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# Accounting Conservatism and the Cost of Capital: An International Analysis

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**Abstract:** This paper examines the role of conditional accounting conservatism in mitigating the cost of equity and debt capital in an international setting. The findings are that firms domiciled in countries with more conservative financial reporting systems have lower cost of equity and debt capital. The paper further explores the cross-sectional variation of the above relationships, finding that the negative association between conditional conservatism and the cost of equity and debt capital is more pronounced in countries with stronger legal enforcement, suggesting a complementary role between conservatism and legal institutions in capital markets. In addition, the paper finds that conservatism only reduces the cost of debt in countries where accounting-based covenants are widely used, consistent with the argument that conditional conservatism improves the efficiency of debt contracts via accelerating covenant violations.

**Keywords:** cost of equity, cost of debt, conditional conservatism, legal enforcement

## 1. INTRODUCTION

Conditional accounting conservatism is the asymmetric timeliness of earnings in reflecting bad news versus good news (Basu, 1997). Existing literature identifies several benefits associated with conservative financial reporting. Zhang (2008) finds that conditional conservatism increases the efficiency of debt contracting and reduces the cost of debt. LaFond and Watts (2008) and Garcia Lara et al. (2011) find that conditional conservatism reduces information asymmetry and the cost of equity. However, the above findings are limited to firm-level analyses within the US, and it is unclear whether they can be generalized to a country-level analysis using an international setting for several reasons. First, firms domiciled in the same country often comply with the same set of accounting standards and face very similar accounting practices and regulations. The observed variation in firm-level conservatism is likely to be a result of firm choice, i.e., it reflects an individual firm's cost–benefit trade-off for

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conservative financial reporting. Therefore, it is not surprising that the observed firm-level conservatism is associated with net benefits in capital markets. However, at the aggregate level, accounting conservatism is mainly driven by various institutional factors, including legal regime, tax burden, political economy and market forces (e.g., Ball et al., 2003; Bushman and Piotroski, 2006; Ball et al., 2008). At the same time, a country's capital markets are also shaped by its legal institutions (e.g., Hail and Leuz, 2006; La Porta et al., 1998). Therefore, it is unclear whether conditional conservatism could still provide incremental benefits to a country's capital markets beyond its institutional structure. Second, although the firm-level conservatism may reduce an individual firm's risk by lowering its information uncertainty and volatility of stock returns (Garcia Lara et al., 2011), it is uncertain whether conservatism is still a priced risk factor when aggregated at the country level, as firm-level idiosyncratic risk could be diversified away in a large economy. Third, prior studies find that financial reporting only benefits capital markets when combined with proper enforcement (Daske et al., 2008; Christensen et al., 2013). Therefore, it is uncertain whether the negative association between conservatism and the cost of capital documented in countries with relatively strong legal enforcement (e.g., US) could be applied to other countries with lax legal institutions.

To examine the association between conditional accounting conservatism and the cost of capital in an international context, a country–year conservatism measure is constructed using Basu's (1997) model for 35 countries over 1991 to 2007. The cost of equity is measured as the average implied cost of equity extracted from four accounting-based valuation models and the cost of debt as the 1-year-ahead realized interest rate. A country-level regression analysis is conducted based on country–year medians of the cost of equity and debt measures. After controlling for firm risk factors, industry composition and country and year fixed effects, it is found that the conditional conservatism level in a country's accounting system is negatively associated with both the cost of equity and debt capital. One standard deviation increase in conditional conservatism reduces the cost of equity by 47 basis points and reduces the cost of debt by 21 basis points. The above results are robust to additional tests based on firm-level regressions, analyses addressing endogeneity concerns, and analyses using alternative cost of capital measures.

The cross-sectional variation of the above association is also explored by examining the interaction between conditional conservatism and a country's legal institutions. It is expected that conditional conservatism will benefit capital markets more when proper legal enforcement mechanisms are in place. To test the above prediction, the sample countries are divided into two groups based on the strength of legal enforcement, measured by the rule of law index and the creditor rights index. The results show that the negative association between conditional conservatism and the cost of equity is stronger in countries with stronger rule of law and the negative association between conditional conservatism and the cost of debt is stronger in countries with stronger creditor rights.

Lastly, the interaction between the contracting role of conditional conservatism and the usage of accounting covenants is explored. Prior literature suggests that conditional conservatism increases the efficiency of debt contracting by accelerating the violation of accounting-based covenants and transferring control rights from shareholders to creditors (Zhang 2008). However, countries differ substantially in terms of the usage of accounting covenants in debt contracts. Therefore, it is expected that

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the debt-contracting benefits of conditional conservatism will be more pronounced in countries where accounting covenants are widely used. To test the above predictions, the sample countries are divided into two groups based on the usage of accounting covenants and the results show that the negative association between conditional conservatism and the cost of debt is stronger among countries with wider usage of accounting covenants in debt contracts.

This paper makes two contributions to the literature. First, it contributes to the strand of research examining the impacts of accounting on international capital markets. La Porta et al. (1997) and Hail and Leuz (2006) examine the impacts of mandatory accounting standards and disclosure regulations on the performance of a country's equity market. Since mandatory standards and regulations are often obsolete and mainly reflect regulators' preferences and political forces, this paper complements the above studies by focusing on the actual accounting practices, which also reflect the incentives of different market participants and are often up-to-date (e.g., Ball and Shivakumar, 2005; Ball et al., 2003). Bhattacharya et al. (2003) examine how the overall earnings opacity shapes a country's equity market. Francis et al. (2005) examine the impacts of firm-level voluntary disclosures on international debt and equity markets. This paper complements the above studies by focusing on an important earnings attribute – conditional accounting conservatism and its effect on both equity and debt markets.

Second, this paper also adds to the understanding of the general role of accounting. Unlike the findings documented in Francis et al. (2005) that voluntary disclosure incentives operate independently of country characteristics, the findings in this paper suggest that incentives for conservative reporting interact with a country's legal enforcement mechanisms. The evidence that the negative association between conditional conservatism and the cost of capital is more pronounced among countries with stronger legal enforcement suggests a complementary relationship between a country's accounting system and its legal institutions. In addition, the result that conditional conservatism only reduces the cost of debt in countries where accounting-based covenants are widely used supports the contracting role of accounting in an international setting.

The rest of this paper is organized as follows. Section 2 discusses the hypothesis development. Section 3 describes the sample, data and research design. Section 4 presents the empirical results. Section 5 concludes.

## 2. HYPOTHESES DEVELOPMENT AND RELATED LITERATURE

### *(i) Conditional Conservatism and the Cost of Equity*

Shareholders delegate firms' operating decisions to managers and incentivize them through compensation contracts based on a series of performance measures in periodic financial reports. However, due to information asymmetry and imperfect contracting, managers may embellish the reports in favor of themselves. This embellishment can entail recognizing good news early and delaying the recognition of bad news. For example, since compensation packages are usually contracted based on current performance and recouping excessive compensation *ex post* is often costly and difficult, upon receiving good news, managers have incentives to incorporate it

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into current performance measures before the actual realization of cash flows. Once receiving compensation, managers with moral hazard are unlikely to exert effort to further convert good news into cash flows. On the other hand, upon receiving bad news, managers with finite horizons have incentives to delay incorporating it into performance, either in hope of riding the bad news in future periods through undertaking high-risk investments or passing the blame to their successors (Watts, 2003b; Kothari et al., 2010). Requiring managers to recognize bad news earlier than good news curbs their incentives to take action against maximizing shareholders' value. In addition, after receiving timely signals of bad news, shareholders could minimize potential losses by exercising greater oversight or replacing the incapable or self-serving managers. Therefore, conditional conservatism mitigates the agency risk borne by shareholders by reducing the risk of potential investment distortion and manager expropriation (Suijs, 2008; Shuto and Takada, 2010; Garcia Lara et al., 2011).[1] In exchange, shareholders are likely to require a lower risk premium from firms that commit to a conservative financial reporting system.[2] Therefore, I predict a negative association between conditional conservatism and the cost of equity capital.

### *(ii) Conditional Conservatism and the Cost of Debt*

Similar to the shareholder–manager conflict, the agency problem also exists between shareholders and creditors. Due to conflicts of interest, self-serving shareholders may expropriate creditors' value through wealth transfers, such as asset substitution and overpaying dividends. Creditors protect themselves through binding contracts based on a series of performance measures in periodic financial reports. Since creditors bear downside risks but face limited upside potentials, they favor a conservative financial reporting system that recognizes bad news in a timelier manner than good news and minimizes the default risk. For example, by having earnings to recognize bad news earlier than good news, covenants based on earnings numbers become more binding (e.g., Ahmed et al., 2002; Zhang, 2008). In the event of covenant violation, creditors could reduce their default risk by either taking over control of the firm or by exercising greater oversight. In exchange, creditors are likely to require a lower return from borrowers that commit to a conservative financial reporting practice.[3] Due to the limited upside potential of debt claims, creditors have less incentive to require managers to recognize good news in a timely manner, especially when the firm value is far above the face value of the debt. Even if self-interested managers voluntarily disclose good news, such behavior is unlikely to be rewarded by creditors

1 In a theoretic paper, Suijs (2008) finds that asymmetric reporting of good and bad news affects firms' stock prices by influencing the allocation of risks among different generations of investors. By examining the association between asymmetric timelines of earnings and managerial ownership using a sample of Japanese firms, Shuto and Takada (2010) find that conditional conservatism contributes to addressing the agency problem between managers and shareholders. Garcia Lara et al. (2011) find a negative association between firm-level conditional conservatism and excess stock returns using a sample of US firms.

