phenomenon of a growing scale of the mobile capital flow between territorial systems (Batey and Friedrich 2000). Both the person seeking adequate living conditions, as well as companies locating their businesses in a particular place, significantly determine the development potential of a country or a region (Strojny 2012). Due to the large-scale flow, finding ways to maintain the foundations of development becomes a key task of the institutions responsible for managing the development of economic systems (e.g. local governments) (Ron and Sunley 1998).

Response to the opportunities and risks of the phenomenon shown above is not easy. The public sector, both in Poland and other European countries is facing an important and topical issue of excessive public debt (Surówka 2014; Dafflon and Beer-Tóth 2009; Bitner and Cichocki 2012). The need to make savings makes it difficult to engage in activities that would increase the attractiveness of a location and thus increase its competitiveness in the market of mobile capital. A particularly problematic situation is observed in the less developed areas that need to make a special effort to reduce the development gap. As an example, regions in eastern Poland could be mentioned. They establish a macro-scale region called Eastern Poland or Eastern Wall (MRD 2008). Poland, and particularly regions of the Eastern Wall, were able in the past, and will be able in a future, to benefit from significant resources in the context of the EU cohesion policy (Czyżewski and Stępień 2014; McCann and Ortega-Argilés 2015). The absorption of these funds, as well as creation of their maximum impact on economic development, however, faces a number of structural problems. These are, e.g.:

– Difficulties in co-financing projects through EU funds due to high debt,
– Excessive focus on the development of infrastructure and too little attention devoted to the creation of relationships between entities of the economy,
– Low culture of strategic management, resulting in a lack of consistency in action and a difficulty in coordinating development processes.

This article focuses mainly on the third mentioned aspect that is the quality of strategic management. It presents the course of the experimental implementation of selected methods practiced by Polish local government. The aim of the study was to adapt the procedures used in these methods to the specific nature of public administration. The described implementation includes the use of four methods namely the AHP (Analytic Hierarchy Process), benchmarking, MBO (Management by Objectives) and PM (Project Management). The article focuses on the initial phase of strategic management (strategic decision-making), which is often referred to as a strategic analysis (Friend and Jessop 2013; Klasik 2000). It uses the first two of these methods. They were used to organize management information.

The first of these methods (AHP) is a multi-criteria decision-making method (Downarowicz et al. 2000). It was developed in the end of 1970s by Saaty (1980). It allows the creation of a structure of the complex decision-making problem and then evaluation of the significance of each of its components (Saaty and Forman 1992). In the case study presented in the article, it is used in two areas. The first area identifies the priorities for endogenous potential, and the second seeks challenges in the environment. The structure of the potential is described by four main dimensions: The potential of society, the potential of the economy, the potential of the environment and institutional capacity. On the other hand, the structure of the environment consists of two main dimensions: the further environment and the closer environment.

The second presented method is benchmarking. It was developed and used for the first time at Xerox in the 1980s (Cross and Iqbal 1995). In literature it has been popularized by Boxwell (1994) among others. This method is a comprehensive approach to management, which is based on comparative analysis but goes significantly beyond its scope (Kyrö 2003). The assessment in relation to the others allows learning and finding the right ways of development and improvement (Bowerman and Ball 2000; Goh and Richards 1997). The use of benchmarking in the example described in this article is used in assessing the competitive position of the local government at the district level. Thus, the discussed method is narrowed mainly for comparative analysis. Statistical data available in the public system was used in this case study. Evaluation parameters were selected on the main criteria separated within the AHP method. The issue is a part of the current trend in both the theoretical and practical needs of public administration.

Implementation of the method of AHP and benchmarking could be enrolled as a part of the concept of NPM (New Public Management). Its basic assumption is striving to increase the efficiency of the public administration by adopting patterns of behavior management methods specific to the business sector (Dunleavy and Hood 1994). The proposed scheme of the decision-making process provides directing the strategy to the stakeholders in a way which is greater than the traditional approach to strategic management. Market conditions and expectations of the major customers of local government are carefully investigated using both of the mentioned models of the AHP. This way it also fits in some areas of the concept of Good Governance, which is the major one in present literature of management in public administration. The assumptions of this theory concern, inter alia, the needs of stakeholders and improvement of the quality of public services (Graham et al. 2003; De Vries and Juraj 2013).

It is also worth referring to the practical framework for development policy in the European Union. One of its most important pillars is focusing on key factors of development. This is called smart specialization (McCann and Ortega-Argilés 2013, 2015; Boschma 2013). Although the guidelines on this scope are related more to the development of the regions, their implementation should also cover the local government (in Poland there are municipalities and counties on this level).

2   Strategic Management in Polish Local Government: A Short Review of the Issue

2.1   *Local Government in Poland: Key Information*

The current Polish territorial division takes into account three levels of management of the country's development: central, regional (voivodships) and the local (districts and municipalities). It was introduced on the basis of territorial reform in 1999 (Municipality Act 1990; District Act 1998; Voivodship Act 1998). Currently, the local government institutions include 16 provinces, 379 districts (including 65 cities with district status), and 2479 municipalities (MAD 2014). Institutions that represent these territorial units possess a relative autonomy in shaping the development process of their areas. This is illustrated by two parallel processes: increasing competence and increasing finance sources (Potoczek 2013). At each level, they can generate their own income (Public Financial Act 2009). The greatest opportunities in this area belong to the municipalities. In addition to the financing of real estate taxes, they also have a significant interest in income taxes from citizens and from enterprises. Districts and regions can also participate in income taxes but with a much smaller share. Currently the total share of local governments in the PIT is almost 49.52 %, and in the CIT it is 22.86 % (Regional and Local Government's Income Act 2003).

The growing capabilities of impact on the processes occurring on a local and regional scale are also accompanied by an escalation of the challenges in the environment. One of the most important is to keep the endogenous potential, in particular in scope of the population. Poland as a country, as well as its individual regions and local territorial units, are affected by the negative trends of migration (Wilk et al. 2013). Two kinds of migration have been observed—interregional and international. Growing development centers (large urban areas—Silesia, Warsaw, Krakow or Poznań) drain the less developed regions (e.g. Eastern Poland), reducing their endogenic potential and power to stimulate their development (Winiarczyk-Raźniak and Raźniak 2012). Similar phenomena are also observed in the investment market, especially if it relates to foreign investments. Companies investing in Poland also focus mainly on the areas with significant growth potential (Gaczek 2010; Dominiak and Churski 2012). In these two fields, we may observe the real competitive processes between territorial units (Grace et al. 2007).

In the context of increasing competition a developmental challenge that is facing local governments in Poland should be considered. There is a question of balancing the two challenges of a different nature. In the 2014–2020 programming period, the funds should be used in a way that enables the start of permanent development processes so that they could be continued even after this financing period has been terminated. At the same time, limiting co-financing should be considered, resulting from the poor condition of public finances (Wieczorek 2014). Therefore, at every level of local government the strategic priorities and development policy focused on their achievement must be defined.

2.2   The Process of Strategic Management

The concept of strategic management is often used in literature. A significant part of the definitions suggest a functional interpretation in this context. For example, Krupski (2007, p. 97) understands it as "the process of defining and redefining the strategy in response to changes in the environment or activity ahead of these changes, and even calling them, and coupled with it the implementation process, in which the resources and organization skills are disposed to realize adopted long-term goals of the development..." According to the other definitions, strategic management consists of three basic steps: strategic analysis, planning of the strategy, implementation (Dess and Miller 1993; Gierszewska and Romanowska 1997). A slightly more elaborate description of strategic management is presented by Thompson and Strickland (1993), indicating the steps consisting of: encouraging the development vision and mission, the choice of long-term objectives, the preparation of strategies, the implementation and execution of strategy, strategic controlling and modification strategies. This concept can be analyzed in the context of the activities undertaken by the public administration. For the purposes of this study it was assumed that strategic management in local government, is a collection of such intentional action, which in the long run leads to meeting the needs of key stakeholders, reaches an optimal level of development of the particular territory and achieves competitive position, taking into account the existing endogenic potential and the impact of the external factors. The main tool to assist this process in local government is a strategy which is here understood as a kind of model, a plan, (Mintzberg et al. 1998), which is usually a formal document, prepared according to the procedure specified.

In Polish legal frames, the obligation of planning the development applies only to the regions (CM 2009). At the local level this kind of activity is compulsory. The practice, however, is that the dominant part of the districts and municipalities take such actions in a formalized way. The basic tool of strategic management is a document typically referred to as a strategy for socioeconomic development. It is a long-term plan of tasks, which fits into the overall scheme of strategic planning in Poland. This scheme includes both, the national level (long-term and medium-term strategy for the country and functional strategies), and the level of regional and local government policies (voivodships, districts and municipalities). The scheme of strategic planning is shown in Fig. 1.

In law, the procedures for planning at different levels and the structures of strategic documents or range of methods haven't been determined in detail (CM 2009). Therefore, there is freedom here. Local governments, however, use a wide-spread scheme in which the strategic document includes two elements: the analytical part and planning part. In the traditional approach in the context of strategic analysis the territorial unit is characterized by internal trends in selected areas of socioeconomic life. Benchmarking (actually the comparison analysis) is used relatively rarely, and without a comprehensive approach. Usually this part of
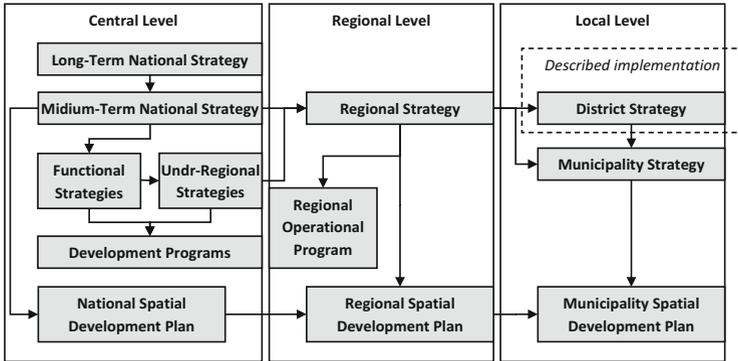
Fig. 1 Levels of strategic management in Poland. Source: own work based on CM (2009)

the planning is relatively poorly developed. It is common to define goals in a too general way as well as a lack of focus on priorities.

The investigated district uses the scheme of management process significantly modified in relation to the common approach in Polish local governments. Firstly, it is concluded that the strategic management must be market-oriented. It should meet the needs of major groups of stakeholders (clients), e.g. residents, businesses, tourists, etc. Secondly, the quality of the strategic management should be improved through the introduction of methods which support the planning and controlling of the strategy. In the proposed scheme, strategic management is divided into four stages:

– Step 1. Preparation of the decision (decision-making)—uses the method of AHP and benchmarking,
– Step 2. Making decisions: the selection of targets (decision-making)—mainly uses MBO method, but also PM
– Step 3. Planning for the implementation of Decision (implementation of the decision)—mainly supported by the method of PM,
– Step 4. Controlling and final control of the implementation of the decision (implementation of the decision)—method PM.

Diagram of the proposed model of strategic management approach is illustrated in Fig. 2.

This article focuses on the presentation of selected methodological aspects related to the first phase (preparation of the decision). It uses two well-known methods in the world. They are targeted to support the decision-making process, ensuring preparation of the management information. Brief summary of their characteristics is shown below.

Undertaking of the Decision		Implementation of the Decision	
Preparation of the Decision	Decision-Making (Choosing Goals)	Planning of the Decision Realization	Controlling of the Decision Realization
AHP			
	MBO		
Benchmarking		PM	
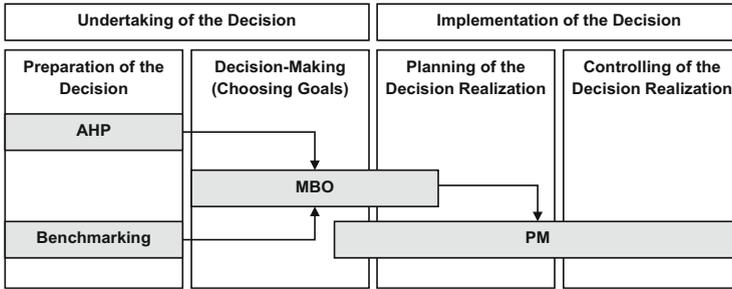
Fig. 2 Model of strategic management in Polish local government

2.3 Analytic Hierarchy Process: A Short Review of the Method

Method of AHP—Analytic Hierarchy Process was established in the US in the 1970s. Its creator is Saaty. It is useful in decision-making relating to complex, multi-dimensional problems. The most important of its features are (Saaty 1990; Prusak et al. 2014):

– Use of expert knowledge about the problem,
– Structuring the decision-making problem,
– Prioritization by comparing pairs of the defined problem,
– Focus on the logic of the decision-making process—requires a high level of consistency of the experts.

Referring to the first of these characteristics, it is worth noting that the AHP is a kind of expert method. This approach must be, in fact, combined with the so-called socialized approach to creating strategies. In practice, there is no contradiction here. Expertise competences are used in this part of the decision-making process, which require excellent orientation in local problems. Therefore, experts may be people working in local government institutions or external persons with significant knowledge of the processes that occur there. Thanks to this, the general outline of the strategy and the extent of its impact are created with the use of professional experience. During the preparation of management information, however, the consultation process (research of stakeholder expectations), which will enrich the knowledge of experts, should be started.

After completing of the expert group, the analytic work starts. In a first step the decision problem should be structured, which results in a decision-making model (it could be called: the decision-making structure or hierarchical tree) (Prusak and Stefanów 2014). It is available as a hierarchical scheme in which the main problem is transcribed on the main elements (criteria), and if it is needed for a more detailed elements (sub-criteria). Diagram of the decision-making model is shown in Fig. 3.

On the basis of the model the survey for experts is prepared. It contains all possible combinations of the comparison in pairs, both on the criteria and
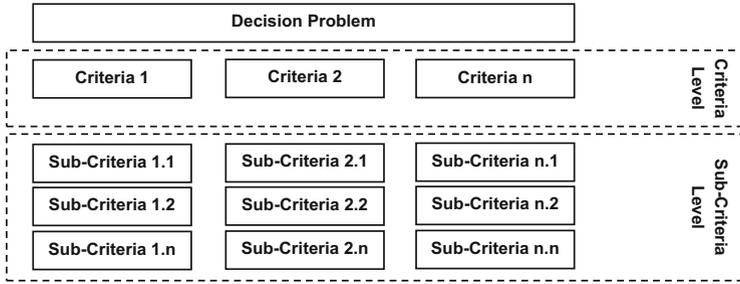
Fig. 3 Scheme of AHP decision-making model. Source: own work based on Saaty and Forman (1992)

Fig. 4 The scheme of Saaty's scale. Source: own work based on Saaty (1994)

sub-criteria levels. Sub-criteria are compared only within a given criteria. It is worth noting that the greater number of elements in a particular part of hierarchy affects the greater number of comparisons. Due to the fact that the model is used in practice, it should not be expanded. To assess the number of comparisons in the context of a given set, e.g., criteria, the Formula (1) can be used.

$$N_c = \frac{N_e(N_e - 1)}{2},$$ (1)

where N_c is the number of comparisons and N_e is the number of elements in the set (being compared). To achieve the judgments a specific method to assess the relationship between elements compared is used. This is a so-called Saaty's fundamental scale. Its diagram is shown in Fig. 4.

The values of each comparison are transferred to the matrix sized $Ne \times Ne$ (where Ne is the number of elements compared within the set). The matrix created is an inversely symmetric. This means that if the comparison value C1 with respect to C2 is 5, then C2 relative to C1 is 1/5.

The process of assessing the relevance of the individual components by comparing pairs is very sensitive to the behavior of the logic of the choice. It is assumed here that if C1 is more important than C2, and C2 more important than C3, than C1 should be more important than C3. The consistency is measured by CR (Consistency Ratio). Its value, as the creator of the method suggests, should not exceed 0.1. Due to the difficulty of obtaining such a substantial compliance in practice, there is a debate about the acceptability of the higher its value (Prusak and Stefanów 2014).

The detailed procedure for it shows, among others, Prusak and Stefanów (2014). The general scheme of calculating the CR is as follows:

$$CR = \frac{IC}{R} = \frac{(\lambda_{max} - N_e) : (N_e - 1)}{R}$$
$$= \frac{\left[\left(\sum_{i=1}^{n} \sum_{j=1}^{n} a_{ij} \cdot w_i\right) - N_e\right] : (N_e - 1)}{R}, \tag{2}$$

where

CR   Consistency Ratio
IC   Inconsistency Index
R   Random Index—values tabulated by Saaty
λ_{max} largest eigenvalue of the matrix comparisons
N_e Number of elements being compared
a_{ij} The value of the element of comparisons matrix
w_i Weighting factor of the element.

The weighting factors are calculated on the basis of the comparison matrix. Detailed procedures for the calculation are presented in the literature (Saaty 1994; Prusak and Stefanów 2014). Here mathematical operations such as matrix calculus, the geometric or arithmetic mean can be used. There are two kinds of weighting factors: local and global. The first shows the importance of the element relative to the parent criterion (located higher in the hierarchy). The global scales, on the other hand, show the significance of the item relative to the main element (research problem). Global priorities for the sub-criteria are calculated as the product of their local weight and the weight of their parent criteria.

From the point of view of the research provided, the value of global weights (priorities) is particularly important, which provide the main management information on the relevance of the element relative to the decision-making problem. The result is a rank presented on the scheme shown in Table 1.

In the present study at this stage of the procedure AHP was stopped. Strategic options (alternatives) were not analyzed. The resulting ranks were a source of management information for the analysis of endogenous and exogenous factors.

2.4   Benchmarking: A Short Review of the Method

The second of the presented methods is benchmarking. In business practice it appeared in the 1980s thanks to Xerox. Currently, this method is a comprehensive approach to the management of organizations. Balm (1992), among others, has

Table 1 Ranks of criteria and sub-criteria significance

Nr	Criteria	Global value of criteria	Sub-criteria	Global value of sub-criteria
1.	Criteria 1	<0;1>	Sub-criteria 2.1	<0;1>
2.	Criteria 4	<0;1>	Sub-criteria 3.2	<0;1>
3.	Criteria 2	<0;1>	Sub-criteria 1.1	<0;1>
4.	Criteria…	<0;1>	Sub-criteria…	<0;1>
	Total	$\Sigma = 1$	Total	$\Sigma = 1$

defined benchmarking, according to which it is a continuous comparison of products or services with their counterparts in the best organizations in the sector of the market. It is undertaken to establish ambitious but realistic objectives and activities of improvement to become best in the market in reasonable time. It also assumes that benchmarking is a tool of management by learning from the best, useful in achieving high performance in the market (Anand and Kodali 2008). This type of approach is used not only in enterprises, but in organisations of the public sector as well (e.g. Bowerman et al. 2001, 2002). An example of this is established in Poland, the benchmarking group (SZGiP 2013). It includes different institutions of local governments (municipalities, districts) that cooperate with each other to create a standard benchmark of strategic and operational management. In particular they prepare the exchange system of management information.

In the literature are described many types of benchmarking (Anand and Kodali 2008): (a) competitive or cooperative, (b) functional, performance or strategic, (c) internal, external and general. The approach presented in this chapter is a part of several of the above-mentioned dimensions of benchmarking. Firstly, in public administration parallel competition and cooperation can be observed. There are a number of initiatives in which the territorial units, because of their similar specificity, are involved (e.g. joint infrastructure or cultural projects). At the same time they compete with each other for resources, tourists, etc. The perspective, adopted in the article, however, suggests a more competitive than cooperative approach. Secondly, analysis enrolls also in strategic benchmarking. The study was conducted within a framework of strategic analysis, where other territorial units were taken as benchmarks. Therefore, it is also an example of external benchmarking.

The general procedure for benchmarking comprises the following steps (Balm 1992): self-analysis, pre-benchmarking phase, benchmarking phase (comparative analysis), post-benchmarking phase (implementation of improvements), review and adaptation. In the present study, the use of benchmarking was narrowed to first three steps. It requires the following actions: establishing priorities and choosing the subject of benchmarking, choosing of benchmarks (other territorial units), identification of sources of the information, gathering and organizing data, comparative data analysis, presenting the results of the comparison.

In the first step, the so-called benchmarks were selected. These are entities which are compared to the organization (in described case—to the investigated unit of local government). In the case of the study the public administration, should be

selected units on the same level (of the same category of NUTS[1]). Searching it is worth taking into account such factors as: the size (area, population), similarity of endogenous potential, to be in direct competitive relationship (operating in the same market share of mobile capital or tourist services), data availability.

The key step is the selection of comparison data. According to the proposed approach to strategic management, the starting point of the analysis is AHP model describing elements of the endogenous factors. The data can be grouped, depending on the availability at the level of criteria or sub-criteria. A natural source of strategic data is public statistics (in Poland—http://www.stat.gov.pl or in Europe—http://ec. europa.eu/eurostat). Selected data could be analyzed using selected tools. The study used: single-based indexes, linear trend function, methods of data standardization.

Single base indexes are calculated for the base year $y_0 = 1999$[2] on the based on the formula (3).

$$I_t = \frac{V_t}{V_{t0}} \tag{3}$$

where I_t is value of single-based index, V_t is value of the variable in year t, and V_{t0} is initial value of the variable in the base year t0. In order to better illustrate the changes in relation to a given variable, used as smoothing of the time series by linear trend function. In order to determine it, the formulas (4a)–(4c) were used.

$$Y_t = at + b \tag{4a}$$

$$a = \frac{\sum_{t=1}^{n} (t - t_s)\ V_t}{\sum_{t=1}^{n} (t - t_s)^2} \tag{4b}$$

$$b = V_S - a \cdot t_S = V_S - \frac{\sum_{t=0}^{n} (t - t_s)\ V_t}{\sum_{t=0}^{n} (t - t_s)^2} \cdot t_S \tag{4c}$$

where:

Y_t Value of the linear trend function at time t
a   Periodic rate of increase or decrease of the phenomenon
b   Value of a linear function of the trend in the period t0–1
t   Period in time series
t_S Average value of the period in the tested time series
V_S Average value of the variable in the tested time series.

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[1] NUTS—Nomenclature of Units for Territorial Statistics.

[2] In 1999 a three-level territorial division of the country was started. In the case when a variable is available later in the system of official statistics, as the base period used the first year of available variables was used.

The grouping of data within each criterion of AHP model suggests the necessity of calculating the level of aggregation of the aggregate value of the index at the level of the criteria and the overall level of endogenous potential. The zero-unitarisation method was used here. To calculate the value of the aggregated indexes values of standardized variables calculated in each year were used, taking into account a set of i = n benchmarks. The value of aggregated index on the level of criteria is counted as an average mean of standardized values of variables used to describe each criteria. The main (general) index is counted on the level of endogenic potential as a weighted value of aggregated indexes of criteria. Weights of a criteria are priorities of criteria resulted from AHP analysis. Here were used follow formulas (5a)–(5d).

For variables accepted as a stimulants:

$$S_{it} = \frac{V_{it} - V_{\min t}}{V_{\max t} - V_{\min t}}, \tag{5a}$$

For variables accepted as a sedatives:

$$S_{it} = \frac{V_{\max t} - V_{it}}{V_{\max t} - V_{\min t}}, \tag{5b}$$

$$AK_{it} = \frac{\sum_{i=1}^{n} S_{it}}{n} \tag{5c}$$

$$AG_{it} = \sum_{i=1}^{n} AK_{it} \cdot w_i \tag{5d}$$

where:

S_{it} Standardized value of the variable V in a territorial unit i and time t
V_{it} Value of the variable in a territorial unit i and time t
$V_{\min t}$ Minimum value of the variable in the compared group of territorial units at time t
$V_{\max t}$ Maximum value of the variable in the compared group of territorial units at time t
AK_{it} Aggregated index of the competitive position of the territorial unit i at time t at the level of criteria describing the size of endogenous potential in AHP model
w_i Weighting factor of the criteria
AG_{it} Aggregated index of the competitive position of the territorial unit i at time t at a general level describing the potential of endogenous in AHP model

For aggregated variable, obtained by zero-unitarisation or another method of data standardization (if preferred), a further analysis can be provided, using single-based indexes, smoothing of time series or setting a trend with the use of a linear function or other method of trends analysis. The procedure here is exactly like on

the level of basic variables. Of course, the aggregation process can also be repeated for the full of endogenous potential, using calculated ingredients (aggregated indexes on the level of AHP criteria). As a result of the analysis, decision-makers gain management information about competitive position of the researched territorial unit in the areas described by model of AHP. This evaluation, together with the results of AHP analysis, is the starting point to the appropriate stage of the decision-making process, which creates a system of strategic and tactical goals, using another implemented method—MBO (Management by Objectives). It is worth noting that other steps of strategic management (strategic planning, intervention and controlling) can be treated as next steps in the above-described benchmarking procedure.

3 Implementation of AHP and Benchmarking: Results

3.1 Short Information About Case Study

Implementation of methods AHP and benchmarking were held in one of the districts of the Southern Poland. It was a place where—deep changes in reorganization were carried out earlier by incorporating elements of project orientation. Strategy based on the priorities is one of the final stages of this organizational innovation. The strategy has been prepared for the period 2015–2022, using a significant proportion of the effects described in this article.

3.2 Implementation of AHP: Models and Results

Implementation of the AHP method in the strategic analysis consisted of two main decision-making problems. They can be described in the following research questions: (Q1) which elements of endogenous potential are the most important from the point of view of development processes in the district? (Q2) What factors within the external environment are the most important from the point of view of the county development processes? Seeking answers to this questions two AHP models were prepared: Model of Endogenous Potential (Fig. 5) and Model of External Factors (Fig. 6).

Analysis of the situation was carried out within a group of experts, who are employees of the District Office. During the moderated meetings both endogenous and exogenous factors were assessed. The result is a ranking of the priority areas of endogenous development potential (Fig. 7) as well as external factors of development (Fig. 8).

The analysis shows that the main elements of the endogenous potential that determine the development of the district are: entrepreneurship, tourist attractions,

1. DIMENSIONS OF ENDOGENIC POTENTIAL			
1.1. Potential of the society	**1.2. Potential of economy**	**1.3. Potential of the environment**	**1.4. Institutional potential**
1.1.1. Social capital	**1.2.1. Entrepreneurship**	**1.3.1. Potential of the infrastructure**	**1.4.1. Competences of workers**
1.1.1.1. Citizenship	**1.2.2. Innovativeness**	1.3.1.1. Communication infrastructure	**1.4.2. Efficiency and effectiveness**
1.1.1.2. Cooperation	1.2.2.1. Innovation in business	1.3.1.2. Municipal infrastructure	
1.1.1.3. Trust	1.2.2.2. Research and development	1.3.1.3. Tourism infrastructure	
1.1.2. Human capital	**1.2.3. Production potential**	1.3.1.4. Healthcare infrastructure	
1.1.2.1. Demographic potential	1.2.3.1. Staff	1.3.1.5. Educational infrastructure	
1.1.2.2. Structure an level of competences	1.2.3.2. Companies	1.3.1.6. Cultural infrastructure	
	1.2.3.3. Agriculture	1.3.1.7. Social care infrastructure	
		1.3.2. Natural environment	
		1.3.2.1. Cleanliness	
		1.3.2.2. Tourist attractions	
		1.3.2.3. Natural resource	

Fig. 5 Model of endogenic potential. Source: own work based on Strojny et al. (2014)

2. EXTERNAL FACTORS OF DEVELOPMENT			
2.1. Closer environment	**2.2. Further environment**		
2.1.1. Competitive territorial units	**2.2.1. Macroeconomic processes (country)**	**2.2.3. Processes in European Union**	**2.2.5. Political situation**
2.1.1.1. Neighboring territorial units	2.2.1.1. Domestic production	2.2.3.1. Attractiveness of common labor market	2.2.5.1. Political instability in country
2.1.1.2. Strong metropolitan systems	2.2.1.2. Level of unemployment	2.2.3.2. Rules of EU budgeting policy	2.2.5.2. Elections
2.1.1.3. Territorial units with the same specialization	2.2.1.3. Inflation rate	2.2.3.3. Integration of UE zone	**2.2.6. Changes in law**
2.1.2. Cooperating territorial units	2.2.1.4. Value of national currency	**2.2.4. Euro-regional processes**	2.2.6.1. Additional tasks for local and regional gov.
2.1.2.1. Territorial units within the territory of district/region	**2.2.2. State of public finance system**	2.2.4.1. Intensity of interregional cooperation	2.2.6.2. Additional reporting obligations
2.1.2.2. Territorial units with a similar develop. specificity	2.2.2.1. Rules to generate income from central budget	2.2.4.2. Rules of financing a euro-regional cooperation	2.2.6.3. Rules for public procurement and PPP
2.1.2.3. Territorial units interacting in relationships	2.2.2.2. Rules to generate internal income		
2.1.3. Customers	2.2.2.3. Rules for executing of local and region gov. expendit.		
	2.2.2.4. Indebtedness of public finance system		

Fig. 6 Model of external factors. Source: own work based on Strojny et al. (2014)
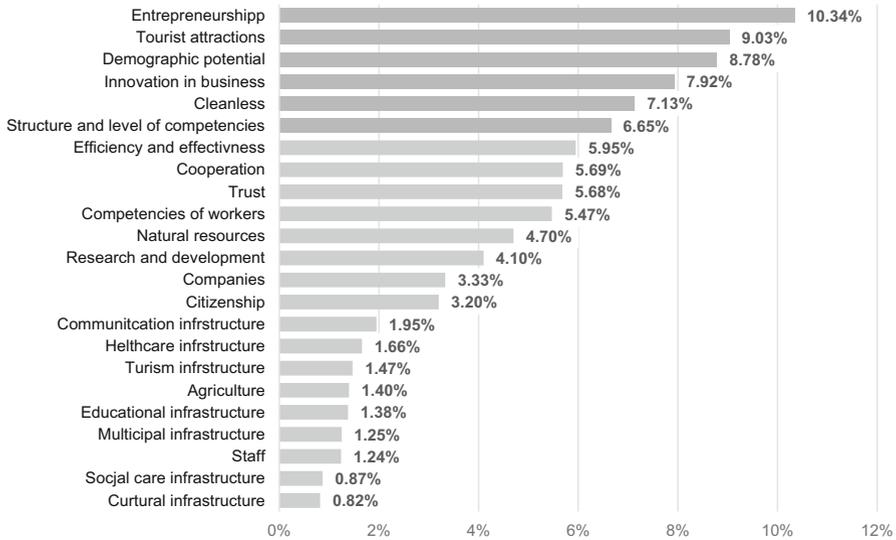
Fig. 7 Ranks of the significance of endogenic potential. Source: own work based on Strojny et al. (2014)
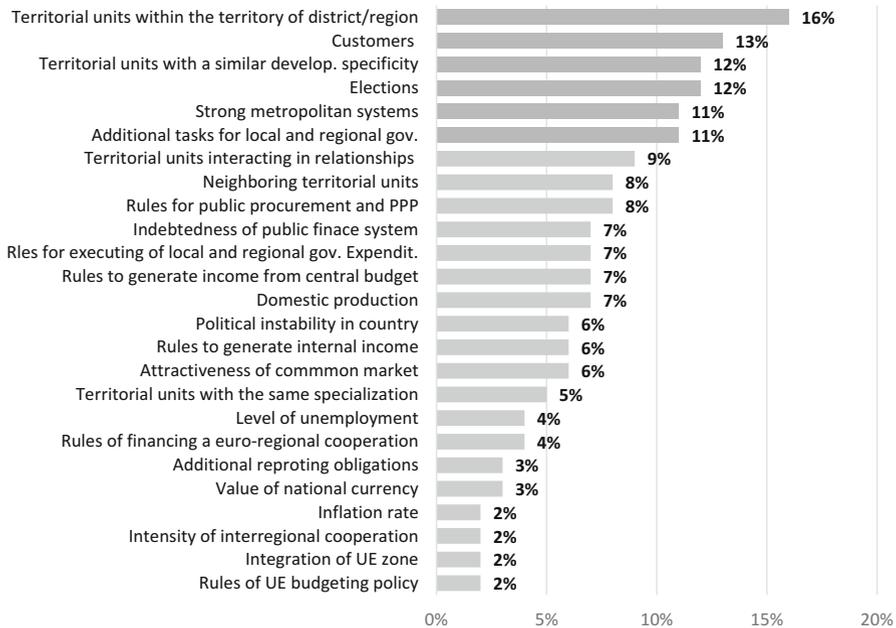
Fig. 8 Ranks of the significance of external factors of development processes. Source: own work based on Strojny et al. (2014)

demographic potential, innovation in business, the cleanliness of the environment, structure and level of competence. In contrast, the most important external factors influencing development processes are: impact of local government within the territory (municipalities included in the district), customers (decisions made by: citizens, businesses, tourists), other local government units of similar developmental specificity (cooperating), the election (all types—president, parliamentary or to local authorities), strong metropolitan systems and additional tasks for the local government.

The rankings obtained on the basis of AHP allow you to get a basic assessment of the situation of the local government. They allow the identification of the strategic directions of intervention (priority areas of potential endogenous) and the main areas of risk or opportunity (priority external factors). Management information, however, requires further completion. In particular, it is an assessment of the situation in the local government units to other units, and therefore a competitive position. Obtaining such information requires a transition from the AHP method to benchmarking.

3.3 Implementation of Benchmarking: Data Analysis and Its Results

In the first stage of a comparative analysis, a group of experts from the District Office chose other districts, which are the points of reference (benchmarks). These include (Strojny 2014): Krośnieński District and city of Krosno, the Nowosądecki District and city of Nowy Sącz), Żywiecki District, Kłodzki District. When selecting, the following criteria: the size of the area and population, the mountainous character, the proximity of the border of the country (Strojny 2014). Then, for each dimension, a list of variables was prepared available in the official statistics. Table 2 shows a list of variables related to separate criteria in the analysis of AHP.

Below we may observe a sample analysis using the aforementioned tools. Due to limitations in the article presents the mechanism of the analysis and presentation of data on the level of the variable were pointed out. At the levels AHP criteria and at the overall for the entire endogenous potential, the mechanism for data presentation is very similar and, as it is in the case of the statistical variable: the representation of the time series, the preparation of the single-based index.

Variable analysis shows an example of one of the indicators of the economic potential of the district—Number of companies with foreign capital to 10,000 residents. In the first step the time series was used to show the course of the variable over time. On this basis, in the second step, a single-based index was calculated for the base period $y_0 = 1999$. Charts can be enriched by linear function of the trend. Then the zero-unitarisation method was applied in order to standardize the data and prepare them for inclusion in the calculation of the aggregate index at a given criterion. These ways of presenting data are shown in Figs. 9, 10, and 11.

Table 2 Variables describing a criterion of the endogenic potential model

Nr	C3. Potential of the environment
1.	Number of associations, social organizations and foundations per 10,000 residents
2.	Number of club members working with cultural institutions per 10,000 residents
3.	Number of members of the artistic team per 1000 residents
4.	Average number of members of sports clubs
5.	Number of detected economic offenses per 10,000 residents
6.	Turnout in local elections
7.	Number of district residents
8.	Share of the working age population in the total population
9.	Share of the pre-working age population in the total population
10.	Share of post-working age population in the total population
11.	Natural increase to 10,000 residents
12.	Inter-district migration balance in the group of people of working age
13.	Percentage of students taking the matriculation exams in secondary vocational schools
14.	Percentage of students taking the matriculation exams in secondary schools
Nr	C2. Potential of the economy
1.	Number of private sector entities
2.	Number of individuals engaged in business activity per 1000 residents
3.	Share of medium-sized companies (50–249 employees) in the total private sector entities
4.	Share of commercial companies in the private sector entities in total
5.	Number of companies with foreign capital to 10,000 residents
6.	Investment expenditures of enterprises for one entity
7.	Gross value of fixed assets of enterprises for one entity
8.	Gross monthly salary
9.	Registered unemployment rate
10.	Number of persons employed
11.	Employment in agriculture, forestry, hunting and fishing
12.	Employment in industry and construction
13.	Employment in small services (e.g. repair, catering, hospitality)
Nr	C3. Potential of the environment
1.	Area of municipalities covered by zoning plans
2	Length of the paved municipal roads per 1 km^2
3	Length of paved district roads per 1 km^2
4	Number of passenger cars per 1000 residents
5	Number of accidents per 1000 residents
6	Area of residential buildings put into use
7	Usable area of the flat per one inhabitant
8	Share of the population using the sewage system in the total population
9	Share of the population connected to the water supply network in the total population
10	Average consumption of water by one using the water supply network (in m^3)
11	Share of the population connected to the gas network in the total population
12	Average gas consumption by one using the gas network
13	Number of persons per one clinic

<div align="right">(continued)</div>

Table 2 (continued)

Nr	C3. Potential of the environment
14	Number of inhabitants per one bed in the hospital
15	Number of primary healthcare advices per one inhabitant
16	Number of beds in hotels
17	Use of beds in hotels
18	Average length of stay of a tourist
19	Average length of stay of foreign tourists
20	Number of events organized by the cultural centers
21	Average attendance at events organized by cultural centers
22	Exhibitions in the exhibition business objects
23	Number of museums
24	Number of visitors to museums
25	Number of sport and cultural events
26	Number of inhabitants per one sit in the cinema
27	Average number of viewers during the show at the theater
28	Share of forest area in total area of district
29	Wood gaining
30	Emissions of gaseous pollutants
31	Emission of dust
32	Industrial wastewater discharge
33	The share of the population using the sewage in the total population
34	Surface dumps
35	Wastes produced in industry
36	Share of legally protected in the total area
37	The share of national parks in total area
38	Area per one natural monument
Nr	C4. Potential of the institution
1.	Total income of municipalities in the district
2.	The share of own income in total income of municipalities in the district
3.	Income from the European Union per capita of municipalities in the district
4.	Total income of district
5.	The share of own income in total income in the district
6.	Income from the European Union per capita in the district
7.	Share of capital investment in the total expenditure of municipalities in the district
8.	Share of current expenditure on wages in the total expenditure of municipalities in the district
9.	Share of debt service expenditures in the total expenditure of municipalities in the district
10.	Share of capital investment in the total expenditure of district
11.	Share of current expenditure on wages in total expenditures of district
12.	The share of debt service expenditures in the total expenditure of district
13.	Participation councilors with higher education in boards of district and municipalities in the district
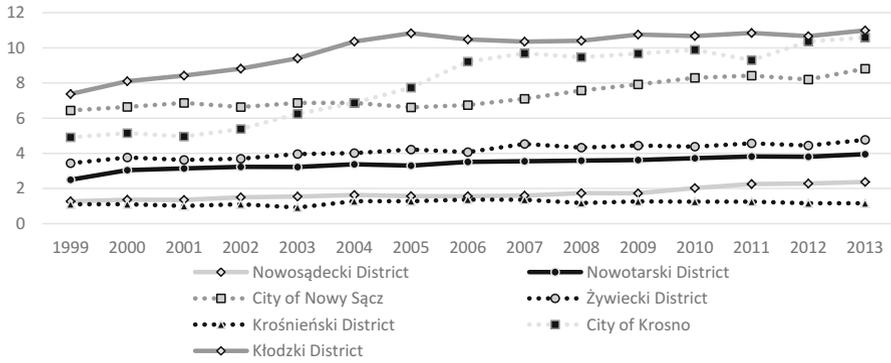
Fig. 9 Number of companies with foreign capital to 10,000 residents in entities (basic variable)—investigated district in relation to the benchmarks. Source: own work based on GUS data
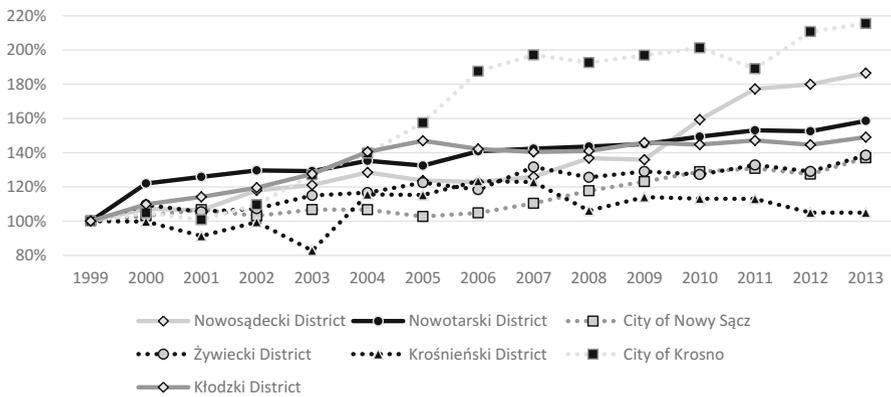
Fig. 10 Number of companies with foreign capital to 10,000 residents (single-based index of the variable)—investigated district in relation to the benchmarks
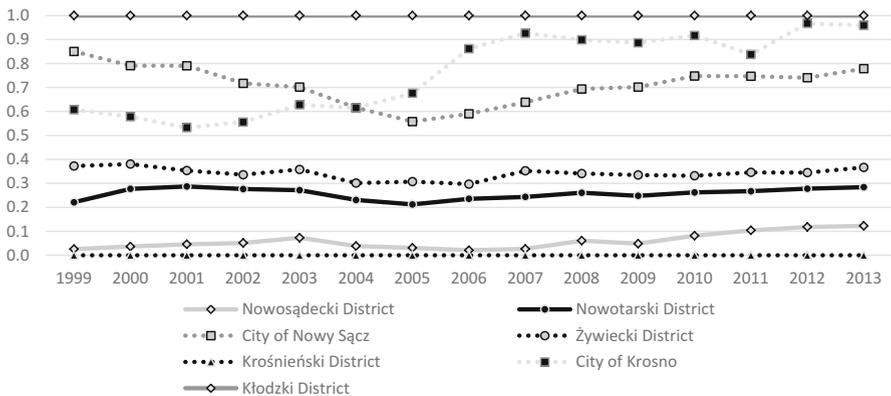
Fig. 11 Number of companies with foreign capital to 10,000 residents (standardized values with zero-unitarisation method)—investigated district in relation to the benchmarks

Presentation of variable using an ordinary time series graph, initially allows the assessment of the scale of the phenomenon in relation to the benchmarks. In the case of variable presented here, we may observe that most districts have a competitive advantage with respect to the analyzed district (Nowotarski District)—Fig. 8. Searching for information on the rate of change in the period of the individual units of local government it is worth to using a different way of presenting the data, for example single-based index. It provides an assessment of the changes that occurred in the last period and prior periods as compared to the base year (1999). It is worth noting that the investigated district is characterized by a fairly significant increase in the number of entities with foreign capital (160 %)—Fig. 9. In respect to this variable there are only two benchmarks with highest tempo of development (Nowosądeckie District and City of Krosno).

As a complement to the above considerations may be assessment of the relative competitive position of the investigated territorial unit. In order to obtain it can be performed by one of the methods of standardization, for example the zero-unitarisation method. On the basis of audited entities a clear leader was separated, which is Nowosądecki District (value 1). The weakest local government unit, taking into account the variable mentioned above is Krosno District (value 0). In the analyzed period, the competitive position of City of Krosno significantly improved. Harmoniously, the position of City of Nowy Sącz decreased.

The presented analysis uses some basic and simple methods of data analysis. However, there is no doubt that it gives a clear and multilevel picture of the strategic situation of an analyzed territorial unit. Thanks to this, the process of goals in creating and strategy planning is easier, more clear and coherent.

4   Conclusions

To summarize, the conclusions relating to the three main dimensions could be presented. They apply to: the theoretical and empirical implications, the usefulness of the results obtained, notes for implementation.

Turning to the first of these areas, it is worth noticing that the two presented methods have been known for several decades. They are also at an advanced stage of development life cycle. There is no doubt, however, that they still have development potential. It applies to both—the methodological aspects of usage of these methods, as well as their adaptation to the conditions of different sectors. This is certainly an interesting topic for further theoretical discussion and research exploration.

To the above-mentioned activities encourages a high usability of the results obtained using the described methods. In particular, we were able to identify external and internal factors affecting the development and assess their relevance, identify benchmarks for the evaluation of competitive position, and create a database of management information describing internal trends and competitive position.

The configuration of the proposed methods, the resulting strategic analysis is more clear and consistent. Between the methods there is a causal relationship, which facilitates the interpretation of the situation, as well as making more adequate decisions. It appears that this approach could be an interesting alternative to the traditional one.

By implementing both methods of strategic management, we should pay attention to several methodological issues. Firstly, the compiled expert group should consist of people with different expertise. Competences represented in it should be addressed to each of the areas of activity of local administration. Moreover, particular surveys of AHP should not exceed 30–40 min. Too many combinations resulting from excessive expansion of AHP models, adversely affect the focus of experts. In the case of this method, it can significantly reduce the consequence of the decision-making, which translates into consistency, and thus the quality of the results achieved. Thirdly, in the comparative analysis only data provided in a systematic way should be used. There should be a large probability to obtain them during the period of the strategy. Despite many imperfections, these criteria meet the system of national statistics. Fourthly, methods of data analysis should be simplified. Their understanding should not be a problem for people working in local government institutions.

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The Impact of the Concepts of Human Nature on the Methodology of Humanistic Economics and Religious Motivated Streams of Economics (Buddhist, Islam and Christian)

Anna Horodecka

Abstract The shape of the economics depends on the concept of human nature, which builds main assumptions of any economical school. This set of assumptions is made about the individual (his/behavior, motives, meaning), interactions with the natural and supernatural powers (worldview) and other people (social world) and provides foundations to the economics. The chapter focuses on the influence of this concept on its methodology and methods of the economics. This impact is presented here on the example of humanistic economics, which is here understood widely, including approaches developed within particular world religions as: Buddhism, Islam and Christian. The method applied to this research is a content analysis of the most important texts created within the humanistic economics and directions of economics motivated by world religions. To reach this goal, the following steps will be conducted: firstly, the concepts of human nature will be defined and categorized; secondly, the main levels and dimensions of the concept of human nature in the humanistic tradition will be presented, and thirdly the influence of such understanding of the human being on the methodology, methods and main theories within those denominations of economics will be discussed. The analysis proved that main orientations of these schools of economic could be explained by the changed assumptions about the human nature.

Keywords Humanistic economics • Concept of human nature • Islam economics • Christian economics • Buddhist economics • Methodology

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1   Introduction

The foundations of the economics base on the concept of human nature. Often those concepts of human nature take form of assumptions and build a basis for further research within the economics. This concerns as well all schools of economics. This chapter focuses on presenting the consequences of the change of concept of human nature for the humanist economics. This humanistic economics will be considered widely, as soon as the humanistic concept of human nature can be understood in its narrow and wide sense. In the narrow sense it is derived from the ideas developed by Maslow and Rogers and adapted by the so called humanistic economics (see Lutz and Lux 1979, 1988). In its wide sense the concept of human nature bases on the humanistic tradition in the philosophy and religions. Putting the human being in the center of their discourse and asking about the way of living, which helps the human being to the inner growth and happiness, can characterize this tradition.

There are some arguments speaking for considering religions tradition in the humanistic tradition. One important argument, which speaks on behalf of such an inclusion are the common features of the economics having roots in the religious traditions and the humanist economics. This can be especially well seen when it comes to the Buddhist economics, which in a strongest way assimilates the humanistic tradition. But other religion traditions, which developed their approach to the economics as well, have many similarities to the humanistic economics. This is the case of Christian attitude to economics (Protestant ethics and the Catholic social teaching) and as well Islamic Economics. Those two religions ground on the Judaist tradition, which won't be discussed separately. Although Judaism counts to the major world religion (even if not by the number of believers, but by its influence especially on the two other world religions as Christianity and Islam), its attitude to economics (resulting from the Biblical scriptures) will be discussed only within former religions. The reason for not discussing it separately is as well connected with the fact, that Judaism doesn't have much influence on the actual world economics, because it's believed only by 0.22 %[1] of the world population and moreover the main part of believers is living in diasporas, so it doesn't have a possibility to impact much on the way of conducting the economic policy for instance or developing its own economic school. The socialistic ideas developed within the institution of a Kibbutz have only a random meaning and as such it will be discussed in the excurse to this article.

The chapter provides an insight in some different approaches and attitudes of each one humanistic tradition. The focus lies here on finding its common aspects. The concept of human nature can be analyzed on different levels and dimensions (see Horodecka 2014). Basing on some anthropological divisions, we can generally

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[1] Christian 33.39 % (of which Roman Catholic 16.85 %, Protestant 6.15 %, Orthodox 3.96 %, Anglican 1.26 %), Muslim 22.74 %, Hindu 13.8 %, Buddhist 6.77 %, Sikh 0.35 %, Jewish 0.22 %, Baha'i 0.11 %, other religions 10.95 %, non-religious 9.66 %, atheists 2.01 % (The World Factbook 2015).

differentiate following levels of the concept of human nature: the worldview—which is the most general level of the concept of human nature, on which the relation between human being and the nature and supernature is discussed. Then comes the social world—which provides an insight into the basic social relations of human being. At this level we are introduced into a basic view of some crucial principles governing the social life like egoism, or altruism for instance. Then it comes to the lowest level of the concept of human being—the individual level, which is focused on describing basic assumptions about human behavior ('body' dimension), the basic motives, values ('soul' level) and the meaning which is associated to those motives and motives in human life ('mind' level).

Such a constructed concept of human nature impacts on the foundations of all social sciences as soon as they deal with phenomena made and changed by the human being. This concerns as well economics and all of its schools. Each of the economic schools seems to base on the different concept of human nature, which explains the differences between those schools.

The goal of this chapter is to present this impact on the example of humanistic economics, which is here understood widely, as mentioned above, including approaches developed within particular world religions as: Buddhist, Islam and Christian. The focus is here put on the impact of the methodology of economics, which in turn impacts methods and theories of economics. The method applied to this research is a content analysis of the most important texts created within humanistic economics and directions of economics motivated by world religions.

Within the chapter the following steps will be conducted: firstly, the broad understanding of the concept of human nature in humanist tradition will be introduced, secondly this concept will be described referring to the main levels of the concept of human nature as worldview, social world, individual world. Thirdly, the concept of human nature will be analyzed in detail on its individual levels: body, soul and mind. In the last fourth step the influence of such understanding of human being on the methodology, methods and main theories within those denominations of economics will be discussed. In the conclusion part it will be evaluated if the main orientations of those schools of economics can be explained by the changed assumptions about the human nature.

2   General Characteristic of the Concepts of Human Nature in the Humanistic Tradition

The concept of the human nature in the humanist tradition has many common features among the diverse divisions of this tradition. First of all it should be realized that the humanist economics as a part of heterodox economics schools can be characterized by the more complex attitude to the concept of human nature. Heterodox economic schools are likely to refer to the natural environment (almost everyone), criticize the classical rationality, argue that egoism only characterizes

one among others attitudes of human being (often lower part according to humanistic economics), speak about values as important part of human decisions. Common for all heterodox approaches to the concept of human nature is as well the critique of economic man is directed against its descriptive value (there are empirical arguments saying that people act in different way), positive meaning (the explanative and prognostic power of models based on economic man isn't illuminative) and normative impact (economic man in its normative aspects lead people to unsocial behaviors).

Generally speaking, the humanistic economics (and so its concept of human nature) roots in the humanistic psychology. This is the paradigm of psychology developed as the counterweight to two prevailing paradigms of psychology (behaviorism and psychoanalysis) dominating the psychological thinking in the mid of the twentieth century. The major humanist psychologists like Abraham Maslow (1943), Charlotte Bühler (1971), Carl Rogers (1957a, b), Rollo May (1996, 2009) decided to ground psychological thinking on a completely different concept of human nature. In the focus of humanist psychology stays the person striving for the fulfilled life, for recognition and self-realization. In deposition of conscious behaviorism, but also by psychoanalysis, humanistic psychology perceives itself as the "third force" or "third stream" of psychology (Lück 2009). This can be characterized by following statements. Firstly, in focus stays the experiencing person and theoretical explanations and overt behavior are often perceived as secondary. Secondly, the emphasis lies here on human-specific characteristics such as the ability to choose, creativity, value-setting and self-realization—as opposed to a mechanistic and reductionist conception of man. Thirdly, the selection of topics and research methods depends on the criterion of meaningfulness—and not the objectivity. Fourthly, a central concern is the maintaining of the value and dignity of human beings, and the interest is in the development of every human being inherent powers and abilities (Bühler and Allen 1982).

The basic beliefs of the humanist psychology—especially those, that the man is inherently good and has self-healing powers (Rogers 1957a), strives for a fulfilled life (Bühler 1971) and for self-actualization (Maslow 1943), are typical of the pluralist American society in which the creed that the individual human is striving for happiness, is anchored in the constitution. Humanistic psychologists methods rely explicitly and implicitly back on older approaches. Striking is the use of phenomenological methods, such as those developed by Husserl (2012), Lipps (1907, 1965). The humanist economics (Schumacher 1973; Lutz and Lux 1979, 1988; Daly and Cobb 1994) overtakes the issue of human needs as differentiated from human wants from the humanist psychology and put in the focus of its analysis. The basic model of human needs is provided by the humanistic psychology. One if its representatives—Abraham Maslow developed model of human needs—the well known pyramid of needs (Maslow 1943). This model evaluated into a model accepted than by the humanistic economics and is known as the 'dual-self' (Lutz and Lux 1988, explained later in text).

