# DISPARITIES IN ECONOMIC GROWTH ACROSS EUROPEAN UNION COUNTRIES

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**TO**

**MY GRANDPARENTS**

# SMT RAJANI PARAKH

# SHRI RAGHUNATH PARAKH

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# CHAPTER 1

# INTRODUCTION AND METHODODLOGY

## Introduction

It has been a long time now since the study of economic growth has had its eminent position in the scope of macro economics. Economists and policy makers have known the importance of economic growth for a nation and have emphasized the process of growth in formulating various policies for a country. Economic growth has attracted the attention of many economists over the years. However, the study of economic growth took a back seat after the late 1960s and was revamped only in the late 1980s – after almost two decades.

Economic growth and economic development have been, for many years, considered as two different disciplines; only until recently. In view of this, let us understand what economic growth and economic development mean.

## Economic Growth

Economic growth refers to the quantitative change and is usually measured as increase in per capita output or income. In other words, it refers to rising output per capita. Economic growth has a connotation of quantitative expansions in economic variables, especially aggregate and per capita national incomes as measured by such statistics as Gross Domestic Product (GDP) and Gross National Income (GNI). Therefore the analysis of economic growth is concerned mainly with measuring growth in economic variables and identifying their inter relationships such as between the National Income

growth rate and the speed of capital formation. Economic growth can be considered as a quantitative aspect of economic development. Economic growth is the result of not a single factor but a number of factors such as economic, social, political, legal and cultural.

Kuznets (1973, 1981) brings out other characteristics of modern economic growth. He notes the rapid rate of structural transformation, which includes shifts from agriculture to industry to services. This process involves urbanization, shifts from homework to employee status, and an increasing role for formal education. He also argues that modern growth involves an increased role of foreign commerce and that technological progress implies reduced reliance on natural resources. Finally he discusses the growing importance of the government as an institution.

Some definitions of economic growth can be given as:

A Dictionary of the Social Sciences, UNESCO, defines economic growth as, "a long-term increase in a country's National Income in real terms".

This states that the process of economic growth is a long run process which is spread over the years. It is not a sudden phenomenon but takes time to occur. It occurs gradually over the period of time. When a nation experiences an increase in its National Income, in quantitative terms, over a period of time, economic growth is said to have occurred.

**Economic Development**

Economic development is a more difficult concept to define and measure than economic growth. This is mainly because economic development has a

qualitative dimension associated with it. It entails structural change, and encompasses the reduction of poverty and widespread gains in nutrition, health, education and standard of living. It implies a diffusion of economic growth and an expansion of economic opportunities. Economic growth is a necessary but insufficient condition for economic development. Professor Dudley Seers argues development is about outcomes i.e. development occurs with the reduction and elimination of poverty, inequality and unemployment in a growing economy. It refers to a general improvement in the standard of living for a population of a nation. With economic development comes structural change – a transformation from a primary agrarian economy to a diversified industrial economy, as earlier noted by Kuznets. And so development should be perceived as a multidimensional process involving the reorganization and reorientation of entire economic and social systems. Economic development is usually conceived as a process involving not only quantitative expansions but also changes in non-quantitative factors such as institutions, organizations, and culture under which economies operate.

As stated by the World Bank's World Development Report (1992), sustainable development means development that would meet the needs of the present generation without compromising the needs of future generation.

As a result, it becomes essential to understand and analyze the process of economic growth of an economy. It would then be possible to establish a comparative analysis on how an economy is moving on the path of growth and development. But how can one measure the status of economic growth in an economy? What are the factors leading to the growth in an economy and how can we measure them? What are the reasons for differences in the rate of

economic growth among the nations? And the most important question to be dealt with is: why are all countries not growing at the same pace?

The answers to these questions can be found in the various theories of growth and development, developed from time to time[1]. The classical theories of economic growth provided with the "…basic approaches of competitive behavior and equilibrium dynamics, the role of diminishing returns and its relation to the accumulation of physical and human capital, the interplay with between per capita income and the growth rate of population, the effects of technological progress in the forms of increased specialization of labor and discoveries of new goods and methods of production, and the role of monopoly power as an incentive for technological advance." (Barro and Sala-i-Martin: 2004, p. 16). Based on these ideas a revolution took place in the economic literature concerning the economic growth of an economy with the neo-classical model of Solow and Swan. Solow considered economic growth to be exogenous from an economic view point in the long-run, as the two factors explaining the economic growth in an economy – population growth and technological progress – were considered to be outside the purview and reach of pure economics and economic policy (Gylfason: 1999). This simple and revolutionary idea of Solow propagated a large literature on economic growth. As economic growth was considered as exogenous; this literature on economic growth came to be known as 'exogenous' theories of economic growth. As time progressed, the exogeinity of technological change/ progress and of the long-run economic growth from the view point of (pure) economics were doubted. Many questions were raised which urged for new thinking about economic

[1] The theories of economic growth and development are presented in detail in Chapter 2

growth. As a result of which, a new theory which considered technological progress as endogenous emerged. This made the long-run economic growth endogenous, and hence these theories are appropriately called as the 'endogenous' growth theories. This endogenous growth literature opened the doors for more intensive research analysis.

Chapter 3 evaluates the ingredients put forth by the various theories of growth from time to time. In this respect the chapter discussed the impact of and the relationship between income inequality, physical capital, human capital accumulations, total factor productivity, technology and research and development, international trade, institutions and policies, and economic integration upon economic growth of an economy.

Integration, it is believed, enhances the rate of growth of an economy. In view of this, Chapter 4 tries to explain the theories which constitute the building blocks of the theories of economic institution; and more specifically the theories of Customs Unions. The chapter is further extended to explain the formation of one of the oldest Customs Unions – the European Union.

The impact of economic integration upon the member countries of the European Union is analyzed in Chapter 5. This chapter is intended to assess the gap in economic growth among the selected member nations of the European Union.

Chapter 6 finally presents the conclusions.

## Methodology

In order to identify the impact of forming a customs union on its member nations, European Union is taken as a case in point, as it is one of the oldest forms of economic integration. Based on the existing economic literature on economic growth and economic integration, the thesis utilizes time series data to examine whether the economic integration among the European countries have facilitated higher economic growth among the selected member nations or not? However, only a few selected countries, with higher levels of development, but belonging to different geographical areas have been considered. The European Union member nations taken for the analytical purpose are:

1. Germany
2. Italy
3. The United Kingdom
4. Portugal
5. Spain
6. Finland

Each of the above member nations has been selected from different phases of development of the European Union. Germany and Italy are the founding members of the European Union; the UK joined the EU in 1973. With the enlargement of the integration, Portugal and Spain entered in 1986 and Finland is the member who entered the EU in 1995.

The questions that I intend to answer in the present research are:

1. Which are the factors that explain the overall economic growth process of the selected member nations?
2. Which are the factors among many that have acted as driver/s of economic growth for the selected nations?
3. What has been the impact of economic integration on the member nations of the European Union taken for analysis?
4. Is there any disparity among the growth of these member states? And if yes, which factor/s explains this disparity in economic growth among the selected member nations?

In order to answer the above questions, a time-series linear regression model is estimated for a period of thirty-nine years from 1971 to 2009, for each individual member nation under study. Most of the economic literatures, in order to study the impact of economic integration, upon the member nations have resorted to cross-sectional studies. However, this thesis intends to study the effects of economic integration based upon time-series regression estimated for individual member nations of the EU. For this purpose, a linear regression model is estimated.

In order to analyze which economic factors explain the process of economic growth in the selected member nation of the EU, the following model for the time period 1971-2009 is estimated using SPSS:

$$(GDPpc) = B_0 + B_1(Invt) + B_2\,(SSER) + B_3\,(Open) + B_4\,(PT) + B_5\,(Govt) + B_6\,(FDI) + e \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

where,

GDPpc = Annual Growth Rate of Gross Domestic Product per Capita in constant 2000 US$

Invt = Domestic Investment/Gross Capital Formation as percentage of GDP

SSER = Gross Secondary School Enrolment Rate

Open = Openness of an economy measured as Total Trade (exports + imports) as percentage of GDP

PT = Annual Growth Rate of Total Residential and Non-Residential Patents and Trademarks

Govt = General Government Final Consumption Expenditure as percentage of GDP

FDI = Inward FDI Flow as percentage of GDP

The variables in the above model, as can be observed, are the conventional and most widely used dummies in order to analyze the process of economic growth in an economy. The main intention to include only the traditional variables in the regression analysis is to study whether these variables explain the process of economic growth even in recent times[2].

Moreover, to calculate for the driver/s or factor/s for economic growth in an individual selected member nation, equation (1) is now estimated using stepwise linear regression model for 1971-2009. This would assist in finding those economic variables, among other, that act as drivers of economic growth in the particular country.

[2] Definitions of the variables under study are mentioned in Appendix.

Furthermore, in order to study the impact of economic integration on the selected EU member nations under study a dummy variable with respect to time is introduced in equation (1). Hence, equation (1) can now be written as:

$$(GDPpc) = B_0 + B_1(Invt) + B_2\,(SSER) + B_3\,(Open) + B_4\,(PT) + B_5\,(Govt) + B_6\,(FDI) + B_7\,(EU) + e \quad \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

where,

GDPpc = Annual Growth Rate of Gross Domestic Product per Capita in constant 2000 US$

Invt = Domestic Investment/Gross Capital Formation as percentage of GDP

SSER = Gross Secondary School Enrolment Rate

Open = Openness of an economy measured as Total Trade (exports+imports) as percentage of GDP

PT = Annual Growth Rate of Total Residential and Non-Residential Patents and Trademarks

Govt = General Government Final Consumption Expenditure as percentage of GDP

FDI = Inward FDI Flow as percentage of GDP

EU = dummy variable for membership in the European Union with respect to time; EU = 1 if a country is EU member and EU = 0 otherwise.

The above time series linear regression equation (2) is estimated by stepwise regression using SPSS. This would aid in analyzing those economic variables which have boosted the economic growth in an individual member country

after it entered the European Union. In a more specific manner, it would now be possible to compare between the driving forces of economic growth pre - EU and post – EU membership.

The time span taken for the analysis is 1971 to 2009. This time span has been selected for the below mentioned reasons:

1. Comparable data could be availed only for this time frame from the authentic and internationally comparable sources.
2. The 1960s, after the Second World War, was a golden period for growth in the European countries. However, since the 1970s, the countries in Europe started experiencing difficulties in their growth process from within and outside the nation. As a result, it is essential to know which economic factor has helped these economies to maintain and/or increase the rate of growth in the country.
3. The impact of economic integration can be studied in view of the expansion in the number of member nations of the European Union.

The data is compiled from World Bank, WIPO, Organization for Economic Cooperation and Development (OECD), International Monetary Fund (IMF) and United Nations Conference on Trade And Development (UNCTAD).

# CHAPTER 2

# EVOLUTION OF ECONOMIC GROWTH THEORIES AND MODELS

## History of Economic Growth and Development

Classical economists, such as Adam Smith (1776), David Ricardo (1817), and Thomas Malthus (1798), and much later Frank Ramsey (1928), Allyn Young (1928), Frank Knight (1944) and Joseph Schumpeter (1934), provided the basic ingredients of economic growth (Barrow & Sala-i-Martin:2004). These ideas include the basic approaches of competitive behavior and equilibrium dynamics, the role of diminishing returns and its relation to the accumulation of physical and human capital, the interplay between per capita income and the growth rate of population, the effects of technological progress in the forms of increased specialization of labor and discoveries of new goods and methods of production and the role of monopoly power as an incentive for technological advancement. The theory of economic growth can be traced from the times of Adam Smith.

**Adam Smith** (1776)

Adam Smith, did not formulate a coherent theory of economic growth, rather he discussed it in terms of certain general economic principles in different sections of his monumental work “The Wealth of Nations”. He moved away from the thoughts of Physiocrats and Mercantilists of natural equilibrium of circular flows. He may, thus, be considered to have started the revolution of theories of economic growth.

The motive force of the Smithian theory was the uniform and the constant efforts on the part of every man to better his own living condition. He advocated division of labor saying that it led to development by increasing the productivity of the labor force. This was Smith’s fundamental argument for the economic growth of a nation. He believed that division of labor is limited by the market thus positing economies of scale argument. Smith argued that growth was self reinforcing as it exhibited increasing returns to scale. According to Adam Smith the increase in labor productivity would take place through

- an increase in skill
- saving of the time lost in moving from occupation to occupation and
- invention of better machines and equipments.

As per Smith manufacturing sector was more conducive to division of labor and was developed to meet the increased demand of the goods and services of the people of a nation. He also advocated for laissez faire policy and considered it indispensable for economic progress. This would lead to no boundaries and hurdles in the path of the economic functions, which could thus be carried out in accordance to the market forces prevalent in the economy at that point of time, smoothly leading towards the economic growth

of a nation. Advocating for capital accumulation he said that it was vital to the process of economic growth. In other words, the savings done by capitalists creates investment and in turn growth in an economy. He further added that any increase or decrease of capital naturally tends to increase or diminish the real quantity of industry, the number of labor and consequently the exchangeable value of the annual produce of the land and labor of the country, the real wealth and revenue of all its inhabitants. Thus, he saw income distribution as being one of the most important determinants of how fast or slow a nation would grow.

With adequate market and capital accumulation, division of labor takes place and raises productivity. National Income rises, so large savings is possible. Population also grows which expands the market. This leads to further division of labor and more specialization with consequential gains in productivity. External economies begin to operate which mean that environmental improvements such as growth of transportation facilities, better raw materials, bring down the cost of production of individual firm. With this background it can be said that Smith postulated a supply side driven model of economic growth. His simple production function can be put forth as:

$$Y = f(L, K, T) \text{ where,}$$

Y is the output, L is the labor, K is the capital and T is the land.

Thus it can be said that output is related to inputs like land, labor and capital as inputs.

Consequently output growth is driven by, as said by Smith, population growth, investment and land growth and increase in overall productivity. Thus we have the function as:

$$G_y = f\,(G_f, G_k, G_l, G_t)$$

As proposed by Smith in his time, population growth was endogenous that is it depended on the sustenance available to accommodate the increasing workforce. Investment too was assumed to be endogenous, determined by the rate of savings (mostly by capitalists). The growth of land was dependent on the conquest of new lands or technological improvements of fertility of old lands.

Smith was of the view that technological improvements could also increase the overall growth of a nation. Smith saw improvements in machinery and international trade as engines of growth as they facilitate further specialization.

Despite of all these, Smith did not see growth as eternally rising, he posited a ceiling in the form of the stationary state where population growth and capital accumulation were zero. In words of Adam Smith, “when the stocks of many rich merchants are turned into the same trade, their mutual competition naturally tends to lower its profits, and when there is a like increase of stock in all the different trades carried on in the same society, the same competition must produce the same effect in them all”. Thus, as population grows and capital accumulation becomes large, the economy reaches a full ‘compliment of the riches’ permitted by its soil, climate and situation with respect to other countries [The Wealth of Nations, ed. E. Cannan, The Modern Library,

Random House, New York, 1937, p.94 as cited in Banerjee, M (1969) Economics of Growth – An Introduction. Katyayani Publishers, Calcutta, p.132].

In short it can be said that Smith advocated division of labor, specialization, accumulation of capital in a laissez faire ambience and emphasized a stable legal framework within which the market could function. Summing up, Smith attributed economic growth of a nation to an increase in the quantity and quality of land, labor and capital (Gylfason: 1999).

**John Stuart Mill** (1848)

J S Mill regarded economic development as a function of land, labor and capital. According to Mill capital is "a stock, previously accumulated of the products of the former labor". Increase in wealth was possible only if land and capital helped to increase the production faster than the labor force. This wealth consisted of tools, machines, and skills of the labor force. Emphasizing on the productivity of labor he said that it was productive labor that is productive of wealth and accumulation of capital. And so population was considered to be consisting of only the number of working class. The conditions of the working class can be improved only if they adopted for population control measures and thus the fruits of technological progress and capital accumulation can be enjoyed by them. The elasticity of supply of labor was considered to be high in response to a rise in the wage rates. He assumed the wages to exceed the minimum subsistence level in general cases. Wages were paid out of the capital meant for paying the wages and so they (wages) were limited by the availability of the capital. Any change in the wage rate was

brought about by the changes in the capital availability or the changes in the number of workers. The rate of capital accumulation depended upon the amount of fund from which savings can be made or the size of net produce of the industry and the strength of the disposition to save. Mill considered savings as spending because saving when used as capital is ultimately consumed in one form or the other (i.e. either for paying wages or for investment). Savings can be increased with the increase in the net produce i.e. the profits of the industry and the increased desire of the people to save. He considered the rate of capital accumulation as a function of labor force employed 'productively'. Thus it can be said that he placed more emphasis on the productivity of labor for economic growth. Profits earned by employing unproductive labor were merely transfers of income as unproductive labor does not generate wealth or income. Only the productive laborers were assumed to go for productive consumption which was essential to maintain and increase the productive powers of the community. It implied that productive consumption was an input necessary to maintain productive laborers. The rate of profit on the other hand would decline due to the diminishing returns from agriculture and an increase in the population in an economy. With absence of technical advancements in the agricultural sector and the growth rate of population being higher than the rate of capital accumulation, the rate of profit as Mill described was "within a hand's breadth of the minimum" and the economy was "on the verge of stationary state". This stationary state, as per Mill, was imminent and does not stay forever, though it can always be postponed. On the contrary, Mill welcomed the arrival of the stationary state by saying that it would lead to improvement in the income distribution and hence large remuneration for the labor. But this can be

possible only if the working class was not very large in number (as stated earlier a check on their population growth can be done with the help of measures of birth control and education). Thus in the stationary state of an economy, profit reached the minimum necessary level to prevent any further increase in population or stock of capital. However, there might still be rising standard of living due to the improvements in the art of living and increased leisure through technical progress.

Although he advocated for laissez-faire, he thought it important for the state to intervene in cases such as redistribution of the ownership of the means of production, reforms in the institutional framework of the market, compulsory education and examination system, regulation of working hours. He also advocated for free trade and defended the imposition of protective duties in the case of infant industries.

**Karl Marx** (1867)

Karl Marx further refined the classical theory by formulating a growth model and initiating the term "steady-state" growth equilibrium. The Marxian theory divided the capitalist society in two classes:

- The capitalists who owned all the means of production like the machinery and other equipments and natural resources and
- The workers who owned only the labor power which they had to offer.

The above two that is the machinery, equipment and natural resources and the labor power when combined, produced a flow of commodities which were greater than those needed to maintain intact the supply of labor and the stock of equipment. There was thus a surplus over the subsistence needs of the

workers on the one hand and the value of raw materials and equipments used up in production on the other hand. This surplus was reaped by the capitalists in the form of net profits, interest and rent. On the other hand the volume of employment was determined by the natural resources and the state of technology at a given point of time in the economy. The actual supply of labor was more than that demanded and so the surplus labor force that Marx called the 'Industrial Reserve Army' competed with the already employed labor force to keep the wages at the subsistence level. Hence, he discarded the belief that labor supply was endogenous to wages. Rather, the wages of the labor were determined by the bargaining between the capitalists and the labor. The capitalist's surplus is given by Marx in form of the following equation

$$V = c + v + s$$

Where, V = Value of total product during any period

c = Constant capital consisting of the value of plant and raw materials used up in the production process

v = Variable capital consisting of the labor value.

s = Surplus value

He derived three ratios from the above equation

s/v = rate of exploitation (surplus produced for every dollar spent on labor)

c/v = organic composition of capital (which can be viewed as a sort of capital-labor ratio)

s/c+v = rate of profit on invested capital.

According to Marx the capitalists tried to increase the rate of profit in the following three ways:

- By extending the working day
- By reducing the wages below subsistence level.

The above two have their own physical limitations as they are related to the labor force which has its own biological limitations.

- By raising the productivity of labor through improved technology i.e. by using labor-saving machinery for production and releasing the labor into unemployment.

On the one hand Marx said that technological progress is the main cause of growth as it tends to improve the productivity of labor and on the other hand he said that technological changes taking place at a rapid rate tends to replace the labor, which though benefits the capitalists to increase their surplus value, but it would also lead to unemployment of the labor force in the industries. Accumulation is beneficial to the labor as it increased their demand which would increase their wages and in turn their standard of living. When the same accumulation was done in excess amount it would lead to drawing in more and more labor force from the reserve army to the industries. When full employment was reached any amount of further accumulation would increase the wage rate and this would reduce the profits with the capitalists. Another reason for the profits to reduce was the technological changes leading to the fall of capitalism in the long run. According to him, there was a tendency for capital costs to increase relative to the labor costs. The capitalists who for the first time introduced the new technique in the market gained extra profit out of it as they were the only one with the latest technology. Later, they could

increase their profits by expanding the output under the existing conditions. This was when there are other competitors in the market with the same technology. The said expansion could be done only when the capitalist increased the labor force, raw materials and capital equipments in the existing production function, for which a part of the surplus was to be reinvested. But the increase in the organic composition of the capital had a depressing effect on the average rate of profit through rise in capital costs.

Further he said that a capitalist system is subject to cyclical fluctuations for two reasons:

- Decline in the rate of profits as explained above and
- Persistent under consumption.

The problem was that production was limited by the consuming power of society. Capitalists restricted their consumption for the reason of accumulation and laborers were unable to consume as they were exploited by the capitalists. Thus they remained poor. Factors of production when shifted from consumer goods industries to producer goods industries eventually lead to severe crisis.

He further said that the urge for more capital accumulation and surplus value led to two situations:

- Concentration, wherein there was increase in the average size of manufacturing enterprises.
- Centralization of capital which decreased the number of manufacturing enterprises.

Both concentration and centralization led to increase in the size of big businesses and misery on the part of the working class as small enterprises were either forced to close down their businesses or sell off their business to the big houses. This would reduce the number of firms in an economy and boost the surplus value with the firms. This brought out the Marxian philosophy of socialism (wherein by the above process the capitalist structure was destroyed as a whole).

But this turned out to be erroneous in case of Italy where instead of becoming poorer the working class becomes more prosperous and at the same time the national wealth too increased. The same phenomenon was also observed in the United States, Great Britain and Germany.

**Joseph Schumpeter** (1934)

Joseph Schumpeter, for the first time, drew attention of many thinkers towards the difference between the processes of economic growth and that of economic development which took place in an economy. He considered economic development to be a distinct phenomenon different from that of economic growth. Development according to him is "spontaneous and discontinuous change in the channels of the circular flow, disturbance of equilibrium, which forever alters and displaces the equilibrium state previously existing" (Banerjee, M. 1969. Economics of Growth – An Introduction. Katyayani Publishers, Calcutta, p.174).

Schumpeter's work directed the attention of growth theorists to technology, emphasizing upon invention, innovation and entrepreneurship. He considered innovation to be the main spring of autonomous investment. According to him

innovation led to increase in factor productivity by a change in the existing production function (i.e. by increasing the productivity of all the existing available resources in an economy). Innovation may take different forms like:

- introduction of a new good or a new quality of good
- introduction of a new method of production
- opening of a new market
- conquest of a new source of supply of raw materials or half-manufactured goods
- a new form of organization of industry

An important role in the Schumpeterian model was played by an entrepreneur. According to Schumpeter an entrepreneur is an innovator who stands apart from a manager and capitalist. An entrepreneur need not be an inventor of a new product or a process. The innovators function was to find out opportunities for newer products, processes and to exploit them successfully. He (entrepreneur) would raise the money, assembles the factors of production, chooses managers and sets the organization going. The entrepreneur was actuated by three kinds of motives:

- the dream and will to find a private kingdom of industrial or commercial venture
- the will to fight and conquer, to prove himself superior to others, to succeed for the sake of success and
- the joy of creating, getting things done, of just exercising his energy and ingenuity.

For the above said things the entrepreneur secured funds not from his past savings but as a credit facility provided by the banks or financial institutions.

Thus, it could be said that he emphasized the role of investments and the financial institutions in the development process of an economy. As soon as the innovation project was completed the said loan would be repaid by him to the bank from the profit so earned from the project. In the same line Schumpeter added that economic development was not a smooth and steady process as depicted by the earlier writers. There were short-run ups and downs resulting from activities like increased infrastructure, better transportation facilities, increase in the electricity, etc. Price and money income would rise as a result of imitative entrepreneurial activities. Productive factors would be released from consumption goods. Forced savings would take place and speculation would develop. When credit was availed by the innovator and innovation took place, it resulted in better quality and increase in the flow of products, and old firms might find their markets destroyed or diminished. As loans were repaid by the entrepreneurs, deflationary forces might set in motion which might cause fall in prices and incomes. Before there was full scale depression in the economy, the climate might again be ripe for entrepreneurial activity. So a new equilibrium would be reached and this equilibrium would be higher than the one from which the growth began. Over the long periods the national and per capita income in real terms rise continually and all the major income groups benefit. The Schumpeterian theory believed in the breakdown of the capitalism but the reasons for the same were different. According to him, capitalism saw a break down not due to the economic failure but due to the impact of success on the social institutions and socialism, finally making a ground for itself in the economy. There are five trends which provide for the same:

- Innovation as it proceeds and succeeds, degenerates into a routine activity carried out by a bureaucracy of trained managers.
- The original institutional framework is destroyed. As rightly put forward by Harper and Row, 'Dematerialized, defunctionalized and absentee ownership does not impress and call for the moral allegiance as the vital form of property did. Eventually there will be nobody left who really cares to stand for it'[3]
- Industrialists and merchants enter into political arena and wield power and rule society but are unable to tackle domestic and international problems.
- Capitalism leads to the rise of the intellectual class, the educated white-collar groups who find employment opportunities insufficient in terms of their training and aspirations. They criticize persons, current events, classes and institutions and become hostile to the social order.
- The traditional idea of the home is replaced by a longing for more leisure, freedom and real income. The accumulation drive is weakened.

**Harrod-Domar** (1939 & 1946)

The Harrod-Domar model developed in 1930s suggests that savings provided with the funds which were borrowed for investment purposes. It was initially developed to analyze the business cycles. It was later adopted to explain economic growth.

Before the model could be discussed, let us consider following features:

[3] Capitalism, Socialism and Democracy, New York, 1950 p.142

Capital accumulation or investment has a vital role to play in the model. Investment has been considered as both demand and supply i.e. a source of productive capacity as well as income to consume the products.

The model can also be called as derivative of the Keynesian income analysis. Thus, it can be said that the Harrod-Domar model tried to review the theory of growth in the Keynesian perspective of full employment (which Keynes provided for short-run) in the long-run.

Their main question was 'was equilibrium possible over the long period?' They wanted to find a solution to the long-run period using the same tools as provided in the Keynesian system with a different setting and few significant differences. They also assumed some ceteris paribus. As Harrod himself have put it 'sooner or later we shall be faced once more with the problem of stagnation and it is to this problem that economists should devote their attention'.

The essence of the model is that maintenance of full employment depended on an ever-expanding amount of investment. This in turn required a continuous growth in real national income. An increase in investment accompanied by an increase in income, might lead to one of the following three situations:

- new productive capacity may just remain unutilized
- it may replace the old capacity, displacing its labor and
- it may be substituted for labor or other factors.

Thus it would result in unemployment of labor or capital. So it was necessary that the volume of spending generated by investment (since it also led to

income) was sufficient to absorb the output of the additional productive capacity resulting from investment.

The model had been appropriately labeled the Capital Stock Adjustment Theory because its problem was the adjustment of capital stock to the rate of output.

The model is meant primarily for the developed countries, which according to Harrod-Domar, are faced with the danger of 'stagnation' or 'mature economy'. It was later extended to the underdeveloped nations.

Having seen the above features the Harrod-Domar model can be constructed as below:

The basic postulations that are to be kept in mind while constructing the model are as follows:

- The capital-output ratio i.e. the number of units of capital required to produce a unit of output is constant. It is on this basis that the generation of total output is related to the available capital stock.
- Total savings in any period are a given fraction of total income or output. This theory of savings follows from the Keynesian concept of the propensity to save.
- All savings are automatically invested and become additions to the capital stock.

Based on the above assumption the equations can be derived as follows:

First we shall present the savings and investment equations and later we shall combine the two to get the growth equation.

Let $Y_t$ be the level of national income in period t and $Y_{t+1}$ that in period t+1. If $\Delta Y$ is chosen to indicate the increase of income in period t+1 over period t, then

$$\Delta Y = Y_{t+1} - Y_t$$

Now let $I_t$ be invested in period t which turns out productive capacity in period t+1 and C/O represents the capital-output ratio.

It follows that since capital C produces output O,

$$\Delta Y = I_t \times O/C$$

Where O/C signifies output in relation to capital or the productivity of capital. It is easy to see that the productivity of capital is the inverse of capital-output ratio.

If both sides of the above equation are divided by $Y_t$, the result is

$$\Delta Y/Y_t = I_t/Y_t \times O/C \qquad (1)$$

On the other hand, for every level of income and employment, there is equality between saving and investment. Thus if $S_t$ represents savings in period t, then

$$I_t = S_t \qquad (2)$$

So $S_t$ can be substituted for $I_t$ in equation I. The result is

$$\Delta Y/Y_t = S_t/Y_t \times O/C$$

Since $\Delta Y/Y_t$ represents the rate of growth of output,

$$G = S_t/Y_t \times O/C$$

Where, G = rate of growth

$S_t/Y_t$ = ratio of savings to income or output

O/C = ratio of output to capital

Thus, this leads to the equation,

$$G = S/K$$

Where, S = savings income ratio

K = incremental capital output ratio

Thus, the rate of growth depends on two factors:

- the propensity to save
- the average productivity of investment

The various growth rates as discussed in the model are:

a) Steady Growth: Based on the above equation, the conditions for a steady rate of growth which led to a full employment of growing resources are clear viz. desired savings out of a full employment level of income must be counterbalanced by an equal amount of desired investment. But there were some lacuna in the economy for the assumption that all intentions to save were realized but intentions to invest might sometimes be frustrated. The desired savings might exceed desired investment leading to inventory accumulation.

b) Actual Growth Rate (G): The actual growth rate is that rate of growth, as Harrod said, that actually takes place on the basis of the available factors of production and at their existing level of utilization.

c) Warranted Rate of Growth ($G_w$): In the words of Harrod, the warranted rate of growth is "that rate of growth which if it occurs will leave all parties satisfied that they have produced neither more or less than the right amount. Or to state the matter otherwise, it will put them into a frame of mind which will cause them to give such orders as will maintain the same rate of growth"[4]. In simple words it is that rate of growth that is required for the full utilization of the growing stock of capital.

d) Natural Rate of Growth ($G_n$): The natural rate of growth is that rate of growth which in the presence of full employment is permitted by the growth in the labor force and rate of technological progress. It is thus the maximum rate of growth that the economy can achieve given the rate of growth in the factors of production. "Broadly conceived, it is a ceiling growth rate where capital requirements are set by the combined growth in population and production techniques"[5].

He further said that there are upper limits or constraints to departures from the path of steady state growth. The upper limit was provided by the Natural Rate of Growth, the full employment ceiling beyond which real income cannot grow due to shortage of resources. The lower limit was set by a number of circumstances like the flow of autonomous investment, the rate of depreciation, etc.

[4] An Essay in Dynamic Theory, Economic Journal, March 1939 p.16
[5] Hamberg, *Economic Growth and Instability*, W W Norton & Co. Inc., New York, 1956

The dynamic equilibrium envisaged in the Harrod-Domar model was of a feeble nature. This was often referred to as the knife-edge problem. Disequilibrium was caused by two factors:

- the difference between the warranted and the natural rates of growth and
- instability of the warranted rate itself. This was considered as the real knife-edge problem by F. H. Hahn and R. C. O. Matthews.

The implications of Harrod-Domar model can be seen in a way that encourage saving and/or generate technological advances, which lower capital-output ratio.

**M. Kalecki** (1939)

According to Kalecki, investment in fixed capital per unit of time was determined with a time lag by the following three factors:

- The current internal gross savings of the firms
- The rate of increase in profits.

The above two had a positive influence on investment in fixed capital, while the next one would have a negative influence.

- The rate of increase in the volume of capital equipment.

Investment decisions in a given period were followed by actual investment but with a time lag. This time lag was largely due to the period of construction but also reflected such factors as delayed entrepreneurial reactions. There was a gradual fall in investment not through the accelerator mechanism but because of the accumulation of capital stock, the partial re-investment of business savings and the higher risks involved in new fields. His model as described by

Hamberg is “essentially ‘cobweb’ in structure because once investment was deemed to have reached a satisfactory or equilibrium level, the continuation to completion of investment projects resulting from prior investment decisions built up the capital stock beyond desired levels, reducing investment and bringing on a slump in output and employment (Theory of Economic Dynamics). On the other hand, when the bottom of slump was reached, since depreciation of capital was not made good, a relative scarcity of capital made itself felt and the rate of profit rose. This called forth new investment and moved the economy in the upward direction.

In Kalecki’s view long-term development was not inherent in the capitalist economy. Specific developmental factors were needed to sustain a long-term upward movement. Innovations were the most important promoter of development. They tend to increase the long-run level of investment and this made for a long-run upward trend. A decline in the intensity of inventions in the later stages of capitalist development resulted in a retardation of the increase in capital and output. ‘Rentier’ savings, consisting of current savings outside firms, tend to depress investment and this detracted from long-run development. If the effect of the increase in the degree of monopoly upon the distribution of National Income was not counteracted by other factors, there would be a relative shift from wages to profits and this would constitute another reason for the slowing down of the long-run rise in output. If the rate of expansion in output fell below the combined rate of increase in productivity of labor and in population, unemployment would show a long-run rise.

**Rosenstein – Rodan** (1943)

Prof Paul N. Rosenstein – Rodan developed his “big push” thesis saying that a “big push” or a large comprehensive program was needed in the form of a high minimum amount of investment to overcome the obstacles of development in an underdeveloped economy and to launch it on the path to progress. The theory stated that proceeding “bit by bit” will not launch the economy successfully on the development path; rather a minimum amount of investment was a necessary condition for this. It necessitated the obtaining of external economies that arise from the simultaneous establishment of technically interdependent industries. Thus indivisibilities and external economies flowing from a minimum quantum of investment were a prerequisite for launching economic development successfully. He distinguished between three different kinds of indivisibilities and external economies.

1) Indivisibilities in the production function, especially the indivisibility of the supply of social production function. According to him, indivisibilities of inputs, outputs or processes lead to increasing returns. He regarded social overhead capital as the most important instance of indivisibility and hence of external economies on the supply side. The services of social overhead capital comprising of industries like power, transport and communications are indirectly productive and have a long gestation period. They cannot be imported and their installations required a sizeable initial lump of investment. So, excess capacity was likely to remain in them for some time. They also possessed an irreducible minimum industry mix of different public utilities, so that an underdeveloped country would have to invest between 30-40 percent

of its total investment in these channels. Thus, social overhead capital was characterized by four indivisibilities

a) It was irreversible in time and therefore must precede other directly productive investments.

b) It had a minimum durability, thus making it very lumpy

c) It had a long gestation period

d) It had an irreducible minimum industry mix of different kinds of public utilities

These indivisibilities of supply of social overhead capital were one of the principal obstacles to development in underdeveloped countries. Therefore, a high initial investment in social overhead capital was necessary in order to pave the way for quick-yielding directly productive investments.

