CHAPTER SIX

Employment and Unemployment

As we have seen, a competitive equilibrium equates the supply of workers with the demand for workers. The equilibrium wage clears the market, and all persons looking for work can find jobs. Despite this implication of equilibrium, unemployment can be a widespread phenomenon in some labor markets. One of the most heart breaking macroeconomic problems of every nation is unemployment. Thus major concern of governments around the world is reducing unemployment via different policies. The unemployed are generally defined as those who are not currently employed and who indicate by their behavior that they want to work at prevailing wages and working conditions. Indeed, the unemployment rate (UR) can be expressed as the ratio of unemployed to total labor force. i.e. UR=U/L, where U is level of unemployed people and L is total labor force.

Workers are unemployed for many reasons, and policymakers usually worry more about some types of unemployment than about other types. At any time, for instance, many persons are "in between" jobs. They have either just quit or been laid off, or they have just entered (or reentered) the labor market. It takes time to learn about and locate available job opportunities. Therefore, even a well-functioning market economy, where the number of available jobs equals the number of persons looking for work, will exhibit some unemployment as workers search for jobs. Put differently, the equilibrium level of unemployment will not be zero. This type of unemployment alone, however, cannot explain the entire amount of unemployment that has been existed. Many workers seem to be unemployed not because they are in between jobs but because of a fundamental imbalance between the supply and the demand for workers.

6.1. Types of Unemployment

Economists usually distinguish among several types of unemployment. These differ according to their causes, their consequences, and the policies that are likely to be

effective in dealing with them. The most common categories are **frictional**, **structural**, **deficient demand**, and **seasonal** unemployment. Each of these will be discussed in turn. As will become evident in the ensuring discussion, the distinctions are often not clear-cut, either conceptually or practically.

6.1.1. Frictional Unemployment:

The labor market is in constant flux. In each period some individuals enter the labor force to search for work while others leave to return to school, retire, or work in the home. Similarly, new jobs open up in some firms and disappear in others. As a consequence, unemployed workers and unfilled job vacancies will coexist at any point in time. This type of unemployment is called frictional unemployment. It is often associated with job search activity within a given labor market.

Because suitable unfilled vacancies exist for the frictionally unemployed, this type of unemployment will typically be of short duration; however, the optimal duration will depend on the benefits and costs of continued search. Unfilled job vacancies and unemployed job seekers coexist because of imperfect information. If workers looking for jobs and firms looking for workers could find each other immediately, there would be no unemployment. However, time is required for the unemployed to discover the available jobs, their rates of pay and their working conditions. Such is also the case for employers to identify applicants and determine their suitability. Hence, frictional unemployment arises because both workers and firms need time to locate each other and to digest the information about the value of the job match.

Frictional unemployment is associated with normal turnover in the labor force; it can thus be thought of as unemployment that would prevail even in a well-functional labor market. The existence of frictional unemployment does not suggest that there is a fundamental structural problem in the economy, such as an imbalance between the number of workers looking for work and the number of jobs available. As a result, frictional unemployment is not viewed with alarm by policymakers. By its very nature, frictional unemployment leads to short unemployment spells. Moreover, frictional

unemployment is "productive" because the search activities of workers and firms improve the allocation of resources. The process of marching job seekers with job vacancies yields benefits- both to the individual employers and employees involved and the society.

There are also easy policy solutions for reducing frictional unemployment, such as providing workers with information about job openings and providing firms with information about unemployed workers. By improving the flow of information, it may be possible to reduce the amount of frictional unemployment. However, it is unlikely that such unemployment could not be eliminated, nor it is necessary the case that reducing frictional unemployment would be desirable. In many circumstances the benefits of search and the acquisition of information by employers and job seekers will exceed the costs.