The economic actor is not just an individual maximizing utility separated from the social context, but a person with definite social needs, which the economics as a

science cannot afford to ignore if it has to play a role in solving social problems and enhancing the quality of life. In other words the humanism put the whole person in the centre of study ('the proper study of mankind is man' and 'man is measure of all things', Pope 2014). Humanistic economics perceives itself like an attempt which "seeks to restore the person in economics to its fullness and wholeness by recognizing another class of motives, and then to derive an economics that is in accord with this wholeness" (Lutz and Lux 1988, p. 18). Lutz uses a metaphor for this image of man comparing him to a building and states: 'the building that is man not only has a basement but also an upper floor', and the man can make decision, choice where it want spent his time (Lutz and Lux 1979).

People are perceived as living in a social world, continuously surrounded by a dense web of interpersonal relationships, of which they themselves are part, acting an reacting (Lutz and Lux 1979). The humanist beliefs about the nature of person (human nature) start with the critics of the existing beliefs. Therefore humanism rejects the idea that the person is a blank slate, which has no inner nature or exists only as a raw material for the forces of society do design and shape. It rejects as well the belief, that human nature is abused on selfishness and acquisitiveness, without making a distinction between the lower and higher human tendencies. Without this distinction the values are eliminated and then we don't have a scale for comparison and stripe human beings of their prime humanistic features. Humanists believe that altruism and the qualities of giving are at least as fundamental. Furthermore the humanism put an emphasis on the growth and the development of human potentialities. The growth is perceived as the emergence of positive and creative qualities in people, which lead people to better self-knowledge, and the continuing refinement of their values and preferences. The focus on the growth of human being has an impact on the way, in which the humanism perceives the society. The society and culture according to humanism is permanently growing and evolving.

For humanist economists the time and changes over time play as well an important role for understanding human behaviour and human institutions. Such a view differs a lot from a vision of society delivered by mainstream economics, which perceives the society in a static way like the elements of an engine. Human being is perceived as an ethical one, which is keeping to values. It's assumed that there are basic needs, which shall be satisfied. These needs are not always showed by preferences like in neoclassical economics assumed. They are derived from other discourses mainly philosophical and ethical! These fundamental needs are human rights, human's dignity, equality, freedom, and economic democracy and economic stability. Therefore this image has a normative role as well.[2]

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[2] In this context Lutz refers to 'reflecting mirror effect', where society reflects back to economists the very same self-interest images that economics have passed on society.
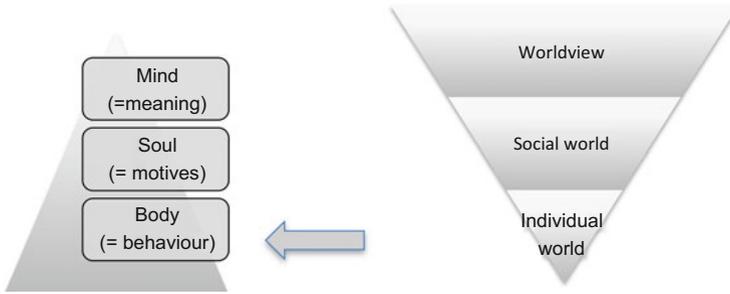
Fig. 1 Levels and dimensions of the concept of human nature

3 Basic Levels of the Concept of Human Nature in the Humanist Economics: Worldview, Social World and Individual World

As it was discussed in the introduction, the concept of human nature has different levels and dimensions, which build an integral view on the human nature. Those are presented on the figures below (Fig. 1).

3.1 Worldview

The first level of analysis is the macro-view on human nature, which has to give an idea about basic relations of human being to the natural world and supra-natural world. This worldview is characterized by an anthropocentric view on the world. The person is in the centre of the world, and the world is the reflection of a person. This doesn't mean that human being is the most important or most powerful being, but only, that looking on the world we view it from the perspective of the human being. The relations of human being can be depicted radially, like the best known presentation of the picture of Leonardo da Vinci of human being in a circle and his perfect measures being measures for all other things (the principle of 'homo mensura'—as formulated by Protagoras, see Platón and Guthrie 1961). Human being as the measure of the natural and supernatural matters, and for good and evil "*homo boni mensura est*" (man is the measure of the good). Furthermore the evolution of society and culture is assumed. Characteristic for the worldview is as well the special concern about the harmony with God, people and nature. This can be ensured practically according to humanist economists by a greater focus on the local community. The task of the world is to support the development of human as individual, as a part of the society and human race.

World religions discussed provide in their worldviews the basic answers to the relation between human and nature and human and supra nature. In the following

section the relation between human being and nature will be discussed and later between human being and super nature.

This attitude is well compatible with ideas developed by Buddha, where all philosophical and religious considerations start by a human being self (which is because Buddhism is a religion without God). Even if the individual is in the focus of the analysis doesn't mean that other parts of the world are subordinated and therefore diminished or misused. Even if the individual is in the focus of the world, it never happens on the cost of the society. The compassion for other beings is the force, which doesn't allow human being using others for own interest or using nature for own profit regardless a risk of destruction. In Buddhist tradition it takes a spiritual form of compassion directed not only to other human beings, but as well to the nature. This rule prevents hurting any living being (plant, insect, animal, or human). As soon as there is no hierarchical thinking, characteristic for Human and Christian tradition, the rights of nature have to be respected in the same grade as those of humans!

The central role of human being can be as well presented in the form of Ladder of Beings or Chain of Beings as the Christian tradition does, basing on the ideas of Thomas of Aquin, later developed by different authors (see Lovejoy 2011). The human being is, as the creation story says, the last and best part of the creation, the crone of the creation, which can't exist without the Creation (Nature) and without his Creator (God). His relation to the nature has to be similar as the one of God to human being guided by love and responsibility (Horodecka 2015). Adam is made responsible for the nature shortly after his creation by God and after being given the world subdued (Gen 1: 28 in. The Bible, Nelson 2009). However his ruling over the world has to be subordinated to the moral law. Breaking this law results in a devastation of whole creation (Noah story about the flood and later stories which can be found by Prophets are the proof of such perceived connection between the natural catastrophes and bad moral behavior).

Islamic tradition presents an attitude to the position of human being in a less central way than Christian tradition does. The human being is a part of the creation, and although it has a special role, its special role in the world is due only to the fact that he is created on the image of God. His position is only so high as he relates to God, as soon a man's origin is very inferior he is made out of a clay[3] (Qur'an, 32: 7–8, see: Ali 2004), in a similar way as in the Old Testament, Genesis. 2:7[4]). Islamic Economics is basing on the image of human nature, who is subordinated to God, and his Law. His relation to the nature is deduced from Quran as well. Human being has custody over the nature. It means that he can't use this nature completely

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[3] Who perfected everything which He created and began the creation of man from clay. Then He made his posterity out of the extract of a liquid disdained. Then He proportioned him and breathed into him from His [created] soul and made for you hearing and vision and hearts; little are you grateful.

[4] Then the LORD God formed a man from the dust of the ground and breathed into his nostrils the breath of life, and the man became a living being.

free. The nature has one function under many, to serve human being, but it is not the only function. Human being has to treat it carefully and resist any waste.

In monotheistic religions there is a little problem which makes it more difficult to respect the nature: the monotheistic religions separated themselves from seeing God in the Nature, as it was in 'pagan' religions, for instance in Judaism, its visible if we look at Genesis 1: the author avoids name sun, moon, because they were assigned to different Gods, and the author speaks of light (big and small referring respectively to the Sun and the Moon). As soon nature isn't something holy, it is subordinated to the man in many creation poems in Judaism and Islam. This is a custody, which can be interpreted, that human being shall care for the environment and not only use it.

Within this section the second basic relation will be discussed, namely the relation between human and God (or other supernatural powers).

The relation to supernatural powers is especially viewed in the world religions but as well in humanist psychology (transcendence of own nature through love, see Maslow 1969). Most of all it takes the form of a prayer or meditation each person has to absolve. Some prayers and meditations serve for the community sustaining, and are discussed later in the social world. They give a human being a possibility to look into their own heart and reflect their behavior, motivation and further directions in lives.

In Buddhism the practice of meditation is very deeply developed and build a basis of spiritual praxis opening the way to overcome the suffering nature of things. In Islam the duty of prayer builds a main pillar of five pillars of the religion. The acts of worship like prayer remind a person on his/her place in the world in relation to God, it has an important psychological effect on human—providing him/her with the sense of security and enables to release all troubles. The prayer in Judaism, Christianity and Islam is an act of removing him/herself from the centre of the world, and take the perspective to one's life, as one among many, and as one who is subordinated to some higher and perfect order, what can console people experiencing in their daily life so many imperfectness. By praying people realize their social and moral trespassing and can correct them. By this self-reckoning they can rectify wrong thinking and behavior. In all monotheistic religions you have first to put in order your social trespassing against neighbor and then pray (in Christianity see for instance: Matthew 5: 20–26, Nelson 2009). In Islam it's believed that Allah can forgive all failures against him, but not against other people, they have to forgive you first, before God can. This teaches people such an important social rule as: asking for forgiveness. In this sense says El-Ghazali (1994, p. 56) "Recitation of Qur'an for peace of mind and elevation of the soul; counteracting the evil desires of the heart, for enhancing self-control in conformity with Allah's commands, patience, satisfaction, modesty and correct behavior". A similar motivation we can find in other religions—reading sacral texts are stressed not only in Christianity, but Judaism, Hinduism, and Buddhism.

The fasting, which is practiced in all other religions, enables people to strengthen their character. In Christianity, Islam and Buddhism it's practiced at times usually common for all members of the community. It teaches a very important virtue

found by Aristotle, the 'moderation', which we find in Judaism and Christianity (fasting is part of a moral codex of Christian tradition). In Buddhism monks are even forbidden to eat after afternoon, in order to practice self-control and independence. Hindu traditions are enhancing fasting as a remedy for purification of mind and body. Gandhi mentioned often his mother praying and fasting before each more important decision and even in the family. Later Gandhi himself has used this instrument very often.

3.2   The Social World

The social world in humanistic human-and worldview bases on some deeper values, meta-rules, like for instance on the solidarity. The solidarity takes different form within those diverse traditions. In a strict humanist tradition it is a part of one level of human needs (referring to the Maslow pyramid)—the acceptance and the belonging to the society. The relations in the society should base on the mutual respect and although they shall serve the development of the individual, they can't be developed on the costs of the society.

   The major monotheistic religions Christianity and Islam having their roots in Judaism consider the role of the community as very relevant and they develop many rules and norms of living together. The ecclesia (Church) plays especially an important role in the Catholic Church. In Islam—the community called the ummah has as well a special position in the understanding of the religion. In Buddhism the believers build a sangha. In Buddhism the community—sangha[5] has (similar to the Catholic church) two forms: a narrow and a broad one. A narrow one is built by monks and nuns living the ideal of Buddhism to full extent and respecting all disciplinary rules—vinaya, basic beliefs, such as the Threefold Refuge and the codes of conduct. The broad one understanding of sangha refers to all people following the teaching of Buddha, who aren't expected to follow all of the rules, but only selected. In turn they support monks and nuns with food and during and thus enabling the first one group to survive. Similarly in the Catholic and Orthodox Church (and in smaller extent in Protestant churches), where the community rules are enforced much stronger in communities like monasteries (orthodox and catholic) or congregations (protestant). Those rules imply on the participators the duty to care for each other. This form of help to others looks like differently for members of those narrow communities and for laic people. Laic have

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[5] Sangha refers to the Buddhist monastic order, which is traditionally composed of four groups: monks, nuns, laymen, and laywomen. The sangha, Buddha and the dharma (teaching) are part of so called Threefold Refuge, a basic creed of Buddhism. The modern sangha is governed by disciplinary rules (vinaya), which are part of a sacred canon. The monastic order is dependent on the lay community for economic support in the form of alms or large gifts of money and property, as soon as Buddhist monks (especially from Theravāda tradition in Southeast Asia) don't engage in commerce or agriculture.

their responsibility primary for family and then for other members of the society. The rules concern not only caring for each other for instance economically, or by helping in illness, supporting in problems, but as well makes possible to sense the community. The common rituals make it possible—by common rituals the community has a possibility to realize the existence of others in their diversity unified by a form given by the tradition, which may give some motivation to feel the responsibility. In Islam common prayers and pilgrimage provide this possibility. Further instruments influencing the motivation are the scriptures, which give not only rules but as well explanations often in a metaphorical way.

The practical engagement for the wellbeing of other takes place in all the mentioned world religions. Its ruled for instance by zakat in Islam, the religious duty to give alms especially in the Catholic Church. In Buddhism as well there are many rules concerning mutual help. In Christianity the responsibility for other takes different forms. By alms, the duty to visit poor and ill, engaging in different activities. Nowadays the majority of the help is institutionalized and financed publicly and by the members of the church (contributions, volunteer work). The pilgrimage to some holy places gives the further opportunity to get concerned about the community. They provide the possibility to stay with other people regardless a social class, work and private interests for many days, united in a goal lying behind an individual utility. It gives people a basic possibility of 'vacation', a time to depart from the everyday business, everyday life, responsibilities of this life, and troubles connected with it, and to do something with other people than only neighbors and friends. Furthermore it gives to the participators the sense of unity regardless differences (different people are pilgrimaging to one place). Moreover it includes the possibility to experience a cultural exchange, gives new insights for a life, time for practicing altruism, prayer, fasting, all important virtues, and is of course important socially (living in a community with others) and spiritually (prayers). Different feasts during the year provide a further chance to give help (packages for poor families for instance).

Summarizing the religions impose on their members the duty of helping each other by influencing their motivation (emotional level by doing things together in form of a cult, and by explaining it through metaphors) and by specific rules (zakat, alms).

3.3   The Individual World

The humanism perceives human being as a complex being who can't be reduced only to the body-level or to a material sphere but encompasses as well the emotions and most of all mind—an important level for a self-realization enabling human being to transcendent him/herself. It's assumed generally that human beings search for the self-realization and that there are some ideals to which the human being shall pursuit. The next section of the chapter gives more detailed insight into this level of the concept of human nature.

4 The Basic Dimensions on the Individual Level of the Humanistic Concept of Human Nature: Body, Soul and Mind

As mentioned before, there are three basic dimensions of the individual level of human being, which can be referred as body, soul and mind. The body refers to the human behavior, the soul—to various motives guiding this behavior and the mind—to the meaning, ascribed to different motives, providing human being with the orientation, allowing to choose among different motives.

4.1 Body

Generally speaking, the body-level is perceived positively, in a whole human tradition. Religions are at different times during the history interpreted differently. Sometimes so, that it was quite contrary to the humanistic thought, especially in Middle Ages, with some abuse of the body. For the whole humanistic tradition the body-level is subordinated to the higher instance—the soul and most of all to the mind. Generally the body-level can be perceived as a system, which can develop itself fully if it is governed by higher instances. This means that it is valued to be able to manage own requirements, needs, and desideration in order to acquire higher goods. In Maslow pyramid it's explained that those lower needs have to be fulfilled, but there is no much sense in focusing only on them. After they have been satisfied (similarly Herzberg 1964; Herzberg 1966), they can't motivate us anymore and consequently human being has to pursuit for higher needs like self-realization and transcendence.

In the Buddhist tradition the human being has to behave according to the right motivation, it means that he/she has to subordinate body to the right will. Therefore human being doesn't have to move to extremes, neither to the bad ones nor to the good ones. Very extreme feelings have to be calmed and bound in order to act/behave properly. In Christian is similarly to the Jewish tradition made created from the body and soul (in Judaism—understood as breath of life,[6] in Christian: the immortal soul). Christian tradition provides as well insights how to behave in a just way. Human being needs this advice because the nature alone is neither naturally good nor bad, but needs guidance. The ideal of goodness of the nature is believed to be in the beginning, and is visible in the story of Paradise. On the same time it constitutes some ideal as well, which the nature has to aim. This is visible in the Prophetic stories of Old Testament and in the Evangel—where the Kingdom of God is proclaimed. In order to acquire such a pre-natural, naïve state, the human has to

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[6] Of course the understanding of this concept changed over time, a mentioned understanding may be considered as one dominating.

work on him/herself and reflect his/her behavior. According to Islam, humans are constituted from body and soul (see: creation of Adam). The soul is responsible for giving life to body and derives feelings, fought, behavior and volition of human beings. The soul is filling and occupying the body. In Islam the tradition impose on all believers watching own behavior in the light of Qur'an. Therefore reading Koran is so important, to be able act out of this motivation and not out of temporary wishes and wants. The ritual of prayer five times per day and of reading and memorizing Koran is an instrument to bound temperament.

4.2 Soul

The level of a soul is referring to various motives, which humans have. In all humanistic traditions it is mostly referred to values (and virtues) and needs, which are source of motivation, which leads to particular behavior. The values and needs are interdependent and they are assumed to have a hierarchical structure (Lutz and Lux 1988), which helps to solve conflicts between the values. For instance persons are guided by the self-interest and by the social interest, which have to be put into balance. The basic value is a life, which enables human being approaching a self-realization.

The soul-level a motivational level of the persons and it looks differently in all the religions but they have much in common. The image of person suggested by the humanistic economics is characterized by recognizing two kinds or duality of motives in human beings. This perspective matches not only common sense but was acknowledged throughout the ages (Lutz and Lux 1988). The human being is not just individualistic and selfish but altruistic and a social as well. A mutual interest side complements a self-interest side. Humanistic economics stresses the importance of ethical individual living within a local community. In other words—the image of man created by humanistic economics seeks not only advantage, but also the truth and the fairness (Lutz and Lux 1988). The relationship between those two basic kinds of motivations and the often necessary trade offers or compromise between them and sheds a new light on the whole range of economic phenomena (Lutz and Lux 1988).

The Buddhist tradition differentiates in human being two factors influencing his behavior—the orientation on getting more pleasure (*tanha*), and orientation on getting more of wellbeing (*chanda*), see: Table 1. Tanha leads us to unhappiness

Table 1 Tanha and Chanda in Buddhist economics

	Tanha	Chanda
Desire	For pleasure objects	For wellbeing
Based on	Ignorance	Wisdom
Satisfaction (example)	Eat for pleasure	East to nourish

Source: Based on Payutto (1994)

and *chanda* to real happy life. The core idea is that by getting knowledge we learn the nature of things and can differentiate the motives in our behavior—tanha and chanda, by choosing behavior directed by chanda we can reach happiness. The behavior resulting from chanda is not self-centered but open to other people, to the environment, to values. Behavior resulting from tanha is self-centred and leads us to conflicts with other people and is destructive for a whole society (Payutto 1994).

The human being according to the Christian tradition is guided by different motives, which roots in either good or bad powers. There are two possible ways of argumentation in the Bible—something is good, when it brings good fruits, and bad, when it carries bad fruits. This way of thinking was relativized before in Job-book, where the 'Tun-Ergehen-Zusammenhang' (act-and-consequence connection), is criticized. In the temptation of Jesus by Satan as well, we see that good results aren't sufficient (Satan promises good things to Jesus). Similarly to Buddhist tradition, they have to come from the right motivation. Often there is a conflict of different motives, and we need to have a higher instance (like a mind) to be able to decide, which of those motives is most important, and the right one. In order to hierarchize the diverse motives we have, it is not enough to take the catalogue of values and needs, but the conscience has to be asked as well.

The Islam assumes that a human being is led by diverse motives: bad and good ones. The cardinal virtue, the good motive is that one, which helps a human being to combat the bad one—which is the pride. The pride leads the human to disobey God and breaks the unity with God, which leads then to the unhappiness, and misery, what this is visualized by the story of Adam fall (Qur'an 7). Although humans aren't sinful by nature, they remain vulnerable to temptation, so that they have to choose between different motives and follow those, which lead them to the 'God's path'. Although it is believed that humans are able to be as well good as bad, similarly to other humanist tradition it's maintained that humans have a more prevalent strive to the goodness, because of the Fitrah—a God's substance, which enables a human being to open himself/herself on the truth of Gods existence (Qur'an, 30: 30). Islam shares with the rest of the humanist traditions a belief in free will (Qur'an, 18: 29). Similarly to the promises in Old Testament (discussed before in the context of the Tun-Ergens-Zusammenhang concept in the Jewish tradition), in Qur'an as well is assumed that, if a human being follows God's path, it will cause for him many spiritual and material blessings as wealth, success, and respect in the community. Moreover it will cause a blessing to others.

4.3 Mind

The humanistic tradition perceives a mind as the rationality oriented on values, or as the spiritual power. It is a place, where decisions are eventually taken after reflecting many different values. The ultimate goal of human being, which has to be realized and which is considered as an ideal, is the self-realization and the self-transcendence.

Within a humanistic tradition the mind is supposed to serve as an instance helping to choose among various values and needs the right value or need, which has to be realized. Acting out of this knowledge depicted in Maslow pyramid, the human being has to allow him/herself for satisfying basic needs in order to be able to pursuit for higher needs. This on the first sight may be opposite to the practices of self-constraint, which are practiced in many of world religions. But the humanism as well maintains, that lower needs have only to be satisfied in order to reach the higher needs. Therefore there is no sense in over-satisfying them, and self-constraint in this matter make it easier for the human being to reach the higher state. The decisions, which motives and needs shall guide our behavior are in their core ethical questions. Therefore moral dimension in human being (Etzioni 2010) and ethics plays a central role in the humanistic tradition. The humanistic ethics is oriented very strongly on virtue ethics looking for their sources in the antic times (Aristotle), or the conscience ethics, and not so much on the utilitarian one. Therefore practicing virtues in a process of education play an important role. They help us to choose in fact those goals, which are most important for us, and eventually to approach the Good. For humanistic tradition and monotheistic religions, the human being is a person, which has an active role in developing life on earth.

The ethical value of behavior in Buddhism can be judged by whether it is motivated mainly by *tanha* (by ignorance) and *chanda* (by wisdom). So an economic decision motivated by greed leads to behavior, which is morally unskillful. On contrary an economic decision motivated by *chanda* leads to a morally skilful behavior. Each of economic activity is perceived as means to a good and noble life. Production, consumption and other economic activities are not ends but means! And they should lead to wellbeing within individual, society and environment. The purpose of wealth is to facilitate the development of highest human potential. This goal should be seen in a following context: there are three goals in Buddhist life: initial, medium and ultimate goal. The initial goal is to acquire reasonable material comfort and economic security. The medium goal refers to the mental wellbeing, and eventually the ultimate goal promises the inner freedom. That means that economics is only an instrument for higher ends and should not interfere with higher goals. A negative example would be here the over-consumption.

The Christianity encourages here in order to lead the virtuous life and pursuing of development, the analysis of conscience, which is practices during acts of individual prayer. In the Catholic and Orthodox tradition the role of penitence act and spiritual exercises is much higher than in the Protestant Church, where the praxis of speaking about once questions of conscience aren't so popular.[7] The conscience is an instance, which helps human being to look on own movements of heart, situation, other people, knowledge in order to decide, what is right and

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[7] For instance, the act of penitence as the sacrament doesn't exist in the protestant church. Protestant teaching encourages much more to look for the perfection within everyday doings like work for instance.

what is wrong. The conscience is more a practice of virtue than knowing the Law and Rules. Although there are ten Commandments, the Christian Law of Love to other persons and to God (see: Matthew 22, 37–40, see: Nelson 2009) (with Judaist roots, see: Deuteronomy 6, 5, see: Nelson 2009), the eventual instance is the conscience.

In Islam, there is an instance, which is common for all people. This is Allah, who sets a moral order, a Law common for all people. People have to follow this Law, which has to provide people in the better orientation within their lives. This is taken as an advice in order to be able to distinguish between different motives, human have. Besides, in order to distinguish between different motives human being has been given by God there divine gifts like intelligence to distinguish the true from the false, a will that can freely choose between them, and the power of speech to worship. Those gift which can be considered as a mind-level, distinguish human being from the rest of nature. This true nature to which human beings strive is the fitra, which enable human being to believe in God and follow his revealed path, which shall bring them to live in peace and harmony with God and with all creation. The man is considered as the principal agent for developing life on earth. Similar to Judaism and Christianity in Islam as well, human being is the crown of the creation because of those gifts. The society can develop if the mankind develops. For choosing the right path human being uses as well the knowledge, which he has been given by Allah knowledge. But this knowledge about humans own soul is limited ["A mankind has not been given of knowledge except a little" (Qur'an, 17: 85)]. Therefore human beings aren't able to discover the secrets of a soul, neither in everyday life nor by a science. Therefore the submission (Islam) is so important—giving a human being the access to unlimited knowledge revealed by the God's Path—Islam. The concept of the Fitrah explains how and why it is possible.

In order to develop human being—a man needs not only cover his material needs but the psychical and spiritual as well. For this he needs education. Education takes a central role in other religious and humanistic traditions. Education has to pass not only skills, but moral competences as well, which may result in leading a good life. This aspect is stressed especially by world 'ethos' (Funkhouser 2000) program nowadays,[8] appealing to main features of all religions, necessity of dialogue and mutual respect as a most efficient way for solving political conflicts (Spaemann 1996).

In Islam education encompass a very various range of skills, and attitudes, which attempt to help to lead a life in every aspect. Similar practical advising we will find in Confucianism, but as well in Judaism, and Christianity. Often there are more general rules for most of people, and strict rules, which find application for a specific form of life like monks and nuns in Buddhism and Christianity. In Christianity more strong and specific rules concern monasteries, and communities (the former can be found as well in Protestantism). In Islam and Judaism there are no

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[8] http://www.weltethos.org (13.03.2015).

monasteries, therefore strict rules are applying for all aspects of family life, like food, praying, sexual relation, birth and death.

Leading a good life means realizing some values and virtues. Those values and virtues we find in every religious tradition, each one is focusing on some of them stronger than others, but there are many in common. In Christianity there are basic virtues like love, hope, and belief, and in Buddhism those are: equality, reciprocity, compassion, concentration, meditation, mental development, discernment, insight, wisdom, enlightenment. In Islam those virtues encompass honesty, dignity, knowledge of one's rights and obligations, cooperativeness, self-sacrifice, altruism, love, sincerity, loyalty, etc. (El-Ghazali 1994). It's assumed that the man has good and bad drives, and he shall develop and enhance good, and neglect bad ones. Unrighteousness and evil behavior are perceived as being in conflict with the 'dignity of man', therefore human being shall abandon it. Education can be perceived as the way of strengthening good sides, and abandoning bad ones. The effect of such education process is self-control, modesty, thankfulness, contentedness, and contrite. Similar positive human attitudes can be found in other religions as well. In Islam there is a motivation lying behind this way—it's because of good life (For those who adhere to their faith and do what is good, Allah has promised a good life). This relationship between good works and good life is visible in many religions, but in Judaism this mentioned act-and-consequence connection is relativized by Job—story, when the good and brave Job is ruined by God, not for any bad deeds. Moreover the reason for such a treatment isn't explained. The bet with Satan is only a superficial plot of the story pointing to the random character of the bad and good things in our lives. This true 'for' is maybe realizing that the true life is actually much deeper, and this meaning is revealed by the last scene, in which God points to his acts as creators.

In Christianity although good works are so important, the Christian should not expect reward on the earth—on the contrary, that will be persecuted and excluded, and will suffer like Jesus. The true reward is in the deep dimension of life, which is called 'Heaven kingdom', which is traditionally expected at the end of the days. In mystical traditions it is 'here and now', and approachable by the deeper insight into the true reality. In Hinduism and Buddhism the explanation of difficult things in life is explained not only by the deeds in this life but in the previous one as well. In Islam the human being is free to choose good and bad life. A similar premise is characteristic for the other world religions. The reward for a good life was discussed in the previous life. The ultimate reward is the Paradise in Islam and Christianity, whereas in Asian religions like Buddhism, Hinduism it is being out of the circle of beings. The punishment in Christianity and Islam is the hell, and leading a life in a next life, as some lower in hierarchy of being living being—Hinduism and Buddhism. It affects as well our current life as well.

All of those religions discussed share together with other religions some basic values. A discovery of common characteristics among those religions could be helpful for solving many unnecessary conflicts, which occur within local and national communities and ensure global peace. Peace and social harmony are considered as major societal and economic goals, enabling individual development.

The Parliament of World Religions provides such a common platform for exchange among the world religions. This institution aims to solve the contemporary problems in the politics and economics by providing mutual understanding between world religions. World religions are working together in the Parliament of World Religions, which is a platform for speaking about common values and common ideas being in each of religion, which can be eventually a basis for thinking about economics. Actually World Parliament aims to solve basic problems people have in the worlds combatting fundamentalism. The similar concern is introduced by the Weltethos project, which aims to work out basic values and norms for all societies. They could be a basis to solve problems, companies have. This program of Weltethos (started back in 1995) is concerned about a new concept of human nature, which bases on basic values. Those values can be and have to be taught in the education process. This started to be put into praxis, by for instance building a first school working under such assumptions.[9] The basic goal of the world ethos is to ensure a constructive coexistence of people. The basic way to do that is sharing basic values. Values are not more a matter of private preferences but a matter of survival of societies. Therefore they had to be taught and executed in the family, at schools, in organization and in the society in general. World ethos project (German: Weltethos) is stressing the fact, that nowadays in the Internet era, of global politics and economics, and increasingly multicultural societies, we need a basic consensus on values and norms, which applies regardless of culture, religion or nationality. Such an assumption that there are such basic norms and values regardless cultures, religions and nationality—is a central thought of humanism. This idea has its roots in the empirical researches conducted by Hans Kueng, who discovered that regardless a world religion and in all philosophical-humanistic approaches there are basic ideas of values and moral in common! The example is for instance a Golden Rule. Other shared values and norms are for instance: treating other respectfully, the lack of violence, justice and sincerity, and partnership between men and women. Within this project it is assumed that such a moral codex already exists has only been passed to the rest of the society by education. Its aim is to make sensible to basic common values in all parts of the society and in that way to build a basis for peaceful and respectful living together. This is possible only for culture and religions. A good start was made, when at September 4, 1993, 200 representatives of all the world religions have signed so called "Declaration Toward a Global Ethic" naming basic elements of a common ethos: the principle of humanity, the "Golden Rule" of reciprocity, and the "four immovable transfers": lack of violence, justice and sincerity, and partnership and equality between men and women.

In order to reach those values people have to be aware of them and pass them, so that they may be lived, what can be ensured by: (a) Dialogue of religions and cultures, especially the knowledge of similarities in ethos, (b) Cross-cultural values education; (c) Ethical and intercultural competence in business enterprises; (d) In

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[9] In July 2014 the first elementary school in Germany was grounded which bases on the ideas of Weltethos.

law and ethics enshrined international policy cooperation and integration instead of military confrontation. Those goals were adopted by the Global Ethic Foundation for intercultural research, education and encounters founded back in 1995.

5   The Impact of the Concept of Human Nature on the Methodology

In the following section the influence of the concept of human nature on the methodology will be discussed. Firstly, it will be explained how the methodology of economics is embedded in the philosophy and what is its connection to the concept of human nature. In the second step the influence of the particular concept of human nature—the humanist concept of human nature will be presented.

The methodology is a fundament of the economics, and is derived from philosophy of economics (Hardt 2013a, b), which in turn has its foundation in philosophy of science derived from epistemology and then from philosophy (Fig. 2). The concepts of human nature can be considered as part of the philosophy, as soon as a philosophy deals with providing major metaphors and concepts for understanding the world, and human nature in general.

The main task of the methodology is to provide a general research strategy or constructive generic framework. Furthermore it includes the analysis of principles, procedures of inquiring in a particular field. It encompasses a set of methods, rules, ideas that are important in a science or art and a design process for carrying out a research.

The main concern of the following abstract lies in showing, what principles and procedures are central for the humanist economics and why they are impacted by the concept of human nature. To answer this question it's necessary to look as well on the main philosophical ideas that provide a fundament to the economics (philosophy of economics) and philosophy of science in general. Then it would be answered what kind of methods are preferred due to such an orientation.

The general humanistic approach to the economics is focused on providing answers to problems, which the society is facing. Furthermore it searches for the possibilities to create (by the means of the economics) such an environment for the individual and society, which would be helpful in developing their potential. This means that the main approach to economics is a normative and pragmatic one, which differentiates it from the neoclassical economics' approach, which has primary a positive and theoretical character. The normative methodology means that in first place the economics bases on some a priori central values and norms,
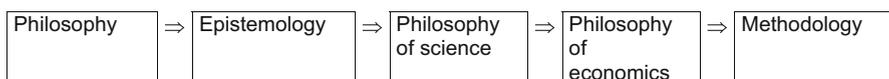
Fig. 2 Embedding of a methodology. Source: Horodecka (2012)

and secondly that it understands its task as advising the policy, the enterprises and the individual.[10] This normative view on economics is not something new but like humanist economists stresses, is something, which the economics has have always been experiencing since their early beginnings and which took later a form of the political economy in the classical thought. This attitude is seen as well by antic economics discourse made by Xenophon (430-c.354 BCE) and later by Aristotle (384–322 BCE). They as well were looking for 'normative' advices of economic actions in order to govern a household in a proper way. The proper way was a way which promised the eudaimonia, what meant that it wasn't only oriented on the end effect of the action but as well on the way to approach it (virtuous one).

Therefore, it won't wonder, that the humanistic economics is as well getting a virtuous character (Nida-Rumelin 2011; Horwarth and Frei 2012). This characteristic of the methodology is a revival of the ideas presented before by Macintyre (1981), Mccloskey (2010) and Sen (1987). In which sense it is the methodology? In that sense, that firstly the phenomena aren't reduced to a materialistic surface, but are observed in the context and secondly they are always combined with the virtues. Virtues are manifesting itself in the behavior and in the reasons for behavior (motives). The pragmatic character of the humanist economic methodology can be seen in a fact, that it is less concerned with formulating ever-lasting laws of economics, but much more with practical problems and matters facing the society currently and within a particular cultural context.

The humanist economics bases on two main methodological principles: the first one concerns human needs, and the second one the life. According to the first principle human needs stay in all their specific understanding (explained in following abstracts) in the focus of the analysis and it is assumed that people have to have a right to satisfy their needs. Such a statement reminds of statements made within politics, and so on the classical origin of economics considered as political economics. Moreover it's worth to say that such normative declarations have found its way in some constitutions, like for example in the US one—in which the right to pursuit a happiness is normatively guaranteed by the state.

This normative statement imposes on the economics a completely different task and attitude as the neoclassical economics does. The neoclassical economics doesn't definite welfare as a task of economics but more as a necessarily (nearby deterministic) outcome of the sum of individual's actions oriented on maximizing the utility. Because humanistic economics doesn't believe in market forces so blindly as the neoclassical economics does (nearby in the ideological way), it has to give back the power of organizing economic life away from 'forces of market' to the deliberative decisions of the polis, society, community and individuals.

Another methodological aspect of the needs is the assumption that they are a main fundament for our values (Lutz and Lux 1979). The values are main forces, which motivates as to undertake particular actions. They have been analyzed in the

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[10] There are three main levels of the economic relationships which are as well used in the 'business ethics' (or 'economic ethics'—in German: Wirtschaftsethik).

proceeding sections. The topics of the needs bring us further to the reason for different methodological attitudes of the humanistic economics. In difference to the neoclassic economics, the humanistic economics' central core is the humanist psychology. The humanist psychology of Maslow and Rogers (Maslow 1943; Rogers 1957b) is responsible for placing needs in the focus of analysis, as well for the ascribing to the humanity the right and the task to the self-realization. Moreover it is the reason for the sceptical attitude to 'objective' and 'mathematical' tools into approaching the reality. This cooperation of the economics with the psychology and other social and cultural sciences makes the humanistic economics and its methodology very interdisciplinary one.

There is another aspect of needs, which is essential from methodological point of view and inevitable for the conceptualization of the consumption. This aspect is the difference between needs and wants. The task and function of the economics according to humanists is covering of needs and only needs. Wants are perceived negatively as an unnecessary and even negative part of the consumption. Whereas the neoclassical economics melt both kinds of the consumption and perceive all human choices (preferences), which can take a form of wants or needs as something, which by definition causes the growth of welfare. The neoclassic economics assumes that what people choose counterparts their true preferences.

Another central principle, on which grounds humanistic economics is the life. The life is source of other needs, and leads to the values discussed before. Valuing life as a central category means that the dignity of human being will be perceived as a crucial norm and value for all. It means that such a philosophical concept as a consequentialism and especially its one form utilitarianism can't be applied to the economics, as the neoclassical economics does, which takes utilitarianism as its philosophical basis. Instead of this, the humanist economics stays closer to deontology, looking for norms, attitudes, motives, intention, basic convictions, which shapes/or shall shape human behavior. Looking on the life as a main and ordering principle leads to some further principles as the complexity and the balance. The life compounds those two principles as soon as it is a highly complex phenomenon on the one hand, and on the other hand bases on the idea of a balance.

The complexity means that not only a human being, but also each economic phenomenon is perceived in a complex, non reductive-way way, and shall be analyzed taking into account its different aspects. The principle of balance demonstrates itself in the view on the economic growth and the development for instance. Whereas the growth has only a quantitative character, the development has both aspects—qualitative and quantitative. The development means that all parts of the society, and all parts of the individual grow and develop in a harmony. On the level of society it requires for instance social justice.

Another central novelty of humanist economics is its attitude to work (Schumacher 1979; Sennett 1998) and workplace (Restakis 1991). This attitude roots in the previous principle of life. It is in so far a methodological principle, or even a paradigmatic one, because it influences the way of perceiving a crucial economic production factor (like the neoclassic economics expresses it) and crucial economic activity. The humanist economics perceives work as something which is

done not only because of its extrinsic value, as bringing income for instance, but intrinsic as well, allowing human being for self-development and in effect for the self-realization or the self-actualization. Therefore not only the way of perceiving work has a meaning, but work will be as well a focus of the field.

In general the humanist methodology is basing on the principles of scientific realism (assumption that the analyzed objects exist independently of the researcher). Not all assumptions made within the humanist methodology can be empirically proven. There are some assumptions taken about the nature of world, and about a human being, which have a metaphysic nature. Opdebeeck (2011) explains this referring to the works of Schumacher (1973, 1977), and differentiates between classical sense of science characteristic for humanist economics (streaming for Truth, Goodness and Beauty)—so called 'science for the insight', and between the 'science for the sake of usefulness/power', oriented on the principles developed by Bacon, which is the casual understanding of contemporary science in Western civilization. Such metaphysical nature have the assumptions, that the human's goal is the self-realization, or the self-transcendence—uniting with some 'Self', or the existence of God in religions, or stream of consciousness in Buddhism. This is an important methodological issue, because it puts on the cognition map of the economics other concepts, which are then used to explain the economic processes. Whereas in the neoclassical economics the egoism/utility and the efficiency are dominating categories in explaining of economic facts, in the humanistic tradition this function plays the self-realization of persons and societies.

The whole humanistic tradition is united in its attitude to the science. The science is considered as necessary and the humanist tradition is full of a cognitive optimism. However the science is not a goal in itself, the end is as well important. It's assumed that although the outer-world can be discovered and analyzed, this doesn't secure automatically the wellbeing. In order to approach the welfare, the analyses of the outer-world have to be accompanied by the discovering the inner world.[11]

Those methodological characteristics can be perceived as a result from the assumptions about the human nature. The consequence for the economics of assuming that human being has a free will to choose itself and realize its potential and has the right to do it, is its normative and pragmatic character, and considering 'the life'—as a crucial concept (together with the complexity and the balance). This central assumption about the human nature leads as well to the specific attitude of the humanist economist to the needs. As soon as all actions has to be valued, whether they help the human being in his/her self-actualization or not, and assuming that a human being has a free choice to be 'higher as angels or lower than beasts' (compare: Mirandolla 1965), makes it necessary to differentiate between wants and needs in economic decisions, which translate into a consumption pattern. As soon as the human being is perceived as a being, who chooses himself, and is realizing

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[11] Socratic virtue—self-discovering, or the inscription on the entrance to the temple of Apollo—'sapereaude').

Table 2 The concept of dual-self in the humanistic economics

Higher self	Lower self
Growth-needs	Deficiency-needs
Self-actualization	Ego-aggrandizement
Truth-seeking	Self-interest seeking
Reasonable	Rational (economic)
Principled behaviour	Instrumental behaviour
Altruism and love	Selfishness
Objective	Subjective
Transpersonal	Personal (individual)

Source: Lutz and Lux (1988), p. 17

and "getting" human through choices, not only the effects counts, but as well motives of action, and attitudes and so virtues are one of a central category when looking at human behavior and choices. The concept of the dual-self is the further step in understanding not only a person, but the methodology of the economics (Table 2).

The concept of human nature affects as well a new understanding of basic phenomena like work, which puts a completely new light on the phenomenon of work compared to the orthodox, neoclassical economic thought. Because the human being is a so central category for the understanding of the world, it can't be reduced to being only a part of a great machine as it is the case in the neoclassical economics. Neither it can't be reduced to a pure resource needed for the production. Therefore a person as an autonomous being can't be subordinated to the work. On the contrary an autonomous person uses work as a tool for the self-realization (in this sense again self-realization is a methodological issue, helping to understand and explain other concepts). The human nature taken in all its complexity can't be reduced only to one motive, but has to be at least perceived dually. This in turn leads to the differentiation between needs, which serve for the self-realization and wants, which even harm the self-realization keeping human being on lower levels. Assuming that human being is a person oriented on values and norms and who streams for self-actualizations means that the whole economic system will be perceived in this light, as serving or harming this goal. Therefore the methodology takes a normative and pragmatic strain. Perceiving human being in such a complex way requires from the methodology having an interdisciplinary character, which again is different from the neoclassical approach. The interdisciplinary character means above all the collaboration with cultural, social, psychological sciences in order to evaluate programs, and measures worth for application.

The character of the humanist economics methodology impacts on the methods preferred in the humanist economics' research. They are historical, as soon as economic institutions and processes are analyzed in their historical context as a part of historical development. They are as well hermeneutical, what means that the meaning of economic processes can't be understood only in an objective way, from outside, but it depends as well on the meaning assumed by individuals and societies. The last in turn is shaped by their experience, motives, and expectations. The

methods are as well organic, what means that the economic phenomena are always analyzed in their relation to others, are perceived as holistic phenomena. Moreover the methods roots in social sciences, which analyze the phenomena in their social and institutional context (see O'boyle 2005). Last but not least all phenomena and processes are perceived as part of existing institutional network, which requires using institutional methods to work on them.

Summing up, the humanistic economics is basing on the realistic view of the reality (dualistic one), but on the same time it is an ideal-streaming economics. The humanistic economics starts its discourse by having an ideal view of human being (virtuous, altruistic, streaming for self-actualization, or even for self-transcendence, see Maslow et al. 1966; Maslow 2013) and on the society (enabling human being for this development, supporting him). This ideal human being and society may be realized with the help of the economics. But in order to do this—the economics has to work with other disciplines, adopt as well their methodology and methods and understand its place as being only a part of other social sciences. The economics has on the one hand get back, and loose the exclusive right to speak about economic phenomena (share this task with other disciplines in mutual dialogue), but on the same time it has to widen its field by looking closer into phenomena behind the market, what means again the necessity to share and exchange methodologies with other disciplines. One of such important tasks behind the economics is advising the policy for social reform. The summarizing of the influence of the concept of human nature on the methodology is presented in the table below (Table 3).

The following section of the chapter provides a look on the different world religions traditions. Furthermore it discusses their attitude to methodological aspects. The repeating components, which are similar to those aspects examined

Table 3 Concept of human nature and economic methodology

World view		Social world		Individual world
Humanist assumptions about the human nature				
Human being is in the focus, homo mensura; harmony with the Nature (and God/religions)		Solidarity, mutual interest, the role of local communities, balanced development		Self-realization, free-will, dual-self, values-needs balance, consciousness, norms and values
Economic methodology (humanistic)				
Principles (life) and balance (justice) and complexity (holistic attitude)	Basic concepts (self-realization)	New understanding of basic phenomena (work, needs/wants)	Normative (virtuous ethical)/pragmatic,	Interdisciplinarity: psychology (needs, motives), history (historical—changing environment), culture
Methods				
Historical, cultural	Hermeneutical, phenomenological	organic	social	institutional

Source: own

above, will be discussed shorter. The chapter provides some examples, and concepts characteristic for each of religion. For all traditions is common, that they have a different attitude to methodological questions, as standard social an economic sciences. They focus more on the ethical behavior of human being as on other objects and results of those actions. This is more a deontological ethics, than a consequentialist, in which people calculate what are costs and what are benefits/ utility of the action.

Therefore the methodology focuses more on the right action in the economical context and reasons for it, like for instance basic norms, attitudes and values. It shall be explained why this is a correct way, showing as well positive consequences for the social world (which encompasses the economic system as well) and the ecological world. The methodology is focusing here on finding out methods, and attitudes and tools firstly for explaining the necessity of those rules (apologetic character, deductive) and secondly for looking for practical ways of employing of most important rules (inductive).

The religious oriented economic schools (as part of a humanist economics) differ from the general humanist economics because for the description of the world view and human view some specific religious language is used referring to some supernatural being or the consciousness. This causes as well some differences as well between those various religious schools, but there are some common features. This is for instance the conviction that a human being is viewed as responsible towards God (moral order), Nature, and other people for his/her life. Therefore most of those economics start with a premise of life, livelihood—as a central category.

The Buddhist economics (Schumacher 1973; Alexandrin 1993, Hattam 2004, Payutto 1994; Lennerfors 2013, Sivaraksa 2011, Mendis 1994; Zadek 1997) as well is oriented normatively and pragmatically. For Buddhism the respect for life is a very central attitude, and encompasses many norms (formulated positively and negatively), which could harm the human being in any way. Some of those rules are similar in the Judeo-Christian-Islam tradition, some even extended. They encompass not only forbidding of killing, stealing but as well oblige for instance to a friendly talk. A central concept is for economic thinking—the livelihood—one element of the Eightfold Path focusing on economic activities (of the second group, which focuses on ethical conduct and encompasses the right speech, right action and right livelihood). This explains as well, why work is treated here as a cooperative, creative and rewarding experience. The concept of labor is not reduced only to the outcomes but encompasses means, process and social context counts as well (Daniels 2005). This has impact on the interdisciplinary character of the methodology—institutional, social, ethical embedding of economic phenomena require very diverse attitude to research (methodology) and translates into different methods. Another important characteristic of the Buddhist methodology is the principle of equity of all living human being, and reciprocity. The economic phenomena are as well perceived from the long-life perspective, and not reduced to short-term decisions, which dominate in neoclassical economics. Economic phenomena are as well analyzed from the whole-life perspective, as opposite to fragmented life concept in neoclassical economics. For the analysis of phenomena count not only

means but as well ends (see Payutto 1994, the idea was further explained by Tomer (2008), which influences the specific understanding of rationality (goals and means matter). Buddhist economics encompasses is in fact very heterogeneous, and as Daniels (2005) mentions, here count as well Gandhian economics (Diwan and Lutz 1985; Diwan and Desai 1990; Diwan 1991, 2000), which as well bases on the assumption of the unity of life, primacy of love and compassion, non-violence, decentralization (seen later by Schumacher 1973) integration of spiritual, moral and natural dimension of the social, economic and political concerns. This means as well a preference for pragmatism, descriptive character of the economic analysis (respecting cultural, historical context), normative (basing on ethical rules delivered mainly of Buddhism, but which can be found as well in other religions).

The Christian attitude to economics takes its shape on the one hand within the Catholic Social Teaching and on the other within the Protestant ethics. As soon as Protestant churches are less centralized, their social and economic teaching has as well less chance to become homogenous and has a less central character than the teaching of the Catholic Church. The Protestant teaching refers especially to the individual level and doesn't formulate any clear position or attitude when it comes to the macro-level or the economic policy, as it is the case in the Catholic social teaching. Protestants prefer therefore refer to their teaching as to the social ethics, and Catholics—as to the social teaching. In the German context it is referred to the Christian social teaching ('Christliche Soziallehre'), which encompasses catholic, evangelic and orthodox social teaching. Depending on the view it is referred either to the Christian social teaching, or the Christian social ethics. Social ethics can be understood as a science of the moral and legal order of the society as a condition for the self-realization of the human being and is interested in the organizational capability and the need to design social structures and processes. It is a counterpart of individual ethics, which is focused on the responsibility of the individual toward the social environment. One of main objectives of the social teaching is a moral judgment about the social dimension in which a human being lives and the central question, if the institutional structures are fair. The social justice stays in focus and the social ethics aims to answer a question about the compatibility of social, political relations, structures and standards with general ideas of distributive, commutative and participatory justice. Starting here, the socio-ethical research attempts to develop solutions for justice deficits. The main methodological principles of Catholic Social Teaching are following: (1) the dignity of human being, (2) common good, (3) subsidiarity, (4) solidarity, (5) natural law, (6) the personal participation, (7) socio-political peace (Glapiński 2012). All of those principles are norms, which are used for evaluating the economic phenomena. They deliver the map of important concepts, elements of the analysis, which enables the researcher to view the economic problems, and questions using this particular perspective.

Islam economics is a very young school of economics, and is in its early stadium of the development (some further reading offer: Khan 1997; Kuran 1995; El-Ghazali 1994; Presley and Sessions 1994). According to Kuran (1995) it started in the early 1970s to put its ideals into the practice. Therefore its methodology is not so fix and consolidated, but differ among diverse economists and practitioners

depending to great extend on the place and scientific tradition of economists developing it. Islam economics is developed by economists coming from many different cultures (Moslems and outsiders), and different languages are used (Arabic, French, English). For the outsider the Islam Economics is made more familiar due to the project of World Bank focused on the impact of different specific Islamic institutions, principles, ideas on economic outcome and its compatibility with such western economic and political institutions as the capitalism and the democracy. The Islamic economics roots (similarly to the economics founded on the fundaments of Christianity and Buddhism) on same basic ideas, which resemble those mentioned in the former religions, however they are called differently or have a bit different focus.

Similarly to previous religious motivated economic schools it has a principally normative character and understands itself as a discipline, which aims to reach particular goals defined beyond the economic system. The goals and ways to achieve them have to be understood in the light of Qu'ran and Hadith and have to be subordinated to the religion, especially to the dim (a moral code). Some of those basic principles have a meta-religious character and can be found not only in religious traditions but in general ethical principles. Here counts most of all the principle of solidarity and justice. Those principles are important to revive other religious norms and commandments, in the process of adjusting to the modernity. This is for instance a case of a riba, which Islam economics reinterprets so that it primarily respects those principles than fix this concept by taking it literally as it is referred in the teaching.

The first basic principle—the solidarity refers to the solidarity with the members of religious community, above all with the poor. This is a methodological issue, because it specifies a way in which different arrangements are perceived. For instance even 'riba' (= taking profit for lending money), when is paid to social institutions as a sign of solidarity with the society, loses its sinful character. Zakah is another religious institution. It is a tax paid for the poor or nowadays for social arrangements like schools, hospitals and social care.[12] Fair distribution is another methodological principle resulting from the solidarity principle. Again it is in the same way methodological, as methodological is the assumption of taking decisions on the basis of efficiency in the neoclassical economics. In the Islam economics instead of assuming efficiency as a basis of economic decisions, it is assumed that the decisions should be taken on the basis of a fair distribution. The second basic principle is a justice. This principle requires evaluating social and economic institutions and processes under the criterion of harming or supporting the justice. An institution, an arrangement or practice, which harms one of those two principles, is forbidden. This for instance is the reason why generally speaking 'riba' is forbidden. Furthermore the Islamic economics counts to the methodology for instance as well such elements as vice regency, priorities, balance and

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[12] World Bank analysing this system in Pakistan refers to some technical problems, which harm the positive result of this general good idea.

complementarity between sectors, modes of investment; institutional aspects of investment, incentives to spend, maintaining of Islamic markets, controls and incentives, brotherhood, the setting of excellent example.

6   Conclusion

The concept of human nature influences in many ways the methodology of the humanist economics (Table 4). First of all, basic principles of looking on economic phenomena and evaluating them are resulting from the general view on the human being on each of the three levels mentioned: world view, social world and individual world. Although the humanist tradition is very broad, and comprises as well diverse religious traditions, those common basic principles seem to have much in common. They are for instance the justice, solidarity towards other human beings, and responsibility towards the nature and balance. Those basic principles impact some further methodological aspects of humanist economics. "Perceiving life as a basic category is one of such principles" (Bowen 1972, p. 14). Another one is identifying a self-realization as a central concept of explaining the human behavior. Religious traditions understand this self-realization as a challenge of the human to become as God. Christianity explains the reason for such a goal with the creation: because the human being was created on the image of God (Judaism, Christianity, Islam), he/she should turn to this ideal. Mystical traditions of all those three religions mentioned perceive this highest goal of human life as being united with God. Buddhism refers here to the state of being enlightened. This goal, which seems very diffuse or unrealistic have much to do with the everyday life, which in order to reach this goal has to be virtuous and full of compassion to other human being and the nature. This of course has a positive impact on the relations to other.