2) Indivisibility of demand or the complementarity of demand requires simultaneous setting up of interdependent industries in underdeveloped countries. This was because individual investment projects have high risks as low income limit the demand for their products. The complementarity of demand reduced the risk of finding a market and increased the incentive to invest. In other words, it was the indivisibility of demand which necessitated a high minimum quantum of investment in interdependent industries to enlarge the size of the market.

3) Indivisibility in the supply of savings or a high income elasticity of saving was the third indivisibility. A high minimum size of investment required a high volume of savings. This was not easy to achieve in underdeveloped

countries because of low incomes. To overcome this it was essential that when incomes increased due to an increase in investment, the marginal rate of saving should be very much higher than the average rate of savings.

Given these three indivisibilities and the external economies to which they give rise, a “big push” or a minimum quantum of investment was necessary to overcome the obstacles to development in underdeveloped countries. Proceeding bit by bit in an isolated and small way does not lead to a sufficient impact on growth. A climate for development is only created when investment of a minimum speed or size was made within an underdeveloped economy.

**J R Hicks** (1950)

Shortcomings in the Harrod-Domar model led to the formulation of many other models of growth in recent times. An important refinement has been made by J R Hicks. Hicks integrated a theory of the trade cycle with that of growth and introduced time lags and psychological elements in respect to which the Harrod-Domar model was weak.

Harrod had provided for an upper limit to the growth of the real income in the ceiling imposed by the availability of the factors of production. But his explanation of how the downward swing started was not satisfactory enough. Hicks presented realistic features of the floors and ceilings. In an upward movement when there are no factor of production, natural resources, capital equipment or technical knowledge, production cannot increase further. If producers on psychological grounds tried to increase production, it would only cause a rise in the prices of goods and factor-services. But this cannot last. Sooner or later, further production must come to a stop and fresh

investment must cease. So the accelerator (the relationship between the level of investment and the rate of increase in income) would disappear. At this stage disinvestment was likely to take place. It meant negative investment which consisted in not replacing the worn-out capital goods. But producers cannot go on that way till capital goods disappear. Gross investment cannot fall below zero. When the floor is reached, some basic investment for replacing inventories and equipment becomes necessary. At this stage autonomous investment asserted itself. Investment is larger than disinvestment. This caused an upward turn of the income. The accelerator and the multiplier operated again to push the economy.

Thus, Hicks superimposed in the accelerator a constant rate i.e. percentage of growth of autonomous investment. It was this rate which determined the equilibrium growth of national income. In conjunction with the multiplier it established the equilibrium level of the output of the economy.

**Arthur Lewis** (1954)

A theory of growth for thickly populated, underdeveloped countries was formulated by Sir Arthur Lewis in 1954. As the population is large in relation to capital and natural resources, it is assumed that there is unlimited supply of labor in such economies. Thus, the theory assumed for the elasticity in the supply of labor at subsistence wage rate. Another assumption is that, the economy consisted of two sectors:

- The subsistence: This sector consisted of the farmers, casual workers, petty traders and so on who suffered from disguised unemployment and

- The capitalists: The capitalists were the owners of the high capitalized industries, highly concentrated at a number of points in the economy.

The wages which the capitalist sector had to pay to the subsistence sector were determined by what people could earn outside that sector. Now, the wages in the capitalist sector were higher as compared to the subsistence sector. Taking advantage of the low wages in the subsistence sector, the capitalists sector would make profit. The key to the process of growth was the use which was made of the surplus (the profit earned as a case of low wages to the subsistence sector) in the capitalist sector. The capitalists' surplus was reinvested in creating new capital. As a result the sector expanded and there was an autonomous expansion in the demand for the products of industry. The laborers from the subsistence sector would now seek employment in the capitalist sector. There would be further rise in the demand, pushing up prices and profits of the capitalist sector. This process would continue causing economic growth in an economy.

Lewis said that the above process of economic growth would not go on indefinitely in any economy. It would come to an arrest when disguised unemployment in agriculture is eliminated by transfer of labor to industry. Wages in the agricultural sector would rise as it felt the impact of relative shortage of labor. At the stage where transfer of labor ceases, the marginal productivities would equal in both the sectors. In the mean time, however, economic development would take place through increased capital formation and expansion of industries. It also proved beneficial to labor by raising the wages above subsistence level.

Improvising upon the above theory, Lewis said that "capital is not the only requirement for growth and if capital is made without at the same time providing a fruitful framework for its use, it will be wasted". He rightly emphasized in this connection the contribution of attitudes, research, technology, administrative experience to grow and the role of the state in capital formation and of economic development.

Thus Lewis's theory of economic growth could be described appropriately as a framework for studying economic development in general perspective for the major underdeveloped, populated economies.

**Lewis – Ranis – Fei** (Arthur Lewis, 1954; Gustav Ranis & John Fei, 1961, 1964)

The LRF model of economic growth is more of a model of economic development rather than economic growth. Using the classical assumption of subsistence wage rate, the model is build to understand the theory of Surplus Labor (unemployment and underemployment of labor in a dualistic developing nation). It was basically developed to study the initiation of growth in a developing nation with two sectors - traditional sector and modern sector. The basic assumptions on which the model was based are:

1. There are two sectors in an economy – the traditional agricultural sector and the modern industrial (manufacturing) sector.
2. The agricultural sector has virtually no capital and technology
3. There are surplus labor in the agricultural sector
4. The marginal productivity of the surplus labor in the agricultural sector is zero

5. These excess (surplus) laborers from the agricultural sector can be transferred to the industrial (manufacturing) sector with no change in the agricultural total output.
6. Wages in the industrial sector are higher than the subsistence wages in the agricultural sector attracting unlimited supply of unskilled rural labor to the industrial urban areas

The employer hired more and more workers till the value of its extra product (marginal revenue product) equaled the wages in the industrial sector (i.e. above the subsistence wage rate). Further, it was assumed that the capitalists saved the entire surplus which was reinvested in the form of capital into the business and the workers saved nothing. This reinvestment of surplus (profit) added to the capital formation thus raising the capital labor ratio i.e. the amount of capital per worker. This in turn increased the labor's marginal productivity leading to an increase in the number of workers hired and the surplus. This cycle continues till all the surplus labor from the agricultural sector was absorbed in the industrial sector. Beyond this point more labor could be hired only with higher wages offered. Thus the economic growth of such an economy took place with the structural changes that took place (transformation of an agricultural economy into an industrialized economy).

The critics argued that the larger industrial labor force contributed to greater food demand, not to forget the agricultural output was assumed to be constant. This would lead to a raise in the food prices which must be balanced with an increase in the wage rates. They go ahead with criticizing Lewis for his overestimating the extent that the availability of cheap rural migrant labor can stimulate industrial growth.

Later this theory of Lewis was modified by John Fei and Gustav Ranis with the incorporation of technological changes in the agricultural sector which led to growth of this sector, expansion in the population of the economy, and the government intervention in the form of non market forces supporting and maintaining the institutional wage (minimum wages or labor union pressures)[6]. In order to avoid the problem of increasing the average product of labor in agriculture, and the industrial institutional wage that would halt industrial expansion, they suggested that the less developed countries maintain a constitutional wage wherein each farm worker took his or her own subsistence bundle to the industrial sector.

Lewis, Fei and Ranis significantly contributed to the literature on economic growth, however, they did not formulate a cohesive theory of economic growth. Instead, they mentioned new dimensions to the existing theories of growth and thereby looking at things in a different manner.

**N. Kaldor** (1956)

In Kaldor's model it was the ratio of savings to income rather than the required capital-output ratio that bared the burden of adjustment for equilibrium. Kaldor's model of economic growth was considered as a Keynesian version of economic growth as saving adjusted passively to investment. He adopted the Keynesian view that savings depended upon investment meaning that investment was determined independently of the saving propensities on the basis of entrepreneurial investment decisions. This

[6] This institutional wage can remain infinitely elastic even when the marginal revenue productivity of labor is greater than zero; this wage remains at the same level as long as marginal productivity is less than the wage

contrasted the pre-Keynesian models where investment was governed by savings. A distinctive feature of these models was that savings and investment combine to determine, inter alia, the distribution of income.

Investment at a particular period was a function partly of the change in output in the previous period and partly of the change in the rate of profit on capital in that period. Given full employment, a rise in investment and thus in total demand will raise prices and profit margins and this reduce real consumption, whilst a fall in investment and thus in total demand, causes a fall in prices (relatively to the wage level) and thereby generates a corresponding rise in real consumption. Assuming flexible prices (or rather flexible profit margins) the system is thus stable at full employment. The model operates only if the two saving propensities differ and the marginal propensity to save from the profits exceeds that from wages i.e. the stability condition.

He also gave importance to the technological progress as factor of growth which was embodied in capital accumulation. The prime mover in the process of growth was the capacity and readiness of the economy to absorb technological improvements and to invest capital in business ventures. As the share of profits in the national income increased, savings ratio also would rise. There was equilibrium rate of growth when the profit rate is such as to equate savings and investment.

In his later work called 'Economic Growth and the Problem of Inflation' (Part II Economica, November 1959), Kaldor emphasized the effects of inflation in real rates of interest as an incentive to larger investment. When prices rose during inflation, real rate of interest tend to fall. This would encourage greater

fall of resources into investment. By maintaining prices at a sufficient high level, booms can be perpetuated. A slow and steady rate of inflation acted as the most powerful aid to a steady rate of economic progress.

In his works with T A Mirrlees, 'A New Model of Economic Growth' (review of Economic Studies, Vol.XXIX, June 1962), forecasted 'high level stagnation' for the advanced capitalist countries, by reason of labor shortages and shifts in demand from goods to services, as standard of living rose. These would combine to check the growth of manufacturing and hence of income as a whole.

**Joan Robinson** (1956)

The growth model of Mrs. Robinson is included in the Cambridge models as it rests on the neo-Keynesian argument that savings ex-ante adjusts passively to planned investment through changes in income distribution. She too, as other Cambridge growth models, rejected the neoclassical production function.

Joan Robinson's model is based on the understated assumptions:

- There exists a laissez-faire closed economy.
- Capital and labor are the only productive factors in the economy.
- Capital and labor are combined in fixed proportions in order to produce the given output.
- There is neutral technical progress.
- Capital formation depends on the way in which income is distributed. If a major part of the income goes with the capitalists there is more capital formation than if it goes to the laborers.

- Utilization of labor depends on the supply of capital on one hand and that of labor on the other.
- Wage earners spend their income wholly on consumption and profit makers on investment (from their profits) without any consumption.
- Savings equal investments (S = I). (Because of the above assumption)
- There are no changes in the price levels.

The net National Income in Robinson model was the sum of the total wages and the profits:

$$Y = wN + pK$$

Where; Y = Net National Income

w = Real wage rate

N = Number of laborers

p = Profit Rate

K = Amount of capital

And so it can be said that National Income or output is the function of labor and capital. Profit rate can thus be shown as:

$p = Y - wN/K$

$p = Y/N - w/K/N$ (dividing by N)

Where; p = Profit rate

w = Wage rate

Y/N = Labor productivity

K/N = Capital – Labor ratio

If $Y/N = \alpha$ and $K/N = \beta$, then we have

$$p = \alpha - w/\beta$$

The rate of profit depended on the relationship between the income that remained after wage payment and the capital/labor ratio. Thus in order to define the profit rate it could be said that the profit rate is the ratio of labor productivity minus the total real wage rate to the amount of capital utilized per unit of labor.

The growth rate of capital being equal to the profit rate depended on the ratio of the net return on capital relative to the given stock of capital. If the income after deducting wages is constant and the capital-labor ratio is high, profit rate and the rate of capital formation were low and vice versa.

The growth rate of population was another factor which determined the growth rate of the economy. Full employment was possible if the growth rate of population was matched by that of capital (growth rate). This was called the 'Golden Age' i.e. a smooth and steady growth with full employment. An increase in population and labor force without an increase in capital reduced labor productivity and if real wages are constant, it lowered the margin of profit and widened the gap between supply of capital and that of labor. This resulted in unemployment. If population increased faster than capital, equilibrium might be attained only by an equilibrating behavior of profit-wage relationship i.e. if excess of labor caused fall in real wage rates and increased the rate of profit leading to a growth of capital to catch up with population. But if real wage rates did not fall or the wage rate fell in the same proportion

as prices, the result was progressive underemployment. Rise in prices helped capital formation if there was no corresponding rise in wages. On the other hand if capital growth exceeded the growth of population, equilibrium might be regained through technological improvements and shifting of the whole production function so that the economy was adjusted to a higher capital-labor ratio.

According to Mrs. Robinson, an economy was in the golden age when the potential growth ratio was being realized. The potential growth ratio represented the highest rate of capital accumulation that could be permanently maintained at a constant rate of profit. This growth ratio was approximately equal to the proportionate rate of labor force plus the proportionate rate of growth of output per head. The golden age was not an ideal one. A new growth ratio made a new golden age possible. A static state was a special case of a golden age where the growth ratio was zero, the profit rate was also zero and the wages absorbed the entire net output of industry. Robinson called this “the state of economic bliss” since consumption was at the maximum level which could be permanently maintained in the given technical conditions. This, in the Harrodian terminology is a state where the natural, actual and the warranted rates of growth are equal.

The rate of technical progress depended upon the demand and supply of labor. When the firms fail to take advantage of the profitable markets expanding around them, they try to adopt labor-saving devices. This was because the rate of technical progress was defined as the rise in output per head, assuming zero growth rate of population. However, technical progress continues even when there was massive unemployment. Robinson pointed out

that the growth of knowledge may lead to 'autonomous innovations', competition among firms may lead to 'competitive innovations' and the scarcity of labor may lead to 'induced innovations'. The desired rate of growth may fall short of the possible rate of growth due to competitive and autonomous innovations. This desired rate of growth is the rate of accumulation which made the firms satisfied with the situation in which they found themselves. It was determined by the rate of profit caused by the rate of accumulation, and the rate of accumulation induced by that rate of profit. On the other hand, the possible growth rate depended upon the physical conditions resulting from the growth of population and technical knowledge. When the desired growth rate equaled the possible growth rate at near full employment, the economy was in a golden age. The real wage rate was rising with increasing output per head due to technical progress. But the rate of profit on capital remained constant. And the techniques of production appropriated to the rate of profit were chosen.

**Solow** (1956)

A Keynesian, Solow's major paper on growth was "A Contribution to the Theory of Growth" in which he presented a mathematical model of growth that was a version of the Harrod-Domar growth model. Only with the difference of dropping out one of the Harrod-Domar assumption of fixed proportions in production. Solow was the first to develop a growth model with different vintages of capital. The idea was that because capital is produced based on known technology and by improving the technology the new capital was more valuable than the old one. He established the primacy of

technological progress in accounting for sustained increases in output per worker.

The Solow model assumed that GDP is produced according to an aggregate production function technology. Output can be produced by both labor and capital taking a Cobb-Douglas production function with constant returns to scale, we have

$Y = L^a K^{1-a}$

Where Y = Output

L = Labor

K = Capital

a = Share of labor in output

1-a = Share of capital in output ($a<0<1$)

The above production function in terms of growth rate can be written as:

$$g = an + (1-a)\,\Delta K/K$$

Where $g = \Delta Y/Y$ i.e. Rate of growth of output

$n = \Delta L/L$ i.e. Rate of growth of labor force

and $\Delta K/K$ is the Rate of growth of capital stock

Now if the capital/output ratio i.e. K/Y is constant in the long run, so that $\Delta K/K = g$, then output per capita must also be constant because g = n (as in the above equation). And therefore it can be said that the long run growth is exogenous. But when g = n the growth of output per capita is zero. And so in

order to explain the observed growth of output per capita, Solow invoked technological progress adding a technological shift parameter to the original Cobb-Douglas production function.

$$Y = AL^{a}K^{1-a}$$

Where, the additional A is the technological progress or the multifactor productivity measuring the productive efficiency of the factors or the so-called Solow residual i.e. the total factor productivity. If we assumed technology to grow at a given rate (aq), embodied in labor, we have $A = Be^{aqt}$, where B is constant representing an initial state of technology.

With more and better education, labor becomes more and more productive over time and so in order to express labor input in units of efficiency we can write:

$$Y = B(e^{qt}L)^{a} K^{1-a}$$

The rate of technological progress (aq) is less than the rate of growth of labor productivity (q) because the quality of capital is unchanged as per the assumption. Whereas, the technical progress was assumed to be in the form of increased labor productivity. Thus the rate of growth of output can be:

$$G = a\,(n + q) + (1 - a)\,\Delta K/K$$

As before if $\Delta K/K = g$, then the output per efficiency unit of labor us constant and

$$g = n + q$$

And therefore the long run growth is still exogenous. And the long run growth of output per capita is no longer zero. In the long run savings and efficiency make no difference for growth unless they affect the rate of technological change.

Solving the Harrod-Domar equation for capital/output ratio:

$$v = s/ g + \delta = s/ n + q + \delta$$

Including gross investment (sum of net and replacement investments) we have:

$$I/Y = K/Y (\Delta K/K + \delta)$$

As savings equals investment in the long run (S=I), I/Y equals savings rate (s) and the above equation can be solved for capital/output ratio as

$$K/Y = s/ \Delta K/K + \delta$$

As long as the saving rate, the depreciation rate and the rate of growth of the capital stock are constant, the capital/output ratio must also be constant. For given s and δ, a constant rate of growth of capital stock must be equal to the rate of growth of output, for that is the only way for the capital/output ratio to stay put.

If the rate of growth of capital stock is constant, then it must be equal to the rate of growth of output. And therefore we have:

$$g = a (n + q) + (1-a) (s.Y/K - \delta)$$

This equation tells us that an increase in the saving rate must increase the rate of growth of output so long as the capital/output ratio remains unchanged.

But the capital/output ratio will not stay put.

**Gunnar Myrdal** (1957)

Myrdal analyzed the problem of underdevelopment in his earlier works from the standpoint of regional and international inequalities. Within the boundaries of an underdeveloped country some regions may have advantages over others in more raw materials and thinness of population. Expansion of trade also helped this process.

Myrdal distinguished between 'spread' and 'backwash' effects. The 'spread' effect represented the spreading and sharing of prosperity while the backwash effect represented the aggravation of differences in income and other economic benefits. Expansion in one region had both kinds of effects on another region but the spread effects were more predominant. So Myrdal suggested economic integration through equalization of factor prices as a pre-condition for development. If labor could earn money in industry than in agriculture, but does not move there is a strong case for reallocation. Similarly in the world economy as a whole there are disequalizing forces. Trade between underdeveloped and advanced countries, because of 'circular causation' leading to vicious spirals and backwash effects, resulted in a tendency away from equilibrium and aggravates the differences between the productivity of the two countries. The shifts in the terms of trade in favor of advanced countries resulted in increasing the differences in their standards of living from those of underdeveloped ones. So the policy in international factor movements, including foreign investments needed recasting in favor of a lashing benefit to underdeveloped economies.

**W. W. Rostow** (1959)

Rostow gave an outstanding theory of economic growth popularly known as the 'stage' theory of economic growth. His theory of growth can be considered as an alternative to the Marx's theory of modern history.

According to Rostow there are five stages of economic growth in any economy. An economy would pass through these stages during its process of economic growth. These stages can be briefed as:

1) Traditional Society: The initial stage of an economy wherein the structure (of the traditional society) is developed within a limited production function. This meant that the production or output is carried out through the most backward and traditional means of production. No technology is used or applied for production. Thus a ceiling existed on the level of attainable output per head. As a result there would be limited and small amount of output for the use or consumption of the existing population.

2) Pre-Conditions for Take-off: This is the stage from where the economy strives to attain growth. The pre-conditions for take-off can be described as the ways and means that are necessary to exploit the fruits of modern science and to repel the diminishing returns. Thus, enjoying the blessings and choices opened up by the rapid economic growth taking place in the economy.

3) Take-off: It is the interval when the old blocks and resistances to steady growth would be finally overcome. The forces leading to economic progress expand and dominate the society. Growth becomes its normal feature. For the take-off to take place three conditions were put forth by Rostow during the mid twentieth century:

- Rise in the rate of productive investment from 5% or less to over 10% of National Income.
- Development of one or more substantial manufacturing sectors with a high rate of growth and
- The existence or quick emergence of a political, social and institutional framework which exploits the impulses to expansion in the modern sector and the potential external economy effects of the take-off gives to growth an ongoing character. This implies a considerable capability to mobilize capital from domestic sources.

His findings indicated that in a decade or two the economic, social and political structure of society would change in a way that would make the process of growth self sustained.

4) Drive to Maturity: After the third stage of take-off the next stage viz. the drive towards maturity would take a long time. During this stage the economy would achieve sustained progress. It would extend its modern technology over the whole front of activity and steadily invest a substantial percentage of national income so that output outstrips increase in population. This would help in accelerating new industries in the economy. Goods formerly imported would now be produced at home, developing requirements for new imports and new export commodities matching them. The society would develop new values and institutions to keep up with the efficient production. He further added that maturity is a stage in which an economy has the technology and the entrepreneurial skills that an economy could produce not just everything but anything that it chooses to produce.

5) The Age of High Mass Consumption: During this stage the leading sectors of the economy would shift towards durable consumer goods and services. The three objectives here are:

- The welfare state
- Extension of consumption beyond basic to better food, clothing and shelter along with the mass consumption of durable goods and services and
- National pursuit of external power and influence through increased allocation of more resources to military and foreign policies.

Thus, an economy would have to submit to all the above stages when in the process of economic growth.

**Meade** (1961)

Prof J E. Meade constructed a model of economic growth to show the way in which the simplest form of economic system would behave during a process of equilibrium growth. The basic assumptions on which the model was built are:

1. There is a laissez-faire economy which is a closed economy

2. There is perfect competition in the economy

3. There are constant returns to scale

4. Two commodities are produced in the economy, consumption and capital goods

5. Machines are the only form of capital in the economy and are alike

6. There is a constant money price of consumption goods

7. Land and labor are fully utilized

8. The ratio of labor to machinery can be changed both in the short and long run. He calls it as the assumption of perfect malleability of machinery

9. There is perfect substitutability in production between capital goods and consumption goods

10. Each year some percentage of machines wears our which requires replacement i.e. depreciation by evaporation

The net output, in an economy with the above stated assumptions, was produced depending upon:

a) The net stock of capital available in the form of machines

b) The amount of available labor force

c) The availability of land and natural resources

d) The state of technical knowledge which continues to improve through time.

This relationship was expressed in the form of a production function as -

$$Y = f(K, L, N, t)$$

Where, Y = Net output or National Income

K = Existing stock of capital (machines)

L = Labor force

N = Land and Natural Resources

t = Time, signifying technical progress

Assuming the amount of land and natural resources to be fixed, net output can increase in any one year with the growth in K, L and t. This can be shown as

$$\Delta Y = V\Delta K + W\Delta L + Y'$$

Where, $\Delta$ = an increase in each case

V = marginal product of capital

W = marginal product of labor

Y' = t (time, signifying technical progress)

The annual proportionate growth rate of output is

$$\Delta Y/Y = (VK/Y \,.\, \Delta K/K) + (WL/Y \,.\, \Delta L/L) + \Delta Y'/Y$$

Where, $\Delta Y/Y$ = proportionate growth rate of output

$\Delta K/K$ = proportionate growth rate of stock of capital

$\Delta L/L$ = proportionate growth rate of labor force

$\Delta Y'/Y$ = proportionate growth rate of technical progress during a year

Let these proportionate growth rates be expressed as y, k, ℓ, and r respectively, the proportionate marginal product of capital VK/Y as U (i.e. the proportion of the net national income being paid as profits to the owners of machines) and the proportional marginal product of labor WL/Y as Q (the proportion of income going to the labor force as wages). Thus the above equation can be written as

$$y = Uk + Q\ell + r$$

This equation shows that the growth rate of output (y) is the weighted sum of three other growth rates viz. the growth rate in stock of capital (k) weighted by the proportional marginal product of capital (U); the growth rate of population (ℓ) weighted by the marginal product of labor (Q), and the growth rate of technology (r). But the real index of the growth of the economy is the growth rate of real income per head rather than the growth rate of income (y). The growth rate of real income per head is

$$y - \ell = Uk + Q\ell + r - \ell$$

$$y - \ell = Uk - \ell + Q\ell + r$$

$$y - \ell = Uk - (1 - Q)\ell + r$$

The equation revealed that the growth rate of real income per head was raised in two ways

1. By an increase in the rate of real capital (k) weighted by its proportional marginal product (U) and
2. By an increase in the rate of technical progress (r).

While it was depressed by the growth rate of population (ℓ) weighted by one minus the proportional marginal product of labor (1-Q). The [– (1 - Q) ℓ] shows the tendency for diminishing returns as the quantity of labor is increased on a given amount of land and capital.

The addition to the stock of capital, ΔK, is equal to the savings out of the net national income. Thus,

$$\Delta K = SY, \text{ and}$$

$$k = \Delta K/K = SY/K$$

where SY represents the amount annually added to the stock of capital through savings (S is the propensity to save and not absolute savings). Thus,

$$Uk = VK/Y * SY/K = VS$$

Hence the basic growth relationship can be expressed as

$$y - \ell = VS - (1-Q)\ell + r$$

Assuming $\ell$ and r to be given and constant, changes in growth rate would be determined by the behavior of V, S and Q over time. If there is no change in the population ($\ell$) and technical progress (r), an increase in the rate of savings (S) would raise capital per head and bring a decline in the marginal product of capital (V). This decline in V will, however, be less if it is possible to substitute capital for land and labor. And if technical progress takes place, V will tend to rise instead of declining. But the amount of land and labor being fixed in the economy, more capital per head will be used and at the same time technical progress will tend to raise V. Under these conditions, the rate of growth of income per head over time would rise which in turn would tend to rise S. There will be a tendency for S to rise still further due to a change in income distribution towards larger profits caused by the above mentioned factors. We may conclude that with a constant population, real income per head depends upon the rate of capital accumulation and technical progress. Thus,

$$y - \ell = VS - (1-Q)\ell + r$$

$$y = VS + r \qquad (\text{Since } \ell = 0)$$

If the rate of technical progress along with population growth is assumed to be constant, the growth rate in income per head will vary directly with VS.

The state of steady economic growth requires the existence of the following three conditions to endure a constant growth rate in total income:

1. All elasticities of substitution between the various factors are equal to unity
2. Technical progress is neutral towards all factors
3. The proportions of profits saved, of wages saved, and of rent saved are all constant

Conditions 1 and 2 meant that the proportions of the national income going to profits, wages and rents remain constant. So the proportions of national income saved out of these remunerations of factors remain constant as per condition 3. Let these savings out of profits, wages and rents be represented by Sv, Sw and Sg respectively, so that total savings

$$S = SvU + SwQ + SgZ.$$

Since all the elements in this equation are constant vide conditions 1, 2 and 3 it follows that the ratio of total savings to total national income will also be constant. The growth rate of income is represented by the basic relationship

$$y = Uk + Q\ell + r$$

wherein U, Q, ℓ and r are assumed to be constant. Therefore, for y to be constant, k should be constant. Knowing that k = SY/K is constant. Y/K will be constant if the rate of growth of Y and K is the same which implies that y = k. The obvious conclusion follows that the growth rate of income will be constant if the growth rate of capital stock is equal to the growth rate of national income.

The equilibrium position ultimately depended upon the rate of accumulation of the capital stock. According to Meade, there is a critical growth rate of the capital stock which makes the growth rate of income equal to the growth rate of capital stock. A more or less growth rate in the capital stock than this critical growth rate will not bring about the equality of y and k. If we put 'a' for critical growth rate then the basic relationship will be

$$a = Ua + Q\ell + r$$

$$a = Q\ell + r/1- U$$

It was this critical rate which will make y = k, and keep the growth rate of national income constant at the steady growth level. If, at any time, there is any deviation from this level of steady growth, forces will set in to bring the growth rate of the capital stock at the equilibrium level.

**D W. Jorgenson** (1967)

His model related to a dual economy consisting of the agricultural and the industrial sectors.

His model was based upon certain assumptions:

- Labor was divided between the two sectors in a straight forward manner. If there was no agricultural surplus, all labor remained on land. In case of agricultural surplus, a part of the labor force became available for the employment in the manufacturing sector and it grew at a rate equal to that of growth of agricultural surplus.
- Manufacturing in the advanced sectors started with some initial injection of capital. Thereafter capital formation proceeded at a pace

determined by the growth of the industrial labor force and the terms of trade between the two sectors.

- There was persistent differential in wage rates between the two sectors and development caused a steady migration of labor from the agricultural to the industrial sector. This differential determined the terms of trades between the two sectors and thereby the rate of investment in the advanced sector.

The output in the agricultural sector was the function of land and labor.

$$Y = f(L, N)$$

Where, Y = total output

L = land and

N = labor

The agricultural sector faced the diminishing returns with no capital accumulation.

On the other hand, in the industrial sector, output was the function of labor and capital

$$Y = f(N, K)$$

Where, Y = total output

N = labor

K = capital

Here the productive capacity expanded on basis of constant returns to scale.

The above two functions shifted over time to give more output than before due to the technological changes. Thus the rate of capital accumulation could be given as

Manufactured goods – Consumption

Once the agricultural workers get their share of manufactured goods for the exchange of food, the remainder of the manufactured goods could be used for further investment in industries. The consumption of manufactured goods in both the sectors was equal to the share of labor in the production of the manufacturing sector.

Thus, with the above discussion it could be said that – the more rapid the rate of technical change and the higher the saving ratio, the more rapid is the pace of growth in the advanced sector. Emphasizing on the rate of the industrial sector in the economic growth he said that "the industrial sector plays a strategic role in the development of a dual economy with or without disguised unemployment"[7].

It can thus be observed that according to Jorgenson, capital accumulation in the industrial sector and the technological changes in both the sectors bring about growth in a dual economy wherein the major role is played by the industrial sector.

**Harris-Todaro (1970)**

[7] Jorgenson, 1967, "Surplus Agricultural Labor and the Development of a Dual Economy". Oxford Economic Papers, New Series, pp.311-12 as cited in Banerjee (1969).

The Harris-Todaro model of rural-urban migration is usually studied in the context of employment and unemployment in developing countries. In the model, the purpose was to explain the serious urban unemployment problem in developing countries. The Harris-Todaro model of economic growth is popularly known as the model of Migration and Unemployment. Their thesis was based on the problems of rural-urban migration and the urban unemployment. The labor migration from the rural to the urban areas was due to the differences in the wage rates prevailing in both the regions, which led to the urban unemployment. In order to remove this unemployment the model suggested a subsidized minimum wage through a lump sum tax.

The propositions that were considered while building this model are:

- There exist only two sectors in the economy, the rural or the agricultural sector and the urban or the manufacturing sector.
- Each of the sectors produces only one good.
- The model operates in the short run
- Both the sectors have fixed quantity of capital available with them
- The number of urban jobs available is exogenously fixed. In the rural sector some work is always available. The total urban labor force comprises of the urban labor force along with the available rural migrants.
- The urban and the rural wages are fixed at a particular level where the urban wages are higher than the rural wages.
- The rural wage equals the rural marginal product of labor and the urban wage is exogenously determined.

- Rural urban migration continues so long as the expected urban real income is more then the real agricultural income
- The expected urban real income is equal to the proportion of urban labor force actually employed multiplied by the fixed minimum urban wage
- There prevails perfect competition among the producers in both the sectors of the economy
- The price of the agricultural good is determined directly by the relative quantity of the two goods produced in both the sectors

Based on the above assumptions the Harris-Todaro growth model can be built as:

Output in the rural sector is supposed to be a function of labor so that the production function for the agricultural good is

$$X_A = f(N_A, \bar{L}, \overline{K}_A)$$

Where, $X_A$ = output of agricultural good

$N_A$ = rural labor units employed to produce the output

$\bar{L}$ = fixed given land

$\overline{K}_A$ = fixed available quantity of capital in rural sector

Similarly output in the urban sector is supposed to be a function of labor so that the production function for manufactured goods is

$$X_M = f(N_M, \overline{K}_M)$$

Where, $X_M$ = output of manufactured goods

$N_M$ = urban labor units employed to produce the output

$\overline{K}_M$ = fixed quantity of available capital in the urban sector

The price determination equation in the economy is

$$P = P\,(X_M / X_A)$$

Where P is the price of agricultural goods in terms of the price of manufactured goods which is a function (*P*) of the relative output of agricultural and manufactured goods.

The agricultural wage equals the value of marginal product of labor expressed in terms of the manufactured good

$$W_A = f'_A\,(N_A) = P\,(f'_M)$$

In the urban sector, the producers are wage-takers and they aim at profit-maximization which means that the urban market wage is

$$W_M = f'_M\,(N_M)$$

However, in this economy, the urban real minimum wage ($\overline{W}_M$) is at a lower level due to institutional or political factors so that

$$W_M = f' \geq \overline{W}_M$$

This equation expressed that wage in the urban sector was equal to the marginal product of labor because of the price-taking behavior of the producers. This assumption was called the wage-rigidity axiom.

Assuming wage to be flexible, if wages are above $\overline{W}_M$, there will be an excess supply of labor in the urban sector and competition among producers will drive $W_M$ to the level of $\overline{W}_M$. Thus, the profit maximization condition becomes

$$\overline{W}_M = f'_M(N_M)$$

The urban expected wage which led to the migration of workers from the rural to the urban sector is given by

$$W^e_u = \overline{W}_M \cdot N_M / N_U \qquad (N_M / N_U \leq 1)$$

Where the expected real wage ($W^e_u$) in the urban sector is equal to the urban real minimum wage ($W_M$) adjusted for the proportion of the total urban labor force ($N_U$) actually employed. When $N_M / N_U = 1$, there is full employment in the urban sector and the expected real wage equals the real minimum wage

i.e. $W^e_u = W_M$.

The total labor endowment in the economy was

$$\overline{N} = \overline{N}_A + \overline{N}_U = N_A + N_U$$

This equation shows that there is labor constraint in the economy in the form of workers actually employed in the rural sector ($N_A$) plus the total urban labor force ($N_M$) with equals the initial endowment of total labor ($\overline{N}_A$) plus permanent urban labor ($N_U$) which in turn equals the total labor endowment (N)

The equilibrium condition is given by the equity equation

$$W_A = W^e_u$$

This is based on the hypothesis that migration from the rural to the urban sector is a positive function of urban-rural wage differential.

The migration from the rural to the urban sector will cease when the expected wage differential is zero i.e. $W_A = W^e_u$ (at the equilibrium level).

**Paul Romer** (1986)

Paul Romer is considered as one of the chief architects of the new growth theories. His theory of economic growth revolutionalized the study of growth economics. His work amounted to constructing mathematical representations of economies in which technological change was the result of intentional actions of the people, such as research and development. According to him growth was not just adding more labor to more capital, but new and better ideas expressed as technological progress. In his words "Economic growth occurs whenever people take resources and rearrange them in ways that are more valuable. A useful metaphor for production in an economy comes from the kitchen. To create valuable final products, we mix inexpensive ingredients together according to a recipe. The cooking one can do is limited by the supply of ingredients, and most cooking in the economy produces undesirable side effects. If economic growth could be achieved only by doing more and more of the same kind of cooking, we would eventually run out of raw materials and suffer from unacceptable levels of pollution and nuisance. History teaches us, however, that economic growth springs from better recipes, not just from more cooking. New recipes generally produce fewer unpleasant side effects and generate more economic value per unit of raw material. Every generation has perceived the limits to growth that finite resources and undesirable side

effects would pose if no new recipes or ideas were discovered. And every generation has underestimated the potential for finding new recipes and ideas. We consistently fail to grasp how many ideas remain to be discovered. Possibilities do not add up. They multiply".