6.1.2. Structural Unemployment

The type of unemployment that causes the most concern is structural unemployment. At any time, some sectors of the economy are growing and other sectors are declining. If skills were perfectly transferable across sectors, the laid-off workers could quickly move to the growing sectors. Skills, however, might be specific to the worker's job or industry, and laid-off workers lack the qualifications needed in the expanding sector. As a result, the unemployment spells of the displaced workers might last for a long time because they must retool their skills. Structural unemployment, thus, arises because of a mismatch between the skills that workers are supplying and the skills that firms are demanding. Unemployed workers and job vacancies are considered to be in different labor markets, either by virtue of geography or because they do not coincide in terms of qualifications and characteristics.

As is the case with frictional unemployment, structural is characterized by the coexistence of unemployed workers and job vacancies. However, in this case, successful matching of workers and job requires more than acquisition of information. Proposed solutions to structural unemployment usually involve improving the human capital characteristics of the workers by education or training programs or encouraging labor mobility and job search in other regions. They could also include adapting the

characteristics of the job themselves by altering entrance requirements, rearranging the basic job component. Regional development policies which attempt to expand employment opportunities in areas with high levels of structural unemployment can also been used.

One of the most difficult issues relating to structural unemployment involves determining whether a particular situation is temporary or permanent. For example, suppose that there is an increase in demand in one industry, occupation or region, giving rise to job vaccines in that sector and a decrease in demand in another industry, occupation or region, giving rise to unemployed workers in the sector. If these changes in demand are permanent in nature, the resulting unemployment is clearly structural and the best course of action will usually be to adjust to the structural changes perhaps via retraining or relocation. However, if the changes in demand are temporary in nature, the resulting unemployment is more frictional than structural and the best course of action may well be to simply wait for demand to return to normal levels in each sector. In these circumstances, costly activities such as relocation or retaining are inappropriate because they yield negligible (perhaps zero) benefits. Unfortunately, it is not always clear in advance which situations are temporary and which are permanent.

6.1.3 Demand Deficient Unemployment

There also may be a structural imbalance between the number of workers looking for jobs and the number of jobs available—even if skills were perfectly portable across sectors. This imbalance may arise because the economy has moved into a recession. Firms now require a smaller workforce to satisfy the shrinking consumer demand and employers lay off many workers. We call this type of unemployment demand- deficient unemployment. It, generally, exists when there is insufficient aggregate demand in the economy to provide jobs. It is not a matter of workers engaging in normal job search or lacking the correct skills or being in the wrong labor market; rather it is a matter of insufficient aggregate demand to generate sufficient job vacancies.

Demand-deficient unemployment is usually associated with adverse business cycle

conditions; hence, the term cyclical unemployment is often used. However, it may also be associated with a chronic (as opposed to sort-term cyclical) insufficiency of aggregate demand. There is an excess supply of workers, and the market does not clear because the wage is sticky and cannot adjust downward. It is possible that union-mandated wage increases or government-imposed minimum wages introduce rigid wages into the labor market and prevent the market from clearing.

Since the cause of such unemployment is a deficiency of aggregate demand, its cures usually involve macroeconomic policies that stimulate aggregate demand (increase consumption, investment, export, or government spending or to decrease imports and taxes. Monetary, fiscal, and exchange rate policies are the common macroeconomic instruments.

6.1.4 Seasonal Unemployment

Seasonal unemployment is often associated with insufficient demand in a particular season. In this sense it can be considered demand-deficient unemployment; nevertheless, it is different in the sense that it is not a shortage of aggregate demand for the economy as a whole, but rather a shortage demand in a particular season. The patterns are usually predictable over the year and specific to particular industries. For example, workers in some industries are laid off regularly because new models are introduced, and firms shut down so that they can be retooled; seasonal unemployment is also prevalent in the rainy season in construction, and during summer for agriculture. Seasonal fluctuations in labor supply may also occur, the most significant example being the large number of college during off academic season. Seasonal unemployment, like frictional unemployment, is not what the unemployment problem is about. After all, the unemployed workers will return to their former employer once the employment season starts.