Furthermore some new aspects of well known economical basic categories are introduced. A work gets in the humanist tradition a new meaning, the same concerns religious traditions of Christianity, Islam and Buddhism, according to which, the work is something, which enables human being transform itself and reach a higher level of the development. In the Christian tradition it's often said, that work enables human being to participate in the creation. Another crucial concept as needs for instance gets a new meaning, which varies from the one in the neoclassical economics. Needs aren't any more reduced to revealed preferences, but are in fact evaluated, in how far they contribute to human wellbeing. This leads to the differentiation between needs and wants. This concerns as well religious motivated economic schools: in Buddhism, Christianity and Islam, moderation, self-discipline is advised, and each consumption has to be evaluated looking for its consequences for human development as individual, as society and in relation to the nature. The humanist methodology, due to the assumptions about the human nature, is as well normative and pragmatic. This means that the ideal of a value-free and objective research has here no application, because some basic principles mentioned before have to be respected. It is believed, that there are no automatic

Table 4 Concept of human nature in the humanist economics and religious motivated economics

	Humanistic	Buddhist	Islam	Christian	Judaism
Worldview	In the centre of the world there is a human being	The relation towards the nature has to be marked by compassion, karma is providing here further motivation	• Human being is a crown of the creations, although is made from the clay. • The Nature is subordinated to the human being but has to be respected • Moral order has to be kept, which roots in God's Word and can be found respectively in Torah, Bible (Old and New Testament) and Qur'an • Ecological conscience has its roots in the Bible, but is motivated socially, it was developed much later, since the ecological problems emerged		
Social world	Altruism, solidarity with the humanity	Responsibility, compassion for/towards other, sangha (community)	Solidarity, zakah, riba, pilgrimage, common prayers, umma	Solidarity, alms, pilgrimage, prayers, church (ecclesia)	Solidarity, care for the poor, common prayers and synagogue (the chosen nation differentiated from goim)
Mutual help within and outside the community					
Body (material sphere)	Basic needs, not: wants	Subordinated to higher levels, especially mind	Submission of all deeds to the Law of God (Quran, Bible, Torah), and to the two higher levels like soul/mind		
Soul (motives, Feelings)	Diverse motives, values, dual-self	Diverse drives	Human being has good and bad drives, which are differently explained in those religions; common is the view that human being can freely choose among those drives; there is a tendency to Goodness, due to fitrah (in Islam), to the heart ('lew' in Judaism), or the soul as place of conscience, which enables the right choice		
Mind (moral sphere)	Ethical mind	Mind and practice of Eightfold Path in order to overcome the Nature	Conscience and Law (Bible, Quran, Torah) are helpful in order to be able to choose in a right way. The education of moral law and daily practice are considered as important for taking the right decisions. The mind can be perceived as the combination between the knowledge (of particular moral law) and the conscience, interrelated		

Source: own

mechanisms in the economy, but real changes base on the change from inside. This is an aspect especially well explained by religions, which take the human motivation (often referred as his/her heart, or intention) as a measure of his/her actions and impact on the state of all the humanity and the world. Last but not least the interdisciplinary character of the methodology results as well from such a complex and broad understanding of human nature. The choice of such methodological

issues has as a consequence the preference for particular methods, which are historical, hermeneutical, organic, social and institutional.

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Part IV
Banking and Finance

Culture, Geographies or Accounting Regimes: Which Are Drivers for Risk-Taking in European and Asian Banks?

Ana Isabel Lopes

Abstract Our goal is achieved using the Hofstede's model of cultural dimensions that has become internationally recognized. A sample covering 41 countries from Europe and Asia and about 3150 bank-years observations was selected to represent low and high averse to risk characteristics. The research is conducted to investigate the influence of culture attributes of risk-taking on the reporting of some variables related to risk, identifying whether or not geographies or accounting regimes are also determinants. We use two proxies for risk-taking, namely, Provisions for Loan Losses and Risk-Weighted Assets. Our research is designed using a twofold perspective. First, we examine if the distribution of our proxies for risk taking are different between independent groups. We compare the outcomes based on groups clustered by national culture dimensions, geographies and accounting regimes. Secondly, we examine if culture is a determinant of banks that present higher or lower amounts of incurred and unexpected losses. Our findings suggest that national culture is (is not) a determinant for the probability of reporting higher or lower level of loans loss provisions (risk weighed assets). These findings are consistent for banks in different geographies (Europe vs. Asia) and subject to different accounting regimes (IFRS vs. local standards).

Keywords National culture • Loan loss provisions • Risk weighed assets • Banking industry

1   Introduction

The objective of this study is to examine the influence of national culture on the Loan Losses Provisions and Risk Weighed Assets (hereafter, RWA) reported by Banks in European and Asiatic countries, henceforward named as Eurasia, identifying also whether or not geographies or accounting regimes are also determinants.

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A lot of countries around the world have either fully adopted, or are considering to adopt, International Financial Accounting Standards (IFRSs). These include all member countries of the European Union and several other European and Asian countries. While many researches analyses the effect of the adoption of IFRSs excluding the impact on financial institutions, we consider that some issues must be highlighted by banks when adopting those IFRSs.

IFRSs can have a significant impact on the banking and capital markets industry. PricewaterhouseCoopers (2006) anticipates that this impact can include changes on earnings and capital volatility, on strategic and financial planning, on capital management, on credit evaluation tools, and on debt covenants, among others. One of the topics that is underlying all these impacts is the "Provision for Loan Losses", since they can be based upon the requirements of central Banks of each country, setting the minimum provisions to be held against lending assets. At the same time, some countries apply the Basel accords (I, II and, in the future, III) to identify and fulfill some capital adequacy ratios, market liquidity tests and stress tests. To calculate capital adequacy ratios Banks need to use a risk-weight approach, from which the "Risk Weighted Assets" must be computed. The information about Provision for Loan Losses and about Risk Weighted Assets could be an easier approach to compare Banks across different geographies. Our analysis seeks particularly to determine whether culture dimensions influence these two issues between Eurasian countries.

Bank lending and risk credit have long being concern to the banking industry. The amount of loans is an important asset for banks, assuming the claim to the repaying and the receivable of the related interest. When these principles are not respected by borrowers the credit relationship is weakened and the economic and the financial performance of banks come reduced. Banking and accounting regulators are accompanying this phenomenon with attention, especially when the financial crisis started. When banks face losses on loans, they should create a provision, or impairment, on the amount of loan. The loan loss provision is thus the current period expense for loan losses recognized in that current period. It is reported in the profit or loss statement and likely influences the reported earnings of banks. The amount of loan losses provisions can be stipulated under the so-called "incurred loss model", which is mandatory under current IFRSs for all listed banks in the European Union.

Gebhardt and Novotny-Farkas (2011) examined how the application of the IAS 39 incurred loss approach affects the loan losses provisions, considered as the main operating accrual item of (commercial) banks. They find that IAS 39 rules significantly reduce discretionary behavior, as measured by less income smoothing after IFRS adoption. They also found that the IFRS adoption effect is significantly less pronounced in stricter supervisory regimes and in countries with more dispersed ownership of banks. Currently, the debate around changes to IAS 39 and IFRS 9 is related to the change from an "incurred loss model" to an "expected credit loss model". The change, the benefits or the cons against the transformation from one model to another are out of the scope of this research. However, because the objective is to compare the influence of culture in loan losses provisions, the type

of standards used to report financial risks are also under aware (namely, IFRSs, local GAAP or other).

While loan losses provisions (or other similar terminology) cover incurred losses, unexpected losses may jeopardize the financial strength of a bank. Banking supervisory authorities (through the so-called Basel accords) formulate broad supervisory standards and guidelines and recommend statements of best practice in banking supervision, in order to improve the quality of banking supervision worldwide. From these regulator's point of view, Tier 1 capital is the core measure of a bank's financial strength and is calculated in order to have an estimative of the effects of those unexpected losses. Tier 1 capital ratio is computed dividing the core equity capital by its total RWA. This means that banks do not assess their solvency ratios the same way ordinary non-financiers companies do, dividing equity by total assets. Instead of total assets, banks use RWA, and this amount represents assets weighted by the relevant risk weigh factor to reflect credit risk, market risk and operational risk.

Our goal in this chapter is achieved using the Hofstede's model of cultural dimensions that has become an internationally recognized standard, and collecting information about the accounting standards followed to prepare financial statements by Banks operating in Asia and Europe. A sample covering 41 Eurasian countries was selected to represent low and high averse to risk characteristics. The research is conducted to investigate the influence of culture attributes of risk-taking, of accounting regimes or geographies on the reporting of some variables related to risk.

An extensive literature also used Hofstede's culture dimensions to examine its influence on business environments, namely, on development of accounting systems (Gray 1988; Salter and Niswander 1995), on earnings management in industry except banking (Nabar and Thai 2007; Han et al. 2010), on earnings management in banking industry (Kanagaretnam et al. 2011), on accounting conservatism (Schultz and Lopez 2001; Doupnik and Riccio 2006; Tsakumis 2007; Salter et al. 2013; Kanagaretnam et al. 2014) and on risk-taking (Kanagaretnam et al. 2014), among others. A recent survey accompanied in 2008 (May) by PricewaterhouseCoopers and the Economist Intelligence Unit on the factors that created conditions for the recent Banking crises (PricewaterhouseCoopers 2008) also reveals that around 73 % of survey participants identified "culture and excessive risk-taking" as their major causes.

Our chapter is most closely related to Kanagaretnam et al. (2011, 2014), since we also focus on the banking industry because usually this industry is excluded from other studies (Nabar and Thai 2007; Han et al. 2010) and because loan loss accounting in this industry is a proper setting to observe the preferences of managers for conservative accounting (Nichols et al. 2009). We use two dimensions of national culture identified by Hofstede (2001), namely, individualism (IND) and uncertainty avoidance (UA) to relate with accounting conservatism and risk-taking. These two dimensions were used by Han et al. (2010) and Kanagaretnam et al. (2014). Prior research also used Hofstede's dimensions of culture in accounting (Schultz et al. 1993; Kachelmeier and Shehata 1997), in economics

(Gorodnichenko and Roland 2011), in finance (Chui et al. 2010), among others authors and business areas.

Our chapter offer some advances. First, we examine the effects of culture on risk measures only in post-IFRS adoption period, avoiding bias from each company changing accounting regimes over time. Second, we use a sample comprising a set of countries from Europe and from Asia, which permits to identify whether different effects of culture exists between local standards versus IFRS standards between different countries. Altogether, our chapter able us to identify the influence of culture on risk taking measures within different geographies and different accounting regimes, adding new contributes to the literature.

We use two approaches. First, we focus on Provisions for Loan Losses as an estimative of expected loan losses. The Provisions for Loan Losses reflect management's estimate of the incurred loan losses that must be recognized on the profit or loss statement. Since these estimates measure fluctuations in the recognized credit losses during the period, we want to identify the effect of national cultural on loan losses provisions.

Second, we focus on risk-weighted assets as an estimative for unexpected losses. The report issued by the High-level Expert Group (HLEG) on reforming the structure of the EU banking sector (HLEG 2012) argues that risk weighed assets calculated by individual banks' internal models can be significantly different for similar risks. Accordingly, "The current levels of RWAs based on banks' internal models and historical loss data tend to be quite low compared to the losses incurred in past real estate-driven crises" (HLEG 2012). The Expert group considers that "the problems due to the possibly very low levels of RWA and varying model outcomes across banks would need to be addressed by supervisors and coordinated European effort to foster greater consistency of model outcomes and to impose more conservative parameters where needed" (HLEG 2012). An important concern about current methods of determining RWA is that they leave room for individual banks to "optimize" capital requirements by underestimating their risks and thus being permitted to hold lower capital (Das and Sy 2012). Even under the recommendations under Basel accords it can be possible that banks with similar loans and similar capital present different solvency ratios. Even after revisions to Basel accords the situation is not completely comparable. The Capital Requirements Directive issued by European Union required that countries in Europe implement the Basel II guidelines by the time of the crisis (Das and Sy 2012). However in Asian countries there are still a lot of banks following Basel I and others Basel II. Because of these regulatory differences, Das and Sy (2012) and Le Leslé and Avramova (2012) found that Risk Weight Assets were higher in Asian and lower in European banks.

The rest of the chapter proceeds as follows. In Sect. 2 we discuss the arguments for which culture dimensions, accounting regimes or geographies can influence accounting conservatism and risk-taking in the banking industry and present the hypotheses. In Sect. 3 we present the results and Sect. 5 concludes.

2 National Culture, Accounting Regimes and Geographies on Loan Losses Provisions and Risk-Weighted Assets, and Hypothesis Development

Hofstede's cultural dimension theory, published in 2001, offers a framework for cross-cultural comparisons that has been widely used in several fields as a paradigm for research. Each country is scored using a scale of roughly 0–100 for each dimension. The higher the score, the more that dimension is exhibited in society (Hofstede 2001).

Prior works applying this theory to earnings management, conservatism accounting and risk taken (Han et al. 2010; Kanagaretnam et al. 2011, 2014) found consistent results for Individualism (IDV) and Uncertainty/Avoidance Index (UAI), demonstrating that individualism and uncertainty avoidance dimensions of national culture affect risk-taking. We will also use these two dimensions.

According to theory, IDV measures the degree to which individuals are integrated into groups (without political meaning). Countries with high scores for IDV dimension usually foster contractual relationships that are based on the principles of exchange, value independence and self-sufficiency place self-interests above collective interests, enjoy challenges and expect rewards for hard work, and accept confrontation as an attribute (Hofstede 2001). With low scores for IDV, countries behave according to social norms that are designed to maintain social harmony among members of an in-group, and consider implications of their actions for wider collective and share resources, being prepared to sacrifice personal interest for collective interests (Hofstede 2001). Kanagaretnam et al. (2014) argue that risk-taking incentives are likely greater in High IND societies where worry for other stakeholders' welfare is likely to be low.

The UAI measures the degree to which members of a society are able to cope with the uncertainty of the future without experiencing undue stress. Weak UAI is characterized, among others, by risk taking, flexibility, organizations with a relatively low degree of structure and few rules. Strong UAI is, by opposite, characterized by avoidance of risk, organizations that have clearly delineated structures, many written rules, standardized procedures, and respect for authority (Hofstede 2001). A summary of these effects is presented in Table 1, showing that geographies with a high score in IDV and a low score in UAI are more committed with risk-taking strategies.

These two dimensions of culture can be applied to our study in the following way. Kanagaretnam et al. (2014) found evidence that banks take more risk in societies where IDV is high or UA is low. Consider that the Loan Loss Provisions and Risk Weighed Assets are two measures of risk-taking. It is expected thus that banks in low IDV and high UAI societies recognize more conservative, i.e., larger, loan loss allowances than banks in high IDV and UA societies. We will test this effect in an income statement item, the loan provision expensed in each year, since every time a bank increase loan loss allowances it records an expense and net income decreases. On another hand, based on testimonies included in Das and Sy

Table 1 The effect of individualism and uncertainty/avoidance index on risk-taking

Scores	IDV	UAI
High	More risk-taking	Less risk-taking
Low	Less risk-taking	More risk-taking

Table 2 The relation between IDV and UAI with loan loss provisions and risk weighted assets

Scores	Loan losses provisions	Risk weight assets
IDV	Negative	Positive
UAI	Positive	Negative

(2012), European banks and banks in other countries may be diverging in their calculations of Risk Weighed Assets, being highly variable in Europe, confirmed also by one of the last reports prepared by EBA (2014). Theoretically, the higher the amount of Risk Weighed Assets, the higher the level of risk assumed as reflected in unexpected losses. Risky-behavior is typical of societies scored as low UAI when compared to less risky-taking societies, scored as high UAI. It is expected thus that banks in high IDV and low UAI societies disclose more risk weighed assets.

These two assertions can be shortened in Table 2, through a matrix crossing the expectations on the amounts reported for Loan Loss Provisions and Risk Weighed Assets with the IDV and UAI dimensions, which in turns give us an expectation of a negative or a positive relation.

Based on Hofstede theory, countries belonging to Asia and to Europe have different scores for IDV and for UAI. We want to test if these relations hold when we have a diversity of banks with different characteristics. We develop the following hypotheses in the null form:

H1: Ceteris paribus, risk-taking strategies will be the same across different scores of culture dimensions.

H2: Ceteris paribus, risk-taking strategies will be the same across different geographies.

H3: Ceteris paribus, risk-taking strategies will be the same across accounting regimes.

Our variables for risk taking strategies are (1) the variable LLP, which is the percentage of the amount of loans loss provisions over the total amount of loans by bank-year, and (2) the variable RWA which is measured as the percentage of Risk Weighed Assets over the total assets of the bank.

Then, we employ a second strand of research, examining the consequences of IDV and UAI on higher versus lower LLP and higher versus lower RWA. Based on the evidence of the studies discussed below, we expect that banks in countries with low IDV and high UAI, are more likely to present higher LLP. Based on theory it should be expected the opposite relationship for the effect on RWA. However, RWA are directly related with minimum capital ratios that banks should present. They adjust the amount of each loan for an estimative of how risky it is, and it could

be not accurate due to the difficulties involved in this estimation and to the motivations to distort it. Therefore, we predict the following:

H4a: Ceteris paribus, Banks in higher risk-taking societies are more likely to report lower loan losses provision that Banks with lower risky behavior.

H4b: Ceteris paribus, Banks in higher risk-taking societies are more likely to disclose higher risk weighed assets than with lower risky behavior.

3 Research Design

In this part of the analysis we want to examine if the scores for IDV and for UAI are similar or different between independent groups and compare the outcomes. Our null hypotheses are that risk-taking strategies measure by LLP and RWA are the same across different scores of culture dimensions (H1), geographies (H2) or accounting regimes (H3).

3.1 The Effect of Culture on Loan Losses Provisions and Risk Weighed Assets

We want to examine if culture is a determinant of banks that present higher or lower amounts of LLP and RWA. We test hypothesis 3 (H3) using a binary logistic estimation where the binary dependent variable (RISK) is a dummy variable takes on the value 1 if the bank presents: (1) a LLP higher than the median and 0 otherwise; (2) a RWA higher that the median and 0 otherwise.

Our main test variable is the culture dimension, and we will IDV and UAI as proxies for risk-taking strategies behavior. Our rationale for using these variables is based on prior research suggesting that culture dimension affects bank financial reporting properties, risk-taking, and financial distress (Kanagaretnam et al. 2014).

We predict that if banks are in countries with low (high) IDV and high (low) UAI, they are more likely to present higher (lower) LLP (RWA). We also include some variables of control, one of which is non-performing loans (NPL). Banks needs to identify and report non-performing loans. A NPL is a loan that is in default or close to being in default. Many loans become non-performing after being in default for 90 days, but this can depend on the contract terms, and there is no unique definition widely used. If a bank has NPL, it shall recognize loans losses provisions (LLP) according to the rules of accounting regimes or supervisory regulators. Listed Banks in European Union are required to apply the International Financial Reporting Standards (IFRS), which contains specific guideline on how to estimate the impairment of financial assets and, consequently, the amount of LLP given the amount of NPL. European and Asian Banks can avoid the growth of LLP if they

reduce the amount of non-performing loans. By other hand, the higher the amount of those NPL, the higher the risk-taking of each bank, given its decision to grant (or not) credit to other parties after analyzing the probability of default of each borrower.

Another set of controls are included. Since large banks are more closely observed by both regulators and analysts (Paananen et al. 2012), we include variables that are Bank-specific, namely size (SIZE), profitability (RET), and bank solvency (SOLV). We also add a number of variables that are Country-specific that also were used by Kanagaretnam et al. (2014), namely, creditor rights (CR), Information sharing index (IS), and law enforcement index (ENF).

We take these variables into a model that is specified using binary logistic approach as follows:

$$
\begin{aligned}
logit[p(RISK)] &= \log\left[\frac{p(RISK)}{1 - p(RISK)}\right] \\
&= \beta_0 + \beta_1 CULT + \beta_2 Proxy\_R + \beta_3 IFRS \\
&\quad + \beta_4 Proxy\_R * CULT * IFRS + \beta_5 B_{level} + \beta_6 C_{level} \\
&\quad + \beta_7 YEAR + \varepsilon
\end{aligned}
\tag{1}
$$

where *Risk* is measured in two different separates approaches: (1) as 1, if the percentage of Loan Losses Provisions over total loans (LLP) is above the median of all countries, and 0 otherwise, which is the first approach; and (2) as 1 if the percentage of Risk Weighed Assets over total assets (RWA) is above the median of all countries, and 0 otherwise, which is the second approach. *CULT* is the score for IDV and UAI, and will be tested separately, considering that IDV and UAI can be substitutes by each other instead of complementary. Proxy_R is used as a determinant for the likelihood of reporting LLP or disclose RWA. Firstly, Proxy_R is NPL, i.e., the percentage of Non-Performing Loans over total Loans. Then, Proxy_R is DT, is the percentage of total deposits over total assets. B_{level} is the vector with bank-level characterizes (*SIZE*, *SOLV* and *RET*) to control for cross-sectional differences in the sample that may influence the relationship between national culture and accounting-based bank risks measures. C_{level} is represents the vector with country characteristics (*CR, IS,* and *ENF*). *YEAR* is included for control for data from different years.

The sign and the significance of the coefficients β_1 and β_4 on the variable *CULT* and interactions of *CULT* with *RISK_R* and *IFRS* are our focus of interest. According with Hofstede dimensions' theory (see Table 2), and consistent with prior findings, we expect negative (positive) coefficients when *CULT* is *IDV* and a positive (negative) coefficient in *CULT* is *UAI*, being *LLP* (*RWA*) is used as a measure of risk, being these relations augmented when CULT is interacted with the other variables.

All the variables are defined in Table 3. All bank-level variables are measured at the fiscal year end.

Table 3 Definition of variables

Variables	Definitions
Dependent	
LLP	Loan Loss Provisions: the amount of provisions at the end of the year divided by market capitalization
RWA	Risk Weighed Assets: the amount of risk weighed assets at the end of the year divided by total assets
Independent	
IDV	Score for individualism from Hofstede (2001)
UAI	Score for uncertainty/avoidance index from Hofstede (2001)
NPL	Begging Balance of Non-Performing Loans divided by market capitalization
TD	Total deposits: Deposits percentage of total deposits over total assets
IFRS	1 if bank-year is applying IFRS; 0 otherwise
EUROPE	1 for European countries and 0 for Asian countries
Controls	
Bank specific	
Size	Log of total assets
LEV	Total debt divided by total assets at the end of the year
AUD	1 if the bank is audited by a Big4; 0 otherwise
XLIST	1 if the bank is listed in more than one stock exchange; 0 otherwise
Macro and country specific	
CR	Index aggregating creditor rights, ranging from 0 to 4, used by Kanagaretnam et al. (2014) and originally from La Porta, Lopez-de-Silenes, Shleifer and Vinish (1998) and updated in Djankov, McLiesh, and Shleifer (2007)
IS	Information sharing index equaling 1 if either a public registry or a private bureau operates in the country and 0 otherwise, used by Kanagaretnam et al. (2014) and originally from Djankov et al. (2007)
ENFORCE	Law enforcement index ranging from 0 (lower) to 10 (greater law enforcement), used by Kanagaretnam et al. (2014) and originally from the Economic Freedom of the World: 2010 Annual Report

3.2 The Sample

Using Thomson Reuters Database (Datastream™), we extract data on all European and Asian listed banks for which there is Worldscope data. These two large geographies are of main concern because of the interests and development of economies such as China, Russian Federation, and European Union, with a diversity of countries that can be distinguished by different type of societies. The culture dimension measures, IDV and UAI, were obtained on Hofstede's cultural database in the Hofstede Centre website (http://geert-hofstede.com/). Other country-level institutional variables are obtained from Kanagaretnam et al. (2014).

We start out with 43 countries, but we exclude Ukraine and Cyprus because these two countries are missing in the Hofstede's cultures measures. For the remaining, we download all the bank-years between 2005 and 2012, which yielded a population of 594 banks and 4159 bank-years observations. 126 banks and

Table 4 Sample description

Country	IDV	UAI	CR	IS	ENFORCE	Asia (1) or Europe (0)	No. of banks	No. of bank-year obs.
Austria	55	70	3	1	6.7	0	7	55
Belgium	75	94	2	1	5.6	0	3	23
Bangladesh	20	60	2	1	1.15	1	7	27
Bulgaria	30	85	2	1	4.77	0	4	16
China	20	30	2	0	6.73	1	20	107
Croatia	33	80	3	0	5.4	0	6	22
Czech Republic	58	74	3	0	3.54	0	1	8
Denmark	74	23	3	1	6.19	0	19	114
Finland	63	59	1	1	8.06	0	3	19
France	71	86	0	1	6.91	0	22	136
Germany	67	65	3	1	6.62	0	6	47
Greece	35	100	1	1	4.13	0	8	62
Hong Kong	25	29	4	1	7.69	1	7	56
Hungary	80	82	1	1	7.15	0	1	6
India	48	40	2	0	2.59	1	39	268
Ireland	70	35	1	1	4.95	0	2	16
Israel	54	81	3	1	3.46	1	9	59
Italy	76	75	2	1	3.18	0	17	137
Japan	46	92	2	1	6.37	1	81	610
Lithuania	60	65	2	1	7.45	0	7	13
Malaysia	26	36	3	1	4.27	1	10	80
Malta	59	96				0	1	2
Netherlands	80	53	3	1	5.11	0	1	8
Norway	69	50	2	1	7.53	0	14	83
Pakistan	14	70	1	1	3.55	1	20	138
Philippines	32	44	1	1	3.42	1	15	102
Poland	60	93	1	0	4.27	0	15	111
Portugal	27	99	1	1	5.25	0	4	28
Russian Fed.	39	95	2	0	7.53	1	16	90
Serbia	25	92	2	0	3.95	0	5	28
Singapore	20	8	3	0	8.48	1	4	24
Slovakia	52	51	2	1	4.64	0	3	22
Slovenia	27	88	3	1	3.87	0	2	14
Spain	51	86	2	1	5.54	0	8	47
Sweden	71	29	1	1	4.73	0	4	32
Switzerland	68	58	1	1	6.03	0	27	198
Taiwan	17	69	2	1	5.55	1	20	146
Thailand	20	64	2	0	6.11	1	11	81
United Kingdom	89	35	4	1	6	0	12	73
Vietnam	20	30	1	1	6.36	1	7	42
Total							468	3150

The bold values are statistically significant

884 bank-years were dropped due to lack of information on the Database for all the variables we need. We also removed all the observations with studentized residuals higher than |2|. Because of this, Luxembourg was excluded. Our final sample consists of a maximum of 3150 bank-years observations for 468 banks, split between 15 Asian countries with 1836 bank-years observations and 24 European countries with 1134 bank-years observations.

Table 4 displays information with the list of countries included in the sample and a set of institutional variables assigned to them. The second and third columns show the measures for our two dimensions of culture, IDV and UAI. The meaning of each one of these scores is included in Table 3.

4 Results

4.1 Summary Description of the Sample

Figure 1 draws a scatter placing all the countries included in the sample in a quadrant that enable the comparison between different countries considering the pair of values for IDV and UAI. United Kingdom is positioned as a country with high IDV and low UAI when compared to Serbia, with low IDV and high UAI. A test for the correlation between IDV and UAI (not tabulated) reveals that there is a negating relationship between them (significant at 10 % level), meaning that countries with higher(lower) measures for IDV are likely to present lower (higher) measures for UAI.

Figure 2 shows the number of bank-years observations split into geographies (Asia and Europe) and into accounting regimes (IFRS and local standards). About
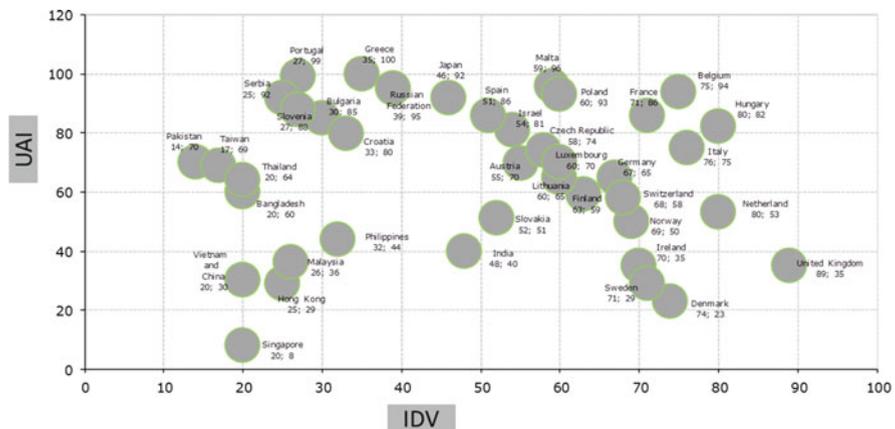
Fig. 1 Individualism (IDV) and uncertainty avoidance (UAI) by country

Fig. 2 Number of bank-
year observations split into
geographies and into
accounting regimes
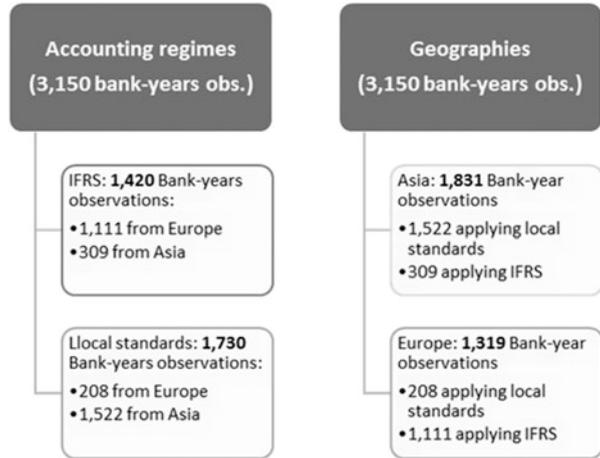
94.5 % (n = 1730) Asian bank-years observations use local standards and around
84 % (n = 1111) European bank-years apply IFRS.

Our two dependent values are LLP and RWA. The number of firm-years
presented bellow id for the sample in which LLP is the dependent variable. Not
every bank disclosed the level of RWA from data collected from the Datastream.
We download several financial statements to hand collect this value, but those
banks for which data was not available in DB also didn't include this information on
the financial statements. So, when RWA is used as dependent variable our sample
drops to 2700 bank-years observations.

4.2   Testing the Culture Dimension Between Groups

Tests to the normality of our culture variables (IDV and UAI) and risk-taking
variables (LLP and RWA), presented in Table 5, reveals that we cannot reject the
null using Kolmogorov-Smirnov test (p < 0.000). So, non-parametric tests applied
to our hypotheses will be appropriate.

We use Kruskal-Wallis test and Mann-Whitney U test when appropriate for
each one of our hypothesis. Table 6 presents the results. In the first column the
hypothesis is presented and in the second the test applied to identify the outcome is
indicated. Third and fourth columns shows the probability associated with the test
used and the decision based on that probability, respectively.

Results showed in each one of the panels reveal that the null was rejected at a
significant level of 1 % (p = 0.000), except for the differences on RWA across
European and Asian Banks for which the rejection is at 10 % level (p = 0.062).
These results suggests that Banks do not report equal amounts of LLP and do not

Table 5 Test of normality

	Kolmogorov-Smirnov	
	Statistic	Sig. (p-value)
IDV	0.150	0.000
UAI	0.187	0.000
LLP	0.223	0.000
RWA	0.106	0.000

Table 6 Distribution of LLP and RWA across different categories

Panel A—*H1: Ceteris paribus, risk-taking strategies will be the same across different scores of culture dimensions*

Risk-taking	Culture	Test for independent samples	Sig. (p-value)	Decision on the null hyp.
LLP	Distribution of LLP is the same across different categories of **IDV**	Kruskal-Wallis	0.000	Reject
	Distribution of LLP is the same across different categories of **UAI**	Kruskal-Wallis	0.000	Reject
RWA	Distribution of RWA is the same across different categories of **IDV**	Kruskal-Wallis	0.000	Reject
	Distribution of RWA is the same across different categories of **UAI**	Kruskal-Wallis	0.000	Reject

Panel B—*H2: Ceteris paribus, risk-taking strategies will be the same across different geographies*

Risk taking	Culture	Test for independent samples	Sig. (p-value)	Decision
LLP	Distribution of LLP is the same across **European** and Asian Banks	Mann-Whitney U	0.000	Reject
RWA	Distribution of RWA is the same across **European** and **Asian** Banks	Mann-Whitney U	0.062	Reject

Panel C—*H3: Ceteris paribus, risk-taking strategies will be the same across accounting regimes*

Risk taking	Culture	Test for independent samples	Sig. (p-value)	Decision
LLP	Distribution of LLP is the same across Banks applying **IFRSs or local standards**	Mann-Whitney U	0.000	Reject
RWA	Distribution of RWA is the same across Banks applying **IFRSs or local standards**	Mann-Whitney U	0.000	Reject

The bold values are statistically significant

disclosing equal levels of RWA (Panel A), and culture, geography and accounting regimes can play a role in the differences arose (Panels B and C).

Panels B and C shows that distribution of LLP is not equal between IFRS versus local standards, and between European and Asian Banks. Crossing with the findings presented in Panel A, we split the file in the following way to test differences in

Table 7 Distribution of LLP on different culture dimensions by geographies and accounting regimes

Groups		Culture	Test for independent samples	Sig. (p-value)	Decision
Geographies	European Banks	Is the distribution of LLP and RWA the same across different categories of **IDV**?	Kruskal-Wallis	0.000	Reject
		Is the distribution of LLP and RWA the same across different categories of **UAI**?			
	Asian Banks	Is the distribution of LLP and RWA the same across different categories of **IDV**?			
		Is the distribution of LLP and RWA the same across different categories of **UAI**?			
Accounting regimes	Banks applying IFRSs	Is the distribution of LLP and RWA the same across different categories of **IDV**?			
		Is the distribution of LLP and RWA the same across different categories of **UAI**?			
	Banks applying local standards	Is the distribution of LLP and RWA the same across different categories of **IDV**?			
		Is the distribution of LLP and RWA the same across different categories of **UAI**?			

The bold values are statistically significant

culture: (1) separate European Banks from Asian Banks and apply the non-parametric test using cultural variables for each one of those sub-samples; and (2) the same, but separating Banks applying IFRS from Banks applying local standards.

All the prior findings are consistent. This methodology is justified because even in the same geography, countries are placed in different points when comparing IDV and UAI between them, as showed in Fig. 1. Because scores are different, we want to examine whether or not risk-taking strategies are the same across the same type of behavior assigned to dimension cultures within geography or accounting regime. Findings are presented in Table 7 Outcomes confirms prior findings, since the null is always rejected, meaning that the distribution of LLP and RWA is not the

same across different categories (higher or lower) of IDV and different categories (higher or lower) of UAI measures of cultural dimension.

4.3 The Effect of Culture on Loan Losses Provisions and Risk Weighed Assets

Descriptive statistics (panel A) and correlations (panel B) for the sample used to test the effect of culture on LLP and RWA is presented in Table 8. In panel A the mean (median) 0.0085 (0.048), 9.529 (0.970) and 0.064 (0.028) respectively for loan loss provisions to total loans, non-performing loans to total loans and risk weighed assets. The variables of culture, IDV and UAI have means (standard deviations) of 47 (20.107) and 66 (24.344), respectively. Pearson (Spearmen) correlations for continuous (categorical/binary) independent variables and the dependent are showed in panel B. The proxies for risk-taken used as dependent (LLP and RWA) are correlated, as expected. However, the coefficient is low, and we do not expect problem of multicollinearity. Some of other control variables are also correlated and thus our analysis will have in attention the VIF and tolerance to detect if this problem exists.

Panel A of Table 9 shows the results when LLP is used as dependent variable, testing the effect of culture on loans loss provisions. Columns separate de findings when CULT = IDV and when CULT = UAI. The variable CULT representing IDV culture dimension is significantly negative as predicted in Hypothesis 4a ($\beta = -0.025$; $p = 0.000$). The variable CULT representing UAI culture dimension is positive as expected although not significant ($\beta = 0.003$; $p = 0.180$). The variables testing the probability of reporting LLP given non-performing loans and application of IFRS are positive as predicted in Hypotheses 4a using either IDV [NPL ($\beta = 10.521$; $p = 0.000$) and IFRS ($\beta = 1.551$; $p = 0.000$)] or UAI [(NPL: $\beta = 12.066$; $p = 0.000$; IFRS: $\beta = 1.145$; $p = 0.000$)] as culture dimensions measures.

Finally, the interaction between CULT variables and the other two variables (CULT*NPL*IFRS) is significantly negative when IDV is used ($\beta = -0.124$; $p = 0.000$) and positive when is used UAI ($\beta = 0.136$; $p = 0.000$). These findings shows that the positive effect on the probability of banks reporting higher LLP when are applying IFRS and have higher NPL is reduced (increased) when banks have lower (higher) scores of IDV (UAI). The Nagelkerke R Square is 40.7 % for CULT = IDV and 37.3 % for CULT = UAI 37.3 %.

These findings suggest evidence in supporting our Hypothesis 4a, indicating that banks in countries with low scores for IDV and high for UAI take low risky strategies and report higher level of LLP adopting a more conservative behavior.

Panel B of Table 9 shows the results when RWA is used as dependent variable, testing the effect of culture on Risk Weighed Assets. The findings are mixed. The variable CULT is negative when either IDV or UAI are used as culture dimensions,

Table 8 Descriptive statistics and correlations

Panel A: Descriptive statistics

	Mean	Median	Std. deviation	Minimum	Maximum																				
Continuous variables																									
LLP	0.0085	0.0048	0.01619	−0.0481	0.3971																				
NPL	0.0640	0.0280	0.9180	0.0000	47.778																				
TD	0.6797	0.7283	0.2090	0.0300	1.010																				
RET	0.0088	0.0080	0.0174	−0.3263	0.1526																				
SOLV	0.8358	0.9281	0.2475	0.0000	1.140																				
RWA	9.529	8.970	12.608	−294.91	285.32																				
Categorical or binary variables																									
IDV	47	46	20.107	14	89																				
UAI	66	70	24.344	8	10																				
IFRS	0.460																								
local	0.540																								
Asia	0.581																								
Europe	0.419																								
CR	1.893	2.000	0.8378	0.000	4.0																				
IS	0.765	1.000	0.4239	0.000	1.0																				
EN	5.381	6.030	1.583	1.15	8.48																				

Panel B: Correlations

	Dependent and independent continuous variables							Dependent and independent Categorical or binary variables							
	LLP	NPL	TD	SIZE	RET	SOLV	RWA	LLP	RWA	IDV	UAI	IFRS	EUROPE	CR	IS
Pearson															
LLP															
NPL	0.022														
TD	−0.700**	−0.190													
SIZE	−0.201**	−0.015	−0.271**												
RET	−0.194**	−0.210	−0.015	−0.042*											
SOLV	−0.025	0.008	−0.056**	0.142**	−0.074**										
RWA	0.194**	0.068**	0.015	−0.290**	0.096**	−0.040									
Spearman															
IDV								−0.185**	−0.130**						
UAI								−0.057**	−0.065**	−0.062**					
IFRS								0.140**	−0.031	0.413**	0.016				
Europe								−0.073**	−0.030	0.723**	0.008	0.669**			
CR								0.067**	0.072**	0.024	−0.268**	−0.114**	−0.161**		
IS								−0.245**	−0.121**	0.166**	0.103**	−0.032	0.213**	−0.039*	
ENF								0.291**	−0.197**	0.015	0.153**	0.099**	0.024	0.112**	0.164**

Please, see Table 3 for definition of variables

*Correlation is significant at the 0.05 level (two-tailed)

**Correlation is significant at the 0.01 level (two-tailed)

Table 9 Results of binary logit regression assessing the effect of culture

	Predict sign	CULT = IDV		CULT = UAI	
		β	Sig.	β	Sig.
Panel A: The effect of culture on loan losses provisions					
Constant		1.678	0.120	0.466	0.482
CULT	−/+	−0.025	0.000	0.003	0.180
NPL	+	10.521	0.000	12.066	0.000
IFRS	+	1.551	0.000	1.145	0.000
CULT*NPL*IFRS	−/+	−0.124	0.000	0.136	0.060
Controls					
B_{level}		Yes		Yes	
C_{level}		Yes		Yes	
Year		Yes		Yes	
Bank-year observations					
Included in the analysis		2562		2562	
Missing cases		588		588	
Total selected		3150		3150	
Nagelkerke R Square		40.7		37.3	
Panel B: The effect of culture on risk weighed assets					
Constant		12.956	0.000	11.700	0.482
CULT	−/+	−0.023	0.000	−0.011	0.000
TD	+	−1.762	0.000	−1.354	0.000
IFRS	+	0.031	0.911	−1.105	0.640
CULT*TD*IFRS	−/+	0.022	0.006	0.039	0.060
Controls					
B_{level}		Yes		Yes	
C_{level}		Yes		Yes	
Year		Yes		Yes	
Bank-year observations					
Included in the analysis		2696		2696	
Missing cases		4		4	
Total selected		2700		2700	
Nagelkerke R Square		40.4		40.4	

Please, see Table 3 for definition of variables

which is consistent with our predictions just for UAI. Also, the interaction between CULT variables and the other two variables (CULT*TD*IFRS) is significantly positive when IDV is used (β = 0.022; p = 0.000) and also positive when is used UAI (β = 0.039; p = 0.000). However, these findings are not as surprisingly as they should be. It has been observed that measures of RWA vary considerably across banks subject to the advanced internal rating-based treatment of the Basel rules (Araten 2013) and the range is risk weighting between banks is "enormous", lowing the confidence on RWA and doubting about the comparing average risk weightings at the group level between banks, namely, in Europe (Samuels 2012). The fourth

report of EBA (2014) says that overall, the documentation provided by banks to develop their report although succinct, "highlighted the banks' use of different definitions for similar concepts. Sometimes they reflect country-specific features, but overall the definitions are bank specific" (EBA 2014).

The variable testing the probability of disclosing RWA given the percentage of total deposits on assets is negative and significant as predicted in both columns ($\beta = -1.767$ when IDV is used; $\beta = -1.354$ when UAI is used; $p = 0.000$ for both) which is consistent with our expectations because the total deposits can reduce the weighed of risks on this type of assets giving a kind of financial support to the bank.

The variable testing the application of IFRSs is not significant. One plausible reason for this situation is because prior studies indicates that banks try to report the most adequate level of RWA to be in compliance with minimum requirements capital, contributing to the dependence of RWA on risk weighs of different type of assets and not standards used.

We rerun the equation again splitting the sample in two: Europe and Asian banks. Similar findings (not tabulated) were found. Some prior studies refer that the distortion on the computation of RWA is questioned (Le Leslé and Avramova 2012; Das and Sy 2012). A notice in Euroweek (2013) says that banks measures producing lower RWAs would appear to have a healthier statement of financial position, but investors and regulators have raised apprehensions that the measure can differ wildly depending on the method banks use to calculate it. We thus consider that our Hypothesis 4b is not supported and culture cannot be accepted as determinant for the probability of disclose RWA.

5 Conclusion

The main contribution of this research is to identify whether national culture accounting regimes and geographies are drivers of Loans loss provisions and risk weighed assets, two proxies for risk-taken in the industry banking. The study addresses this contribution using a sample of European and Asian Banks over the period 2006–2013.

Our empirical findings suggest and confirm prior results found in the unique research using national culture to justify conservatism and risk-taken. Our study notwithstanding extends prior research suggesting that in addition to bank-specific or country-specific typical determinants on banks' risk-taken, we confirm the influence of IDV and UA in loan loss provisions, and we add the accounting regime (IFRS versus local standards). Geographies (Asia versus Europe) reveal to be a substitute for accounting regimes. However, the findings are confused and mixed when Risk-weighted assets is used as proxy of risk-taken instead of loan loss provisions. This finding stays in line with reports done by regulators in the bank-industry documenting that diversity exists in the computation of this ratio and culture, accounting regimes or geographies do not have a stable influence on its development.

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Effects of Macroeconomic Factors on Bank Loans Quality: Evidence from Central and Eastern European Countries

Bilan Irina and Roman Angela

Abstract The objective of our study is to identify the key macroeconomic factors with impact on the dynamics of non-performing bank loans and to empirically assess their contribution in 11 Central and Eastern European countries (namely Bulgaria, Czech Republic, Estonia, Croatia, Hungary, Lithuania, Latvia, Poland, Romania, Slovenia and Slovakia), over the period 2000–2013. Our research is conducted on data from the International Monetary Fund, the World Bank and the Eurostat databases, using panel data estimation techniques. The results of our study show that, among the considered macroeconomic variables, the GDP growth rate, the unemployment rate and the public debt have a significant impact on the ratio of non-performing bank loans in all countries included in our analysis. Our chapter thus underlines that the health of a country's macroeconomic environment is of great importance for bank loans quality and, in general, for ensuring the soundness and stability of the banking sector in the selected Central and Eastern European countries. The added value of our study arises from the inclusion in the analysis of public finance variables, especially of public debt which has proved to have crucial relevance for the financial stability in the context of the recent economic and financial crisis.

Keywords Non-performing loans • Macroeconomic determinants • Public debt • Banks • Economic and financial crisis

1 Introduction

In the years preceding the outbreak of the recent financial crisis, the majority of the new EU member states from Central and Eastern Europe recorded an extremely high and unsustainable growth of the loans granted to the economy, and especially of loans granted to households, that led to the accumulation of high macroeconomic

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and financial imbalances. A special situation was that recorded in Romania and the Baltic States, where the growth rate of the loans granted to the economy was on average over 50 % and 42 %, and the growth rate of the loans to granted to households was on average over 70 % and 46 %, respectively (Roman and Sargu 2011). The extremely rapid growth, expressed through two digits, of the loans granted to the economy, and the large share of foreign currency loans have been important common features of bank crediting in the majority of countries included in our study, with the exception of Czech Republic and Poland. Such dynamics was triggered, on the one hand, by the easy access of banks to international financing, especially from foreign parent banks and, on the other hand, by the particularities of the domestic economic environment, characterized by significant economic growth, decrease of inflation and interest rates, growth of households' incomes and rising prices of real estate assets. From the perspective of commercial banks, such evolutions led to higher risk of deterioration of their loan portfolio quality and also to high exposure to the evolution of real estate market.

On the background of the global economic crisis, as a result of the economic recession, the increase of unemployment rate, the decrease of incomes, the depreciation of some national currencies and the decrease of assets value, especially that of real estate assets, starting with 2009 a significant deterioration of banks loan portfolio quality (especially in Lithuania, Latvia and Romania) and a strong decrease in bank lending were recorded in the majority of countries included in our analysis, having a high negative impact on bank efficiency and soundness, and also on economic growth.

The reduction of the amount of non-performing bank loans and, therefore, the clean-up of the banking sector play an important role, as these loans influence the ability of banks to resume banking activity and to further spur aggregate demand, investment and economic growth. Moreover, a high ratio of non-performing bank loans can become a threat to the financial stability, especially if the provisions of banks are insufficient and their capital buffers are low (European Banking Coordination "Vienna" Initiative 2012). Under such circumstances, the issue of bad bank loans has become the main concern for both national, European and international policy-makers. To address this issue, within the Vienna Initiative it was set up a working group focusing on the management of bad bank loans, especially in the countries of Central, Eastern and Southeastern Europe.

The aim of our study is to empirically investigate, using aggregate data for the period 2000–2013, the key macroeconomic determinants of bank loans quality and of the dynamics of non-performing loans rate in the banking sector of 11 countries from Central and Eastern Europe, that joined the European Union between 2004 and 2013.

With this aim in mind, we've structured our chapter as follows: Sect. 2 is a literature review; Sect. 3 describes the data, the selected variables and the methodology of research, Sect. 4 presents the main results of our empirical study and the final section concludes.

The study contributes to the literature on the determinants of non-performing loans by evaluating the impact of key macroeconomic variables on bank loans portfolio quality in 11 Central and Eastern European countries, included in our

sample. The added value of this study arises from the inclusion in the analysis of public finance variables, especially of the public debt variable, which has proved to have a crucial relevance for the financial stability in the context of the recent economic and financial crisis.

2 Literature Review

The review of recent literature on bank loans quality, usually assessed by the ratio of non-performing bank loans, shows the existence of a large number of studies that empirically investigate the determinants of non-performing loans. The particular interest researchers proved for this issue, especially after the emergence of the international economic crisis in 2008, is due to the major role bank loan portfolio quality plays for ensuring the efficiency and soundness of the banking sector, and also for resuming and promoting economic growth.

Academic literature distinguishes between two types of factors that have an impact on the dynamics of non-performing loans rate, namely *macroeconomic factors* (e.g. GDP growth, unemployment, inflation, exchange rate, interest rate, private sector credit to GDP ratio) and *bank-specific factors* (e.g. capital adequacy, profitability, loans-to-assets ratio, loans' growth, bank size, ownership).

A large number of studies focuses only on the analysis of macroeconomic factors that could have an impact on the dynamics of non-performing loans, concluding that macroeconomic variables are the most important determinants of the quality of bank loans and of the non-performing loans rate, respectively. However, there are also studies that, besides the analysis of macroeconomic factors, also examine the impact of bank-specific factors, underlining their role of early warning indicators for future changes in the non-performing loans rate (Salas and Saurina 2002). Also, we notice that many empirical studies on the determinants of bank loans quality focus on a panel of countries.

Fofack (2005) analyses the main factors that lay behind non-performing loans for a sample of 16 African countries, for the period 1993–2003. Using pseudo-panel models, the author observes that the economic growth, the real exchange rate appreciation, the real interest rate, the net interest margins and the interbank loans could be the key determinants of non-performing loans in these countries.

Using aggregate banking, financial, economic, and legal environment data for a panel of 59 countries for the period 2002–2006, Boudriga et al. (2009) examine the determinants of non-performing loans and the impact of supervision and institutional environment on the exposure to credit risk. The results of their empirical study indicate that capital adequacy ratio, ownership status and provisions ratios have a significant impact on non-performing loans. Also, the authors underline that exposure to credit risk could be reduced by improving legal and institutional frameworks.

Nkusu's study (2011), conducted for a sample of 26 developed countries over the period 1998–2009, seeks, on the one hand, to identify the main macroeconomic and

financial determinants of non-performing loans, and, on the other hand, to assess the reverse effects from non-performing loans to macroeconomic variables. The results of the study show, on the one hand, that the deterioration of the macroeconomic environment (reflected mainly by slow economic growth, the growth of unemployment and the decrease of assets prices) leads to the increase of non-performing loans rate. On the other hand, the sudden growth of non-performing loans has a significant negative impact on macroeconomic performance.

Similarly, De Bock and Demyanets (2012) analyze, for a panel of 25 emerging market countries and over the period 1996–2010, the key macroeconomic determinants of bank assets quality (expressed by the ratio of non-performing loans) and investigate, using a structural panel VAR approach, the presence of feedback effects from the financial sector to the real economy. The authors find, on the one hand, evidence that the economic growth, the exchange rate and the capital flows have a high impact on the quality of bank loans, and, on the other hand, evidence for significant feedback effects from the financial sector to the real economy.

Beck et al. (2013) empirically investigate, using panel data techniques, the impact of macroeconomic and financial indicators on the non-performing loans rate in 75 countries for the period between 2000 and 2010. Their empirical results show that the real GDP is the main determinant of the non-performing loan rate in considered countries. Also, the authors emphasize the negative impact of some other factors, such as exchange rate depreciations (for countries with large amounts of foreign currency loans, in the case of unhedged borrowers), share prices (for countries with high level of stock market capitalization-to-GDP ratio) and the lending interest rate.

Using dynamic panel data approaches, Castro (2013) focuses on the analysis of macroeconomic environment's impact on bank credit risk in five countries (Greece, Ireland, Portugal, Spain and Italy) between 1997Q1 and 2011Q3. His empirical results show that the credit risk is highly influenced by GDP growth, the share and housing price indices, the unemployment rate, interest rate, credit growth, the real exchange rate and also by the recent financial crisis. Also, the author underlines that the economies of the examined countries could be stabilized by implementing measures and programs supporting economic growth and employment, promoting external competitiveness, productivity growth and reducing external and public debt.

With respect to the analysis of non-performing loans in the banking sector of Central and Eastern European countries, especially in the EU New Member States, to our knowledge there is only a limited number of studies. Festic et al. (2011) empirically analyze the relationship between the non-performing loans ratio and some macroeconomic and bank-specific variables in the five EU New Member States (Estonia, Latvia, Lithuania, Bulgaria and Romania) between 1995Q1 and 2009Q2. Their econometric results show that credit growth and the amount of available finance deteriorate the dynamics of non-performing loans. The authors conclude that strong economic growth and a decelerating non-performing loans ratio can be interpreted as a sign of economy overheating and, therefore, a possible threat to the performance of the banking sector.

Jakubik and Reininger (2013) investigate the relationship between non-performing loans and macroeconomic and financial variables in nine countries of Central, Eastern and Southeastern Europe, over the period 2004–2012. Their empirical results show that economic growth is the key determinant of non-performing loans. Also, credit growth and exchange rate volatility have a high impact on the quality of bank assets. By their analysis, the authors draw attention on the risk represented by the excessive credit growth, but also by foreign currency crediting.