2 See Albuquerque and Wang (2008) for a theoretical model that analyzes how investment distortions due to agency conflicts translate into higher risk premiums. Guay and Verrecchia (2007) argue that conditional conservatism may also reduce the cost of capital by reducing the discount rate that market applies to firm value in the presence of uncertainty.

3 See Dow et al. (2005) for a theoretical model that analyzes how over-investment in a world with agency problems leads to higher corporate bond spreads. Khurana and Wang (2015) argue that by committing to accounting conservatism, borrowers face lower agency costs of debt and thus gain access to long-term debt.

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in contracting.[4] Therefore, I predict a negative association between conditional conservatism and the cost of debt capital.

### *(iii) Legal Institutions, Conditional Conservatism and the Cost of Capital*

The above arguments predict an *average* negative association between conditional conservatism and the cost of capital. There is considerable heterogeneity in the effectiveness of conditional conservatism serving as a governance and contracting mechanism. For example, when managers engage in value-destroying activities, conditional conservatism sends a timely signal to shareholders. However, upon receiving the signal, if outside shareholders cannot take timely actions to stop managers from wrongdoing or if timely intervention is very costly, conditional conservatism is unlikely to be valued by outside shareholders. In addition, if creditors are not well protected in the event of default or if it is costly for the court to enforce the debt contracts, conservative borrowers are less likely to be rewarded by creditors. In other words, the effectiveness of conditional conservatism in reducing the agency cost of equity and debt depends on the strength of shareholder protection and legal enforcement. Consistent with this argument, Daske et al. (2008) and Christensen et al. (2013) document that the positive effects of adopting international accounting standards on equity markets are only limited to countries with strong legal institutions. Therefore, I expect the negative association between conditional conservatism and the cost of capital to be stronger in countries with stronger legal enforcement.

I also expect the association between conservatism and the cost of debt to differ across regimes with different usage of accounting-based covenants in debt contracts. The arguments in section 2(*ii*) suggest that conditional conservatism increases the efficiency of debt contracting by accelerating the violation of accounting-based covenants and transferring control rights from shareholders to creditors. Therefore, the effect of conditional conservatism on the cost of debt is likely to be stronger in countries where accounting-based covenants are more widely used.

## 3. DATA AND RESEARCH DESIGN

### *(i) Measure of Conditional Conservatism*

Separately for each country and year, this paper uses Basu's (1997) piecewise-linear regression model of accounting income on stock returns to measure conditional conservatism at the country-year level:

$$NI_t = \beta_0 + \beta_1 DR_t + \beta_2 R_t + \beta_3 DR_t \times R_t. \quad (1)$$

The data are obtained from Compustat Global and Compustat North America. In equation (1), $NI_t$ is net income before extraordinary items (Item *ib*) at year $t$ deflated by the market value of equity at the beginning of the year, $R_t$ is the annual

4 Guay and Verrecchia (2006) argue that the contracting benefits of conditional conservatism do not exist if firms write contracts in a way to account for the expected bias in financial reporting. However, Beatty et al. (2008) find that firm-specific modifications of debt contracts do not entirely replace lenders' demand for conditional conservatism in financial reporting. Therefore, conditional conservatism still has a comparative advantage in satisfying lenders' demand for timely signals about bad news.

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buy-and-hold return with a 3-month lag at year $t$, and $DR_t$ is a dummy variable equal to 1 if $R_t$ is negative, and 0 otherwise. $\beta_3$ thus measures the incremental timeliness of earnings reflecting bad news versus good news, or the conditional accounting conservatism. To obtain an aggregate measure of conservatism for each country–year, the above regression uses all firms with available data on earnings and stock returns in a country–year. However, this is empirically challenging as certain countries have a small number of firms. Therefore, to enlarge the sample size and obtain more reliable regression coefficients, the observations from the past six years (i.e., from $t$–5 to $t$) are included in a country to run a rolling-window regression.[5]

A country-level measure for conservatism is used, as theories suggest that the benefits of conditional conservatism come from managers' *commitment* to conservative reporting in the future (e.g., Watts and Zimmerman, 1986; Watts, 2003a) and the country-level measure is better at capturing such commitment than firm-level measures for several reasons. First, current empirical measures for conditional conservatism are estimated using historical information and researchers have to assume that the current conditional conservatism level reflects managers' commitment to future conservative reporting (e.g., Zhang, 2008). However, in practice, it is difficult for an individual firm to make a credible commitment to investors. At the country level, such commitment is more credible, as a country's conditional conservatism level is largely determined by mandatory accounting standards across regimes.[6] For example, in the analytical model developed by Chen et al. (2007), although firms are unable to credibly commit to not managing earnings, conservative accounting standards could alleviate rational yet dysfunctional unobservable earnings manipulation. Second, when aggregated at the country level, firm-level deviations from the commitment to conditional conservatism are likely to be diversified away (Bushman et al., 2011). Third, a country's conditional conservatism level is also shaped by relatively static institutional structures, such as the legal systems, securities laws, political economy and tax regime (e.g., Ball et al., 2003; Bushman and Piotroski, 2006). Therefore, the current conditional conservatism level is an equilibrium outcome balancing the needs from various incentive sources and is unlikely to change in the short run. The conservatism measure is allowed to change overtime to take into account the changes in mandatory accounting standards during the sample period, e.g., the mandatory adoption of International Financial Reporting Standards (IFRS) in the European Union in 2005, which could potentially affect the conservatism level.

While recent literature has debated the reliability of Basu's (1997) model to measure conditional conservatism (Dietrich et al., 2007; Givoly et al., 2007; Patatoukas and Thomas, 2011, 2015; Ball et al., 2013; Cano-Rodriguez and Nunez-Nickel, 2015), it is used as the empirical measure in this paper for several reasons. First, the majority of existing literature examining cross-country variations of conditional conservatism relies on this measure.[7] Using a measure consistent with prior studies provides a better comparison of results. Second, in response to the criticism of Basu's (1997) measure,

5 Results are qualitatively similar if different regression windows are used.

6 The findings that accounting conservatism increases after firms adopt international accounting standards (IAS) indicate that conditional conservatism is at least partially determined by mandatory accounting standards (e.g., Hung and Subramanyam, 2007; Barth et al., 2008).

7 A non-exhaustive list of extant studies using Basu's model to measure conservatism at the country level includes: Pope and Walker (1999), Ball et al. (2000), Ball et al. (2003), Bushman and Piotroski (2006), Ball et al. (2008), Giner and Rees (2001), Raonic et al. (2004), García Lara and Mora (2004), and García Lara et al. (2005).

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Ball et al. (2013) argue that the bias in Basu's regression coefficients is caused by the lack of control for the expected components of earnings and returns rather than the sample truncation suggested by Dietrich et al. (2007) and Patatoukas and Thomas (2011). Ball et al. (2013, pp. 785) further point out that Basu's original regression without controls for expected components remains well-specified in settings where the research objective is to examine the contracting role of conservatism.[8] Third, when $\beta_3$ is measured at the country level, the estimation bias caused by firm-specific characters could be mitigated. To the extent that the estimation bias is country- or year-specific and is caused by factors potentially correlated with the cost of capital, such concern is mitigated by having country fixed effects and year fixed effects in the regression models.

### *(ii) Measures for the Cost of Capital*

#### (a) Cost of Equity

The internal rates of return implied from accounting-based valuation models are used as the primary measure for the expected cost of equity. Four different models are adopted as suggested by Claus and Thomas (2001), Gebhardt et al. (2001), Ohlson and Juettner-Nauroth (2005) and Easton (2004). A detailed description and an empirical implementation of these models can be found in the Appendix. To mitigate biases and measurement errors existing in each model, the average of estimates from these four models are used as the proxy for the cost of equity.[9] The firm-level financial and stock price data are again obtained from Compustat Global and Compustat North America. The data on inflation and exchange rates are obtained from Compustat Global Economy and Currency files, respectively. Analyst forecast and actual EPS data are obtained from I/B/E/S Unadjusted Summary and Actual files.

All the data items are converted into US dollars before estimating the returns. Since these measures are estimated using expected future earnings, they are treated as expected future cost of equity. To control for time-series variation in the risk-free rate, the 1-year ahead 90-day US Treasury Bill return as obtained from CRSP US Treasury and Inflation monthly file is subtracted to construct the final cost of equity measure $R_{Et+1}$ used in the regressions.[10] In other words, $R_{Et+1}$ measures the expected equity risk premium for each country–year. One potential problem with using the implied cost of equity in this paper is its negative correlation with conditional conservatism by construction. This issue is addressed in detail in the robustness analysis in section 4(*ii*).

#### (b) Cost of Debt

Consistent with previous literature, the 1-year ahead average interest rate a firm pays for its debt outstanding is used as the primary measure for the expected cost of debt

8 In a recent working paper, Patatoukas and Thomas (2015) refute Ball, Kothari, and Nikolaev's (2013) defense for Basu's measure. However, Patatoukas and Thomas (2015) fail to provide any empirical fix for this problem.

9 This approach is becoming more common in the accounting literature. See for example, Hail and Leuz (2006), Daske et al. (2008, 2013) and Blanco et al. (2015).

10 This approach assumes that exchange rates reflect inflation differences across countries and is widely used in international studies on the cost of capital (e.g., Harvey, 1995; Bekaert and Harvey, 2000).