The Steady-State Rate of Unemployment

The flows of workers across jobs and in and out of the market generate some unemployment. It is easy to calculate the steady-state rate of unemployment, the

unemployment rate that will be observed in the long run as a result of these labor flows. To keep things simple, suppose a worker can be either employed or unemployed. In reality, some persons also will be in the nonmarket sector, but we will ignore initially the nonmarket sector to simplify the presentation. Fig. 5-1 describes the labor flows in an economy where workers are either employed or unemployed. There are a total of *E* employed workers and *U* unemployed workers. In any given period, let k be the fraction of the employed workers who lose their jobs and become unemployed, and let *h* be the fraction of the unemployed workers who find work and get hired.

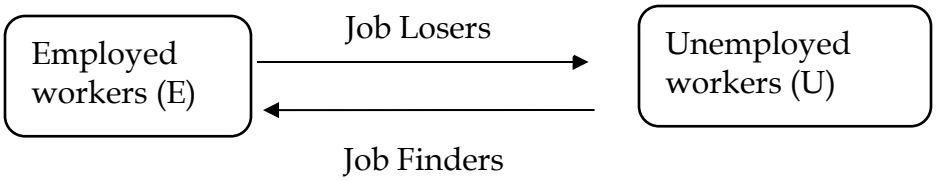

Fig.6-1. Flows between employment and unemployment

In a steady state, where the economy has reached a long-run equilibrium, the unemployment rate would be constant over time. In the steady state, therefore, we require that the number of workers who lose jobs equal the number of unemployed workers who find jobs. This implies that

$$kE = hU$$

The labor force is defined as the sum of persons who are either employed or unemployed, so

$LF=E + U$. Substituting the equation $kE = hU$ yields

$$k(LF - U) = hU$$

By rearranging terms, we can solve for the steady-state unemployment rate:

$$\text{Unemployment rate} = U/LF == k/(k + h)$$

The last equation makes it clear that the steady-state unemployment rate is determined by the transition probabilities between employment and unemployment (k and *h*). Policies designed to reduce steady-state unemployment must alter either or both of these probabilities. The unemployment rate is smaller when jobs are more stable and larger when unemployment spells last longer. In other words, two key factors determine the

unemployment rate: the incidence of unemployment (that is, the likelihood that an employed worker loses his or her job or k) and the duration of unemployment spell (which equals $1/h$). The steady-state rate of unemployment is sometimes called the natural rate of unemployment. Of course, the simple model of labor force dynamics presented in this section does not accurately describe the actual flows observed in real-world labor markets. There are also flows in and out of the labor force, so a person can be in one of three states: employed, unemployed, and the nonmarket sector.

6.2 The Cost of Unemployment

Whether measured by economic and material loss or by human suffering and wasted skills, the cost of unemployment is high. Unused natural resources remain to be used in the future. But work, the creative activity of man, once wasted can never be recovered; what might have been produced is lost. The damage to individuals and to society from unemployment often cannot be repaired.

The financial problems of the families of unemployed have never been fully or accurately studied, but few studies conducted around this area shows that; family investments, saving and reducing spending including basic necessities are some of the steps taken during times of stress. Measures taken to adjust to loss of income, according to the same study, were, in order of importance; use of savings, reductions in buying, getting help from relatives, piling up bills and borrowing money.

The effects of unemployment are felt long after the unemployed person has gone back to work. Accumulated debts have to be paid, neglected health problems must be managed, and depleted savings replenished. In most cases, it takes a family along time to regain the financial position it held before unemployment. Many serious social problems follow directly from unemployment. The social effects of unemployment vary considerably according to age, length of unemployment, the economic level of the unemployed and other factors, but there is a common pattern of unfortunate consequences.

6.3 An Employment Oriented Strategy

Although it is difficult to come up with refined employment policy that can be equally applied to every situation, the following suggestions can be applied with great flexibility. Every approach to the problem should be based on a cost- benefit approach to each possible policy option open to the existing situation. However, it should be made clear that policy analysts are operating in the world of the second-best and most of the forms of intervention that might be proposed could introduce other distortions.