Focusing on 16 countries from Central, Eastern and South-Eastern Europe (CESEE) over the period 1998–2011, the results of the empirical study conducted by Klein (2013) show that the level of non-performing loans is influenced by both macroeconomic and bank-specific factors. Also, the analysis confirms the existence of significant feedback effects from the banking system to the real economy in CESEEs.

A similar analysis was conducted by Makri et al. (2014) for 14 countries of the Euro area and for the period 2000–2008. Using the difference GMM estimation technique, the authors show the existence of significant correlations between the rate of non-performing loans and different macroeconomic (public debt, GDP and unemployment) and bank-specific (rate of non-performing loans of the previous year, capital adequacy ratio and return on equity) variables.

Another recent study of interest for European countries is the one conducted by Škarica (2014). The author analyzes, using aggregate data, the impact of macro-economic indicators (the real GDP growth, unemployment rate, nominal effective exchange rate, harmonized index of consumer prices, share prices index and the 3 month money market interest rate) and of the amount of loans in the banking system, on the changes in the non-performing loans rate in Central and Eastern European countries, from 2007 (Q3) to 2012 (Q3). The empirical results show that the real GDP growth and unemployment rates are the most important determinants of the non-performing loans rate in the examined countries.

An overall assessment of existing literature on the issue of the determinants of bank loans quality leads to the conclusion that there can be found some controversial results, mainly generated by the particularities of the macroeconomic environment of the countries included into the analysis, but also and some similarities with regard to the key macroeconomic determinants of the non-performing loans' dynamics.

The literature review shows there are few recent studies analyzing non-performing loans determinants in the New EU Member States. Hence, this chapter brings its contribution to the field by supplying empirical evidence on the main macroeconomic factors that have an impact on the rate of non-performing loans in the 11 countries of the Central and Eastern Europe.

3   Data and Methodology

Our chapter analyses the macroeconomic determinants of bank loans quality on a
panel of 11 Central and Eastern European countries that joined the European Union
during 2004–2013, namely Bulgaria, Czech Republic, Estonia, Croatia, Hungary,
Lithuania, Latvia, Poland, Romania, Slovenia and Slovakia. The analysis covers the
period 2000–2013 and has been conducted on aggregate data coming from IMF
country reports, Eurostat and World Bank's Global Financial Development
Databases.

Our baseline model is a simple time and country fixed effects linear regression
model that links the ratio of non-performing loans to total loans and key macro-
economic variables. The general regression equation is the following:

$$Y_{i,t} = \beta_0 + \beta_1 X1_{i,t} + \ldots + \beta_K Xk_{i,t} + \gamma_2 E_2 + \ldots + \gamma_n E_n + \delta_2 T_2 + \ldots \\ + \delta_m T_m + \varepsilon_{i,t} \tag{1}$$

where: i refers to an individual country ($i = \overline{1,n}$); t refers to year ($t = \overline{1,m}$); $Y_{i,t}$
refers to the dependent variable (the ratio of non-performing loans to total loans);
$Xk_{i,t}$ represent the independent variables (the macroeconomic determinants of
non-performing loans); β_k are the coefficients for the independent variables; E_n
are the country binary (dummy) variables and γ_n their coefficients; T_m are the time
binary (dummy) variables and δ_m their coefficients; β_0 is the constant term; $\varepsilon_{i,t}$ is the
error term.

The results of the Hausman test have indicated that the fixed effects estimation
technique is preferred to the random effects. The fixed effects estimation allows us
to remove the effect of time-invariant differences between countries, so we can
assess the net effect of the predictors on the outcome variable. To see if time fixed
effects are needed we have tested if the dummies for all years are equal to 0; as they
aren't, time dummy variables have also been included in the model. In our estima-
tion we have used Huber/White (sandwich) estimators to control for heteroske-
dasticity, as the results of the modified Wald test for groupwise heteroskedasticity
in fixed effects regression model have rejected the null hypothesis of
homoscedasticity.

In our baseline model, we have considered as macroeconomic determinants of
non-performing loans the same year's real GDP growth rate, inflation, unemploy-
ment, exchange rate and two public finance variables, namely the government
budget balance and public debt (details on the selected variables and their expected
relationship can be found in Table 1). Given the persistence of non-performing
loans, in our subsequent models we have also included on the right-hand side of the
Eq. (1) a lagged term of the dependent variable ($npbl_{i,\,t-1}$), expecting for a positive
correlation. As high non-performing loans to total loans rates may also affect
economic growth, reverse causality issues may arise, so we have also took into
consideration an 1 year lag of the real GDP growth rate as regressor.

Table 1 Definitions of the variables and their expected relationship

Variables	Symbol	Description	Expected effect
Dependent			
Non-performing loans	npbl	The ratio of non-performing loans (as loans more than 90 days past due) to total bank loans—it is a proxy for credit risk and a measure of banks' asset quality and of the soundness of their credit portfolio	
Independent			
Macroeconomic (external) factors			
Economic activity	gdp	Annual real GDP growth rate (%)	−
Inflation	infl	Inflation rate [annual average rate of change (%)]	+/−
Unemployment	unemp	Harmonized unemployment rate (%)	+
Government budget balance	bug_bal	General government budget balance [deficit (−) or surplus (+)] as percentage of GDP	−
Public debt	debt	General government consolidated gross debt as percentage of GDP	+
Exchange rate	exch	Real effective exchange rate with reference to the 28 EU members	−/+

Source: Authors' elaboration based on the academic literature

In our analysis, the dependent variable is the quality of bank loans, as reflected by the ratio of non-performing loans (npbl), calculated as the share of non-performing loans to total bank loans, which is one of the most important indicators measuring the health of loan portfolio and also the performance and soundness of banks. As the value of the ratio of non-performing loans is restricted to a finite interval (0–100 %), we have applied the logistic transformation to this variable. The central banks of the countries in our sample take into consideration as key element when defining non-performing loans the recommendations of the IMF Financial Soundness Indicators Compilation Guide (including the amendments approved in 2007) (IMF 2006, 2007), saying that a loan is non-performing if the payments of principal or interest are past due by 90 days or more. Our study is based on aggregated data on non-performing loans ratio for the entire banking sector in each country in the sample, presenting the advantage, in the opinion of some authors such as Boudriga et al. (2009) or Makri et al. (2014), compared to data for individual banks, that it reduces the risk of non-representativeness of the sample.

As mentioned in the paragraph devoted to literature review, the non-performing loans rate is mainly influenced by two types of factors, *macroeconomic* and *bank-specific* ones. Since our study is only concerned with the first category of factors, in their selection based on the academic literature we took into account the criteria of representativeness and availability of data for all the countries in our sample. Thus, in our research we have included as potential determinants of the bank credit quality or of the level of non-performing loans rate *six explanatory (independent) variables*, as follows:

The annual real GDP growth rate (gdp) is used in our study as a proxy variable for the economic activity and is expected to influence the bank loans quality or the rate of non-performing loans. When economic activity slows down, incomes decrease, more and more firms go bankrupt, difficulties in making payments are registered and the ability of borrowers to service their debts decreases, leading to the deterioration of the bank loans portfolio quality. Therefore, a negative relationship is expected between the GDP growth rate and the ratio of non-performing loans. Such a relation is also attested for in the empiric literature (Fofack 2005; Nkusu 2011; De Bock and Demyanets 2012; Filip 2014; Jakubik and Reininger 2013; Klein 2013; Beck et al. 2013; Castro 2013; Makri et al. 2014; Škarica 2014; Chaibi and Ftiti 2015).

Inflation (infl)—according to existing empirical studies, the relationship between inflation and the non-performing loans rate is mixed (Nkusu 2011; Castro 2013; Klein 2013; Škarica 2014; Chaibi and Ftiti 2015). On the one hand, a high inflation rate can reduce the real value of outstanding loans, which makes it easier for borrowers to service their debts. On the other hand, a high inflation rate leads to a fall in real incomes, so the ability of borrowers to service their debts deteriorates. Therefore, the relationship between inflation and the non-performing loans rate can be either negative or positive.

Unemployment (unemp) has an impact on credit quality and so on the level of non-performing loans rate. An increase in unemployment leads to lower revenues, the demand for goods and services reduces and the ability of borrowers to service their debts diminishes. Therefore, unemployment is positively correlated with the non-performing loans rate, which is empirically attested for by the research undertaken by Nkusu (2011), Klein (2013), Castro (2013), Makri et al. (2014), Škarica (2014), Chaibi and Ftiti (2015).

With regard to *public finance variables* [the government budget surplus or deficit as percentage of GDP (bug_bal) and the government consolidated gross debt and as percentage of GDP (debt)], these macroeconomic variables are rarely analyzed as determinants of non-performing loans in empirical studies. However, the realities of the past few years, mainly the European sovereign debt crisis and its effects on the banking sector, proved the necessity of taking into account such variables as potential determinants of the level non-performing loans. According to Makri et al. (2014) and Castro (2013), we expect a positive correlation between public debt and non-performing loans and a negative correlation between government budget balance as percentage of GDP and non-performing loans.

The exchange rate is reflected in our work through the *real effective exchange rate (exch)*, with reference to the 28 EU members. According to the results of other empirical studies (Nkusu 2011; Klein 2013; Castro 2013; Škarica 2014; Chaibi and Ftiti 2015), the relationship between the exchange rate and the non-performing loans rate may be either negative or positive. On the one hand, an increase in the exchange rate or the appreciation of the domestic currency under question may entail (Nkusu 2011) the reduction of firms' exports, which decreases their ability to service their debts, bank loans included, and thus the quality of bank loans decreases and the ratio of non-performing loans increases. On the other hand, the

appreciation of the national currency may positively affect borrowers who contracted debt in foreign currency, and thus the ratio of non-performing loans may decrease.

4 Empirical Results and Discussions

The summary statistics for the selected variables for our panel of 11 countries are presented in Table 2. As regards the ratio of non-performing loans, indicator of the quality of bank loans, its average value is 7.08 % and it shows high disparity between countries (it varies between 0.20 % in Estonia, in 2005 and 2006, and 29.30 % in Czech Republic, in 2000). The annual real GDP growth rate records an average of 3.34 % and high deviations from this average, respectively a minimum value of −17.70 % (in Latvia, in 2009) and a maximum value of 11 % (in Latvia, in 2006).

Inflation rate has reached an average value of 4.83 %, with a minimum value of −1.20 % (Latvia, 2010) and a maximum of 45.70 % (Romania, 2000). The average unemployment rate has been 10.70 %, the minimum value of the unemployment rate has been 4.30 % (Lithuania, 2007) and the maximum one 20 % (Poland, 2002). With regard to the government budget balance, the average value indicates a deficit of 3.37 % of GDP, while significant disparity is also recorded between countries, ranging between a budget deficit of 14.60 % of GDP (Slovenia, 2013) and a budget surplus of 3.30 % (Estonia, 2006). The public debt variable has reached an average of 34.07 % and varies between a minimum value of 3.70 % of GDP (Estonia, 2007) and a maximum value of 81 % of GDP (Hungary, 2011). The exchange rate has recorded an average of 104.85 %.

Table 3 presents the results of estimates on the impact of selected macroeconomic factors on the rate of non-performing loans for the 11 Central and Eastern European countries included in our sample. For reasons of space economy, the parameters of time dummy variables have not been reported.

We can see that the annual real GDP growth rate (gdp) is an important macroeconomic determinant of the quality of bank loans and also of the non-performing loans rate. As expected, the coefficient is statistically significant and negative,

Table 2 Descriptive statistics of the variables used in our analysis

Variables	Mean	Min	Max	Std. dev.
Non-performing loans (npbl)	7.08	0.20	29.30	5.83
Annual real GDP growth rate (gdp)	3.34	−17.70	11.00	4.54
Inflation rate (infl)	4.83	−1.20	45.70	5.30
Unemployment rates (unemp)	10.70	4.30	20.00	4.23
Government budget balance (bug_bal)	−3.37	−14.60	3.30	2.96
Public debt (debt)	34.07	3.70	81.00	18.83
Exchange rate (exch)	104.85	76.48	133.71	12.08

Table 3 Estimation results

	Model 1	Model 2	Model 3
L.npbl		0.536*** (8.69)	0.499*** (8.04)
L.gdp			−0.0185 (−0.90)
gdp	−0.0554* (−2.62)	−0.0627*** (−4.91)	
infl	−0.00766 (−0.73)	0.00219 (0.20)	0.0105 (0.67)
unemp	0.163*** (5.98)	0.0741*** (5.39)	0.0905** (3.30)
bug_bal	−0.0454 (−2.14)	−0.0355 (−2.06)	−0.0595* (−2.68)
debt	−0.0235* (−3.10)	−0.0197** (−4.00)	−0.0192** (−3.37)
exch	−0.0150 (−1.19)	−0.0102 (−1.27)	−0.00611 (−0.68)
_cons	−2.235 (−1.33)	−0.738 (−0.85)	−1.789 (−1.48)
N	154	143	143
R^2	0.8521	0.9152	0.9017

Notes: Heteroskedasticity-robust standard errors, t statistics in parentheses

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

which indicates that improving economic conditions and higher economic growth lead to reducing non-performing loans rate. Just as the GDP growth rate, the unemployment rate (unemp) also has an important impact on the rate of non-performing loans. Its coefficient is statistically significant and positive, in line with our expectations and in accordance to the results of the above mentioned empirical studies.

With regard to inflation (infl), its association with the non-performing loans rate is positive, according to the above theoretical arguments. An increase of the inflation rate leads to an increase of the non-performing loans rate, as a result of reduced real incomes of borrowers, which damages their ability to service their debts. However, the coefficient is not statistically significant, in agreement with the results obtained by Castro (2013). The author shows that an increase of inflation causes not only a decrease of real incomes, but also a decrease of the real outstanding loans value. Therefore, one effect is canceled by the other so that the final impact of inflation may not be significant. The results of our estimates also reflect, as expected, a negative correlation between the government budget balance as percentage of GDP and the non-performing loans rate, but the coefficient is not statistically significant, in accordance with the results of Makri et al. (2014).

Regarding the public debt variable, surprisingly our results do not confirm the sign of correlation identified in other empirical studies on the macroeconomic

determinants of non-performing loans, in the sense that an increase of the general government debt as % of GDP leads to a decrease of the rate of non-performing loans. We should consider, in this regard, several possible explanations. The negative effects of rising public debt on financial stability are felt especially when the former records high, unsustainable values. However, the public debts of Central and Eastern European countries are not, in general, very high by other European countries standards (by our calculations, based on data from Eurostat database, the average general government debt was in 2013, for the European countries in our sample, of 34.07 % of GDP, compared to the EU average of 72 %). Moreover, some empirical studies confirm that the effects of public debt on the economy become negative only after it exceeds a certain threshold, estimated for the developed European countries at about 90 % of GDP (Reinhart and Rogoff 2010a, b; Checherita and Rother 2010; Baum et al. 2012). Another possible explanation is related to the fact that during the recent crisis public debt growth has also occurred as a result of government taking over the assets of distressed banks. In these conditions, public debt increase appears to be correlated with a decrease of the rate of non-performing loans.

With reference to the exchange rate (exch), the relationship is negative and in line with our expectations, meaning that an increase in the exchange rate (which expresses an appreciation of the domestic currency) positively affects borrowers who have contracted foreign currency loans, which leads to a lower non-performing loans rate. But, surprisingly, the coefficient is not statistically significant, in agreement with the results of Škarica (2014). An important feature of most of the countries in our sample (provided they are not members of the euro area) is the large share of foreign currency loans, so it was expected that the non-performing loans rate would significantly react to exchange rate changes.

5   Conclusions

It's well known that a healthy, solid and stable banking sector ensures an efficient allocation of resources and plays a crucial role in supporting the real economy, promoting sustainable economic growth and ensuring financial stability. One of the key factors of influence on the stability and soundness of a bank is the quality of its loan portfolio, primarily measured by the non-performing loans rate. During the recent international financial crisis, the banking sectors in most countries showed a significant deterioration in their loan portfolio quality. As a result of the economic recession, rising unemployment, reducing household incomes and the national currency depreciation that have been registered in some countries, banks recorded a significant, even alarming increase of their non-performing loans rate, particularly in Latvia, Lithuania and Romania.

The issue of bank loan portfolio quality is, especially after the onset of the international economic crisis in autumn 2008, a topic of great interest to both researchers and policy makers, as a result of the major importance that it has for

ensuring banking sector health and soundness, and, in general, for resuming and promoting economic growth. Also, the significant deterioration in the quality of bank loans can be a threat to financial stability, especially if the provisions of banks are insufficient and their capital buffers are low (European Banking Coordination "Vienna" Initiative 2012).

On this background, our study aimed to empirically investigate the impact of some macroeconomic factors on the quality of bank loans, respectively, on the evolution of the non-performing loans ratio, in the banking sectors of 11 countries from Central and Eastern Europe, that joined European Union during 2004–2013, namely Bulgaria, Czech Republic, Estonia, Croatia, Hungary, Lithuania, Latvia, Poland, Romania, Slovenia and Slovakia. The independent variables which were empirically investigated are: GDP growth rates, inflation, unemployment, government budget balance, public debt and exchange rate. The added value of the study arises from the inclusion in the analysis of public finance variables, especially of the public debt variable which has proved, in the context of the recent economic and financial crisis, to be very relevant for ensuring financial stability.

The results of our analysis generally are in line with the findings of other empirical studies. GDP growth rate and unemployment rate were found to be the key macroeconomic factors that affect the quality of bank loans (the non-performing loans ratio) in our country group. Therefore, the real economy has a decisive impact on the health of the banking sector, as reflected by the quality of bank loan portfolio. This confirms the vital need to adopt measures and programs to boost economic growth and recovery, thus ensuring the health and soundness of the banking sector.

Our empirical study also showed that the effects of inflation, government budget balance and exchange rates are in line with economic theory and the findings of other studies; however, these variables were not found to be significant determinants of the quality of bank loans in our countries. With regard to public debt variable, our results did not confirm the sign of the relationship identified in other empirical studies, and some possible explanations, particular to CEE countries, have been drawn.

Given the importance of the topic we addressed in this chapter, we consider appropriate to further expand our analysis by empirically investigating the impact of other macroeconomic factors (the real interest rate, the private sector credit to GDP ratio), but also of some bank-specific factors, on the quality of bank loans portfolio in the banking sectors of the EU28 Member States. It would also be of interest to empirically investigate the feedback effects of bank loans quality on the real economy.

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Stock Market Reactions to Credit Ratings Across the Subprime Crisis

Eleonora Isaia, Marina Damilano, and Cristina Rovera

Abstract At the time of the subprime crisis, investors strongly blamed credit rating agencies (CRAs). Six years later, we want to verify if CRAs are still suffering a reputational damage by measuring stock prices reactions to rating announcements. To test our hypothesis we conduct an event analysis on the American, EU area and Asian/Pacific stock markets over a 10-year period from November 2003 to November 2013. We find that the post-crisis abnormal returns are in general lower if compared with the pre-crisis level, in particular if rating changes are far away from the speculative-junk border.

Keywords Rating agencies • Information efficiency • Stock market returns • Subprime crisis

1 Introduction

At the time of the subprime crisis, investors strongly blamed credit rating agencies (CRAs) for failing in evaluating the credit risk of collateralized securities and, more in general, the probability of default of issuer companies, giving misleading, if not wrong, signals to the market. Therefore, in this chapter we want to verify if CRAs are still suffering a reputational damage by measuring stock prices reactions to rating announcements. Our assumption is that, if the market is still considering rating agencies unable to produce additional and reliable information, it should not react to rating actions or react less than before the subprime crisis, in particular when the market activity is far from the speculative-junk border and thus not driven by regulatory constraints.

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2   Literature Review

The literature on rating is extensive. One branch of the scientific literature deals with the conflict of interest related to the rating agencies. Our chapter, instead, pertains to another branch of the literature. It focuses on the market responsiveness to rating changes. The work of Gonzalez et al. (2004) offers a literature review of the effects of ratings on market dynamics. Further in-depth analysis on the topic can be found in the works of Katz (1974), Hand et al. (1992), Followill and Martell (1997), Liu et al. (1999), Steiner and Heinke (2001), Ammer and Clinton (2004), Linciano (2004), Martell (2005), Afonso et al. (2012), Grothe (2013) who claim that downgrades have, on average, a greater impact than upgrades have.

The parameters on the basis of which a rating is determined are investigated in the works of Norden and Weber (2004), Micu et al. (2006), Steiner and Heinke (2001), Opp et al. (2013), Jorion and Zhang (2006), Hill et al. (2010), Arezki et al. (2011), Iannotta et al. (2013), Bar-Isaac and Shapiro (2013).

Norden and Weber (2004) have proved whether S&P, Moody's and Fitch can or cannot convey new information to the market. Steiner and Heinke (2001) give instead great importance to the security issuers' country, while Arezki et al. (2011) dwell upon the type of announcement and upon the agency that issues it. Jorion and Zhang (2006) maintain that the market response might also depend on the value of the rating preceding the announcement. With the help of empirical tests, the authors demonstrate greater price changes when low ratings are issued. Iannotta et al. (2013) insist on the opacity of negotiation procedures, reducing in this way the explanatory power of ratings and the interpretation of results, while Bar-Isaac and Shapiro (2013) dwell on the economic cycle under way, by observing its countercyclical trend over the ratings quality: lower ratings accuracy in boom times and higher accuracy in recessionary times.

3   The Methodology

The sample consists of 1455 ratings revisions from November 1st 2003 to November 1st 2013. The type of rating actions taken into consideration are restricted to S&Ps, Fitch and Moody's issuer rating, long term issuer default and outlook, with positive and negative watches, if there. Rating actions and all the data have been extracted from the Bloomberg database. In order to standardize the three conventional alpha-numerical scales used by CRAs, we covert their ratings into a single numerical scale that goes from excellent to poor: AAA (or similar) is equal to 1, while B- (or similar), which is the lowest rating of our sample, is equal to 16. The positive and negative watches are equal to -0.25 and $+0.25$ respectively.

Our analysis considers the 150 most representative companies in the American, Euro zone and Asian/Pacific markets selected by using the components of the

following blue-chip regional indexes: STOXX USA 50, EURO STOXX 50 and STOXX Asia/Pacific 50.

The time frame has been split into three shorter sub-periods, in order to gauge the impact of the sub-prime mortgages financial crisis on the reliability of rating agencies:

(a) Pre-crisis (01/11/2003–15/09/2008, Lehman Brother bankruptcy)
(b) Crisis (i.e., the peak of the crisis, 16/09/2008–15/10/2009, Vix index return to the pre-crisis mean level);
(c) Post-crisis (16/10/2009–01/11/2013).

The main characteristics of the sample are summarized in Table 1, which shows a prevalence of downgrades (584) compared to upgrades (462). Moreover, it can be noted how 32 % of downgrades is affected by an earlier rating revision occurred in the previous month, compared with 18 % of the upgrades. Likewise, data show that in 111 cases, downgrades have been anticipated by the use of a watch in the same direction while appreciations have been found only in 54 cases.

For what concerns the composition of the sample by the category of the issuer company, about 2/3 of rating events involve non-financial firms (which represent 76 % of the firms in the sample), with an almost consistent distribution between downgrades and upgrades, while financial companies (including banks) show an imbalance in favor of downgrades.

As a consequence after the turmoil in the markets originated by the financial crisis of sub-prime mortgages, most of the downgrades (65 %) were recorded in the years following the Lehman Brothers bankruptcy, while the same percentage refers to the upgrades in the pre-crisis period.

Considering now the geographical areas, the sample has been divided into 477 observations related to companies listed in Euro zone markets, 323 ratings events related to American issuers and 246 revisions of assessments on the credit-worthiness of Asian companies in Australia, Japan, Hong Kong or Singapore. The largest number of observations recorded in the European market has been associated with the highest percentage of downgrades (47 %) and upgrades (44 %).

However, the cross-analysis of subsamples portrayed in Table 2 shows a greater incidence of downgrades in the United States during the peak of the financial crisis (2008–2009) and referred to financial and banking companies only.

Table 3 shows the distribution of ratings events by the category of investment grade versus speculative grade. Data show the obvious predominance within the sample of companies with a good credit quality (observations that fall within the investment grade category are 1090 and represent 97 % of the total number of events, excluding outlooks). In the present analysis, the Euro zone stands out for the largest number of events registered in the ratings grades known as "border" (between the BBB+/Baa1 rating classes and BB−/Ba3). This is true whether only current ratings are considered and if the reviews of previous ratings have been aggregated to it.

Finally, matching the data of Table 1 with those of Table 3 it can be seen that within the 584 downgrades there are only 2 cases of passing from the category of

Table 1 Classification of ratings events (November 1st 2003–November 1st 2013)

	Downgrade	Upgrade	Outlook	Other events[a]	Total
By ratings agency					
Fitch	160	93	78	46	**377**
Moody's	175	111	118	30	**434**
Standard & Poor's	249	258	106	31	**644**
Total	**584**	**462**	**302**	**107**	**1455**
Of which:					
– Contaminated	*187*	*83*	*162*	*25*	***457***
– Anticipated by watch	*111*	*54*	*–*	*–*	***165***
By category of the issuer company					
Financial companies	227	132	79	18	**456**
Of which:					
– Banks	*144*	*83*	*45*	*8*	***280***
Non-financial firms	357	330	223	89	**999**
Total	**584**	**462**	**302**	**107**	**1455**
By period of time					
Pre-crisis	202	298	45	60	**605**
Crisis	124	26	16	19	**185**
Post-crisis	258	138	241	28	**665**
Total	**584**	**462**	**302**	**107**	**1455**
By geographical area					
USA	200	123	91	42	**456**
Euro zone	275	202	114	34	**625**
Of which:					
– Belgium	*0*	*3*	*3*	*2*	***8***
– Germany	*69*	*50*	*36*	*7*	***162***
– Spain	*63*	*37*	*9*	*1*	***110***
– France	*72*	*68*	*44*	*20*	***204***
– Ireland	*4*	*3*	*3*	*1*	***11***
– Italy	*61*	*28*	*11*	*0*	***100***
– The Netherlands	*6*	*13*	*8*	*3*	***30***
Asia	109	137	97	31	**374**
Of which:					
– Australia	*43*	*32*	*28*	*12*	***115***
– Hong Kong	*3*	*4*	*6*	*2*	***15***
– Japan	*63*	*97*	*57*	*17*	***234***
– Singapore	*0*	*4*	*6*	*0*	***10***
Total	**584**	**462**	**302**	**107**	**1455**

[a]Other events include ratings confirmed, deleted or with developing watches
The bold and italic values are statistically significant

investment grade to the speculative grade one while in the 462 upgrade cases only 6 changes are registered.

In conclusion, one final comment on the distribution of ratings events per year. Figure 1 represents the evolution of the total number of observations—highlighting

Table 2 Distribution of ratings events by subsamples

	Downgrades			Upgrades		
	Financial companies	*Of which: banks*	Non-financial firms	Financial companies	*Of which: banks*	Non-financial firms
	US					
Pre-crisis	26	*11*	56	27	*17*	55
Crisis	45	*27*	15	4	*2*	3
Post-crisis	29	*18*	29	4	*1*	30
	EU					
Pre-crisis	9	*6*	84	35	*24*	86
Crisis	20	*10*	23	3	*2*	11
Post-crisis	74	*58*	65	22	*15*	45
	Asia					
Pre-crisis	1	*1*	26	26	*17*	69
Crisis	5	*2*	16	1	*1*	4
Post-crisis	18	*11*	43	10	*4*	27

The italic values are statistically significant

Table 3 Distribution of ratings events by category: investment grade versus speculative grade

	Investment grade	Speculative grade	Total	*Of which: current ratings border*	*Of which: current or last rating border*
By time span					
Pre crisis	525	22	**547**	*127*	*156*
Crisis	157	1	**158**	*32*	*33*
Post crisis	408	5	**413**	*98*	*116*
Total	**1090**	**28**	**1118**	*257*	*305*
By geographical area					
USA	338	8	**346**	*40*	*52*
EU	500	3	**503**	*142*	*168*
Asia	252	17	**269**	*75*	*85*
Total	**1090**	**28**	**1118**	*257*	*305*

The bold and italic values are statistically significant

the number of events with positive or negative watch in a separate bar—distributed by downgrade, upgrade and outlook. Moreover, despite the "abnormal" values of 2003 and 2013 collecting the revisions of only 2 and 10 months respectively, the chart shows a significant reduction in the ratings agencies activity in 2010, when the number of ratings events falls by 32 % compared to the previous year, and
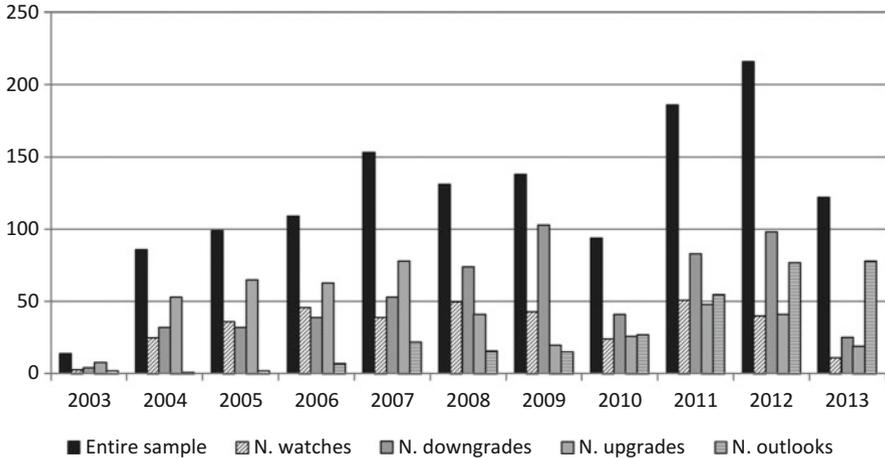
Fig. 1 Distribution of ratings events per year (November 1st 2003–November 1st 2013)

eventually rises of 98 % the following year. In particular, during that year the increase of upgrade and outlook cases appears to be counterbalanced by the strong decrease in downgrade events, after the critical 2-year period of 2008–2009 when downgrades were almost doubled compared to the pre-crisis levels.

To test our hypothesis we conduct an event analysis on our sample. Thus, for all stocks under revision, we calculate the cumulative abnormal return (CAR) over a [−1;+1] day window around the rating event, following the CAPM and estimating Beta over a 500-day window. Then, we conduct a multivariate OLS regression: our dependent variable is the absolute value of the 3-day cumulative abnormal returns, ABS_CAR, following Grothe (2013), as we want to analyze the size and not the sign of the market reaction. The independent variables are detailed in Table 4. In line with previous works on the topic, they are mainly related to: the crisis/post-crisis period, the type of rating actions, the market conditions, the nature of the issuer company and the geographical area.

4   The Findings

Findings are summarized in Table 5. If we first focus on the entire sample, column (1) shows that ABS_CARs are bigger when the market and the stock itself are more volatile, as well as during the peak of the crisis period. Nevertheless, it has to be noticed that outlier observations display a strong explicative power.

In column (2) we add some independent variables in order to improve the estimation model and better evaluate the market reaction to rating announcements during the post-crisis period. To this end, we create three new independent variables, simply multiplying two single regressors, NOBORDER_POSTCRISIS,

Table 4 Independent variables of the OLS regression

Name	Definition	Expected sign of the coefficient
DUMMY_CRISIS	Dummy variable which is equal to 1 for all rating actions between September 15, 2008 and October 15, 2009 and 0 otherwise	?
DUMMY_POSTCRISIS	Dummy variable which is equal to 1 for all rating actions after October 15, 2009 and 0 otherwise	−
VIX	Value of the VIX index on the announcement day of the rating action	+
DEVST	Standard deviation of the 50-day daily returns preceding the rating action for the specific stock under revision	+
CONTAMIN	Dummy variable which is equal to 1 if the distance between two consecutive rating actions on the same company is lower than 30 days and 0 otherwise	−
DUMMY_FINANCIAL	Dummy variable which is equal to 1 if the rating action concerns a financial company and 0 otherwise.	+
DUMMY_OUTLIERS	Dummy variable which is equal to 1 if the ABS_CAR of a specific stock under the rating action is an observation that lies outside of the overall pattern of other observations and 0 otherwise	+
BORDER_POSTCRISIS	Dummy variable that is equal to 1 if the rating action is in the post-crisis period and concerns a company whose last or current ratings are between BBB+ and BB− (speculative-junk grade border) and 0 otherwise	?
NOBORDER_POSTCRISIS	Dummy variable that is equal to 1 if the rating action is in the post-crisis period and concerns a company whose last or current ratings are not between BBB+ and BB− (speculative-junk grade border) and 0 otherwise	−
WATCH_POSTCRISIS	Dummy variable that is equal to 1 if the rating action is in the post-crisis period and consists in a credit warning instead of a downgrading or upgrading and 0 otherwise	−
DUMMY_US	Dummy variable which is equal to 1 if the rating action concerns an American company and 0 otherwise	−

(continued)

Table 4 (continued)

Name	Definition	Expected sign of the coefficient
DUMMY_EU	Dummy variable which is equal to 1 if the rating action concerns a Euro area company and 0 otherwise	−
DUMMY_EU2_CTRY_SOVCRISIS	Dummy variable which is equal to 1 if the rating action concerns a Euro area company involved in the sovereign crisis (Ireland, Italy Spain, and France) and 0 otherwise. The Euro area sovereign crisis period has been defined from April 1, 2010 to December 31, 2012	+

BORDER_POSTCRISIS and WATCH_POSTCRISIS, that help us to compare the relationship between the market reactions across the speculative-junk border and as a consequence of credit warnings before and after the sub-prime crisis. Then, we include the DUMMY_FINANCIAL in the second model. In line with our research question, the absolute value of abnormal cumulative returns are lower if compared with the pre-crisis level for those ratings far away from the speculative-junk border, where the market activity is not contaminated by regulatory constraints. On the contrary, the market reaction around the threshold is not significant and does not exhibit any difference with respect to the pre-crisis period. Credit warnings seem to maintain their informative power, as generally proved in literature, even if this evidence is not confirmed in the further sub-sample analysis and almost always is not significant. The DUMMY_FINANCIAL has a positive coefficient and is statistically significant indicating that financial firms have been experienced higher abnormal returns than non-financial companies both in the crisis and post-crisis periods. This result confirms our expectations, since banks and financial firms have been swamped by the long wave of Lehman collapse.

However, if we exclude the outliers—column (3)—regressors' signs and P-values remain almost unvaried, but the R-squared of the regression decreases significantly. Column 4 restricts the sample only to banks and confirms that rating agencies lose their informative power and/or their credibility when they do not display a regulatory function. In fact, the negative sign and the significant P-value of the NOBORDER_POSTCRISIS show that the market reaction far from the borderline is lower than in the pre-crisis period. The same result, i.e., the lower market reaction compared to the pre-crisis span, is obtained around the critical threshold, but in this case it is not statistically significant. Furthermore, DUMMY_US indicates that the negative impact of the subprime crisis on the rating agencies reliability is stronger in the US stock market. The DUMMY_CONTAMIN displays the expected sign, since cumulative abnormal returns should be lower when rating actions are closely preceded by another rating announcement, but it is not significant.

Table 5 Explicative variables of the ABS_CAR

	(1) Entire sample	(2) Entire sample	(3) Entire sample without outliers	(4) Sub-sample BANKS	(5) Sub-sample US Contamin = 0	(6) Sub-sample EU	(7) Sub-sample ASIA
C	0.007 (2.061)	0.006 (1.281)	0.002 (0.571)	−0.000 (−0.134)	0.008 (1.188)	0.002 (0.608)	−0.006 (−0.324)
DUMMY_CRISIS	0.018*** (3.337)	0.018** (2.375)	0.012** (1.987)	0.019 (1.346)	0.025** (1.978)	0.006 (0.821)	0.006 (0.495)
DUMMY_POST CRISIS	−0.002 (−1.285)						
DUMMY_OUTLIERS	0.584*** (5.060)	0.838*** (6.011)					
CONTAMIN				−0.004 (−0.976)			
VIX	0.0005*** (2.599)	0.000* (1.942)	0.000*** (4.186)	0.001** (2.354)	0.000 (1.135)	0.000* (1.768)	0.003 (1.23)
DEVST	0.489*** (3.549)	0.421*** (2.689)	0.396*** (2.586)	0.760** (2.455)		0.793*** (3.111)	1.478* (1.649)
NOBORDER_POST CRISIS		−0.008*** (−3.045)	−0.009*** (−4.018)	−0.0166** (−2.412)	−0.006* (−1.728)	−0.009** (−2.346)	−0.013*** (−2.528)
BORDER_POST CRISIS		0.007 (1.562)	0.006 (1.379)	−0.001 (−0.116)	−0.005 (−1.002)	0.002 (0.2677)	−0.0007 (−0.082)
WATCH_POST CRISIS		0.0103** (2.540)	0.010 (2.563)	0.003 (0.574)	−0.000 (−0.398)	0.004 (0.922)	0.030*** (2.612)
DUMMY_FINANCIAL		0.004* (1.878)	0.004* (1.860)		0.009** (2.422)	0.004 (1.237)	−0.001 (−0.303)

(continued)

Table 5 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Entire sample	Entire sample	Entire sample without outliers	Sub-sample BANKS	Sub-sample US	Sub-sample EU	Sub-sample ASIA
					Contamin = 0		
DUMMY_US				−0.0123* (−1.916)			
DUMMY_EU2_CTRY_ SOV_CRISIS						0.003 (0.380)	
Adjusted R^2	0.58	0.67	0.18	0.34	0.26	0.22	0.17
No. of observation	1455	1117	1113	202	220	503	175

Notes: The t-stat are reported in brackets under each coefficient. White heteroskedasticity-consistent standard errors and covariance
*significant at 10 % level; **significant at 5 % level; ***significant at 1 % level with a two-tailed test
The bold values are statistically significant

Then, we test the same model of column 4 on the financial and non-financial sub-samples. Results are omitted due to lack of space, but they confirm lower CARs in absolute value in the no-border market activity in the post-crisis years, even if the evidence is weaker for non-financial firms suggesting that rating agencies might have suffered a stronger reputational damage in the banking and financial sector. Finally, columns (5) to (7) compare the three different geographical areas. Each regression confirms our main finding, that is NOBORDER_POSTCRISIS with negative sign and statistical significance. In the US sub-sample, represented in column (5), we exclude the outlier observations otherwise the R-square would jump to 0.82. In the EU sub-sample—column 6—the effect of the subprime crisis on rating agencies credibility is mixed with the impact of the sovereign crisis, that scattered on the so called Euro2 countries. The DUMMY_EU2_CTRY_-SOVCRISIS does not display a significant explicative power suggesting that deeper investigation is needed. We will take it into consideration in the further steps of our research project.

5   Summary and Conclusions

In conclusion, the findings of the analysis seem to prove the effectiveness of our research question: in line with previous works on the same topic, the big distinction between the informative power and the regulatory function of CRAs is confirmed. This evidence is even stronger in the post-crisis period, proving that, at least in the banking and financial sector, the faith on rating agencies capacity to gauge credit risk has been undermined by the subprime crisis scandals. The global stock markets do not longer have the same confidence in credit rating agencies as before the subprime crisis. In fact, in our analysis the post-crisis CARs are in general lower if compared with the pre-crisis level, especially when we look at those ratings far away from the speculative-junk border, where the market activity is not contaminated by regulatory constraints. The same result is obtained when restricting the sample to banks and financial firms, confirming that CRAs lose their informative power and/or their credibility when they do not display a regulatory function. Nevertheless, moving to the non-financial firms subsample, this evidence is weaker suggesting that CRAs might have suffered a stronger reputational damage in the banking and financial sector. Finally, comparing the three different geographical areas, we find that the negative impact of the subprime crisis on the rating agencies reliability is more significant in the US stock market.

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Does the Market Trust Credit Rating Agencies After the Subprime Crisis? A Comparison Between Major and Minor Agencies

Paola De Vincentiis and Patrizia Pia

Abstract As a consequence of the subprime crisis the credit rating agencies suffered a reputation damage. In this chapter we gauge the extension of this reputation damage by looking at the market's reaction to rating actions. Through a standard event-study methodology, we measure the abnormal return of stock prices in the 3-day window centered on the announcement day during the decade 2003–2013. Our thesis is that the market reaction to rating actions should be lower—after the crisis—than it used to be, due to a lack of trust in the reliability of the rating agencies. The evidence strongly supports the thesis. In line with previous literature, we find that—as a consequence of the "certification" role that many regulations recognize to rating agencies—the abnormal return is stronger when the valuation is near to the border between investment and speculative grade. On the contrary the cumulative abnormal return is significantly lower after the crisis when there is no "regulation-induced" trading. The reputation damage is stronger for the major rating agencies who were directly involved in the subprime scandal. However a lower reaction to rating actions emerges also for minor rating agencies due to a general decrease in the trust over private creditworthiness assessment.

Keywords Credit rating • Event-study • Reputation damage

1 Introduction

After the so-called subprime crisis, whose climax was reached with the default of Lehman Brothers, one of the main scapegoats identified by academicians and supervising authorities were the rating agencies. In fact, during the turmoil, their valuations of the collateralized debt obligations (CDOs) and similar securities proved to be extremely poor and unreliable. In the space of a few months, thousands

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of bonds were rapidly downgraded from AAA to junk level. The same happened to many banks deeply involved in the securitization market, both as originators and investors. In the aftermaths of the crisis, various critical analysis and a few trials focused on ascertaining the responsibilities of credit rating agencies (CRAs) and the roots of a disastrous performance that did not have equals in their history. A mixture of conflicts of interest and excessive workload emerged as the most probable factors underlying the widespread overvaluation of structured finance products. As a consequence, an international debate developed over the role of rating agency, the need to put a limitation to their regulation-related power and the drawbacks of the issuer-pay business model.

Undoubtedly the events linked to the subprime crisis damaged the reputation of the rating agencies, at least in the short and medium term. The conclusions drawn by the Us National Commission on the causes of the financial and economic crisis are extremely heavy on the point and mirror similar opinions expressed by other important observers: "We conclude the failure of credit rating agencies we essential cogs in the wheel of financial destruction. The three credit rating agencies were key enablers of the financial meltdown. The mortgage-related securities at the heart of the crisis could not have been marketed and sold without their seal of approval. Investors relied on them, often blindly. In some cases, they were obligated to use them, or regulatory capital standards were hinged on them. This crisis could not have happened without rating agencies" (Financial Crisis Inquiry Commission 2011, p. 25).

In this chapter we want to gauge the extension of the reputation damage suffered by CRAs by looking at the market's reaction to their rating actions. Through a standard event-study methodology, we measure the abnormal return of stock prices in the 3-day window centered on the announcement day during the period November 2003–November 2013. Since the poor performance of rating agencies during the subprime crisis primarily concerned the financial sector, we focus the attention on a sample of major international banks belonging to the Stoxx 1800 Index. Furthermore, we distinguish the rating actions announced by the three main CRAs—Moody's, Standard & Poor's and Fitch, who were more directly involved in the scandal and in the following inquiries—from those emanated by other minor agencies.

We expect to find a lower market impact of rating actions after the crisis, due to a loss of trust in the neutrality and reliability of the rating valuations. In other words, we expect the market to believe less blindly and, consequently, react less strongly to rating agencies' credit opinions. In particular, we expect the phenomenon to be stronger when the certification role is less relevant and, thus, the regulation-induced trading is thinner. For what concern the type of agency, we expect to find a lower market reaction and, thus, a lower trust in the rating actions announced by the three majors. For other agencies, the effect of the crisis is less clear. On one side, they may have suffered an indirect reputation damage, due to the lower perceived reliability of credit valuations issued by private issuer-paid raters. On the other side, they could have benefited from a weaker oligopolistic power of the three majors and from their cleaner track record.

2 Literature Review

The literature on rating agencies and their role in financial markets is rich and diversified. The majority of papers focused on the informative content of rating and aimed at measuring abnormal returns in market prices following various types of announcements made by agencies. In many empirical works the researchers took into consideration the abnormal returns preceding rating actions as well, so as to determine if and to what extent the market anticipates the judgments made by the agencies. In most recent works, alongside the informative content of rating, their certification role is explored. Since many laws and regulations—the most prominent example being Basel 2 Agreement—have recognized an official role to rating agencies' valuations, the crossing of certain thresholds affects the behavior of numerous restricted investors who may be forced to sell a downgraded security or may regain the right to buy an upgraded one (Steiner and Heinke 2001; Micu et al. 2006; Kiff et al. 2012). In these cases, not only—or, even, not mainly—are the abnormal returns a consequence of the information content conveyed by the agency, but they are also a by-product of the gatekeeper status granted by the regulatory framework (Partnoy 2006).

Many papers also aimed at distinguishing the market impact of rating announcements on the basis of the motivation given by the agency (Goh and Ederington 1993), the concurrent diffusion of important information by the issuing company (Hand et al. 1992), the presence of a review/outlook anticipating the rating action by the same agency or any preceding announcement by another agency. Studies also differentiate on the basis of the type of the market analyzed, the extension of the event windows taken into consideration and the technicalities in the measurement of abnormal returns.

Just a few empirical works specifically focused on banks. From a theoretical point of view, some researchers maintain that rating actions should be able to convey less information to the market when concerning banks, since these financial intermediaries have to comply to enhanced transparency requirements and operate within the framework of strict prudential supervision (Richards and Deddouche 1999). The opposite view is expressed by other researchers who highlight that authorities in charge of monitoring banks tend to withdraw bad news, in fear of creating panic among retail investors. If this is the case, rating agencies could disclose information that—even if known by the supervisory authorities—have not been adequately diffused to the market. In a way, the authorities' reluctance to pass on bad news could even amplify the effect of a downgrade on market prices (Gropp and Richards 2001; Steiner and Heinke 2001).

3 Sample Description

The sample used in our empirical analysis consists of 1821 rating revisions issued by the three major CRAs (Standard & Poor's, Moody's and Fitch) and by four minor CRAs in terms of market share (EJR, R&I, DBRS and JCR), during the period November 1st 2003–November 1st 2013. The assessed issuers are 108 financial intermediaries—43 % from Europe, 34 % from Asia, 23 % from America—extrapolated from the STOXX 1800 Index. The analyzed events, all concerning the issuer rating, include downgrading and upgrading, confirmations on earlier ratings, insertions in the surveillance list with positive or negative directions or in evolution and outlooks. All data have been extracted from the Bloomberg database.

The distribution of the 1821 rating actions by year (Fig. 1) and its subdivision into groups according to the type of CRAs (Big vs. Non-Big), suggests two conclusions: the first one concerns the dynamics which affected the rating actions, the second one concerns their composition. The constant increase of rating activities, with a slowdown just in the year 2009, indicates an intense information activity carried out by the CRAs. A significant role is also played by minor agencies, especially in the last 3 years. During the period under investigation, each issuer has been monitored by an average of 2.28 agencies; 21 % of the analyzed financial intermediaries exclusively addressed to at least one of the Big Three; 31.5 % were followed only by one or more minor agencies, while 47 % of issuers got their ratings from both. It can be pointed out that more than half of the issuers was evaluated by the two types of CRAs starting from 2011, possibly under the influence of the ESMA guidelines.

The different alphanumeric characters used by all CRAs have been unified into a single numerical scale, with the lowest value attributed to the highest grade of creditworthiness (AAA = 1, AA with positive watch = 1.75) and the highest value to the worst assessment (CC = 20, CC with negative watch = 20.25). This operation enables to verify how credit agencies have rated issuers over the years. Considering the average value of the 1595 ratings issued (outlooks excluded) and divided
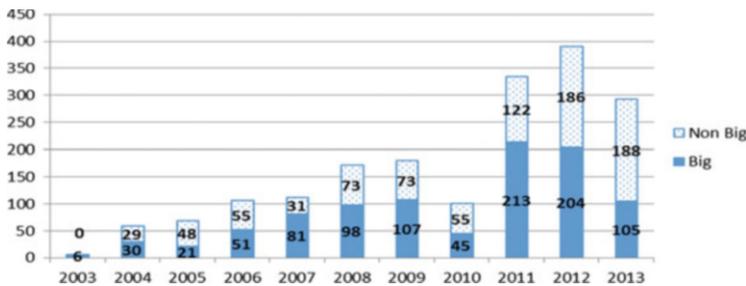
Fig. 1 Distribution of ratings revisions (November 1st 2003–November 1st 2013). Note: The number of revisions of the year 2003 is abnormal because the survey takes into consideration only 2 months, as well as in the year 2013 when the events of the last 2 months are not taken into consideration

Table 1 Average ratings value

	# obs.	Average rating	Maximum value	Minimum value	Standard deviation
Big	801	5.94	1	15.25	2.53
Non Big	794	6.56	2	20	2.79
Total observations	1595				
Ratings reviews by period					
Pre-crisis Big	222	4.38	1	10	1.73
Pre-crisis Non Big	181	4.71	2	10	1.61
Crisis Big	142	4.99	2	11	1.49
Crisis Non Big	88	5.36	2.75	9	1.47
Post-crisis Big	437	7.05	1.25	15.25	2.60
Post-crisis Non Big	525	7.40	2	20	2.90
Rating revisions by agency					
DBRS	180	4.98	2	13	2.11
Moody's	230	5.21	1	14	2.59
R&I	249	5.36	3	10	1.37
JCR	32	5.59	2	9	2.10
Fitch	217	5.74	2	11	1.98
S&P	354	6.54	2	15.25	2.65
EJR	333	8.40	3	20	2.92

according to the nature of the agency they refer to, it seems that minor CRAs have been more severe in their judgments, with an average rating value higher than the one recorded by major CRAs (Table 1). Minor CRAs' greater rigor is clear even if the indicator is considered by dividing the period under investigation into three sub-periods: the pre-crisis, crisis and post-crisis period. In all the three periods, the average value of the ratings assigned by the major agencies is lower than the one issued by minor competitors. Furthermore, if the average rating value is disaggregated, it is clear that the greater rigor attributed to minor CRAs is mainly due to the EJR credit agency which, as well known, differs from its competitors for having adopted the "subscriber-pay" model. Standard & Poor's is the rating agency among the Big Three that issues the strictest ratings. By restricting the analysis to the issuers judged both by major and minor CRAs during the crisis and post-crisis period, the greater rigor by EJR and Standard & Poor's is confirmed.

4 Methodology

In order to evaluate the reputational damage suffered by credit rating agencies we adopt a standard event study methodology. We measure the abnormal return for each rating change included in our sample in a 3-day event window centered on the announcement day $[-1; 1]$ using a market model with 500 days as estimation window. Such a short event window is in line with our research question, focused on the reputation of rating agencies and the information value of their actions. The price drift in the following days and weeks may be the result of autonomous analysis performed by investors, even if stimulated by the rating change, whereas the immediate return is more strictly dependent on the level of faith put in the agency's competence.

Since we are specifically interested in the magnitude of the price reactions to agencies' announcement, independently from its sign, we mostly focus on the absolute value of cumulative abnormal return:

$$ABS\_CAR_{i;t} = \left| CAR_{i;t} \right| \tag{1}$$

We perform a multivariate econometric analysis of the 3-day cumulative abnormal returns associated to rating actions using the OLS method. In this analysis we focus on the absolute value of cumulative abnormal returns, adopting an approach similar to Grothe (2013).

As independent variables we consider a set of standard factors which proved to be relevant in past empirical work. Table 2 summarizes the definition and the expected signs of these regressors, in line with the main findings of specific literature on the topic.

The dummy variable BIG distinguishes between the major and minor rating agencies. The two dummies S&P and EJR allow to gauge if the pronouncements made by the agencies that tend to be more severe in their judgments produce a higher market impact (see Table 1). In particular, EJR is the only agency characterized by an investor-pay model, as opposed to an issuer-pay model, and, as such, should be less exposed to conflicts of interests.