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(e.g., Zhang, 2008; Beatty et al., 2008). The debt and interest information is obtained from Compustat Global and Compustat North America. Interest rate is calculated as the ratio of a firm's interest expenses (Item *xint*) to the average interest-bearing debt outstanding (Item *dltt* + Item *dlc*). This measure captures the average cost of borrowing for both public and private debt. All the data items are converted into US dollars before calculating the ratio.To control for time-series variation in the risk-free rate, the 1-year ahead 90-day US Treasury Bill return is subtracted to calculate the final cost of debt measure $R_{Dt+1}$ used in the regressions.[11] In other words, $R_{Dt+1}$ measures the expected debt risk premium for each country–year. Using interest rate to measure the agency cost of debt implicitly assumes that creditors are unlikely to use other debt contracting terms, such as larger lending amount, longer maturity or less binding covenants, to reward conservative borrowers. However, the above assumption could be violated in practice. For example, Beatty et al. (2008) examine a sample of private lending contracts and find that higher conditional conservatism is associated with a lower probability of having an income escalator in debt contracts after controlling for the interest rate. Also, Gigler et al. (2009) argue that the optimal debt contract is simultaneously determined by the specification of a covenant and an interest rate negotiated *ex ante* between the lenders and borrowers. However, the possibility that creditors may adjust other contracting terms rather than lowering the interest rate for conservative borrowers is working against finding a negative association between the interest rate and conditional conservatism. Nevertheless, this issue is further addressed by using a sample of public bond issuances in the robustness analysis at section 4(*ii*).

### *(iii) Sample Selection*

The following data selection procedure is first used to construct the sample for estimating the country–year conservatism measure: 1) information is first obtained for all public firms from 1991 to 2007.[12] Stocks that are traded outside the country of incorporation are eliminated, as cross-listed firms are likely to face different incentives as well as different financial reporting requirements;[13] 2) non-missing data are required for all variables used in equation (1); 3) observations in the top and bottom percentiles for earnings and returns variables are deleted; (4) To estimate each country–year conservatism measure, data from the past 6 years are used and at least 400 observations are needed to run the regression.

For the country–years with valid conservatism measure, the following procedures to construct the cost of equity and debt samples are used: 1) For cost of equity sample, sufficient data are required to estimate implied cost of equity models and the estimated measures must be within the range 0 to 1; 2) For cost of debt sample, the cost of debt measures must be within the range 0 to 1;[14] 3) financial industries (SIC 6000–6999) are excluded from both samples due to their different nature of

11 This approach is consistent with prior literature measuring the cost of debt (e.g., Zhang, 2008).
12 Years after 2007 are excluded to avoid the financial crisis period.
13 For example, existing literature shows that firms cross-listed in the US are likely to face different financial reporting practices and therefore have different cost of capital (e.g., Fernandes and Ferreira, 2008; Ball et al., 2013).
14 Note that although the raw cost of capital measures needs to be between 0 and 1, since their risk premium (net of risk-free rate) is used in the regressions, their values could be negative.

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business and industry-specific regulations;[15] 4) non-missing values for all variables used in respective regressions are required; (5) Since the main analysis is based on country-level regressions, at least five observations per country–year in both samples are necessary to have sufficient data to calculate country–year medians.

The final sample consists of 349 country–year observations covering 35 countries over 1991 to 2007. Table 1, Panel A reports the conservatism measure $\beta_3$ and the cost of capital measures averaged across the sample period for each country and Panel B reports the measures averaged across all sample countries for each fiscal year. Panel B suggests an upward trend in conditional conservatism around the world during the sample period, in line with the trend observed in the US (Givoly and Hayn, 2000).

## 4. EMPIRICAL RESULTS

### *(i) Conditional Conservatism and the Cost of Capital*

#### (a) Conservatism and the Cost of Equity

The following regression model is used to estimate the impacts of conditional conservatism on the cost of equity capital:

$$\begin{aligned} R_{Et+1} = {} & \alpha_1\beta_{3t} + \alpha_2 Size_t + \alpha_3 MTB_t + \alpha_4 Leverage_t + \alpha_5 ROA_t \\ & + \alpha_6 Earn\ Vol_t + \alpha_7 Ret\ Vol_t + \alpha_8 For\ Bias_{t+1} \\ & + Industry\ controls + Country\ fixed\ effects + Year fixed\ effects, \end{aligned} \tag{2}$$

where $\beta_{3t}$ is the country–year conservatism measure for year $t$ estimated from equation (1) and $R_{Et+1}$ is the cost of equity capital measure described in section 3(*ii*). The regression controls for firm-specific risk factors, including firm size (*Size*), market-to-book ratio (*MTB*), leverage ratio (*Leverage*), and return volatility (*RetVol*).[16] Firm size is the natural log of a firm's total assets at the fiscal year end. Market-to-book ratio is calculated as the market value of equity at the fiscal year end divided by the book equity value. Leverage ratio is calculated as the total debt divided by total assets. Return volatility is measured as the standard deviation of annual buy-and-hold return over the last 5 years with at least 3 years' observations required. Market-to-book ratio also controls for the differences in accounting rules and the unconditional form of conditional conservatism across countries. Earnings volatility (*EarnVol*) is measured as the standard deviation of annual earnings divided by total assets over the past 5 years, to control for the volatility of business and the variability of macroeconomy (Hail and Leuz, 2006; Francis et al., 2005). Return on assets (*ROA*) is measured as operating income divided by total assets, and is used to control for profitability. Analyst forecast bias, measured as 1-year-ahead analyst forecast minus the actual EPS scaled by the absolute value of actual EPS, is used to control for international differences in analysts' forecasting biases. Also included are country fixed effects and year fixed

15 Note that financial firms are initially included in the regressions to estimate the country-level conservatism measure. However, excluding these firms from the sample does not change the results.

16 Return volatility is used instead of beta because: 1) the estimation of beta requires a choice of market portfolio, which is a common difficulty in international studies; and 2) the estimation accuracy depends on the level of market integration (Hail and Leuz, 2006).

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**Table 1**

Sample Composition and Summary Statistics by Country and Year

**Panel A: Summary Statistics of Conditional Conservatism and the Cost of Capital Measures by Country**

| | | | *Cost of Equity* | | | *Cost of Debt* | | |
|---|---|---|---|---|---|---|---|---|
| *Country name* | *#Country–years* | $\beta_3$ | *#Firm–years* | $R_{Et+1}$ | $Ret_{t+1}$ | *#Firm–years* | $R_{Dt+1}$ | *Bond Spread*$_{t+1}$ |
| Australia | 15 | 0.390 | 2,730 | 7.68% | 2.51% | 5,090 | 3.91% | 1.46% |
| Belgium | 9 | 0.346 | 457 | 9.33% | 3.39% | 650 | 2.86% | 0.60% |
| Brazil | 7 | 0.094 | 441 | 7.05% | 7.08% | 694 | 10.67% | 5.93% |
| Canada | 15 | 0.354 | 2,698 | 9.83% | 3.48% | 4,435 | 3.32% | 1.74% |
| Chile | 6 | 0.078 | 110 | 7.73% | 1.70% | 212 | 2.64% | 0.05% |
| China | 6 | 0.062 | 1,505 | 9.91% | 5.85% | 4,237 | 3.09% | 1.39% |
| Denmark | 9 | 0.256 | 491 | 10.69% | 3.61% | 685 | 3.00% | 1.06% |
| Finland | 7 | 0.289 | 553 | 11.35% | 2.76% | 695 | 2.95% | 0.49% |
| France | 16 | 0.324 | 3,398 | 6.92% | 2.28% | 5,397 | 2.40% | 0.36% |
| Germany | 16 | 0.305 | 3,161 | 8.93% | 1.90% | 5,239 | 4.67% | 0.66% |
| Greece | 6 | 0.121 | 296 | 10.71% | 4.97% | 503 | 2.63% | 0.69% |
| Hong Kong | 11 | 0.515 | 504 | 8.67% | 3.60% | 1,158 | 2.44% | 1.00% |
| India | 7 | 0.781 | 871 | 11.91% | 5.10% | 3,263 | 5.82% | 5.77% |
| Indonesia | 9 | 0.749 | 387 | 13.76% | 5.21% | 1,308 | 5.30% | 9.92% |
| Israel | 2 | 0.226 | 29 | 7.79% | 4.56% | 89 | 3.03% | n.a. |
| Italy | 12 | 0.293 | 1,069 | 7.73% | 1.41% | 1,674 | 2.41% | 1.25% |
| Japan | 17 | 0.080 | 10,571 | 5.69% | 3.44% | 24,630 | –1.11% | –2.86% |
| Malaysia | 14 | 0.153 | 1,807 | 8.36% | 1.48% | 5,668 | 2.42% | –3.16% |
| Netherlands | 13 | 0.238 | 1,070 | 8.96% | 2.39% | 1,259 | 3.08% | 0.31% |
| New Zealand | 5 | 0.305 | 227 | 6.81% | 2.76% | 317 | 5.25% | 3.77% |
| Norway | 8 | 0.539 | 592 | 14.04% | 5.82% | 733 | 3.96% | 5.04% |
| Pakistan | 3 | 0.033 | 21 | 6.03% | 1.97% | 303 | 5.08% | n.a. |
| Philippines | 8 | 0.748 | 136 | 12.38% | 3.99% | 523 | 6.89% | 7.94% |
| Poland | 4 | 0.391 | 110 | 7.73% | 1.85% | 449 | 3.00% | n.a. |
| Singapore | 13 | 0.185 | 1,215 | 9.76% | 2.11% | 3,282 | 1.28% | –0.60% |
| South Africa | 11 | 0.122 | 783 | 11.25% | 4.39% | 1,290 | 9.41% | 8.07% |
| South Korea | 11 | 0.596 | 569 | 14.23% | 5.25% | 2,953 | 4.50% | 2.88% |
| Spain | 11 | 0.264 | 756 | 7.46% | 2.14% | 955 | 2.71% | 0.07% |
| Sweden | 11 | 0.376 | 1,223 | 9.38% | 4.13% | 1,763 | 3.04% | 0.40% |
| Switzerland | 12 | 0.296 | 1,229 | 8.61% | 2.02% | 1,637 | 1.59% | –1.44% |
| Taiwan | 7 | 0.243 | 906 | 9.76% | 4.73% | 3,932 | 0.65% | –1.59% |
| Thailand | 11 | 0.366 | 797 | 11.72% | 2.25% | 2,260 | 2.79% | 2.09% |
| Turkey | 3 | -0.049 | 100 | 12.37% | 3.48% | 195 | 6.13% | n.a. |
| UK | 17 | 0.244 | 8,104 | 8.09% | 2.34% | 12,865 | 4.04% | 1.21% |
| US | 17 | 0.504 | 36,484 | 7.28% | 4.64% | 60,879 | 4.01% | 1.29% |
| Total | 349 | | 85,400 | | | 161,222 | | |