In his article "Increasing Returns and Long-Run Growth" (1986) he specified a long run growth model wherein knowledge was considered as an input in production which had an increasing marginal productivity. Technological change had been considered endogenous to this competitive equilibrium model. In sharp contrast to the models that assume diminishing returns, the article stated that growth rates can be increasing over time and that large countries would grow faster than the smaller ones. The model was based on the following postulations:

1. Technology was assumed to be endogenous
2. Long-run growth was driven primarily by the accumulation of knowledge by forward-looking, profit-maximizing agents
3. New knowledge was assumed to be the product of a research technology that exhibited diminishing returns (i.e. "given the stock of knowledge at a point in time, doubling the inputs into research will not double the amount of new knowledge produced")
4. Investment in knowledge had a natural externality
5. Knowledge cannot be perfectly patented or kept secret. Thus, the creation of new knowledge by a firm had a positive external effect on the production possibilities of other firms.
6. Knowledge was assumed to be a capital good having increasing marginal productivity (i.e. "production of consumption goods as a

function of the stock of knowledge and other inputs exhibits increasing returns") Production of consumer goods was assumed to be globally convex not concave as a function of stock of knowledge while all other inputs were held constant.

7. Romer discarded the steady state stating that new research was undertaken continuously. Thus, new knowledge was being added to the existing state of knowledge.
8. No government intervention

Keeping these postulations in mind Romer developed his model stating that production was possible with all the factors of production in addition to knowledge. While knowledge can be augmented, it was assumed that other factors of production (physical capital, labor and size of population) were fixed in supply. The research technology produced knowledge for tomorrow's better production from the consumption that is foregone today and the trade-off was assumed to be one for one. Thus the equilibrium in a two-period model, in words of Romer, "is a standard competitive equilibrium with externalities. Each firm maximizes profit taking knowledge, the aggregate level of knowledge, as given. Consumers supply part of their endowment of output goods and all other factors of production (that are assumed to be fixed in supply) to firms in the first period. With the proceeds, they purchase output goods in the second (next) period. Consumers and firms maximize taking price as given. As usual, the assumption that agents treat prices and the aggregate level of capital as given could be rationalized in a model with a continuum of agents. Here, it is treated as the usual approximation for a large but finite number of agents. Because of the externality, all firms could benefit from a collusive agreement to invest more in research. Although this

agreement would be Pareto-improving in this model, it cannot be supported for the same reasons that collusive agreements fail in models without externalities. Each firm would have an incentive to shirk, not investing its share of output in research. Even if all existing firms could be compelled to comply, for example, by an economy-wide merger, new entrants would still be able to free-ride and undermine the equilibrium". Further, he proceeded with the infinite-horizon growth model in line with the above model and went on to calculate the welfare gains in a no-intervention competitive equilibrium.

Further, he proceeded with the infinite-horizon growth model in line with the above model. Though additional knowledge was produced by foregoing the consumption today, the only difference here lied in the fact that the trade-off was no longer assumed to be one for one (as in the earlier case). The rate of growth is a function of investment in research (i.e. the foregone amount of consumption) and the current stock of private knowledge with the firm and went for a competitive equilibrium. The welfare analysis of the competitive equilibrium stated that "the social marginal product of knowledge is greater than the private marginal product in the no (government) intervention competitive equilibrium".

Since the model here can be interpreted as the special case of the two-state-variable model in which knowledge and capital are used in fixed proportions, this kind of' extension can only increase the range of possible equilibrium outcomes.

**Robert Lucas** (1988)

His theory was rather a theory of economic development than that of economic growth. He closely followed the applications of the neoclassical models of Robert Solow, Edward Denison and others to study the US growth in the 20th century but concluded to find these models inadequate. He then went ahead by including the effects of human capital accumulation in to the one-sector (interaction of physical and human capital) model and the two-goods system where there are possibilities of interaction between trade and development. Thus, the model regarded human capital and technology to be the driving forces of growth in an economy. It assumed population growth as constant and treated all exchanges as goods for goods (barter exchange). The basic assumptions, in addition to those stated earlier, on which the model was built, are:

1. A closed economy having competitive markets
2. Presence of identical and rational agents in the markets
3. Constant returns to the technology.

On the basis of these assumptions it was said that the total output (Net National Product) was summation of the product of man-hours devoted to production and per capita consumption and the rate of change of stock of capital. And production was a function of capital and labor at the existing level of technology. Solving for the equations along the balanced path, it was found that "the rate of growth of per capita magnitudes is simply proportional to the given rate of technical change and the constant of proportionality is the inverse of labor's share". Higher savings (induced by low time preference and low risk aversion) were associated with relatively high output levels on a

balanced path. To put in Robert's words "a thrifty society will, in the long run, be wealthier than an impatient one, but will not grow faster".

Lucas went on with adding the novel dimension of human capital to the technologically driven growth model of Solow. Human capital was defined by Lucas as "...the general skill level, so that a worker with human capital *h(t)* is the productive equivalent of two workers with *½ h(t)* each, or a half time worker with *2h(t)*". Thus the theory of human capital focused on the fact that the way an individual allocated his time over various activities in the current period affected his productivity or his human capital level in the future periods. In order to simplify the theory Lucas made simple assumptions on the following lines:

There are N workers in total, with skill levels h ranging from zero to infinity. Let there be N(h) workers with skill level h, so that $N = \int_0^\infty N(h)\, dh$. Suppose a worker with skill h devotes the fraction u(h) of his non-leisure time to current production, and the remaining 1-u(h) to human capital accumulation. Then the effective workforce in production is the sum $N^e = \int_0^\infty u(h)N(h)hdh$ of the skill weighted man-hours devoted to current production. If output as a function of total capital K and effective labor $N^e$ is $F(K, N^e)$, the hourly wage of a worker at skill h is $F_N(K, N^e)h$ and his total earnings are $F_N(K, N^e)hu(h)$. In addition to the internal effects of human capital, Lucas went on to identify the external effects of the human capital – which too contributed to the productivity of all the factors of production. He describes the average human capital as

$$h_a = \int_0^\infty hN(h)dh \,/\, \int_0^\infty N(h)dh$$

The effective workforce in an economy is $N^e$ = uhN, wherein the all the workers are identical with skill level h and all choose the time allocation u. Here the description of technology of goods production was

$$N(t)c(t)+ \dot{K}(t) = AK(t)^{\beta}[u(t)h(t)N(t)]^{1-\beta}h(t)^{\gamma}$$

Where, $h(t)^{\gamma}$ = external effects of human capital and

A = level of technology (constant)

In order to understand the effects of human capital accumulation, Lucas adapted the Uzawa-Rosen (linear) model formulation which stated that if no effort was devoted to human capital accumulation, then none accumulates. And if all efforts are devoted to the accumulation of human capital then the rate of change in human capital grew at its maximum rate. This human capital was assumed to stream from one generation to the other in a way that the other next generation started acquiring the human capital from the point beyond the past generation's acquired human capital.

Keeping these assumptions in mind, the model followed in line with the assumptions of the Solow model of a closed economy where the population grew at a fixed rate. He employed Romer's and Arrow's analysis in order to obtain the optimal and equilibrium paths and to compare them. The balanced path was derived as

$$v = \delta(1-u)$$

while the common growth rate of consumption per-capita capital is

$$\kappa = (1 - \beta+\gamma / 1-\beta) v$$

and the exogenous rate of technological change μ is

$$(1 - \beta+\gamma)v$$

Solving the equations for further mathematical solutions, the efficient rate of human capital growth along a balanced path was arrived at which was

$$v^* = \sigma^{-1}[\delta - (1-\beta/1 - \beta+\gamma)\ (\rho-\lambda)]$$

and the competitive equilibrium growth rates of human capital along a balanced path was

$$v = [\sigma(1 - \beta+\gamma)- \gamma]^{-1}\ [(1 - \beta)(\ \delta-(\ \rho-\lambda))].$$

In the case with the above two equations, the growth increased with the effectiveness (δ) of investment in human capital and declined with increases in the discount rate (ρ). While $\kappa = (1 - \beta+\gamma\ /\ 1-\beta)\ v$ gave the corresponding rate of growth of per capita physical capital. However, it should be kept in mind that the theory predicted sustained growth whether or not the external effect was positive.

Further, he explained that an efficient economy, on a balanced path, will have a higher level of human capital for any given level of physical capital. He also stated that the returns to capital were constant and also constant over time even though capital stocks of both kinds were growing. In the absence of the external effect the real wage rate for labor of a given skill level i.e. the marginal product of labor is constant.

He further analyzed the impact of learning-by-doing on the accumulation of human capital. For this purpose he postulated for; a closed economic system with two consumption goods, $c_1$ and $c_2$ and no physical capital. The growth in

population was assumed to be constant and learning effects (of human capital accumulation) were assumed to be external to the system. He then, went on with analyzing the effects when the economy was opened to international trade. Thus, adding the possibility of different growth rates across countries, though differences were not systematically related to income levels. “Each country would produce a good for which its human capital endowments suit it. Given the learning technology, countries accumulate skills by doing what they are already good at doing, intensifying whatever comparative advantage they begin with”. However, it should be noted that the model does not capture the offsetting forces in an economy.

This discussion leaves us with the basic ingredients and recipes which are essential for the process of growth and development of any economy. Nonetheless, it should be remembered that the true essence of a good recipe can be noticed only after tasting. And so the next question I intend to answer is – whether the ingredients, given by the growth theories, have passed the test of time? These ingredients formulate the various factors that affect the process of economic growth of an economy. In view of this, the next chapter evaluates these various factors considered to be vital to the process of economic growth.

# CHAPTER 3

# EVALUATION OF GROWTH THEORIES

## Introduction

In the earlier chapter, we saw the major theories and models developed over a period of time to understand the process of economic growth and development of a nation. These theories and models outlined the various factors that led to the economic growth and development of the nations. Furthermore, these variables facilitate in examining the disparities in the process of economic growth among the nations of the world. Moreover, these variables aided in analyzing disparities in the process of economic growth among nations of the world.

In today's time of economic turmoil – the US depression of 2000 and the major economic crisis in the European Union in the recent time – it becomes essential to understand as to which factor, given by the theories of economic growth and development, would get the troubled economies back on the growth track. How can the literature on economic growth assist in understanding this process successfully thereby providing fruitful results? The answer to this question, however, is complex and embraces the many economic variables.

In this chapter, I shall try to highlight some of these economic factors that allow us to understand economic growth of an economy in the light of the existing economic literature prevailing on the subject area. This would further aid in identifying research gap to be undertaken in this thesis.

## Income

The evolution of growth theories over a period of time has evolved varied factors to measure the economic growth of a nation. One such important factor, which can be considered as pedestal, initially to compare the growth among countries is Income. The differences in the income per capita of the countries started to widen with the Industrial Revolution. At the same time, the number of middle income countries had dwindled and hence we had two polarized economic clubs: one rich and the other poor. Economists, therefore, use real income per capita to measure how well off people are. Maddison (2001) provided estimates of economic growth for the longest period of time. According to his data, growth was negligible from the Middle Ages to the Industrial Revolution, and it picked up in the nineteenth century. From the early part of the nineteenth century until World War I growth accelerated dramatically. World War I, the Great Depression, and the World War II slowed down the process of economic growth. World War II was followed by the Golden Age of economic growth (1950-70) – a period of rapid expansion not matched by any other historical episode. This Golden Age lasted until 1970s and with the outbreak of the oil crisis in 1973, economic growth slowed down. The growth rates on a whole have been uneven whilst the disparities in income per capita between the rich and the poor countries have increased. Sir Arthur Lewis, in his Nobel Prize acceptance speech said that "The

performance of less developed countries was remarkable in absolute terms, but the gap between most developed countries and less developed countries in income per head continued to widen rapidly" (Lewis, 1980). Apparently, if we compare the income levels of the countries in the world, it becomes straightforward in knowing the growth and developmental situations.

Growth of income in an economy is essential for achieving economical, social, political, and developmental goals. Nurkse (1952) and others have emphasized income as a factor contributing to economic growth while analyzing the relationship between income equality and growth for underdeveloped countries. Helpman (2004) described the disparities in income per capita among various countries of the world from 1992 up till 1996. He compared historical per capita income of the USA from 1870 to 1992 with other countries' per capita incomes in 1992. He measured economic growth by the rate of change of real income per capita stating that a country with a growth rate of 1 percent per annum doubles its living standard every 70 years, while a country with a growth rate of 3 percent per annum doubles its living standard every 23 years. Summarizing the growth rates of 104 countries during 1960 to 1990, he showed the growing disparities in the rate of growth among these countries. This exercise depicted higher growth rates for many countries prior to the 1973 oil crisis than after the crisis. "The simple average rate of growth of the 104 countries was 3 percent in the former period (*i.e. prior to 1973 oil crisis*); it dropped to 1.1 percent in the latter (*i.e. after the 1973 oil crisis*)" observed Helpman (Helpman, 2004 p. 5). Moreover, the coefficient of variation of the growth rates increased after the 1973 oil crisis period. However, it could be observed that the rich countries were less affected by the

oil crisis compared to the poor countries. In words of Helpman "An important difference between the rich and poor countries is that even after the worldwide slowdown in economic growth that followed the oil crisis, none of the rich countries experienced a prolonged period of declining income per capita" (Helpman, 2004 p. 5). However, the story was completely different for the poor countries as observed by Helpman – prior to oil crisis only nine counties out of 104 selected countries had negative growth rates, after the crisis the number increased to thirty two.

Helpman (2004) provided with the reasons for the disparities in the income per capita across the countries. Accumulation of physical capital, accumulation of human capital, (total factor) productivity, innovations, interdependence, (income) inequality, and institutions and politics are some of the reasons believed to create discrepancies among the income per head across various countries.

Growth economists have been rather concerned with the distribution of income across the nations. Effects of income (or the distribution of income) on economic growth has been one of the major concerns of growth theorists. Sizeable literature is available on economic growth and development of the nations which analyzes the distribution of income and the process of economic growth.

Earlier literature on income inequality and development was dominated by Kuznets hypothesis (Kuznets: 1955, 1963). Kuznets (1963) found an inverted U-shaped relationship between income inequality and GNP per head using time series and cross-country data. This view was recently supported by Chen

(2003). Kuznets (1963) found that income inequality would increase during the early stages of development due to industrialization and urbanization, and decrease later as industries would already have attracted larger fraction of rural labor force. Barro (2000) noted that income inequality appears to affect the growth rates of different countries differentially, depending upon their level of development. He showed that more income inequality reduces the growth rate of low-income countries but raises the growth rate of high-income countries. Shin (2008), in his theoretical model depending on the state of development of a nation, found a negative effect of income inequality on economic growth during the early stages of development, while a positive effect of income inequality on economic growth was found near a steady state. Voitchovsky's (2005) study suggested that inequality at the top end of the distribution positively affected growth, while the lower end of distribution was negatively affected by inequality. His suggestions were based on comparable data on disposable income from the Luxembourg Income Study for a panel of countries. Castelló-Climent (2010) found similar estimation in a dynamic panel data model which controlled for country specific effects and accounted for the persistency of inequality indicators. His investigations showed a negative effect of income inequality on economic growth in the low and middle-income economies, and positive effect of income inequality on economic growth in higher income countries.

Alesina and Rodrik (1994) by regressing the average growth rate over 1960-85 on the Gini coefficient of income, and Persson and Tabellini (1994) by regressing the average growth rate of GDP over 1960-85 on the income share, showed that for a cross section of countries the data support a negative

correlation between the degree of income inequality and the subsequent growth of income per capita. Further Persson and Tabellini (1994) found negative effect of inequality on growth for nine developed countries for the period 1830-1985, using a time series data. Perotti (1996) found a similar result for a large cross-section of countries. Aghion et.al. (1999) too showed a negative impact of inequality on growth then the capital markets were imperfect. Mo (2000) found significant negative effect of income inequality on the growth rate of GDP. In his paper, Panizza (2002), using both standard fixed effects and GMM estimates on a cross-state panel for the US, assessed the relationship between inequality and growth; wherein he found evidence in support for a negative relationship. However, he warns that the relationship between inequality and growth is not robust as small differences in the method used to measure inequality can result in large differences in the estimates. Helpman (2004) argues with limited confidence that inequality slows the growth of a nation[8]. Murphy et.al. (1989), Perotti (1993), Alesina and Perotti (1996), Acemoglu (1997), Tachibanaki (2005), Sukiassyan (2007) among others estimated a negative relationship between income inequality and economic growth. Analogously, it is believed that higher levels of income inequality are detrimental to the process of economic growth.

In sharp contrast to this, Birdsall (2007) feels that "a certain degree of (income) inequality may be necessary to permit the incentives that induce individuals to work hard, innovate, and undertake risky but productive investment projects, resulting in higher output and productivity, and therefore

[8] Helpman (2004) reasons out his limited confidence as the research in this area has not been able to identify the mechanism through which this happens (Helpman, 2004; *The Mystery of Economic Growth*; p. 93).

higher incomes and growth rates". In other words, this inequality of income by way of concentration in the hands of the few rich may encourage economic growth by increasing the marginal propensity to save (by the rich), leading to more investment, and the undertaking of new investment projects. This inequality effect, as considered by Birdsall, is the outcome of what she calls 'constructive inequality'. Her views convince that inequality of income is conducive to the growth process of an economy. Okun (1975), Bourguignon (1990), Benabou (1996), Li and Zou (1998), Aghion and Howitt (1998), Forbes (2000) and others found a positive relationship between income inequality and economic growth. On the other hand, Strassmann (1956) believed that a low degree of income inequality in a large and prosperous economy may have no serious effect on growth. Such inequality may largely reflect the changeable conditions of supply and demand for various skills. According to him the factors which are conducive to high productivity and the use of productive investment are social homogeneity (when income inequality is not derived, directly or indirectly, from permanent differences in caste, race, ownership, and the like) and the resulting patterns of income equality. He believed that in a developed country, given a sufficiently large population, economic growth depended not only on capital formation and technological progress, but also in growing income equality which he later goes on to define as consumption equality. In his words "…when income inequality derives, directly or indirectly, from permanent differences in caste, race, ownership, and the like (social heterogeneity), and if consumption inequality is the result, then the marginal efficiency of capital in mass production industries will be lower than otherwise and the introduction of machinery will be retarded" (p. 440). The relationship between income distribution and productivity by an economy

with homogeneous labor supply is illustrated by him with the help of examples that include farm workers and landlords. As the landlords import superior agricultural tools, productivity of laborers increase by which half of the labor force is released. This released labor force is then available for employment in the mechanized mass-production industries – only if the national income increment overwhelmingly accrues to the released laborers from agriculture. In this sense, he says that if the portion of the labor force working in industries capable to intensive mechanization can be increased, then income redistribution can accelerate economic growth. Furthermore, he stated that 'the more mechanized an economy is to be, the more it must be high wage economy' (p. 430). However, he reminded that 'during the early stages of developmental process a direct redistribution of purchasing power may lead to increased per capita consumption at the expense of desirable capital formation. Even in advanced societies the channeling of workers into the production of capital goods may be intimately associated with institutional arrangements that involve an unequal distribution of income' (p. 431). Thus, under such circumstances it is not wise to increase the wages at the expense of a diminished rate of growth. And hence, he restated his theory of economic growth and income distribution in terms of 'consumption inequality or distribution of consumption'[9]. Empirically, he found an inverse correlation between income inequality (i.e. share of national income of upper and lower income groups) and per capita income in various developed and developing countries (U.S., the UK, Denmark, Italy, Ceylon, India, Puerto Rico) on the

[9] Unlike Keynes and Hobson who considered income inequality a cause of under consumption or over saving and therefore a cause of depression in the short-run and were concerned with the aggregate rate of consumption.

basis of the availability of the data. Further, comparing the eight countries viz. Finland, Australia, Switzerland, Canada, New Zealand, Southern Rhodesia, Chile, and Peru in which the portion of national income received by unincorporated enterprises varied no more than 7 percent from 28 percent and where the data for the late 1940s are available. It was found that higher the ratio of employees' compensation to profits, interest, rent, and royalties; the per capita income is likely to be higher. Thus, it is the consumption inequality that is likely to channel workers away from mass production industries into luxury handicraft industries and personal services like retainers, menial servants, etc.

In one of his seminal lecture series on economic growth, Nobel laureate, Sir Arthur Lewis (1974) discussed growth and income distribution with special reference to the less developed countries. The less developed countries are characterized by the dominance of the traditional sector and some leading sectors which are initially small compared to the traditional sector. Eventually the leading sectors grow creating both positive and negative impacts in income distribution and employment. Moreover, the process of economic growth begins only in these few leading sectors of the economy. And in the process of their expansion the (re)distribution of income takes place among the traditional and the leading sectors of the economy. Sir Lewis believes that the process of economic growth is not naturally an egalitarian process. Some sectors or regions grow more vigorously than others while causing some impoverishments in this growth process. However, he says that the distribution of income can be improved by emphasizing and improvising the growth process in agriculture and rural industries – sectors employing largest

number of people in a less developed countries, wherever possible labor-intensive technique of production should be used so that more number of manpower can be employed – for the reason that in the process of growth of the leading sectors there is growth in the population also. Furthermore, he added that enough employment opportunities should be provided to the rural people to retain them in the rural areas, thereby abstaining them from coming to the urban areas and adding to the urban unemployment rates. (Re) distribution of income can be made possible by taxing some of the product of more prosperous sector or regions or persons and using it to provide services in the form of basic infrastructural facilities for the less prosperous. Shin (2008) suggested that redistribution of income by higher income tax could reduce income inequality only near a steady state and not in the early stage of development. However, Easterly and Rebelo (1993) found positive effect of redistribution (as measured by marginal and average tax rates and different types of social spending) on economic growth rate. In a two-stage least squares growth regression, Perotti (1996), estimated a positive and significant impact of redistribution on economic growth. Aghion et.al. (1999) also found a positive effect of redistribution in economic growth. Lewis (1974) finally concludes "The problems of less developed countries cannot be solved mainly by redistributing what they have; the problems have to be solved mainly by growth. Growth and distribution are not enemies of each other". Thus, it can be said that redistribution has both direct and indirect effect on growth. On the one hand, it reduces differences in income and wealth, and hence lowers the rate of growth. While on the other, income redistribution through income tax diminishes the incentives to accumulate wealth, and hence have a negative effect.

## Capital Accumulation

The classical growth theorists emphasized the role played by physical capital in the growth of a nation. However, with the passage of time growth theorists realized the efficacy that human capital had in the growth process of an economy. Here, we shall include the literature with respect to both the physical and human capital accumulations. Accumulation of physical capital and human capital has attained its important place in the formulation of growth theories. These forces have been considered as chief forces of income growth by the economists as they respond to the economic incentives. Plumper and Graff (2001) find a robust, positive and statistically significant correlation among physical capital accumulation and economic growth; and human capital accumulation and the rate of growth of a nation.

The effects of capital accumulation on growth are to the credit of Solow (1956, 1957) – the founder of neo-classical growth model. Rostow (1958, 1959) and Gerschenkron (1962) attributed rapid growth to rapid acquisition and installation of machinery and equipment. Landes (1969) explored Western Europe's economic development since 1750. He found that the role of machinery investment has been essential to economic growth. Mokyr (1990) characterizes technology embodied in equipment and machinery as "the lever of riches". Barro's (1991) regression study comprising for 98 countries from 1960-1985, finds that the estimated coefficient that measures the correlation between the growth rate of per capita real GDP and the investment share is significantly positive. De Long and Summers (1991) find that countries that invest heavily in equipment relative to other countries at the same stage of economic development exhibit rapid economic growth. According to their

analysis, in the period between 1960 and 1985, each extra percent of GDP invested in equipment is associated with an increase in GDP growth of almost one third of a percentage point per year. They concluded that there is a much stronger relationship between growth and equipment investment. Further, they found a strong negative association between equipment prices and growth suggesting that it is equipment investment that drives growth and not the other way round. In an extended version of the above paper De Long and Summers (1993), based on the data from Aitken (1991) and Lee (1992), found a strong link between investment in equipment and economic growth for developing countries. They concluded that where investment in equipment was found to be high growth was fast and vice versa. Sala-i-Martin (1997) in his analysis too agrees that physical capital investment is an important explanatory factor of economic growth. Benhabib and Spiegel (1994) too find that physical capital is a significantly positive explanatory variable to real output.

We have already discussed Solow's model in the previous chapter. However, two important features of his theory with respect to capital accumulation needs a special mention. First, the growth rate of income per capita converges to the rate of technological progress - which is assumed to be constant in his model of growth – in the long-run[10]. Secondly, growth rates vary with capital intensity i.e. the growth rate of income per capita is lower higher the capital-labor ratio[11]. Analyzing the US economy for hundred years, King and Rebelo

[10] This implies that the long-run rate of growth cannot be affected by the state of the economy or by the economic incentives. (Helpman, 2004; *The Mystery of Economic Growth*; p. 13).
[11] This has two implications: (1) the growth rate of a country declines over time when its capital intensity rises and vice versa and (2) in a cross-country comparision, countries with

(1993) concluded that the transitional dynamics driven by capital accumulation could not explain the sevenfold increase in income per capita. Unlike King and Rebelo, Barro and Sala-i-Martin (1992) found negative correlation between initial levels of output per capita and its subsequent growth – consistent with the Solow model. However, this relationship could be considered true only after controlling for variables that affect the steady states and hence was correctly termed as 'conditional convergence'. They found that income per capita converged to its long-run value at a rate of about 2 percent per annum[12]. However, the conditional convergence holds true within the group of rich countries, but not across the groups of rich and poor countries. William Baumol (1986) was one of the first economists to provide statistical evidence documenting convergence among some countries and absence of convergence among others. Barro and Sala-i-Martin (1991, 1992) show that the US states, regions of France, and prefectures in Japan all exhibit 'unconditional convergence'. Charles Jones (2002) examines for an unconditional convergence among OECD member countries during 1960 to 1997. Grier and Grier (2007) present an anomaly to the neoclassical growth models in one of their research papers. Unlike the neoclassical growth models (Barro and Sala-i-Martin, 2002; Mankiw et. al., 1992) which predicts that a country will converge to its own, possibly unique, steady state; the authors find a strong and continued income divergence in the world based on their

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higher capital intensity grow more slowly. (Helpman, 2004; *The Mystery of Economic Growth*; p. 13).

[12] The magnitude of this rate of convergence is closely related to the elasticity of output wit respect to the capital stock, which measures how readily output changes when the capital stock changes. The higher this elasticity, the faster the transition. (Helpman, 2004; *The Mystery of Economic Growth*; p. 14-15).

study of ninety countries from 1961 to 1999[13]. They confirm Pritchett's (1997) conclusion that at the country level, the world income distribution is characterized by continuing divergence over time[14]. Based on linear regression, they find no evidence of absolute or conditional convergence for all of the ninety countries in general and the sixty-eight developing nations in particular. Output in these samples was found to diverge while the neoclassical determinants of steady state were found to be converging. In their further attempts of investigation of variables that may be consistent with the finding that the rich countries converge while the others diverge; it was found that rich countries showed income convergence while developing countries diverged.

In their paper "A Contribution to the Empirics of Economic Growth", Mankiw, Romer and Weil (1992) evaluated the implications of the Solow model depicting that the cross-country variation in income per capita is a simple function of the cross country variation in the rate of saving, the rate of population growth, and the initial level of labor productivity. They concluded that the Solow model performed very well when their estimates explained about 60 percent of the cross country variation in income per capita in 1985 for 98 developed and developing countries. However, they then noted that the "fit" of the model could be improved even more by extending the model to include human capital. Using the secondary school enrollment rate in the working age population as a proxy for the fraction of income invested in

[13] Of these ninety countries, twenty-two are rich countries while sixty-eight are developing nations.
[14] Lant Pritchett (1997) in a paper titled "Divergence, Big Time" calculates that the ratio of per capita GDP between the richest and poorest countries in the world was only 8.7 in 1870 but rose to 45.2 in 1990.

human capital, their modified estimation explained nearly 80 percent of the 1985 cross country variation in per capita income. Moreover, it should be remembered that the inclusion of human capital (accumulation) into the Solow model does not change the flavor of the model. Mankiw (1995) agreed with the conclusions drawn by Mankiw, Romer and Weil (1992) that Solow's model when estimated with the help of both physical and human capital accumulations explained the data very well. In response to the criticisms of the Solow-Swan model of economic growth; Knight, Loayza, and Villanueva (1992) extended the Mankiw, Romer and Weil's model of economic growth in two directions: 1). unlike the standard empirical study that employs a cross sectional data only, the authors employ a panel of time-series cross sectional data to determine the significance of country specific effects. It was observed, empirically, that the estimated effects of country-specific factors on economic growth resulted in a faster estimated rate of conditional convergence. This observation was based on the correlation between country specific effects and the independent variables in the growth process. Further, it was found that investment in physical capital has been less productive for developing countries with lower initial stocks of human capital and social infrastructure and higher rates of effective protection and 2) labor-augmenting technical change is assumed to be influenced by the extent of openness to international trade and the level of public infrastructure. It was observed that when openness and public infrastructure are taken into account, investment in physical and human capital became more quantitatively important in the growth process. Lucas (1988) assumed that the aggregate output depended on physical capital, aggregate human capital, and the average level of human capital of the workforce. It was assumed that if in an economy the average

level of human capital was higher, the combined effect of physical and human capitals on output would be larger. Further, he stated that the growth rate of an economy wherein individuals devote efforts to the accumulation of human capital depends on features of its technology for producing human capital. In another version of his model, Lucas considered a specialized human capital. It was assumed that human capital stock grew by the process of learning-by-doing. This part of his version stated that an economy in the long-run would grow even without technological change because learning-by-doing becomes the engine of economic growth. However, this version of human capital as a source of economic growth in Lucas' model was a sector specific study. Thus, Lucas considered human capital accumulation as a source of permanent long-run growth. But the view that growth of human capital is a permanent source of economic expansion was rejected on the grounds that an individual's lifetime was finite and that human capital per person cannot grow without bound.

Education is one another important mechanism for human capital formation. Based on this belief, Goldin and Katz (2001) found that during the twentieth century about a quarter of the US growth in income per worker was due to the rise in education. Mitch (2001) found that the spread of secondary and tertiary education had a larger impact on European economic growth in the twentieth century. Young found that the rise in years of schooling played a central role in the growth of Asian Newly Industrialized Countries (NICs).

Fiaschi and Lavezzi (2007) develop a model of non-linear economic growth considering the relation between growth and income. They identify three growth regimes based on different income levels: i) at low income levels the

relation is negative or flat; ii) at intermediate levels of income the relation is positive and iii) at high income levels the relation is again negative. Their paper tested this process of growth for 122 countries over the time period of 1950 to 1998 using absolute level of per capita gross domestic product. The paper considered a simple Solovian model with no exogenous technological progress wherein the production function exhibits increasing returns to scale within a certain range of income. It further assumed that average capital productivity does not decrease so much to generate poverty trap, and remains sufficiently high for high levels of capital to ensure positive growth in the long-run. Moreover, this particular model has no equilibria and the per capita income tends to grow indefinitely. Based on such assumptions, the authors detect non-linearities in the growth process. In particular they find support to the fact that initially the growth rates in an economy are low followed by a phase of acceleration in growth rates which eventually decelerates once a country has reached a certain level of per capita GDP. However, straightforward capital accumulation and population growth for human capital accumulation is not sufficient for sustained growth in per capita income. Therefore, the emphasis should be on accumulation of inputs of superior quality. The accumulation of capital and labor will increase long-run rate of economic growth if this capital embodies more sophisticated technology and if workers are more skilled.

**Total Factor Productivity**

Hence, economists use the concept of total factor productivity (TFP) to measure the joint effectiveness of all inputs combined in producing the output. Productivity is even more important than physical capital and human

capital accumulations in explaining income differences and growth rate differences across the countries (Helpman, 2004 p. 10). Changes in total factor productivity represent the joint effects of all input-augmenting technological improvements and the effect of Hicks-neutral technological change[15]. Total factor productivity is represented by the difference between the rate of growth of output and the contribution of input growth. That is, it represents the aggregate effect of the various forms of technological change. In the most general sense, all unmeasured improvements in the quality of inputs like improvements in technology, improvement in the organization of production and distribution, the reduction of distortions, and improvements in government policies will be attributable to total factor productivity growth. This total factor productivity is often termed as Solow's residual.

Solow (1957) calculated total factor productivity growth in the US for the first half of the twentieth century, finding it close to 80 percent of the rate of output growth. However, he did not account for the improvements in the quality of inputs. These improvements were incorporated by Jorgenson and Griliches (1967), Jorgenson and Yip (2001), and Young (1995). Nevertheless, it was accounted that total factor productivity has remained a major source of growth even in countries with the finest quality adjustments. Mankiw, Romer and Weil (1992) provide a satisfactory explanation for the variation of income per capita across countries by assuming a common total factor productivity growth in a simple Solovian model. Their estimates helped in explaining about 80 percent of the cross-country variation in per-capita incomes. Contrary to

[15] In addition to the input-biased productivity improvements, technological change can raise output by a factor of proportionality that is independent of the composition of inputs employed in production. This type of proportional shift is called Hicks-neutral technological change.

Mankiw, Romer, and Weil, Grossman and Helpman (1994a) observed that total factor productivity growth rates were different for different countries. Empirically testing for the relationship between total factor productivity growth and investment, they found a positive correlation between total factor productivity growth and investment-to-GDP ratio for 22 countries over 1970-1988. This explains that accumulation of capital may not be made possible in the absence of improvement in productivity as high productivity induces capital accumulation. Helpman (2004) provides for the differences in total factor productivity levels across countries by showing the 1960-1985 average productivity levels of 14 countries relative to Somalia - who had the lowest total factor productivity level. He found Hong Kong to be forty times and Canada to be thirty times more productive than Somalia. His data reveal large variations in productivity levels that exist across countries. Furthermore, he shows that the rates of total factor productivity growth too differ across countries. His calculations of the average total factor productivity growth from 1971 to 1995 for 21 rich countries depict that for countries like Finland, Ireland, Japan and Norway, the total factor productivity grew in excess of 2 percent per annum. While the total factor productivity growth in Germany and Spain was above 0.5 percent per annum. Total factor productivity in Portugal grew at just above 1 percent per annum, in the UK nearing 1.5 percent per annum and in Italy above 1.5 percent per annum. He further explores the relationship between total factor productivity and income per capita for a sample of 96 countries which is a part from Islam's (1995) sample. Helpman finds positive correlation among the two variables – average total factor productivity and income per capita. He observes that countries that had high levels of average total factor productivity in 1960-1985 periods also had

high income per capita in 1960 and 1990. In words of Helpman, "Since rich countries also have more capital per worker and their workers are both educated, it follows that their income per capita is higher for all three reasons: more physical capital, more human capital, and higher productivity" (Helpman, 2004 p. 31). There exists convincing evidence that total factor productivity plays a major role in accounting for the observed cross-country variation in income per worker and patterns of economic growth. Hall and Jones (1999) concluded that total factor productivity differences explain the ratio up to 7.7 for the disparities in income per worker in the US and Niger Klenow and Rodriguez-Clare (1997) decomposed the cross-country variation in income per worker in to fractions that can be attributed to differences in physical capital, human capital, and total factor productivity. This process found total factor productivity as a factor explaining, in major, the differences in income. Dowrick and Nguyen (1989) argue that any evaluation of relative success or failure in terms of economic growth should account for the total factor productivity catch-up. They tried to explain the income level convergence in the OECD nations with the help of total factor productivity catch-up. Income convergence for the past 35 years in the OECD countries, where it has occurred, is found to be the result from a systematic tendency for catching up in total factor productivity. As per Dowrick and Nguyen, this catch-up is not restricted to the immediate post-war years; indeed it appears to have continued to be a highly significant factor even after the oil crisis of 1973[16]. Controlling for the differences in the growth of factor inputs, regression results indicate that there has been no statistically significant

[16] This particular result contradict the conclusions which Abramovitz (1986) and Baumol and Wolff (1988) have drawn on the insignificance of income convergence since 1973.

decline in the proportional rate of total factor productivity catch-up within the OECD countries over the whole post-war period. Hence, the authors have extensively tested that levels of total factor productivity within the OECD nations have converged significantly in the post-war period. Moreover, it was found that income convergence in OECD since 1950 is critically dependent on total factor productivity catch-up. This result holds even when the authors control for potential data bias due to cyclical differences, different measures of purchasing power parity, potential errors in the backward projection of income levels, and sample selection bias. They find systematic total factor productivity catch-up throughout the post-war period in OECD countries for the combination of factors like the public goods, nature of technological progress, changing preference for quality of work and life rather than quantity of goods, and real and apparent differences in sectoral productivity growth. Total factor productivity catch-up appeared to have been operating at a very similar rate in the non-OECD industrial capitalist countries which were relatively rich in 1950.