In order to measure the reputational damage—and this is the core of our analysis—we consider two dummy variables: CRISIS and POST_CRISIS. The first assumes a value equal to 1 for all rating actions taking place between the 15th September 2008 and the 15th October 2009; the second has a value equal to 1 for all dates after 16th October 2009 and 0 elsewhere. These dummies are the main instrument we use to gauge to reputation impact of the subprime crisis on rating agencies. The expected sign of the coefficient for the DUMMY_CRISIS is uncertain. On one side, after Lehman's collapse and the rapid downgrading of a huge mass of structured product, the market should have put less trust in the judgments of the agencies. On the other hand, during a crisis, the investors tend to be more sensitive to any kind of news and especially to bad news. Once the worst of the crisis was over, the decrease in level of trust and the consequent lower

Table 2 Independent variables included in the econometric analysis—definition and expected sign of the coefficient

Name	Definition	Expected sign
VA_CHGNOTCHES	Absolute value of the change in rating level, computed on the basis of a numerical conversion of the alpha-numerical scale used by CRAs, where the higher rating is equal to 1 and the lowest is equal to 20. The positive and negative watches are equal to -0.25 and $+0.25$ respectively	+
CONTAMIN	Dummy variable which is equal to 1 if the distance between the following rating announcements on the same company is shorter than 30 days	+
ANTICIP	Dummy variable which is equal to 1 when a downgrading or upgrading are preceded by a watch in the same direction	−
RATING_BORDER	Dummy variable which is equal to 1 if the last or current ratings are between BBB+ and BB− and 0 otherwise	+
DUMMY_WATCH	Dummy variable which is equal to 1 if the announcement consists in a credit warning instead of a downgrading or upgrading	+
VIX	Value of the VIX index on the announcement day of the rating action	+
DEVST	Standard deviation of the daily returns in the 50 working days preceding the rating action for the specific stock concerned by the announcement	+
DUMMY_CRISIS	Dummy variable which is equal to 1 for all announcements between the 15th September 2008 and the 15th October 2009	?
DUMMY_POSTCRISIS	Dummy variable which is equal to 1 for all announcements after the 15th October 2009	+
NOBORDER_POST CRISIS	Dummy variable that is equal to 1 when the announcement is in the post crisis period and concerns an issuer that is not on the verge of the critical threshold between investment and junk grade	−
BORDER_POST CRISIS	Dummy variable that is equal to 1 when the announcement is in the post crisis period and concerns an issuer that is on the verge of the critical threshold between investment and junk grade	?
STABLE	Dummy variable which is equal to 1 when the announcement made by the agency is a confirmation of the former rating	−
BIG	Dummy variable which is equal to 1 when the announcement is made by Moody's, Standard and Poor's and Fitch	−
S&P	Dummy variable which is equal to 1 when the announcement is made by Standard and Poor's	+
EJR	Dummy variable which is equal to 1 when the announcement is made by EJR	+

reactivity of the market to the information conveyed by credit rating agencies should be more evident. Thus, we expect a negative coefficient for the DUMMY_POSTCRISIS. In particular, we expect the phenomenon to manifest itself in a stronger way when the regulatory and psychological threshold of the junk level is far away. To test this aspect, we introduce two variables accounting for the "borderline" and "not-borderline" status in the post-crisis period.

5 The Findings

5.1 Analysis of the CARs for the Rating Actions Announced by Moody's, S&Ps and Fitch

As already explained above, we start the analysis from the sub-sample of rating actions announced by the three most important agencies—Moody's, Standard & Poor's and Fitch—which were more directly involved in the subprime scandal and which may have suffered the greater reputational damage. Table 3 summarizes the most interesting results of the analysis performed.

The first analysis makes use of a restricted set of independent variables that are available for all the 961 rating events. All coefficients have the expected sign and are statistically significant, with the exception of the DUMMY_CRISIS. In particular, the abnormal return is positively related to the level of volatility, both at market and security-specific level. The DUMMY_POSTCRISIS displays the expected negative sign and the coefficient is significant at the 5 % confidence level.

The second column details the results of an analysis where the set of independent variables is enriched, at the cost of reducing the set of events to 810. In particular, we substitute the DUMMY_POSTCRISIS with two factors that allows to distinguish—in the post-crisis period—the effect of rating actions near to the borderline between the speculative and investment grade from those concerning companies in a "safe zone". The lack of trust should manifests in a stronger way when there is less regulation-induced trading. The results show that the absolute value of abnormal return is lower, in the post-crisis period, when the rating is far away from the threshold. On the contrary, there is no significant difference in the market reaction between the pre- and post-crisis periods when the current rating or the last available rating is near to the borderline. The DUMMY_CRISIS remains insignificant, whereas the VIX and DEVST coefficient display the expected sign and are strongly significant.

Column (3) increases further the set of independent variables considered, introducing various factors accounting for the type of rating action, the time passed from a previous intervention from another or the same agency, the intensity of the rating change measured in notches and the anticipation of a downgrade or upgrade by a previous credit watch. Even if all factors present the expected sign, their statistical

Table 3 Determinants of the ABS_CAR

	(1)	(2)	(3)	(4)	(5)
	Entire sample	Entire sample	Entire sample	Sub-sample CONTAMIN = 0	Sub-sample WATCH = 1
C	−0.1578	−0.525	−0.733	−0.472	0.670
	(−0.308)	(−0.928)	(−0.919)	(−0.627)	(0.673)
VA_CHGNOTHCES			0.642	0.314	0.508
			(1.354)	(0.813)	(0.711)
CONTAMIN			−0.332		−1.652***
			(−0.704)		(−2.649)
DUMMY_ANTICIP			−0.472	−0.769*	
			(−1.05)	(−1.865)	
RATING_BORDER					
DUMMY_CRISIS	0.601	−0.105	0.008	0.009	−3.599***
	(0.754)	(−0.12)	(0.992)	(0.091)	(−2.50)
DUMMY_POSTCRISIS	−0.589**				
	(−1.97)				
NOBORDER_POSTCRISIS		−1.306***	−1.515***	−1.585***	−2.092***
		(−3.533)	(−3.647)	(3.24)	(−2.352)
BORDER_POSTCRISIS		0.341	0.03	0.521	−0.733
		(0.858)	(0.05)	(1.60)	(−0.713)
VIX	0.09***	0.113***	0.113***	0.1068**	0.176***
	(2.709)	(2.844)	(2.738)	(2.287)	(4.604)
DEVST	0.502**	0.549***	0.529***	0.535***	0.633***
	(3.64)	(3.823)	(3.522)	(3.051)	(3.718)
DUMMY_WATCH			0.557		
			(1.44)		
Adjusted R2	0.228	0.244	0.236	0.281	0.276
No. of observations	961	810	718	515	243

Notes: *significant at 10 % level, **significant at 5 % level, ***significant at 1 % level with a two-tailed test

The t-stats are reported in brackets under each coefficient. White heteroskedasticity-consistent standard errors and covariance

significance is low and the marginal increase in the explicative power of the regression, measured by the adjusted R-squared, is not sensible.

Column (4) restricts the sample to the uncontaminated events i.e. the rating actions that are not preceded by another agency's announcement in the 30 previous days. Comparing column (3) and (4), the set of significant variables remains unvaried, but the R-squared of the regression increases to 28 %. Finally, column (5) focuses on the credit warnings that in literature are often associated to a greater informative content for market participants. The number of available observations is 243. In this case the negative coefficient of the CONTAMIN variable is significant and, thus, the credit watches that come soon after other announcements are associated to lower abnormal return. Both the DUMMY_CRISIS and NOBORDER_POSTCRISIS variables are significant and have the expected negative coefficient, signaling a reduced market impact of rating actions compared to the pre-crisis period.

We can conclude that the major rating agencies have indeed suffered a reputation damage as a consequence of the subprime crisis that translates in a weaker market reaction to their announcements. This is particularly evident when the crossing of a regulatory threshold is not involved and, thus, when there is less market impact from restricted investors who are obliged to react independently from their trust in the informative content conveyed by the agency.

The regressions are all conducted with the ordinary least square method. The dependent variable is ABS_CAR i.e. the absolute value of cumulative abnormal return computed as defined in Sect. 5. The independent variables are described in Table 2.

5.2 Analysis of the CARs for the Rating Actions Announced by the Minor CRAs

Moving to the sub-sample of rating events issued by minor rating agencies, we conduct the analysis on the dependent ABS_CAR variable by testing the same regressors used for the sample with the Big Three, in order to determine whether the independent variables exert similar effects or if there are any discrepancies (see Table 4). The first set of regressors (1) shows the sign of the coefficients in line with our expectations, except in the case of DUMMY_CRISIS, whose value, however, is not significant. The adjusted R^2 signals an explanatory power of the regression higher than the one recorded for the same case of the Big Three. By enriching the study with other variables, such as the combination of ratings in the critical area during the post-crisis period with ratings in the security area, and considering the same period, we find confirmation to our working hypothesis (2). As a result of the subprime mortgage crisis, the market proved to react less even to ratings issued by minor agencies, albeit with less intensity than for their larger competitors. However, in the No Big subsample the value is significant at 5 % only confidence level

Table 4 Determinants of the ABS_CAR—sample minor CRAs

	(1)	(2)	(3)	(4)
	Entire sample	Entire sample	Entire sample	Sub-sample Dummy stable = 0
DUMMY_CRISIS	−1.748 (−1.291)	−1.353 (−0.997)	−1.729 (−1.311)	−2.870 (−1.121)
DUMMY_POSTCRISIS	−0.649** (−1.291)			
NOBORDER_POSTCRISIS		−0.672** (−2.329)	−0.302 (−0.378)	−1.420** (−2.024)
BORDER_POSTCRISIS		−0.449 (−1.043)	−0.257 (−0.537)	−1.946*** (−2.627)
VIX	0.104*** (2.6361)	0.109*** (2.677)	0.104** (2.378)	0.226*** (2.894)
DEVST	133.35*** (3.684)	125.13*** (3.395)	125.41*** (3.040)	82.45* (1.772)
VA_CHANGE_NOTCHES			1.154 (1.525)	4.404** (2.327)
CONTAMIN			−0.334 (−0.419)	
DUMMY_WATCH			2.762** (2.375)	4.784** (2.432)
DUMMY_ANTICIP			−2.384** (−0.749)	
DUMMY_BIG				
Adjusted R-squared	0.278	0.283	0.313	0.364
No. of observations	860	859	666	277

Notes: *significant at 10 % level, **significant at 5 % level, ***significant at 1 % level with a two-tailed test

The t-stats are reported in brackets under each coefficient. White heteroskedasticity-consistent standard errors and covariance

for no-border issuers. The negative sign for the border issuers, in contrast with what observed in the ratings issued by major CRAs, might be explained by a lower use in the certification activity of ratings issued by minor agencies. Proceeding the investigation with the third scenario, in which new independent variables are added, the signs of the coefficients are in line with the expectations, but significance levels are acceptable only for the DUMMY_WATCH and DUMMY_ANTICP variables.

In the No Big sample, more than half of the issued ratings confirm the previous assessment. As they do not add new information, we decided to reiterate the analysis by restricting the sample to only those events that have led to a change in rating (4). The new combination of regressors manages to explain a higher value of extra-performance and highlights the less confidence of the market in minor CRAs in the post-crisis period. In fact, the BORDER_POSTCRISIS regressor shows a more accentuated negative coefficient than the one issued by the Big

Table 5 Determinants of the ABS_CAR—major and minor CRAs

	(1)	(2)	(3)
	Sub_sample DUMMY_STABLE = 0	Entire sample	Entire sample
DUMMY_CRISIS	1.43 (1.28)	1.741* (1.84)	1.332 (1.44)
NOBORDER POSTCRISIS	−1.30*** (−3.167)	−0.79*** (−3.313)	−1.223*** (−3.742)
BORDERPOSTCRISIS	−0.376 (−0.766)	0.403 (1.152)	0.068 (0.154)
VIX	0.186*** (4.866)	0.177*** (5.799)	0.191*** (6.09)
DEVST	18.47 (1.025)	1.71 (0.107)	2.78 (0.192)
VA CHANGENOTCHES	2.462** (2.525)	1.317** (2.30)	
DUMMYWATCH	2.231*** (2.847)	1.375** (2.29)	1.476** (2.446)
DUMMY_ANTICIP	−0.043 (−0.085)	−0.258 (−0.503)	0.241 (0.496)
DUMMY_BIG	−1.576*** (−3.132)		
DUMMY S&P		−1.31*** (−2.842)	
DUMMY EJR			1.129*** (2.799)
Adjusted R-squared	0.248	0.214	0.201
No. of observations	828	1220	1220

Notes: *significant at 10 % level, **significant at 5 % level, ***significant at 1 % level with a two-tailed test

The t-stats are reported in brackets under each coefficient. White heteroskedasticity-consistent standard errors and covariance

Three and with the same margin of error. The presence of a watch causes more accentuated changes in the extra-yield, as well as the absolute value of the notch.

Finally, by combining the two subsamples of major and minor rating agencies and analyzing the ABS_CAR in light of the independent variables already considered, to which we have added the DUMMY_BIG variable, we can strengthen our conclusions that as a consequence of the subprime mortgages crisis, the market has less confidence in the ratings issued by CRAs (Table 5). The stock prices show lower variations especially where operators are not "forced" to act according to supervisory standards and regulations. In fact, the dummy NOBORDER_POSTCRISIS variable appears with a high negative coefficient and with a margin of error inferior to 1 %. Moreover, it seems that the reputational damage has a greater impact on major CRAs, as shown by the negative coefficient and higher level of the DUMMY_BIG variable. We have also analyzed the extra-performance of the entire sample by comparing the two agencies that were identified as more

severe in their descriptive analysis of the sample (see Table 1). The sign of the coefficient for the S&P variable is negative, notwithstanding its higher severity. On the contrary the sign of the EJR dummy is positive and highly significant.

6 Conclusions

The results of the analysis seem to confirm our hypothesis that the credibility of CRAs is diminished after the subprime mortgage crisis. The impact of ratings actions on the prices of equity securities of financial intermediaries is lower in the post-crisis period, especially for those issuers with a high creditworthiness. Evidently, the informative role of CRAs is considered unimportant, that is, the activity of rating agencies has a low informative value for this type of financial intermediaries. On the other hand, the prices of securities whose issuers have ratings previously defined as border, react to ratings actions even in the post-crisis period, probably due to the certification value of the rating. In fact, the sub-division of the sample depending on whether the rating action comes from one of the three major agencies or to minor agencies, showed a different impact on the prices of securities called border. In the first sample, the extra-yield cumulated in the post-crisis period reacts more because of regulatory obligations, which generally refer to the evaluations expressed by larger agencies, although the effect is not significant. On the other hand, in the sample of ratings issued by minor CRAs, price variation is always limited in the post-crisis period. Even when rating confirmations have been excluded, the negative sign of the border shows a modest informative value, not being counterbalanced by the regulatory role of minor CRAs. The present analysis also confirms what has already been reported in the literature about the role of watches: price variations are greater when the issuer is put under scrutiny, rather than when a real change in assessment occurs.

The overall analysis of the 1595 ratings actions confirms the loss of credibility of the agencies and, in particular, to those most involved in the financial crisis after the Lehman bankruptcy. Finally, by the comparison between two agencies adopting very different organizational models, Standard & Poor's and EJR, the survey has identified equal opposite reactions in the market: negative in the first case and positive in the second agency.

Considering that in the future the regulatory role of CRAs will become increasingly limited, it will be necessary to verify if the loss of credibility found in post-crisis period will be recovered, thanks also to new security measures and to the increased competition which is always encouraged.

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Towards Valuation Multidimensional Business Failure Risk for the Companies Listed on the Bucharest Stock Exchange

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Abstract Current research aims at developing a comprehensive financial instrument towards valuation business failure risk for a sample of 69 companies listed on the Bucharest Stock Exchange in 2013. There were considered several financial ratios such as liquidity ratios (e.g., current ratio, quick ratio, cash ratio), indebtedness ratios (e.g., general indebtedness ratio, financial stability ratio, global financial autonomy ratio, financial independence ratio, borrowing capacity ratio, long-term financial autonomy, leverage ratio, debt service coverage ratio), as well as solvency ratios (e.g., global solvency ratio and patrimonial solvency ratio). By taking into consideration the large number of selected ratios, we employed the principal component analysis as multidimensional analysis technique which ensures the non-redundant decomposition of the total variability out of the initial causal space through a lower number of components. Thereby, there were retained five principal components (being underlined liquidity, financial autonomy, financial independence, debt service coverage ratio, and solvency) which cumulate 90.5895 % of the initial information. Subsequently, based on the selected principal components we reported the aggregate business failure risk indicator.

Keywords Business failure risk • Principal component analysis • Correlation matrix • Eigenvectors • Eigenvalues

1 Introduction

The financial stability of a company within a highly competitive business environment is influenced by its financial solvency at the inception, its ability, relative flexibility, and efficiency towards cash creating from its continuous operations, its access to capital markets, as well as its financial ability and standing strength when faced with unplanned cash short-falls. In fact, business failure happens when the companies record serious losses, withal the corporations becoming insolvent with

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liabilities, therefore generating great loss to stockholders, managers, investors, and employees (Li and Sun 2011). Therefore, we notice the inability of the corporations to pay their obligations due to inadequate working capital (Zeytinoglu and Akarim 2013).

Beaver (1966) employed a univariate research to each of the 30 different ratios by selecting a sample of 79 failed companies, as well as 79 nonfailed companies operating in 38 different industries. There was found that net income to total debt had the highest predictive ability (92 % accuracy 1 year prior to failure), followed by net income to sales (91 %) and net income to net worth, cash flow to total debt, and cash flow to total assets (each with 90 % accuracy). The first researcher who used discriminant analysis to predict the failure of firms from different industries is Altman (1968), the accuracy of the employed model towards predicting bankruptcy being estimated at 95 % 1 year prior to bankruptcy and 72 % 2 years prior to bankruptcy. Deakin (1972) showed that the model employed by Altman (1968) is better than the model applied by Beaver (1966) on the short term (1 year), whereas the model of Beaver (1966) is better on the long term (5 years), as regards the error classification rates. By considering the fact that the usefulness of accounting information is a function of the predictive ability of the information and the ability of users to interpret the data, Libby (1975) found a narrow set of financial ratios which allowed a high degree of accuracy in prediction.

Therefore, a variety of statistical techniques (such as linear discriminant analysis, LDA; multivariate discriminant analysis, MDA; quadratic discriminant analysis, QDA; multiple regression; logistic regression, logit; probit; factor analysis, FA), neural networks topologies (such as network architectures including multi-layer perception, MLP; radial basis function network, RBFN; probabilistic neural network, PNN; auto-associative neural network, AANN; self-organizing map, SOM; learning vector quantization, LVQ; cascade-correlation neural network, Cascor), as well as other intelligent techniques (such as vector machines, fuzzy logic, isotonic separation) have been applied to solve bankruptcy prediction problem (Kumar and Ravi 2007). Moreover, Tsai (2009) compared five well-known feature selection methods used in bankruptcy prediction and showed that the t-test feature selection method outperforms the correlation matrix, the stepwise regression, the principal component analysis (hereinafter 'PCA'), and factor analysis (FA).

Current research aims at developing a comprehensive financial instrument towards valuation business failure risk for a sample of companies listed on the Bucharest Stock Exchange (BSE) by employing the PCA for an extensive set of financial ratios. According to McGurr and DeVaney (1998), financial ratios and cash flow information are chief variables as regards business failure prediction. However, gathering as much financial ratios as possible as predictors in order to make a prediction is a fundamental step in the area. The novelty of current chapter is emphasized by the financial instrument which will be developed with the purpose of valuation business failure risk related to the companies listed in Romania, being considered an extensive set of financial ratios. The utility of this study is underlined

by the information provided to managers in order to set the financial policies, respectively to the investors worldwide for investment decision making.

The rest of the chapter is organized as follows. The next section provides a literature review on using PCA within financial research. Section 3 provides the research design and methodology in terms of data, variables, and statistical procedure used for the study. Empirical results of the investigation are given and discussed in Sect. 4. Some general conclusions are drawn in the last section.

2   Literature Review

PCA was developed by Pearson (1901), being an analogue of the principal axes theorem in mechanics and registering a noteworthy usefulness as regards exploratory data analysis and developing prediction models. Furthermore, the method was later independently developed by Hotelling (1933, 1936). Depending on the field of application, PCA it is also named the discrete Karhunen–Loève transform (KLT), the Hotelling transform, or proper orthogonal decomposition (POD). Canbas et al. (2005) proposed a methodological framework towards creating an integrated early warning system (hereinafter 'IEWS') which could be used for detection of banks which are facing serious problems, by selecting 40 privately owned Turkish commercial banks (21 banks failed during the period 1997–2003), being combined three parametric models (discriminant, logit, and probit) with another parametric approach, namely PCA. Therefore, PCA was employed in order to investigate the basic financial characteristics of the banks, whereas discriminant, logit, and probit models were estimated based on these characteristics to construct the IEWS. Bataille et al. (2007) applied PCA in order to extract the cyclical factors from companies' data possibly used in the construction of the scores by the Bank de France and from these scores themselves. By employing PCA within the Turkish banking sector, Boyacioglu et al. (2009) selected 20 financial ratios with six feature groups covering capital adequacy, asset quality, management quality, earnings, liquidity, and sensitivity to market risk and retained only seven factors which explain 80.384 % of the total variance. Hu and Ansell (2009) applied sequential minimal optimization (SMO) to develop default prediction model in the US retail market. There were considered 67 potential performance variables, covering both internal and external company measures, at long last based on PCA five key principal components being retained for each of the final models. Li and Sun (2011) developed a hybrid method for business failure prediction by integrating PCA with multivariate discriminant analysis and logistic regression. There was emphasized a dominating predictive performance in short-term as regards business failure prediction of Chinese listed companies.

3 Research Design and Methodology

3.1 The Sample and Variable Selection

Initially, the dataset comprised all the companies from the exchange segment 'BSE', respectively 104 companies, over the year 2013. Afterwards, there were removed 20 companies from the tier 'Unlisted', one company from the tier 'Int'l', one company from the tier 'Other Int'l', 11 companies from financial intermediation sector (three banks, five financial investment companies, and three financial investment service companies), as well as two companies without financial data on the website related to the BSE. The industry membership of selected sample is varied as follows: wholesale/retail (4), construction (8), pharmaceuticals (4), manufacturing (20), plastics (3), machinery and equipment (8), metallurgy (3), food (2), chemicals (3), basic resources (5), transportation and storage (2), tourism (3), and utilities (4). The source of our data is depicted by the Annual financial information (key financials) which was reported on the BSE website for each company.

Table 1 reveals the description of all the variables employed within empirical research.

3.2 Statistical Procedure

PCA depicts a multidimensional data analysis technique which ensures the decomposition expressed through a lower number of components (Han and Kamber 2006), as well as non-redundant of the total variability out of the initial causal space (Jolliffe 2002). The principal components are orthogonal vectors which capture as far as from the variance corresponding to the original vector variables as follows: the first principal component contains the maximum variance from the original variables' variance, whereas the second principal component is calculated to have the second most variance, being uncorrelated (in a linear sense) with the first principal component, and so on (Hand et al. 2001; Han and Kamber 2006; Hastie et al. 2009). The initial causal space is determined by the 14 variables as regards liquidity (e.g., current ratio, quick ratio, cash ratio), indebtedness (e.g., general indebtedness ratio, financial stability ratio, global financial autonomy ratio, financial independence ratio, borrowing capacity ratio, long-term financial autonomy, leverage ratio, debt service coverage ratio), and solvency (e.g., global solvency ratio and patrimonial solvency ratio), respectively $v_1, v_2, \ldots, v_{13}, v_{14}$. Therefore, each of the 69 companies listed on the BSE in 2013, selected in order to develop current empirical investigation, is distinguished through 14 variables (Witten and Frank 2005).

The principal components related to the researched causal space are described by a vector with 14 dimensions, noted with w:

Table 1 The description of all the variables employed within empirical research

Variable	Definition
Liquidity ratios	
CR (v_1)	Current ratio = Current assets / (Bank loans [amounts payable in a period below 1 year] + Trade suppliers [amounts payable in a period below 1 year])
QR (v_2)	Quick ratio = (Current assets − Inventories) / (Bank loans [amounts payable in a period below 1 year] + Trade suppliers [amounts payable in a period below 1 year])
CR (v_3)	Cash ratio = (Current assets − Inventories − Receivables) / (Bank loans [amounts payable in a period below 1 year] + Trade suppliers [amounts payable in a period below 1 year])
Indebtedness ratios	
GIR (v_4)	General indebtedness ratio = Total liabilities / Total assets = (Bank loans [amounts payable in a period below 1 year] + Trade suppliers [amounts payable in a period below 1 year] + Bank loans [amounts payable in a period above 1 year] + Deferred income) / (Non-current assets + Current assets + Prepayments)
FSR (v_5)	Financial stability ratio = Liabilities (amounts payable in a period above 1 year) / Invested capital = Bank loans (amounts payable in a period above 1 year) / (Bank loans [amounts payable in a period above 1 year] + Shareholders' equity)
GFAR (v_6)	Global financial autonomy ratio = Total liabilities / Shareholders' equity = (Bank loans [amounts payable in a period below 1 year] + Trade suppliers [amounts payable in a period below 1 year] + Bank loans [amounts payable in a period above 1 year] + Deferred income) / Shareholders' equity
FIR (v_7)	Financial independence ratio = Shareholders' equity / (Bank loans [amounts payable in a period above 1 year] + Shareholders' equity)
BCR (v_8)	Borrowing capacity ratio = Shareholders' equity / Bank loans (amounts payable in a period above 1 year)
LTFAR (v_9)	Long-term financial autonomy = Liabilities (amounts payable in a period above 1 year) / Shareholders' equity = Bank loans (amounts payable in a period above 1 year) / Shareholders' equity
LR (v_{10})	Leverage ratio = Total assets / Shareholders' equity = (Non-current assets + Current assets + Prepayments) / Shareholders' equity
DSCR1 (v_{11})	Debt service coverage ratio1 = Gross profit or loss / Interest expense
DSCR2 (v_{12})	Debt service coverage ratio2 = Financial year net profit or loss / Interest expense
Solvency ratios	
GSR (v_{13})	Global solvency ratio = Total assets / Total liabilities = (Non-current assets + Current assets + Prepayments) / (Bank loans [amounts payable in a period below 1 year] + Trade suppliers [amounts payable in a period below 1 year] + Bank loans [amounts payable in a period above 1 year] + Deferred income)
PSR (v_{14})	Patrimonial solvency ratio = Shareholders' equity / Total assets = Shareholders' equity / (Non-current assets + Current assets + Prepayments)

$$w = \begin{pmatrix} w_1 \\ w_2 \\ \ldots \\ w_{13} \\ w_{14} \end{pmatrix} \tag{1}$$

Hence, each coordinate w_i of the aforementioned vector is a principal component defined in relation with the original variables through the following linear combination:

$$w_i = \alpha_1^{(i)} * v_1 + \alpha_2^{(i)} * v_2 + \ldots + \alpha_{13}^{(i)} * v_{13} + \alpha_{14}^{(i)} * v_{14} \quad i = 1, 2, \ldots, 13, 14 \tag{2}$$

The coefficients $\alpha_j^{(i)}$ are the coordinates of the eigenvectors corresponding to the covariance matrix related to the original variables $v_1, v_2, \ldots, v_{13}, v_{14}$, whereas the variances of the principal components are the eigenvalues of the covariance matrix. Furthermore, the aim is to solve the following extreme problem and the optimal criteria could be maximum or minimum depending on the nature of the function ϕ:

$$\begin{cases} \text{opt } \phi(v, w) \\ w = A^t * v \end{cases} \tag{3}$$

We will consider the fact that the vectors $\alpha^{(i)}$ are the columns of the matrix A of dimension 14×14 having the following form:

$$A = \begin{pmatrix} \alpha_1^{(1)} & \alpha_1^{(2)} & \ldots & \alpha_1^{(13)} & \alpha_1^{(14)} \\ \alpha_2^{(1)} & \alpha_2^{(2)} & \ldots & \alpha_2^{(13)} & \alpha_2^{(14)} \\ \ldots & \ldots & \ldots & \ldots & \ldots \\ \alpha_{13}^{(1)} & \alpha_{13}^{(2)} & \ldots & \alpha_{13}^{(13)} & \alpha_{13}^{(14)} \\ \alpha_{14}^{(1)} & \alpha_{14}^{(2)} & \ldots & \alpha_{14}^{(13)} & \alpha_{14}^{(14)} \end{pmatrix} \tag{4}$$

Likewise, we will suppose the fact that v is the vector whose coordinates are the original variables $v_1, v_2, \ldots, v_{13}, v_{14}$, whilst w is the vector whose coordinates are the principal components $w_1, w_2, \ldots, w_{13}, w_{14}$. Therefore, the linear combinations which define the principal components could be written as below:

$$\begin{cases}
w_1 = \propto_1^{(1)} * v_1 + \propto_2^{(1)} * v_2 + \ldots + \propto_{13}^{(1)} * v_{13} + \propto_{14}^{(1)} * v_{14} \\
w_2 = \propto_1^{(2)} * v_1 + \propto_2^{(2)} * v_2 + \ldots + \propto_{13}^{(2)} * v_{13} + \propto_{14}^{(2)} * v_{14} \\
\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots \\
w_{13} = \propto_1^{(13)} * v_1 + \propto_2^{(13)} * v_2 + \ldots + \propto_{13}^{(13)} * v_{13} + \propto_{14}^{(13)} * v_{14} \\
w_{14} = \propto_1^{(14)} * v_1 + \propto_2^{(14)} * v_2 + \ldots + \propto_{13}^{(14)} * v_{13} + \propto_{14}^{(14)} * v_{14}
\end{cases} \tag{5}$$

4 Empirical Results and Discussion

4.1 Descriptive Statistics

Table 2 shows descriptive statistics as regards all the variables employed within empirical research. By taking into consideration the fact that there are differences as regards the measurement order, as well as measurement units of the selected variables in order to develop the comprehensive financial instrument towards valuation business failure risk on the BSE, we will employ the procedure of data standardization. Thus, data standardization supposes the completion of the following steps: mean-centering (it involves the subtraction of the variable averages from the data),

Table 2 Descriptive statistics

	N	Mean	Median	Min	Max	Std. dev.
Liquidity ratios						
v_1	69	5.862	2.717704	0.058	75.49	10.35
v_2	69	4.474	1.639651	0.04	74.72	9.77
v_3	69	2.428	0.212318	0.003	72.51	9.06
Indebtedness ratios						
v_4	69	0.297	0.223472	0.005	1.5	0.29
v_5	69	0.113	0.012258	−2.512	3.59	0.56
v_6	69	0.307	0.208123	−10.927	9.76	2.07
v_7	69	0.887	0.987742	−2.594	3.51	0.56
v_8	69	8.255	0.308626	−222.434	233.57	43.83
v_9	69	0.041	0.004281	−5.037	3.24	0.79
v_{10}	69	1.147	1.376204	−16.282	17.32	3.75
v_{11}	69	2036.403	0.603585	−269.187	93,450.54	12,162.36
v_{12}	69	1633.504	0.364559	−269.187	76,225.61	9831.07
Solvency ratios						
v_{13}	69	12.867	4.474824	0.667	207.78	27.79
v_{14}	69	0.475	0.624888	−1.665	0.96	0.51

Notes: The description of the variables is provided in Table 1

alongside reduction (it involves dividing the variables' values to their standard deviation, employed to the centered variable).

Table 3 provides the correlation matrix related to the original variables. We notice that there are high positive and statistically significant correlations between v_1 and v_2 (0.975), v_1 and v_3 (0.934), v_1 and v_{13} (0.946), v_2 and v_3 (0.969), v_2 and v_{13} (0.964), v_3 and v_{13} (0.937), v_6 and v_9 (0.917), v_6 and v_{10} (0.850). Moreover, the strong correlations between the selected variables mitigates the individual meaning of the variables and emphasizes the presence of informational redundancy. Thereby, PCA is employed with the purpose of reducing the dimensionality of the initial causal space, also considering a minimum loss of information.

4.2 The Results of Principal Component Analysis

Table 4 shows the eigenvalues of the correlation matrix (Table 3) and related statistics, the principal components being descending ordered according to the retained information, as percentage of the total variance. Likewise, Table 4 provides the percentage out of the initial information related to each of the 14 selected variables which is synthesized within the extracted principal components. Thereby, the first principal component explains 30.25 % of the total variance, the second principal component explains 19.94 % of the total variance, the third principal component explains 15.12 % of the total variance, the fourth principal component explains 13.86 % of the total variance, whereas the fifth principal component explains 11.39 % of the total variance. Besides, the first five principal components cumulate 90.5895 % of the total information.

Figure 1 reveals the graph of the eigenvalues of the correlation matrix (Table 3) proposed by Cattell (1966).

Thus, we notice that after the fifth point out of the above graph, which depicts the fifth principal component, the slope is decreasing. Furthermore, according to Kaiser (1960) criterion, there are retained only the principal components which correspond to the eigenvalues greater than one. Hence, based on the graph revealed in Fig. 1, as well as Kaiser (1960) criterion, we will retain five principal components.

Table 5 provides the factor matrix, its elements being the correlation coefficients between the original variables and principal components.

The strong relationship expressed by the first (-0.954663) and by the second correlation coefficient (-0.956570) out of the first column from Table 5 emphasizes that the first principal component conveys the informational content of the original variables v_1 and v_2. Likewise, the second principal component expresses the informational content of the original variables v_6 and v_9, the third principal component expresses the informational content of the original variables v_5 and v_7, the fourth principal component conveys the informational content of the original variables v_{11} and v_{12}, whereas the fifth principal component conveys the informational content of the original variables v_8 and v_{14}. Therefore, the first principal component (F_1) underlines a synthetic **indicator of liquidity**, the second principal

Table 3 Correlation matrix

	v1	v2	v3	v4	v5	v6	v7	v8	v9	v10	v11	v12	v13	v14
v1	1													
v2	0.975** (0.000)	1												
v3	0.934** (0.000)	0.969** (0.000)	1											
v4	-0.370** (0.002)	-0.322** (0.007)	-0.231 (0.056)	1										
v5	-0.036 (0.770)	-0.047 (0.699)	-0.040 (0.742)	0.191 (0.115)	1									
v6	-0.049 (0.689)	-0.041 (0.736)	-0.034 (0.780)	-0.080 (0.516)	0.039 (0.752)	1								
v7	0.036 (0.770)	0.047 (0.699)	0.040 (0.742)	-0.191 (0.115)	-1.000** (0.000)	-0.039 (0.752)	1							
v8	-0.036 (0.768)	-0.025 (0.836)	-0.031 (0.802)	-0.339** (0.004)	-0.020 (0.871)	0.093 (0.449)	0.020 (0.871)	1						
v9	-0.016 (0.899)	-0.011 (0.929)	-0.012 (0.923)	-0.127 (0.298)	-0.177 (0.145)	0.917** (0.000)	0.177 (0.145)	0.007 (0.956)	1					
v10	-0.024 (0.846)	-0.013 (0.913)	-0.014 (0.906)	-0.031 (0.799)	0.074 (0.544)	0.850** (0.000)	-0.074 (0.544)	0.087 (0.480)	0.718** (0.000)	1				
v11	0.137 (0.261)	0.125 (0.305)	0.080 (0.514)	-0.134 (0.274)	-0.036 (0.768)	-0.014 (0.906)	0.036 (0.768)	-0.031 (0.799)	-0.008 (0.947)	0.023 (0.851)	1			
v12	0.132 (0.280)	0.120 (0.326)	0.076 (0.536)	-0.132 (0.279)	-0.036 (0.767)	-0.014 (0.908)	0.036 (0.767)	-0.031 (0.800)	-0.008 (0.948)	0.023 (0.849)	1.000** (0.000)	1		
v13	0.946** (0.000)	0.964** (0.000)	0.937** (0.000)	-0.353** (0.003)	-0.077 (0.532)	-0.049 (0.687)	0.077 (0.532)	-0.029 (0.815)	-0.013 (0.915)	-0.024 (0.848)	0.097 (0.427)	0.092 (0.451)	1	
v14	0.291* (0.015)	0.258* (0.032)	0.202 (0.096)	-0.730** (0.000)	-0.153 (0.210)	0.146 (0.232)	0.153 (0.210)	0.398** (0.001)	0.109 (0.373)	0.242* (0.045)	0.058 (0.638)	0.056 (0.646)	0.295* (0.014)	1

Notes: **significant at 1 % level; *significant at 5 % level. The description of the variables is provided in Table 1

The bold values are statistically significant

Table 4 Eigenvalues of the correlation matrix and related statistics

Value number	Eigenvalue	% Total variance	Cumulative Eigenvalue	Cumulative %
1	**4.235827**	**30.25590**	**4.23583**	**30.2559**
2	**2.792183**	**19.94417**	**7.02801**	**50.2001**
3	**2.116876**	**15.12054**	**9.14489**	**65.3206**
4	**1.941745**	**13.86961**	**11.08663**	**79.1902**
5	**1.595901**	**11.39930**	**12.68253**	**90.5895**
6	0.649445	4.63890	13.33198	95.2284
7	0.366657	2.61898	13.69864	97.8474
8	0.146135	1.04382	13.84477	98.8912
9	0.053664	0.38331	13.89843	99.2745
10	0.051539	0.36814	13.94997	99.6427
11	0.036598	0.26142	13.98657	99.9041
12	0.013189	0.09421	13.99976	99.9983
13	0.000239	0.00170	14.00000	100.0000

Source: Author's computations
The bold values are statistically significant
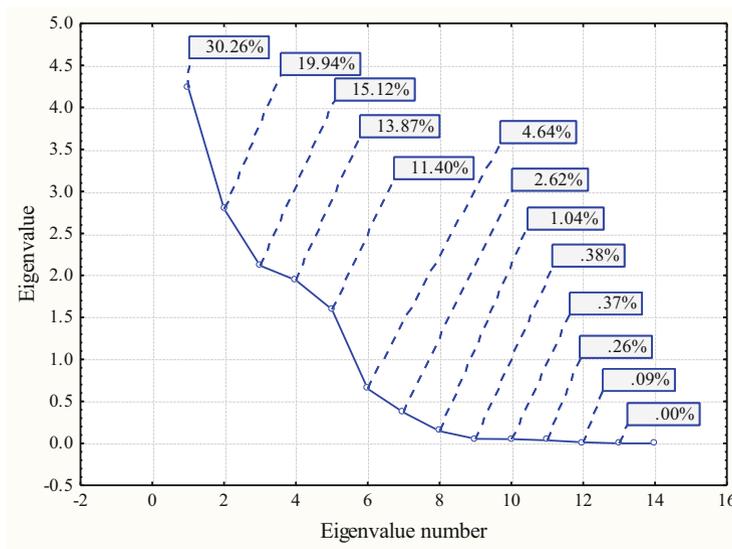
Fig. 1 Eigenvalues of correlation matrix

component (F_2) is interpreted as an **indicator of financial autonomy**, the third principal component (F_3) is an **indicator of financial independence**, the fourth principal component (F_4) is an **indicator of debt service coverage ratio**, whereas the fifth principal component (F_5) is construed as an **indicator of solvency**.

Table 6 discloses the coefficients related to the linear combinations which define the principal components representing the eigenvectors of the correlation matrix (Table 3).

Table 5 Factor coordinates of the variables, based on correlations

	F_1	F_2	F_3	F_4	F_5
v_1	**−0.954663**	−0.119463	−0.175794	−0.040418	0.090462
v_2	**−0.956570**	−0.121383	−0.187470	−0.054548	0.127763
v_3	−0.917998	−0.135080	−0.220863	−0.088476	0.175321
v_4	0.526955	−0.272281	−0.315411	0.047821	0.552125
v_5	0.172186	−0.189849	**−0.851779**	0.266501	−0.361835
v_6	0.002415	**0.923415**	−0.296022	0.051232	0.147434
v_7	−0.172186	0.189849	**0.851779**	−0.266501	0.361835
v_8	−0.075129	0.238316	0.167204	−0.110827	**−0.688664**
v_9	−0.043759	**0.898882**	−0.108191	−0.009713	0.290320
v_{10}	−0.024082	0.854492	−0.311309	0.094372	0.080239
v_{11}	−0.232195	0.013118	0.269572	**0.933027**	0.028042
v_{12}	−0.227470	0.013990	0.271030	**0.933767**	0.027571
v_{13}	−0.950079	−0.113614	−0.153447	−0.091189	0.109282
v_{14}	−0.461809	0.371213	0.240066	−0.101447	**−0.611359**

The bold values are statistically significant

Table 6 Eigenvectors of the correlation matrix

V	F_1	F_2	F_3	F_4	F_5
v_1	−0.463853	−0.071493	−0.120825	−0.029005	0.071608
v_2	−0.464780	−0.072642	−0.128850	−0.039145	0.101135
v_3	−0.446039	−0.080839	−0.151801	−0.063494	0.138781
v_4	0.256038	−0.162946	−0.216785	0.034318	0.437053
v_5	0.083662	−0.113615	−0.585436	0.191251	−0.286422
v_6	0.001174	0.552618	−0.203458	0.036766	0.116706
v_7	−0.083662	0.113615	0.585436	−0.191251	0.286422
v_8	−0.036504	0.142620	0.114921	−0.079534	−0.545135
v_9	−0.021262	0.537936	−0.074361	−0.006970	0.229812
v_{10}	−0.011701	0.511371	−0.213966	0.067724	0.063516
v_{11}	−0.112820	0.007851	0.185279	0.669573	0.022197
v_{12}	−0.110524	0.008372	0.186282	0.670104	0.021825
v_{13}	−0.461626	−0.067992	−0.105466	−0.065440	0.086506
v_{14}	−0.224385	0.222153	0.164999	−0.072802	−0.483942

The score matrix is disclosed in the Appendix 1. Thus, based on the principal components' coefficients, there were computed the scores related to the observations in the space of the principal components. The coordinates of the objects in the new space, respectively the projections of the objects on the space' axes, are the valuations of the objects in relation with the new variables, being entitled the scores of the principal components. By taking into consideration the informational content, we will compute the coefficients of importance for each of the five principal components. Thereby, we mark as CI_1 the coefficient of importance related to the first factor, as well as $var(w_1)$ denotes the variance corresponding to the first

principal component, $CI_1 = var(w_1)/\sum_{j=1}^{5} var(w_j)$, thus ensuing the following values for the coefficients of importance: $CI_1 = 0.3340$; $CI_2 = 0.2202$; $CI_3 = 0.1669$; $CI_4 = 0.1531$; $CI_5 = 0.1258$.

Therefore, the Appendix 2 provides the values of the aggregate business failure risk indicator (hereinafter 'ABFRI') for the companies listed on the BSE in 2013. The ABFRI was computed as following: $ABFRI = \sum_{j=1}^{5} C_i(j)*F_j$.

5 Concluding Remarks

By selecting a set of variables which comprised 14 financial ratios as regards liquidity, indebtedness, as well as solvency, related to 69 companies listed on the BSE in 2013, we employed PCA in order to develop a comprehensive financial instrument towards valuation business failure risk. Therefore, five principal components were retained, being underlined liquidity, financial autonomy, financial independence, debt service coverage ratio, alongside solvency, which cumulate 90.5895 % of the initial information. Subsequently, based on the selected principal components we computed the aggregate business failure risk indicator. The limitations of current empirical investigation are depicted by the short period of research. As future research avenues, we propose the development of a neural network model for business failure prediction, alongside employing the traditional statistical techniques, aiming at comparing the registered results.

Appendix 1

Factor coordinates of cases, based on correlations

Company	F_1	F_2	F_3	F_4	F_5	Company	F_1	F_2	F_3	F_4	F_5
ARS	-2.07	0.29	3.12	10.03	0.22	MEF	-2.65	-0.12	-0.09	-0.59	-0.16
ALR	0.53	0.41	-0.44	-0.03	-0.09	MJM	2.36	-1.95	-0.57	0.04	2.83
ALT	0.79	0.38	-0.24	-0.07	0.09	OIL	-0.06	0.42	0.63	-0.39	-1.10
ALU	-0.08	0.24	0.12	-0.27	-0.30	OLT	2.99	-2.78	-1.57	0.59	6.55
AMO	0.09	0.26	0.51	-0.31	-0.46	SNP	0.19	0.34	0.45	-0.29	-0.68
ATB	0.37	0.25	0.39	-0.26	-0.19	PEI	1.22	1.92	-2.02	0.39	1.03
ARM	0.21	-2.93	1.33	-0.57	-0.02	PREH	0.54	0.33	0.20	-0.20	-0.39
ARTE	0.64	0.26	0.28	-0.22	0.04	PPL	-0.62	0.17	0.36	-0.37	-0.40
BRM	0.53	0.34	0.33	-0.24	-0.43	RTRA	0.94	0.50	-0.51	0.01	0.29
BIO	-0.17	0.23	0.50	-0.18	-0.44	ROCE	0.91	0.51	-0.36	-0.02	0.24
SPCU	0.07	1.04	1.12	-0.71	-3.34	RRC	0.94	0.51	-0.05	-0.12	0.54
TEL	0.72	0.39	-0.35	-0.05	0.09	PTR	-1.96	0.00	0.10	-0.52	-0.31
CAOR	0.67	0.42	-0.20	-0.06	-0.31	RPH	0.97	0.66	-0.12	-0.16	0.20
CBC	0.07	0.28	0.56	-0.32	-0.55	SNN	-0.05	0.28	0.03	-0.23	-0.43
BCM	-13.60	-1.85	-3.10	-1.82	2.20	SNG	-4.91	-0.30	0.69	3.51	0.30
CEON	1.25	6.42	-3.73	0.83	1.82	TGN	-0.44	0.61	0.69	-0.56	-1.94
CMCM	-1.58	0.11	0.36	-0.28	-0.50	SNO	-0.17	0.25	0.50	-0.35	-0.53
CMF	0.69	0.47	0.28	-0.27	-0.46	STZ	0.30	0.33	0.35	-0.26	-0.58
CMP	0.50	0.32	0.09	-0.17	-0.29	SRT	0.60	0.64	-0.66	0.05	0.13
ENP	1.14	1.08	-0.68	0.04	0.84	SOCP	-2.67	-0.09	-0.04	-0.63	-0.22
COFI	2.32	-3.96	-7.41	2.28	-2.44	STIB	0.60	0.32	0.10	-0.18	-0.16
COMI	0.74	0.67	-0.37	-0.02	0.25	TRP	0.71	0.35	0.10	-0.17	-0.09
COTE	-1.66	0.04	0.16	-0.52	-0.32	ART	0.74	0.41	-0.30	-0.05	0.06

(continued)

Company	F_1	F_2	F_3	F_4	F_5	Company	F_1	F_2	F_3	F_4	F_5
CNTE	−0.25	0.21	0.41	−0.35	−0.39	COTR	0.45	0.35	0.27	−0.21	−0.53
CGC	2.06	−9.29	−0.46	0.38	−2.19	TBM	1.11	1.03	−1.01	0.16	0.56
COS	1.04	−0.91	0.20	−0.13	1.00	TUFE	−0.66	0.29	0.40	−0.42	−0.85
DAFR	0.65	−2.22	6.08	−2.00	3.15	EFO	−0.31	0.27	0.57	−0.39	−0.66
ELJ	−0.36	0.20	0.41	−0.35	−0.41	UAM	0.74	0.34	−0.01	−0.15	0.06
ELGS	0.63	0.33	0.07	−0.16	−0.12	UCM	0.87	−1.01	−0.06	−0.07	1.48
ELMA	−0.35	0.22	0.47	−0.32	−0.50	UZT	−0.08	0.27	0.21	−0.27	−0.43
EPT	0.98	−1.36	0.60	−0.25	0.51	VESY	0.23	0.30	0.27	−0.23	−0.04
RMAH	1.09	1.09	−0.26	−0.17	0.07	APC	0.47	0.29	0.20	−0.21	0.13
ECT	0.17	0.27	0.51	−0.31	−0.45	VNC	0.88	0.38	−0.17	−0.09	0.17
IMP	0.15	0.31	0.14	−0.22	−0.50	SCD	−0.22	0.22	0.51	0.01	−0.36
MECF	−1.92	0.01	0.11	−0.53	−0.31						

Appendix 2

Aggregate business failure risk indicator for the companies listed on the BSE (2013)

Company	ABFRI	Company	ABFRI	Company	ABFRI
ARS	1.46	CNTE	−0.07	PTR	−0.75
ALR	0.18	CGC	−1.65	RPH	0.45
ALT	0.31	COS	0.29	SNN	−0.04
ALU	−0.03	DAFR	0.83	SNG	−1.02
AMO	0.07	ELJ	−0.11	TGN	−0.23
ATB	0.18	ELGS	0.25	SNO	−0.04
ARM	−0.44	ELMA	−0.10	STZ	0.12
ARTE	0.29	EPT	0.15	SRT	0.25
BRM	0.21	RMAH	0.54	SOCP	−1.04
BIO	−0.01	ECT	0.10	STIB	0.24
SPCU	−0.09	IMP	0.05	TRP	0.29
TEL	0.27	MECF	−0.74	ART	0.29
CAOR	0.24	MEF	−1.04	COTR	0.17
CBC	0.06	MJM	0.63	TBM	0.52
BCM	−5.47	OIL	−0.02	TUFE	−0.26
CEON	1.56	OLT	1.04	EFO	−0.09
CMCM	−0.55	SNP	0.09	UAM	0.30
CMF	0.28	PEI	0.68	UCM	0.23
CMP	0.19	PREH	0.21	UZT	−0.03
ENP	0.62	PPL	−0.22	VESY	0.15
COFI	−1.29	RTRA	0.38	APC	0.24
COMI	0.36	ROCE	0.38	VNC	0.36
COTE	−0.64	RRC	0.47	SCD	0.02

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Using Past Prices and Earnings to Derive Abnormal Returns over a Stock Index

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Abstract Our objective is to determine whether one can derive returns in excess of a chosen benchmark by using readily available information such as past prices and earnings. A key aspect of our method is that we test the estimation results in conjunction with the portfolio optimization process that incorporates those same estimates, as they are generated, into a rationally-diversified portfolio. We rely on a sampling process that randomly pairs companies from a pool of available estimates for any given date, coupled with the Black–Litterman optimization algorithm, in order to derive a distribution of average returns for the 2006–2014 period, using data available for companies listed at Bucharest stock Exchange. We find that even when using information such as earnings and past prices, one can still improve the performance of a given benchmark, both on an absolute and risk-adjusted metrics. We show how the variability of the results coming from the calibration of the Black–Litterman model itself can easily be mitigated by carefully selecting the model's parameters.

1 Introduction and Literature Review

The relationship between earnings yield and price returns was thoroughly documented in academic papers, most of the results indicating that low P/E companies bring higher risk-adjusted returns (Basu 1983). While the result seems natural though at odds with the efficient market hypothesis, there are almost no

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clues on how this anomaly could be exploited—and more specifically, what would have been the results of a realistic investment strategy that deliberately overweighs low P/E companies. In fact, virtually all testing procedures rely on a long–short setting, where the hypothetical investor buys the cheap companies with the proceeds from short-selling the expensive ones (in this case, the high P/E stocks). There are serious doubts that any investor would really follow such a strategy or that it would even be possible to implement it, given the real market constraints. Consequently there is a looming question whether these results "really" work or they only are apparent in unrealistic, laboratory-type settings.

To completely eliminate such hypothesis we believe that a joint test of the "abnormal" return estimation procedure and of a portfolio optimization algorithm is necessary in order to decide whether realistic "abnormal" returns are indeed significant. The paper closest to ours is that of Fabozzi et al. (2006), where the authors use a momentum strategy to derive estimates, which they combine with equilibrium returns using Black–Litterman optimization algorithm. Unlike their paper, however, where a portfolio carrying estimates into the optimization process was formed arbitrarily based on the absolute risk of those companies (as measured by their standard deviation), we allow a random sampling procedure to select those companies that will carry our estimates freely into the optimization process, thus accordingly to their covariance with the other components.

The chapter is organized as follows: Sect. 1 describes the method and data, touching briefly on the B–L optimization algorithm, which is more of a specialized issue; Sect. 2 discusses the empirical results and Sect. 3 concludes the chapter.

2 Methodology and Data

As per our objective, we embark on this research by confining ourselves to using some of the simplest and easily accessible data about stocks: we rely solely on historical market values and historical earnings of listed companies. Each month we use prices that were only available at the end of the previous month; and we use annual earnings only after a full 6 months period passed from the end of the year pertaining to those earnings. We take these precautions in order to eliminate any looking forward bias that might temper with our data.

Raw data is thus comprised of daily market values of companies (capitalization) and yearly earnings, from June 2006 until December 2014. We follow on all the companies listed in that period on Bucharest Stock Exchange, tier I and II: that means 96 companies overall, but the number is significantly lower for any month taken separately, as not all these companies began trading at the same time, and not all of them were listed until the end of the period. We went through the tedious task of uncovering all those companies that went bankrupt or have been delisted during the period in order to eliminate survivorship bias, by interpolating data from two sources (Bucharest Stock Exchange public site and Rasyonet StockGround database). In few cases we also have eliminated data not available as of each period—a common case of back-filling bias that affects many databases.

Daily market capitalization was further used to derive monthly returns (the standard data used throughout this chapter) and daily returns (the finer granulation of the data series was used to compute covariance matrices for the Black–Litterman model, when monthly data was scarce). We use no data (NA) when some stock was not traded in a particular month: since we rely on monthly prices to compute monthly returns, this procedure ensures that we only include a company in our research if and only if that particular company was traded in the respective month and the previous month. We feel this is also the approach of professionals when confronted with little or no reliable data.

We have also taken extra-precaution to ensure that our returns were correctly adjusted for corporate actions and dividends. This is in fact the only reason why we chose to go no further than June 2006, as data adjustments for earlier data were unreliable from our perspective. Earnings were computed as of the end of December for each year, and we made sure we use end of year data only after 6 months have already passed. Thus each year on June the 30th our database was updated with end of year data. We collect earnings computed from IFRS financials, when available; otherwise we rely on Romanian Accounting Standards (RAS) financials.

Our methodology for generating estimates is based on selecting the extremes of the companies ordered on earnings yield—that is end of year earnings divided by capitalization. This is actually the inverse of the well-known P/E ratio, with the added advantage that earnings yield is meaningful even for companies with negative profits or losses at the end of the year.