**Panel B: Summary Statistics of Conditional Conservatism and the Cost of Capital Measures by Year**

| | | | *Cost of Equity* | | *Cost of Debt* | |
|---|---|---|---|---|---|---|
| *Year* | *# Countries* | $\beta_3$ | $R_{Et+1}$ | $Ret_{t+1}$ | $R_{Dt+1}$ | *Bond Spread*$_{t+1}$ |
| 1991 | 3 | 0.202 | 6.45% | 6.90% | 4.40% | 0.79% |
| 1992 | 5 | 0.179 | 7.01% | 3.62% | 5.30% | 0.63% |

(*Continued*)

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**Table 1**
Continued

**Panel B: Summary Statistics of Conditional Conservatism and the Cost of Capital Measures by Year**

| | | | *Cost of Equity* | | *Cost of Debt* | |
|---|---|---|---|---|---|---|
| *Year* | *# Countries* | $\beta_3$ | $R_{Et+1}$ | $Ret_{t+1}$ | $R_{Dt+1}$ | *Bond Spread*$_{t+1}$ |
| 1993 | 7 | 0.292 | 6.26% | 1.37% | 3.93% | 0.37% |
| 1994 | 8 | 0.235 | 4.30% | –1.19% | 2.21% | 0.32% |
| 1995 | 10 | 0.254 | 3.07% | –1.29% | 1.79% | –1.14% |
| 1996 | 12 | 0.285 | 4.62% | –0.54% | 1.40% | –0.83% |
| 1997 | 18 | 0.276 | 6.32% | 2.63% | 3.18% | 1.07% |
| 1998 | 18 | 0.220 | 5.39% | 3.68% | 2.42% | 0.13% |
| 1999 | 21 | 0.298 | 6.85% | 1.77% | 1.44% | 0.67% |
| 2000 | 23 | 0.310 | 12.41% | 2.57% | 2.82% | 1.75% |
| 2001 | 27 | 0.298 | 15.39% | 4.26% | 5.50% | 2.34% |
| 2002 | 30 | 0.342 | 11.84% | 6.82% | 5.64% | 2.18% |
| 2003 | 31 | 0.399 | 10.33% | 4.82% | 5.05% | 2.15% |
| 2004 | 32 | 0.381 | 9.58% | 3.22% | 3.22% | 0.91% |
| 2005 | 34 | 0.344 | 8.06% | 0.93% | 2.24% | 0.67% |
| 2006 | 35 | 0.364 | 5.14% | 0.82% | 2.19% | 0.77% |
| 2007 | 35 | 0.315 | 14.62% | 8.00% | 4.64% | 2.78% |

*Notes:*
Conditional conservatism is measured using $\beta_3$, a country–year specific regression coefficient estimated from Basu's (1997) model using panel data from the past 6 years. $R_{Et+1}$ and $Ret_{t+1}$ measure the cost of equity capital and $R_{Dt+1}$ and *Bond Spread*$_{t+1}$ measure the cost of debt capital. $R_{Et+1}$ is the average of implied cost of equity estimated from four models described in the Appendix minus the contemporaneous risk-free rate. $Ret_{t+1}$ is the 1-year-ahead realized buy-and-hold stock return minus the risk-free rate. $R_{Dt+1}$ is the 1-year-ahead interest expense divided by average debt outstanding minus the risk-free rate. *Bond Spread*$_{t+1}$ is the yield-to-maturity of new bonds issued 1 year ahead minus the risk-free rate. In the country-level regressions, all cost of capital measures are computed at country–year medians. Panels A and B report the sample average of $\beta_3$ and the cost of capital measures used in the country-level regressions by country and fiscal year, respectively. Panel A also reports the number of firm–years used in the firm-level regressions on $R_{Et+1}$ and $R_{Dt+1}$.

effects to control for unobservable country-specific and year-specific factors that might influence both conditional conservatism and the cost of equity measure. Following Hail and Leuz (2006), the model controls for industry composition, measured as the percentage of firms in each of the nine industry classes (one-digit SIC code excluding financial industry) by country–year.

The main analysis is conducted at the country-level, where the country–year medians are used to compute the cost of equity measure $R_{Et+1}$ and firm-level control variables. The standard errors of regression coefficients are clustered at the country level to correct for country-specific autocorrelation. One disadvantage with the country-level analysis is the loss of firm-specific information during the aggregation process. To address this issue, the analysis is also conducted at the firm level, where all firm-level regression variables are winsorized at the top and bottom one percentage levels and the standard errors are clustered at the firm level.

Table 2 reports the descriptive statistics for the country-level regression variables. The sample represents large and highly profitable firms. On average, analyst forecasts are upward biased. The regression results of equation (2) are reported in Table 3, Panel A. The coefficients on $\beta_3$ are negative and significant at conventional levels for

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**Table 2**

Descriptive Statistics of Regression Variables

| | *Cost of Equity* | | | | | | *Cost of Debt* | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *N* | *Mean* | *Std Dev* | *Q1* | *Median* | *Q3* | *N* | *Mean* | *Std Dev* | *Q1* | *Median* | *Q3* |
| $\beta_3$ | 349 | 0.321 | 0.236 | 0.153 | 0.294 | 0.421 | 349 | 0.321 | 0.236 | 0.153 | 0.294 | 0.421 |
| $R_{Et+1}$ | 349 | 9.23% | 4.72% | 5.61% | 8.79% | 12.11% | | | | | | |
| $R_{Dt+1}$ | | | | | | | 349 | 3.46% | 2.72% | 1.65% | 3.26% | 4.85% |
| *Size* | 349 | 6.429 | 1.729 | 5.139 | 6.093 | 7.403 | 349 | 5.637 | 1.935 | 4.284 | 5.497 | 6.844 |
| *MTB* | 349 | 2.596 | 2.610 | 1.182 | 1.898 | 2.984 | 349 | 2.358 | 6.218 | 0.894 | 1.431 | 2.232 |
| *Leverage* | 349 | 0.151 | 0.135 | 0.036 | 0.122 | 0.238 | 349 | 0.163 | 0.135 | 0.054 | 0.146 | 0.240 |
| *EarnVol* | 349 | 0.044 | 0.076 | 0.013 | 0.024 | 0.045 | 349 | 0.067 | 0.141 | 0.015 | 0.033 | 0.065 |
| *ROA* | 349 | 0.136 | 0.077 | 0.090 | 0.126 | 0.180 | 349 | 0.101 | 0.092 | 0.057 | 0.106 | 0.149 |
| *RetVol* | 349 | 0.115 | 0.076 | 0.069 | 0.094 | 0.137 | | | | | | |
| *ForBias* | 349 | 0.336 | 1.446 | −0.100 | 0.019 | 0.198 | | | | | | |
| *IntCov* | | | | | | | 349 | 9.725 | 37.367 | 1.120 | 3.428 | 7.051 |
| *Tangibility* | | | | | | | 349 | 0.361 | 0.221 | 0.174 | 0.339 | 0.519 |

*Notes:*

This table presents the descriptive statistics of variables used in country-level regressions. $\beta_3$, $R_{Et+1}$, and $R_{Dt+1}$ are as defined in Table 1 and computed at country–year medians. *Size* is natural logarithm of total assets (in million dollars). *MTB* is the MTB ratio, defined as market value of equity divided by book equity value. *Leverage* is defined as total debt divided by total assets. *EarnVol* is earnings volatility, defined as the standard deviation of earnings divided by total assets of the past 5 years. *ROA* is defined as operating income before depreciation divided by total assets. *RetVol* is stock return volatility, defined as the standard deviation of annual stock returns over the past 5 years. *ForBias* is forecasting bias, defined as the 1-year-ahead analyst forecast EPS minus the actual value of EPS scaled by the absolute value of the actual EPS. *IntCov* is interest coverage ratio, defined as the operating income after depreciation divided by interest expense. *Tangibility* is the net property, plants and equipment divided by total assets.