More than half of the variation in income per capita results from differences in total factor productivity. Knowing the fact that productivity differences prevail across the countries, it becomes essential to know the reasons that lead to this productivity discrepancies across nations. In this respect, one of the factors functional in measuring the productivity discrepancies is explained next.

**Technology and Research and Development**

One of the explaining factors determining total factor productivity is the technological change. Much has been said about technological change both

implicitly and explicitly in the growth literature. The neo-classical economists considered technological change as essentially an imperative factor determining the economic growth of a nation. Yet, they considered technological change to be exogenous to the process of economic growth (because that was the only viable assumption at that time) while the modern growth theorists considered it to be endogenous to economic growth process. The new growth theories emphasized innovation as a source of growth. In R&D based endogenous growth models, the pace of long-run growth is solely determined by the number of researchers, respectively by the level of research expenditure. According to these models, subsidization of research leads unambiguously to a higher long-run growth rate. Grossman (2008), in a quality ladder model, suggests that subsidizing R&D is conducive to R&D and growth without inducing the firms to raise advertisement outlays. Using post-war time series for major OECD economies, Jones (1995b) indicated that whereas the numbers of scientists and engineers engaged in R&D exhibit rapid exponential growth, aggregate total factor productivity growth rates were stationary. This finding is different from the essential prediction of R&D-based endogenous growth models, according to which the dependence of growth rates on the numbers of researchers is monotonically positive. Considering Jones findings, semi-endogenous growth models that overcame this inconsistency have been developed. In these models, long-run growth rate is affected neither by the level of research not by the degree of R&D subsidization. Moreover, the long-run growth rate here do not exhibit scale effects (i.e. does not depend upon the size of the economy). In fact, in these models, the long-run growth rate depends linearly on the population growth rate.

Endogenous growth theories have highlighted trade as the principal channel through which knowledge is transmitted internationally (Grossman and Helpman, 1991). A micro-level study for 17 OECD nations by Ulku (2007) too supports the view that openness increases knowledge spillovers and promotes innovation and growth. Frankema and Lindblad (2006) attributed technological progress as the main force explaining the differences in the long-run growth rates in Indonesia and Thailand during the second half of the twentieth century. The paper argues that technological progress shaped by official policies and the institutional framework of absorption sufficiently explains why outcomes have differed so substantially in Thailand and Indonesia despite apparently similar initial conditions of long-run economic growth. Using patent citation data Jaffe and Trajtenberg (2002) show that patenting is an important channel of technological diffusion together with providing a mechanism for R&D spillovers. Fagerberg (1987, 1988) found a significant positive association between patent applications in foreign countries and national gross domestic product growth. Contrarily, Jones (1995a, 1995b) raised doubts whether R&D has an effect on long-run growth. In particular he documented that growth rates in OECD countries since World War II have not exhibited any persistent upward trend in spite of a substantial rise in R&D efforts.

Romer (1990) developed a disaggregate model of business sector in order to study the evolution of productivity. His model predicted a link between resource allocation and productivity growth. According to this model, business firms invest into Research and Development (R&D) to develop a new product – which can be protected through patents – ultimately gaining a monopoly for

the new product. This imperfect market helps in gaining additional profits which can in turn be invested in further R&D process. Inadvertently, the innovators of the new product by R&D create knowledge which is available to others in the form of R&D spillovers. These R&D spillovers reduce the cost of future R&D (that is the more R&D performed in the past, the larger the stock of knowledge and the cheaper it is to do R&D today). But as more and more products are invented, competition among their suppliers cuts the profits of each of them leading to decline in profits per product. The incentive to innovate, thus, rises or declines over time depending on how fast the costs of R&D fall relative to profits. Yet, it is the technological feature that keeps the incentive to innovate constant and hence the economy experiences a constant rate of productivity growth which depends on the saving rate of that economy. Schumpeter's creative destruction was included in the model of economic growth by Aghion and Howitt in their 1992 seminal paper "A Model of Economic Growth through Creative Destruction". According to this model, growth results exclusively from technological progress. This technological progress, as per the authors, is the result of competition among research firms that generate innovations. As per this model each innovation comes up with a new intermediary good that can be used to produce the final output more efficiently than before. Monopoly rent of this new innovation can be enjoyed by patenting the innovation. However, these intermediary goods become obsolete and the monopoly rents will be destroyed with the introduction of new innovative goods. Economies with higher saving rates grow faster as they allocate endogenously more resources to R&D activities. Helpman (2004) accounts for the non-defense R&D as a percentage of GDP. The data for the G-7 countries from 1981 to 1998 represent variations across countries and time.

He points out that investment in R&D is substantially smaller than investment in physical capital. He emphasizes the importance of investment in R&D by quoting the direct and indirect effects of R&D on output – i) the rate of return on R&D is many times higher than the rate of return in investment in machines and equipment and ii) whenever R&D raises total factor productivity, the higher total factor productivity level induces capital accumulation. Jones (2002) found that between 1950 and 1993 rise in the stock of ideas produced in the US explained about 70 percent of the growth in the output per hour. The classical growth models based on innovation were criticized on the ground that they produced scale effects. Young (1998) presented a unified model without any scale effects on long-run productivity growth wherein long-run productivity growth was driven by growth in product quality. Employing non-scale endogenous growth model to sectoral analysis, Ulku (2007) empirically provides that R&D intensity promotes the rate of innovation in majority of the sectors in 17 OECD nations. Furthermore, he found a positive impact of rate of innovation on the growth rate of output in all the sectors. Nevertheless, Helpman (2004) feels that Young's model does contain some element of scale effect. Jones (1995b) and Segerstrom (1998) introduced crowding into the R&D activity and thereby eliminated the long-run effect of size on productivity growth. Grossman and Helpman (1991b) believe that international trade leading to the access of a larger market encourages investment in R&D and this boosts the growth of productivity. They termed this as the market size effect. Next they pointed at the competition effect wherein competition in the international market induces the incentive to invest in R&D. It may also induce technological leaders to forge ahead more quickly in order to avoid competition from technological

followers. They further pointed out at the effects of trade and FDI on domestic R&D and factor prices. They state that in an international market where competition is among the sellers and products worldwide, it is possible to reduce the duplication of R&D efforts thus, bringing about faster growth of R&D stocks of knowledge and lower R&D costs; finally leading to faster productivity growth. Finally they state that when R&D spillovers are international, they activate convergence forces. And when they are country specific, they activate divergence forces. The empirical results in an anomaly by Grier and Grier (2007) showed that R&D converged among the rich countries of their sample while diverged in the developing countries. The fact that more than 95 percent of the world's R&D is carried out by a handful of industrial countries has been well explained by Helpman (2004) by taking into account the ratios of domestic R&D capital to GDP in 1990 for the G-7 countries. This data showed large variations – on the one hand, the US, the UK and Germany had domestic capital stock in excess of 20 percent; Japan and France had it in excess of 15 percent; while on the other hand, Italy and Canada had domestic capital stocks in excess of only 5 percent. This reflects low levels of investment in Canada and Italy in R&D. Coe and Helpman (1995) estimated the effects of domestic as well as foreign R&D capital stocks on the productivity level of each of 22 countries. Their estimates were able to explain some 60 percent of the variation across countries in total factor productivity levels. In addition to this, they found that the elasticity of total factor productivity with respect to the domestic R&D capital stock was about three times higher in G-7 countries than in the smaller industrial countries. Computing rates of return to investment in R&D from these elasticities, they found rates of 85 percent in the small industrial countries and 120 percent in

the large industrial countries (of the sample of 22 countries). Moreover, R&D in the G-7 countries produced an additional return of 30 percent in the smaller industrial countries, thereby revealing R&D spillovers across national borders. Coe, Helpman, and Hoffmaister (1997) extended the above research to estimate the impact of foreign R&D capital stocks in total factor productivity of developing countries. For a sample of 77 countries, the study showed that foreign R&D capital stocks explained 20 percent of the variation in the total factor productivity levels of these developing countries. Keller (2001) decomposed the international R&D spillovers into three parts viz. trade, FDI and language skills. He found that close to 70 percent of the effect was due to trade, about 15 percent due to FDI, and 15 percent due to language skills. Helpman (2004) concludes that investment in innovation in the industrial countries leads to divergence of income between the rich North and the poor South.

Helpman (2004) distinguishes between growth driven by incremental (technologies) innovations and general purpose technologies (GPTs)[17]. In his words, "GPTs can trigger an uneven growth trajectory, which starts with a prolonged slowdown followed by a fast acceleration" (Helpman, 2004 p. 51). Different arguments have been laid down to explain this process. Hornstein and Krusell (1996) and Greenwood and Yorokolgu (1997) argue that the adoption of new technologies requires firms to learn how to use them, and this learning process slow down productivity growth. Helpman and Trajtenberg (1998) suggested that it takes time to develop complementary inputs that can

[17] Incremental innovations, as per Helpman, are when small improvements take the form of technological progress. While GPTs are rather drastic, have the potential for [pervasive use in a wide use of applications, triggers the development of many complementary inputs, and launch a prolong process of adjustment.

be used with new technologies, and that during the phase when resources are diverted to the development of these inputs, growth slows down. They also show that the arrival of new GPT reduces the value of firms that use the old technology. In the meantime the new technology is not very productive, because it takes time to develop its complementary inputs and organizational forms. As a result, the value of the stock market falls relative to GDP. The stock market starts to rise faster than GDP only when these GPTs become a large part of the economy. Helpman and Rangel (1999) argued that on-the-job training, which raises the productivity of the workers, can be the source of slowdown. Helpman (2004) shows, empirically, the annual average growth rate of output per hour in the US business sector from 1952 to 2001. This data depicts that output grew during the 1950s and 1960s around 3 percent, and declined during the 1970s that the growth rate of output accelerated. This data depicts the GPT driven growth in the US economy during the said period of time. Nelson and Phelps (1966) construct their models assuming Harrod-neutral technical progress and argue that education needs to be considered as an important aspect of technology driven growth process. Addition to this they believe that education is especially important to those functions requiring adaptation to change. They built their models in a dynamic world which is ever changing and progressing. By this way they contradict the earlier growth theories. In their 1966 paper they said “The earlier growth theories built the production function, the pertinent feature of which was the “marginal productivity” of education, which is a function of the inputs and the current technology, can remain positive forever even if the technology is stationary”. Nevertheless, they believed that education has a positive pay-off only if the technology is always improving. Their approach viewed education as an act of

investment in people and that educated people are bearers of human capital. The models in the paper suggest that the progressiveness of the technology has implications for the optimal capital structure by showing that the rate of return to education is greater when an economy is technologically progressive. They suggest that for an economy where technology is dynamic, more human capital than physical capital should be built. And it is education that speeds the process of technological diffusion. Hence, the role of education as viewed by the authors seems to indicate another possible source of a divergence between the private and social rate of return to education. Similar to Aghion and Howit (1992), Palokangas (2005) uses Schumpeter's creative destruction to understand the growth process in multi-industry economy with capital market imperfections, wherein both innovation and imitation takes place – thereby distinguishing between the initial innovation process and the later imitation process. For this purpose, he extends the Wälde's (1999a, 1999b) growth model with risk-averting house-holds by replacing the sector of innovating firms by a large number of industries which innovate and imitate. This highly stylized model is used to explain the relationship of growth, product market competition and public policy (relating to subsidies provided to the industries by government for R&D). It is assumed that firms finance their R&D by issuing shares, and households save only in these shares. Further, he proposes that the government subsidizes R&D by discriminating between innovation and imitation, and promotes collusion or product market competition (PMC). The author finds that in a case where the government cannot discriminate between innovation and imitation, there is an "inverted U" relationship between product market competition and welfare. In such a situation, imitation induced product market competition would be growth

enhancing. However, he finds no support for the assertion that imitation-induced product market competition is growth enhancing in situation in which it is possible for the government to discriminate between innovation and imitation. Contrary to the existing literature, he provides that product market competition reduces the incentive to imitative R&D and not to innovate R&D. In such a case, he states that the households transfer their investment from imitating firms to innovative firms; firms spend longer time in the imitative stage, the proportion of innovative industries decreases and the growth rate falls. Hence, he emphasize on innovation as being the driving force to lead the process of economic growth. Yet, the process of innovation so discussed is not free from any hassle. There are hindrances in the path of innovation. One such factor causing hindrance to innovation is the availability of finance. Canepa and Stoneman (2008) accounted for such financial constraints to innovation in the United Kingdom. Their paper makes use of individual firm responses data from two surveys viz. CIS 2 (1994-96) and CIS 3 (1998-2000). Financial constraints to innovation arise only when a firm reported 'a lack of availability of finance', that is the firm could not raise the necessary funding at market rates. Based on the classification by firm size and level of technology it was found that small firms and firms with high technology levels were more likely to experience hampered projects because of lack of financial availability. This particular information was empirically tested by the authors using Ordinary Logistic Regression models separately on CIS 2 and CIS 3 data sets. Their empirical testing concluded that the financial factors do have an impact upon the innovative activity of the firms in the United Kingdom.

Hence, we can say that diffusion of knowledge is one of the ways of transmitting economic growth. In this sense, learning-by-doing is one form through with the diffusion of knowledge may take place. However, the growth rates of the countries are affected by the extent to which learning-by-doing create national or international spillovers states Grossman and Helpman (1995). In the long-run, a closed economy can grow faster if the country's size is large, there exists faster learning-by-doing in the favored sector and there is higher intrinsic productivity level of the favored sector. However, for an open economy, trade may drive a country to specialize in a sector with low growth potential, slowing down its long-run growth. Or it may allow the trading countries to grow faster in the long-run, as the process of learning-by-doing turns out to be international in scope[18].

**International Trade**

The theories of absolute and comparative cost advantage points out at one major wisdom that the economic growth of any nation cannot take place in a condition of autarky. Interdependence and international integration has sizeable effects on economic growth of any nation. The positive effects of international trade on economic growth were first pointed out by Smith (1776). International trade, as Smith said, leads to specialization which affects the capital accumulation and growth in an economy. In other words it can be said that international trade intensifies the ability and skills of workers, encourages capital accumulation and technical innovations, help overcome the technical indivisibilities, thus, leading to economic growth. Frankel and

[18] This outcome will depend on the size of the trading countries, their intrinsic productivity levels, and their speeds of learning.

Romer (1999) concluded that trade appears to raise income by encouraging accumulation of physical and human capitals and by increasing output for given levels of capital – based on his study for 150 countries in 1985. The neoclassical theories of economic growth emphasized up on international trade as a driving force for the growth of an economy through the process of technological diffusion, wherein the less developed countries are proved beneficiaries. However, the neoclassical theory did not account for the effects of international trade on the long-term rate of economic growth. Ram's (1987) empirical study for eighty-eight less developed countries, for the period 1960 to 1985, concluded that international trade (especially the exporting sector) have positive effects on the economic growth for about 70 percent of the sample countries. Krueger (as cited in Óscar Afonso) observed that since 1960s many less developed countries reduced commercial barriers and other controls of economic activity and obtained a significant increase in the rate of economic growth. Rajapatirana (as cited in Óscar Afonso) argued that international trade brings about dynamic gains to the less developed countries. It is only through international trade that less developed countries can specialize in different branches of industry and production stages. International trade leads the internal products for international competition. Knight, Loayza, and Villanueva (1993) too feel that countries which pursue outward oriented policies are likely to enjoy higher growth. Further, they also state that economic growth and openness of an economy are positively related to each other. Moreover, the literature with respect to openness and trade from 1970s until recently has established a positive relationship between openness of a country to trade and growth. Afonso (2001) suggested that trade openness is beneficial to the growth of developed as well as less developed

countries. Moreover, he feels that the intensity of dynamic effects of international trade depends simultaneously on the geographic structure of international trade (i.e. on the level of development and absorption capacity of trade partners), on the composition and intensity of international trade, and on the capacity for internal technological adaption. Vamvakidis (2002) is one of the few studies that considered the relationship between openness and growth over a long historical period. Vamvakidis (2002) studied the correlation between openness to international trade and GDP per capita growth. He is quite skeptical with the literature which establishes a positive correlation among the two above stated variables by finding that evidence for the correlation among openness to international trade and GDP per capita growth are available only since the 1970s. He tried to find out the robustness of growth-openness connection in historical perspective – way back from 1870 till 1990 – using cross-sectional data over the periods 1870-1910, 1920-1940, 1950-1970, and 1970-1990. For this purpose, he estimated the growth regressions with the limited historical data that he could collect. Empirically, it was found that during the period 1870 to 1910 no correlation existed between growth and duty ratio and trade and growth showed no robust correlation. During the interwar period from 1920 to 1940, trade openness and growth showed negative correlation. The growth regression so calculated showed no correlation between trade openness and growth during 1950 to 1970, while for the period between 1970 and 1990 this relationship turned positive. Thus, based on his empirical studies he believed that the positive correlation between trade and growth can be observed only in the recent times. Theories suggest that trade plays an important role in the economic growth of an economy. Pomeranz (2000) and Galor and Mountford (2003)

provide for a case in point – the growth and development of Europe in comparison to the East Asian nations. Lockwood (1954) documented the role that trade played in the developmental process of Japan. He stated that Japan's openness to the rest of the world in the second half of the nineteenth century – in trade and assimilation of foreign technologies – contributed to a larger extent towards the growth of Japan. Foreign trade provides access to world markets to small and large countries alike. Smaller countries gain more in terms of market size expansion, and therefore the effect of trade on their income per capita and its rate of growth should be larger. This theoretical observation was supported by the research work of Frankel and Romer (1999) and Alesina, Spolaore, and Wacziarg (2003). In larger size countries, however, additional trade does not contribute to growth, ceterus paribus.

Conversely, Wood and Ridao-Cano (1999) feel that trade may not be developmentally the best policy for backward countries to grow, since it retards their capital accumulation of skills by causing them to specialize in goods of low skill intensity. Myrdal (1956, 1957) believed that for the less developed countries, in the long-run, international trade has a negative effect on the growth of the countries as it (international trade) stimulates production of primary goods subject to irregular prices and demand. Rodríguez and Rodrik (2000) question the method that finds a positive relation between openness and growth and demonstrate that the positive correlation between growth and openness is not robust to various measures of openness.

The traditional development literature considered exports as growth-enhancing because of the positive productivity spillovers from the tradable to the non-tradable sector and because exports encourage more efficient

investment projects (Jakob Madsen, 2009). Bresser Pereira (2010) referred to exports as a form of effective demand that is less constrained economically. He considered a strong increase in exports as a major developmental factor on the demand side. Plümper and Graff's (2001) study for 90 countries reveal that export specialization does matter for the economic growth of a nation. Their empirical results, in a cross-sectional study during 1980-1990, suggested that competitive advantage trade in high-technology goods is most favorable for economic performance of an economy. While trade in mature goods, on the other hand, has the lowest impact on economic growth. Their regression results imply that an increase in the high-technology export to total trade ratio from 0.5 to 0.6 (which according to them requires a 50 percent increase in exports if imports are held constant) would increase the growth rate of an average country at about 0.8 percent. They further believed that technology and trade specialization are positively and significantly related to growth and so are a country's openness and trade specialization. However, in a seminal paper Findlay (1972) stated that if capital goods are imported under conditions of increasing costs, free trade does not provide for an optimum solution for economic growth of a nation. Further, he stated that import substitution for capital goods which serves the regional markets instead of national markets, taking the advantage of economies of scale; initially have unfavorable effects on the growth rate of a nation. Bresser Pereira (2010) while distinguishing old and new developmentalism concur that import-substitution may prove to be damaging for the developmental process of a nation. For the reason that import-substitution – which protects the national industry and focuses on the domestic market – reduces the openness coefficient of an economy and is greatly constrained by the economies of scale.

He found that when import-substitution model was maintained through the 1970s, it led the Latin American economies into a deep distortion. Moreover, under the import-substitution model, inefficient firms may enjoy the benefits of protection while under the export-led model the likelihood of this happening is substantially smaller (p. 97). Furtado (1965) remarked that after the initial import-substitution phase of consumer goods industries, continued industrialization implied a substantial increase of the capital to labor ratio with two consequences: first, income contraction[19] and, second, reduced capital productivity. Conversely, exports can be considered to be strategic to solve the problem of insufficient demand (unemployment) as exports encourage investment. "In the era of globalization, export-led growth is the only sensible strategy for developing countries while they have the competitive advantage of cheap labor. Exports increase employment, wages, and domestic consumption" (Bresser Pereira, 2010 p.134).

Terms of trade movements provide an important mechanism for the international transmission of growth effects (Helpman, 2004 p. 59). Acemoglu and Ventura (2002) pointed out that growth that affects the terms of trade adversely leads to convergence. They also found evidence for negative cross-country correlation between growth of income per capita and the growth of terms of trade between 1965 and 1985. Their estimates show that a 1 percent faster growth rate accelerated the deterioration or terms of trade by somewhat 0.6 percent. Furthermore, they found a negative cross-country correlation between the growth of income per capita and the growth of terms

[19] Income contraction leads to the expansion of production of luxury consumer goods which beside being perverse, contains the seeds of the dissolution of the national pro-development alliance (Bresser Pereira, 2010).

of trade. Krugman (1987) assuming that there are only two countries with many products and unitary elasticity of substitution in demand; showed that the growth rates of income per capita do not converge that is international trade does not lead to convergence.

Many studies have examined the impact that trade policies have on the economic growth of a nation. But the theories that tend to establish the relationship between trade policies and trade are quite complex. In some countries a restrictive trade policy may accelerate the growth rate while for others it may hinder the growth process. European experience of the late nineteenth century can be considered as a case in point where countries like France, Germany, and Sweden benefitted from protection while Italy experience slow growth (Bairoch; 1993). O'Rourke (2000) found positive effect of tariffs on the rate of growth of real income per capita. His growth equation for ten countries from 1875 and 1914 found that an increase of one standard deviation in the average tariff rate raised the annual growth rate by 0.74 percent. Clemens and Williamson (2002) too, find a positive relationship between tariff rates and economic growth for more than thirty countries between 1870 and 1913. They, however, find that this positive relationship turned negative for the post World War II period – when high tariff countries grew more slowly than low tariff countries. Since post World War II, countries started reducing the tariffs and this led to many researchers for using proxies for protection like measures of real exchange distortions, the size of black market premium on foreign exchange, the fraction of imports covered by non-tariff barriers, institutional features of economic regimes, and the deviation of trade volumes from the predictions of trade theory. They found negative

effects of trade restrictions on economic growth of a country using above mentioned proxies for protection.

Foreign Direct Investment (FDI) represents an important dimension of economic integration. FDI is a particular form of investment, as it transfers knowledge as well as finance that may otherwise be unavailable in the domestic economy (Lesher & Miroudot: 2008). It has a two-fold effect up on the receiving economy. Firstly and directly, through capital accumulation FDI is expected to be growth-enhancing by encouraging the incorporation of new inputs and foreign technologies in the production function. And secondly, indirectly through knowledge transfer FDI is expected to augment the existing stock of knowledge through labor training and skill acquisition and introduction of alternative better management practices and organization arrangements (de Mello: 1999). Foreign investment increases the productivity of the receiving economy and hence FDI can be considered as catalyst for domestic investment and technological progress. de Mello (1999) based on his study for a sample of thirty-two OECD and non-OECD countries during the span of 1970-1990 provided empirically that the long-run effects of FDI on the recipient economy can be both growth-enhancing or growth-depressing – based on the absorption capacity of the nation. His empirical testing found a long-run positive effect of FDI on capital accumulation for a group of countries, while, for some, no cointegration was found. Further, there existed both a positive as well as a negative relationship between FDI and TFP growth. His analysis with respect to panel data suggested a dominant complimetarity effect between FDI and domestic investment, and that the

OECD nations were benefited by FDI in terms of technological change while opposite was observed for the non-OECD panel countries.

**Institutions and Policy**

Among the above factors affecting economic growth of any economy, the institutional factors has a substantial role to play. Since the 1960s, institutions have been a central concern of political scientists and since the 1980s a major research program for economists. Classical, Marxist, German historicists had always attributed a central role to institutions, whereas neoclassical economics practically ignored them for around a century. In the early 1990s institutions were eventually brought back into the mainstream economics. In one of his Keynote addresses, Sala-i-Martin stated, "Institutions affect the "efficiency" of an economy much in the same way as technology does: an economy with bad institutions is more inefficient in the sense that it takes more inputs to produce the same amount of output" (Sala-i-Martin, 2002). Helpman (2004) feels that Institutions (and politics) determine the ability of countries to accumulate, to innovate, to adapt new technologies, and to reorganize in the face of technological change. And they shape the economic policies that either promote or hinder growth. Marx, on the contrary, viewed institutions as an obstacle rather than an incentive to the process of economic development.

North (1990) distinguished between institutions and organizations. According to him organizations are influenced by the institutions (who put forth the rules) and in turn, the organizations affect the evolution of rules to be formulated by these institutions. Grief (n.d., chap. 2; in Helpman, 2004 p.

115) proposed a broader definition of institutions (which embraced North's definition) as "an institution is a system of institutional elements that conjointly generate a regularity of behavior by enabling, guiding, and motivating it". Unlike North, Grief's definition state that institutional elements include organizations. Institutions are more fundamental determinants of economic growth than R&D or physical or human capital accumulation. Helpman (2004) reasons this statement by saying that "…institutions affect the incentive to innovate and to develop new technologies, the incentives to reorganize production and distribution in order to exploit new opportunities, and the incentives to accumulate physical and human capital" (Helpman, 2004 p. 139).

However, Institutions in its broader sense embraces the aspects of law enforcement, markets, inequality and social conflicts, political institutions, health systems, financial institutions, as well as government institutions. These institutions may affect the economy in both constructive and unconstructive ways. While on the one hand, better institutions amplify the incentives to invest in technology, human capital and physical capital, these incentives are grounded by bad institutions, on the other hand. The organizational success and failure account for the progress and retrogression of societies (North, 1981).

Birdsall (2007) expressed that the process of economic growth in developing countries is undermined by the weak markets and poor government. According to her, in developing countries in general, financial and other markets are less complete and public policy is less effective in addressing market failure and imperfections. That is imperfect credit and other markets,

ineffective and corrupt institutions of the state, poor public policy, political instability and social conflict lack the essence to address the issue of market imperfections and failures. In one of his lecture series in India, Sir Arthur Lewis summarized that for developing countries to grow faster, their economic policies must aim at eliminating the constraints in way of growth process. He identified these constraints in the form of shortages of skilled labor, infrastructure, savings and entrepreneurs. It is only through the elimination of these constraints that the productive capacity can be expanded to the ultimate boundary set by full employment. Countries wherein the governments provide an environment that persuade production are comparatively dynamic and successful than those wherein the governments engage and permit diversions (Jones, 2002). And so the main task of plan implementation is to work on the fundamental constraints and to keep the economy buoyant. Moreover, governments can deliberately alter the comparative advantage in specific sectors to the disadvantage of the other sectors. The European Union's 'subsidies to the chosen sectors' is the best example of such policies which alter the competitiveness of an economy. Plumper and Graff (2001) introduced a simple endogenous growth model to show how government can stimulate economic growth by implementing policies that successfully create competitive advantage in favorable sectors. Reappraising the role of national policies in economic growth of a nation, Esterly William (2003) found that the relationship between policies and growth miss out to explain some stylized facts of the post-war period. Emphasizing on the taxation methods in an economy he intends to explain how strong is the relationship between national economic policies and growth rates of the economy. He concludes that though sound macro-economic policy

is a useful tool for the growth of any economy, good macro-economic policies are not the only and cannot be considered a must to create the conditions for high steady state growth. Government policies and decisions with respect to the economic variables have a significant role to play on the growth of a nation. Ghosh and Gregoriou (2008) analytically characterized an optimal fiscal policy with two public goods with differing productivities in 15 developing decentralized economies over a span of 28 years. They identified the bias in government spending that arises due to misperceptions of governments about their priorities. Their use of GMM technique in an endogenous growth model showed that current spending has positive and statistically significant effects on the growth rates of the selected nations, whilst capital spending depicted negative growth effects. Further, the extension of their analysis to the functional components within the above categories of spending showed, that capital spending i.e. expenditure on health and education affected growth in a negative and statistically significant manner. While the current spending i.e. expenditure on operations and maintenance was found to have a positive and significant impact on the growth. Moreover, on the revenue side it was found that tax and non-tax revenue have positive and significant effects in the growth rates, while budget deficit or surplus reported to be statistically insignificant. Baoyun, Martinez-Vazquez, and Xu (2008) develop a theoretical model of fiscal decentralization in China where the objectives of central government is the overall national economic growth and equity in regional distribution of fiscal resources. This model is tested using panel data from 1985 to 1998. They found that fiscal decentralization in China has led to economic growth as well as to significant increase in regional inequality – confirming for a trade-off between economic

growth and regional equity. In addition to this two other findings are noteworthy:

1. Fiscal decentralization significantly affected economic growth – a higher level of decentralization led to a higher growth but this relationship was non-linear and

2. The existence and use of extra budgetary funds helped to alleviate disparities in the distribution of fiscal resources.

Most econometric tests have demonstrated that there is a strong positive correlation between good institutions and the level of economic growth. But in the growth process one cannot find sensible correlations between institutional variables and the yearly percentage increase in per capita income. The tight correlation between the structural and institutional instances is confirmed, whereas the hope that institutional reforms will generate growth is not. Institutional reforms remain essential to development but they do not explain why some countries begin to grow faster than before and, gradually, catch-up (Bresser Pereira, 2010). Bresser Pereira (2010) believed that it is impossible to link institutional reforms to the rate of growth. "Institutional reforms are always necessary, but they rarely precede economic growth: they take time to mature, to be transformed into law, and to be enforced" (p. 126). In explaining his concept of 'new developmentalism', he emphasized upon the importance of macro-economic policies (especially with respect to exchange rate) in the economic growth and development of nations – specially comparing the Asian and Latin American countries.

## Economic Integration

The theory of economic growth has its distinguished place in the literature of Macroeconomics. These theories along with the advocates of Customs Union postulate growth enhancing effects of economic integration. Movements toward economic integration in various parts of the world have evoked a considerable amount of economic literature concerning its immediate effects on trade and welfare.

Jacob Viner's (1950) landmark theory of Customs Unions which was further improvised up on by Meade (1955) distinguished the effects of economic integration into trade-creation[20] and trade-diversion[21]. These effects, however, are of a 'static' nature as they provide for justification of customs union in terms of forecast changes in flows of trade. Trade creation and trade diversion, and the improved terms of trade of the integrating nations contribute to a larger market size through their effect on national income. Empirical literature like The Economist and Intelligent Unit (1957), Verdoorn: An Unpublished Paper quoted by Scitovsky (1958), Johnson (1958), Stamp and Cowie (1967) forecasted large increase in trade because of customs union formation. Balassa's (1975) empirical study found trade creation in absolute terms over trade diversion for manufactured goods in EC integrated market, while trade diversion was observed where Common Agricultural Policy (CAP) was followed. Similar results were found by Jacquemin and Sapir (1988a) for

[20] Trade creation is the new trade between members of the customs union which would replace higher cost production in the importing member hence causing an increase in welfare – as higher cost production is replaced by lower cost production. (Denton: 1969)

[21] Trade diversion is the replacement of imports from non-member countries to member countries which would reduce welfare – as the old imports from a non-member country were of lower-cost then new imports which replaced them because of tariff preferences. (Denton: 1969)

four EC integrating nations viz. France, Germany, Italy and the United Kingdom. EC integration was found to be welfare-enhancing especially for the manufacturing sector which was more liberal in comparison to the temperate agricultural sector which was highly protectionist (where integration generated welfare costs). However, Lipsey estimated the net gains from trade to be less than one per cent of the national income. This is because the 'static gain' to welfare due to increase in trade is not equal to the increment in trade itself but to the increment in trade multiplied by the reduction in cost due to change in the source of production (Denton: 1969, p.149). Thus, these static effects of customs union cannot prove beneficial for practical policy making.

However, Scitovsky (1958), Lipsey (1960), Balassa (1961) and others opined that the static analysis as indicated by Viner's approach is in any case relatively unimportant. The creation of customs union can have a number of indirect or dynamic effects. The dynamic factors are the long-run consequences of increased market size for the growth rate of the integrating region. This may operate through:

1. Internal economies of scale – internal to the plant
2. External economies which include enlarged pool of technological and managerial skills, economies of specialization, inter-industry transmission of innovations, and better use of discoveries and research
3. More competitive market structure
4. Elimination of risks and uncertainty from foreign transactions leading to expanded trade and investment.

What are considered more important for practical policy making are the 'dynamic' effects of customs union on investment, competition, and balance of payments of the member nations. According to Balassa (1961) these dynamic effects of economic integration are rooted in internal and external economies of scale, faster technological progress because of these economies in the research and development (R&D) sector of an economy, enhanced competition, reduced uncertainty, creation of more favorable environment for economic activity and lower cost of capital due to the integration of financial markets.

"Thus, the dynamic gains due to considerations of 'scale' and the 'climate of competition' seem likely to be far more important than the static gains or losses due to trade creation and trade diversion…" (Pinder: 1969, p. 151).

The upshot of economic integration can be well understood from two most influencing theories of economic growth viz. the neoclassical theory of economic growth and the endogenous theory of economic growth.

The neoclassical growth literature was dominated by the exogenous 'Solow-Swan' growth model. As per the neoclassical growth theory, the economy converges towards a steady-state due to diminishing returns to investment in physical capital. Assuming a constant population, the long-run growth rate is solely determined by the exogenous factor – technological change. Hence, as per neoclassical growth theory economic integration and other institutional aspects or economic policy measures have no effect on the steady-state growth rate. Thus, economic integration as per this theory will only have temporary

effects on the growth rates; rejecting the hypothesis of permanent growth effects.

With Romer's (1990) introduction of the endogenous growth models; technological change was now not a public good but endogenous to growth and subject matter of decision-making process at individual firms. According to this theory technological progress depends on the Research and Development (R&D) activities of individual firms.