6.3. 1 Investment on Human Resources

The concern of economists with the use of human input in the productive process is not an entirely new one, but rather a return to older concepts. Alfred Marshall, the leading figure in neoclassical economics, stressed that the most valuable of all investment was the capital invested in human beings. Investment in human capital means doing something now to increase one's skills, knowledge, or health that will increase one's productivity and therefore, will bring returns in monetary or psychic income in the future. Expenditures on mobility can also be considered a form of human capital investment, because the individual may increase the value of his labor services thereby.

But formal education is not the sole means of investing in human resources. On the job-training, including formal schooling and training in a job situation as well as "learning from experience" is another very important form of investing in workers to improve their skills and productivity. Recognition of the value of investment in human capital has led individuals, employers and the nation to expand programs of education and training. The major objective of the investment has been to aid in meeting the manpower needs of the economy. To this end actions have been taken to project manpower needs of the future in order to develop the country's future human resources through improved education.

6.3.2. Provision of Information

Forecasts of manpower trends must be available to the public, for private employers, government agencies, educational institutions, and some primary source of such information should be institutionalized in the country. And they have to publish information such as trends in manpower requirements, resources utilization and training requirement for the different category of manpower in the economy. Providing workers with information about job openings and providing firms with information about unemployed workers is also important policy instrument.

6.3.3 Matching Manpower and Jobs

Nations, at the same time, face both problems of jobs unfilled because of a shortage of people with the requisite skills and unemployment of labor force. The aim of manpower policy is not only to help individuals to be better able to compete in the labor market but also to improve the functioning of the country's economy by matching workers and jobs more quickly. Improving the human capital characteristics of the workers by education or training programs and encouraging labor mobility and job search in other regions help to reduce unemployment problem.

6.3.4. Informal Sector

The informal sector has been contributing the source of a living for large people in the developing countries. However, the sector is largely ignored, rarely supported, often regulated and sometimes actively discouraged by the government. But in view of their contribution to employment for the majority of the population the following policy interventions are believed to boost the output and employment of the sector:

Firstly, the system of trade and commercial licensing should be substantially improved. Secondly, the credit facility and access should be streamlined and provisions should be placed to assist and check the inclusion of this sector in the credit disperses.

Thirdly, informal sector operations are more labor using per unit of output than formal sector operations. Therefore, an increase in income- earning opportunities would result from a shift in the structure of demand from the later to the former. There are two broad policies that can be followed to achieve this: because informal sector products are

consumed primarily by the poor and formal sector products by the well-to-do, the income-equalizing policies (taxing the formal and injecting the money in the informal sector) would help; secondly, in its own consumption and investment expenditures the government should increase its purchase from informal sector, either directly or by making government purchases from the former sector conditional upon subcontracting. Fourthly technical aid and research is required to develop and encourage the production of goods used in the informal sector itself.

6.3.5. Rural Development

The importance of an increase in agricultural output as the key to improving rural incomes and increasing rural employment has been emphasized in various courses (agricultural economics, development economics).

Generally a standard national manpower policy can be conceived of as having the following dimensions: (1) The creation of new job opportunities to accommodate a growing labor force and the elimination of some job (that are believed to be dangerous and life costing) through technological change; (2) the training of a labor force capable of handling the jobs available; (3) making sure that workers with the requisite skills can be easily matched with the right jobs; (4) another area the manpower policy should handle or take into consideration is the provision of equal employment opportunity for all citizens. Affirmative action plans which consider specific type of training for minority group members are appropriate. Moreover, a greater effort has to be placed on raising the productivity and employability of females that have been suffered from discrimination.

6.4. Models of Unemployment

Economists developed different models to explain the existence of unemployment.

Some of the models are explained in the following sections.