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**Table 3**

Regression Results of the Cost of Capital on Conditional Conservatism

| | | **Panel A: Cost of Equity: $R_{Et+1}$** | | | | **Panel B: Cost of Debt: $R_{Dt+1}$** | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | *Country-level* | | *Firm-level* | | *Country-level* | | *Firm-level* | |
| | *Pred.Sign* | *Coef.* | *p-value* | *Coef.* | *p-value* | *Coef.* | *p-value* | *Coef.* | *p-value* |
| $\beta_3$ | – | –0.020* | (0.07) | –0.024*** | (0.00) | –0.009* | (0.08) | –0.008*** | (0.00) |
| *Size* | – | –0.003*** | (0.01) | –0.011*** | (0.00) | 0.000 | (0.41) | –0.004*** | (0.00) |
| *MTB* | – | –0.004*** | (0.01) | –0.003*** | (0.00) | 0.000 | (0.23) | 0.000 | (0.23) |
| *Leverage* | + | 0.030*** | (0.01) | 0.067*** | (0.00) | 0.011* | (0.09) | –0.045*** | (0.00) |
| *EarnVol* | + | 0.029 | (0.13) | 0.054*** | (0.00) | 0.003 | (0.32) | 0.020*** | (0.00) |
| *ROA* | – | 0.078*** | (0.01) | –0.165*** | (0.00) | –0.010 | (0.23) | –0.049*** | (0.00) |
| *RetVol* | + | 0.068** | (0.02) | 0.144*** | (0.00) | | | | |
| *ForBias* | + | 0.001 | (0.28) | 0.005*** | (0.00) | | | | |
| *IntCov* | – | | | | | 0.000 | (0.40) | 0.000*** | (0.00) |
| *Tangibility* | – | | | | | –0.007*** | (0.00) | –0.011*** | (0.00) |
| Industry controls | | Yes | | Yes | | Yes | | Yes | |
| Fixed effects | | Country & Year | | | | Country & Year | | | |
| # Countries | | 35 | | 35 | | 35 | | 35 | |
| Sample period | | 1991–2007 | | 1991–2007 | | 1991–2007 | | 1991–2007 | |
| Adj-$R^2$ | | 76.3% | | 36.4% | | 87.8% | | 22.8% | |
| N | | 349 | | 85,400 | | 349 | | 161,222 | |

*Notes:*

This table presents the country- and firm-level regression results on $R_{Et+1}$ and $R_{Dt+1}$. $R_{Et+1}$ is the average of implied cost of equity estimated from four models described in the Appendix minus the contemporaneous risk-free rate. $R_{Dt+1}$ is the 1-year-ahead interest expense divided by average debt outstanding minus the risk-free rate. $\beta_3$ is a country-year specific regression coefficient estimated from Basu's (1997) model using panel data from the past 6 years. For country-level regressions, country–year medians of $R_{Et+1}$, $R_{Dt+1}$, and firm-level controls are used and standard errors are clustered at the country level. For firm-level regressions, firm–year specific $R_{Et+1}$, $R_{Dt+1}$, and firm-level controls are used and standard errors are clustered at the firm level. Country fixed effects, fiscal year fixed effects, and industry controls are included in all regressions. Industry controls are defined as the percentage of firms in each of the nine industry classes (one-digit SIC excluding financial industry) by country and year. Their coefficients are omitted for brevity. See Table 2 for variable definitions on firm-specific controls. This table also reports *p*-values in parentheses (one-tailed for coefficients with predicted signs and two-tailed otherwise). *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

both country- and firm-level regressions. A coefficient of –0.020 indicates that, holding other things equal, one standard deviation increase of conditional conservatism reduces the cost of equity by 47 basis points. The coefficients on control variables are generally consistent with prior literature (Hail and Leuz, 2006): large and high-growth firms have lower cost of equity, while highly levered and highly volatile firms have higher cost of equity. In addition, in firm-level regressions, forecasting bias is positively associated with the cost of equity measure and firm profitability reduces the cost of capital.[17]

(b) Conservatism and the Cost of Debt

The following regression model is used to estimate the impacts of conditional conservatism on the cost of debt capital:

$$\begin{aligned} R_{Dt+1} = {} & \alpha_1 \beta_{3t} + \alpha_2 Size_t + \alpha_3 MTB_t + \alpha_4 Leverage_t \\ & + \alpha_5 ROA_t + \alpha_6 Earn\,Vol_t + \alpha_7 Int\,Cov_t + \alpha_8 Tangibility_t \\ & + Industry\ controls + Country\ fixed\ effects + Year\ fixed\ effects, \end{aligned} \tag{3}$$

where $\beta_{3t}$ is the country–year conservatism measure for year $t$ estimated from equation (1) and $R_{Dt+1}$ is the 1-year ahead cost of debt capital measure described in section 3(*ii*). Besides including firm size, market-to-book ratio, leverage, ROA and earnings volatility as firm-specific controls for risk, the interest coverage ratio (*IntCov*) and the tangible ratio (*Tangibility*) are also included. The interest coverage ratio is measured as the operating income after depreciation divided by interest expenses, and the tangible ratio is measured as net property, plant, and equipment divided by total assets, as additional controls for default risk. Similarly, industry composition, country fixed effects and year fixed effects are controlled for. The country–year medians of the cost of debt measure and firm-level control variables are used for the country-level regressions and standard errors are clustered at the country level. All firm-level regression variables are winsorized at the top and bottom one percentage levels and the standard errors are clustered at the firm level for firm-level regressions.

Table 2 reports the descriptive statistics for the regression variables. Compared with the cost of equity sample, the cost of debt sample consists of smaller and less profitable firms. The regression results are reported in Table 3, Panel B. The coefficients on $\beta_3$ are negative and significant at conventional levels for both country- and firm-level regressions. A coefficient of –0.009 indicates that, holding other things equal, one standard deviation increase of conditional conservatism reduces the cost of debt by 21 basis points. The coefficients on control variables suggest that small size, highly volatile and highly levered firms face higher default risk and therefore bear higher cost of debt. On the other hand, firms with high tangibility and profitability have lower cost of debt.[18]

17 The negative coefficient on ROA in the country-level regression suggests that country-level profitability increases the cost of equity.

18 The negative coefficient on *Leverage* at the firm-level regression could be due to the mechanical negative relationship between the cost of debt and leverage measures. The positive coefficient on *Interest Coverage* could be due to the high correlation between ROA and interest coverage ratio at the firm level.

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*(ii) Robustness Analysis*

This section contains a battery of robustness analyses. First, the endogeneity issue is addressed. Then, alternative proxies are used to measure the cost of equity and debt capital.

(a) Endogeneity Issue

Although in equations (2) and (3), the 1-year ahead cost of capital measures are regressed on current year's conservatism measures estimated using the past 6 years' earnings and stock return data, the analysis using a level specification is still subject to endogeneity concern. In this section, this issue is addressed further in two ways. First, if some unobserved institutional factors influence both current-year conservatism and cost of capital, they might also influence future cost of capital. Therefore, I include the current-year cost of capital measures as separate independent variables in the regressions to control for correlated-omitted variables (Wooldridge, 2000). Second, the 1-year ahead change of cost of capital is regressed on the change of conditional conservatism. The change specification could also mitigate the effect from relatively static omitted variables (Garcia Lara et al., 2014). Table 4 reports the results from the above specifications. The positive coefficient on the lagged cost of capital measure suggests that the cost of capital measures are auto-correlated. Nevertheless, the coefficients on $\beta_{3t}$ continue to be negative and significant. The negative coefficients on $(\beta_{3t} - \beta_{3t-1})$ in the change regressions suggest that although a country's conditional conservatism level is very stable over time (with an autocorrelation coefficient of 85%), there is still evidence suggesting that an increase in current-year conditional conservatism leads to a lower cost of capital in the next period.

(b) Alternative Measure for the Cost of Equity

Although implied cost of equity models has been widely applied in the accounting literature, several papers criticize using accounting-based proxies imputed from prices and contemporaneous analysts' earnings forecasts to measure the expected returns. For example, Easton and Monahan (2005) find that these proxies are unreliable and none of them has a positive association with the realized returns even after controlling for changes in expectations about future cash flows and future discount rates. Guay et al. (2011) find that as analysts do not incorporate information in stock prices in a timely manner, sluggish analyst forecasts usually result in downward (upward) bias in the cost of equity estimates following large positive (negative) stock returns. As the analyses in this paper are based on country-level variables, the above problem is less severe and could be mitigated by controlling for analyst forecasting bias in the regressions.

Another potential concern with the cost of equity measures estimated from analyst-based accounting models is their correlation with conditional conservatism by construction. For example, Hail and Leuz (2006) argue that firms from countries with more conservative accounting systems may exhibit higher growth rate in residual income after the explicit forecast horizon because accounting earnings have to catch up with economic earnings. Therefore, assuming a similar growth rate (usually the inflation rate) across different regimes is likely to underestimate the terminal value

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**Table 4**
Regression Results Dealing with Endogeneity

| | | Panel A: Cost of Equity | | | | Panel B: Cost of Debt | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | $R_{Et+1}$ | | $R_{Et+1}-R_{Et}$ | | $R_{Dt+1}$ | | $R_{Dt+1}-R_{Dt}$ | |
| | *Pred.Sign* | *Coef.* | *p-value* | *Coef.* | *p-value* | *Coef.* | *p-value* | *Coef.* | *p-value* |
| $\beta_{3t}$ | – | –0.021** | (0.03) | | | –0.009* | (0.07) | | |
| $\beta_{3t}-\beta_{3t-1}$ | – | | | –0.025** | (0.05) | | | –0.006* | (0.06) |
| $R_{Et}$ | + | 0.074*** | (0.00) | | | | | | |
| $R_{Dt}$ | + | | | | | 0.056** | (0.02) | | |
| Firm controls | | Yes | | Yes | | Yes | | Yes | |
| Industry controls | | Yes | | Yes | | Yes | | Yes | |
| Fixed effects | | Country & Year | | | | Country & Year | | | |
| # Countries | | 35 | | 35 | | 35 | | 35 | |
| Sample period | | 1992–2007 | | 1992–2007 | | 1992–2007 | | 1992–2007 | |
| Adj-$R^2$ | | 79.7% | | 78.3% | | 90.1% | | 82.6% | |
| N | | 345 | | 314 | | 346 | | 314 | |