In endogenous models which assume constant technological parameter – like the AK models – integration would lead to permanent growth effects with an increase in investment-ratio. However, "A stable, endogenous growth rate is only realized, if returns to accumulable factors (*like K in AK models*) are exactly constant; increasing returns would imply explosive growth and the case of decreasing returns would bring is back in the neoclassical world without endogenous growth." (Badinger: 2001, p.7).

Among endogenous growth models with variable, endogenously determined technological progress exhibiting the 'scale effects' imply that the long-run growth rate increases with the size of the economy (Romer (1990), Rivera-Batiz and Romer (1991), Grossman and Helpman (1991), Aghion and Howit (1992), Rivera-Batiz and Xie (1994), Walz (1998)). As per this analysis, the more the number of countries joining the economic integration, the larger would be the scale of integrated economy. This would lead to higher incentives for R&D and, accordingly, higher growth rates.

However, this 'scale effect' characteristic of the above models has been criticized by Jones (1995a). According to his empirical research, labor engaged

in the R&D sector of the OECD countries increased significantly during the post-war period; while the growth rates were found to be relatively stable. "As response, a number of endogenous growth models without scale effects have been developed, e.g. by assuming decreasing returns to accumulabe inputs in the R&D sector (Jones (1995b)), introducing the principle of "equivalent innovation" (Young (1998)) or assuming an increasingly difficult research process (Segerstrom (1998))." (Badinger: 2001 p.8)[22]

But do countries essentially benefit from economic integration is the question that showed the way for the following empirical research.

Firstly, researches were made to compare growth benefits of economic integration for countries joining it with those not a part of such integration model. In such cross-country study, Landau (1995) found no growth bonus for the European Union member countries in comparison to countries that did not join the EU. Moreover, both – European Union member and non-member countries – were at a similar stage of development. DeMelo et.al. (1992) using the Barro (1991) technique in a cross-section of 101 countries, did not find any growth effects associated with the European Union integration.

Secondly, improvements in the data and statistical techniques opened ways to deal with the growth effects of integration.

In view of this, apart from the above two cross-sectional studies, Vanhoudt (1998) focused exclusively on the growth effects for European Union member countries only. Based on a time-series data for the European Union at several

[22] These models are compatible with the neoclassical growth as they show level effects bit bi effects on the steady-state growth rates (Badinger, 2001)

stages, he tested the validity of the neoclassical implications of regional integration. For this purpose, he carried out a panel data regression on 23 OECD countries, only to conclude that "…there is no convincing evidence to support the idea of a long-run growth bonus associated with EU membership, nor with membership length…" (p.18). His study further rejected the hypothesis of scale-effect on growth rate of average EU labor productivity. Yet, "the growth experience during the development of the EU is well described by a textbook neoclassical model which emphasizes the role of investment as engine of growth." (p.17).

Vanhoudt's study was contradicted by the study of Henrekson et. al. (1997). As per their study EC or EFTA membership may increase growth rates by around 0.6 to 0.8 percent point per year; irrespective of its membership to EC or EFTA as an organization. Their results support the hypothesis that regional integration in Europe can have significant growth effects and suggest that further regional integration may be growth enhancing in the long-run. However, the results of the paper are not completely robust with respect to changes in model specification. Sapir (1992) found strong evidence of positive impact of EC integration on growth for the member nations. As per his view, EC led to a substantial multilateral trade liberalization that benefitted the Community and her trading partners. Borota and Kutan (2008) used augmented Solow model to analyze and measure the benefits of regional integration on growth for the EC member nations. Their study, in particular, emphasized the impact of trade and FDI net inflow on economic growth in EU-15 countries over a period of 1973 to 2002. This study sustained the earlier studies when it found no evidence of integration-induced investment-led

growth in EU-15. Further, technological progress was considered as a lead factor for economic progress. Empirically, net FDI inflow was found to have a significant and positive impact on growth. As per their empirical study, a 1 percentage point increase in net FDI inflows in the integrated economy increased the countries growth rate by some 0.3 percentage point.

The study by Crespo-Cuaresma et. al. (2003) focused exclusively on the current EU member states and the issue of convergence within the integrated European economy. Their empirical study found positive and asymmetric effect on long-run economic growth of EU membership which approves European integration of driving convergence. Further, they feel that the longer a country has been a member of the EU, the more it would profit from the membership. However, one can argue that the growth benefits associated with regional integration seem to be due to formal participation in the union. Moreover, objection could be that it is not EU membership itself that enhances growth, but that the accompanying stability measures for nominal macroeconomic variables that has a positive impact on growth performance. The regression coefficients support the hypothesis of a positive impact of investment, education and openness to growth; but a negative impact of high inflation rates. Thus, the results conclude for a growth-enhancing effect of EU membership. Moreover, this effect gains importance over the duration of membership. The study further enquiries into the benefits from European Union membership on particular country. In view of this it was found that countries with a higher level of development grew faster the longer they were member of the European Union; this effect was even more pronounced for the less advanced countries. Thus, their study found a positive effect of integration

on economic growth for the present members of the European Union. More importantly, on the basis of the uncertainty surrounding the nature of the driving forces, the study rejects the implications of the basic neoclassical model.

A critical point in all the above studies, as pointed out by Badinger (2001), is the measurement of economic integration which is usually undertaken by dummy variables or proxies for the membership in EC/EFTA/EU. He criticizes the former studies on the ground that "…dummy variables…or proxies for the 'market expansion' as a result of EC enlargement in terms of population, GDP or area. Other frequently employed variables include total or intra-EC trade (as percentage of GDP) or the share of intra-EC trade in total trade. These variables, however, might only be rather poor proxies for the complex and continuous process of integration of the EU countries." (p.8). Thus, his measurements for the said purpose were the tariff reduction in the framework of GATT (General Agreement on Tariffs and Trade) and in the framework of EU (EC/EFTA/EEA/Common Market), and harmonization of external tariff. By using these measures in the endogenous growth framework, Badinger tries to endeavor to find the temporary or 'level' effects of economic integration on growth. His empirical results show positive and considerable level effects of integration on European Union's postwar economic growth. "In terms of growth…without integration, the average growth rate per annum over the period 1950 to 2000 would have been lower by 0.4 percent points." (p. 27). The increased growth rate of EU was found to rest on technology rather than investment. Further, "…two thirds of the total level effects is due to GATT liberalization" while only 7 percent of level effect was observed because of

European integration. Of great consequence, this research rejects the endogenous growth models with scale effects for understanding the effects of economic integration (especially the case of European Union member nations) on economic growth while not essentially supporting the neoclassical model too.

From the above survey and review of economic literature (especially with respect to economic integration) gives an idea with respect to the following research gap:

1. Most of the earlier studies analyzed the impact of EU integration upon both the developed and developing nations, or studied the impact of EU integration upon the member and non-member country, while this study analyses the impact of EU integration upon developed member countries only for a period of thirty-nine years.
2. Further, a comparison between the economic status and performance of the member countries before and after they joined the European Union is also not found in the previous research. As a result, this study intends to compare the economic status and performance of the selected member countries for pre-EU and post-EU time periods.
3. Most of the earlier studies have employed cross-sectional or panel data to validate the hypothesis and not the time series data. Hence, the present study aims to study the hypothesis using time series data for individual countries.

Therefore, this study has been made with a view to bridge the research gap noticed in the previous attempts. The above analysis has put forward the basic variables that tend to explain economic growth in an economy. Based on these

variables, this thesis intends to account for the disparities in economic growth among the selected member nations of the EU. However, it also intends to study the impact of EU membership on these selected member nations.

To serve this purpose it becomes essential to understand the economics behind the formation of the EU. The next chapter takes a ride into this economic area of customs union and how has the EU transformed itself towards a more integrated market economy.

# CHAPTER 4

# TOWARDS AN INTEGRATED MARKET

## Theory of Customs Union

The Second World War left many economies in a devastating position. Nations were left weak on economic, political and social grounds. In order to recover from such devastation, economies felt the need to integrate itself. As a result nations started trading in blocks. Countries' preference moved towards regional groupings within which trade took place. These regional groupings led to the unification of the trade taking place between different nations eliminating trade barriers. This in turn carved way for customs union – a market where trade took place differently from that stated in the traditional trade theory. The traditional trade theory was concerned only with the non-discriminatory tariff changes between the trading countries, whilst the customs unions are discriminatory in nature. Customs Union tends to discriminate between nations belonging to the same group and nations outside the said group. Customs Union is a unique combination of free trade and protection – free trade among countries participating in customs union and protection from the rest of the world.

The movement towards economic integration has evoked a considerable amount of economic literature. This literature on a whole is based on the assumption of static equilibrium. The customs union theory that follows is mainly concerned with the immediate effects of economic integration on trade and welfare. The theory of customs union, explaining trade creation and trade diversion, and its effects on welfare for countries forming customs union,

attempts to explain the static effects of economic integration. The theory as explained below consists of the landmarks in this area.

The theory of customs union is that branch of tariff theory which deals with the effects of geographically discriminatory changes in trade barriers. A country engaged in international trade may discriminate between commodities[23] and/or between countries[24].

The earliest theory of customs union articulated that free trade would maximize world welfare. By way of customs union tariffs were reduced which led towards free trade, in turn, increasing world welfare even if it does not lead to maximum world-welfare. Such traditional theories confined themselves with studying the effects of customs union on welfare only.

However, Jacob Viner (1950) considered this argument of welfare enhancing through free trade to be incorrect. Rather, he gave novel ideas of trade creation and trade diversion when countries integrate regionally to trade. His theory of customs union is based on the below mentioned assumptions:

1. Absence of transportation costs
2. Production cost will determine the supply price of goods i.e. cost equates price
3. Tariff is the only source of diversion between price and cost

[23] Commodity discrimination occurs when different rates of duty are levied on different commodities. (Lipsey: 1960)
[24] Country discrimination occurs when the same commodity is subject to different rates of duty, the rates varying according to the country of origin. (Lipsey: 1960)

4. There is full employment in all the countries before and after the formation of customs union

In this respect, his theory can be recalled as depicted in the table.

**Table.1 Money Prices (at existing exchange rates) of a single commodity X in three countries**

| Country | A | B | C |
|---|---|---|---|
| Price | 70 | 60 | 50 |

If country A levied 100 percent tariff on imports of commodity X from both the countries B and C, there will be no imports of goods from other countries and the domestic market of country A for commodity X will be well protected. If country A levied a lower tariff say 50 percent on imports of commodity X from countries B as well as C, which is of a non-discriminatory nature, then country A will buy commodity X from country C – a country producing commodity X at the lowest cost.

Now, if country A forms a customs union with country B, all tariff will be eliminated to import commodity X from country B and therefore it will be possible for country A to import commodity X at price 60 (which is lower compared to the price which country A paid in the domestic market). Imports, now, will shift from country C to country B i.e. a shift from low-cost producing country to high-cost producing country because a 50 percent non-discriminatory tariff is still levied on imports from country C. Trade has thus been diverted from country C towards country B. This is how, according to Viner, trade diversion takes place as a result of formation of customs union.

Viner's analysis of customs union between countries A and B gives rise to the following three leeways:

1. Neither country A nor country B produces the commodity X; rather they import it from some other country (rest of the world). In such case the formation of customs union between countries A and B will not change their trade pattern – they will still import commodity X from other country (rest of the world).

2. One of the countries forming the customs union produces commodity X inefficiently i.e. the country is not the lowest cost available source of supply. The union partner would then import from the cheaper source and there will be a trade diversion.

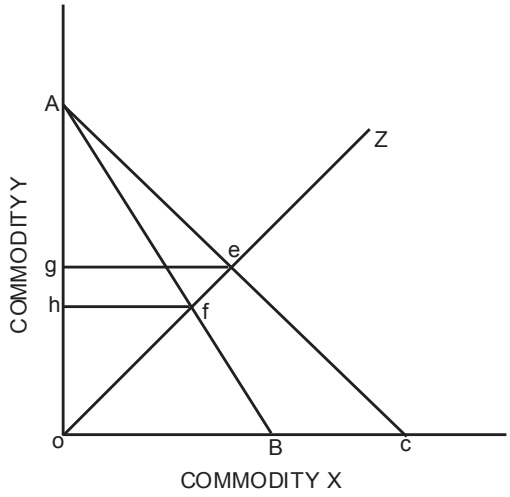
3. Both countries may be producing the commodity inefficiently under tariff protection. In this case the customs union removes tariffs between countries A and B and ensures that the least efficient of the two will capture the union market. In this situation there will be trade creation.

This analysis leads to the conclusion that customs union will cause losses if the countries are complementary in the list of goods that they produce. Viner showed that gains from customs union will arise if both countries are producing the same commodity (and hence customs union may be formed between countries with similar producing products i.e. agricultural country should prefer forming customs union with another agricultural country and industrial country should prefer forming customs union with another industrial country – as in the case of European Union).

Consider a group of commodities produced by each of the two countries under tariff protection. If these groups overlap to a larger extent, then the most efficient of the two countries will capture the union market and there will be a reallocation of resources in a more efficient direction. But, if these groups overlap to a smaller extent, then the protected industry in one country will capture the whole of the union market and there is likely to be a reallocation of resources in a less efficient direction. Thus, the gains from customs union will be greater when the degree of overlapping between the groups of commodities produced under tariff protection in the two countries is greater.

Further, on the demand side, Viner assumed, that there are no possibilities of substitution in consumption i.e. commodities are consumed in some fixed proportion independent of the relative price structure (all price elasticities of demand equals zero). On the supply side, he assumed that the supply elasticities are infinitely large so that all the products are produced under constant returns to scale. It now becomes possible to study the shifts in production between countries as given by trade creation and trade diversion. This can be identified with the following diagram:

Figure: 1



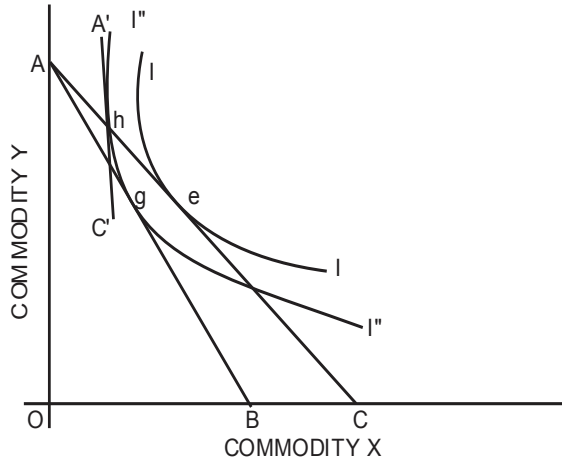
In the above diagram, country A is specialized in producing a single commodity Y. It imports a single commodity X at terms of trade independent of any taxes or tariffs levied in country A. The fixed proportion in which commodities are consumed is shown by the slope of the line OZ – which is the income-consumption and price-consumption line for all finite prices and incomes. OA indicates country A's total production of commodity Y and the slope of the line AC shows the terms of trade offered by country C (the lowest cost producer of commodity X). Under conditions of free trade, country A's equilibrium will be at point e – the point of intersection between AC and OZ. Country A will now consume Og of commodity Y and export Ag in exchange of imports ge of commodity X from country C.

Country A now forms customs union with country B. This will then lead to trade diversion. The new terms of trade offered by country B is the slope of the line AB. Country A still specializes in production of commodity Y and exchanges it for commodity X from country B. After forming customs union the new equilibrium for country A is at point f. Country A now consumes Oh of commodity Y (less compared to Og) and exports Ah in exchange of hf of commodity X from country B – for the reason that country A still consumes along the line OZ. This situation is clearly inferior to the situation before forming customs union as it represents smaller amount of both goods consumed. Thus, A's welfare is unambiguously diminished. Under the assumptions of no substitution in demand, trade diversion deteriorates country A's terms of trade which necessarily lowers A's welfare.

However, Viner's assumptions on the demand side may not hold true when customs union is formed. "A Customs Union necessarily changes relative

prices and, in general, we should expect this to lead to some substitution between commodities, there being tendency to change the volume of already existing trade with more of the now cheaper goods being bought and less of now more expensive" (Lipsey: 1960, p. 501). This situation, as presented by Professor Gehrels, can be illustrated with the following diagram:

Figure: 2




Country A is specialized in the production of commodity Y and produces at point A on the y-axis and hence country A's total production is OA. Before the customs union, it imports commodity X from the cheapest possible source, country C. Line AC shoes the terms of trade offered by country C. If free trade is permitted, country A would consume at point e where indifference curve II is tangent to the line AC. If country A imposes tariff on imports from country C – as indicated by the line A'C' – this will move A's equilibrium position from point e to point h. This will cause a reduction in the imports of commodity X from country C and an increase in the consumption of the domestic commodity Y; as at point h the indifference curve I"I" cuts line AC with a slope equal to line A'C'.

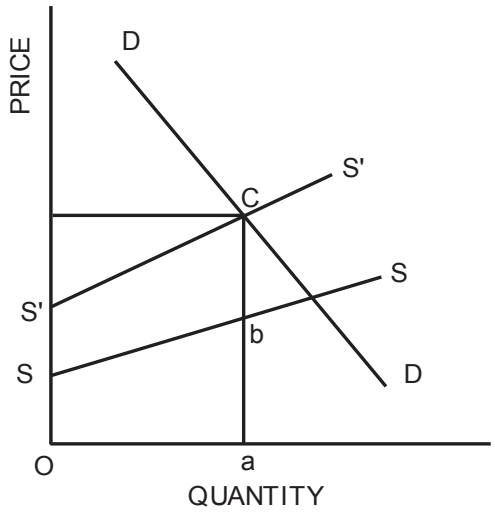
Now, if country A forms customs union with country C; trade diversion will take place worsening country A's terms of trade. Country A still produces OA of commodity Y and imports commodity X. The new terms of trade now is given by the slope of the line AB. The price ratio AB will now rule the domestic market of country A and commodity X is now cheaper than at the tariff-inclusive price ratio at A'C'. Therefore, commodity X will be substituted for commodity Y in consumption and the consumption of Y will now move to point g. As shown in the diagram, point g is on the same indifference curve as point h. Hence, consumers are as well off after the customs union as before. This shows that a customs union, even though leading to trade diversion, could result in consumers being as well off as before. But, if the deterioration in the terms of trade had been less than what is shown by line AB, and the new price line or terms of trade line had been somewhere between AC and AB, the customs union would have led to an increase in consumers welfare and would have put them on a higher indifference curve than I"I". In such case, the customs union would have increased consumers welfare even though it was of a trade diverting kind. This demonstrates that if substitution in consumption takes place, it implies that customs union can lead to an improvement in welfare even if it is of a trade diverting nature. On a whole, Professor Gehrels' analysis establishes a general presumption in favor of gains from customs union rather than losses.

Viner's analysis of trade creation and trade diversion substituted the source of country for commodities to be imported i.e. inter-country substitution. While Gehrels' analysis provided for substitution between commodities because of shift in relative prices i.e. inter-commodity substitution. However, analyzing

with just two commodities may not seem to be a real phenomenon as customs union formation gives rise to both kinds of substitution i.e. inter-country as well as inter-commodity. This can be understood from Professor Meade's analysis.

Professor Meade's analysis attempts to classify a large number of possible cases, showing the factors which would tend to cause welfare to increase when a customs union is formed and to distinguish them from the factors which would tend to cause welfare to diminish. In order to measure the gains and losses from customs union, Meade uses an important factor – the height of tariffs. Consider the following diagram:

Figure: 3




The figure shows the demand and supply curves for any imported commodity. Any tariff levied will shift the supply curve upwards i.e. from SS to S'S'; thus raising the price of imported commodity. Equilibrium is then established at point c. At point c, the demand price is different from the supply price by the amount of the tariff levied. If the supply price (ba) shows the utility of the

commodity to the producer and the demand price (ac) shows the utility of the commodity to the consumer, then the utility of the taxed import is higher to the consumers than to the producers. And the money value of this difference in utility is the value of tariff (bc).

If we assume that the marginal utility of money is the same for buyers and sellers then if one more unit of expenditure were devoted to the purchase of this commodity, there would be a net gain to the society equal to the proportion of the selling price of the commodity composed of the tariff. In the above figure, the rate of tariff is *bc/ab %*; the supply price is ab and the demand price is bc, therefore the money value if the gains to the society resulting from a marginal increase in expenditure on this commodity is cb. If there is a marginal decrease in this expenditure then there would be losses to the society. This kind of analysis implies that the higher the initial tariffs between the countries forming the customs union, the larger the scope for gain. Conversely, the lower the tariffs with the outside world, the lower should be the losses due to trade diversion. Professor Meade's analysis puts forth some generalizations for customs unions:

1. When only some tariffs are to be changed, welfare is more likely to be raised of these tariffs are merely reduced than if they are completely removed.

2. What matters is the relation between imports from the outside world and expenditure in domestic commodities – the larger are the purchases of domestic commodities and smaller are the purchases from the outside world, the more likely is it that the union will bring gain.

Thus, the size of the trade with a union partner is not the important variable[25].

Meade's analysis, however, suffers from one very important limitation. Unlike the marginal reductions, when there are large changes in many tariffs, as there will be with most of the customs union, it can be no longer assumed that the demand and supply curves will remain fixed. The ceteris paribus assumptions on which they are based will no longer hold, so that both demand and supply curves are likely to shift. When this happens it is no longer obvious how much welfare weight should be given to any particular change in the volume of trade even if we are ready to make all of the other assumptions ne cessary for the use of this type of classical welfare analysis (Lipsey: 1960, p. 506).

## Alleyway to European Union

The economic literature in international sphere confronts many economists who advocate for free trade. Many theories in international economics have proved that trading is always beneficial than autarky (Say's Absolute Advantage Theory, Ricardo's Comparative Advantage Theory, Heckscher-Ohlin's Factor Endowment Theory among others). With further development in the literature of international economics there were thinkers who condemned the idea of free trade. Yet, there were some thinkers who strongly favored trade by arguing that all countries are not bestowed with all the resources that it needs. This fact was aptly embraced by Gaedicke and von Eynern (1933) in their two volume work (Gaedicke, Herbert, and Gert von

[25] For a detailed analysis see Meade, J.E. 1956. The Theory of Customs Unions. Amsterdam: North Holland Publishing Company and Lipsey, R.G. The Theory of Customs Unions: A General Equilibrium Analysis. Ph.D Thesis, University of London. Unpublished.

Eynern. 1933. *Die Produktionswirtschaftliche Integration Europas: Eine Untersuchung über die Aussenhandelsverflechtung der Europäischen Länder*. Berlin: Junker and Dünnhaupt; as cited in Machlup: 1977 p. 7). In their book using statistical data for foreign trade, they concluded that there existed a 'high degree of export integration' in Europe. Trade is one factor that inter-related the countries of Europe through supply of raw materials and intermediary products to each other. Later, with the development of the theories of customs unions the idea of "restricted trade" was emphasized upon "free trade". And to this respect many thoughts have entered the economic literature whether trade would prove to be beneficial or not for the trading countries? Moreover, the theories of customs unions advocated for a regional integration.

Economic integration has attracted immense attention since the post war period. It divides the world into preferred and discriminated partners (Pelkmans: 1997). Therefore, it becomes essential to understand economic integration. Integration is the process of reaching the state of union (Denton: 1969). Denton defines economic integration as "…both the removal of discrimination as between the economic agents of the member countries, and the formation and application of co-ordinated and common policies on a sufficient scale to ensure that major economic and welfare objectives are fulfilled.". Hence, economic union is a state in which discrimination has been largely removed, and coordinated and common policies have been and are being applied on a sufficient scale. In other words, economic integration is the elimination of economic frontiers between two or more economies. This provides for elimination or reduction of discrimination on the mobility of

goods or services, production factors as well as communication flows. Economic integration refers both to market integration and policy integration[26].

General economic integration of the economies refers to the entirety of economic activities of the region, country, block, or world. If the government of countries intend to integrate their economies they will have to remove restrictions on the movement of people, funds, and goods; pursue policies designed to correct wrong signals of the free market and to strengthen the effects of correct signals; and to create permanent institutions without which the integrating forces of free markets may be too weak to be effective (Machlup: 1977) i.e. to go for both positive as well as negative integration.

Europe witnessed two devastating world wars and the Great Depression of the 1930s. This led the European economies to alter their trade relationships with each other as well as with the rest of the world. This in turn led to regional and economic integration of the countries of Europe. The European Union is not the first historical experiment of greater economic integration, but it is definitely one of the most successful and far-reaching illustrations. It is a revolutionary project that radically transformed the economic and political map of Europe. Hence, what follows next is a brief summary of the journey to the European Union.

[26] Market integration is a behavioral notion indicating that activities of market participants in different regions or member states are geared to supply and demand conditions in the entire Union. Policy integration may cover very different types of economic policies, using different kinds of instruments (Pelkmans: 1997 p. 6)

## Formation of the Union – From the BENELUX to The European Union

Adolf Hitler was the main catalyst of the European Community. He brought together, by the strength of sword, virtually the entire area of the original European Economic Community (EEC). The governments of the Netherlands, Belgium, and Luxembourg decided in 1944 that their economic futures were inextricably disheveled. The Benelux Union came into force on 1st of January 1948 as a customs union and was the oldest post-war regional integration in Western Europe. The USA and the Soviet Union both gave the nations of Western Europe a thrust in the direction of unity. The fighting of World Wars left the Western European countries in crisis, as a result of which all the Western European nations had to accept the Marshall Aid from the USA[27]. In order to evenly divide the flow of the US aid under the Marshall Plan, the Organization of European Economic Co-operation (OEEC) was set up in 1947. The aid program was completed over three years, but the OEEC continued as a forum for promoting economic co-operation and free trade among Western European countries. Later its membership was extended to include all industrialized non-communist nations and the name was changed to Organization for Economic Co-operation and Development (OECD) in 1961. The domination on the countries of Eastern Europe by USSR forced several West European countries to come together and unite into larger groups – more powerful and protective than the traditional nation state. As early as 17th March 1948, the Treaty of Brussels was signed providing for a 50 years

[27] The Marshall Plan transferred about $12.5 billion to Europe in grants, loans, and conditional aid.

agreement between the UK, France, Belgium, the Netherlands, and Luxembourg which was known as the Western European Union (WEU). WEU was later joined by Germany and Italy in 1954. The Franco-West German dispute over the Saarland, which was largely fuelled by French, feared that if its iron and coal industries were integrated with those of the rest of the West Germany it would once again dominate the economy of Europe. France had tried unsuccessfully to annex the Saarland, which was overwhelmingly German in population, and as in the post-1919 period, this attempt had poisoned relations between the two countries. In order to reduce the prospects of subsequent major military conflicts, an alternative was brought to the fore as a part of a wider political initiative. Jean Monnet (principal architect of European Union and the then head of the French Planning Organization) succeeded in capturing the ear of the French foreign minister, Robert Schuman, to put forward his (Monnet's) proposal of Franco-West German reconciliation. Monnet's proposal was put forward as the 'Schuman Plan'[28] by the French government. It was considered as a functional approach towards the unity, embodying a gradual progression. As per this plan, the West German and the French coal and steel industries – then considered as strategic sectors of the economy - should be placed under a single High Authority which should supervise their development. West Germany, and later Italy and the Benelux countries (the Netherlands, Belgium, and Luxembourg), quickly responded to the invitation to join the Plan, and the Treaty of Paris was signed on 18th April 1951. The Treaty of Paris formally established the European Coal and Steel Community (ECSC), which came into

[28] The Schuman Plan was launched on 9th May 1950.

being on 10th August 1952[29]. The ECSC was the European contribution to the foundation of the European Union and an institutional innovation that allowed recovery to continue in Europe. It was created to stabilize prices, ease the distribution of coal during the post-war boom, provide new markets for iron ore and steel, and coordinate competition. All import and export duties, subsidies, and other discriminatory measures were immediately abolished on the trade of coal and steel among the six member countries. The ECSC was unique in being provided with a supra-national High Authority which was given wide powers to determine the direction of two key industries throughout the member nations. However, the UK declined to join the ECSC as her coal and steel industries had been nationalized immediately at the end of the war by the Britain's labor government. Moreover, the UK never participated in the continental steel cartels before World War II (Neal: 2007). The absence of the UK facilitated the construction of a community that was different from the many other international organizations established during this period, such as the Council of Europe, the North Atlantic Treaty Organization (NATO) or the General Agreement on Tariffs and Trade (GATT). Monnet had intended that the ECSC would be paralled by a common European Defense Force, which would supersede national armies and facilitate the rearming of West German force. France, West Germany, Italy, Belgium, the Netherlands, and Luxembourg signed a treaty in May 1952 providing for a creation of a European Defense Community (EDC)[30]. However the creation of EDC was a failure. The failure of EDC had two significant consequences. Firstly, West German rearmament proceeded on a national basis and secondly, West

[29] Jean Monnet was the first president of ECSC.
[30] However, the French National Assembly declined to ratify the treaty in August 1954.

Germany was admitted as a full member of NATO (North Atlantic Treaty Organization) in October 1954. From this, Monnet concluded that the path towards European unity lay through economic rather than military co-ordination. He (Monnet) then headed the Action Committee for the United States of Europe (ACUSE) which included leading figures from the six member nations. The foreign ministers of these six nations met in Messina in June 1955 and appointed a committee under the chairmanship of the Belgian foreign minister, Paul-Henri Spaak, to investigate establishing a common market. This committee produced a report which was the basis of the Treaty of Rome signed on 25th March 1957, establishing the European Economic Community (EEC)[31] as a Customs Union. All six parliaments ratified the treaty which came into effect on 1st January 1958[32]. The greatest achievement of the EEC has been the progressive lowering of barriers, both economic and psychological, between the Member States (Minshull: 1978). However, the UK decided not to join the EEC as a member. Instead the UK with other six members of the OECD (Austria, Denmark, Norway, Portugal, Sweden and Switzerland) formed the European Free Trade Agreement (EFTA) by signing the Treaty of Stockholm in 1959. The EFTA was a free trade area, as opposed to the Customs Union, with a common external tariff i.e. providing for gradual reductions and eventual abolition of quotas and tariffs on imports from member countries, leaving their tariffs on imports from other countries unaffected and a political agenda. The three communities – the ECSC, Euratom, and the EEC – were formally amalgamated on 1st July 1967. They

[31] A separate treaty signed on the same day in Rome established the European Atomic Energy Community (Euratom).
[32] Walter Hallstein of Germany was the first president of EEC Commission.

were jointly known as the European Community (EC), or sometimes the European Communities. The meeting of European Council at Maastricht in December 1991 set the grounds for the Treaty on European Union. After much political hassle, the Treaty on European Union finally came into force on 1st November 1993. It provided a new dimension to the development of European economy. Since then the European Community has been generally known as the European Union (EU). It can thus be said that the Maastricht Treaty opened the doors to a broader pathway – economically, politically, financially and institutionally – to European Union (EU).

The European Union as the reincarnation of the three old communities (the ECSC, the EEC, and the Euratom) in a much more developed form and with wider membership has clearly emerged as the most important regional organization, an organization which almost all European countries aspire to join (Tsoukalis: 2003). The European Union is far more the largest customs union formed. And all the member nations tend to benefit from this regional integration in one or other form.

In this chapter, we saw the theories of Customs Union which are considered to have triggered the economic literature on the subject area of (regional and economic) integration. Based on the arguments put forward by these theories, it was quite clear that forming a Customs Union would benefit the member countries by increasing welfare, ultimately elevating economic growth of the member economy.

In view of this, I intent to study whether forming a Customs Union have had an impact on the economic growth of its member countries. Since the

European Union is one of the oldest forms of Customs Union, it has been chosen for the analysis purpose. Further in this chapter, we saw, the factors that led to the formation of the European Coal and Steel Community and how it has been elevated to the present state of a complete European Union.

This takes us to the study of various economic conditions that have been faced and prevail in the selected member nations of the European Union. In the light of this, the next chapter explains the economic status of the selected EU countries since Second World War.

# CHAPTER 5

# ASSESSMENT OF THE EUROPEAN UNION COUNTRIES' ECONOMIC GROWTH

## Introduction

When the Second World War came to a halt in 1945, European economies observed much obliteration. Many countries were faced by huge wartime debts and post-war shortages; while, some of them had to face the widespread destruction and famine; including the return of the emigrant workers. By the end of World War II the economic future of Europe seemed austere. It was now the right time to revamp the economic situation in Europe, and government of each nation started taking revolutionary steps in this direction. The World War inculcated in the Europeans the significance of industrial investment. The result was observant in the second half of the twentieth century (1950 – 1970), which was a period of unparalleled growth in Europe – also known as the golden age of economic growth in Europe. The motives that stimulated this golden growth age were

i) The backlog of unexploited technological and organizational knowledge in the initial years and

ii) The Cold War which moved the western European nations towards market capitalism

These factors resulted into Europe's transition from extensive (1947-1960s) to intensive growth (1960s onwards) and regional integration. (Eichengreen in Fulbrook: 2001). Fulbrook (2001) in her book points to the four filaments

which dominated the European continent during 1945 and 1990. These four strands, according to her, are The Cold War, The European Integration, The Transatlantic Relation, and the Soviet Rule in Eastern Europe.

The Cold War began after the declaration of the anti-communist policy by the then US President Truman. The Cold War divided the European continent into two – the West and the East. It was a war between two different ideologies viz. communism and democracy. The West followed the American ideology of democracy while the East which was controlled by the Soviet Union followed the communist ideology. The war between the two ideologies was fought economically, politically, diplomatically and occasionally even militarily. With the collapse of the Cold War, economic integration had already triggered in a handful of West European countries. The economical and regional integration subsequently started spreading in the West, and after the collapse of the Iron Curtain, even the East showed its intentions in joining the integration. "This process of integration was multifaceted and never uncontested: the impulses behind it ranged from, on the one hand, a purely functional, pragmatic belief in the importance of a common market for goods and labor, to the quite different and more visionary ideals embodying commitment to closer political as well as economic union in what was held out as the promise of a post-nationalist era." (Fulbrook: 2001, p. 4). The Transatlantic Relationship shows the relationship between both sides of the Atlantic Ocean, mainly the US, Canada and the Europe, in terms of political, social, cultural and economical relations. The US and the EU are each other's most important trade and investment partners. The program on Transatlantic Relations promotes dialogue on major issues affecting the transatlantic

partnership and the ability of the US and the Europe to respond to global challenges. The Soviet rule in the eastern parts of Europe is a much told story. Its economic implications can be known from the communist political rule which was dissolved in 1991. Since then the European integration has expanded immensely from the east European nations.

The Marshall Aid from the US, after the Second World War, helped in revamping the European economies, especially the west. Nations accepting the Marshall Aid began to lift the import restrictions, which helped in exploiting the comparative advantage of a nation in the international market. This further led to regional integration among the nations. "The establishment of the EEC in 1958 and its creation of a free trade area encompassing France, Germany, Italy, and the Benelux countries in less than ten years was without question the most profound development affecting growth in the West in the 1960s." (Eichengreen in Fulbrook: 2001, p. 118). Many studies have proved that the formation of the EEC have been trade-creating rather than trade-diverting among the member countries. Since then, this regional integration's membership has been increasing and widening, developing a set of supranational European institutions.

It was only later since 1973 (especially the two oil shocks of 1973 and 1978 that led to economic difficulties in the European countries) that it became difficult for the European nations to sustain its unbelievable growth records. And since then, Europe has been facing economic problems like unemployment, inflation, and even financial and political stiff.