6.4.1. Job Search Model

Many theories claim to explain why unemployment exists and persists in competitive markets. We observe frictional unemployment even if there were no fundamental

imbalance between the supply of and demand for workers. This is because, on the one hand, different firms offer different job opportunities and make different offers to the same worker, on the other hand, workers are not fully informed about where the "best" jobs are located it takes time to find the available opportunities. These wage differentials for the same type of work encourage an unemployed worker to "shop around" until he or she finds a superior job offer. Because it takes time to learn about the opportunities provided by different employers, search activities prolong the duration of the unemployment spell. The worker, however, is willing to endure a longer unemployment spell because it might lead to a higher-paying job. In effect, search unemployment is a form of human capital investment; the worker is investing in information about the labor market.

The worker's economic trade-offs are clear: The longer he searches, the more likely he will get a high wage offer; the longer he searches, however, the more it costs to find that job. When should the worker stop searching and settle for the job offer at hand? There are approaches answering this question. Each approach gives a "stopping rule" telling the worker when to end his search activities. One is a strategy of non-sequential search. In this approach, the worker decides before he begins his search that he will randomly visit, say, some firms in the labor market and accept the job that pays the highest wage. This search strategy is not optimal.

The second strategy, better strategy, is sequential search. In this strategy, a worker decides which job offers he is willing to accept before the worker sets out on the search process. For instance, he might decide that he is not willing to work for less than, say, 20 birr an hour. The worker will then visit one firm and compare the wage offer to his desired 20-birr wage. If the wage offer exceeds 20 birr he will accept the job, stop searching, and end the unemployment spell. If the wage offer is less than 20 birr, he will reject the job offer and start the search process over again (that is, he will visit a new firm, compare the new wage offer to his desired wage, and so on). Finally, a worker stop his job search when he gets a job offer that equals to or higher than his desired wage (asking wage).

The most important problem in sequential is deciding the asking wage. The asking wage is the threshold wage that determines if the unemployed worker accepts or rejects incoming job offers. There is a clear link between a worker's asking wage and the length of the unemployment spell the worker will experience. Workers who have low asking wages will find acceptable jobs very quickly and the unemployment spell will be short. Workers with high asking wages will take a long time to find an acceptable job and the unemployment spell will be very long. Hence, workers with high asking wage incur more cost to find that job.

The worker decides the asking wage by considering the marginal gain of searching and marginal cost of searching. The marginal gains from search are lower if the worker has a good wage offer at hand. As a result, the marginal revenue curve (that is, the marginal gain from one additional search) is downward sloping. There are two types of search costs. The first is the direct costs of search, including transportation costs and the cost of preparing resumes. The second cost is the forgone wage offer at hand by looking better wage. As a result, the marginal cost of search is high if the worker has a good wage offer at hand. Therefore, the marginal cost curve is upward sloping. The intersection of the marginal cost curve and the marginal revenue curve gives the asking wage.

The worker's asking wage is determined by factors which affect the benefits and costs of search activities. As with all human capital investments, the benefits from search are collected in the future, so they depend on the worker's discount rate. Workers with high discount rates are present oriented, and, hence, perceive the future benefits from search to be low. Workers who have high discount rates have lower marginal revenue curves, and hence will have lower asking wages. A major component of search costs is the opportunity cost resulting from rejecting a job offer and continuing the search. The unemployment insurance system compensates workers who are unemployed and who are actively engaging in search activities. This reduces the marginal cost of search and raises the asking wage. The unemployment insurance system, therefore, has three important effects on the labor market. To summarize, the job search model has two key predictions about the length of unemployment spells: Unemployment spells will last

longer when the cost of searching falls and unemployment spells will last longer when the benefits from searching rise.

6.4.2. The Intertemporal Substitution Hypothesis

The theory of labor supply behavior over the life cycle, introduced in the labor supply chapter, predicts that workers have an incentive to allocate their time to work activities during those periods of the life cycle when the wage is high and to consume leisure when the wage is low and leisure is cheap. The intertemporal substitution hypothesis also has important implications for how workers allocate their time over the business cycle. Suppose that the real wage fluctuates over the business cycle; the real wage rises when the economy expands and declines when the economy contracts. Because it is cheap to consume leisure when the real wage is low, workers are more than willing to reduce their labor supply during recessions; they can become unemployed and collect unemployment benefits, or perhaps leave the labor force altogether. As a result, part of the unemployment observed during economic downturns might be voluntary because workers are taking advantage of the decline in the real wage to consume leisure. The intertemporal substitution hypothesis makes two key assumptions: (1) the real wage is pro-cyclical and (2) labor supply responds to shifts in the real wage.