*Notes:*
This table presents the country-level regression results. $R_{Et+1}$ and $R_{Dt+1}$ are as defined in Table 1. $R_{Et}$ and $R_{Dt}$ are 1-year lagged $R_{Et+1}$ and $R_{Dt+1}$. $\beta_{3t}$ is the current year $\beta_3$ and $\beta_{3t-1}$ is 1-year lagged $\beta_{3t}$. Country–year medians of $R_{Et+1}$, $R_{Et}$, $R_{Dt+1}$, $R_{Dt}$, and firm-level controls are used and standard errors are clustered at the country level. Firm-level controls are as defined in Table 2 and their coefficients are omitted for brevity. Country fixed effects, fiscal year fixed effects, and industry controls are included in all regressions. Industry controls are defined as the percentage of firms in each of the nine industry classes (one-digit SIC excluding financial industry) by country and year. Their coefficients are omitted for brevity. This table also reports *p*-values in parentheses (one-tailed for coefficients with predicted signs and two-tailed otherwise). *, ** and *** indicate statistical significance at 10%, 5% and 1% levels, respectively.



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of firms from more conservative countries and such underestimation biases the cost of equity estimates downwards. To address this concern, the analysis is repeated with $r_{PEG}$ as described in Appendix A4, which does not rely on any assumption of growth rate or terminal value. This leads to even stronger results (unreported). In addition, the realized stock return ($Ret_{t+1}$) is used, which is free from the criticism of analyst-based accounting models, as the alternative measure for the cost of equity.[19] Realized return is measured as 1-year-ahead realized buy-and-hold stock return adjusted for stock splits and dividends. To have a meaningful proxy for the cost of capital, realized stock returns must be within the range 0 to 1. To be consistent with other cost of capital measures, realized return net of risk-free rate is used as the dependent variable in the regressions.

The average realized stock return by country and year is reported in Table 1 and the regression results at both the country level and the firm level are reported in Table 5, Panel A. The results remain qualitatively similar to those reported in Table 3.

(c) Alternative Measure for the Cost of Debt

In the main analysis, the interest rate is used to measure the agency cost of debt, and this approach has several drawbacks. First, realized interest rate measures historical cost of debt and is influenced by the amortization rate and firm age. Therefore, it is not a current market measure for the cost of debt. Second, interest rate is also affected by the underlying structure of debt, such as the maturity, the seniority and the riskiness of the debt. Without controlling for these variables, the regression coefficients could be potentially biased by the omitted variables. Third, it is assumed that creditors reward conservative borrowers by charging a lower interest rate instead of adjusting other contracting features, such as longer maturity, larger offering amount or fewer covenants. This assumption may not be plausible in practice, given the findings in Beatty et al. (2008). To address the above concerns, a sample of firms with new bond issuance are used as a sensitivity test. First, by examining new bond issuance, it is possible to control for various debt features, such as maturity, seniority and offering amount in the regressions. Second, due to the dispersed ownership structure of public bonds and high renegotiation costs, bond contracts often have few covenants, especially the financial ones. Therefore, adjustments to contracting terms other than interest rate are less of a concern in the setting of public bonds.

Data are collected on new bond issues from Mergent Fixed Income Securities Database (FISD) and augmented with observations from Thomson Deals (former SDC) database. Information on bond yield-to-maturity, offering amount, time-to-maturity, ratings, and bond features including seniority, callability and convertibility are also collected. Due to the limited coverage of deals outside the US, after requiring non-missing values for all control variables, the final sample consists of 7,526 firm–year observations.[20] Yield spread of bonds newly issued at year $t+1$ are used as the alternative measure for the cost of debt and bond-specific features are included in the regressions. Yield spread has been widely used by the literature as a measure for the cost of debt (e.g., Anderson et al., 2004; Zhang, 2008). Bond yield spread (*Bond*

19 This approach is consistent with Daouk et al. (2006).

20 If a firm issues multiple bonds in a certain year, the yield spread of the bond with the largest offering amount is used. Qualitatively similar results are obtained by using the weighted-average yield spread of all the bonds issued in that year.

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**Table 5**

Regression Results using Alternative Cost of Capital Measures

| | | **Panel A: Cost of Equity: $Ret_{t+1}$** | | | | **Panel B: Cost of Debt: Bond $Spread_{t+1}$** | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | *Country-level* | | *Firm-level* | | *Firm-level* | | *Firm-level ex. US and Japan* | |
| | *Pred. Sign* | *Coef.* | *p-value* | *Coef.* | *p-value* | *Coef.* | *p-value* | *Coef.* | *p-value* |
| $\beta_3$ | – | –0.019** | (0.02) | –0.039*** | (0.00) | –0.020*** | (0.00) | –0.019*** | (0.00) |
| *Size* | – | 0.000 | (0.26) | –0.008*** | (0.00) | –0.002*** | (0.00) | –0.002*** | (0.00) |
| *MTB* | – | 0.000*** | (0.00) | –0.000 | (0.30) | –0.000*** | (0.00) | –0.000 | (0.33) |
| *Leverage* | + | –0.001 | (0.44) | 0.025*** | (0.00) | 0.013*** | (0.00) | –0.002 | (0.40) |
| *EarnVol* | + | –0.005 | (0.23) | 0.010*** | (0.00) | 0.024*** | (0.00) | 0.063** | (0.02) |
| *ROA* | – | 0.000 | (0.48) | –0.044*** | (0.00) | –0.028*** | (0.00) | –0.006 | (0.37) |
| *RetVol* | + | 0.014 | (0.24) | 0.182*** | (0.00) | | | | |
| *IntCov* | – | | | | | –0.000 | (0.34) | –0.000 | (0.15) |
| *Tangibility* | – | | | | | 0.001 | (0.31) | –0.007** | (0.04) |
| *Log(Offering Amt)* | – | | | | | 0.000 | (0.21) | 0.000 | (0.50) |
| *Log(Years to Maturity)* | – | | | | | –0.005*** | (0.00) | –0.004*** | (0.00) |
| *Investment Grade* | – | | | | | –0.011*** | (0.00) | –0.006*** | (0.01) |
| *Callable* | + | | | | | 0.008*** | (0.00) | 0.013*** | (0.00) |
| *Subordinated* | + | | | | | 0.007*** | (0.00) | 0.014** | (0.02) |
| Convertible | – | | | | | –0.041*** | (0.00) | –0.028*** | (0.00) |
| Issuance History | – | | | | | –0.003*** | (0.00) | 0.002* | (0.09) |

(*Continued*)

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**Table 5 (Continued)**

| | | Panel A: Cost of Equity: $Ret_{t+1}$ | | | | Panel B: Cost of Debt: Bond $Spread_{t+1}$ | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | *Country-level* | | *Firm-level* | | *Firm-level* | | *Firm-level ex. US and Japan* | |
| | *Pred. Sign* | *Coef.* | *p-value* | *Coef.* | *p-value* | *Coef.* | *p-value* | *Coef.* | *p-value* |
| Industry controls | | Yes | | Yes | | Yes | | Yes | |
| Fixed effects | | Country & Year | | | | | | Country & Year | |
| # Countries | | 35 | | 35 | | 31 | | 29 | |
| Sample period | | 1991–2007 | | 1991–2007 | | 1991–2007 | | 1991–2007 | |
| Adj-$R^2$ | | 64.8% | | 14.6% | | 71.3% | | 59.8% | |
| N | | 349 | | 96,188 | | 7,526 | | 1,286 | |

*Note:*

This table presents the country- and firm-level regression results on $Ret_{t+1}$ and *Bond Spread*$_{t+1}$. $Ret_{t+1}$ and *Bond Spread*$_{t+1}$ are alternative measures for cost of equity and debt capital as defined in Table 1. *Offering Amt* is the total amount of bond offering (in million dollars). *Years to Maturity* is the total number of years left until the bond matures. *Investment Grade* is a dummy variable equal to one if the bond issuance rating is equal to or higher than BBB- (Standard & Poor's) or Baa3 (Moody's). If the bond rating is missing, Altman's (1968) Z-score is used and *Investment Grade* is equal to one if the firm has a Z-score higher than 2.675. *Callable*, *Subordinated* and *Convertible* are dummy variables indicating that the bond has callable, subordinated, and convertible features, respectively. *Issuance History* is equal to one if the firm issued bonds before the current issuance. See Tables 1 and 2 for definitions for other variables. For country-level regressions, country–year medians of $Ret_{t+1}$, *Bond Spread*$_{t+1}$, and firm-specific controls are used and standard errors are clustered at the country level. For firm-level regressions, firm-year specific $Ret_{t+1}$, *Bond Spread*$_{t+1}$, and firm-level controls are used and standard errors are clustered at the firm level. Country fixed effects, fiscal year fixed effects and industry controls are included in all regressions. Industry controls are defined as the percentage of firms in each of the nine industry classes (one-digit SIC excluding financial industry) by country and year. Their coefficients are omitted for brevity. See Table 2 for variable definitions on firm-level controls. *p*-values are reported in parentheses (one-tailed for coefficients with predicted signs and two-tailed otherwise). $^{*}$, $^{**}$ and $^{***}$ indicate statistical significance at 10%, 5% and 1% levels, respectively.