With the companies thus ordered it is simple to select n of them that look "cheap" and other n that look "expensive", according to E/P ratio (earnings yield); we rely on common sense to label some group as "cheap" and the other as "expensive", but these labels—reader is forewarned—carry no economic consequences and we proceed further with no preconceived expectation other than those that data themselves reveal. Suffice to say that we consider as belonging to the "cheap" group all of the n companies with the highest E/P ratio, while those n companies with the lowest (even negative) E/P belong to the "expensive" group.

Each month, our selection will yield $n \times n$ pairs of (cheap, expensive) companies—that is all possible combinations of two companies belonging to each group. It is straightforward to compute the return on any investment that is, let's say, long the first company of the group (the "cheap" one), and short the second (the "expensive"). We thus have $n \times n$ returns that can provide a reasonable estimate as to what could happen when one is long a cheap company and short an expensive one. Each month our sample gets larger with $n \times n$ observation and each month we can make better estimates about our returns—that is historical mean return—and more reliable information about the distribution of those expected returns—that is historical standard deviation. We thus got a set of estimates and some measure of confidence associated with them, and we are ready to proceed further—that is incorporate these estimates into a portfolio optimization process and try to beat some benchmark.

The benchmark is simply an equally weighted index formed from all the companies that our investment universe consists of. We introduced some additional constraints regarding a selected universe of N stocks—that is each company should be traded for the month at the end of which a selection is made and for the month preceding that; and we also added the constraint that companies should be top traded—that is a very generous top consisting on the majority of stocks, in order to insure some realistic way of implementing portfolio rebalancing strategies. The astute reader might notice that we do use extra information for this objective other than price and earnings—that is information on traded volume—but in our defense this changed very little in our conclusions and the first constraint (traded or not traded) was actually a far more effective constraint.

The portfolio optimization process that we use is the Black–Litterman algorithm, which is thoroughly explained elsewhere [see Black and Litterman (1992) for an exposition of the model by its authors and Walters (2014) for a detailed discussion]. We will just run here through its main steps and acknowledge those features of the model which makes is so suitable to our testing framework.

The logic of the optimization algorithm starts off by deriving the vector of market expected, or equilibrium, excess returns. That is:

$$\Pi = \delta \Sigma w \tag{1}$$

where delta is defined as the market price of risk, Σ is the covariance matrix of excess returns for the N assets in the benchmark and w is the vector of the N assets weights in the benchmark, actually a vector of N elements each equal to $1/N$. That is so because we chose our benchmark to be a simple equally weighted index comprised of all the stocks in our investment universe. The next step consists in expressing investor's views—in this case the "subjective" views are exactly our generated estimates, derived as explained above. The k-dimensional vector of k views is defined as

$$q = P\mu + \varepsilon_q \tag{2}$$

where P is $k \times N$ matrix of positions implied by the views (1, -1, or 0 for our setting) and each row sums up to 0 (again, this is strictly true for our setting, but the model allows for absolute views as well, where that means the weights add up to 1). The error term in the above equation is described by $\varepsilon q \sim N(0, \Omega)$, where omega is an ideally diagonal matrix reflecting the uncertainty pertaining to the subjective views, with the errors ideally not correlated to each other. We see that by randomly sampling with replacement from our group of estimates and using the mean as an unbiased estimator for the future returns we actually do obtain a diagonal matrix of the return distribution—a result that could only artificially be molded into this framework in other papers by "diagonalizing" the actual distribution.

Further we combine the two sources of information and derive the B–L expected returns computed as:

$$\widehat{\Pi} = \Pi + \tau \Sigma P' \left[P\tau \Sigma P' + \Omega \right]^{-1} [q - P\Pi] \tag{3}$$

and the posterior variance computed as:

$$\Sigma_{BL} = (1 + \tau)\Sigma - \tau^2 \Sigma P' \left[\tau P \Sigma P' + \Omega \right]^{-1} P\Sigma \tag{4}$$

and we are finally able to derive using reverse optimization the B–L optimized portfolio weights as:

$$w_{BL} = (\delta \Sigma_{BL})^{-1} \widehat{\mu}_{BL} \tag{5}$$

which we conveniently normalize to sum up to 1.

We have described so far the procedure meant to generate estimates and incorporate those estimates into a portfolio optimization process for the next month. In what follows we describe a simple Monte-Carlo or bootstrapping procedure meant to test whether our strategy significantly out passes a passive benchmark. This is a rather computationally extensive task which starts by sampling randomly n pairs of companies that will enter the optimization process. That's 10 out of 10^{10} possible combinations. We compute the optimized weights as above and derive the monthly return obtained. Subsequently, the whole process is repeated monthly until we reach an average return. However, since this return is just one draw out of a large number of possible combinations, we repeat the same procedure numerous times in order to get a distribution for the mean return.

3   Findings

We should start by giving the results of our estimation procedure here i.e., mean and standard deviation, which was supposed to be an intermediary step between our input information and our results that confirm the actual value of that information.

From Fig. 1 it becomes apparent that what we might have thought to be a smart strategy—to buy "cheap" companies and sell "expensive" ones—was actually a money-losing endeavor, as evidenced by the negative mean obtained over the period. Luckily the optimization algorithm does not have preconceived notions on what a company labeled "cheap" should bring in excess of a company labeled "expensive", and although we entered long on the cheap company and we shorted the expensive one into our estimates (that's the P matrix), the algorithm appropriately changed signs based on mean estimates and the weights based on covariance matrix. Nonetheless, the result still remains puzzling—"expensive" companies would outperform "cheap" ones—and although this is not our focus here, we would offer some explanations for such peculiar behavior:

Fig. 1 Subjective views: estimates
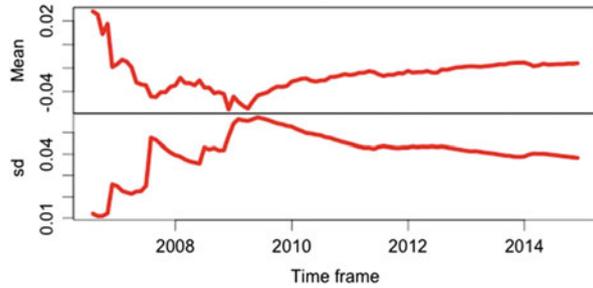
- As earnings are largely known by the time we adjust portfolios, it follows that what our monthly rebalancing captures is the "contrarian" strategy—basically we sell companies that performed well lately (and thus became "expensive") and buy those that were poor performers (and thus became "cheap"). From this perspective a mixed fundamental and contrarian strategy, based on monthly rebalancing, behaves rather badly. The views on momentum [see Jegadeesh and Titman (1993) for an inspiring paper that served as model to this one as well] versus contrarian strategies are rather split, the two factions settling on a question of time frame—meaning that for some time frames momentum seems to work, on other contrarian strategies are better.
- This situation might be just one of those "outliers". Indeed, as we shall see, most of the outperformance was concentrated on the months of 2008–2009 when the financial crisis ravaged markets. It seems that expensive, well regarded companies that demanded lot of premium for owning their stocks, were better prepared to withstand tough periods of economic contraction.

It is also worth mentioning that, as depicted in the same figure, the expected return (about 2 % on an absolute basis) is dwarfed by a standard deviation of 3 %, or even as high as 6 %. It follows that we can't say much about the expected return, using a standard confidence level (at best, we would be 95 % sure that the return of some stock over the other is somewhere between -4 and 8 %, which is not very precise at all). With this in mind, is thus remarkable how this little information was so efficiently used in order to see the returns depicted in the next figure.

We see in Fig. 2 that all the portfolios that we optimized using our estimates based on earnings, which we fed into the B–L optimization algorithm, managed to beat the benchmark (depicted in red color). For the dramatic effect we have chosen a rather large *tau* (which is a crucial parameter in the B–L optimization and reflects uncertainty regarding prior distribution, or historic covariance) that allows very large weights to be assigned to our subjective estimates. Otherwise, using a more realistic tau—such as 0.2, the mean and deviation of the distribution of the average return would all be much lower than those in Fig. 3, but still statistically greater than 0 with a very high degree of confidence (basically 99.99).

There are some additional comments we ought to make. We consider that what we wanted to prove—that even the slightest amount of correct information, if

Fig. 2 Benchmark versus optimized portfolios (tau = 1)
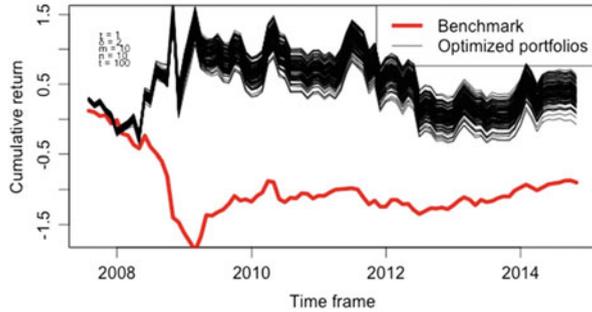
Fig. 3 Histogram of excess return plotted against normal curve
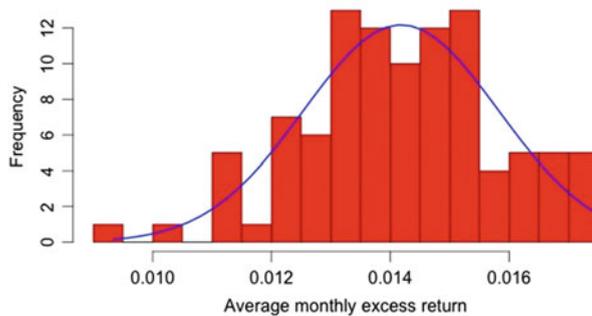
treated uninhibitedly, can help generate some statistically positive return, was proven above. However, given the rather extreme choice of tau in the model and the very large weights that our estimates got to have, we are pretty sure that those large average excess returns (mean of about 1.4 % each month) are not realistically obtainable, given restriction against short selling or unlimited borrowing at risk free rate.

In Fig. 4 we have repeated our estimate-optimization process in a more realistic scenario (tau is 0.3). The average excess returns would amount to 1.8 % after 1 year this time (compared to 1.4 % a month), which is still not bad considering that most mutual funds underperforms their benchmark at least by that amount each year. Again, as can be seen from the histogram (right side of Fig. 4) we can confidently affirm that earnings and historic prices can be used to beat a benchmark, should one be ready to constantly apply the optimization algorithm correctly.
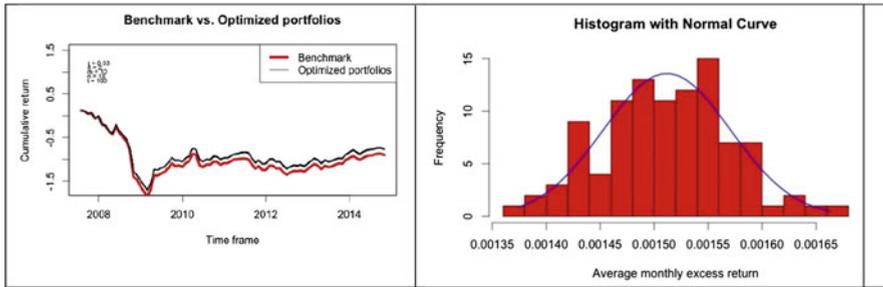
Fig. 4 Optimized portfolios (tau = 0.03) and histogram of excess returns

4 Conclusion

We have described above a procedure meant to test a simple investment idea. In particular, we have succeeded to demonstrate that simple information, such as historical prices and earnings, can be successfully used in order to generate returns above some benchmark. We show that realistic returns, though they are not very large on standard investment circumstances, are significantly greater than zero. We relied on a very simple estimation procedure and the Black–Litterman optimization algorithm that incorporated those estimates to improve, and finally beat, a given benchmark.

We also stumbled upon some unusual behavior of stocks listed at Bucharest Stock Exchange, namely the most expensive companies in terms of Price over Earnings seem to have been a better investment than other, much cheaper, companies. This might have to do with these companies' stamina during the worst part of the financial crisis, or might be the manifestation of some momentum effect, which we could not document before for this market.

Finally, the procedure shown here to test some simple investment ideas can easily be applied to other criteria. If in this case we have used P/E, we have also shown that P/BV can be another criteria for selecting investments (working paper), or Market to Debt ratio, or any other meaningful and constantly updated ratio or corporate parameter.

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Corporate Social Responsibility (CSR) and Stakeholders Management

Liliana Simionescu and Dalina Dumitrescu

Abstract This chapter describes the ways in which CSR practices can develop and strengthen company's relation with their key stakeholders in order to create both social and financial value to the companies. Using companies CSR reports, current study identifies theoretically for the case of Romania the mechanisms and the important contingencies in whether the CSR practices are considered by stakeholders authentically and effective and if these practices persist in time. The importance of relation between company and stakeholders through CSR practices is due because of the long term success of the company as there are outside immediate profit maximization goals. We conclude from companies CSR reports and websites that in order to achieve long term financial performance, they (the companies) engage in specific CSR activities as social activities. Thus, companies select 'the right' social activities turning them into companies' strategies addressed to specific types of stakeholders, namely to those are trying to strengthen their relation with.

Keywords Corporate social responsibility • CSR practices • Stakeholders • Strategies

1 Introduction

The literature on CSR has increasingly emphasized the important effect of sustainable development (SD) principles where stakeholders' inclusions play a significant role (Matos and Silvestre 2013; Mont et al. 2014). Companies' social strategies, as CSR, depend on the development of a strong relationship with their key stakeholders in order to create both social and financial value. According to Freeman (2010), stakeholders are those groups or individuals affected by the company's business achievements or, more closely, as underlined by Post et al. (2002), are the individuals that contribute to the companies' wealth creation and activities, and

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thus are not just the beneficiaries but also the risk bearers as a result of companies economic activities effects. A CSR company which takes into consideration stakeholder approach as an integral part of its business strategy is actual views are the long term success of the company, the SD of the business, because of the function given by the relationships with stakeholders such as employees, customers, investors, and communities.

Through social strategies companies enhance external stakeholders social benefits or diminish companies social issues, leading thus to companies long term sustainable business strategies (Marquis et al. 2007). Sankar et al. (2006) argued that stakeholders reactions to CSR practices exist only if these initiatives and actions offer them returns. As regards the CSR practices authenticity and effectiveness push the stakeholders to respond as being the benefits (that they obtain are) the central mediator through which CSR strengthens stakeholder–company relationships (Bhattacharya et al. 2009). Despite of the traditional view of the companies' only goal of profit maximization, they begin to understand and to base their social engagement decisions on an extensive stakeholder logic model. Thus, CSR companies allocate resources which are intended to create those benefits required by the various external stakeholders. Companies allocate these resources for CSR activities but only for a selective social practice or for those which fit their core business depending on which type of stakeholder relationship the company seek to strengthen. Companies adopting CSR practices, annually publish CSR reports, Sustainability reports where their aims and objectives are described.

Current manuscript follows the CSR pyramid (see Fig. 1) designed by Visser (2008) for developing countries since it examines companies' stakeholders from Romania. Visser (2008) revised Carroll's (1999) CSR pyramid and replaced discretionary responsibilities with philanthropic responsibilities. However, according to Visser (2008), in order to implement CSR activities successfully in developing countries, there should be more considered philanthropic activities. The basis of the pyramid is the economic category, representing the foundation for the rest of the three categories. The next level within pyramid is described by the philanthropic activities and only then could legal and ethical responsibilities follow.

This chapter aim is to underline ways in which companies in Romania realize social responsible strategies by considering stakeholders' approach and simultaneously can create financial value by strengthening and developing relationships with companies' key stakeholder through CSR practices. When the stakeholder–company relationship is strong the companies benefits that arise through CSR are the cost reduction, increased market value, revenue enhancement, and improved competitive advantage (Porter and Kramer 2006). Thus, this study focus is on those mechanisms and important contingencies as regards the companies CSR practices if there are considered authentic and effective by the stakeholders. Moreover, using companies CSR websites and their CSR reports, considering the above contingencies, in the following sections we analyze in the Romanian context, ways in which by strengthening stakeholders' relationships over CSR practices are increased bottom line benefits.
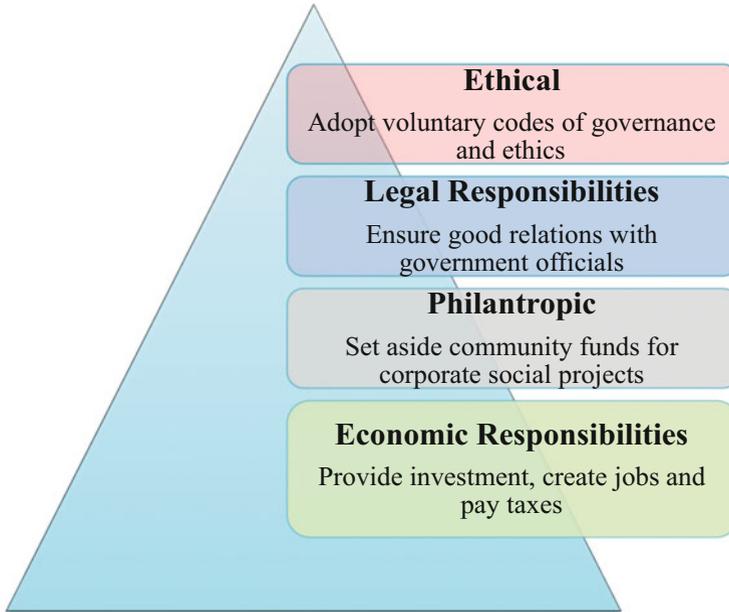
Fig. 1 CSR pyramid for developing countries. Source: Visser (2008)

2 Connection with Employees

Ashforth and Mael (1989) said that CSR can lead companies to a greater identification thereof, where employees feel "oneness" with the company where they work. Jones's (2007) study analyzed employees attitude and work-behavior changes after they participated at community social programs organized by the company where they work. The author findings showed a statistically significant increased between philanthropic activities and the employees' sense of identification with the company who organized these philanthropic activities. Moreover, these employees where correlated with a greater level of commitment, increased productivity, and improvement of job performance. Indeed many studies found that CSR practices can lead not only to employees' motivations but also increased their performance, self-esteem, and achievements by connecting the employees' identity and value with those of the company (Dutton et al. 1994).

Turban and Greening (1997) underlined that prospective job applicants tend to pursue jobs from companies which are socially responsible because of their reputation. CSR companies encourage entry level employees to gradually increase their positions in companies to executive level trough CSR development activities. Companies constantly increase their selection on CSR activities based on which both business and social values can be achieved and found that aligning CSR practices with skilled employees is an effective way to raise internal capacity.
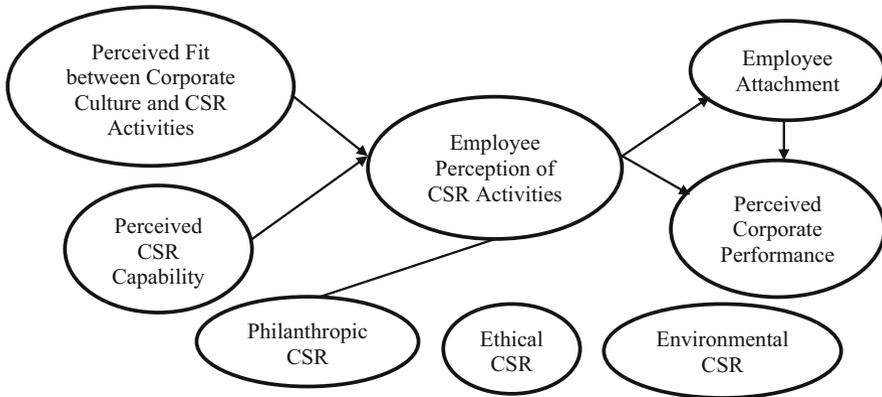
Fig. 2 The conceptual model. Source: Lee et al. (2013)

Lee et al. (2013) examined in their research the impact of employees' perception as regards the CSR activities on employee' attachment and corporate financial performance. For their research they proposed a conceptual framework (see Fig. 2) for which was provided empirical evidence. Their results showed a positive relationship between CSR activities and improved employees performance. Moreover, the research noticed that companies should take into consideration and pay a particular attention regarding the employees' feeling and attachment of the place where they work and long term performance.

The logic model as regarding the impact of CSR practices on employees in companies from Romania is moderated by several factors. Based on literature reviewed above and the CSR reports and companies website, CSR practices are split on companies' employees' generations. Generation Y employees resonate with CSR practices based on corporate culture and with the characteristic of gen Y, meaning making impact on society. Generation X employees resonate with CSR activities which imply direct communications on their social programs.

Based on company economic activity, employee engagement with CSR varies. Companies in the oil extraction, telecommunication, financial, and pharmaceutical sector have strong CSR programs as well as employee engagement, while manufacturing sector has less green work force as well as the employee engagement. The CSR power to recruit skilled employees was also noticed in companies from Romania, especially at multinationals and big companies such as Petrom, Orange, BCR Erste Group, BRD Groupe Societe Generale, etc. which also encourage volunteering, social employees programs, and team work community activities.

3 Connection with Customers

Companies' connection with their customers is important as they need to attract and keep customers. Through social programs, certain philanthropic causes, and commitment to community, companies found an effective way not only to differentiate themselves from their main competitors but to enhance customers loyalty and brand perception as well (Lim 2010). As Ruf et al. (1998) underlined, improved corporate social performance (CSP) can lead to increased financial performance as a result of high customer loyalty and increased companies' reputation or both derived from a strong relationship with consumers. Customers' loyalty is also correlated with sales growth and profitability. As in the case of employees, customers also can identify themselves with the company through companies' social involvement in communities (Lim 2010).

Companies which also take into consideration consumers' safety and try to minimize the environmental impact through their products and processes may also lead to customers' loyalty (Reinhardt et al. 2010). Thus, CSR companies which tends to be greener or support the social activities on environmental protection will not only increase customers loyalty but will also improve companies image and reputation and will have a positive impact on companies evaluation overall (Bhattacharya and Sen 2004).

The logic model of connecting customers with companies' social and environmental practices and its performance is still debatable for many developing countries where unemployment rate is high and incomes are low. CSR concept in Romania is relatively new and companies which are adopting these practices are either on the beginning of CSR road or already half road. If whether CSR companies through different social, environmental, and philanthropic activities were able to strengthen their relation with customers is yet too soon to say. Today, in the year of 2014, at Bucharest Stock Exchange in Romania are listed 81 companies out of which only 21 are CSR companies. From the 21 CSR companies more than 80 % adopted CSR in the last 2 years and their understanding of CSR rely on the environmental management certificates (ISO 9001 2008, ISO 14001 2009). The rest of 20 % adopted CSR more than 3 years ago and are split between implicit and explicit CSR.

4 Connection with Investors

Luo and Bhattacharya (2006) showed that companies with low innovation capacity, CSR might actually reduce the customers' level of satisfaction and would therefore harm the market value. The authors continue in their study and found throughout a positive relation between CSR activities and stock market returns and company intangible values measures.

Dowell et al. (2000) found that companies taking seriously environmental standards and are firm in their applicability have a higher market value than those companies which are not considering at all these standards or do not conform exactly to standards. Developing countries with low environmental regulations that seek to attract foreign direct investment (FDI) might end up by attracting substandard or inferior quality, even, less competitive companies (Dowell et al. 2000; Visser 2008; Dumitrescu and Simionescu 2014).

Companies adopting CSR not only increase their reputation and competitive advantage (Porter and Kramer 2006) but also they become more transparent in such way investors can screen their performance and tendencies to socially responsible investments. Investors prefer companies which have a high performance reputation in activities such as environment, social, and governance (Bhattacharya et al. 2009; Sen et al. 2009). These companies are able to offer a more complete picture about their ability to achieve, in the long run, high return (Sucher and Beyersdorfer 2009) because of their quality management and intangible values. Thus, investors may be attracted and the valuation of share-price raise (Lim 2010).

The association of CSR activities with lower cost of capital and improved valuation of market share was noticed by companies in Romania as well. Companies adopting socially responsible activities in developing countries need first to find the host country specific CSR model. The authenticity of CSR model and effectiveness came from company social efforts and these efforts are the investors' information about company social responsibility performance. The company social and environmental activities are screened by investors and based on their social performance the company is classified as preferred one with good aspects for investments. CSR companies social activities, projects, evolution, aims, and their performance can be screened on a socially responsibility website in Romania.

5 Connection with the Community

The relation between company and community where it operates is important because the latter can act both as a collaborator as well as a target (the beneficiary) for CSR initiatives. According to Marquis et al. (2010), the different CSR activities are seen as "arising from and responding to local communities" as regards the community identity, values, regulations, and organizational infrastructure. These activities are considered key drives for the level of social practices expected from corporations (Dumitrescu and Simionescu 2014).

CSR activities implemented in companies business strategies result in improved wellbeing of community where it operates leading thus, to economic and social development as well as to business SD. Thus, both company productivity and community welfare increase as well (Visser 2008; Jamali and Mirshak 2007). Companies need to develop continuously the relation with the community. Therefore, they need to weigh the short-term costs and see the long-term benefits, also to determine whether the immediate burden can be supported in order to achieve the

social mission or to find ways, if there are any, to recover the cost in the future. Companies that honor their contracts with the community, which are actually normative and cultural duties and not legal responsibilities, gain reputation that helps in establishing the firm terms of trade in a community where it operates and can negotiate as well with various stakeholders (Ruf et al. 2001).

A community stakeholder logic model relies heavily on the geographical place and company dispersions. CSR companies in developing countries have a different community strategic approach, whereas in developing countries CSR strategies are based on community social needs (Dumitrescu and Simionescu 2014) such as: infrastructure development, environment, *job creation and stability of a job* and political governance (Visser 2008). This is also the case of Romania, CSR companies with a strong commitment to the community where they operate are seen stable from the point of view of jobs, and these companies encourage and recruit young and skilled workers, have a very low rate of redundancy even during economic downturns, contribute to infrastructure development and have high environmental performance.

6 Conclusions

As Post et al. (2002) underlined, stakeholder management is about managing the extended enterprise. Indeed, a company strategy need to take into consideration and to continuously improve its relationship with stakeholders, whether or not were created voluntarily or none voluntarily activities. Companies with strong social strategies will have a positive impact on stakeholders that will lead to a high quality relationship company–stakeholder. In our previous chapter, we underlined that every country, especially developing countries, need a specific CSR model with specific social strategies. Thus, simply implementing social strategies will not necessary lead to the level of stakeholder impact the company need to derive for business to benefit. In the case of Romania, the stakeholders impact through social strategies was understood by successful CSR companies (JTI, Petrom, Orange, BCR, BRD, Holcim, A&D Pharma, Mol Romania) which notices or/recognized the benefits seek by stakeholders and how these benefits will turn into satisfaction for both stakeholders and companies, trust, commitment and, the most important, identification with the company. These companies selected specific social activities turning them into social strategies addressed to specific types of stakeholders, namely to those are trying to strengthen their relation with such as employees, customers, investors, and community. As Porter and Kramer (2011) said companies which align business strategies and social goals are known as value shared by the company with all its stakeholders and this should not be a surprise but an integral part of business.

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EU's Political Actions for the Enhancement of Macroeconomic Stability in Confrontation with Great Economic Recession

Rasa Daugėlienė

Abstract After the great economic recession, started in the end of 2007, provokes the complicated question for researches and experts: do the EU's legal authorities [e. g., European Commission (EC), European Central Bank] have taken appropriate political actions in order to make more efficient fight with banks collapses, growing the governmental debt of some EU member states, rising unemployment rate and other undesirable downturns in the systems of economies. The article tries to answer to mentioned question. For the first time, it were systemised and explained various EC's initiatives towards supervision of EU's economic stability. Comprehensive analysis of first adequate actions of Lithuania's Government and other World countries as the reaction to the great economic recession in the period of 2007–2009 was systemised. The chapter highlights several important results: what actions were undertaken by EU authorities in order to reduce the painful consequences of later economic recession? Were they adequate and timely? How to maintain stability of state's economy by implementing political actions of EC? The latter economic recession showed that fiscal policies—both micro level (related with interest payments) and macro level (related with amount of resources available to deal with financial crises)—have an influence on the vulnerability of economy. However, still it is unclear what exact adaptations in the economy are needed.

Keywords Macroeconomic stability • Economic recession • European Union • Political actions • Initiatives • Lithuania

1 Introduction

The scientific literature declares the methods how macroeconomic stability could be controlled through the management of fiscal and monetary policy (Clarida et al. 2000; Freedman 2000; Barrell and Davis 2005; Mendoza and Tesar 2003).

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Keynes (1936) developed interventional governmental policy, explained interrelations between employment, interest rates and monetary theory. One of his followers—Friedman (1962) stated, that liberal governmental policy do not ensure the stability of state's economies. Moreover, decline of bank's sector control (or its absence), is equal to the destruction of economy. Kaminsky and Reinhart (1999) stated that problems of payments balance and non-controlled bank's activities stipulate instability. Frankel and Rose (1996) fluctuations of exchange rates identified as precondition for economy recession. Meyer et al. (2002) and Minsky (1992) analysed coordination process of monetary and fiscal policy. They stated that this ensures stability of state's economies'. Meanwhile, Bresnahan et al. (2002) agreed that enhancement of employment level is one of the most important criteria for the assurance of economy growth. It is interesting to stress, that Krugman and Venables (1995) made the conclusion the economic recession seems to be the price of globalisation. Is it positive or negative conclusion? The answer needs further discussions'. But this is not the object of this chapter.

Moreover, in recent work of this article's author, historical lessons from the past, as well as methods which allow to predict the possible events as well as to design guidelines for the solution of economic crises consequences were systemised. The interrelation of classic and modern economic growth theories searching for the impact of globalisation on change of people values and evolvent for the evaluation of countries macroeconomic situation was systemised (Daugeliene 2011). In order to specify what are the main growth engines of twenty-first century, there was highlighted the interrelation between globalisation phenomenon and features of global economic recession. It was concluded that economic stability directly appertain on fluctuations in macro economy. New theoretical dimension was proposed by search of interrelation between globalisation and global financial crisis.

According to mentioned above, there are enough studies, researches and proposal how the macroeconomic stability should be supervised and ensured. But, why legal authorities not always and not properly react to the certain signs which show that the state's economy suffers?

This article solves practical aspects of the problem by detection and interpretation of European Commission initiatives in order to maintain EU's macroeconomic stability. Comprehensive analysis of first adequate actions of Lithuania's Government and other World countries as the reaction to the great economic recession in the period of 2007–2009 was systemised as well. Mentioned analysis allowed to identify actions for the enhancement of EU's economy stability. The *article aim* is to systemise EU's political actions for the enhancement of macroeconomic stability in confrontation with great economic recession.

Results and conclusions. After the systemic analysis there were highlighted several important results how to maintain stability of state's economies under the conditions of European Union's economic integration. Essential requirements for assurance of economic stability are: effectively functioning strictly controlled and harmonized finances (banking sector), fiscal (public debt) as well as labor market systems. EU needs to develop functioning of Single Euro Payments System. There

is still a need for clearness, how complex financial institutions should function as they develop activities in many countries. In addition, it remains unclear what changes should be inspired in the institutional environments in order to help best to reduce financial markets' pro-cyclicality and the buildup of systemic risks. The latter economic recession showed that fiscal policies—both micro level (related with interest payments) and macro level (related with amount of resources available to deal with financial crises)—have an influence on the vulnerability of economy. However, still it is unclear what exact adaptations in the economy are needed. From this follows, that creation of crisis prediction model is needed.

2 European Commission's Initiatives in Order to Support Economic Stability

As the previous research shows, this extending economic recession is not a new phenomenon in the World's history. Imbalances in the trade area, the fall of real estate prices as well as total downturn of economy has the parallels in history. Nevertheless, many of experts state, that this recession is much bigger and deeper than it was in 1930s during "Great Depression". In recent work Krujilov (2015) presented discussible idea that crisis is a sign of structural reorganisation of the global social system. The author concluded that the consequence of "Cold War" (between the European World, the Soviet Union and the United States) was the slowdown of the European world progress.

Starting from 1992 European Commission applied different measures in order to look after the effectiveness of internal market functioning as well as insurance of economy growth and stability. Special actions were taken in the very beginning of crisis when first bankrupts of countries were noticed. Anyway, these actions were not such efficient and timely as they had to be. In April 12 of 2005, European Commission for the first time presented common economic policy guidelines where recommendations for economic and employment policy actions were highlighted. This was revised Lisbon Strategy where just high value added actions for the economic and social development where specified.

For the assurance of economic growth and social stability in the EU region, European Commission in September of 2004 suggested some improvements of Stability and Growth Pact. These improvements were for better governance, better coordination and management of economic policies as well as for avoidance of fiscal deficit. Even then it was claimed that taxes and functioning of customs union influence the competitiveness of European Union. According to this in this field it was reduced number of formal administrative procedures; it was forecasted to help countries ensure the stability of inward flows; to stimulate bigger competitiveness in the markets; promote trade as well as collaboration of science and industries by organising R&D.

After the September of 2008, all official actions of European Commission, reacting to the consequences which were raised because of World's financial crisis,

were orientated for the stipulation of effectiveness of functioning of monetary policy. The big changes were implemented rapidly in order to avoid financial institutions insolvency as well as downturn of all financial system. The certain actions were: European Central bank was empowered reduce interest rates level till 0 %; the member states were empowered revise the level and structure of governmental debt and ensure that this level will be reduced in short period; banks' recapitalisation actions were implied as well as the support for the depreciated assets were reduced as well.

In order to avoid the complete collapse of the banking system, European countries governments began to bail out their banks by providing rapid, until then unheard-wide support. In the period of 2008 and 2011 it was appointed 1.6 trillion euro which consist 13 % of EU's annual GDP. Starting from the end of 2009 some euro zone countries faced with difficulties by management of debt. Because of uncertainty in the market, provide lending operations started to be too expensive and complicated. Taking into account such situation, EU countries established security and confidence-built measures which allowed to finance the debts of economically weak countries.

While Greece lost access to the affordable market financing, European Commission focused bilateral loans of prosperous member states. Two temporary funds were created: European Financial Stabilisation Mechanism (EFSM) and European Financial Stability Facility (EFSF). The total loan was 500 billion euros. It is a key to stress, that later measures were just temporary. According to this, in autumn of 2012, euro zone countries created new permanent financial security mechanism—European Stability Mechanism (ESM). This is the permanent crisis resolution mechanism for the countries of the euro area. The ESM issues debt instruments in order to finance loans and other forms of financial assistance to euro area Member States.

European Council, encouraged by financial crisis, during the meeting which was held on 11–12 December of 2008, confirmed European Economic Recovery Plan (EERP). The plan forecasted actions how member states and European Union could coordinate policies and suggest new stimulus for the recovery of European economy. The scope of the budget of plan was five billion euros. From this sum, 3.98 billion euros was dedicated to the projects of energy sector, and 1.02 billion euros—for the development of broadband internet projects.

Quite controversial and discussible seems to be the first attempts to strengthen EU economy. EERP suggested enhance investments in the strategic sectors of EU, especially to the infrastructure development projects. It was a plan for lighting fast development of EU economy (by injections of money). In the long period it was expected sustainable economic growth. The plan offered invitations for a funding of projects of Trans-European Transport Network (TEN-T). Funding sum was 500 billion euros. Question rises, if such actions where adequate for the composed situation in the EU economy? Why actions were not focused for the solution of financial problems of such countries like Ireland, Latvia, Spain, Greece, and Portugal? It could be done by financing projects of small and medium size enterprises which would be enabled create new working places. It should be concluded,

that European Economic Recovery Plan—it's financial part—was not orientated the solution of essential macroeconomic problems.

In 2009, European Commission presented the structure of crisis management policy. The actions for crisis prevention, management and mitigation of consequences where forecasted in this plan. The resolution was prepared as well where the steps how to coordinate EU's financial, monetary, fiscal and structural policies were highlighted. Despite quite fast European Commission's political reaction to the consequences of financial crisis, economic imbalance in euro zone and the rest of EU internal market still appreciable.

On 4th March, 2009, European Commission published communication "Driving European Recovery". There it obliged present suggestions how to reform the structure of EU financial system as well as, how to create monitoring bodies for the financial system. Essential actions in order to implement the monitoring of EU financial system were: improvement of investment funds management as well as creation of alternatives; suggestion of new requirements for banks capital; security of consumers and SMI through the initiatives towards responsible lending and borrowing; risk management in short period; tightening of sanctions for the non-compliance. Financial Conglomerates Directive (FCD) was revised as well.

European economy recovery plan for the 2010–2013 years was sign in 2009 as well. European Commission and industrial partners have agreed in collaboration in three spheres: in the production sector by implementing initiative "Factors of the Future" (1.2 billion euros were appointed for the implementation of R&D activities); in the construction sector by implementing initiative "Energy-efficient Buildings" (one billion euros appointed for the implementation of R&D activities); in the automotive sector by implementing initiative "Green Cars" (five billion euros, from which one billion euros appointed for the implementation of R&D activities).

In March of 2010, *Europe 2020 strategy* was presented. European Commission suggested new platforms for initiatives in order to enhance the growth of economy. The ambitious tasks in the field of employment, innovation creation, education, social inclusions and climate/energy were raised to be implemented till the 2020. Four priorities were detailed: smart growth, sustainable growth, inclusive growth, economic governance. European Commission proposed and EU legislators agreed with the "six-pack" considering legislation in the field of economy management. According to this Stability and Growth Pact (SGP) was corrected in order to strengthen monitoring system of public finances. It is a key to stress that the content of this Pact was reformed twice: in 2005, when EU Council under the pressure of Germany and France, diminished the requirements; and in 2011, when the debt situation in some EU member states exceeded all requirements. Then EU member states applying *Open Method of Coordination* straightened the rules of governance. They implemented automatic punishment system for countries which are not able properly manage the debt. Procedures were escorted by one more pact—*Euro Plus Pact*. After the reform in 2011, Stability and Growth Pact covered the programmes of stability and convergence stimulation, as well as *National Reforms Programmes* which are applied as control measure in member states.

It is can be agreed with Calmfors and Wren-Lewis (2011) statement, where is stressed, that the upper deficit and debt limits where forecasted in the EU Stability Pact and this solution was interpreted as middle term budget task. Just several countries applied national fiscal policy rules. For some of them these rules were insufficient (e. g., Greece). Twenty-three member countries (all euro zone countries, Bulgaria, Denmark, Latvia, Lithuania, Poland and Rumania) implemented rules of *Euro Plus Pact* in 2011. Unfortunately, this Pact was not implemented consistently because of application of controversial measures as well as inadequate goals setting. Therefore, after the 2011 reform *Stability and Growth Pact* covered stability and convergence stimulation programmes as well as National Reforms Programmes. The later are used as instruments for the control of member state's actions in order to keep stability in all economic fields (especially in monetary and fiscal policies).

Regulation of macroeconomic imperfections management in the EU (see Fig. 1) It is basically agreed that coordination of member state's economic policies should be organised taking into account the guidelines of economic and employment policies as well as have to conform the principles of stabile prices maintenance, sustainable public finances, development of monetary conditions as well as sustainable payments balance maintenance. In the regulation of macroeconomic imperfections management, the same attitudes as they were highlighted in scientific works and experts reports, were detailed. The regulation stresses that it is essentially important to pay attention to past lessons and do not repeat the same mistakes.

Financial rules which were settled down in the Stability and Growth Pact were too weak in order to manage the collapse of EU financial market, European Commission suggested new system for maintenance. As it was show by economic and financial crisis, EU's banks system was not protected from the shocks. In order to correct situation in the financial sector EU and it's member states straightened the maintenance of financial sector. In January of 2011, new regulation (1093/2010) which was presented by European Parliament and European Council get into force. According to this regulation *European System of Financial Supervision* (ESFS) was created. It was created as a decentralised, multi-layered system of micro- and macro-prudential authorities in order to ensure consistent and coherent financial supervision in the European Union. This supervisory system is currently undergoing major changes further to the introduction of a Banking Union.

The structure of European System of Financial Supervision (ESFS). Micro-prudential supervision and regulation Micro-prudential supervision according to the European Union rules is characterised as multilevel system of different legal authorities. The different legal authorities can be appointed regarding to the area of sectorial supervision and regulation. For example, one authorities will be separated for supervision of banking market, other for insures or securities markets. Different authorities can be appointed for supervision and regulation in European and in national level. In order to ensure consistency and coherence between the different

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│           Regulation of Macroeconomic Imperfections Management in the EU   │
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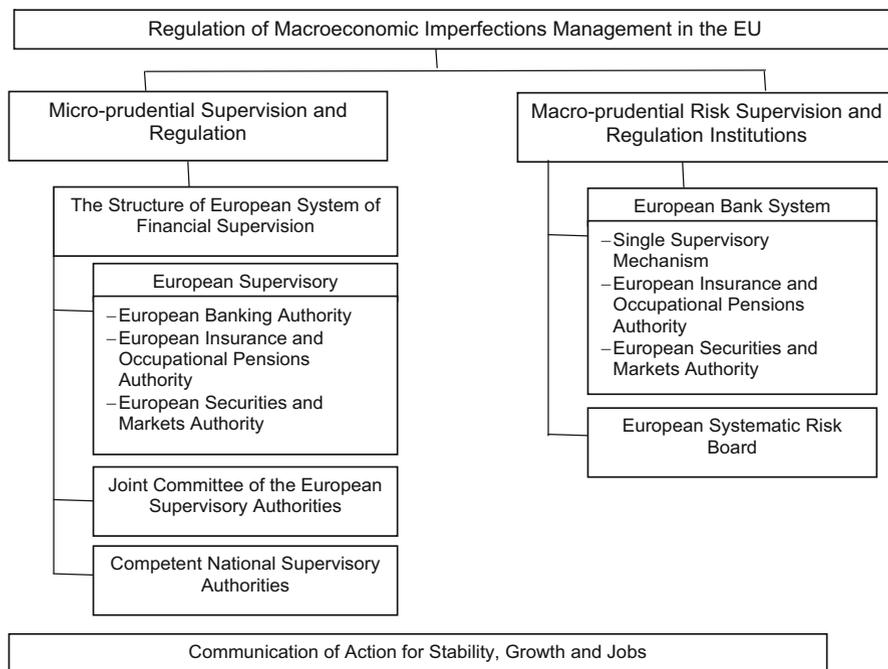
Fig. 1 Mechanism of regulation of macroeconomic imperfections management in the EU

authorities, various coordination bodies and instruments have been created. In addition, coordination of the institutions at international level has to be ensured.

European Supervisory Authorities (ESAs) In the level of Europe European Supervisory Authorities are responsible for the supervision of micro- level risk as well as day-to-day supervision is completed in the national level. European Banking Authority (EBA), European Insurance and Occupational Pensions Authority (EIOPA), and European Securities and Markets Authority (ESMA) are Union bodies with their own legal personality, which are represented by their respective chairpersons; they are independent and act only in the interests of the Union as a whole.

Joint Committee of the European Supervisory Authorities (JCESAs) The Joint Committee is responsible for overall and cross-sectorial coordination. The main aim of this Committee is to ensure cross-sectorial supervisory consistency. This includes such areas as micro-prudential analyses of cross-sectorial developments, financial conglomerates, risks and vulnerabilities for financial stability, accounting and auditing, retail investment products, information exchange between ESRB and ESAs and the development of relations between these institutions as well as measures to combat money laundering, The Joint Committee is responsible for the settlement of inter-sectorial discussions' between ESFS Authorities.

Competent national supervisory authorities According to the different legislative measures in the financial services field, each member state designate one or several competent institutions. These national supervisory institutions belong to the structure of European System of Financial Supervision (ESFS).

Macro-prudential risk supervision and regulation institutions Macro-prudential oversight is carried out at European level by the European Systematic Risk Board (ESRB). The main aim of ESRB—taking into account macroeconomic changes, prevents Europe from the systemic risk in the financial sector. The founding regulations cover various tasks upon, and provide instruments to, the ESRB, including the collection and analysis of relevant information, risk identification and prioritisation, issuing warnings and recommendations and monitoring their follow-up, issuing a confidential warning and providing an assessment to the Council when the ESRB determines that an emergency situation may arise, cooperating with other parties of ESFS, coordinating its actions with international financial organisations such as the IMF and the Financial Stability Board (FSB), and carrying out tasks specified in other Union legislation.

It is a key to stress, that accelerated financial crisis demonstrated the limitation of structure of European System of Financial Supervision (ESFS). According to this, European Commission, in the middle of 2012, suggested create *European banks system*. This system overlapped Single Supervisory Mechanism (SSM), Single Resolution Mechanism (SRM), suggestions for Deposit Guarantee Schemes (DGS), and the Code of common supervisory rules (EC 2012a, b).

The objective of the *Single Supervisory Mechanism (SSM)* is to ensure consistent, coherent supervision of credit institutions in order to prevent regulatory arbitrage and fragmentation of the financial services market in the Union. Participating Member States are all euro area Member States and non-euro area Member States which decide to join. The SSM is composed of the ECB and the national competent authorities.

Single Resolution Mechanism (SRM) In April 2014 the European Parliament adopted a regulation establishing the Single Resolution Mechanism (SRM) and Single Bank Resolution Fund (SRF). The SRM provides tools and instruments for the recovery and resolution of credit institutions and certain investment firms in the euro area and other participating Member States. The Resolution Board is the decision-making body. The SRF serves as financial backstop. Some aspects of the SRF, such as the transfer and mutualisation of national contributions, are covered by an intergovernmental agreement. The SRM is not the same as the Bank Recovery and Resolution Directive, which ensures harmonised *national* recovery and resolution mechanisms in *all* EU countries.

Deposit Guarantee Schemes (DGSs) are linked to the recovery and resolution procedure of credit institutions and provide an important safeguard for financial stability. In 2010, the Commission tabled a proposal for a recast of the (existing) DGS Directive. In April 2014, the European Parliament adopted this recast. In the event of the non-payment of due deposits, up to 100,000 euro of covered deposits

are protected (in some cases a higher level of protection is possible temporarily). Other major achievements include risk-based contributions, shortened repayment deadlines (from 20 to 7 working days), and voluntary lending between DGSs in different Member States [systemised according to Maier (2014)].

Other important initiative of European Commission in order to implement Europe 2020 strategy was made on May 30, 2012. The *Communication of Action for Stability, Growth and Jobs* was established. For the first time European Commission faced to single European citizen by stating that most of citizens already are agree and confused about what is happening with their life's because of great recession. European countries managed to join forces and established the biggest financial support fund in the World. European Commission, International Monetary Fund and European Central Bank by common forces helping member states prepare national programmes, which would allow to reduce government debts, enhance economies, and create new working places. Staring 2010, Greece, Ireland, Portugal, Spain and Cyprus received beneficiaries from this fund. European Union strengthened fiscal rules and started to apply new system for the supervision of macroeconomic imbalances.

3 Lithuanian Government's Political Actions for Macroeconomic Stability Insurance

Lithuania as most of others EU member states faced with the consequences of global economic recession. Naturally the question rises, to analyse the first political actions which were applied by the Lithuanian Government in order to avoid tragic consequences of great recession and fall down of state's economy. Table 1 summarises the actions in the period of 2007–2009 and compares them with certain events in Europe and the World. Some interesting conclusions can be done from the data.

As it is stress in Table 1, the Government of Lithuania reacted to the processes which were named as consequences of great recession just in the end of 2008. The first solutions concerned with tax system reform. Most of taxes were raised and this increased the tax burden for Lithuania citizens. Other solutions regarding supervision of economy downturn were not friendly for citizens as well. The main measures were taken in order control the situation after the financial difficulties, were connected with: decrease of salaries for civil servants, VAT rate was increased (from 19 till 21 %), the dividends had been charged by 20 % tariff, state's property rental fee was increased from 0.5 until 2 %, income tax was increased from 15 until 20 %, the excise for gasoline, diesel, gas and alcohol was raised as well, state's budget was reduced.

It is a key to stress that opinion about enhancement of taxes or abolition of new once will supplement the state's budget, not always is right. As the example of Finland shows, in the early 1990s when the country fall into deep economic

Table 1 First adequate actions of Lithuanian Government and other World Countries as the reaction to the Great Economic Recession (2007–2009)

Date	Events/actions
September 2007 (Europe)	Interbank interest's rates level seeks the highest level since 1998. The problems of Northern Rock (UK) bank became obvious
October 2007 (Europe)	The bank of Switzerland UBS announced about losses of 3.4 billion of dollars
December 2007	The US Federal Reserve Bank and European Central Bank proposed financial support for the commercial banks during the Christmas period Standard & Poor's diminished the rankings of insurance companies which activities are concerned with the insurance of bonds
November 2008 (Lithuania)	The first official reaction of Lithuanian Government to the situation in economy. It was started to negotiate about the possible Lithuanian financial stability assurance project
January 2008 (Lithuania) January 2008 (World)	Lithuanian bankers guarantied Government that Lithuania will not face with the threats of financial crisis which already was started in the USA Meanwhile, World Bank prognoses were, that World economy is facing with the big difficulties. It was stated that this is the biggest slowdown of economy growth starting from 11 September of 2001
January–November 2008 (Lithuania)	The tax burden for citizens was degreased. Less incomes flows to budget
	Personal incomes tax was reduced from 27 till 24 %
	Temporal social tax on taxable profit was abolished (was 3 and 4 %)
	Lithuanian Government decided to rise the salaries for teachers
	Unemployment social security payments regulations were changed (more citizens will get social payments in case of temporal unemployment and in other social exclusion situations)
	Government appointed additional payments for poor families Social security pensions as well as social assistance benefits were increased
	Lithuanian Government positively assess the act for European small business EU Commissioner pointed that Lithuania have to follow fiscal discipline as well as to seek reduce the budget deficit
	Taking into account the decisions of ECOFIN Lithuania increases the amount of insured deposits till the 100,000 of euro. Deficit budget for next year was approved as well
November 2008	Lithuanian Government approved resolution for the "Financial Stability Insurance" as well as project for the prevention and management of financial crises plan

(continued)

Table 1 (continued)

Date	Events/actions
December 2008	New Government of Lithuania approved the plan for a fight with financial crisis consequences. Cardinal tax reform started to be implemented
2009	Lithuanian lending rankings were not stable. The Lithuanian tax burden started to increase
Meantime in the World and Europe (2007–2008)	British Government nationalised the *Northern Rock* bank
	In the meeting of G-7 it was announced that the collapse of mortgage market raised the losses by 400 billion of US dollars
	The problems of liquidity of one of the biggest US investment banks—Bear Stearns—had been announced. The collapse of financial sector was forecasted at this period
	IMF warned that potential losses because of financial credits crisis in the World can seek 1 trillion US dollars or even more. Considering this, the crisis will cover all financial fields
	USA starts judicial investigations regarding intentional financial crimes
	In UK real estate prices fall until the level of 1991
	European Central Bank donates 95 mln. euro to the market of European banks in order to rise their liquidity
	The beginning of decline of stock markets Ireland—the first EU country which felt into a deep recession
	Bankrupt of "Lehman Brothers" bank (USA)
	Credit crisis shocks the European banking sector. The first victim—the giant of European banking and insurance company "Fortis"
	US House of Representatives and Senate approved for saving package of 700 billion of dollars
	Governments of Ireland and Denmark announced about guaranties considering security of banks deposits
	Iceland nationalising banks
	Central banks of USA, EU, G. Britain, China, Canada, Sweden and Switzerland reduced interest rates. IMF provides the opinion about the downturn of global economy
	Meeting of G-7 financial ministers in Washington. There were not settled common agreement regarding plan for the management of financial crisis
	G-20 meeting in Washington. There were expressed ambitions regarding the reforms of global financial system. State's leaders expressed restrictive declarations against trade protectionism
December 2008	The recession was confirmed in the USA. Nickolas Sarkozy proposed 26 billion euro plan for the France economy promotion. ECB reduced interest rates level. Government of Belgium sold "Fortis" bank assets. The reputation of Germany business felt down to the lowest position during the 20 years period

Table 1 (continued)

Date	Events/actions
January 2009	European countries announces about growing level of unemployment and losses of different countries
	Regarding financial crisis crumbles Island's government
	Island announces about willingness to join EU
	Governments' of Belgium and Latvia experienced turmoil's
	Barack Obama signed 787 billion dollars packet act for economy stimulation. This packet was forecasted for stimulation of energy and health sectors
September 2009	G-20 meeting in Pittsburgh in the USA. Meeting countries were committed to create policies in order to avoid unstable financial flows in the future. It was recognized a need to reduce consumption in such high incomes countries as USA and to fasten consumer spending in such country as China

recession (because of banks crisis), the government take a strategic solution to reduce most of taxes. As the consequence of such decision, the state's economy became flexible and the budget policy was reinforced. However it is important to mention that Lithuania's Government actions regarding the fight with the consequences of economic recession were taking reacting to the solutions of International Monetary Fund.

4 Crisis Policy Framework for the Enhancement of EU's Economy Stability

It is a key to stress that all EU countries should follow for the requirements or suggestions by European Commission in order to create policy framework for crisis management (see Table 2). This framework, once fully developed, should include policy instruments in the pursuit of crisis prevention, crisis control and mitigation, and crisis resolution. Basically it is important to stabilise monetary and fiscal policies. It is a key to stress that governments should pay exclusive attention and to the development of innovation policy, as innovation is the key driver of economic development, growth and competition. Guzikova (2015) suggests to investment in innovation creation in order to ensure macroeconomic stability.