The two oil shocks and the economic downturn during the early 1980s caused major problems for the nations at large. Unemployment rates in the European nations soared high and showed no signs of sooner recovery. The problem of severe unemployment faced by the European economies was the result of inadequate flexible wages, overly rigid work rules and excessive non-wage labor costs (Fulbrook: 2001). The Single European Act (SEA) of the mid 1980s freed the institutional restraints to the effective operations of the market. It carved way for the market drivers (forces) over the governance model. This resulted into liberalization of the markets, thus, creating wealth as a result of increasing profits with the numerous individual market participants. "The Single European Act", however, "did not necessarily enshrine free trade. It had the more limited initial purpose of creating a single European Market for European producers in the face of global competition." (Gillingham: 2003, p. 450).

The European nations were just recovering from the downturn that they were again hit by the global crisis of the 1990s. The 1990s in Europe saw the dissolution of the Soviet rule and the reunification of Germany, the creation of the European Union, and the acceptance of the Euro as a common currency. The adoption of the Maastricht Treaty in the early 1990s involved the transfer of powers of policy making from the member states to the central bank directorate. Later, with the European Monetary Union (EMU) coming into force, the governments of the member states will have to adjust to the tight constraints of the EMU. Further, it is also felt among the economic thinkers, that the shift to the monetary union and the acceptance of the Euro would keep the economic growth rate of the participating member states low and

would increase the rate of unemployment in these economies (see Gillingham: 2003). Nonetheless, it depicted an impressive picture on the innovation front. The structural changes in the market along with modernization and liberalization of the business, reformations in the financial sector, increased the size and importance of the service sector whose contribution has increased over the period of time. However, the top-level policy making during the 1990s was concentrated on political issues rather than economic. On a whole, during the 1990s, the European Union missed on some of the opportunities of the decade.

With the advent of the 2000, the basic European institutions needed a refurbishment. The structural problems, rigid labor markets, stiffed long-term growth, the crisis of the 2000s and misleading policies of the earlier decade created cultures of dependence and frustrated innovation and creativity. Furthermore, the newer investments and increase in productivity are lagging behind mainly because of the global crisis of the early 2000.

With this overview in mind, I now move ahead with the assessment of economic status of the selected member countries of the EU taken for the research. What follows next is the economic changes that have taken place in these selected member states (Germany, Italy, The UK, Portugal, Spain & Finland) since Second World War. How has these countries evolved through the phases of economic ups and downs, and how have they managed to deal with these situations? As a result, the next part deals with the economic situation that has prevailed in Germany, Italy, The UK, Portugal, Spain & Finland since the Second World War.

## GERMANY

Germany had to face defeat in the Second World War and with this defeat the future seemed bleak. Germany was divided among four allied powers after the war – the US, the UK, the Soviet Union and France. The economy almost came to a halt with widespread destruction and famine. Germany had to absorb around 8 million ethnic Germans coming from Eastern Europe. It was in 1949 when Germany was divided into East Germany and West Germany. East Germany was then known as the Deutsche Demokratische Republic (GDR – German Democratic Republic), while West Germany was called the Bundesrepublik Deutschland (FRG – Federal Republic of Germany). The reconstruction of West Germany was restored into the hands of private corporate, while the East Germany restored herself under the leadership of central government agencies. Despite of many difficulties, Germany was able to rebuild her economy from the rubbles of the war, thanks to the availability of large capital stock resulting from the investments made during the war. The available capital stock was then used in manufacturing goods, thus increasing manufacturing capacity of the economy.

After the division, West Germany strongly established herself in the export industry. The West German economy grew by leaps and bound since the Second World War mainly because of the high level engineering, low wages (*especially in the skilled trades*), well maintained public institutions and an excellent legal system (Sinn: 2007). These factors made West German products more competitive in the international market. In addition to this; hard working, well educated, highly motivated, and willing to save work force; and increasing population; widened and deepened West Germany's domestic

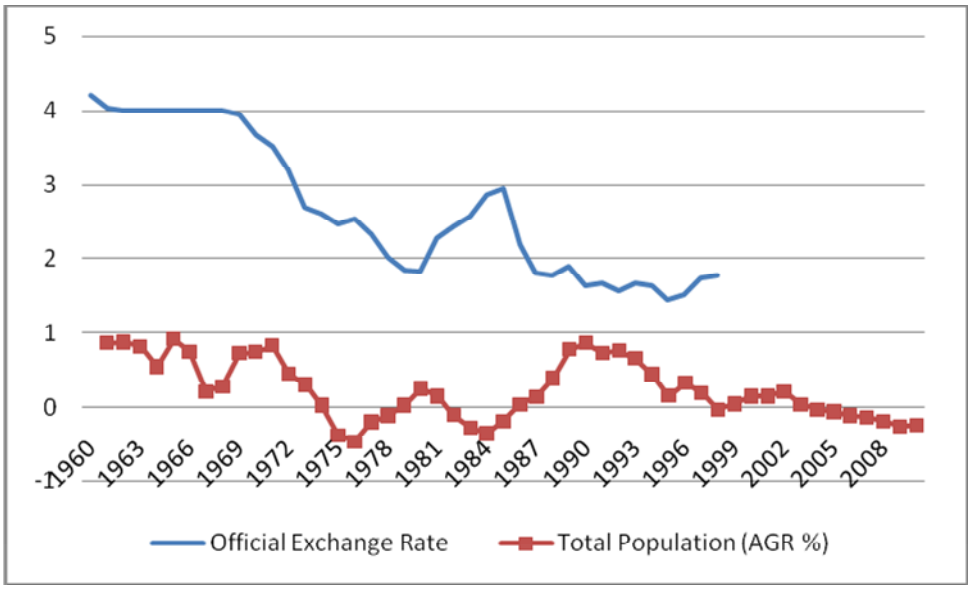
market which provided for further growth prospects. “Ironically, the Russian policy of pushing Germans out of Eastern Europe and encouraging them to leave even East German economy provided more assistance to the recovery of the West German economy than all the American aid.” (Neal: 2007, p. 212). The materialization of Marshall Aid extensively benefitted the West German economy. “In a classic study published in 1955, Henry C. Wallich concluded that West German industry had ‘pulled itself up by its tax-exempt bootstraps” (Grotewold: 1973, p. 55). The labor market too extended their cooperation in the growth process of the West German economy. The labor unions emphasized on the creation of employment opportunities and expansion of social services. As part of the currency reform in 1948, workers accepted large reductions in their real incomes, which ended the post-war inflation and channeled resources into capital formation. These factors led to resurgence of the West German economy and her speedy recovery. In 1951 West German industrial production was 50% higher than in 1936 (Grotewold: 1973). West Germany enjoyed this economic miracle till 1958 when it joined the Common Market, during which a brief slowdown was observed in the rate of expansion of the West German economy. However, Grotewold (1973) felt that unemployment in West Germany during the 1950s “…was not created by imports competing with domestic products, but by a variety of other causes, of which the most important was the large number of refugees from East Germany and areas beyond the Oder-Neisse line.” (p. 361).

The economic miracle of the 1950s slowed down in the 1960s because of the decrease in the population growth rate and falling birth rate. It can be observed from Figure 1 that the population growth rate remained at less than

one percentage during the 1960s. Another major reason for the slowdown of the West German economy was the completion of Berlin wall in 1961 which stopped the flow of refugees from East Germany to West Germany. As a result, West German industries started facing shortage of docile labor. In order to respond to this situation, West German industries initiated the Gastarbeiter (guest worker) program which saw a huge success. These guest workers, from the Mezzogiorno, Spain, Yugoslavia, Greece and Turkey, occupied the least skilled positions in the firms and were paid lower wages. Meanwhile, foreign investment from the UK and the US increased which led the capital stock in West Germany to grow. The increasing capital stock combined with the lower average unit costs increased the competitiveness of the West German firms in the export market. The tight monetary policy of the Bundesbank combined with the fixed exchange rates of the deutsche mark in the international market[33] increased competitiveness of German exports in the international market. This fact is pertinent from Figure 1 where the official exchange rate of the German domestic currency to the US dollar remained fixed at 1 US$ = 4 duetsche mark from 1962 to 1968. West Germany's heavy dependence on guest workers, however, allowed the economy to grow but at a slower rate of growth and investment (Neal: 2007). Offsetting the problem of supply of labor by importing guest labor, however, discouraged the technical progress in West German industries (Neal: 2007).

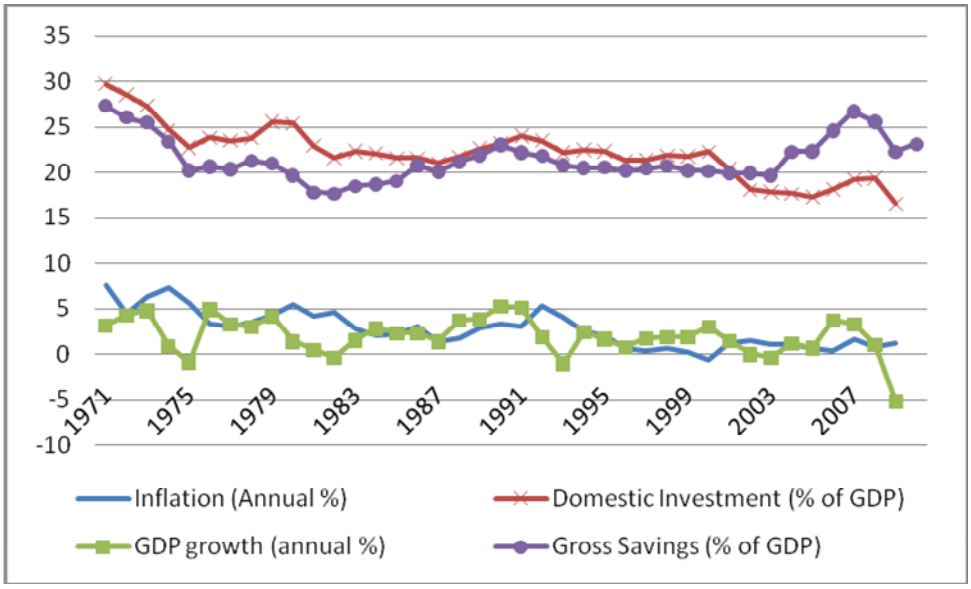
[33] The fixed exchange rate of the deutsche mark with other currencies especially of the trading partners in the West led to falling of the real exchange rate of the deutsche mark. Exchange rates of the deutsche mark in West Germany remained fixed from 1949 to 1970. It was only in 1971 that the exchange rates were made flexible in West Germany.

**Figure: G-1**



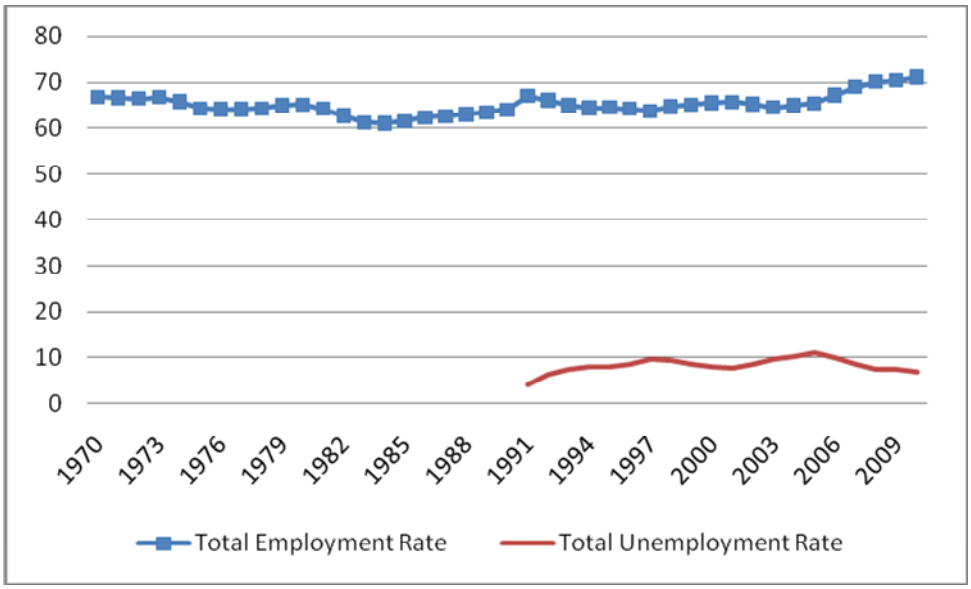

*Source: Author's Calculation, Absolute figure from World Development Indicators, World Bank*

**Figure: G-2**



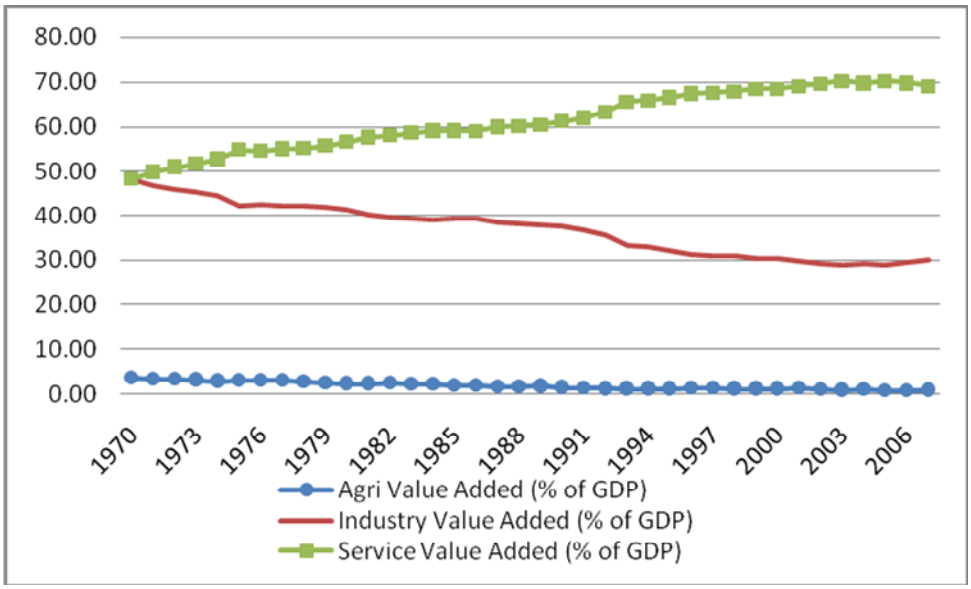

*Source: World Development Indicators, World Bank*

**Figure: G-3**




*Source: OECD Factbook 2009 & 2011-112*

**Figure: G-4**

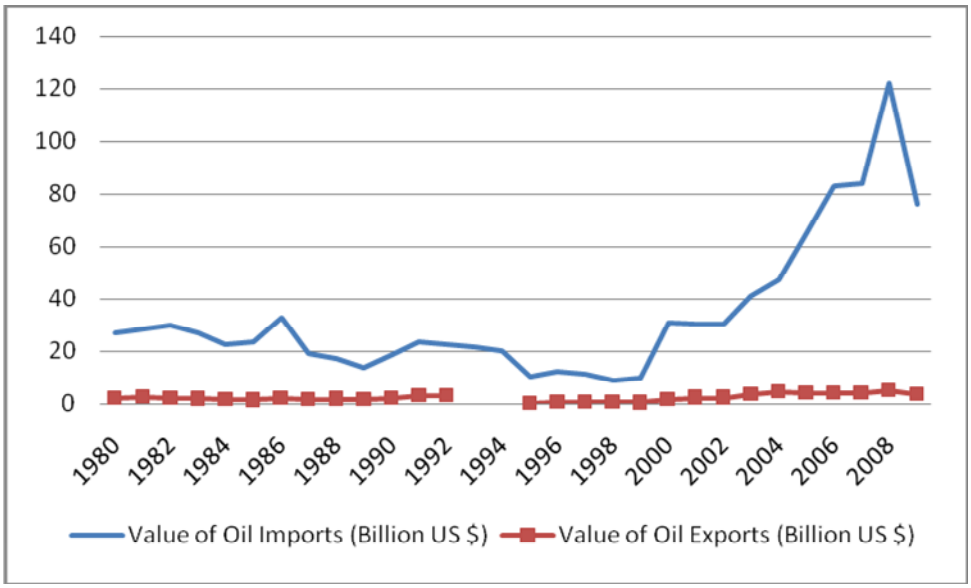



*Source: World Development Indicators 2009, The World Bank*

As a result, by the initial years of the 1970s i.e. by 1973 West Germany was facing the problems of outdated technology, almost stagnant and not expanding exports and slow rate of growth of human capital in the manufacturing sector. Europe was hit hard by the oil shock of 1973. Nonetheless, West Germany could weather the effects of this oil shock much better than her West European trading partners because of the continued appreciation of the deutsche mark relative to the dollar as a result of low inflation rate in the economy compared to the rest of the European nations (who were West Germany's trading partners) and her strong trading relationships with Iran. It is observant from Figures 1 and 2 that the inflation rate, as measured by GDP deflator, in Germany after 1974 till 1978 was low; while the official exchange rate fluctuated somewhere at more than 2 duetsche mark for 1 US$. Appreciation of the deutsche mark reduced the costs of imported raw materials and fuel which in turn helped in reducing the cost of production of exporting goods. As a result West Germany's exports gained competitiveness in the international market in comparison to the rest of the European Union. The annual growth in German exports, as depicted by Figure 7, was in double digits from 1973 to 1976, with only a sharp dip in 1975. This strong currency strategy assisted in withstanding the first oil shock. While on the other hand, most of the European countries which consisted of a major export market for West Germany's products felt the oil shock hard. As a result, the demand for German products from the European markets reduced resulting in a fall in German output, profit, investment and an increase in the rate of unemployment. Figure 2 shows a decline in the rate of domestic investment in Germany since 1971 only to recover in 1979. By 1975, West Germany's growth rate was upsettingly low (-0.87). Despite of its strong

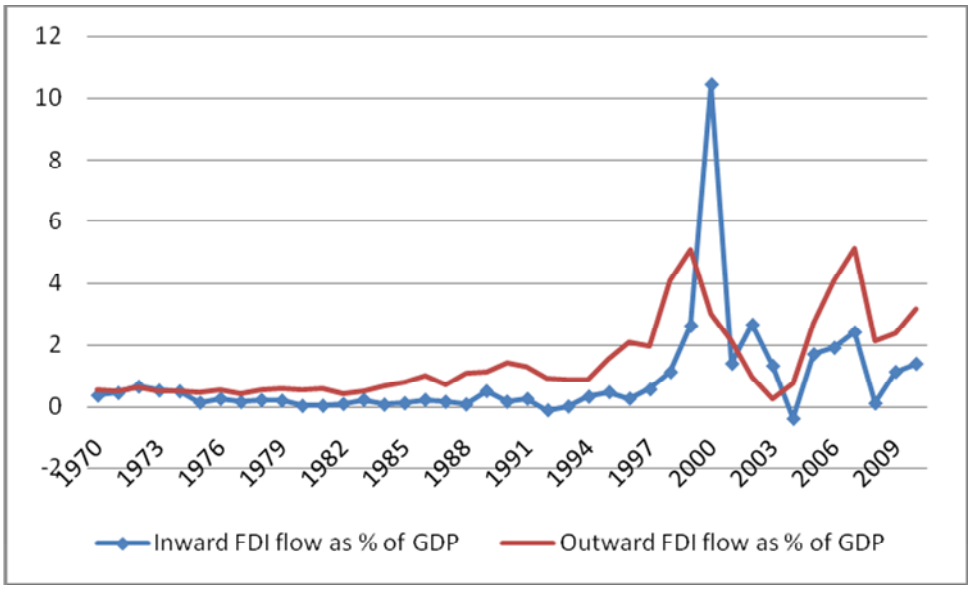
internal monetary policy, West Germany's heavy dependence on exports, led to worsening of her economic condition. The second oil shock of 1978 worsened the economic situation in West Germany ultimately putting an end to its golden growth age of 1950-1973. The second oil shock casted doubts on West Germany's restrictive monetary policy and disrupted the exchange rates agreed upon by the European Monetary System (EMS). Despite of controlled inflation rates, unemployment in the country rose permanently and the growth rates declined. It can be seen in Figure 1 that the official exchange rate of Germany against the US dollar is constantly declining from 1976 to 1980.

**Figure: G-5**



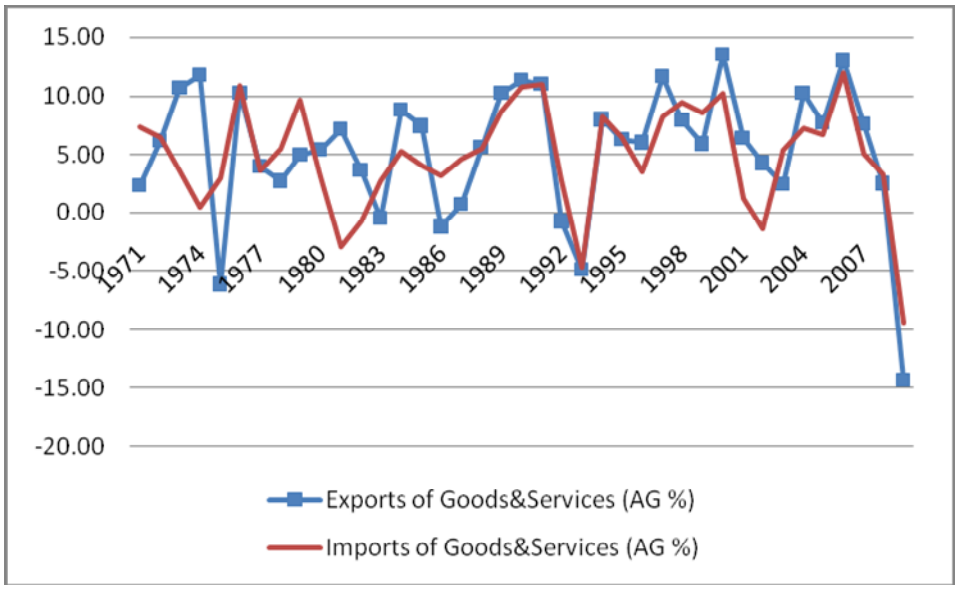

*Source: World Economic Outlook Database, Sept 2011, IMF*

**Figure: G-6**



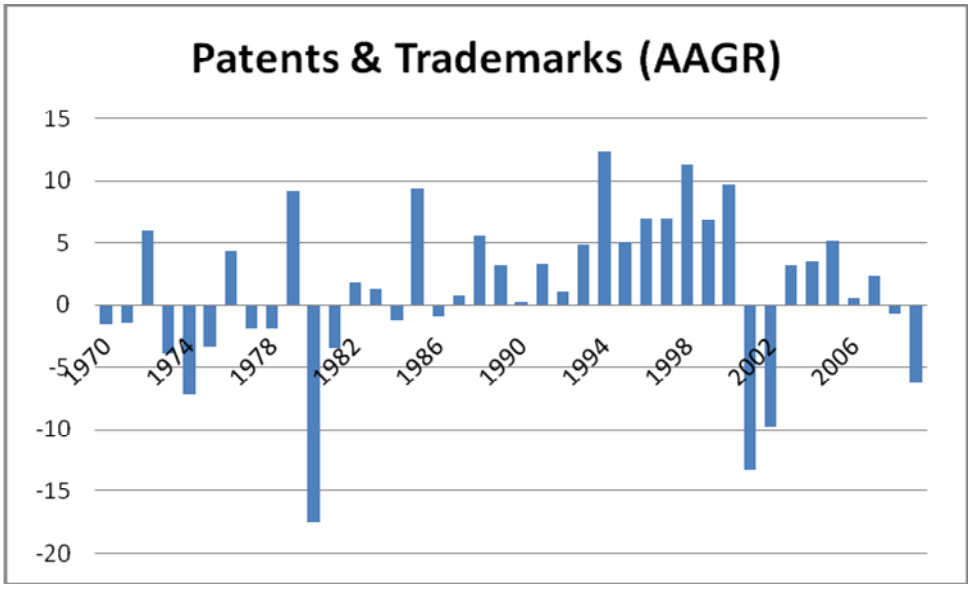

*Source: UNCTAD*

**Figure: G-7**




*Source: Author's Calculations, Absolute figures from World Bank national accounts data, and OECD National Accounts data files.*

**Figure G-8**




*Source: WIPO*

In 1980-81, the West German economy slipped into recession followed by periods of prolonged stagnation which ended only in 1986. It is evident from Figure 2 that the annual growth rate of Gross Domestic Product slipped from 4.15% in 1979 to 0.53% in 1981 only to become negative in 1983. Since then the annual growth rate of GDP in Germany has recovered and it stood at 2.29% in 1986. According to Herbert Giersch supply side constraints impaired the better performance of Germany. According to him, low levels of profitability and investment in German firms was due to a 'gap' in the tax reforms combined with high subsidies to ailing industries[34], excessive regulation, incentive dampening income-tax bracket creep, increasing cost of social security, health and unemployment benefits, and high wage rigidity. By this time, Japan rose as a major exporting economy in the international market. The competition in the export markets from Japan adversely affected

[34] Which misdirected the resource allocation

the export market for West German products. This fact is observant from Figure 7 which shows a declining trend in the German growth of exports in the initial years of the 1980s. Unemployment in West Germany after the second oil shock was recorded historically high. Labor market rigidity[35] led to high and persistent unemployment in the economy. The active labor market policy had little effect on reducing unemployment in Germany because the real obstacles to placement in new jobs were financial disincentives, lack of mobility, old age, ill health, and poor morale (Gillingham: 2003). Population growth in Germany observed a negative trend during the initial years of the 1980s; GDP growth and domestic investment in the economy also declined (see Figures 1 and 2). Moreover, the fast increasing wages in the manufacturing sector during the 1970s and 1980s, led the German firms to evade the high labor costs. In view of this, companies started investing abroad (the outflow of FDI started increasing since 1975, see Figure 6) and left the economy's labor-intensive sectors, thus, restoring to mechanized production processes. Nonetheless, on the one hand, the labor-saving process increased firm productivity, on the other; these structural changes lowered the aggregate productivity of the economy. The increase in the outward movement of the investment (thereby low domestic investment) led to a dramatic slowdown in the growth rate of the economy. Further, the inclusion of two low-wage economies namely Spain and Portugal into the EEC in 1986 surged West Germany's foreign investment to these countries. It is seen in Figure 6 that the outflow of foreign investment increased dramatically since 1987. Furthermore, the reduction in the price of imported oil in 1986 removed the

[35] Rigidity in the labor market meant that employees could be fired and all those who worked for eight hours a day were paid full benefits. As a result, no one was ever hired.

pressures in the currencies of the participants in the Exchange Rate Mechanism of the European Monetary System, so they were all allowed to appreciate in lock step with the deutsche mark (Neal: 2007). The value of oil imports fell during the early 1980s, while it shot up in 1986 from where there has been a continuous reduction until 1989. The depreciation of the US dollar during this time further proved beneficial for the West German economy. As a result, in the late 1980s, West Germany showed healthy trade surpluses. Despite of such expansion, high levels of unemployment still persisted.

East Germany, on the other hand, faced severe economic problems under the communist rule. The East German regime started to falter in 1989, when the Berlin wall fell and thousands of East German workers fled to West Germany[36]. To the people of Germany the only way out from these economic problems seemed in the process of unification with their western counterpart (West Germany). This East German economic problem was finally solved in 1990 with the reunification of East Germany and West Germany in October 1990. The next big challenge in front of West Germany now was to equalize the economic and social conditions in both parts (East and West) of Germany. East Germany, since the reunification, has been financially dependent on West Germany. In view of this the "institution transfer" model was created. As a part of this, loans or gifts were provided to the East Germans in the form of social transfers financed out of West German taxes and social security contributions. However, this model overstretched West Germany economically and financially. While in the East Germany it produced a heavily

[36] Mainly because of the removal of the border fence of Hungary which punctured the Iron Wall

subsidized, culturally colonized, resentful and stagnant society. The unified Germany was now more engrossed with tackling her internal situation. As a result the leadership position of Germany in the European market seemed to slip away. The cost of reunification kept the German budget under constant stress in the 1990s. National debt alleviated after the reunification. The German economy was weakening mainly because of excessive taxation, overregulation of labor markets, lack of innovation and institutional rigidity. After the reunification, East Germany was seen as a new large market segment for the West German firms, as a result of which they expected an escalation in the profits. However, pitfalls in the institutional factors led to the deficits in German trade pattern. "National and international firms that invest their funds in Germany know that they will be asked one day to help finance the unresolved problems of German reunification, which is one of the reasons why Germany's investment rate is so low… Germany was once Europe's growth engine, but since the mid 1990s it has brought up the rear on the European growth train." (Sinn: 2007, p. 8). By the end of the twentieth century Germany had the highest wage costs of manufacturing workers. This resulted into worsening of the international competitiveness of the German manufacturing workers. Faced with low-wage competition from within the European Union (low-wage East European nations) and outside Europe (rise of Japan, participation of the Asian tigers in the international market), labor intensive German firms found it difficult to strive in the international market. Since the creation of an integrated market for goods and services by the European Union, Germany is losing her former advantage of a large domestic market. Further, with the introduction of the Euro in 1999, German firms have lost their advantage of lower capital costs. On the domestic front, the

annual growth in GDP has remained low, along with high level of inflation rate during the initial years of the 1990s. Gross savings and domestic investment showed a declining trend all throughout the 1990s. The growth in population was also meager. However, the value added by the service sector in the economy increased, while that of the industrial sector started declining. The unemployment rate in the economy shot upwards; nonetheless, it remained much lower to the employment rates during the 1990s. On the international front, the exchange rate remained considerably stable, while the increasing rate of outflow of FDI out-shadowed the lower amounts of FDI inflow. The growth in exports which became negative in 1992-93 showed an improving tendency, while the growth in imports of goods and services has remained considerably low. The decade of the 1990s showed a positive growth on the technological front. European Union's eastern enlargement of 2004 worsened the economic situation of German firms. Faced with the low-wage competition from these countries, Germany has lost her allure as an investment location. As a result lion's share of domestic savings since 2005 has been invested abroad (see Figure 6).

After the attack on the World Trade Center, world economy faced a severe downturn. This downturn effect was observed even in the German economy which practically stagnated during the early 21st century. The GDP growth rate started declining at a faster rate since 2000 and in 2003 it stood at -0.38%. On the one hand gross savings in the economy dipped and remained almost stagnant at around 19% of GDP, while on the other hand, domestic investment dipped remaining less than the savings rate. Major portion of domestic savings was invested in the international market (see Figure 6) while inflow of

foreign investment dipped during the initial years of 2000. Negative inflation was observed in 2000 which turned positive but at a higher level during 2001-2004. The growth in exports of goods and services declined from 13.53% in 2000 to 2.46% in 2003, while the growth rate of imports dipped from 10.17% in 2000 to 5.36% in 2003. German economy showed signs of recovery only during 2004-05. However, the total unemployment rate in the economy remained very high (figure 3). Since then the growth rate of GDP has improved, however, it declined in 2008 and became-5.13% in 2009. High level of gross savings was matched by very low levels of domestic investment and a very high level of outflow foreign investment. The condition in the growth rates of exports and imports of goods and services improved only to be negative in 2009. Population growth is constantly showing negative trend throughout 2004-2010. Improvements on the technological front were observed during 2003-20007 (Figure 8). However, the value of oil imports increased drastically creating problems for the economy.

In view of the above discussion, let us analyze empirically the factors that have led to the changes in the level of income and the growth of the German economy since 1971.

## Economic Growth in Germany – An Empirical Analysis

To analyze and understand which factors explain the economic growth in Germany for the period 1971-2009, the following linear regression model is estimated using the selected variables mentioned in the Chapter 1:

$$(GDPpc) = B_0 + B_1(Invt) + B_2(Open) + B_3(PT) + B_4(Govt) + B_5(FDI) + e \quad \ldots\ldots\ldots (1)$$

The results of the regression estimation of the above equation are shown in table 1:

**Table: G-1**

**Model with all variables(Except SSER) for 1971-2009**

| **Variables** | **B** | **t-Stat** | **p-Value** | Regression Statistics | |
|---|---|---|---|---|---|
| Constant | -21.489 | -1.701 | 0.098 | R | 0.641 |
| Invt | 0.695 | 3.315 | 0.002 | R Square | 0.411 |
| Open | 0.082 | 1.812 | 0.079 | Adjusted R Square | 0.322 |
| PT | 0.097 | 2.195 | 0.035 | Standard Error | 1.618 |
| Govt | 0.178 | 0.502 | 0.619 | F | 4.603 |
| FDI | -0.053 | -0.312 | 0.757 | Significance F | 0.003 |

The above table 1 reveals the following:

1. Domestic investment has a positive and statistically significant effect on the growth of per capita GDP in Germany over the period 1971-2009. A one percent increase in domestic investment in the economy leads to 0.695 percentage points increase in growth of per capita GDP. This result is in accordance with the existing literature which depicts a positive impact of domestic investment on economic growth of a nation.
2. GDP per capita during 1971-2009 was positively affected by the total trade as percentage of GDP. A one percent increase in the economy's total trade as percentage of GDP improved the per capita GDP by 0.082

percentage points. However, it was found to be statistically insignificant.

3. Improvement in the growth rate of patents and trademarks showed positive and statistically significant effect on GDP per capita over the period 1971-2009. A one percent increase in the growth rate of patents and trademarks increased the per capita GDP by 0.097 percentage points.
4. Government consumption, as per the existing economic literature, tends to reduce the growth in an economy. The results in Table: 2 do not confirm this hypothesis when an increase in government consumption by one percent increases the per capita GDP by 0.178 percentage points. Moreover, this result is found to be statistically insignificant.
5. Inflow of foreign investment into the German economy from 1971-2009 has impaired the growth in GDP per capita in the economy by 0.053 percentage points. However, it is not found to be statistically significant.

In order to incorporate the human capital as a factor explaining the economic growth in Germany, the above equation (1) was modified as:

$$(GDPpc) = B_0 + B_1(Invt) + B_2(SSER) + B_3(Open) + B_4(PT) + B_5(Govt) + B_6(FDI) + e \quad \text{.....(1.1)}$$

The above equation was then estimated by a linear regression model for the period 1991-2009[37]. The results of the estimated equation 1.1 are presented below:

**Table: G- 1.1**

| **Variables** | **B** | **t-Stat** | **p-Value** | Regression Statistics | |
|---|---|---|---|---|---|
| Constant | 86.474 | 3.219 | 0.007 | R | 0.902 |
| Invt | 0.167 | 0.652 | 0.527 | R Square | 0.814 |
| SSER | -0.134 | -1.181 | 0.260 | Adjusted R Square | 0.721 |
| Open | -0.056 | -1.067 | 0.307 | Standard Error | 1.091 |
| PT | 0.038 | 0.789 | 0.446 | F | 8.735 |
| Govt | -3.767 | -4.001 | 0.002 | Significance F | 0.001 |
| FDI | 0.094 | 0.678 | 0.511 | | |

The above table 1.1 shows that:

1. Upon the inclusion of SSER as a variable for human capital in the equation (1) and estimating it for 1991-2009, all the variables turned out to be statistically insignificant, except for government consumption.

[37] The time frame of 1991-2009 is selected because the data for Secondary School Enrolment Rate are available for this period only.