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$Spread_{t+1}$) is calculated as the yield-to-maturity at issuance minus the contemporaneous yield of a US Treasury security with the same maturity and the closest coupon rate.

Table 1 reports the average bond yield spread by country and year. Since the majority of the observations are from firms in the US and Japan and many sample countries have less than five observations per year, the regression analysis is only conducted at the firm level. The regression results are reported in Table 5, Panel B. The coefficients on $\beta_3$ continue to be negative and significant for the firm-level analysis. To exclude the possibility that the results are driven by large US and Japanese samples, the analysis is repeated by excluding these two countries from the sample and the results remain unchanged.

In summary, the analyses in this section show that the main results of this study are robust and generally support the conclusion that firms in countries with more conservative financial reporting systems have lower cost of equity and debt capital.

### *(iii) Legal Institutions, Conditional Conservatism and the Cost of Capital*

As discussed in section 2(*iii*), it is expected that the negative relationship between conservatism and the cost of capital is more pronounced in countries with stronger legal enforcement. The rule of law index and the creditor rights index are used to measure a country's legal enforcement from the perspective of shareholders and creditors, respectively. The rule of law index has been widely used in the literature to measure the strength of enforcement (e.g., Daske et al., 2008; Christensen et al., 2013). It is obtained from Kaufmann et al. (2009) and measures the extent to which agents have confidence in and abide by the rules of the society in year 2000. The creditor rights index is the creditor rights aggregated score in year 2003 and is obtained from Djankov et al. (2007). This index is formed by adding one when: (1) the country imposes restrictions, such as creditors' consent or minimum dividends, to file for reorganization; (2) secured creditors are able to gain possession of their security once the reorganization petition has been approved (no automatic stay); (3) the debtor does not retain the administration of its property pending the resolution of the reorganization; and (4) secured creditors are ranked first in the distribution of the proceeds that result from the disposition of the assets of a bankrupt firm. These mechanisms protect creditors' power and secure their claims in the event of bankruptcy. A higher rule of law index or a higher creditor rights index indicates stronger legal enforcement. The values of these indexes for my sample countries are reported in Table 6.

To examine the differential effect of conservatism on the cost of capital for countries with high and low legal enforcement, the sample countries are divided into two groups based on their rule of law index or creditor rights index relative to the sample median. The analysis is repeated for equations (2) and (3) using the subsamples. The results are reported in Table 7. The coefficients on $\beta_3$ are only negative and significant in countries with high rule of law index or high creditor rights index, while they are not significantly different from zero for the other group. The differences between $\beta_3$ coefficients across the high and low groups are also significant in conventional levels. This finding suggests that conditional conservatism only reduces the cost of capital in countries with strong legal enforcement, consistent with the view that financial reporting and legal institutions are complements.

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**Table 6**
Summary of Country Institutional Structure Measures

| | *Rule of Law* | | *Creditor Rights* | | *Avg.Acct Covenants* |
|---|---|---|---|---|---|
| Australia | 1.73 | (1) | 3 | (1) | 1.5 |
| Belgium | 1.30 | (1) | 2 | (0) | 0.0 |
| Brazil | –0.33 | (0) | 1 | (0) | 0.5 |
| Canada | 1.72 | (1) | 1 | (0) | 2.0 |
| Chile | 1.27 | (0) | 2 | (0) | 2.0 |
| China | –0.48 | (0) | 2 | (0) | 1.0 |
| Denmark | 1.81 | (1) | 3 | (1) | 0.0 |
| Finland | 1.95 | (1) | 1 | (0) | 0.0 |
| France | 1.39 | (1) | 0 | (0) | 0.5 |
| Germany | 1.60 | (1) | 3 | (1) | 2.0 |
| Greece | 0.84 | (0) | 1 | (0) | 3.3 |
| Hong Kong | 0.84 | (0) | 4 | (1) | 1.5 |
| India | –0.76 | (0) | 2 | (0) | 2.0 |
| Indonesia | 0.29 | (0) | 2 | (0) | 2.5 |
| Israel | 1.06 | (0) | 3 | (1) | 1.5 |
| Italy | 0.80 | (0) | 2 | (0) | 0.0 |
| Japan | 1.34 | (1) | 2 | (0) | 0.0 |
| Malaysia | 0.35 | (0) | 3 | (1) | 1.0 |
| Netherlands | 1.73 | (1) | 3 | (1) | 2.0 |
| New Zealand | 1.76 | (1) | 4 | (1) | n.a. |
| Norway | 1.81 | (1) | 2 | (0) | 0.5 |
| Pakistan | –0.86 | (0) | 1 | (0) | n.a. |
| Philippines | –0.46 | (0) | 1 | (0) | 2.0 |
| Poland | 0.63 | (0) | 1 | (0) | n.a. |
| Singapore | 1.28 | (1) | 3 | (1) | 2.0 |
| South Africa | 0.06 | (0) | 3 | (1) | 1.5 |
| South Korea | 0.86 | (0) | 3 | (1) | 1.0 |
| Spain | 1.39 | (1) | 2 | (0) | 0.5 |
| Sweden | 1.80 | (1) | 1 | (0) | 2.0 |
| Switzerland | 1.93 | (1) | 1 | (0) | 0.0 |
| Taiwan | 0.88 | (0) | 2 | (0) | 3.0 |
| Thailand | 0.55 | (0) | 2 | (0) | 0.3 |
| Turkey | –0.08 | (0) | 2 | (0) | n.a. |
| UK | 1.64 | (1) | 4 | (1) | 0.5 |
| US | 1.53 | (1) | 1 | (0) | 2.0 |

*Notes:*
This table presents the country-level institutional variables used to partition the sample. *Rule of Law* measures the extent to which agents have confidence in and abide by the rules of society in year 2000. It is obtained from Kaufmann, Kraay and Mastruzzi (2009). *Creditor Rights* is the creditor rights aggregated score in year 2003 obtained from Djankov, McLiesh and Shleifer (2007). *Acct Covenants* is the number of accounting covenants contained in debt contracts. It is the country–year medians of debt with available information on debt covenant. The numbers are averaged across the sample period for each country. For *Rule of Law* and *Creditor Rights* indexes, reported in parentheses is a binary variable with the value one indicating the index value being higher than (lower or equal to) the sample median, and zero otherwise.

As discussed in section 2(*iii*), the usage of accounting covenants is an important condition for conditional conservatism to improve the efficiency of debt contracting. Information on the usage of accounting covenants in debt contracts is obtained from various data sources, including Mergent Fixed Income Securities Database (FISD), Capital IQ, Thomson Deals, Bloomberg and DealScan. The procedures used in Ball et al. (2015) are followed to compile this dataset. To capture the cross-country variation

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## Table 7
Conditional Conservatism, Legal Enforcement and the Cost of Capital

| | | Panel A: Cost of Equity: $R_{Et+1}$ | | | | | Panel B: Cost of Debt: $R_{Dt+1}$ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *High Rule of Law* | | *Low Rule of Law* | | *Diff (Hi–Lo)* | *High Creditor Rights* | | *Low Creditor Rights* | | *Diff (Hi–Lo)* |
| | *Pred. Sign* | *Coef.* | *p-value* | *Coef.* | *p-value* | *p-value* | *Coef.* | *p-value* | *Coef.* | *p-value* | *p-value* |
| | | *Country-level analysis* | | | | | | | *Country-level analysis* | | |
| $\beta_3$ | – | –0.039*** | (0.01) | –0.015 | (0.20) | (0.09) | –0.020*** | (0.00) | –0.004 | (0.35) | (0.00) |
| Adj-$R^2$ | | 84.0% | | 73.6% | | | 84.0% | | 90.6% | | |
| N | | 211 | | 138 | | | 137 | | 212 | | |
| | | *Firm-level analysis* | | | | | | | *Firm-level analysis* | | |
| $\beta_3$ | – | –0.061*** | (0.00) | –0.022*** | (0.00) | (0.00) | –0.017*** | (0.00) | 0.002 | (0.26) | (0.00) |
| Adj-$R^2$ | | 37.3% | | 33.7% | | | 15.7% | | 25.3% | | |
| N | | 74,959 | | 10,441 | | | 39,895 | | 121,327 | | |
| Firm controls | | Yes | | Yes | | | Yes | | Yes | | |
| Industry controls | | Yes | | Yes | | | Yes | | Yes | | |
| Fixed effects | | Country & Year | | Country & Year | | | Country & Year | | Country & Year | | |

*Notes:*
This table presents the subsample regression results partitioned by institutional variables. The partitioning is based on country-level indexes relative to sample medians (see the corresponding binary variables reported in parentheses in Table 6). All other variables are as defined in Tables 1, 2 and 3. For country-level regressions, country–year medians of $R_{Et+1}$, $R_{Dt+1}$, and firm-level controls are used and standard errors are clustered at the country level. For firm-level regressions, firm–year specific $R_{Et+1}$, $R_{Dt+1}$, and firm-level controls are used and standard errors are clustered at the firm level. Coefficients on firm-level controls are omitted for brevity. Country fixed effects, fiscal year fixed effects and industry controls are included in all regressions. Industry controls are defined as the percentage of firms in each of the nine industry classes (one-digit SIC excluding financial industry) by country and year. Their coefficients are omitted for brevity. See Table 2 for variable definitions on firm-level controls. I also report *p*-values in parentheses (one-tailed for coefficients with predicted signs and two-tailed otherwise). Columns titled "Diff (Hi–Lo)" report the *p*-values of comparing coefficients on $\beta_3$ across the subsample. *, ** and *** indicate statistical significance at 10%, 5% and 1% levels, respectively.