6.4.3. The Sectoral Shifts Hypothesis

Although job search activities can help us understand the presence of frictional unemployment, they do not explain the existence and persistence of long-term unemployment. As a result, a number of alternative models have been proposed to explain why structural unemployment might arise in a competitive market. One important explanation stresses the possibility that workers who are searching for jobs do not have the qualifications to fill the available vacancies. It is well known that shifts in demand do not affect all sectors of the economy equally. At any point in time, some sectors of the economy are growing rapidly and other sectors are in decline. To see how these sectoral shocks might create structural unemployment, suppose the manufacturing industry is hit by an adverse shock. Because of the reduced demand for their output, manufacturers lay off many of their workers. Big growth in other sectors (such as the

computer industry) increases the demand for labor by computer firms. If the laid-off manufacturing workers have skills that can be easily transferred across industries, the adverse conditions in the manufacturing sector would not lead to long-term unemployment. The laid-off workers would leave the manufacturing sector and move on to jobs in the now-thriving computer industry. Manufacturing workers, however, probably have skills that are partly specific to the manufacturing sector, so that their skills may not be very useful to computer firms. Long-term unemployment arises because it will take time for these workers to acquire the skills that are now in demand in the computer industry. The sectoral shifts hypothesis suggests that there will be a pool of workers who are unemployed for long spells because of a structural imbalance between the skills of unemployed workers and the skills that employers are looking for.

6.4.4. Efficiency Wages Model

When firms find it expensive to monitor the worker's output, they offer a wage-employment package that encourages its workers not to shirk at all. They might use efficiency wages to "buy" the worker's cooperation. Because the firm pays above-market wages, efficiency wage models generate involuntary unemployment. Firms in this market, however, do not wish to employ these workers because full employment encourages workers to shirk. There are no pressures on the firm to lower the wage because the efficiency wage *is* the profit-maximizing wage; if the firm lowers the wage, the payroll savings are more than outweighed by the productivity losses caused by worker shirking. If the unemployment rate is very high, it is costly to shirk because once a shirking worker gets fired, he faces a long unemployment spell. As a result, firms will be able to attract workers who will not shirk even if they pay a relatively low wage. If the unemployment rate is very low, however, shirking workers who are fired face only a short unemployment spell. To make shirking costly, firms will have to offer the worker a relatively high wage. If the market employs all the workers at a particular wage, a shirking worker who gets fired can walk across the street and get another job. In other words, there is no penalty for shirking. The key insight provided by the efficiency wage model is that unemployment is necessary to keep the employed workers in line.

The structural unemployment generated by efficiency wages is very different from the frictional unemployment generated by job search. Search unemployment is productive; it is an investment in information that leads to a higher-paying job. The unemployment that is due to efficiency wages is involuntary and unproductive (from the worker's point of view). The worker would like a job but cannot find one. Further, the worker has nothing to gain from being in a long spell of unemployment. From the firm's point of view, however, the involuntary unemployment is productive. It keeps the employed workers honest, thereby increasing output.

6.4.5. Implicit Contracts

The long-term nature of labor contracts introduces opportunities for workers and firms to bargain over both wages and layoff probabilities. The bargaining leads to a contract that specifies both the wage and the number of hours of work for any given set of aggregate economic conditions. There are many types of feasible implicit contracts between workers and firms. Consider, in particular, two extreme types of contracts. The first is a "fixed-employment" contract, under which the person works the same number of hours per year regardless of the economic conditions facing the firm. The second is a "fixed-wage" contract, where the worker receives the same hourly wage, again regardless of the economic conditions facing the firm.