2. Domestic investment showed a positive effect on growth of GDP per capita; however, it turned out to be statistically insignificant.
3. SSER displayed a negative impact upon the growth of per capita GDP for 1991-2009; however, it was not statistically significant. An improvement in human capital would decrease the per capita GDP by a 0.134 percentage points. However, theoretically this estimation seems to raise doubts.
4. The impact of openness on economic growth in Germany for 1991-2009 is negative and statistically insignificant. An improvement in total trade as percentage of GDP in Germany would impair the economic growth of the economy by 0.056 percentage points. It may thus be inferred that openness of the German economy since its reunification has not benefitted in improving the economic growth of the economy.
5. In equation (1) patents and trademarks recorded a positive and statistically significant effect upon GDP per capita. However, upon inclusion of SSER and estimating the equation for 1991-2009, the effect of patents and trademarks on economic growth of Germany still remained positive but statistically insignificant.
6. Government consumption shows a negative and statistically significant effect upon the rate of economic growth in the economy. This would mean that increase in government consumption in the economy by 1% would reduce the growth in per capita GDP by more than 3.767 percentage points.
7. Inflow of FDI now shows a positive but statistically insignificant effect on the growth rate of GDP per capita.

Further, in order to analyze which factor/s among the other selected ones have acted as driver/s of economic growth in Germany, for the periods 1971-2009 and 1991-2009, the above equations (1) and (1.1) were estimated using stepwise regression. This regression technique would facilitate in removing the unnecessary variables creating traffic and would highlight only those factors that have worked upon to improve the economic growth of the German economy. The results are depicted in tables 2 and 2.1

**Table: G - 2**

**Stepwise Regression on Per Capita GDP for 1971-2009**

| Regression Model | Variables | R2 | Adj R2 | F-Value | p-Value |
|---|---|---|---|---|---|
| 1 | Invt | 0.259 | 0.239 | 12.935 | 0.001 |

**Significance of Coefficients for final model**

| Variables | B | t-Stat | p-Value |
|---|---|---|---|
| Constant | -5.77 | -2.69 | 0.011 |
| Invt | 0.346 | 3.596 | 0.001 |

**Table: G – 2.1**

**Stepwise Regression on Per Capita GDP for 1991-2009**

| Regression Model | Variables | R2 | Adj R2 | F-Value | p-Value |
|---|---|---|---|---|---|
| 1 | Govt | 0.466 | 0.434 | 14.825 | 0.001 |
| 2 | Govt, Invt | 0.748 | 0.716 | 23.715 | 0.000 |

**Significance of Coefficients for final model**

| Variables | B | t-Stat | p-Value |
|---|---|---|---|
| Constant | 50.448 | 5.1 | 0.000 |
| Govt | -3.100 | -5.954 | 0.000 |
| Invt | 0.482 | 4.229 | 0.001 |

Table 2 reveals the following:

1. The stepwise regression analysis for the period 1971-2009 resulted into only one statistically significant model with only one statistically significant variable – domestic investment.
2. It shows that domestic investment is the only statistically significant variable, which explains the growth of per capita GDP in Germany for 1971-2009. All other factors are discarded during estimating the equation (2) by stepwise regression.
3. A 1% increase in domestic investment escalates the growth of per capita GDP in the economy by 0.346 percentage points. It may, thus, be inferred that domestic investment has played a significant role in economic growth of the German economy for 1971-2009.

Table: 2.1 reveal the following:

1. The stepwise regression analysis for the period 1991-2009 resulted into two statistically significant models. The first model considered government consumption as a factor explaining economic growth in Germany, while the second model included domestic investment along with government consumption.

2. It shows that after 1991 (especially after the reunification of Germany), government consumption and domestic investment are the only factors, statistically significant, which explain the growth of per capita GDP in Germany. All other factors have been discarded during estimating the equation (1.1) by stepwise regression.
3. Government consumption was found to have a negative impact upon the economic growth of the German economy. Moreover, this result is statistically significant and is in accordance with the existing literature which states that an increase in the government consumption would lead to reduction in the rate of growth of an economy. An increase in government consumption would reduce the growth rate of the German economy by 3.1 percentage points.
4. The existing literature on economic growth observes a positive and significant relationship between domestic investment and economic growth of an economy. This relationship is established in case of Germany where a 1% increase in domestic investment increases the growth of per capita GDP by 0.482 percentage points. This result, moreover, is statistically significant.

However, due to lack of availability of data, empirical comparison between the economic growth conditions in Germany pre-EU membership and post-EU membership could not be established.

## ITALY

Since the formation of the European Coal and Steel Community i.e. the inception of the European Union as a Customs Union, Italy has been actively involved in all its major decision making process. Italy is one of the founding members of the European Union and one of the largest countries in Europe. Italy has been a dual economy, over a very long period of time now, with divisions in terms of structure and economic performance between the industrially developed North and the Mezzogiorno South.

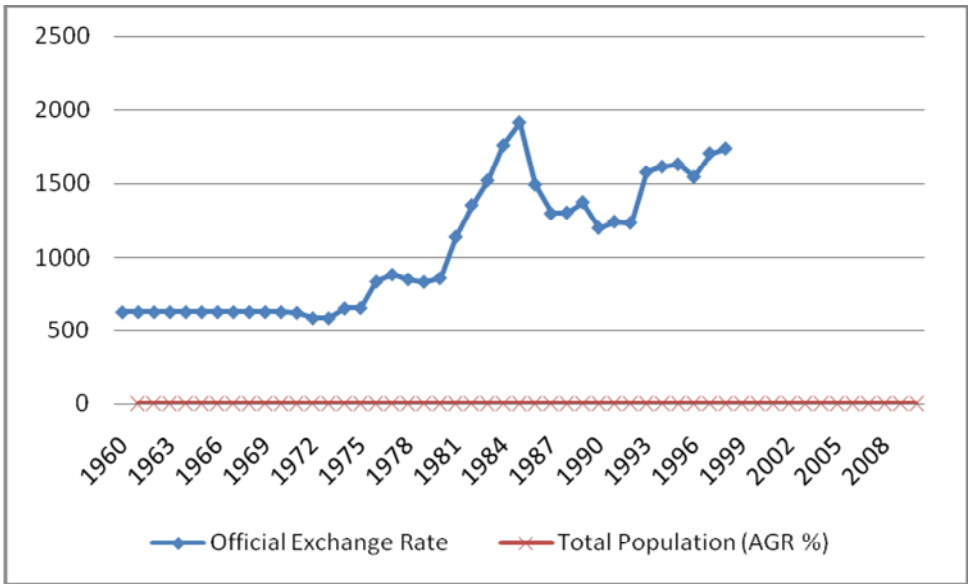
From the twelfth to the fifteenth century, Italy was a forerunner in economic development, technological progress and international trade. However, this allure subsided by the end of the seventeenth century when Italy along with other Mediterranean countries had become underdeveloped area. Among the European nations, as many economic historian feel, Italy started-off as an underdeveloped area. Industrialization and modernization processes in the economy started comparatively late to other (West) European nations. Nonetheless, Italy was able to fall in line with the rest of the West European nations soon. Italy became predominantly an industrialized nation only after the Second World War. Since then, Italy has been internally divided into – North-West or the industrial triangle, the South or the Mezzigiorno, and the North-East and Centre (A. Bagnasco: 1977, as in Zamagni: 1997). Zamagni (1997) observes that the Italian industrialization moved from textile and primary need towards engineering and metallurgy industries.

Italy was in shatters by the end of the Second World War, overburdened by the returning refugees and lower levels of per capita income. Despite of such

depressing conditions, Italy still had the necessary capital stock with which post-war industrial expansion could be undertaken. The post-war Italian economy saw the reunification (of the nation), devaluation of the domestic currency at different intervals up till 1949, sharp increase in the money supply in the economy, inflation and government deficits. Italy was a recipient of the Marshall aid. The funds from the aid directly went to finance the capital projects of huge state holding companies, thereby intending to compete effectively in the world market. Italy joined the International Monetary Fund (IMF) in 1947, which led to stabilizing the exchange rate of the lira and making it fully convertible to trade with Europe. Then, in 1953, Italy joined the European Coal and Steel Community (ECSC) and later was one of the founding members of the European Economic Community (EEC) – which was set up by signing the Treaty of Rome in 1957. The membership to these institutions combined with the favorable domestic environment like 'a liberal economic environment, an elastic labor supply, and high rates of saving and investment' (Neal: 2007) – led to the Italian miracle of 1947-1963. Bank of Italy's restrictive monetary policies helped in controlling the labor market thereby permitting the Italian firms to grow impressively both in the domestic as well as international markets. It can be observed from Figure 1 that the official exchange rate of the lira against the US dollar remained constant throughout the decade 1961-1970. The impressive growth rate of the Italian economy during the 1950s and early 1960s was also the result of large public sector companies which provided the necessary inputs and the basic infrastructural facilities like transportation and communication to the Italian manufacturing firms. Since 1963, the Italian economy became vulnerable to the shocks coming from changing political sphere, increasing labor costs,

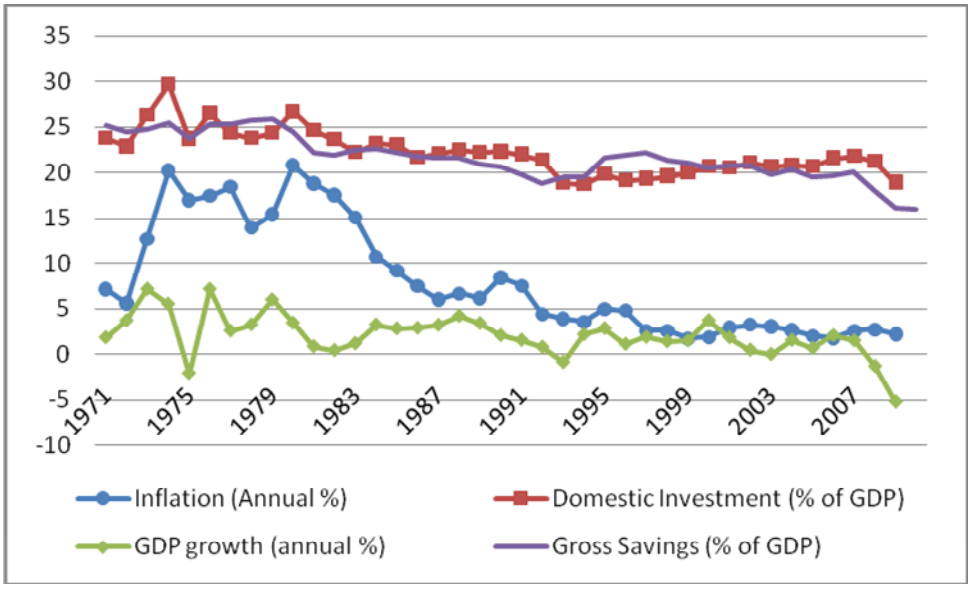
increasing unemployment and government spending. By the end of the 1960s (1969-1973), wages and the unit labor costs increased in double digits. Inflation rate increased, while productivity growth reduced. Employment, on the contrary, increased because of the policy of *Statuto dei Lavoratore* which made firing of any employee almost impossible. As a result, most sectors of the industry faced losses. On the one hand, investment in private sectors stagnated, while on the other, public sector investment increased. All these factors led to a rigid economic structure of the economy, which could not bear up to the oil shocks of the 1970s.

**Figure: I-1**




*Source: Author's Calculation, Absolute figure from World Development Indicators, World Bank*

**Figure: I-2**

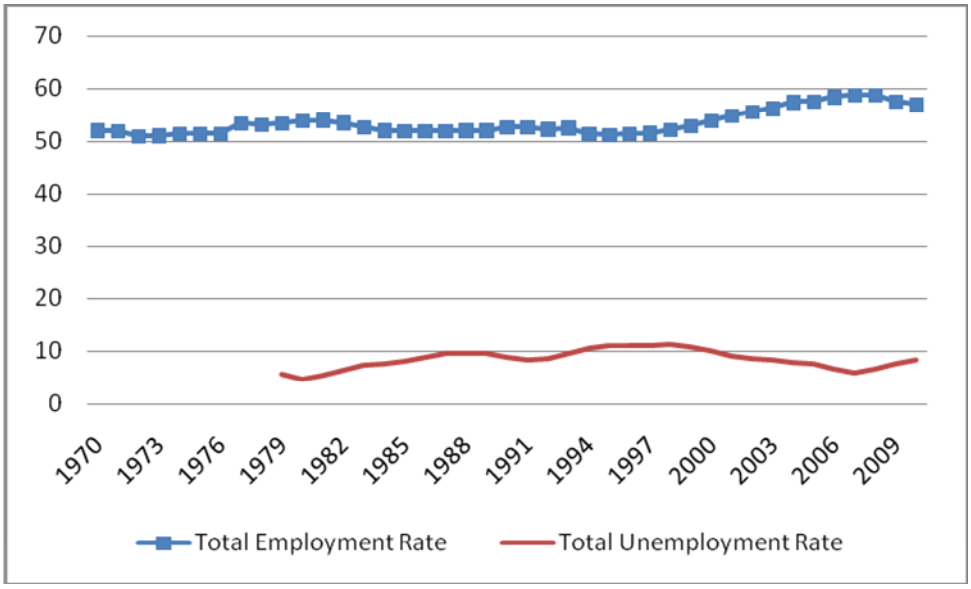



*Source: World Development Indicators, World Bank*

The first oil shock of 1973 hit the Italian economy hard. The inflation rate in the economy soared at the highest levels. It can be seen from Figure 2 that the inflation rate in Italy in 1971 was 7.18% which shot up to 20.25% in 1974. Neal (2007) observes that "Italy suffered the highest and the most persistent rates of inflation of any western European country through the two oil shocks of the 1970s." (p. 306). Recessionary situation and unemployment in other west European nations because of the oil shocks brought the immigrant Italian workers back to their homeland. This resulted in an increase in the "informal economy" leading to huge government deficits. Rigidities in the labor market, strikes and worker militancy created problems in the domestic markets. During the first half of the 1970s (1970-1974), unit labor cost increased. Trade unions were given legitimate powers. As a result, the trade unions used their powers to eliminate overtime, regulate lay-offs, restrict internal mobility, and slowdown the pace of work (Locke: 1995). As a consequence, number of hours

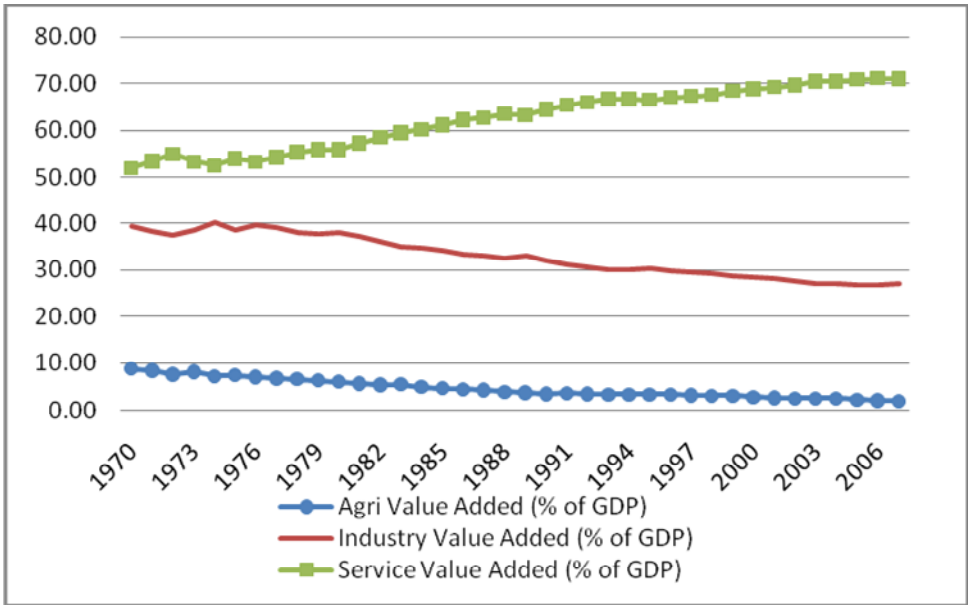
worked per employee reduced, thus, lowering the productivity growth. Stubbornness from the labor market led to distortions and increasing costs of the industrial units. As a result, the industrial value added in the economy declined during the first half of the 1970s (Figure. 4) and industrial investment stagnated during the 1970s. Distortions in the domestic industries lowered Italy's competitiveness in the international market. The result of which was high import penetration and loss in the share of Italian exports on the European markets. The collapse of the international monetary system was another external shock that hit the Italian economy during the 1970s. Lately, the second oil shock of 1978 aggravated the disparities in the economy. The GDP growth rate which was -2.09% in 1975 showed a positive trend, however, during the 1980 the Italian economy grew only at 3.24% p.a. Gross savings and domestic investment too remained at lower levels. Italy's terms of trade deteriorated because of her heavy dependence on imported raw material especially oil (OECD Economic Survey: 1984). Devaluation of the domestic currency fuelled inflation further. Inflation, which remained at relatively lower rates after 1974, increased dramatically to more than 20% in 1980. Restrictive policies to counter external imbalances followed by expansionary measures to stimulate growth provoked external imbalances. Both the internal and external disturbing factors rendered the traditional strategies of the Bank of Italy and the state holding companies ineffective thereby increasing distortions in the economy. The Italian economy, thus, had to face stagflation because of the weak government and its policies. The service sector, however, contributed significantly, all through the 1970s (see Figure. 4), in generating income in the economy. Italy joined the European Monetary System (EMS) in 1979.

**Figure: I-3**




*Source: OECD Factbook 2009 & 2011-112*

**Figure: I-4**



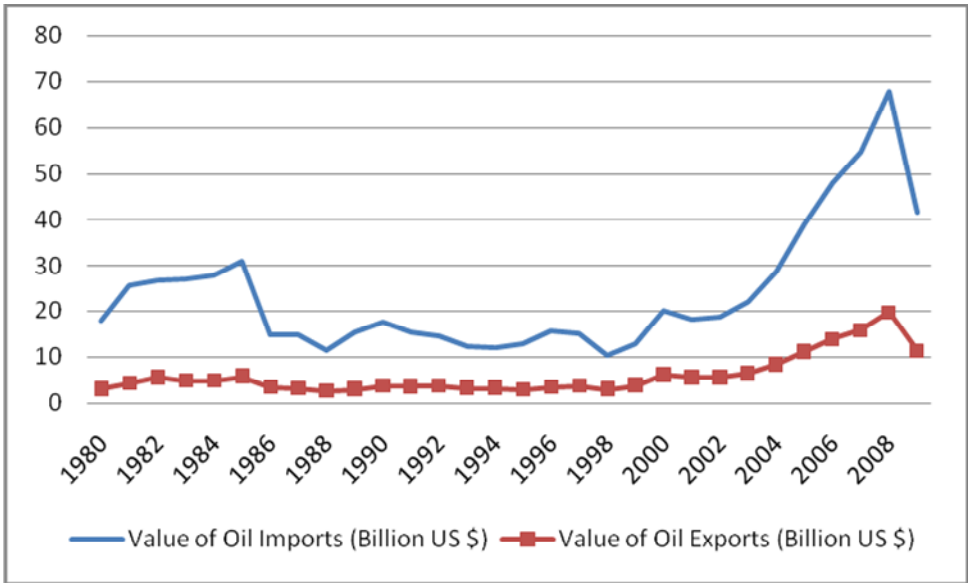

*Source: World Development Indicators 2009, The World Bank*

By the early 1980s, Italy's GDP growth was at its lowest rates since 1947 (Neal: 2007). It is observant from Figure. 2, that, the Italian GDP growth was 0.84% and 0.41% in 1981 and 1982 respectively. However, after devaluating the

currency within the EMS, it was possible for Italy to renew the GDP growth rate in the mid 1980s (Figure. 2) and reduce inflation rate. The inflation rate which was more than 18% in 1981 was reduced to almost 6% during the late 1980s. The devaluation of the domestic currency made the Italian goods cheaper in the international market. Figure 1 shows a continuous devaluation of Italian lira during the 1980s against the US dollar. As a consequence, Italian exports to the world market increased (see Figure. 7). Notable performance of the export sector enabled to maintain the growth rate of the economy even in the time of turmoil. Unemployment levels, however, remained high all through the 1980s (see Figure. 3) because of the supply-side weakness, rigid labor markets and oversized public sector units. Clientelism damaged the economic (and political) system(s). Many are of the opinion that Italy lacked the basic infrastructure needed for proper operation of market institutions. Interest rates and inflation level remained high. Despite of the non-accommodating monetary policy, prices in the country kept on rising. Extensive government intervention, a weak public sector, corruption, ill-functioning of the institutions ('welfare state') led to the market distortion of the 1980s. Economic advisers and policy-makers of Italy suggested for improvements in the Italian institutions if the economy had to be raised from the problems that prevailed in the 1980s. Kostiris (1993) in her study pointed that 'the market-distorting incentives caused net wages to rise faster in the south than in the north, outran gains in productivity and created a situation that could only be remedied by infrastructural improvement.' (Gillingham: 2003). Higher tax rates reduced the saving rates in the economy. Figure 2 observes that the gross savings in the Italian economy kept on declining throughout the 1980s – from 24.48% in 1980 to 20.98% in 1989. Despite of

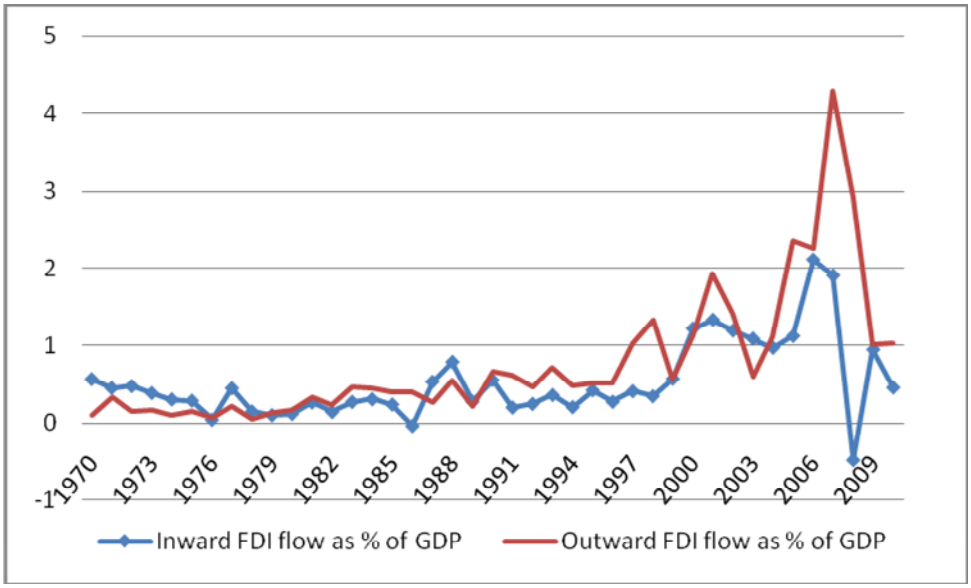
such difficult times, Italy, during the 1980s surpassed many of the European nations in terms of growth of exports and GDP, labor productivity, firm profitability, investment in new machinery and equipment and accumulation of personal savings (Locke:1995). Restructuring of the Italian firms and the technological innovation (see Figure. 8) also aided in increasing the labor productivity which in turn reduced labor cost. Nonetheless, it was observed that, the 1970s and the 1980s, despite being difficult years, showed better results compared to the pre-World War II period (Zamagni: 1997).

**Figure: I-5**



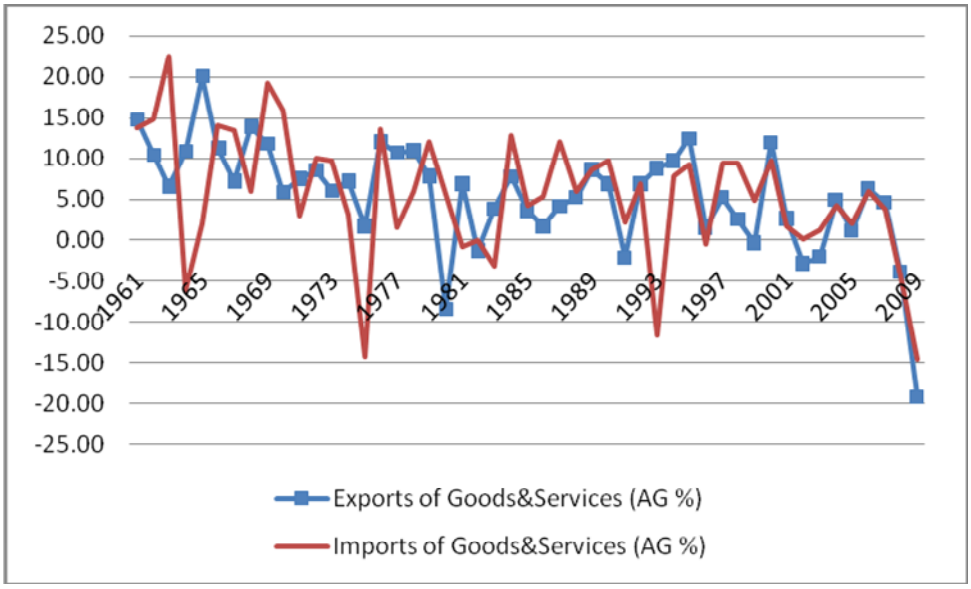

*Source: World Economic Outlook Database, Sept 2011, IMF*

**Figure: I-6**



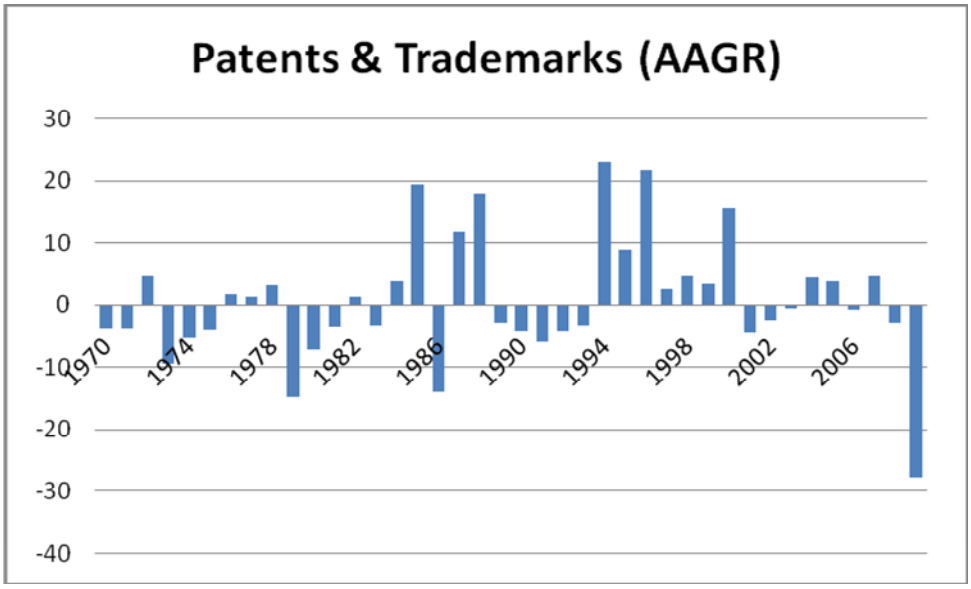

*Source: UNCTAD*

**Figure: I-7**




*Source: Author's Calculations, Absolute figures from World Bank national accounts data, and OECD National Accounts data files.*

**Figure: I-8**




*Source: WIPO*

The growth rate of Italian GDP during the initial years of the 1990s was quite anemic and the employment level was stagnant (see Figure. 3). Figure 2 show that the GDP growth rate in the economy during the initial years of the 1990s was declining and in 1993 the Italian economy grew at -0.89%. By 1992 the economy had entered in to a recessionary phase. The recession in Italy began in the last quarters of 1992 and remained till the last quarters of 1993 (Scobie, et.al: 1996). The decline in the economic performance during the early 1990s can be traced to the global recession of that time, domestic difficulties and the industrial restructuring of the earlier decade. The most important factor that led to the recession of 1992-93, as per many authors, was the reduction in the disposable income of the people. Decline in the employment rates, higher taxes accompanied by the wage reforms of the early 1990s led to reduction in the household's disposable income. As Scobie. et.al. (1996) have observed in their book,

*'The unusually severe effect this fall in income had on demand can be attributed perhaps to the extreme pessimism of the time. That is, the lower income levels were expected to last for a long-time, whereas in the past income decreases had been seen as temporary situations. Perhaps this difference of attitude was also due to growing political instability, falling employment and the general economic uncertainty preceding and following on from the currency crisis.'*

As a result of the domestic and international recession, Italy observed a downward trend in her investments (see Figure. 2). Other factors that hindered investment in the economy were the low capacity utilization rates, the high debt of many firms, and high real interest rates (Scobie et.al: 1996). Italian imports increased during the initial years of the 1990s (see Figure. 7). However, this increase in imports was not countered by an increase in exports which resulted in current account deficits. Italy had to face the consequences of such distortions by moving out of the EMS and letting the lira float freely in the international market. One again the lira was devalued in September 1992. The resultant fact was that Italian exports became cheaper in the international markets, hence increasing the competitiveness of Italian firms. Furthermore, major restructuring of the economy took place in the 1990s. A wave of privatizing the state holding enterprises began in 1993. Labor market reforms were also undertaken which helped in reducing labor cost and improving the productivity growth. Italy, thus, recovered from the recession soon and by 1994, the economy started showing signs of improvement. Nevertheless, the economy moved at nearly a constant rate during 1995-1999. The rates of GDP growth, gross savings and domestic investment remained almost the same

(see Figure. 2). Annual inflation was controlled while the lira was still devalued against the US dollar. Employment rates stagnated, while the unemployment rate in the economy showed an all time high values during 1994-1998. The unemployment rate dipped in 1999, still remaining at a very high rate (Figure. 3). Figure 4 shows that during the decade of 1990s, contribution of the industrial sector declined while the service sector contributed significantly in terms of value added. In case of foreign investment, the outflow remained slightly higher to inflow of FDI all throughout the 1990s. The exports of goods and services, however, did not improve in comparison to the increase in imports of goods and services (see Figure 7). The value of oil imports remained above the value of oil exports, nonetheless, the gap between the two was not found to be significantly higher (Figure 5). On the technological front, as measured by growth in number of patents and trademarks, Italy displayed signs of improvement after 1993 (see Figure 8). However, Scobie et.al. (1996) feel that Italy in many respects was a late-comer in the privatization process. Nevertheless, "many of the measures taken in the first half of the 1990s will be working their way through the economy in the second half." (Scobie. et.al: 1996, p. 99).

The Italian economy was just recovering from the recession of the initial years of the 1990s that once again it had to face the consequences of the depression that hit the internationally during the 2000s. The effects of this depression can be observed on Italy if we look at Figure 2. It shows that the growth rate of GDP declined since 2000 and stood at -0.017% in 2003. However, the Italian economy was able to recover in 2004. But by the end of the decade once again the economy was bit able to hold to its positive growth rate of GDP. Gross

savings in the economy reduced, while domestic investment was kept high in comparison to savings. The inflow f FDI remained much higher during the initial years of the 21st century but sharply declined after 2007; while the outflow of investment increased during 2005-2008 and reduced only during 200-2010 (see Figure 6). The unemployment rates in the economy remained at more than 6% throughout 2000-2010 (Figure 3). The value of oil imports (Figure 5) dramatically increased since 1999 till 2008, while the growth in exports and imports of goods and services turned negative during 2008-2009 after being positive during the earlier years (Figure 7). Figure 8 depicts that the performance of the Italian economy was not at all impressive on the technological front during the first decade of the 21st century.

In view of the above discussion, let us analyze empirically the factors that have led to the growth of the Italian economy since 1971.

## Economic Growth in Italy – An Empirical Analysis

To analyze and understand which factors explain the economic growth in Italy for the period 1971-2009, the following linear regression model is estimated using the selected variables mentioned in the Chapter 1:

$$(GDPpc) = B_0 + B_1(Invt) + B_2(SSER) + B_3(Open) + B_4(PT) + B_5(Govt) + B_6(FDI) + e \quad \text{.....(1)}$$

The results of the regression estimation of the above equation is shown in table 1

**Table: I-1**

**Model with all variables for 1971-2009**

| Variables | B | t-Stat | p-Value | Regression Statistics | |
|---|---|---|---|---|---|
| Constant | 0.302 | 0.031 | 0.976 | R | 0.724 |
| Invt | 0.525 | 2.249 | 0.032 | R Square | 0.524 |
| SSER | 0.055 | 0.711 | 0.482 | Adjusted R Square | 0.435 |
| Open | -0.124 | -1.343 | 0.189 | Standard Error | 1.78 |
| PT | 0.088 | 2.840 | 0.008 | F | 5.880 |
| Govt | -0.510 | -1.607 | 0.118 | Significance F | 0.000 |
| FDI | 0.329 | 0.456 | 0.651 | | |

The above table 1 observes that:

1. Domestic investment has a positive and statistically significant effect on the growth of per capita GDP in Italy over the period 1971-2009. A one percent increase in domestic investment in the economy leads to 0.525 percentage points increase in the growth of per capita GDP. Moreover, this result is in agreement with the existing economic literature on economic growth.
2. SSER has positive and statistically insignificant impact upon the growth of per capita GDP in Italy for 1971-2009. A one percent improvement in the human capital in Italy would increase the rate of economic growth of the economy by 0.055 percentage points. This result is consistent with the existing literature on economic growth that considers human capital as one of the most important factors contributing to economic growth of an economy.

3. GDP per capita during 1971-2009 was negatively affected by the total trade as percentage of GDP. A one percent increase in the economy's total trade as percentage of GDP would reduce the per capita GDP by 0.124 percentage points. However, this result was found as statistically insignificant.
4. Improvement in the growth rate of numbers of patents and trademarks showed positive and statistically significant effect on GDP per capita over the period 1971-2009 for the Italian economy. A one percent increase in the growth rate of number of patents and trademarks would increase the growth of per capita GDP by 0.088 percentage points.
5. Government consumption, as per the existing economic literature, tends to reduce the growth in an economy. The results in Table: 1 affirms this hypothesis because an increase in government consumption by one percent reduces the growth of per capita GDP by 0.510 percentage points. Moreover, this result is found to be statistically insignificant.
6. Inflow of foreign investment into the Italian economy from 1971-2009 has improved the rate of growth in GDP per capita in the economy by 0.329 percentage points. However, it is not found to be statistically significant.

Furthermore, in order to analyze which factor/s among the other selected ones have acted as driver/s of economic growth in Italy, for the periods 1971-2009, the above equation (1) is estimated using stepwise regression. This regression technique would facilitate in removing the unnecessary variables creating traffic and would emphasize only those factors that have

worked upon to improve the economic growth of the Italian economy. The results are depicted in table 1.1

**Table: I- 1.1**

**Stepwise Regressions on Per Capita GDP for 1971-2009**

**Regression**

| Model | Variables | R2 | Adj R2 | F-Value | p-Value |
|---|---|---|---|---|---|
| 1 | Govt | 0.330 | 0.312 | 18.246 | 0.000 |

**Significance of Coefficients for final model**

| Variables | B | t-Stat | p-Value |
|---|---|---|---|
| Constant | 19.267 | 4.689 | 0.000 |
| Govt | -0.944 | -4.272 | 0.000 |

Table 1.1 reveals the following:

1. The stepwise regression resulted into only one statistically significant model with only one statistically significant factor – government consumption.
2. Government consumption show a result which is in accordance with the economic literature which states that government consumption has a negative impact on the economic growth of an economy. An increase of 1% in government consumption in Italy would increase GDP per capita by 0.944 percentage points.