As it was stressed in the document, the EU policy framework for crisis management largely builds on existing institutions and procedures, but parts of it are emerging from the various policy actions during, and prompted by, current crisis. This framework, once fully developed, would include policy instruments in the pursuit of crisis prevention, crisis control and mitigation, and crisis resolution (EC 2009). Every country should now start to think about actions concerning crisis preventions while measures for crisis control and mitigation as well as resolution is still very important.

Table 2 Crisis policy framework for the recovery of EU economy

	Crisis prevention	Crisis control and mitigation	Crisis resolution	EU coordination frameworks
Financial policy	Regulation, supervision (micro- and macro-prudential)	Liquidity provision, capital injections, credit guarantees, asset relief	State-contingent exit from public support; audits, stress tests, recapitalisation, restructuring	EU supervisory committees, Single Market, Competition policy, joint representation in international forum (G20)
Monetary policy	Leaning against asset cycles	Conventional and unconventional expansions	State-contingent exit from expansion, safeguarding inflation anchor	Single monetary policy, European System of Central Banks
Fiscal policy	Automatic stabilisers within medium-term frameworks, leaning against asset cycles	Expansions plus automatic stabilisers, while respecting fiscal space considerations	State-contingent exit from expansion, safeguarding sustainability of public finances	Stability and Growth Pact, European Investment Bank
Structural policy	Market flexibility, entrepreneurship and innovation	Sectorial aid, part-time unemployment compensation	State-contingent exit from temporary support	Single Market, Competition policy, Lisbon Strategy
EU coordinated tools	Micro- and macro-prudential surveillance, fiscal surveillance, peer pressure, learning	Liquidity provision, balance of payment lending facilities, Eurobonds	Definition of coordinated exit strategies, structural funds	–

Source: EC (2009, p. 58)

Most of EU's economy recession management actions were and are implemented by existing institutions and procedures (or not effective). However EC was enforced to stipulate creation of new institutions or different new departments, funds, programmes which mission would be a fight with consequences of economic recession. This particularly affected banking sector. Each EU country is obliged to relook national political actions which would assure the recovery of economies' stability. In 2013 EC determined the priorities for the policy considering economic recovery.

Actions concerning implementation of these priorities had to be realised until 2014 (still the final results are not achieved). The main points of recommendations were: in order to save, the governments have not reduce expenses for education, scientific research and investments projects; tax systems have to be adopted for the stimulation of growth. E. g., reduce tax burden for the employees (real state, consumption or population taxes); banking sector need to be reformed. It has to serve for the real economy as well as have enable implementation of programs

which allow job seekers and employers to feel more secure; by reduction of expenses and administrative burden, governmental services need to be modernized.

In order to overcome challenges of economic recession it is necessary to create close and deep relations between politicians, representatives from business and academic society.

They have to be interested in collaboration preparing strategic actions plans as well as implementing them. Attention must be focused not only to the reorganization of banking sector. Assurance of welfare of society is essential as well, especially when it is tackled with employment policy. This is directly related with the development of foreign direct investments, education as well as other sensitive social policies. And, as it was stressed in Mussa (2011) work, the key actions should be taken in order to stimulate essential factors which are driving global economic integration. These factors are trade, movements of people and capital, possibility access information and to take advantage of new technologies.

Essential requirements for assurance of economic stability are: effectively functioning strictly controlled and harmonized finances (banking sector), fiscal (public debt) as well as labor market systems. If existing financial markets are weak (costs of credits and loans are very big) it is strongly important to suggest alternatives for those who are able to borrow and intend to take a credit (e. g., establishment of capital market measures such as bonds). Just reliable and safe financial system ensure long lasting and sustainable state's economy growth, targeted relocate resources and contributes to the stability of the fixed prices. EU needs to develop functioning of Single Euro Payments System.

Financially integrated markets are beneficial however they are hazardous as harmonization of financial systems in the international level is quite complicated process. Coordination problems arise when investors and/or institutions take actions—like withdrawing liquidity or capital—merely out of fear that others also take similar actions.

Given this fragility, a crisis can easily take place, where large amounts of liquidity or capital are withdrawn because of a self-fulfilling belief—it happens because investors fear it will happen. Small shocks, whether real or financial, can translate into turmoil in markets and even a financial crisis. There is still a need for clearness, how complex financial institutions should function as they develop activities in many countries. In addition, it remains unclear what changes should be inspired in the institutional environments in order to help best to reduce financial markets' pro-cyclicality and the buildup of systemic risks. For example, changes in the accounting standards for mark-to-market valuation, adaptations of employee compensation rules, moves of some derivatives trading to formal exchanges, greater use of central counter parties. The latter economic recession showed that fiscal policies—both micro level (related with interest payments) and macro level (related with amount of resources available to deal with financial crises)—have an influence on the vulnerability of economy. However, still it is unclear what exact adaptations in the economy are needed. From this follows, that creation of crisis prediction model is needed. Macroeconomic models need to better reflect the roles of financial intermediaries.

Harmonization of national states' policies' would ensure such functioning of fiscal, monetary and social policy which would stimulate growth of economy, reduce governmental depth as well as unemployment level, stipulate adequate to incomes consumption and ensure good life conditions for the residents. Studies of assumptions and reasons of past economic recessions in Europe and World showed, that states' need to live under national capacities'. They are obliged to assume responsibility for the management of state's finances and economic stability. Only responsible financial and monetary policy, on-time, adequate and appropriate political solutions as well as focus of nation can ensure rapid and long lasting stabile growth of economy.

5 Conclusions

Economic stability directly correlates with the fluctuations in the macroeconomic level. They depend on existence of micro- and macro-prudential regulations. Macroeconomic and financial consequences of economic recessions are difficult. While there are obviously differences between recessions, there are many similarities in terms of the patterns macroeconomic variables follow during these episodes. Large output losses are common to many crises and other macroeconomic variables (consumption, investment and industrial production) typically register significant declines. And financial variables like asset prices and credit usually follow qualitatively similar patterns across crises, albeit with variations in terms of duration and severity.

Despite the fact, that starting from 1992 European Commission applied different measures in order to supervise the effectiveness of EU internal market functioning as well as insurance of economy growth and stability. Therefore these actions were not efficient and timely as they had to be. This allows to conclude, that till the end of 2008 all applied control and supervision measures were not adequate and effective in order to avoid the consequences of financial crisis. As one of the first official reactions' of the European Commission to the stimulation of economy growth was preparation of Europe 2020 which was presented in March of 2010. This was called as the platform for a new growth initiative.

In order to control unbalanced economy of EU internal market, EU's legal authorities started regulation of macroeconomic imperfections management. The two ways strategy was selected: micro-prudential supervision and regulation; and macro-prudential risk supervision and regulation institutions. As a consequence of first strategy the Structure of European System of Financial Supervision was created. It covered such control measures as European Supervisory Authorities, Joint Committee of the European Supervisory Authorities and Competent National Supervisory Authorities. Implementing second strategy European Systematic Risk Board and European Bank System with special supervision mechanisms was created.

Despite of obvious signs about financial crisis and its consequences in USA and rest of EU's member states (e.g., Ireland, Spain, later Greece economic downturn, collapse of greatest banks in UK), government of Lithuania reacted to the processes which were named as consequences of great recession just in the end of 2008. The first solutions concerned with tax system reform. Most of taxes were raised and this increased the tax burden for Lithuania citizens. Other solutions regarding supervision of economy downturn were not friendly for citizens as well.

After the systemic analysis there were highlighted several important results how to maintain stability of state's economies under the conditions of European Union's economic integration. Essential requirements for assurance of economic stability are: effectively functioning strictly controlled and harmonized finances (banking sector), fiscal (public debt) as well as labor market systems. If existing financial markets are weak (costs of credits and loans are very big) it is strongly important to suggest alternatives for those who are able to borrow and intend to take a credit (e. g., establishment of capital market measures such as bonds). Just reliable and safe financial system ensure long lasting and sustainable state's economy growth, targeted relocate resources and contributes to the stability of the fixed prices. EU needs to develop functioning of Single Euro Payments System.

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Determinants of Stock Price in Singapore's Manufacturing Sector

Parvinder Arora and Muslim Bhimani

Abstract Determination of factors influencing the share prices has been one of the favorite themes of researchers, academicians as well as the practitioners. Empirical research indicates, though not conclusively, that firms' internal financial performance indicators and external macroeconomic variables affect the share prices. The notable among those factors that have been found to affect the stock prices are Earning per Share (EPS), Net Cash Flow (NCF), Leverage, Gross Domestic Product (GDP) and Inflation. The present study has been conducted to revalidate this relationship in the context of manufacturing sector in Singapore. Panel regression technique has been used to carry out the analysis for of data pertaining to 263 manufacturing companies in Singapore on for a time period of 10 years. The results indicate the GDP, Inflation and earnings per share impact the prices of common stock but the relationship does not seem to be very strong.

Keywords Stock prices • EPS • Net cash flows • Panel data

1 Introduction

In this era where the prime objective of any corporation is to maximize the stockholder's wealth; leaders are constantly looking forward towards strategies which might aid in contributing towards an increase in the price of common stock. Managers spend a lot of time and effort to determine and verify what are the real factors or determinants that affect the common stock prices, and once determined, they try and fit their findings to devise an overall financial strategy for the corporation. As an investor, one buys common stock to have an ownership stake in the company; the main objective behind any such investment is to either receive dividends; which are actually a part of the earnings of the corporation or to achieve capital gains; which is nothing but earnings due to selling a common stock at a price higher than what it was bought for. In financial literature, one approach usually

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taken to solve the fundamental valuation problem is to use the constant growth model or the Gordon's model (Gordon 1962); which basically specifies the price of common stock as a function of the expected future dividend, constant growth rate and constant discounting rates. The Gordon's model had its own limitations and researchers added other factor's into the model to determine the stock price. Another school of thought, Miller and Modigliani (1961) suggest that there is no particular advantage for a corporation to choose one dividend policy and the investors are indifferent of dividends and capital gains. Doors opened to a heated debate and many different theoretical and empirical studies were conducted to understand what actually determines the stock price. Till date, many internal and external determinants have been found to have significant bearing in determining the stock prices, some have been found to have a significant relationship; while the others were not able to significantly explain the stock price movements.

The intent of this study is to check the significance of certain external and internal determinants in explaining the stock price changes in the manufacturing industry in Singapore. Singapore is chosen as a country since it is one of the few developed countries in Asia Pacific region which has shown sound economic progress in recent times. Moreover, concentration of most researchers at this point in time is towards developing countries and studies for developed countries are mostly quite old. It would therefore be interesting to check how the determinants affect the stock price of a developed country in the present age. For the purpose of this study manufacturing sector has been identified. The manufacturing sector contributes anywhere between 20 and 30 % to Singapore's GDP annually. The major industries include electronics (semi-conductors, precision-engineering, etc.), pharmaceutical, chemicals, construction, and ship-building. The manufacturing industry demonstrated resilience in 2011 thanks to the pharmaceutical and bio medical sectors. However, the manufacturing output growth slowed down in 2012 owing to a dampened demand for electronics from traditional export markets such as the US and Europe.

2 Stock Prices and Its Determinants

Many definitions of common stocks have been provided in the literature; it can be defined as the residual corporate interest that bears the ultimate risks of loss and receives the benefits of success. In order to receive the benefit, the stocks have to be traded in a market. Brewer III et al. (2003) defined stock market as a market enabling lenders and users of money to satisfy their own needs. Corporations and stock holders have always been interested to know what are the factors affecting the stock price. Many researchers have earlier tried to classify the major determinants of stock prices. White et al. (2003) classified the determinants of stock price as (1) company fundamentals (internal factors) (2) external factors, and (3) market behavior. It is difficult to quantify market behavior and there can be a lot of variables which actually affect the market behavior; therefore, most of the

researchers have restricted the scope of the study to internal and external factors. It has always been a challenge to say that capital markets are efficient in the sense that prices fully reflect all available information. Significant amount of work has been carried out to check whether the available information has any relation with the stock price. In this section, a brief summary of all the relevant work pertaining to this research has been elucidated. While discovering the external determinants affecting the stock price, Homa and Jaffee (1971) found that significant and systematic relationship exists between the money supply and the stock market. Arouri et al. (2011) investigated whether short- and long-term relationships exist between oil prices and stock markets in GCC countries. On the basis of short-term analyses, strong positive links were found in Qatar, the UAE, and to some extent Saudi Arabia. Their long-term analysis showed that except for Bahrain, there is no long term link between oil and stock markets in GCC countries. For Bahrain, they found positive long-term relationships. Kraft and Kraft (1977) tried to determine a causal relationship between stock prices and determinants of common stock prices. The determinants used were money supply, the rate of change in the money supply, the corporate interest rate and a measure of risk. Their results indicated that there is no causal relationship between the money supply, percentage change in the money supply, and Moody's AAA corporate bond rate and common stock prices. While studying the effect of inflation on the stock prices, Udegbunam and Eriki (2001) provided empirical evidence that inflation is significantly negatively related to the stock index and GDP is significantly positively related to the stock prices. Al-Qenae et al. (2002) in their study of the effect of micro and macroeconomic factors on the stock prices in the Kuwait stock exchange concluded that macro-economic factors (inflation and interest rate) significantly impact stock prices negatively. A lot of studies have been conducted to determine an empirical relationship between stock market development and the economic growth. Most of these studies have been pretty much in conclusive; however, some studies do show that a positive relationship exists between stock markets and economic growth. Levine and Zervos (1998) identified that measured of stock price are positively correlated with measures of real economic growth in different countries. The relationship was particularly strong in the developing countries. Durham (2002), contrary to what Levine and Zervos (1998) found out that stock market development has a more positives impact on growth for greater GDP per capita, lower levels of country credit risk and higher levels of legal development. Apart from studying the external or macro-economic factors researchers have also tried to determine the internal or financial factors which affect the stock market prices. Gompers et al. (2003) stated that the price of an equity is significantly influenced by a number of factors which includes book value of the firm, dividend per share, earnings per share, price to earnings ratio and dividend cover. A significant positive correlation was found between common stock prices and earning changes by Benston (1967) and Ball and Brown (1968). Findings from Rashid and Rahman (2008) were not consistent with Miller and Modigliani (1961) who had initially given the dividend irrelevance proposition and they found out that dividends were a relevant contributor in determining the stock price. A study conducted by Abdullah and Alhamad (1993) concluded that a

significant relationship between stock prices and EPS along the short range, while the relationship is insignificant along the long range. Abdel-Jalil and Thuniebat (2009) studied the relationship between Price to sales (PS) ratio, Price to book value of equity (PBVE) and Price to Earning (PE) ratio as dependent variables with net profit margin, return on equity and dividend pay-out ratio as independent variables. Consistent with the economic theory it was found that, price to sales ratio is significantly positively related to net profit margin; price to book-value of equity ratio is significantly negatively related to return on equity ratio and price to earnings ratio is significantly positively related to dividends pay-out ratio. The study was conducted for Jordanian stock exchange call Amman Bourse. Bhatt and Sumangala (2012) studied the impact of Earnings per share (EPS) on the market value of an equity share in the Indian context. The study concluded that EPS impacts the market value of an equity share in the Indian context. Further research on Jordanian commercial banks indicated that significant relationships exists between market price of stock and net asset value per share, market price of stock dividend percentage, gross domestic product; and negative significant relationship exists between market price of stock and inflation, lending interest rate but not always significant on some years of Amman stock exchange (Al-Shubiri 2010). Obeidat (2009) investigated the effects of earnings per share (EPS), dividends per share (DPS), and book value per Share (BVPS) on stock market prices in Abu Dhabi Securities Market. He found that there is a significant effect of EPS and BVPS on stock market price in the Abu Dhabi Securities Market, whereas no significant effect of DPS was found. Findings of Chowdhury and Chowdhury (2010) suggests that in order to maximize the shareholder's wealth and perfect combination of debt and equity is required and that cost of capital has a negative correlation in this decision and has to be as minimum as minimum as possible. To investigate the effect of expected EPS and EPS on common stock prices, Ohlson and Juettner-Nauroth (2005) developed a parsimonious model relating to the price per share of the firm. This study showed how one expresses cost-of-capital as a function of next-year expected EPS and the two measures of growth in expected EPS. Despite of a plethora of research studies, there is no conclusive evidence on what exactly determines the share prices. It seems to be contextual phenomenon. Hence, the present study can contribute towards the existing literature on the determinants of the stock prices in the context of companies in the manufacturing sector of the Singapore.

3 Research Design

The study aims at analyzing the relationship between some of the already known determinants and the stock prices in the context of companies in manufacturing industry in Singapore. The primary objective is to identify and analyze if any relationship exists between specific internal (mostly financial) and external (macroeconomic) parameters and the stock prices of selected manufacturing companies

in Singapore. The choice of determinants is based on the study of existing literature. The study intends to test the following hypotheses:

H_1: There is significant relationship between the market price of common stock and the earnings per share for companies in the manufacturing sector in Singapore.

H_2: There is significant relationship between the market price of common stock and the net change in cash flow for companies in the manufacturing sector in Singapore.

H_3: There is significant relationship between the market price of common stock and leverage for companies in the manufacturing sector in Singapore.

H_4: There is significant relationship between the market price of common stock for companies in the manufacturing sector in Singapore and the GDP per capita of Singapore.

H_5: There is significant relationship between the market price of common stock for companies in the manufacturing sector in Singapore and the inflation rate of Singapore.

For the scope of the study the population is considered as all the companies classified under the manufacturing sector as listed in the Singapore Stock Exchange. A total number of 299 companies have been classified in the manufacturing sector in the SGX website. A total of 263 companies have been considered for the analysis because complete data for the remaining companies was not available. The study has been based on last 10 years of secondary data (2003–2012). The main sources of data are the Singapore Stock Exchange (SGX) website, the Singapore Department of Statistics (DOS) website and the Bloomberg.

3.1 Variables

The average stock price per year has been considered as the dependent variable; primarily due to the fact that it is a very strong measure used by the stakeholders to judge the performance of the company. Earnings per share, net change in cash flow and leverage are considered as independent internal variables. The variables are selected to understand how the profits generated by the company, the cash position of the company and the capital structure of the firm affects the stock price. GDP and inflation rates are considered as the external independent variables. The variables are representative of how the country is performing economically. It will be interesting to see whether a change in any one or both the variable impacts the stock price of the manufacturing industry. The following variables have been selected for the purpose of analysis:

Average Price of Stock: The dependent variable chosen for the study is the Average Price of Stock (APS). Previous researches have used a lot of ideas as a measure of stock prices some of them are percentage change in the stock price to the present stock price (Beaver 1968), absolute price change and the squared change, stochastic volatility, multiples like P/E ratios, and average market value for a year.

Average market value of the share for a year has been used as dependent variable, an approach similar to the one used by Al-Shubiri (2010). One year has been defined as 12 months from January to December.

Earnings per share (EPS): Earnings per share shall be defined as (net income − preferred dividends)/(Weighted average common shares outstanding); the same definition was used by White et al. (2003).

Net change in cash flow (NCF): Limited research is available on studying the effect of change in the net cash flow on the stock price. For the purpose of this study, NCF is defined as the year on year difference in the summation of cash from operations, cash from investing activities and the cash from financing activities.

Leverage: Leverage can be defined in a number of ways for e.g., total liabilities divided by total assets, total debt divided by net asset and total debt (both short term and long term) divided by the total assets. For the purpose of this study, leverage shall be defined as total debt (both short term and long term) by the total assets.

GDP: To account for the GDP, data as published by the Department of Statistics Singapore (DOS) for annual GDP at current market prices has been used. The concepts, definitions and methodology given in the United Nation's Publication "A System of National Accounts, 1993" are closely followed in compiling the data on the website.

Inflation: To account for inflation, data as published by the Department of Statistics Singapore (DOS) for inflation has been used has been used.

3.2   Methodology

Panel regression has been used to analyze the data. A panel data set contains n entities or subjects (e.g., firms and states), each of which includes T observations at 1 through T time periods. Thus the total number of observations is NT (Park 2009). The intention is to have a balance panel; i.e., data shall be obtained for each company for the 10 years under study.

A panel has the form: X_{it}, $i = 1, \ldots, N$, $t = 1, \ldots, T$, where "i" is the entity or in our case the company itself and "t" is the time period. For this study, in order to determine the effect of each determinant on the stock price and then the combined effect of each of the determinants over the stock price panel regression using R software has been used. A final check on the heteroskedasticity of the model was also made and wherever appropriate the coefficients have been re-adjusted to account for heteroskedasticity. In order to choose the most appropriate model as depicted in Appendix was used. The above model was used to determine the appropriate type of estimator for the data collected and also for checking whether the validity of the model whether there is any heteroskedasticity involved or not.

4   Analysis and Discussion

The data was classified as un-balanced panel since values for some of the variables were not available. An analysis of the average stock price suggests that median stock price for the data set is 0.2 SGD and the mean is 0.4561 SGD. The minimum stock price is 0.01 SGD and the maximum is 18.4 SGD. 176 data points were not available. The variability in the data is quite high since the minimum and maximum values are quite far from the mean and median.

An analysis of the average stock price of the companies suggests that median EPS for the data set is 0.01SGD/share and the mean is 1.19 DGD/share. The minimum EPS is 0.01 SGD/share and the maximum EPS is 330 SGD/share. 1303 data points are not available. The variability in the data is quite high since the minimum and maximum values are quite far from the mean and median. An analysis of the NCF of the companies suggests that median NCF for the data set is 0.2 MSGD and the mean is 92.03 MSGD. The minimum NCF is −1888.38 MSGD and the maximum is 65,357.72 MSGD. 916 data points are not available. The variability in the data is quite high since the minimum and maximum values are quite far from the mean and median.

Median of leverage is 0.19 and the mean is 0.2554. The minimum leverage is 0.01 SGD and the maximum is 18.4 SGD. 1213 data points are not available. The variability in the data is quite high since the minimum and maximum values are quite far from the mean and median. An analysis for the GDP in Singapore suggests that the median GDP for the data set is 268,860 SGD and the mean is 260,578. The minimum stock price is 167,174 SGD and the maximum is 345,561 SGD. Data is available for all 10 years being considered. Median inflation for the data set is 1.9 and the mean is 2.56. Minimum inflation is 0.5 and the maximum inflation is 6.6. Data for all the 10 years under consideration is available.

4.1   Determinants of Stock Prices

The analysis has been carried out as per the methodology described in the flow chart presented in Appendix. The analysis was conducted in twofolds. First, a panel regression was run with APS as dependent variable and each of the independent variables individually. A panel regression was then run with APS as a dependent variable and with all other variables to understand the multiple variable effects on the APS.

APS vs. EPS; An analysis of APS as a dependent variable and EPS as an independent variable and using the methodology as elucidated in Sect. 3 to select the appropriate simulation model it was concluded that the "random" model is the most suitable for the analysis. The random panel regression indicates that. EPS has a coefficient of −0.0007710 which practically says that a unit increase in decrease in EPS will cause the APS to go down slightly. The p value is 0.7801 which

indicates that the independent variable does not influence the dependent variable. Hence it is concluded EPS does not have any significance in defining APS.

APS vs. NCF: An analysis of APS as a dependent variable and NCF as an independent variable and using the methodology as elucidated in Sect. 3 to select the appropriate simulation model it was concluded that the "random" model is the most suitable for the analysis. The random panel regression indicates that NCF has a coefficient of −1.3 that indicates that a unit decrease in NCF will cause the APS to go down slightly. The p value is 0.8881 which indicates that the independent variable does not influence the dependent variable. Hence it is concluded NCF does not have any significance in defining APS.

APS vs. Leverage: An analysis of APS as a dependent variable and leverage as an independent variable and using the methodology as elucidated in Sect. 3 to select the appropriate simulation model it was concluded that the "random" model is the most suitable for the analysis. The random panel regression indicates that leverage has a coefficient of −0.0041911 which practically indicates that a unit increase decrease in leverage will cause the APS to go down only slightly. The p value is 0.7023 which indicates that the independent variable does not influence the dependent variable. Hence it is concluded EPS does not have any significance in defining APS.

APS vs. GDP: An analysis of APS as a dependent variable and GDP as an independent variable and using the methodology as elucidated in Sect. 3 to select the appropriate simulation model it was concluded that the "random" model is the most suitable for the analysis. Heteroskedasticity is found to be present and therefore the coefficient was adjusted. The random panel regression indicates that GDP has a coefficient of $-1.52e-06$ which indicates that a unit increase decrease in GDP will cause the APS to go down only slightly. The p value is 0.009037 which indicates that the independent variable influences the depended variable. Hence it is concluded GDP has certain significance in defining the APS; however the adjusted R square value of 0.003876 suggests that the predictability of this single variable model is very low.

APS vs. Inflation: An analysis of APS as a dependent variable and Inflation as an independent variable and using the methodology as elucidated in Sect. 3 to select the appropriate simulation model it was concluded that the "random" model is the most suitable for the analysis. The random panel regression indicates that inflation has a coefficient of −0.02 which indicates that a unit increase decrease in inflation will cause the APS to go down by 2 %. The p value is $3.261e-05$ which indicates that independent variable influences the depended variable. Hence it is concluded that inflation has certain significance in defining the APS; however the adjusted R square value of 0.0066789 suggests that the predictability of this single variable model is very low.

APS vs. (all independent variables): An analysis of APS as a dependent variable and EPS, NCF, Leverage, GDP (Table 1) and inflation as independent variables and using the methodology as elucidated in Sect. 3 to select the appropriate simulation model it was concluded that the "random" model is the most suitable for the

Table 1 Regression results

Variable	Coefficient	P-value
EPS	$-1.9403e-03$	$2.509e-06$***
NCF	$8.2682e-07$	0.85422
LEVERAGE	$-3.3350e-01$	0.08568
GDP	$-3.1928e-07$	0.80892
INFLATION	$-5.5532e-03$	0.20586
Adj. R-Squared: 0.0018064		

Table 2 Correlation matrix

APS	EPS	NCF	LEV	GDP	INF	
1	-0.0037	-0.0015	0.0026	-0.00623	-0.0368	APS
	1	0.5187	-0.0371	0.0449	0.0269	EPS
		1	-0.0246	0.0204	0.0146	NCF
			1	0.0219	-0.0007	LEV
				1	0.6606	GDP
					1	INF

analysis. Heteroskedasticity is found to be present and therefore the coefficients were adjusted.

A brief summary of the results is as follows:

The summary (Table 1) shows that EPS is significant with a p value of $2.509e-06$ however the coefficient is very small i.e., $-1.9403e-03$ which shows that it is able to define APS in a limited manner. All other variables are not significant; however, leverage might be considered significant if a 90 % confidence interval is considered. The above model does not conclude that GDP and inflation influence the dependent variable. This is because there might be a presence of multicollinearity in the multiple variable panel regression models. In order to check this, a correlation matrix is prepared.

We can see (Table 2) that the two variables GDP and Inflation are highly correlated. Correlation value 0.660 and therefore explains that in a multivariate panel regression GDP and Inflation are impacting the results of each other. We have not dropped these variables in order to remove any bias. However, we consider that GDP and inflation are influencing the value of the APS.

The overall strength of the model is quite weak. This shows that it cannot be used to predict future values of average stock prices. There are two reasons behind this: One, none of the independent variables except EPS have actually been found to be significant; however, the coefficient is very small which shows that EPS defines the value APS in a very limited manner. Two, unbalanced panel data has been used for simulation and that may have caused this issue.

5   Conclusions

The study throws some interesting findings. However, most of the findings remain inconclusive and the model seems to be weak in explaining any relationship. Stock prices of the companies in the manufacturing sector of Singapore do not seem to be impacted by change in cash flows and leverage. There is a negative relationship between the market price of common stock and the earnings per share for companies in the manufacturing sector in Singapore; however, the relationship is very weak and is not significant. Similarly, there is a negative relationship between the market price of common stock for companies in the manufacturing sector in Singapore and the inflation rate of Singapore; however, the relationship is very weak and is not significant. No relationship was found to exist between market price of common stock and the net change in cash flow and leverage. However, a negative relationship has been found between the market price of common stock and the GDP per capita. This relationship is also very weak and is not significant.

Appendix

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┌─────────────────────────────────────────────┐
│ Use One-way (individual) effect Pooling Model on │
│ the data                                         │
└─────────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────┐
│ One-way (individual) effect Within Model        │
└─────────────────────────────────────────────┘
                      │
┌─────────────────────────────────────────────┐
│ One-way (individual) effect Random Effect Model │
└─────────────────────────────────────────────┘
                      │
┌─────────────────────────────────┐        ┌──────────────────────────────┐
│ Lagrange multiplier test– (Honda) │ ─────▶ │ If p <0.05 use random        │
│                                   │        │ effects model; else, use     │
│                                   │        │ pooling model                │
└─────────────────────────────────┘        └──────────────────────────────┘
                      │
┌─────────────────────────────────┐        ┌──────────────────────────────┐
│ F test for individual effect     │ ─────▶ │ If p <0.05 use within        │
│                                   │        │ model; else, use pooling     │
│                                   │        │ regression                   │
└─────────────────────────────────┘        └──────────────────────────────┘
                      │
┌─────────────────────────────────┐        ┌──────────────────────────────┐
│ Hausman test                     │ ─────▶ │ If p <0.05 use within        │
│                                   │        │ model; else, use random      │
│                                   │        │ effects model                │
└─────────────────────────────────┘        └──────────────────────────────┘
                      │
┌───────────────────────────────────────────┐   ┌──────────────────────────┐
│ Apply studentized Breusch-Pagan test on the │ ─Y─▶ │ Re adjustment of the     │
│ chosen model. Check if p<0.05               │   │ coefficients using vcovHC │
│                                             │   │ function                  │
└───────────────────────────────────────────┘   └──────────────────────────┘
                      │ N
                      ▼
┌─────────────────────────────────────────────┐
│ Analyze and interpret the results               │
└─────────────────────────────────────────────┘
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Corporate Social Responsibility (CSR) and Company Financial Performance: Empirical Evidence from Listed Companies in Romania

Dalina Dumitrescu and Liliana Simionescu

Abstract The increased attention of companies' managers towards the benefits of corporate social responsibility (CSR) has led many corporations to integrate CSR practices into their business strategy. Consequently, the literature has examined the relation between CSR and firm performance. Although CSR is adopted by companies on a voluntary basis, more heated discussions regarding the effects of CSR on company financial performance has lead various authors to different results. This chapter empirically analyzes the CSR effects on company financial performance in developing countries, especially Romania. As empirical method we employed univariate analysis to investigate whether the company financial performance of companies which implement CSR (considered experiment group) is higher than non-CSR companies (considered control group). T-test is used to find out if there is any statistically difference in mean company financial performance between ROA, ROE, ROS, PBV, PER, and EPS of experiment group and control group. The sample used included 68 companies listed on the Bucharest Stock Exchange (BSE) for the 2011 fiscal year. The empirical research reveals that there is not a significant difference in mean company financial performance between CSR companies and non-CSR companies.

Keywords Corporate social responsibility • Financial performance • Developing countries • Romania

1 Introduction

Globalization, various scandals and the economic and financial crises, have led the business world to adopt or to consider a new set or forms of regulations relating to the their effects on society, environment and all their stakeholders. The concern of

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these effects are now embodied in companies codes of ethics and conduct which look beyond companies' returns or profitability and more toward climate, water and pollution concerning, sustainable business development, stakeholders (clients, societies, investors, shareholders, media, NGO's, employees, Government, environment, etc.) requirements for responsible products and services from the companies, but also the need of companies to be moral and to become more and more involved in ethical and social responsible practice.

Thus, stakeholders' wellbeing has led companies to rethink their business strategies in order to achieve a sustainable development business. Since mid-1990s, and mainly from 2000 onwards, the number of companies which considered important to integrate socially responsible practices into their core business strategies have increased rapidly. The process which accounts for integration of socially, environmental, and ethical practices into business decision making (Renneboog et al. 2008) was labeled under the name of Corporate Socially Responsible (CSR) which not only increased in popularity but also is considered an important financial market tool (Hoffman et al. 2007) and a company leverage (Porter and Kramer 2002).

Researchers, scholars, and company managers tried to determine whether and how CSR can be operational in such way both stakeholders' requirements as regards the need of companies to be socially responsible and the company's shareholders' interests be satisfied at the same time (Derwall 2007). According to Porter and Kramer (2006) CSR has the capacity to realize both the stakeholders' requirements concerning social responsibility as well as the interests of company shareholders.

The increased attention of CSR and its benefits, has determined many researchers and practitioners to evaluate firms performance in relation with CSR (Waddock and Graves 1997). The CSR relation with the company financial performance (CFP) is most debatable among researchers because of the lack of a clear accepted definition and framework of CSR. Thus, the understanding, evaluation and explanation of the relation between CSR and CFP is still an open question. So far, many studies tried to determine this relationship and yet with no clear answer. The reason why there isn't yet a clear answer regarding this relation is motivated by the two opposite points of view presented in the theoretical framework. Firstly, Friedman's (1970) point of view regarding CSR is that it implies unnecessary costs which decrease the company profits along with the shareholders' wealth. Continuing its argument, Friedman says that, the only responsibility of a company is to increase their shareholders wealth, thus the relation between CSR and CFP must only be negative. Secondly, stakeholder theory stands for a positive relation between CSR and CFP (Freeman 1984; Donadson and Preston 1995).

Thus, with two different points of view, the researchers which tried to empirically determined the relation between CSR and CFP found either a positive relation (Alexander and Buchholz 1978; Moskowitz 1972; Tsoutsoura 2004, Dumitrescu and Simionescu 2014), a negative relation (Auperle and Pham 1989; Friedman 1970; McWilliams and Siegel 2000) or no correlation between CSR and CFP (Ullmann 1985). These differences in results are explained by the several

methodologies used to measure CSR and CFP (Griffin and Mahon 1997; McWilliams and Siegel 2000; Griffin 2000; Hillman and Keim 2001; Margolis and Walsh 2003).

This chapter identifies gaps in the existing CSR literature regarding the use of financial performance measures. Most of the studies employed as financial measures in their empirical research just accounting or market measures and only a few studies used both of the financial measures and even fewer employed univariate analysis. Moreover, this study attempts to improve the CSR literature by studying the effects of the CSR practices on the CFP in developing countries, respectively Romania. Only a few paper studied the impact of CSR on CFP in developing countries. We employ T-test as empirical analysis to study the impact of CSR on company performance using as financial performance both accounting and market measures such as ROA, ROE, ROS, PBV, PER, and EPS considering all the company listed on the Bucharest Stock Exchange (BSE) for the 2011 fiscal year.

In the next section we review the literature on CSR, than we present some of the relevant regulations and social reports definitions as well as the empirical studies regarding the relationship between CSR and CFP. The Sect. 3 presents the methodology of this study and then the results are discussed. The last section concludes this study finding as well as further research.

2 Literature Review

2.1 Corporate Social Responsibility

According to Friedman (1970), companies socially responsibility is "to increase business profits". Carroll's (1999) CSR pyramid changed this traditional view of CSR and extends companies economic functions to environmental and social issues which need to be considered by the companies' managers in their business strategies. Ducassy and Jeannicot (2008) considered that CSR is equivalent to a sustainable development at microeconomic context. European Commission (2002) defined CSR as *"A concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis."*

CSR is adopted by the companies on a voluntary basis where social and environmental practices are incorporated in companies' strategic goals. Nowadays, it is considered a management strategy (Porter and Kramer 2006) that meets and answers the financial markets demands and stakeholder's requirements regarding a responsible business. CSR does not have yet a clear accepted definition, framework or methodology. Researchers and scholars that studied CSR tried to provide in their studies a clear accepted definition, theory and methodology. Their results studies have emerged in a considerable increased amount of definitions, theories and methodologies. The most appropriate theory for CSR was considered stakeholder

theory which takes into consideration all the internal and external stakeholders of a company (Freeman 1984; Donadson and Preston 1995; Margolis and Walsh 2003). CSR concept linked with the stakeholder theory, increased as well governmental and institutional interest because it is considered to be the link in the chain that leads to sustainable development for both the companies and society as a whole (Dumitrescu and Simionescu 2014).

2.2 Social Responsibility Reports

Companies which adopt CSR publish annually a CSR report or a Sustainability report, as a principle of transparency (ISO 26000 2001), where the company's objectives are described regarding their social and environmental practices. Upon these reports stakeholders can evaluate the company CSR performance. Ramanathan (1976), International Organization for Standardization (ISO 26000 2001) and Global Reporting Initiative (GRI 2006) proposed that CSR reporting role should be in measuring the overall social and environmental practices impacts or effects related with the company's activities. CSR practices have become companies key elements in their business strategies (Déjean and Gond 2004; Ducassy and Jeannicot 2008).

Organizations like United Nations (UN), Organization for Economic Cooperation and Development (OECD) and International Labor Organization (ILO), have developed, guidelines, principles and other instruments for CSR companies to follow, which summarize the acceptable conduct regarding the social norms of the companies. Through GRI Sustainability Reports were implemented a set of rules meant to complete companies guidelines to help them to implement social, economic and environmental practices. The GRI's Sustainability Reporting Guidelines, state, "*A primary goal of reporting is to contribute to an ongoing stakeholder dialogue. Reports alone provide little value if they fail to inform stakeholders or support a dialogue that influences the decisions and behavior of both the reporting organization and its stakeholders*" (GRI 2002).

CSR concept, framework, regulations, principals and guidelines were developed, studied and applied mostly in developed countries. But these standards and principles in developing countries have limited applicability (Lindgreen et al. 2007; Matten and Crane 2005) because of the differences in the national business systems framework (Matten and Moon 2005), in culture (Chambers et al. 2003), countries level of development and the top management level as well as the organizational commitment and culture (Chambers et al. 2003); and the most important is the lack of legal framework concerning the environment and anti-discrimination laws (Küskü and Zarkada-Fraser 2004). Thus, CSR studies in developing countries are just a few but recent studies made by Jamali (2007), showed that CSR can and needs to be employed in developing countries if these principle and standards are modified in such way could fit the context of these countries. If whether CSR principles and practices can be implemented in developing countries, respectively Romania,

or not is the question addressed in this study and we answer by examining the relation between CSR and CFP.

2.3 CSR and CFP

As we underlined above, there isn't yet a consensus in literature regarding the effects of CSR on CFP (Jones and Wicks 1999, Berman et al. 1999, McWilliams and Siegel 2000, 2001; Margolis and Walsh 2003; Allouche and Laroche 2006). Margolis and Walsh (2001) summarize 95 studies regarding the relationship between CSR and CFP from 1971 to 2000 and showed that 50 out of 122 studies linked the companies' social or financial performance with CSR practices. The authors' results showed a positive relationship between CSR and CFP. Also, Allouche and Laroche (2006) identified a positive and statistically significant relation between CSR and CFP on 49 out of 93 studied companies.

In order to achieve a positive relation between CSR and CFP, companies need to satisfy stakeholders' requirements (Freeman 1984) and that, through CSR practices, companies' image and reputation improve (Waddock and Graves 1997). In his study, Orlitzky et al. (2003) concludes that *"CSR helps improve managerial knowledge and skills and enhance corporate reputation"*.

From the point of view of Friedman (1970), the relation between CSR and CFP can only be negative because of the costs related to CSR activities which can reduce CFP and its competitiveness (Quazi 2003; Lantos 2001). McWilliams and Siegel (2001) found no relationship between CSR and CFP but Tsoutsoura (2004) explain why these results, the relation between CSR and CFP, are so different from study to study. The lack of consensus regarding methodology, financial measures (Tsoutsoura 2004) and data employed in studies (Allouche and Laroche 2006) make difficult a real study on CSR and its impact on CFP.

2.4 CSR Measurements

The first challenge in testing the relation between CSR and CFP is first to identify the companies which are socially responsible because the principles and standards underlined above are still open to discussion. The next challenge is CSR measure which can lead to a real confusion because of the different agencies that measure CSR. The methodology that quantifies CSR, is the question raised by many researches. For these reasons, the key performance indicators of CSR are difficult to be determined by the companies' managers (Fiori et al. 2007) since CSR reflects an internal decision making approach, thus its presence or absence might not be easily determined by external stakeholders.

According to Igalens and Gond (2003) there are five approaches to measure CSR namely: the company's annual reports, questionnaire surveys, pollution indicators,

reputation indicators and the data offered by the specialized agencies such as: KLD for USA, Oekom for Germany, Triodos for Netherlands, Eiris for Great Britain, Avanzi for Italy, BMJ Ratings, EthiFinance and SAS for France.

The CSR measure approach used in this chapter were the companies' sustainability report, the companies that adopted CSR based on principles and standards of ISO 26000 and/or GRI. The companies' sustainability report provides information for the external stakeholders as well regarding the company conduct and contributes to the company transparency allowing to all the stakeholders (consumers, employees, investors, etc.) to know the company level of socially responsible practices as well as the environmental performance (Chatterji et al. 2007) and the willingness to undertake ecological, social and societal problems. The limitation of this CSR measure approach based on sustainability report is that, it is not possible to determine whether the data provided by the companies in their annual report on CSR is under or over reported. Only a few companies have their CSR annual reports, sustainability report and environmental reports externally verified but most of them not at all.

2.5 Financial Measures

Measuring CFP is not simple because of the many debates concerning which measurement should be applied. There are opinions as regards the market measures being the right ones (Alexander and Buchholz 1978), while others researchers' considered the accounting measures the good ones (Cochran and Wood 1984; Waddock and Graves 1997) and some underlined that the use of both of these measures is appropriate for CFP (McGuire et al. 1988). Market and accounting measures are debated in literature because each evaluate CFP differently and have also different theoretical meaning (Hillman and Keim 2001) being each subject to a particular biases (McGuire et al. 1986). The present study considered six financial measures, both market and accounting such as: Return on Assets (ROA), Return on Equity (ROE), Return on Sales (ROS), Market to Book (PBV), Price Earnings Ratio (PER), and Earnings per share (EPS).

Following the literature review so far, this study examines if CSR companies perform better than non-CSR companies. Thus, the study hypotheses to be tested are the follow:

H_0: The difference between the CSR companies and non-CSR companies as regards CFP mean is zero;
H_1: The difference between the CSR companies and non-CSR companies as regards CFP mean is not zero.

3 Methodology

3.1 Data and Sample Selection

This study aim is to empirically analyze the relation between CSR and CFP following the literature review above, empirically and theoretically, for Romania considering six financial measures as dependent variables and one independent variable for CSR measure. Thus, we considered all the companies listed on Bucharest Stock Exchange (BSE) in the fiscal year 2011. After removing the financial institutions as it operates under specific rules and regulations there remained a final sample of 68 companies.

The selected companies are classified into two sets as follow:

- First set is represented by the CSR companies and are designated as the "experimental group."
- Second set is represented by the not CSR companies and are designated as the "control group".

This study contributes to the empirical literature regarding the relation between CSR and CFP in developing countries by providing a statistical approach using univariate analysis, respectively T-test, the formula being provided below:

$$t = \frac{\overline{X_1} - \overline{X_2}}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}} \tag{1}$$

where:

- $\overline{X_1}$ and $\overline{X_2}$ are the mean values related to the first and second set;
- S_1^2 and S_2^2 are the variances related to the classified sets;
- n_1 and n_2 are the size corresponding to the first and second set.

The independent samples T-test is employed in order to empirically investigate whether the means of both classified sets are different from each other. In fact, we empirically investigate if there are differences in CFP for companies which adopt CSR and those are not.

3.2 Variables

3.2.1 Dependent Variables

In order to perform the independent samples T-test, we used as dependent variables Return on Assets (ROA)—computed as the ratio between net income and total assets; Return on Equity (ROE)—calculated as the ratio between net income and

shareholders' equity; Return on Sales (ROS)—is calculated as the ratio between EBIT (Earnings Before Interest and Taxes) and sales; Price/Book Value (PBV)—is calculated as the ratio between market value of equity and book value of equity; Price Earnings Ratio (PER)—is calculated as the ratio between market value price by the earnings per share; and Earnings Per Share (PS)—is calculated as the difference between net income and dividends on preferred stock divided by the average outstanding share.

3.2.2 Independent Variable

CSR is the independent variable and is measured through a dummy variable which takes the value of 1 if the companies adopt CSR principles and guidelines of ISO 26000 and/or GRI as well as publishing their CSR annual reports, sustainability report and environmental reports and a value of 0 otherwise.

4 Results Discussion

The hypotheses of this study were tested using the statistical software SPSS to perform the independent samples T-test. The analysis was carried out for the 2011 year and resulted in 14 CSR companies and 54 non-CSR companies.

Table 1 provides group statistics for both CSR and non-CSR companies namely mean, standard deviation, as well standard error mean.

We notice the fact that, in mean, CSR companies perform better than non-CSR companies, but only in case of ROE and EPS.

Table 2 shows the results related to the T-test for equality of means. The T-test assumes that each group, CSR and non-CSR, have approximately equal variability.

Table 1 Group statistics

Var	CSR	N	Mean	Std. deviation	Std. error mean
ROA	Non-CSR	54	−0.02763	0.19104	0.02599
	CSR	14	−0.04705	0.32862	0.08782
ROE	Non-CSR	50	−0.29008	1.73007	0.24466
	CSR	12	0.08047	0.07354	0.02123
ROS	Non-CSR	54	−0.10570	0.49895	0.06789
	CSR	14	−0.28870	1.05228	0.28123
PBV	Non-CSR	54	0.85009	3.08191	0.41939
	CSR	14	−0.30196	3.58744	0.95878
PER	Non-CSR	54	32.02650	80.69465	10.98115
	CSR	14	10.72611	14.20437	3.79627
EPS	Non-CSR	54	0.06284	0.44060	0.05995
	CSR	14	2.40316	8.59454	2.29698

Table 2 Independent samples test

		Levene's test for equality of variances		T-test for equality of means					95 % confidence interval of the difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean diff.	Std. err. diff.	Lower	Upper
ROA	**Equal variances assumed**	1.740	0.192	0.288	66	**0.774**	0.01942	0.06745	−0.11524	0.15409
	Equal variances not assumed			0.212	15.349	0.835	0.01942	0.09159	−0.17542	0.21426
ROE	**Equal variances assumed**	1.189	0.280	−0.737	60	**0.464**	−0.37056	0.50268	−1.37608	0.63495
	Equal variances not assumed			−1.509	49.728	0.138	−0.37056	0.24558	−0.86391	0.12277
ROS	Equal variances assumed	7.300	0.009	0.944	66	0.349	0.18299	0.19390	−0.20415	0.57014
	Equal variances not assumed			0.633	14.548	**0.537**	0.18299	0.28931	−0.43533	0.80133
PBV	**Equal variances assumed**	1.056	0.308	1.205	66	**0.233**	1.15206	0.95606	−0.75679	3.06091
	Equal variances not assumed			1.101	18.287	0.285	1.15206	1.04649	−1.04408	3.34820
PER	**Equal variances assumed**	2.688	0.106	0.978	66	**0.331**	21.30039	21.76949	−22.16381	64.76459
	Equal variances not assumed			1.833	62.770	0.072	21.30039	11.61884	−1.91967	44.52045
EPS	Equal variances assumed	16.766	0.000	−2.035	66	0.046	−2.34032	1.15008	−4.63654	−0.04410
	Equal variances not assumed			−1.019	13.018	**0.327**	−2.34032	2.29777	−7.30366	2.62302

The bold values are statistically significant

As such we are examining the value out of the column labeled "Sig." under the heading "Levene's Test for Equality of Variances". In fact, if this value is less than or equal to the α level for the test (in our study we have considered 0.05), then we reject the null hypothesis according to which the variability of the two groups is equal, which involve that the variances are unequal. Therefore, if the p-value is less than or equal to 0.05, then we use the bottom row of the output, namely the row labeled "Equal variances not assumed". Otherwise, if the p-value is greater than 0.05, then we use the middle row of the output, respectively the row labeled "Equal variances assumed". Furthermore, the column labeled "t" provides the observed t value, whereas the column labeled "df" offers the degrees of freedom associated with the T-test.

As regards ROA, the significance (p-value) of Levene's test is 0.192, thus is larger than 0.05, so we reject the null hypothesis according to which the variability of the two groups is equal. Thus, we will assume that the variances are equal and we will use the middle row of the output. Assuming equal variances, the t-value is 0.288, being 66 degrees of freedom, and the p-value is 0.774, so we fail to reject H_0. This means that there is no difference in CFP if companies are adopting CSR or not. Subsequently, the aforementioned procedure was also followed for the rest of the selected ratios. Likewise, as regards ROE, ROS, PBV, PER, and EPS, there is no difference in means between the CSR companies and non-CSR companies.

Thus, our results show that there is no difference in means between CSR companies and non-CSR companies as regards CFP for the year 2011. Therefore, we can conclude from this empirical analysis that companies' performance is not affected if it undertakes CSR or not.

5 Conclusion and Further Research

The present study aim was to empirically analyze the CSR effects on CFP in Romania by employing univariate analysis on a sample of 68 companies listed on Bucharest Stock Exchange (BSE) for the 2011 fiscal year. In this sense we considered CSR companies—experiment group and non-CSR companies—control group. In order to see if there is any statistically difference between CFP (variable ROA, ROE, ROS, PBV, PER, and EPS) which employ CSR (experiment group) or not (control group), we used T-test. Although, our results showed no differences in mean CFP between CSR companies and non-CSR companies we underline the importance of CSR practices to be adopted or integrated in companies' business decisions and strategies'. Company's managers need to understand that CSR practices would keep the company closer to society, community and all stakeholders. Through CSR bridges can be built from which not only the society benefits but also the company.

The current study used for the empirically analyze only 1 year, correspondingly 2011, did not controlled for the companies economic activities and aims at contributing to the literature on CSR in developing countries, respectively Romania.

CSR in Romania is at embryonic level, for this reason more research should be done regarding the relation between CSR and CFP and if the results hold or change in time.

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IMF and Recent Crisis Prevention: Evidence from Romania

Gurgen Ohanyan

Abstract Romania, a member of the EU, was among the first countries to turn to the IMF for assistance. Since then, the Romanian economy has experienced positive changes and ranks among front runners of economic growth in the EU. In light of the development, it has become an issue of interest to investigate to what extent and how the IMF firstling collaboration with the EU affected the Romanian economy and to appraise the compliance of the government to the underlined measures. At the same time, in context to the case of Romania, the chapter aims to highlight the main actions of the IMF, which could be helpful for prevention or mitigation of a new crisis. The propensity score matching method was used to identify a country most similar to Romania and one that has not claimed IMF assistance—Bulgaria. Comparative analysis of major economic indicators over a 5-year span in Romania and Bulgaria suggests the effectiveness of IMF measures. The novelty of the article is in the results, which underline the success of conditional lending on specific macroeconomic indicators in Romania. Both EU states and other governments cooperating with the IMF might want to take the positive findings into consideration.

Keywords Romania • Bulgaria • IMF programs • Conditionality • Financial crisis

1   Introduction

Before the breakdown of the Bretton Woods system, a result of the U.S. decision to suspend convertibility of the dollar into gold, the IMF's main responsibility was to solve temporary imbalances of payments. Meanwhile, the havoc of fixed exchange rates and the switch to floating ones, following the fall of par value regime, led to comprehensive changes in the nature of the IMF. Particularly, the IMF has primarily focused on the stability and convertibility of exchange rates, while it has become an international financial institution with a broader array of responsibilities

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(Herrmann and Terhechte 2010, pp. 123–4). Besides monetary issues, the IMF deals with depth restructuring and financial reforms. Scholars most often criticize the enlargement of the IMF's responsibilities. In particular, such growth entails broader implications in the policy-making process of a country due to conditions attached to IMF loans. On the other hand, the enlarged conditions can prove advantageous for the IMF, as it could protect itself against critiques because of uncertainty of main goal. Moreover, Vreeland (2006) noted a palpable non-compliance amongst countries that, in addition, the IMF does not rigorously punish. IMF supporters in protection needs demonstrated non-compliance as well.