Over the business cycle, the firm will face very different market conditions for its product. During an expansion, the firm typically finds that product demand is strong and growing; during a contraction, the demand for the firm's output weakens. If the firm and the worker settled on a fixed-employment contract, the firm would respond to these changes in market conditions by varying the worker's wage. The worker would get paid a high wage during an economic expansion and would have to accept substantial wage cuts during a recession. As a result of these wage cuts and wage increases, the worker's income would probably fluctuate greatly over the business cycle.

In contrast, if the firm and the worker settled on a fixed-wage contract, the firm would respond to changes in the product market by changing the worker's hours so the worker

works fewer hours during a recession. Even though the worker's annual income would be lower during a recession, his loss might be offset by the fact that the additional leisure hours the worker would have to consume during a recession have some value (after all, workers like leisure) and by the possibility that unemployment compensation might replace some of the lost earnings. As a result, the worker's "real" income may be relatively constant over the business cycle in a fixed-wage contract.

Some studies have argued that workers, in general, prefer fixed-wage contracts and willingly "accept" layoffs as part of the long-term employment relationship. In other words, workers willingly enter implicit contracts where their incomes are relatively stable over the business cycle, even if their hours of work are not. The reason is that workers are typically assumed to be risk-averse. The utility function of a risk-averse worker exhibits diminishing marginal utility of income. The increase in utility resulting from the higher incomes paid during an expansion is not enough to offset the loss in utility resulting from the lower incomes paid during a recession. Firms that offer fixed-wage contracts, in effect, offer "insurance" against wage declines during recessions and hence can attract risk-averse workers at lower average wages. The typical implicit contract in the labor market would then be a fixed-wage contract—implying that the wage is sticky over the business cycle. This leads to higher level of unemployment during a recession. Note, however, that the unemployment generated by this type of implicit contract is "voluntary." Workers are better off with the fixed-wage contract and therefore they have accepted layoffs in return for a more stable consumption path.

6.5. Sector-wise Pattern of Unemployment

The economy is often separated into three basic sectors:

1. the primary sector (the agricultural sector),
2. the secondary sector (the industrial sector), and
3. the tertiary sector (the service sector).

The agricultural sector is called the primary sector because economies must produce enough food for the population to survive before anything else can be produced. For

most of the history of our species, most work was devoted to agrarian activities. It is only in recent centuries that the industrial and service sectors have become important. Employment in the primary sector has been steadily declining as a share of total employment. Employment in the service sector has been growing steadily as a share of total employment.

To account for these changes, there are two fundamental concepts that have to be considered: the rate of technological improvement in each sector and the income elasticity of demand for the output of each sector (As you learned in your microeconomics principles class, income elasticity =% change in quantity demanded / % change in income).

In the agricultural sector, there has been a rapid pace of technological improvement but the income elasticity of demand is relatively low. Technological change results in increased output per worker and higher income in the economy. Yet, most people do not eat substantially more food when income rises. Thus, increases in productivity in this sector result in a need for fewer workers in this sector.

The industrial sector has also been characterized by a fairly high rate of productivity growth. The income elasticity of demand for products in this sector, however, is substantially higher than for the agricultural sector. Increased output per worker has been accompanied by increased demand for the output of this sector as income rises (due to productivity increases throughout the economy). For most of this century, the demand for this sector's output was growing at approximately the same rate as productivity was rising. It is only in recent years that productivity has been growing faster than the demand for output in this sector.

In the service sector, productivity growth is relatively low but the income elasticity of demand for service sector output is relatively high. Productivity growth is low in the service sector because labor is an essential ingredient in the quality of the final product. It is likely that the overall rate of productivity growth will be substantially lower than other sectors of the economy. As incomes rise (due to overall productivity growth), however, households tend to spend a growing share of their income on education,

medical services, restaurant services, motel and hotel services, etc. Since productivity growth in this sector is unable to keep up with the growth in demand, the share of total employment in the service sector must increase.