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**Table 8**

Conditional Conservatism, Accounting Covenants and the Cost of Debt

| | | *Cost of Debt: $R_{Dt+1}$* | | | | |
|---|---|---|---|---|---|---|
| | | *High Acct Covenants* | | *Low Acct Covenants* | | *Diff (Hi–Lo)* |
| | *Pred. Sign* | *Coef.* | *p-value* | *Coef.* | *p-value* | *p-value* |
| | | | | *Country-level analysis* | | |
| $\beta_3$ | – | –0.022** | (0.03) | 0.025 | (0.12) | (0.01) |
| Adj-$R^2$ | | 80.1% | | 94.1% | | |
| N | | 157 | | 95 | | |
| | | | | *Firm-level analysis* | | |
| $\beta_3$ | – | –0.019*** | (0.00) | 0.010 | (0.19) | (0.01) |
| Adj-$R^2$ | | 19.2% | | 28.3% | | |
| N | | 93,559 | | 53,768 | | |
| Firm controls | | Yes | | Yes | | |
| Industry controls | | Yes | | Yes | | |
| Fixed effects | | Country & Year | | Country & Year | | |

*Note:*

This table presents the subsample regression results partitioned by the usage of accounting covenants. The "High (Low) Acct Covenants" subsample includes country–years with *Acct Covenants* being positive (zero). *Acct Covenants* is the number of accounting covenants contained in debt contracts. It is the country–year medians of debt with available information on debt covenant. All other variables are as defined in Tables 1, 2 and 3. For country-level regressions, country–year medians of $R_{Dt+1}$ and firm-level controls are used and standard errors are clustered at the country level. For firm-level regressions, firm–year specific $R_{Dt+1}$ and firm-level controls are used and standard errors are clustered at the firm level. Coefficients on firm-level controls are omitted for brevity. Country fixed effects, fiscal year fixed effects and industry controls are included in all regressions. Industry controls are defined as the percentage of firms in each of the nine industry classes (one-digit SIC excluding financial industry) by country and year. Their coefficients are omitted for brevity. See Table 2 for variable definitions on firm-level controls. This table also reports *p*-values in parentheses (one-tailed for coefficients with predicted signs and two-tailed otherwise). The column titled "Diff (Hi–Lo)" reports the *p*-values of comparing coefficients on $\beta_3$ across the subsample. *, ** and *** indicate statistical significance at 10%, 5% and 1% levels, respectively.

in the usage of accounting covenants, a country-year index is created using the sample median of all debt with available covenant information issued by firms within that country in a certain year. Table 6 reports the average usage of accounting covenants by country.

In Table 8, the cost of debt sample is divided into two subsamples based on whether or not the corresponding country–year has accounting covenants. The analysis is repeated for equation (3) using the subsamples. The coefficients on $\beta_3$ are only negative and significant in country–years where covenants are used, while they are not significantly different from zero for country–years where covenants are not used. The differences between $\beta_3$ coefficients across two subsamples are also significant at conventional levels. This corroborates the findings based on US data that timely loss recognition improves the contracting efficiency of debt through accounting-based covenants (e.g., Zhang, 2008).

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## 5. CONCLUSIONS

This paper examines the impact of conservative accounting on international equity and debt markets, finding that a higher level of a country's conservative reporting system leads to lower cost of equity and debt capital. These findings contribute to the literature by highlighting the important role that accounting information plays in international capital markets. However, findings in this paper should not be interpreted as suggesting that firms in all countries should report more conservatively in order to reduce the cost of capital. Instead, the observed conditional conservatism level in a country is an equilibrium outcome balancing various institutional forces and deviating from this level may be costly and difficult in the short run. In addition, conditional conservatism also imposes costs on a firm by introducing a downward bias to its earnings and impairing the valuation role of its accounting reports (Chen et al., 2007).

Furthermore, and perhaps more importantly, it is found that the benefits of conditional conservatism on capital markets vary with countries' institutional structures. The negative association between conditional conservatism and the cost of capital is found to only exist in countries with strong legal enforcement, suggesting a complementary relationship between a country's financial reporting system and its legal institutions. In addition, the negative association between the cost of debt and conditional conservatism is found to only exist in countries where accounting covenants are widely used, corroborating the argument that conditional conservatism provides debt-contracting benefits via accelerating the violation of accounting-based covenants.

## APPENDIX

***Implied Cost of Equity Capital Models***

Four accounting-based valuation models suggested by prior literature are used to calculate the *ex-ante* cost of equity capital. The first two are the special cases of the residual income model in Ohlson (1995), and the last two are based on the abnormal earnings growth valuation model developed by Ohlson and Juettner-Nauroth (2005). See Hail and Leuz (2006) for a detailed description of these four models.

Variables used in these models are defined as follows:

$p_0$ – Current stock price, measured as of month +10 after the fiscal year-end.
$bv_0$ – Current book value of equity per share, measured as of fiscal year-end.
$e_t$ – Expected future earnings per share for year $t$.
$d_t$ – Expected future dividends per share for year $t$.
$bv_t$ – Expected book value of equity per share for year $t$.
$g$, $g_{st}$, $g_{lt}$ – Expected perpetual, short-term and long-term growth rate.
$k$ – Average dividend payout ratio over the past 3 years.

A1. Claus and Thomas (2001)

$$p_0 = bv_0 + \frac{e_1 - r_{CT} \times bv_0}{(1 + r_{CT})} + \frac{e_2 - r_{CT} \times bv_1}{(1 + r_{CT})^2} + \frac{e_3 - r_{CT} \times bv_2}{(1 + r_{CT})^3} + \frac{e_4 - r_{CT} \times bv_3}{(1 + r_{CT})^4} + \frac{e_5 - r_{CT} \times bv_5}{(1 + r_{CT})^5} + \frac{(e_5 - r_{CT} \times bv_4) \times (1 + g)}{(r_{CT} - g)(1 + r_{CT})^5} \quad \text{(A1)}$$

$$bv_t = bv_{t-1} + e_t - e_t \times k$$

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If $e_3$, $e_4$ and $e_5$ are missing, they are replaced by $e_3 = e_2 \times (1+g_{lt})$, $e_4 = e_3 \times (1+g_{lt})$, and $e_5 = e_4 \times (1+g_{lt})$, where $g_{lt}$ is the analyst forecast for long-term growth rate. The inflation rate of Year 5 is used as a proxy for $g$.

A2. Gebhardt, Lee and Swaminathan (2001)

$$p_0 = bv_0 + \frac{e_1 - r_{GLS} \times bv_0}{(1+r_{GLS})} + \frac{e_2 - r_{GLS} \times bv_1}{(1+r_{GLS})^2} + \frac{e_3 - r_{GLS} \times bv_2}{(1+r_{GLS})^3} + \sum_{t=4}^{11} \frac{\overline{ROE_t} - r_{GLS}}{(1+r_{GLS})^t} \times bv_{t-1} + \frac{\overline{ROE_{12}} - r_{GLS}}{r_{GLS} \times (1+r_{GLS})^{12}} \times bv_{11} \tag{A2}$$

$$\overline{ROE_t} = \frac{1}{I} \sum_{i}^{I} \overline{ROE_{t,i}}$$

$$ROE_{t,i} = \frac{e_{t,i}}{bv_{t,i}}$$

$$bv_t = bv_{t-1} + e_t - e_t \times k$$

After the explicit forecast period of 3 years, the residual income series is derived by linearly fading the forecasted accounting return on equity to the sector-specific average return. The industry-average return on equity is used for firms in a given country and year.

A3. Ohlson and Juettner-Nauroth (2005)

$$p_0 = \frac{e_1}{r_{OJ}} \times \left( g_{st} + \frac{r_{OJ} \times d_1}{e_1} - g_{lt} \right) / (r_{OJ} - g_{lt}) \tag{A3}$$

$$g_{lt} = (e_2 - e_1)/e_1, \quad d_1 = k \times e_1$$

Short-term growth ($g_{st}$) is as defined in Gode and Mohanram (2003). The inflation rate of Year 5 is used as a proxy for $g$.

A4. Modified PEG Ratio Model by Easton (2007)

$$p_0 = \frac{e_2 + r_{PEG} \times d_1 - e_1}{r_{PEG}^2} \tag{A4}$$

A5. Data Requirements

Book equity value per share ($bv_0$), dividends payout ratio ($k$), and current stock price ($p_0$) are calculated based on data extracted from Compustat. $bv_0$ and $p_0$ are adjusted for stock splits. $e_1$, $e_2$, $e_3$, $e_4$ and $e_5$ are mean analyst forecast earnings per share obtained

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from I/B/E/S Summary Unadjusted file and are further adjusted for stock splits. Non-missing values for $e_1$ and $e_2$ are required, as well as for $k$ to be between 0 and 1. If $k$ is missing for a certain firm–year, it is replaced by the country–year median. Stock price and analyst forecasts are measured as of month +10 after the fiscal year end. All data items are converted to US dollars.

An iterative program is used to back out the internal rate of return. This procedure identifies the annual firm-specific discount rate that equates the left-hand-side price to the right-hand-side value. I start iterating the discount rate from 0 to 1 by 0.0001 each time and stop until the absolute difference is less than 0.1% of the left-hand-side price. If there is no solution, the 0.1% restriction is relaxed to 1%, 5% or 10%. Finally, solutions from at least two of these models are required to calculate the average cost of equity capital for each firm–year.

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