What's more, the IMF has been often condemned for backing U.S. interests. Notably, Dreher et al. (2009) found a systematic bias in IMF inflation forecasts, which favor countries voting in line with the U.S. in the UN. Moreover, IMF surveillance shows palpable political economy influence and partly follows a "defensive surveillance", i.e., another criticized subject of IMF activity is the conditionality attached to loans (Fratzscher and Reynaud 2011). This method aims to improve economic policies in such a way that the country overcomes the problems that led to seeking financial aid in the first place. On the other hand, it is also a way for the IMF to ensure that it gets its money back. Meanwhile, conditions attached to loans have gradually risen from macroeconomic targeting to structural reforms. Dreher (2009) highlights that criticism of conditionality points to the ineffectiveness of IMF measures to enable low-income countries (LIC) on IMF loans to overcome dependence. Experts of Oxfam International (2011) expressed concern that the IMF review process does not consult with the affected people in program countries. In this sense, prominent scholar Sachs, even in 1998, underlined that the IMF, with its loyalty to financial orthodoxy, neglected political and economic distinctions of debtor countries and often "poured oil on the flames" (Sachs 1998). Due to diversity and the micromanaged policy conditionality, countries in crisis do not want to turn to the Fund, thereby leading to worsening crises (Feldstein 1998). These national decisions decreased the list of under-program countries to include only those that had no choice but to borrow from the IMF. As a result its lending portfolio dropped from $100 billion in 2003 to $13 billion in 2007. Another criticism of the IMF in the literature is the lack of accountability and transparency (Stiglitz 2003; Bradlow 2006). And last but not least, a sizeable amount of literature mentions the negative effects of IMF programs on major macroeconomic indicators, such as economic growth, sovereign debt, and social distribution. Particularly, Przeworski and Vreeland (2000) argue that IMF programs lower growth rates for as long as countries remain under the program. In addition, another prominent scholar tackling the problem with endogeneity by employing pooled time-series cross-section regression concludes that IMF conditionality reduces growth rate (Dreher 2006). Besides, Garuda (2000) observed significant deterioration of income distribution in countries with IMF programs. According to Vreeland (2002), IMF participation significantly reduces the labor share of income in the manufacturing sector, thereby resulting in more social inequality. Furthermore, Jorra (2012) concludes that IMF programs reasonably increase the probability of subsequent sovereign debts by approximately 1.5–2 %.

Though the IMF has significantly improved its transparency and accountability by unveiling letters of intent and various policy documents and by streamlining the conditionality, which is based on country ownership of programs, compliance is still an overarching issue. According to the Independent Evaluation Office of the IMF the official compliance rate is 54 % (IEO 2007). At the same time, governance of the IMF is still problematic, as it does not articulate real power of economies. In particular, Belgium has more voting power than Brazil does. In this context, many scientists and experts have claimed that the global financial crisis (GFC) highlights the need to rebuild the IMF into one that governs as required and is more accountable and powerful.

In general, the function of the IMF has been widely discussed in the wake of the GFC, especially in terms of whether it should be a crisis preventer, the last resort lender, dispute settlement, or rule-making international body. In particular, Herrmann and Terhechte (2010, pp. 123–4) prescribe the role of a "Global Sheriff" to the IMF with regard to international financial stability, when the main purpose of the IMF would be surveillance. Meanwhile, Grabel considers the GFC as an opportunity for the destruction of the "neoliberal coherence" of the past several decades, which may entail the end of a misled regime that granted excessive authority to the IMF (Grabel 2011). Thus, Lane and Maeland (2011) note that the GFC is not just another economic downturn, but points to the need for fundamental changes in the international financial architecture. Continuing on the idea of global changes Fratzscher and Reynaud (2011) highlight that the IMF is thus standing at a crossroad in its search for a clearly defined role in the global economic and financial order. Moreover, they noted two major changes to the IMF: redefinition of its function in the global financial system and a fundamental shift in the balance of political power within the institution.

Hence, this chapter attempts to evaluate the IMF's role as a crisis preventer using Romania as a case study. We employed the propensity score matching (PSM) tool to identify among EU Member States a country most identical country to Romania and one that did not claim IMF assistance during the crisis. We compare these two countries for this study. The chapter is organized as follows: Sect. 2 provides a selective overview of the literature concerning the IMF's current role and ongoing reforms; Sect. 3 details recent IMF intervention in Romania; Sect. 4 describes the data underlying the propensity score estimation and presents empirical data and Sect. 5 concludes.

2 Overview of Recent IMF Modifications

The IMF has been highly criticized since its establishment for various reasons. Meanwhile, it has made substantial changes concerning conditionality, accountability, transparency, and governance. In particular, the IMF realizing that more transparency could enhance the accountability of policymakers and the credibility of policies, leading toward better understanding of its role and operations. So far,

the Fund has adopted a "voluntary but presumed" policy to encourage countries to publish policy documents, including press releases, letters of intent, and memoranda on economic and financial policies. Thanks to such changes, 96 % of countries published their policy documents in 2013 (IMF 2014a). Moreover, in 2002, the IMF responded to criticism on its gradually increasing conditionality by introducing a policy of streamlining conditionality. The latter means that the Fund may impose conditions in the core area of its responsibility, which has reduced the average number of conditions. A year earlier in 2001, the IMF established its watchdog, the Independent Evaluation Office (IEO), which conducts independent and objective evaluations of Fund policies and activities. Established to enhance credibility and accountability of the IMF, the IEO is fully independent from the IMF. A comparison of two reports from the IEO before and after the crisis reveals significant improvement of the IMF's image. For example, the IEO (2009) reports that the IMF was least effective with advanced and large emerging economies and most effective with PRGF-eligible (Poverty Reduction and Growth Facility) countries. Additionally, post-crisis evaluation of the Fund as Trusted Advisor reveals a rise in the satisfaction of country authorities' with the Fund. What has changed in the IMF since the onset of the GFC?

In response to the increased demand for financing from international institutions, the IMF has proposed several amendments and reforms to its governance. At the same time, because the recent financial and economic crisis that affected major economies like the U.S. and other Western countries, the IMF could not lend to all countries in need. Moreover, at the onset of the crisis, IMF resources were at a historic low, relative to financial flow and the size of the global economy. The Fund reformed its lending toolkit and increased non-concessional lending, from almost nil to about \$400 billion in 2008 to 2013 (IEO 2014)[1]. Resource mobilization through New Arrangements to Borrow and quota doubling[2] enabled the increased lending of up to \$750 billion. Another major change in the IMF's lending toolkit is two new arrangements that rely on ex-ante conditionality. Based on pre-qualification criteria, the Flexible Credit Line (FCL) is free of tailored conditions and is offered to countries with strong economic fundamentals. Another lending tool, the Precautionary and Liquidity Line (PLL) is considered a mix of ex-ante and ex-post conditionality, while the cost of borrowing is the same as with FCL and Stand-By Arrangements (SBA).

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[1] The IMF offers two types of loans: concessional and non-concessional. Concessional loans are granted to low-income countries via the Extended Credit Facility (ECF), the Standby Credit Facility (SCF) and the Rapid Credit Facility (RCF) with zero interest rates until the end of 2014. Non-concessional lending comes mainly through Stand-By Arrangements (SBA), the Flexible Credit Line (FCL) and the Precautionary and Liquidity Line (PLL). All these facilities are subject to the IMF's market-related interest rate and have attached conditions (IMF 2014b).

[2] New Arrangement to Borrow (NAB) is a collective agreement between 38 member countries, financial institutions and the IMF, whereby the IMF lends from the other member nations and institutions in case its normal funds fall short of the borrower's needs. Expended to SDR \$367.5 billion in March, 2011, it came into effect shortly thereafter.

In 2010, the Executive Board of the IMF proposed governance and quota reform to enhance effectiveness and legitimacy. According to the amendment, quotas should be doubled, and shifts in share should take place. With respect to the latter, over a 6 % shift should go from over-represented to under-represented members. As of 18 February, 2015 162 members, representing 79.54 % of the voting power, have accepted the amendment, instead of required 85 %. Next, in light of the GFC, the Fund strengthened its collaboration with multilateral entities, particularly by participating and coordinating global and regional initiatives, such as Group of 20 (G-20) and the Financial Stability Board (FSB). In terms of regional initiatives, the IMF enhanced its financing of struggling Eastern European countries like Romania, Hungary, and Latvia in 2008, thereby starting an unprecedented collaboration with the European Union (EU). The latter has intensified since mid-2010 in the aftermath of the sovereign debt crisis in Europe. To prevent foreign banks from withdrawing from Eastern European countries, the Vienna Initiative was put into effect in January 2009. The IMF managed to convince the foreign banks to stay in the region, thus preventing a large capital flight (De Haas et al. 2012). Furthermore, enhanced cooperation between the IMF, European Commission (EC) and European Central Bank (ECB), referred to as the Troika, have highlighted the IMF's ability to collaborate. Those three entities have attempted to help advanced European countries cope with the sovereign debt problems. Thus, the IMF has enhanced its collaboration with the Regional Financial Arrangements (RFA) by endorsing six principles in November 2011. In doing so, it sought to enhance the regional capacity of preventing a financial crisis by combining RFA's better understanding of regional circumstances and IMF's global surveillance capacity. Furthermore, the IMF has revamped its surveillance tool as well. In 2012 the IMF adopted the Integrated Surveillance Decision (ISD), which significantly increased legal framework for surveillance by contributing to evenhandedness and better integration of surveillance activities. The Fund introduced spillover reports assessing the impact of economic policies of five major economies (U.S., China, Japan, U.K., and the Euro Area). Separately, the new Pilot External Sector Report has been introduced for assessment of external imbalances.

Despite the IMF's ongoing efforts to restructure itself, the efficiency of the reforms is widely debated. In particular, some scholars find that quota reform is not fundamental, as it preserves the U.S. veto power within the institution and shifts in quotas are not perceptible. Moreover, tight measures from the Troika initiative in Euro area countries have caused discontent among the people, evidenced by social manifestos and riots. In Greece, anti-austerity Syriza party won the general election, which may halt collaboration with the EU and the IMF. After weeks of protests against austerity measures, Romanian prime minister stepped down in 2012. Notwithstanding, Romania was among the top three by it is economic growth in the Euro area after crisis. Thus, this chapter aims to delve into the IMF collaboration with Romania.

3   IMF and Romania Since Onset of the Financial Crisis

The IMF signed 88 arrangements between 2000 and 2007, of which 31 were SBAs. Meanwhile, since 2008, the former number has increased to 132 and the latter to 41; the accessed amount comprised SDR 510 billion, almost ten times more than during the period from 2000 to 2007. The issue is that SBAs were not popular after the crisis in Latin America countries because of the austere conditions attached to the loans. Yet, on the one hand, severity of the financial crisis and on the other, streamlined IMF conditionality that aims at promoting country ownership of strong and effective policies, pushed countries to turn to SBAs. Analysis of Quantitative Performance Criteria (QPC) data in the same period reveals that since 2008 conditions have been reduced from 47 to 39 per one arrangement on average. At the same time, structural benchmarks and prior actions in average have decreased to 28 from 43. This may signal that the IMF is on track to reform its conditionality.

Besides other struggling countries, Romania, since the onset of the financial crisis, has signed an SBA three times: once in 2009, 2011, and 2013, where the last two were treated as precautionary measures (see Fig. 1). Romania, along with Hungary and Latvia, became the first EU Member States to turn to the IMF for financial assistance.

Figure 1 shows the amounts allocated to Romania by year. Along with crisis cushioning, the amounts have decreased from SDR 11.4 billion in 2009 to 1.7 in 2013. By analyzing Romanian Technical Memorandums of Understanding (TMUs), we noted major areas where ceilings and floors are appropriate:

- Net foreign assets consultation mechanism on the 12-month rate of inflation
- Performance criteria on general government balance
- Limiting the issuance of government guarantees to the non-financial private sector and public enterprises performance criteria on non-accumulation of domestic arrears by the general government
- Continuous performance criteria on non-accumulation of external debt payments arrears by the general government

Fig. 1 IMF financial assistance to Romania (millions, SDR). Source: IMF MONA database, http://www.imf.org/external/np/pdr/mona/index.aspx
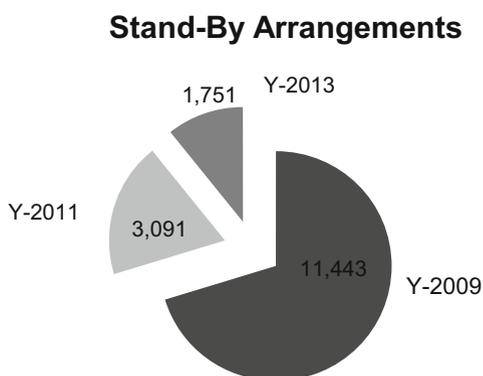
- Indicative target on general government primary spending
- Monitoring of public enterprises

The overarching goals of the aforementioned limitations are cutting the budget deficit, reducing inflation, and assuring stable economic growth. After exploring the IMF's reviews under the SBA, it could be said that Romania has been on the right track while implementing the proposed measures. There were some delays regarding the privatization and public offering of some State Owned Enterprises (SOEs), but it was further improved. However, there have been mass demonstrations and protests against the austere measures imposed by the government under IMF supervision. In the aftermath of the protests, Prime Minister Emil Boc resigned in 2012, and the new government, headed by social-democrat leader Victor Ponta, continued the collaboration with the IMF by further reducing the budget deficit and privatization of the SOEs. Romanian experts have strongly criticized the aforementioned policies. Particularly, Stoiciu (2012) notes that the austerity measures had negative social consequences by contributing to a persistently high rate of unemployment and a low measure of well-being among the population. Tudora and Zamfir (2013) find that the restructuring of the SOEs led to the cancellation of the thousands of bargaining agreements. Workers have been threatened with job loss as a result.

To assess the situation more thoroughly, a comprehensive analysis of IMF involvement in Romania is required. First of all, the global financial crisis affected almost every country in the world, and it is difficult to identify if persistent unemployment or weak economic growth is due to IMF austerity measures or the former. In most cases, countries facing economic problems turn to the IMF; hence, we should consider selection bias when evaluating the IMF's effect on a certain country. Similarly, we cannot compare a hospital patient who needs to take medicine to one who does not need to find out whether the medicine is effective. Thus, we employed the propensity score matching (PSM) method, which is widely used in medical sciences, to identify which countries are in similar economic situations. A detailed description of the method and the data follows.

4 Methodological Issues, Data and Descriptive Statistics

4.1 Methodological Issues

PSM has become a popular approach to estimate causal treatment effects. It is widely used in labor policy evaluation (Dehejia and Wahba 1999); yet, empirical examples can also be found in different fields of study. It is especially applicable in the case of an available treatment, a group of treated individuals, and a group of untreated individuals (Caliendo and Kopeinig 2008). In this case, treatment refers to IMF arrangements with a country, the treated group refers to a country getting aid from the IMF, and the untreated group refers to a country that is in the same

economic situation, but does not claim IMF's assistance. Firstly, Conway (1994) suggests that it may be possible to predict a country's decision to participate in an IMF program based on some major economic indicators. Thus, the assumption would likely split countries into treated and untreated countries with the same pre-program conditions. Garuda (2000) further develops the idea when he first employed PSM to estimate IMF's program effects on income distribution. Based on the scores, Garuda (2000) defines three groups. Furthermore, within those groups, countries are divided into program-countries and non-program countries. The mentioned method mitigates the problem of bias, thereby providing opportunities to compare a means of selected variables within the group and make robust findings.

4.2 Data and Descriptive Statistics

Our cross-country data spans the period between 1993 and 2013 for 28 EU Member States. We chose all types of IMF loans as the dependent variable to estimate propensity scores. Thus IMF participation is a binary variable, where under program country take value 1, otherwise 0. We selected independent variables by consulting relevant studies (*see* Garuda 2000; Przeworski and Vreeland 2000; Dreher 2006) of the field. Garuda (2000) includes only economic indicators to estimate propensity scores; otherwise, he mentioned inclusion of other indicators like political status could lead to misinterpretation of PS as a scalar measure of a country's economic conditions. Yet, it should be noted that the exclusion of political indicators like availability of veto powers or past participation may not provide a complete picture of the country's motivation to participate in an IMF program (Vreeland 2004). Nevertheless, we have faced with the data limitation once seeking the same political indicators for the 28 EU Member States. In this end, we only use economic indicators to estimate a country's likelihood of turning to the IMF. Table 1 illustrates the selected indicators and their sources.

Considering that a government's decision to participate in an IMF program may be lagged, i.e., past economic growth or inflation could have influence the decision, we used 1 and 2-year lagged variables.

Table 2 shows the output of the regression, in which the dependent variable is IMF participation. Real economic growth, investment, and unemployment are robust indicators to apply to the IMF in real time. Meanwhile, Current Account Balance (CAB), Government Debt and Exchange Rate are significant 1-year lagged, which could lead governments to seek funds in the coming year. Budget deficit is only significant 2-year lagged, which may indicate that governments have implemented an expansionary fiscal policy without a certain caution. In the aftermath of the eased fiscal policy countries in the Euro area faced sovereign debt problems. Using the selected variables, we calculated propensity scores. Initially, we looked at 2007 and 2008 to identify the country that had the same pre-crisis

Table 1 Data description and sources

Variable	Description	Source
Unemployment rate	Percent of total labor force (OECD harmonized definition)	World Economic Outlook
IMF participation	Dummy variable: 1 if the country was under program that year and 0 otherwise	MONA database
Real growth	Real growth of GDP in constant prices	World Economic Outlook
Investment	Ratio of total investment in current local currency and GDP in current local currency	World Economic Outlook
Inflation	Annual percentages of average consumer prices and year-on-year changes	World Economic Outlook
Budget deficit	Net lending (+) or borrowing (−) is calculated as a ratio revenue minus total expenditure and GDP	World Economic Outlook
Public debt	General government gross debt as a percentage of GDP	World Economic Outlook
XRAT	Exchange rate to US dollar	PENN World Table 7.1
Poverty	People at risk of poverty or social exclusion percentage of total population	EUROSTAT
Strength of legal rights	Measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate lending	World Development Indicators

conditions as Romania and found Bulgaria to be a good match, as indicated in Fig. 2.

Figure 2 shows that in 2007 the probability to claim IMF assistance was very high at around 0.50 in both countries. Meanwhile, in 2008 probability to turn to the IMF decreased, yet Bulgaria was more likely to apply for a loan to the Fund. However, Romania applied in 2009 and again in 2011 and 2013, while Bulgaria did not turn to the IMF in that period. Taking into consideration political similarities of Romania and Bulgaria—both became part of the EU in 2007, both had a soviet regime, and both are not in the Euro area—they represent a great opportunity for comparison. For this study, we considered macroeconomic indicators because the main goal of the IMF is macroeconomic stability and economic growth.

Table 3 lists macroeconomic indicators we used for a comparison between Romania and Bulgaria. We selected 2008 as a base year, as it is widely considered the pre-crisis year and it was a pre-program year for Romania since it signed an arrangement with the IMF in 2009. The first indicator, GDP per capita growth, is calculated with 2008 as a base year. We can see a decrease in 2009 almost three times more in Romania than Bulgaria, but in 2014, the former managed to exceed 2008's value by 6.2 %. Meanwhile, Bulgaria experienced a growth of GDP per capita in 2014 almost twice that of Romania in comparison to its respective 2008 figure. As for economic growth, despite a severe drop from 2011 to 2012, Romania surpassed Bulgaria and was among the frontrunner in Euro area in 2013. When we look at unemployment, Romania and Bulgaria had the same starting point of 6.9,

Table 2 Correlation between major economic indicators and IMF participation

Dependent variable: IMF participation dummy

L_XRAT			REAL_GROWTH			L_REAL_GROWTH			UNEMPLOYMENT		
Coef	SE	Sig	Coef	SE	Sig	Coef	SE	Sig	Coef	SE	Sig
0.008	0.003	0.007	−0.25	0.072	0.001	−0.094	0.057	0.095	0.09	0.035	0.11
L_GOV_DEBT			L2_BUDG_DEF			INVEST			L_CAB		
Coef	SE	Sig	Coef	SE	Sig	Coef	SE	Sig	Coef	SE	Sig
0.062	0.041	0.091	0.1	0.067	0.101	−0.229	0.078	0.003	−0.048	0.043	0.049
Observations 588			Periods included 20			Cross-sections 28			R-squared 0.61		

Source: Author's calculation

Fig. 2 Propensity scores
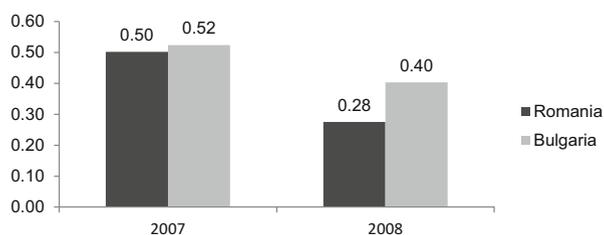
Table 3 Main macroeconomic indicators from 2009 and 2014

	2009	2010	2011	2012	2013	2014[a]
GDP per capita growth (base year 2008)						
Bulgaria	−6.2	−7.0	6.7	2.8	6.9	11.6
Romania	−19.7	−19.7	−10.2	−17.1	−7.2	6.2
Economic growth						
Bulgaria	−5.5	0.4	1.8	0.6	0.9	1.4
Romania	−6.6	−1.1	2.3	0.6	3.5	2.4
Unemployment						
Bulgaria	6.9	10.3	11.4	12.4	13.0	12.5
Romania	6.9	7.3	7.4	7.0	7.3	7.2
Investment share in GDP (percent change from 2008)						
Bulgaria	−21.8	−39.0	−41.6	−42.1	−44.2	−37.4
Romania	−18.8	−18.2	−14.1	−16.9	−26.7	−28.0
Inflation						
Bulgaria	2.5	3.0	3.4	2.4	0.4	−1.2
Romania	5.6	6.1	5.8	3.3	4.0	1.5
Current account balance						
Bulgaria	−8.9	−1.5	0.1	−0.9	1.9	−0.2
Romania	−4.1	−4.4	−4.5	−4.4	−1.1	−1.2
Budget deficit share in GDP						
Bulgaria	−0.9	−4.0	−2.0	−0.5	−1.9	−2.7
Romania	−7.3	−6.4	−4.3	−2.5	−2.5	−2.2
People at risk of poverty or social exclusion (percent change from 2008)						
Bulgaria	3.1	9.8	9.6	10.0	7.1	N/A
Romania	−2.5	−6.3	−8.8	−5.7	−8.6	N/A
Strength of legal rights index (0 = weak to 12 = strong)						
Bulgaria	9	9	9	9	9	9
Romania	9	9	9	9	10	10

Source:
World Economic Outlook: https://www.imf.org/external/pubs/ft/weo/2015/01/weodata/weoselgr.aspx
Eurostat: http://ec.europa.eu/eurostat/data/database
World Development Indicators: http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators
[a]Indicators for 2014 were projected by the IMF World Economic Outlook database

but the figure increased much more in Bulgaria to 12.5 % in 2014 versus 7.2. Next, though investment in both countries started much lower than in the pre-crisis year and decreased overall, it dropped more slowly in Romania. In 2014, investment was 28 % lower than in 2008 in Romania and 37.4 % lower in Bulgaria than its respective 2008 figure, but Bulgaria did experience a slow recovery by 2014. Looking at inflation, we see it was relatively higher in Romania when the crisis hit, but it fell to 1.5 % in 2014. At the same time, Bulgaria managed to keep inflation under the Central Bank target. Moreover, by the current account balance (CAB), Romania and Bulgaria are closer at just 1.2 and 0.2 % deficit, respectively. In general, a positive current account balance means that a country exports more than it imports, but in this case, a decrease in CAB was conditioned by an accelerated decrease of imports. Moving forward, even IMF officials praised the performance of the Romanian budget deficit. The country succeeded in curtailing it from 7.3 % in 2009 to 2.2 in 2014. Meanwhile, in Bulgaria, it went up overall to 2.7 % but still remains under the advised 3 %. Another indicator in our table, people at risk of poverty or social exclusion, was calculated using 2008 as a base year to identify improvement. The Romanian government managed to cut poverty and social exclusion by 8.6 % in 2013 as compared to 2008, while in Bulgaria, conditions worsened and led to an increase by 7.1 %. Finally, the last indicator illustrates the degree to which bankruptcy and collateral laws protect the rights of borrowers and lenders, where 12 point means the highest protection. The table shows a rank of nine from 2009 to 2012, but Romania surpassed Bulgaria by one point with 10 in 2013 and 2014. In summary, out of nine macroeconomic indicators, Romania is in a better situation than Bulgaria in five of them. Bulgaria is preferable in terms of GDP per capita, but with the other three indicators in which Bulgaria fares better, both countries score similarly.

5 Concluding Remarks

The IMF has reasonably improved its image after the global financial crisis. It has proved that it can shoulder the role of the global crisis preventer. Yet, it will be difficult, even for the IMF, to help highly developed countries like the U.S., U.K., or Japan due to their much better economic standing. Meanwhile, the IMF has launched several reforms to ensure more accountability, transparency, and good governance. In particular, it has proposed quota and governance reform, which has not been ratified yet, but is on track to be. In addition, the IMF has proven its ability to collaborate with Regional Financial Arrangements, such as with the European Commission and European Central Bank to cushion the Euro area sovereign debt crisis. In this instance, the Vienna Initiative is devoted to negotiating with foreign capital banks in Eastern Europe to maintain their presence in those countries. Furthermore, during the crisis, the Fund introduced new facilities with ex-ante conditionality, thereby offering loans to countries with strong economic

fundamentals. It has revamped its surveillance as well by adopting Integrated Surveillance Decision and contributing to evenhandedness.

Most notably, in Romania, the IMF advised major structural and economic reforms, like privatization of SOEs, restructuring of public employment, a 5 % increase in Value Added Tax comprising 24 %, and the introduction of a new labor code. However, these reforms have been highly criticized for their austerity and for serving the interests of some groups. To look into whether they help Romania recover, we used propensity score matching to identify a country that had similar pre-crisis economic conditions as Romania. We found that Bulgaria could serve as a robust point of comparison based on nine main macroeconomic indicators. Romania performed better from 2009 to 2014 in terms of economic growth, unemployment, poverty, investment, and strength of legal rights. In terms of budget deficit, current account balance, and inflation, Bulgaria did better, but not by too much. Bulgaria only did much better in terms of GDP per capita. According to IMF officials' quarterly reviews Romanian government has been quite responsible and with some delays has implemented proposed reforms. Hence, one may conclude that good compliance of the Romanian government, as well has contributed to the efficient implementation of the IMF programs.

Thus, based on our findings, the IMF collaboration with Romania has been generally positive during the observed period, and the changes align with IMF's main mission, i.e., structural reforms for stable economic growth. Comparing with the country that has same pre-crisis conditions and their achievements after 5 year of the crisis first hit, it is unveiled that treated country, i.e., Romania is in more advantageous position than Bulgaria. Thus, once may conclude that despite that in first 2 years due to austere measures under-program country's economy could be hurt severely, while in the mid-term it could entail to more stable economic growth and reduced unemployment. At the same time, it should be noted that this chapter has its own limitations, particularly considering the data and the selection of the main economic indicators, since we have not defined a certain algorithm in the selection of economic indicators. Nevertheless, the findings could contribute to the enrichment of the relevant field literature.

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When Stock Market Investors Breathe Polluted Air

Ender Demir and Oguz Ersan

Abstract The finance literature documents a strong relationship between mood effects and stock market returns. Air pollution is one of the factors affecting people both physiologically and mentally. This study examines the impact of air pollution sourced mood change on stock returns in Turkey. We find that lag of air pollution in the three most populated cities of Turkey where the majority of investors live is negatively related to stock returns, even when other variables are controlled. On the contrary, the relationship doesn't exist for the air pollution in other cities of Turkey.

Keywords Air pollution • Stock returns • Turkey • Borsa Istanbul • Investor mood

1 Introduction

Various mood effects on human behavior and decisions are studied in the literature. For example negative mood effects of low and high temperature days are documented in numerous papers (e.g., Wyndham 1969; Bell and Baron 1976; Bell 1981; Sanders and Brizzolara 1982; Howarth and Hoffman 1984; Parsons 2001). Cunningham (1979) and Schneider et al. (1980) find evidence on the fact that people tend to help others less in cold and hot days. Berument and Yucel (2005) show that international wins of Fenerbahce, a popular Turkish football club, significantly increase productivity and monthly growth rate by affecting workers' mood positively.

Mood states are shown to play a role in the way people process information and make choices (e.g., Bless and Shwarz 1999; Mitchell and Phillips 2007; Isen 2008). De Vries et al. (2012) experimentally show that participants' choices deviate from

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the logical choices (dominant strategies that maximize the outcomes) more frequently when they are in happier moods.

A financial market is a broad experiment area for the analyses of decision making process for several reasons. First, it enables us to observe, store and study millions of separate individuals' decisions. Second, plenty of detail information such as decision time and conditions yield comparisons among different states and time periods. Finally, the outcomes of each decision are concrete and quantitatively observable in financial data. Although interpreting only the realized outcomes of the past, it remedies the essential observation problem in social sciences. Mood and decision making relationship as well is much apparent in financial markets which explains the extensive literature on the field. Efficient markets hypothesis as well as main asset pricing models are based on the assumption of 'rational agents' in financial markets. On the other hand, behavioral finance depicts the role of biases due to irrational behavior. Mood, interfering with the rational decision making process in financial markets contradicts the rationality assumption.

According to Edmans et al. (2007), three conditions must be fulfilled in order to reasonably analyze the effects of a mood variable on stock returns. First, the underlying variable must affect mood substantially in order to be observed in the financial data. Second, the effect must be widespread in the sense the moods of enough number of investors are changed. Finally, the mood effect must be correlated across most of the people in a country.

Studies on mood effects arising from nature events have been dominant in the field of mood—stock return relationship. Cloudy days associated with a bad mood are found to have significantly lower stock returns (e.g., Saunders 1993; Hirshleifer and Shumway 2003). Similarly, seasonal affective disorder (SAD) generates lower stock returns (Kamstra et al. 2003). Finding evidence on the negative correlation between temperature and stock returns, the temperature anomaly in stock returns is suggested by Cao and Wei (2005). Finally, lunar phases are shown to be affecting mood and consequently stock returns (e.g., Yuan et al. 2006; Dichev and Janes 2003). Arguing against the relationship between mood and stock returns, Lu and Chou (2012) assert that mood effects exist in financial markets; however, by affecting not the returns but the trading intensity.

Another mood effect on financial markets, studied frequently in the literature, is the effect of soccer results on stock returns. It is shown that favorable soccer match results, affecting investors' mood positively, result in higher stock returns (e.g., Edmans et al. 2007; Berument et al. 2009; Kaplanski and Levy 2014; Demir and Danis 2011; Demir and Rigoni 2015). Moreover, Eker et al. (2007) and Demir et al. (2014) provide supportive evidence for the relationship between soccer and exchange rates in Turkey. Large scale twitter feeds are found to be affecting the society mood which exhibits significant positive relationship with stock returns (Bollen et al. 2011).

Air pollution is one of the factors affecting people both physiologically and mentally (Evans and Jacobs 1981). Bullinger (1989) observes mood and stress effects of higher levels of SO_2. Lercher et al. (1995) experimentally document that fatigue, exhaustion, bad mood, nervousness, irritation of the eyes and stomach

aches are significantly linked to traffic air pollution. Psychological effects of air pollution include the annoyance resulting from the perceived pollution. Rotko et al. (2002) point out the significant relationship between reported annoyance and air pollution. Moreover, observed air pollution annoyance among pregnant women is expected to have psychological and physiological effects (Llop et al. 2008). Numbers of family disturbances and assault reports are increased with higher ozone levels (Rotton and Frey 1985).

Mood effects due to air pollution can be observed in the finance data as well. However, studies that address to the effect in this field are relatively limited in number. Lepori (2009) examines the relationship between air pollution and stock returns with the concentration on trading floor community. It is suggested that air pollution in the surrounding area of the trading floor negatively affects the mood of floor traders. Restating the finding that individuals in a bad mood state are more pessimistic and they end up with downward biased probability estimates; it is observed that resulting actions of floor traders negatively affect stock returns with decreased demand. While for the time period prior to the replacement of computerized trading system in Milan Stock Exchange, equity returns are found to be 0.2 % lower when particulate matter is one standard deviation higher; no such relationship is detected through the period with the computerized system. Besides, the paper's extended examination for the main stock exchanges in the world supports the stated findings.

Levy and Yagil (2011) investigate the relation between air pollution and stock returns by analyzing four stock exchanges in the US for the time period of 1997–2007. It is found that air pollution has significant negative effects on stock returns also after controlling for Monday effect, January effect and previous day return. Mean daily return difference between the unhealthy and good days is found to be -0.49 % for the S&P index and -0.32 % for the AMEX index both significant in 1 % level. Moreover, it is observed that larger the distance between stock exchange and the polluted area is, weaker the relationship gets. Finally, air pollution is shown to be affecting local traders investing in exchanges far from the polluted area. Based on the findings, an investment strategy of taking short position on the polluted days and long position on the good days is originated. Yielding average yearly returns higher than the ones for the classical buy-and-hold strategy, it is shown to be profitable as well. Extending their previous work, Levy and Yagil (2013) examine the stock markets from countries in different continents, namely Canada, China, Netherlands and Australia with respect to the effect of air pollution on stock returns. The authors obtain similar negative relationship also after controlling for the seasonal and meteorological factors namely, lunar cycles, cloud cover and summer seasonality. In addition, the effect is found to be more obvious for the pollution related companies' stocks. In their recent study of the Chinese stock market, Hu et al. (2014) state that rather than the reported air quality index, perceived air quality which is increasing with the local air pollution relative to the one in Beijing, negatively affects both the trading volume and stock prices. Besides the fact that Beijing is the most populated and polluted region in China; above mentioned finding is also linked to the comparison theory asserting that people form feelings by comparing themselves with other people. Moreover, it is observed that

the reported air quality index suffers from a large amount of manipulation with the aim of keeping the pollution numbers below the critical level.

The limited literature on this topic focuses on developed markets while in this paper, we analyze the impact of air pollution on an emerging market namely Borsa Istanbul of Turkey. Compared to the developed markets, emerging markets incorporate higher level of investor biases generating inefficiency in the prices. Considering the mood effect of air pollution on the stock market as a source of inefficiency, we believe that the examination of an emerging market is valuable for the relevant literature. Moreover, in terms of number of investors and account value, Istanbul, Ankara and Izmir highly dominate Turkey. This fact on the Turkish stock market enables us to sharply differentiate our expectations for the air pollution in three cities and in the remaining of Turkey. Consequently, in line with our expectations, for the above mentioned three cities, we find a statistically significant and negative relationship between lag of air pollution and stock returns. On the other hand, no relationship is documented for air pollution in other cities.

The remainder of this paper is organized as follows: Sect. 2 presents the data and methodology. Section 3 states the main findings. The last section concludes the paper.

2 Data and Methodology

The data for Borsa Istanbul (formerly known as Istanbul Stock Exchange) Index is collected from the official website of Borsa Istanbul. Specifically, BIST100 Index, which is a value weighted index composed of the largest 100 company stocks, is used. Air pollution data is drawn from Air Quality Monitoring Network Website of Ministry of Environment and Urbanization of Turkey.[1] This website provides air pollution data from different cities (and districts) of Turkey. Borsa Istanbul dataset is available from the beginning of 1988 but the air pollution data is not complete till 2008. Thus, the final data set covers the period of 2008–2013. MSCI World Index data is derived from Bloomberg Terminal.

The daily returns are computed as the difference in the natural logarithm of the BIST100 index for each of the consecutive trading days. First, we analyze the impact of air pollution with the following simple model:

$$R_t = a + \beta_1 PM10_t + \beta_2 PM10_{t-1} \tag{1}$$

where R_t is the daily return of BIST100. We select the particulate matter (PM10) and lag of PM10 to measure the air pollution as also used in the previous studies (Lepori 2009; Levy and Yagil 2013). That will let us compare our findings with them. As the next step, we extend this model by including control variables in line with Kaplanski and Levy (2010) and Fung et al. (2015) and we run the following regression:

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[1] http://www.havaizleme.gov.tr/Default.ltr.aspx

$$R_t = a + \beta_1 Ramadan_t + \sum_{i=1}^{5} \beta_2 R_{t-1} + \beta_3 R_{t-2} + \sum_{i=1}^{4} \beta_4 D_t + \beta_5 MSCI_t$$
$$+ \beta_6 January_t + \beta_7 PM10_t + \beta_8 PM10_{t-1} \tag{2}$$

R_{t-1} through R_{t-5} are 1–5 days lagged returns, respectively. The dummy variable, Ramadan takes the value of one throughout the duration of the holy month and zero otherwise. $MSCI_t$ is the return of the MSCI World Index used to control for global market movements. We also include January dummy variable to control for the January effect. D_t represents the dummy variables for each day of the week in order to check for the day of the week effect. D_t, i = 1, 2, 3, 4, are dummy variables for the days of the week: Monday, Tuesday, Wednesday, and Thursday, respectively. To avoid dummy trap, Friday is excluded.

In order to control for any conditional heteroscedasticity, we follow the proce-dure adopted in the relevant studies (e.g., Kaplanski and Levy 2010; Demir et al. 2014); and we implement GARCH(1,1) with Model 2. First, we run the regression model 2. Obtaining the error terms from the regression, we estimate conditional volatility, $\widehat{\sigma}_t^2$, by the use of a GARCH(1,1) model. Next, we calculate normalized returns, R_t^N, by the use of $R_t^N = a + bR_t/\widehat{\sigma}_t$ where a and b are selected so that R_t^N and R_t have the same mean and variance. Finally, we run the regression model 2 with the normalized returns.

With the population of 14.1 million, Istanbul is the most crowded city among 81 cities in Turkey. Ankara and İzmir follow Istanbul with 5.0 million and 4.1 million, respectively. Three cities constitute 30.4 % of Turkey's population. In terms of number of investors, those three cities dominate the country. According to the data of Central Depository Institution of Turkey, more than half of the investors live in those three cities. More specifically, 31 %, 11.6 %, and 9.4 % of investors in Turkey live in Istanbul, Ankara, and İzmir, respectively. In terms of investment account value, investors in Istanbul have 60.1 % of the total investment. The sum of the account value of investors in three cities is 75.4 %. If the stock market returns are affected by the air pollution, we should expect that this is mostly driven by the air pollution in the regions with large number of investors and investment account value. Therefore, in the case of Turkey, we expect to detect a significant relation-ship between the air pollution in İstanbul, Ankara and İzmir and stock market return. On the other hand, we anticipate limited or no effect for the air pollution in other cities.

3 Findings

The regression estimates for Model 1 are presented in Table 1. As this model doesn't include any control variables, we present the results only for Istanbul which has the highest number of investors in Turkey. Six districts, Aksaray, Besiktas, Esenler, Kadıköy, Uskudar and Umraniye are the districts with the largest number

Table 1 Air pollution and stock return for Istanbul districts (model 1)

	Aksaray	Beşiktaş	Esenler	Kadıköy	Uskudar	Umraniye[a]
$Pm10gm_t$	0.00008	0.00001	−0.000002	−0.000007	−0.000006	0.000004
	(0.00009)	(0.00003)	(0.00001)	(0.00002)	(0.00003)	(0.00003)
$Pm10gm_{t-1}$	−0.000098*	−0.00005*	−0.00002*	−0.00001*	−0.00006**	−0.00005**
	(0.00009)	(0.00003)	(0.00001)	(0.00002)	(0.00003)	(0.00003)
Constant	0.0017*	0.0020	0.00153*	0.00123	0.00273**	0.0024**
	(0.0011)	(0.0014)	(0.0009)	(0.0009)	(0.0012)	(0.001)
Observations	1405	1351	1435	1386	1392	1328
R^2	0.0018	0.0037	0.0031	0.0013	0.0054	0.0058

Note: Standard deviations are stated in parenthesis. *, **, and *** represent 10 %, 5 % and 1 %, significance levels, respectively
[a]For Umraniye district, NO2, instead of PM10, is used due to data availability

of investors and they are among the most crowded districts of Istanbul. Results suggest that stock market returns are not affected by the air pollution on the same day, whereas they are affected by the air pollution on the previous day. The relationship between the lagged air pollution and stock market returns is significant at 5 % level for two districts and at 10 % level for the remaining districts. But due to lack of control variables,

Although Model 1 predicts a negative relationship between lag of air pollution and return, we have to check whether the air pollution effect remains after the addition of control variables in the model. Table 2 shows the regression estimates of Model 2 for the six districts. A strong positive correlation exists between the stock market return of Istanbul and MSCI World Index return. Yet, the evidence regarding the air pollution effect is left untouched. The coefficient of the lag of air pollution proxy is consistently negative and statistically significant for all of the examined districts in Istanbul. Specifically, the coefficients of lagged air pollution are significant at 5 % level for Besiktas, Uskudar and Umraniye; and significant at 10 % level for Aksaray, Esenler and Kadıköy.

Table 3 presents the findings for Ankara and Izmir which are the second and third cities in terms of number of investors and account value of investors. The regression estimates according to Model 2 are in line with the ones for Istanbul. Lag of air pollution has a statistically significant and negative effect on stock returns. Considering the air pollution in Istanbul, Ankara, and Izmir, we provide strong supportive evidence to the previous literature on the negative relation between air pollution and stock returns.

Table 4 represents the regression estimates for air pollution in some cities from different regions of Turkey.[2] We do not observe any effect of air pollution in the examined cities on the stock market returns, a fact which is in line with our expectations. The investors are heavily concentrated in Istanbul, Ankara and Izmir. On the other side, only less than half of the investors reside in the remaining 78 cities of Turkey. Therefore, the mood effect of air pollution in any of these cities is not widespread reaching limited number of investors. This does not satisfy the required conditions suggested by Edmans et al. (2007).

The results are very similar with the use of GARCH(1,1) model for all of the reported regressions. Specifically, the observed effects remain unchanged at the same significance levels. For the sake of brevity, we do not include the results, however, they are available upon request.

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[2] We also run the same model for some other cities but we don't present all to save space.

Table 2 Air pollution in Istanbul districts and stock market returns (model 2)

	Aksaray	Beşiktaş	Esenler	Kadıköy	Uskudar	Umraniye
Monday	0.00098 (0.0013)	0.00025 (0.0014)	0.00124 (0.0013)	0.001414 (0.00131)	0.00059 (0.0013)	0.00056 (0.0014)
Tuesday	−0.00082 (0.0013)	−0.00013 (0.0014)	−0.000164 (0.0013)	−0.00042 (0.001309)	−0.00016 (0.0013)	0.000035 (0.0014)
Wednesday	−0.0003 (0.0013)	0.0002 (0.0014)	0.000453 (0.0013)	0.00048 (0.00131)	0.00003 (0.0013)	0.00003 (0.0014)
Thursday	−0.0011 (0.00127)	−0.00045 (0.0014)	−0.000192 (0.0013)	−0.00015 (0.00130)	−0.00107 (0.0013)	−0.00082 (0.0014)
Ramadan	−0.00218 (0.00149)	−0.0007 (0.0015)	−0.000264 (0.0015)	−0.00043 (0.00151)	−0.0009 (0.0015)	−0.00183 (0.0015)
January	−0.00112 (0.00147)	−0.00117 (0.0016)	−0.00051 (0.0015)	−0.00116 (0.00148)	−0.0013 (0.0015)	−0.00183 (0.0017)
Rworld	0.77537*** (0.03274)	0.76159*** (0.0332)	0.77231*** (0.0315)	0.76204*** (0.03154)	0.7586*** (0.0318)	0.7901*** (0.0335)
$Rxu100_{t-1}$	0.01897 (0.0226)	0.03755* (0.0232)	0.0237* (0.0222)	0.042171* (0.022)	0.0335* (0.0227)	0.02475** (0.0233)
$Rxu100_{t-2}$	0.04914* (0.0223)	0.0371* (0.0234)	0.0372** (0.0223)	0.045948** (0.022)	0.04086** (0.0229)	0.032 (0.0231)
$Rxu100_{t-3}$	−0.0006 (0.0222)	−0.0245 (0.024)	−0.0179 (0.02235)	−0.0246 (0.022)	−0.0055 (0.023)	−0.0065 (0.0231)
$Rxu100_{t-4}$	−0.0211 (0.0225)	−0.01635 (0.024)	−0.0293 (0.0223)	−0.01561 (0.022)	−0.02342 (0.0231)	−0.01004 (0.0232)
$Rxu100_{t-5}$	−0.00527 (0.02264)	0.03949* (0.0234)	0.02996 (0.0224)	0.03972* (0.022)	0.034 (0.023)	0.03646** (0.0238)
$Pm10gm_t$	−1.46E−06 (0.000017)	0.000013 (0.00002)	−7.50E−06 (0.00001)	−5.19E−06 (0.000014)	−2.57E−06 (0.00002)	7.68E−06 (0.00002)

Pm10gm$_{t-1}$	-0.00003*	-0.00005***	-0.00002*	-0.00002*	-0.00005**	-0.00005**
	(0.000017)	(0.00002)	(0.00001)	(0.000014)	(0.00002)	(0.00002)
Constant	0.00263***	0.00224***	0.0018196**	0.0013087	0.00247**	0.00233**
	(0.00132)	(0.0015)	(0.0012)	(0.00114)	(0.00137)	(0.0013)
Observations	1371	1346	1433	1382	1392	1323
R^2	0.30	0.29	0.30	0.30	0.30	0.31

Note: Standard deviations are stated in parenthesis. *, **, and *** represent 10 %, 5 % and 1 %, significance levels, respectively

[a]For Umraniye district, NO2, instead of PM10, is used due to data availability

Table 3 Air pollution in Izmir and Ankara districts and stock market returns (model 2)

	Izmir Alsancak	Izmir Bornova	Izmir Guzelyali	Izmir Karsiyaka	Ankara Bahcelievler	Ankara Demetevler
Monday	0.00092* (0.00134)	0.00056*** (0.0013)	0.00069 (0.00135)	0.00070* (0.0014)	0.00079 (0.0014)	0.00111 (0.0014)
Tuesday	4.35E−06 (0.00134)	0.00029 (0.0013)	−0.00083 (0.0013)	−0.00029 (0.0014)	0.00143 (0.0014)	0.00034 (0.0014)
Wednesday	−0.0000276 (0.00133)	−0.00009 (0.0013)	−0.0001182 (0.00133)	0.00028 (0.0014)	0.00040 (0.0014)	−0.00006 (0.0014)
Thursday	−0.0006887 (0.00133)	−0.00054 (0.0013)	−0.0010 (0.00132)	−0.00090 (0.0014)	0.00003 (0.0014)	−0.00131 (0.0014)
Ramadan	−0.0005156 (0.0017)	−0.00144 (0.0015)	−0.0013487 (0.00164)	−0.00150 (0.0020)	−0.00018 (0.0018)	0.00037 (0.0018)
January	−0.0005144 (0.0015)	−0.00094 (0.0015)	−0.0013 (0.0015)	−0.00023 (0.0016)	0.00004 (0.0016)	0.00068 (0.0017)
Rworld	0.7769828*** (0.03357)	0.79077*** (0.033)	0.7802*** (0.033)	0.82709*** (0.0372)	0.72597*** (0.0452)	0.75696*** (0.0484)
$Rxu100_{t-1}$	0.0155146* (0.0236)	0.02536 (0.02332)	0.0503* (0.0232)	−0.00667* (0.0253)	−0.03113 (0.0288)	−0.03297* (0.0289)
$Rxu100_{t-2}$	0.0319545* (0.0232)	0.03836** (0.0233)	0.0176 (0.0229)	0.01979 (0.0248)	0.07116** (0.0294)	0.05977** (0.0296)
$Rxu100_{t-3}$	−0.0127724 (0.0232)	0.0088 (0.0232)	−0.01331 (0.0228)	0.01398* (0.0244)	0.03427 (0.0293)	0.00533 (0.0293)
$Rxu100_{t-4}$	−0.0243795 (0.023)	−0.04552** (0.0232)	−0.0123 (0.0227)	−0.02612 (0.0246)	−0.01606 (0.0291)	−0.05172* (0.0288)
$Rxu100_{t-5}$	0.0080458 (0.0234)	0.03954 (0.02336)	0.03177* (0.0231)	0.00400 (0.0247)	0.00215* (0.0292)	−0.01976 (0.029)
$Pm10gm_t$	−4.64E−06 (0.000017)	0.00001 (0.00002)	−4.30E−06 (0.00002)	0.00001 (0.00002)	0.00002 (0.00002)	0.00001 (0.00001)

Pm10gm$_{t-1}$	−0.00004**	−0.00006****	−0.000034**	−0.00006****	−0.00004**	−0.00003**
	(0.000017)	(0.00002)	(0.00002)	(0.00002)	(0.00002)	(0.00001)
Constant	0.0028714**	0.00241***	0.00232**	0.00263**	0.00053*	0.00120**
	(0.0012)	(0.0013)	(0.0012)	(0.0013)	(0.0012)	(0.0012)
Observations	1364	1346	1320	1118	958	924
R^2	0.29	0.29	0.31	0.32	0.22	0.23

Note: Standard deviations are stated in parenthesis. *, **, and *** represent 10 %, 5 % and 1 %, significance levels, respectively

[a]For Umraniye district, NO2, instead of PM10, is used due to data availability

Table 4 Air pollution in some cities in Turkey and stock market returns (model 2)

	Ardahan	Artvin	Erzurum	Siirt	Kastamonu	Isparta	Edirne
Monday	0.00199** (0.0015)	0.00033 (0.0015)	0.00097 (0.0014)	0.00079 (0.0014)	0.00185* (0.0013)	0.00045 (0.0013)	0.00173 (0.0014)
Tuesday	0.00155 (0.0015)	0.00010 (0.0015)	0.00051 (0.0014)	0.00165 (0.0014)	0.00089 (0.0013)	0.00028 (0.0013)	0.00069 (0.0014)
Wednesday	0.00120 (0.0015)	0.00002 (0.0015)	−0.00020 (0.0014)	0.00053 (0.0014)	0.00064 (0.0013)	0.00061 (0.0013)	0.00118 (0.0014)
Thursday	0.00009 (0.0015)	−0.00035 (0.0015)	−0.00095 (0.0014)	−0.00120 (0.0014)	−0.00009 (0.0013)	−0.00051 (0.0013)	0.00006 (0.0014)
Ramadan	−0.00167 (0.0019)	−0.00078 (0.0016)	−0.00057 (0.0015)	−0.00051 (0.0018)	−0.00208 (0.0016)	−0.00093 (0.0016)	−0.00182 (0.0016)
January	−0.00160 (0.0017)	−0.00135 (0.0017)	−0.00006 (0.0017)	0.00078 (0.0017)	−0.00068 (0.0015)	−0.00014 (0.0016)	−0.00119 (0.0017)
Rworld	0.78395*** (0.0357)	0.80385*** (0.0354)	0.75868*** (0.0326)	0.79571*** (0.0460)	0.74988*** (0.0374)	0.77700*** (0.0348)	0.77337*** (0.0345)
$Rxu100_{t-1}$	0.04841** (0.0244)	0.02518* (0.0246)	0.04128* (0.0231)	−0.00853 (0.0272)	0.01634 (0.0243)	0.01782 (0.0238)	0.05697** (0.0243)
$Rxu100_{t-2}$	0.01446 (0.0249)	0.05059** (0.0248)	0.03049* (0.0233)	0.06868** (0.0275)	0.03376** (0.0243)	0.02898 (0.0237)	0.03045 (0.0242)
$Rxu100_{t-3}$	−0.00443 (0.0251)	−0.01030 (0.0247)	−0.01647 (0.0234)	0.04790* (0.0273)	0.02729 (0.0244)	−0.01558 (0.0238)	−0.02352 (0.0241)
$Rxu100_{t-4}$	−0.02265** (0.0250)	−0.00688* (0.0248)	−0.02567 (0.0233)	−0.03597 (0.0273)	−0.01758 (0.0245)	−0.01776 (0.0234)	−0.01594 (0.0238)
$Rxu100_{t-5}$	0.05084 (0.0252)	0.04736 (0.0254)	0.03736* (0.0233)	−0.00359 (0.0279)	0.04775** (0.0243)	0.03781* (0.0239)	0.03074* (0.024)
$Pm10gm_t$	0.00001 (0.00001)	0.00001 (0.00003)	0.00000 (0.00001)	0.00000 (0.00001)	0.00002 (0.00002)	0.00000 (0.00001)	−0.00002 (0.00002)
$Pm10gm_{t-1}$	−0.00001 (0.00001)	−0.00003 (0.00003)	−0.00001 (0.00001)	−0.00001 (0.00001)	−0.00001 (0.00002)	−0.00001 (0.00001)	−0.00001 (0.00002)

Constant	−0.00057	0.00062	0.00064	0.00000	−0.00101	0.00113	0.00207
	(0.0013)	(0.0014)	(0.0011)	(0.0013)	(0.0012)	(0.0012)	(0.0015)
Observations	1195	1125	1316	1023	1254	1346	1240
R^2	0.30	0.32	0.30	0.24	0.25	0.28	0.30

Note: Standard deviations are stated in parenthesis. *, **, and *** represent 10 %, 5 % and 1 %, significance levels, respectively
[a]For Umraniye district, NO2, instead of PM10, is used due to data availability

4   Conclusion

Mood states are shown to play a role in the way people process information and make choices. Following this line of reasoning, finance literature examines how mood variables affect the stock markets. Air pollution is one of the factors which affect people both physiologically and mentally. In this study, we use air pollution as the mood variable and analyze the impact of air pollution on an emerging market namely Borsa Istanbul of Turkey.

In terms of number of investors and account value, Istanbul, Ankara and Izmir dominate Turkey. For those cities, we find a statistically significant and negative relationship between lag of air pollution and stock returns. Considering the air pollution in Istanbul, Ankara, and Izmir, we provide supportive evidence to previous literature on the negative relation between air pollution and stock returns. However, no relationship is documented for air pollution in other cities where only small numbers of investors live.

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