However, due to lack of availability of data, empirical comparison between the economic growth conditions in Italy pre-EU membership and post-EU membership could not be established.

## UNITED KINGDOM

The United Kingdom fought the Second World War till the victory. But it had little to celebrate as the price the British paid for the victory was very high in the form of wartime debts and post-war shortages. Even higher was the price that the Britain had to pay to sustain a large military force during the peacetime. Because of the extreme dependence on imported food and material during World War II, the value of British imports rose while the value of British exports declined. This created financial problems for the British economy by the end of the war. Britain's debts increased enormously to over three billion pounds against the available reserves of gold and dollar amounting to 0.5 billion pounds. Domestically, financial problems were created by the deferred payments made to the British labor for their wartime sacrifices. The United Kingdom, however, was able to recover the import deficits and improve its financial position by increasing the exports to the sterling area, the dollar area, and from the huge sums of money received under the United Nations Relief and Rehabilitation Agency, the Anglo-American Loan, and the Marshall aid[38]. Further, large sums were recovered by the increase in the Britain's capital exports. However, rather than reinvesting this money in increasing export capacity of its exporting industries, the United Kingdom utilized these funds to make the process of transition toward peacetime more gradual and less disruptive to the British people (Neal: 2007). At this same time the United Kingdom maintained a distance from the US plan of liberalizing trade and reintroduction of multilateral settlements of financial imbalances, and the Europeans' Schuman Plan.

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[38] The United Kingdom was a recipient of large sums of money under the Marshall aid.

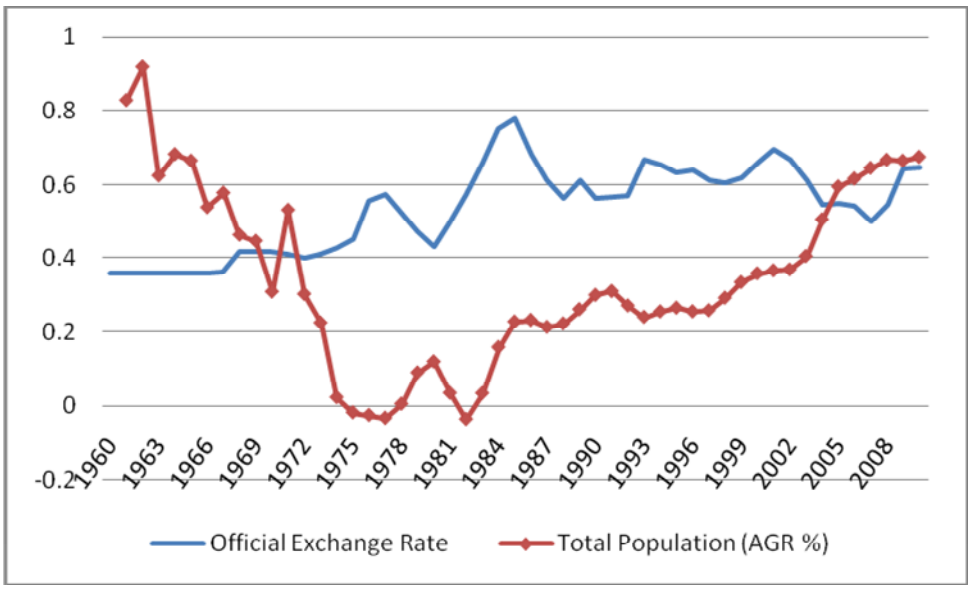
At the first post-war elections, the Labor party was elected to form a government. The elected government immediately implemented their strategy of a welfare state and nationalized the economy's basic industries. The Labor government nationalized the basic industries like coal, gas, electricity, rail and canal transportation, telecommunications, civil aviation and steel along with the Bank of England. Under the welfare state, the Labor government followed the recommendation of the Beveridge Report of "cradle to grave" policy. As part of this policy, a national health system access (based on needs rather than the ability to pay), free universal education, benefits for unemployment, retirement and death were provided. The government's objective behind the implementation of these policies was to provide with ample employment opportunities, control the output prices and to avoid inflation. This, however, was achieved by controlling the consumption level. This further led to increase in investment as well as in exports, thereby, overcoming the balance of payments problem. Unemployment dipped to the lowest point. However, these reforms brought in by the Labor government proved to be a failure. The actions of nationalization and welfare state did not bring any economic structural changes, while the nationalization strategy rendered the British industries uncompetitive[39].

Meanwhile, the other European countries sought to strengthen their connections with each other forming the European Coal and Steel Community and advancing it to the EEC. The United Kingdom, however, remained aloof from this process of integration, maintaining its relations with the earlier

[39] The British firms and labor unions used the traditional work practice and plant organization to increase output.

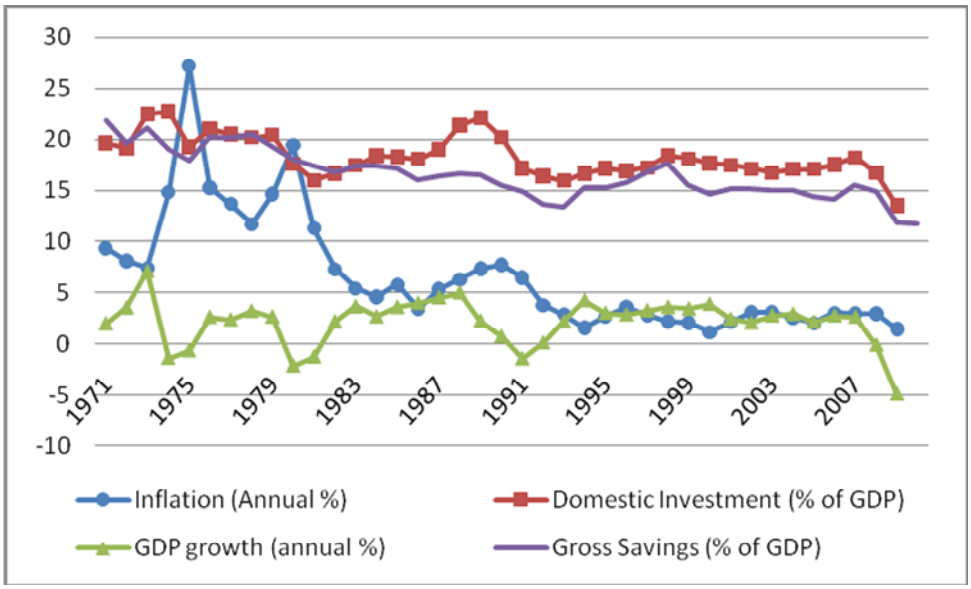
trading partners from the sterling and dollar areas. The rate of economic growth was favorable and low levels of unemployment were maintained. Nonetheless, by the end of the 1950s, the other Continental countries started growing rapidly. From the 1960s till 1973, the EEC member countries enjoyed the golden period of rapid economic growth, whilst the British economy still depicted the growth rates of the 1950s.

**Figure: U-1**



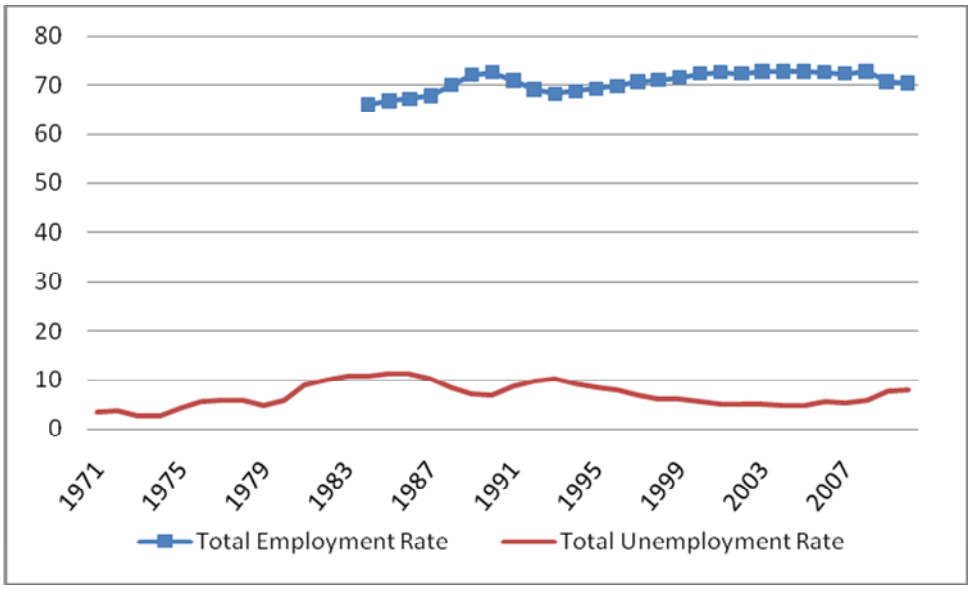

*Source: Author's Calculation, Absolute figure from World Development Indicators, World Bank*

**Figure: U-2**



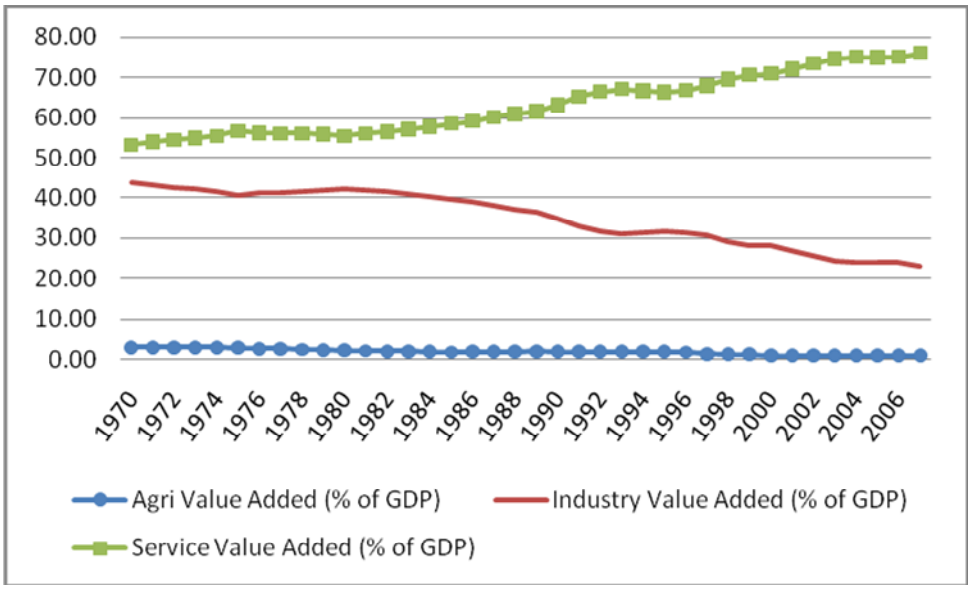

*Source: World Development Indicators, World Bank*

**Figure: U-3**




*Source: OECD Factbook 2009 & 2011-112*

**Figure: U-4**




*Source: World Development Indicators 2009, The World Bank*

The United Kingdom lagged behind many of the other large countries of Europe. Much research has been undertaken in order to understand the reasons for the British economy to lag behind the other economies. One such factor that led to the relatively slow growth of the United Kingdom's economy was lower rates of investment to total output or low rate of investment-output ratio. However, many believe that the reason for the decline in the growth rate of the United Kingdom's economy was the low levels of productivity of capital, especially in public sector and to some extent in the private sector. "The conjecture here is that the fragmented structure of British labor unions and the ability of each small craft union to protect the jobs of its members by preserving out-of-date work rules prevented the new equipment from being used most efficiently." (Neal: 2007, p. 274). Broadberry (1994) was of the opinion that misdirection of the investment in human capital was one among the many reasons for the decline in the growth rates in the United Kingdom.

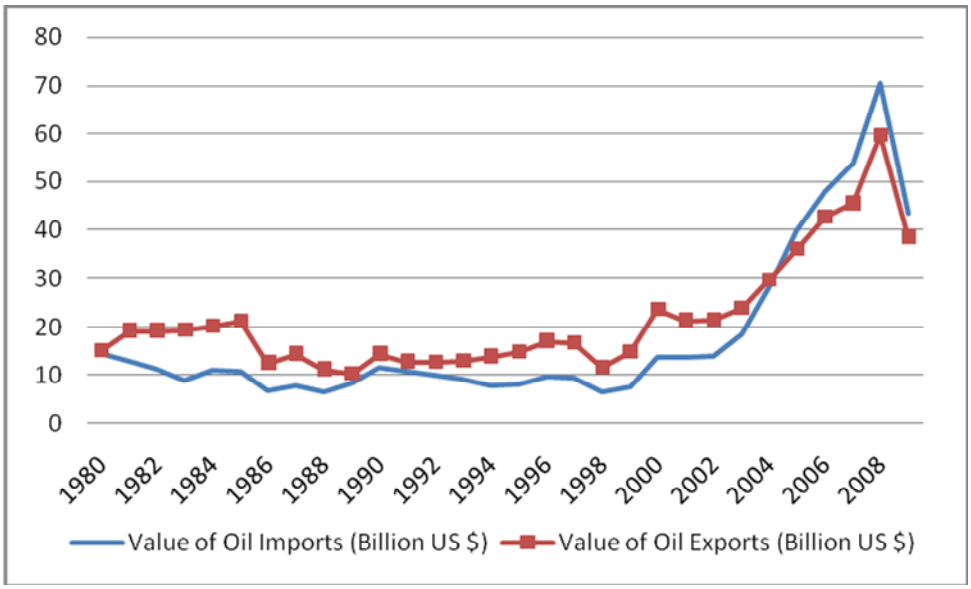
Outrageous taxes on "unearned" capital income and protection against dismissal of the workers made the British economy inflexible. By the mid 1960s, Britain had become the sick man of Europe (Sinn: 2007). The Conservative government and later the Labor governments of the 1950s and 1960s did no good in improving the growth rate of the UK economy. By the mid 1960s, growth rates fell, unemployment increased, inflation rates soared and there were severe balance of payments problems because of the declining exports and increasing imports. It can be observed from Figure 7 that the growth rate of exports of goods and services remained lower to the growth in imports of goods and services until 1968. Figure 1 depicts that the exchange rate of pound sterling against US dollar remained constant throughout the period 1960-1966. In 1967-1968, the pound was devalued against dollar.

Meanwhile negotiations were initiated by the UK to pursue membership in the EEC. However, these negotiations did not materialize and were rejected twice by the French mainly because of the differences in the economic strategy between the UK and the member European nations of the EEC[40]. It was only in 1973 that the negotiations turned out to be fruitful and the UK joined the EEC or the Common Market. From 1971 to 1973, growth rate of GDP in the UK increased dramatically from 2.02% to 7.13%. Meanwhile, the inflation rate was kept under control and the rate of domestic investment in the economy exceeded the savings rate (Figure 2) and the pound sterling was appreciated against the US dollar in the international market (see Figure 1). Unemployment rates reduced from 1971 to 1973 (Figure 3) and exports of goods and services exceeded the imports (Figure 7).

[40] However, the political differences here should also not be neglected.

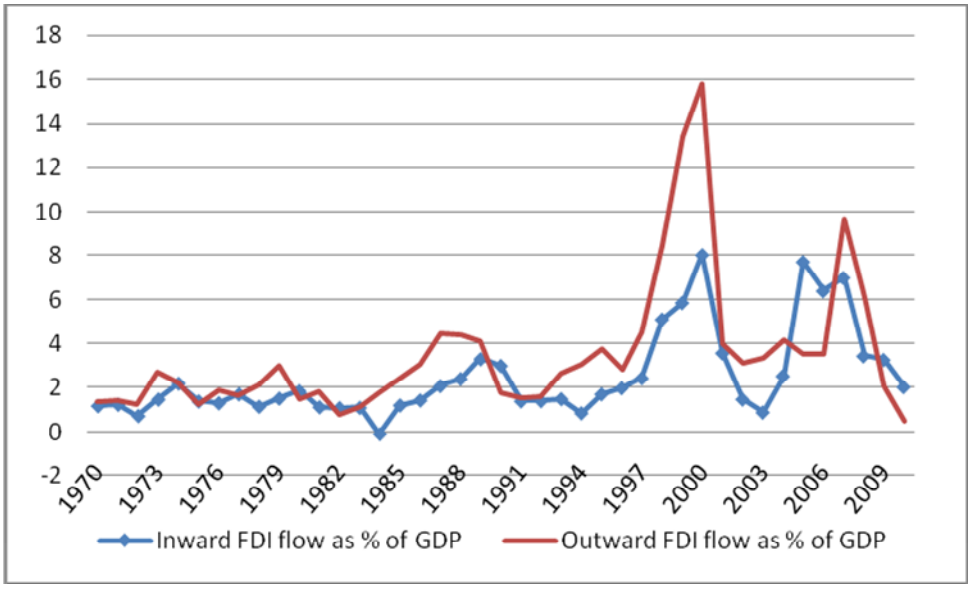
The same year i.e. 1973 saw the first oil shock. Increasing price levels and nominal wages in the domestic economy made the UK weak to face the first oil shock. Unemployment increased from 2.6% in 1974 to 5.8% in 1977 and inflation soared high (see Figure 2) as a result of the oil shock as well as domestic government policy – both monetary and fiscal. As a result of this, the value of pound – which was allowed to float in 1972 – slipped against the dollar as well as the other European currencies. It is observant from the Figure: 1 that the pound sterling was continuously devalued from 1973 to 1977 against the US dollar. Moreover, the growth rate of GDP in the British economy became negative during 1974-1975. At the same time, the UK was facing difficulties with the transition into the EEC and the first oil shock only made the conditions worse. While other European countries were busy formulating strategies to tackle with the oil shock, the UK went ahead with developing the potential oil-reserves from the stormy North Sea. Keeping the oil prices high, the UK started investing heavily in the North Sea. This can be seen in Figure: 2 where the domestic investment in the UK during 1976 to 1979 was more than 20%. As a result, by 1976, the cost of drilling in the form of imported construction material started putting pressure on the balance of payments. The pound, once again, weakened against the dollar; escalating the cost of imported oil. Inflation (see Figure 2) and unemployment (see Figure 3) observed increasing trend. By 1977-78 exports of gas and oil from the North Sea facilitated in improving the current account deficits and strengthen the pound.

**Figure: U-5**




*Source: World Economic Outlook Database, Sept 2011, IMF*

**Figure: U-6**

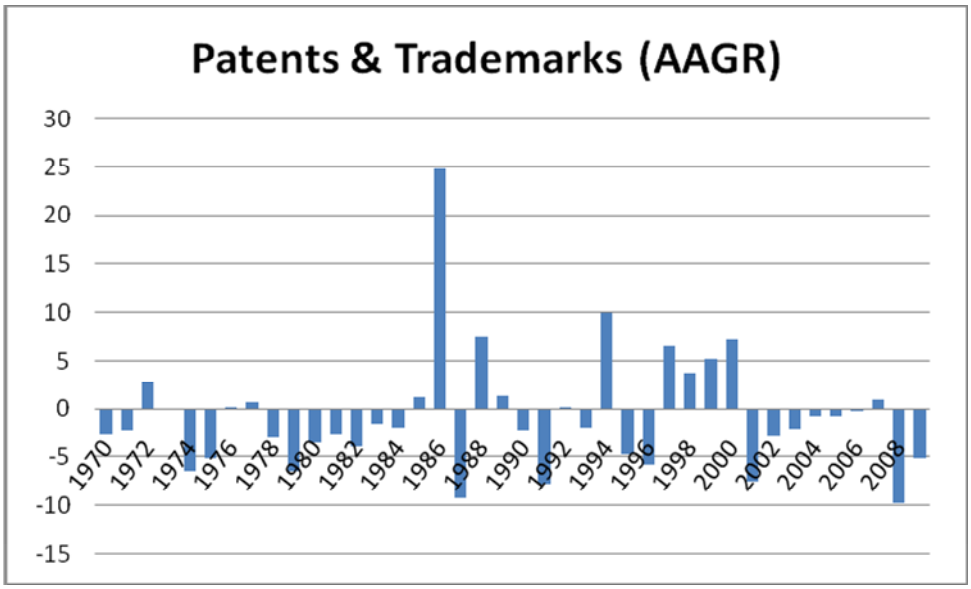



*Source: UNCTAD*

**Figure: U-7**


*Source: Author's Calculations, Absolute figures from World Bank national accounts data, and OECD National Accounts data files.*

**Figure U-8**




*Source: WIPO*

By the end of the 1970s, the UK economy was once again hit by the wrath of labor unions who demanded for an increase in their pay. However, resistance

to these demands from the labor party led to the fall of the labor government in 1979; and the rise of the Conservative government headed by Margaret Thatcher.

The period during the tenure of Margaret Thatcher saw profound changes in the United Kingdom economy. She was determined to reduce, to the extent possible, government regulations and interferences from the market. During the subsequent years (1980-81), however, the UK economy observed the deepest recession in the whole of the post-war period. The major impact of this recession was observed in the export-oriented industries, mainly manufacturing (Gillingham: 2003). Unemployment increased sharply from 5.8% in 1980 to 8.8% in 1981, value of pound declined against dollar (see Figure 1) and the growth rate factually turned negative. The growth rate of GDP stood at -2.09% in 1980 and -1.22% in 1981. Rates of savings and domestic investment too declined (see Figure 2). Inflation increased and exports and imports of goods and services showed negative trends during 1980-1981 (Figure 7). As a result it became essential to curb the ever increasing inflation rate. This was done by restricting the money supply in the economy. By 1982, the UK economy started showing signs of recovery in the form of improved growth rates and reduction in inflation rates (see Figure 2). Further structural changes were brought in the form of liberalization, privatization and limiting the powers with the labor unions. Reforms in the financial sector through liberalization, denationalizing the nationalized industries and the introduction of privatization led to an increase in the investment rates from 16.63% in 1982 to 22.11% in 1989, labor productivity and total factor productivity of manufacturing in the economy. Technical

advances in the manufacturing were now taking place. On her way to privatization, Margaret Thatcher reduced (a) the top personal income tax rate, (b) the role of state pension system (c) social benefits (d) housing allowances and (e) social assistance (Sinn:2007). The service sector played an important role in the improvement of the growth rate of the British economy (see Button and Pentescost: 1993). The Figure 4 shows that the contribution of the services sector in the economy, in the form of value added, is continuously increasing during 1981-1989. Once again, by the mid 1980s, the British balance of trade weakened on account of a sharp fall in the prices of oil (see Figure 5). However, it was recovered by the early 1990s by increasing in the exports and devaluation of pound. The UK economy was enjoying the growth rates during the 1990s, only to know that the economy would again be hit from the external shock of German reunification. However, the UK was in a position to avoid the economic cost resulting out of the German reunification.

During the initial years of the 1990s, GDP growth in the British economy tumbled and stood at -1.39% in 1991. Gross savings and domestic investment too recorded a down turn (see Figure 2). Figure 3 shows that during the initial years of the 1990s, employment rates in the economy declined while the unemployment rates remained very high. Industrial value added almost remained the same while the value added from the services sector improved (Figure 4). The growth rates of imports as well as exports of goods and services declined (Figure 7). In the international market, the value of oil exports exceeded the value of oil imports (Figure 5). It is evident from Figure 6 that the outflow of FDI remained higher than the inflow of FDI; while Figure 8 shows that the technological development was not at all impressive in the

UK economy. It may thus be said that the British economy felt the shock of the international recession of the 1990s. However, the UK recovered from the shock by the mid 1990s and showed signs of improvement thereafter. “The UK’s economic success, starting in the 1980s and interrupted only by the brief experience with the European Monetary System at the beginning of the 1990s, did not depend on export-led growth. Indeed, as the importance of foreign trade has leveled off for the UK since 2000, it has begun to run larger import deficits – which would be anathema to France and Germany. Thanks to a flexible exchange rate with the eurozone, the UK can now adjust to these trade deficits with a depreciation of the pound, if the deficits cannot be financed otherwise.”

The GDP growth rate in the 21st century demonstrated a declining trend. Domestic investment stayed at higher levels in comparison to savings rate (Figure 2). The Figure 1 depicts that the total population growth in the economy improved during the decade 2000-2010. Employment rates in the economy declined, while the unemployment rates in the economy remained at a considerable higher rates as can be seen from Figure 3. Contribution of the services sector in the economy increased while that of the industrial sector declined (Figure 4). As Figure 5 depicts, the value of oil imports dramatically increased after 2004, while the outflow of investment maintained its high rates until 2008 and then declined drastically. AS Figure 8 shows the decade of 2008 was very depressing on the technological front.

In view of the above discussion, let us analyze empirically the factors that have led to the growth of the UK economy since 1971.

## Economic Growth in The UK – An Empirical Analysis

To analyze and understand which factors explain the economic growth in the UK for the period 1971-2009, the following linear regression model is estimated using the selected variables mentioned in chapter 1:

$$(GDPpc) = B_0 + B_1(Invt) + B_2(SSER) + B_3(Open) + B_4(PT) + B_5(Govt) + B_6(FDI) + e \quad \text{.....(1)}$$

The results of the regression estimation of the above equation is shown in table 1

**Table: U-1**

**Model with all variables for 1971-2009**

| Variables | B | t-Stat | p-Value | Regression Statistics | |
|---|---|---|---|---|---|
| Constant | 2.915 | 0.232 | 0.818 | R | 0.692 |
| Invt | 0.412 | 1.518 | 0.139 | R Square | 0.479 |
| SSER | 0.045 | 0.655 | 0.517 | Adjusted R Square | 0.382 |
| Open | 0.008 | 0.074 | 0.941 | Standard Error | 1.768 |
| PT | 0.124 | 2.558 | 0.015 | F | 4.907 |
| Govt | -0.604 | -1.960 | 0.059 | Significance F | 0.001 |
| FDI | -0.216 | -1.191 | 0.242 | | |

The above table 1 shows that:

1. Domestic investment has a positive and statistically insignificant effect on growth rate of per capita GDP in the UK over the period 1971-2009. A one

percent increase in domestic investment in the economy leads to a 0.412 percentage points increase in the per capita GDP.

2. SSER has positive and statistically insignificant impact upon the growth of per capita GDP in the UK for 1971-2009. A one percent improvement in the human capital in the UK would increase the rate of economic growth of the economy by 0.045 percentage points. This result is consistent with the existing literature on economic growth that considers human capital as one of the most important factor contributing to economic growth of an economy.
3. GDP per capita during 1971-2009 was positively affected by the openness of the economy. A one percent increase in the economy's total trade as percentage of GDP would increase the growth rate of per capita GDP by 0.008 percentage points. However, this result was found statistically insignificant.
4. Improvement in the growth rate of numbers of patents and trademarks showed positive and statistically significant effect on the rate of growth of GDP per capita over the period 1971-2009 for the British economy. A one percent increase in the growth rate number of patents and trademarks would increase the growth rate of per capita GDP by 0.124 percentage points.
5. Government consumption, as per the existing economic literature, tends to reduce the growth in an economy. The results in Table: 1 affirms this hypothesis when an increase in government consumption by one percent reduces the growth of per capita GDP by 0.604 percentage points. However, this result is found statistically insignificant.

6. Inflow of foreign investment into the British economy from 1971-2009 has impaired the growth in GDP per capita in the economy by 0.216 percentage points. However, it is found to be statistically insignificant.

Furthermore, in order to analyze which factor/s among the other selected ones have acted as drivers of economic growth in the UK, for the periods 1971-2009, the above equation (1) is estimated using stepwise regression. This regression technique would facilitate in removing the unnecessary variables creating traffic and would accentuate only those factors that have worked upon to improve the economic growth of the British economy. The results are depicted in table 1.1

**Table: U-1.1**

**Stepwise Regression on Per Capita GDP for 1971-2009**

**Regression**

| Model | Variables | R2 | Adj R2 | F-Value | p-Value |
|---|---|---|---|---|---|
| 1 | Govt | 0.305 | 0.287 | 16.265 | 0.000 |
| 2 | Govt, PT | 0.398 | 0.364 | 11.888 | 0.000 |

**Significance of Coefficients for final model**

| Variables | B | t-Stat | p-Value |
|---|---|---|---|
| Constant | 17.964 | 3.972 | 0.000 |
| Govt | -0.781 | -3.527 | 0.001 |
| PT | 0.114 | 2.350 | 0.024 |

Table 1.1 reveals the following:

1. The stepwise regression resulted into two different statistically significant models. The first model considered government consumption as a factor explaining economic growth in the UK over the period 1971-2009. The second equation considered the growth in number of total residential and non-residential patents and trademarks along with government consumption in explaining the economic growth in the British economy.
2. Government consumption is showing a negative and statistically significant effect upon the rate of growth of GDP per capita for the period 1971-2009. It may thus be inferred that an increase in government consumption has impaired the process of economic growth in the British economy. In fact an increase in government consumption by 1% reduces the growth of per capita GDP by 0.781 percentage points. This result falls in line with the existing economic literature that states a negative relation between government consumption and growth in GDP per capita.
3. Growth in number of total residential and non-residential patents and trademarks, in case of the British economy, shows a positive effect on the growth rate of per capita GDP. A one percent increase in growth in number of total residential and non-residential patents and trademarks increases GDP per capita by 0.114 percentage points. Moreover, this result is observed as statistically significant.

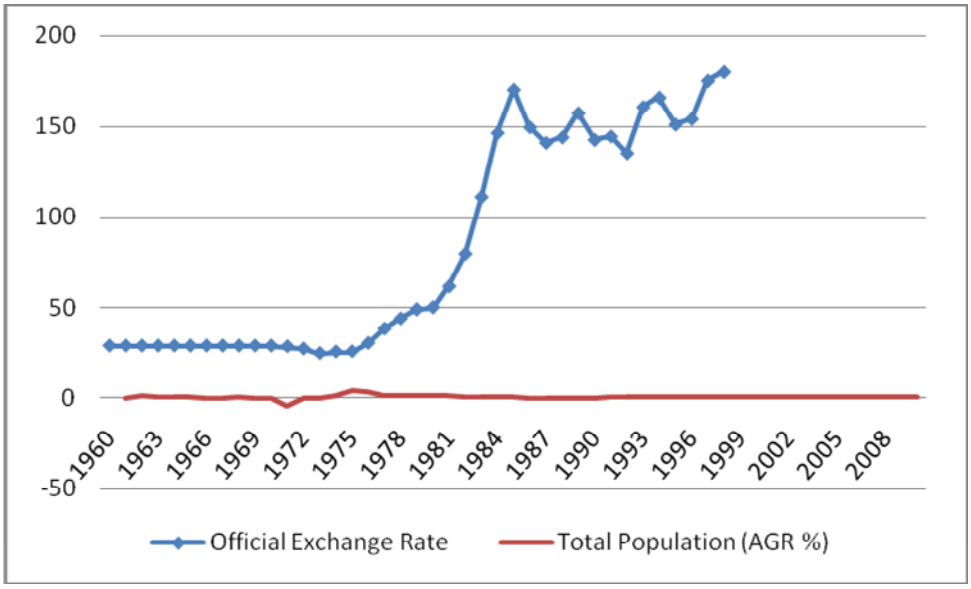
However, due to lack of availability of data, empirical comparison between the economic growth conditions in the UK pre-EU membership and post-EU membership could not be established.

## PORTUGAL

Portugal, cousin of Spain, is a small, compact and relatively homogeneous country. The republic regime of Portugal, by its end in 1926, left the economy in an unstable financial situation. The republic government was taken over by the military government in 1926 headed by President Óscar Fragoso Carmona. In order to restore the financial situation of the nation, the then Minister of Finance, António de Oliveira Salazar, considered the principles of a balanced budget and monetary stability thereby restoring the equilibrium in fiscal budget and balance of payments. His success led to the forty years of authoritarian rule in Portugal i.e. from 1928 to 1968. Salazar laid the foundations of Estado Nova, the "New State". This New State was characterized as "neither capitalist nor communist, Portugal's economy was cast into a quasi-traditional mold." (Solsten: 1993). The economy was extensively regulated by the state and maintained an autarkic economic policy. These policies worked well in Portugal all through the 1930s and the 1940s. From 1930s till the end of 1950s, Portuguese industries were strictly regulated under the system of industrial licensing – *condicionamento industrial*. As per Solsten (1993), during this time, 'the state exercised extensive de facto authority regarding private investment decisions and the level of wages'. Under such industrial licensing policy, approval of the government was needed for expanding, diversifying, relocating, or setting up of a new establishment. Such protectionist and state regulated industrial policy facilitated the growth of the industrial sector, but severely restricted its development process. As Corkill (1993) observes, until the 1950s, industrial portfolio was limited only to industries such as textiles, cork, beverages,

metallurgy, mining, and chemicals. Studies reveal that Portugal enjoyed highest rates of economic growth under the "New State". It was during the 1950s, however, that these autarkic policies did not fare well, and Portugal had to open its economy to a more outward looking economic policy and international integration – especially with the industrial Northern Europe.

**Figure: P-1**



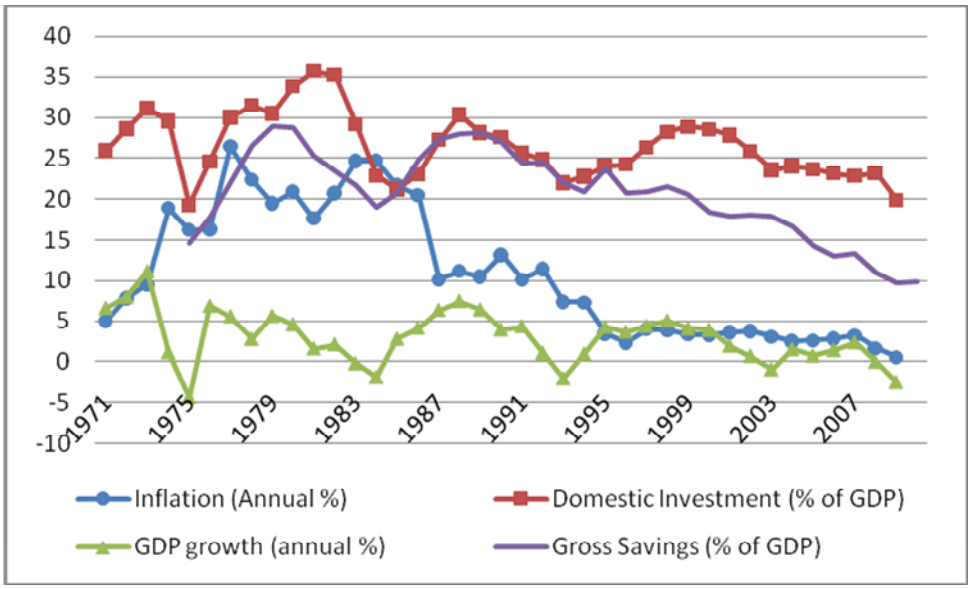

*Source: Author's Calculation, Absolute figure from World Development Indicators, World Bank*

In order to have closer relations with Europe, Portugal became a charter member of the UK-initiated European Free Trade Association (EFTA) and later it joined the GATT (General Agreement on Tariffs and Trade), IMF (International Monetary Fund) and the World Bank. The membership in EFTA and GATT, in particular, led to the reduction in tariff rates. As a result, Portugal's trade with EFTA-member nations saw an upward trend.

The slow liberalization process, during Salazar's regime, gained momentum since 1968 under Prime Minister Marcello Josè das Neves Caetano. This

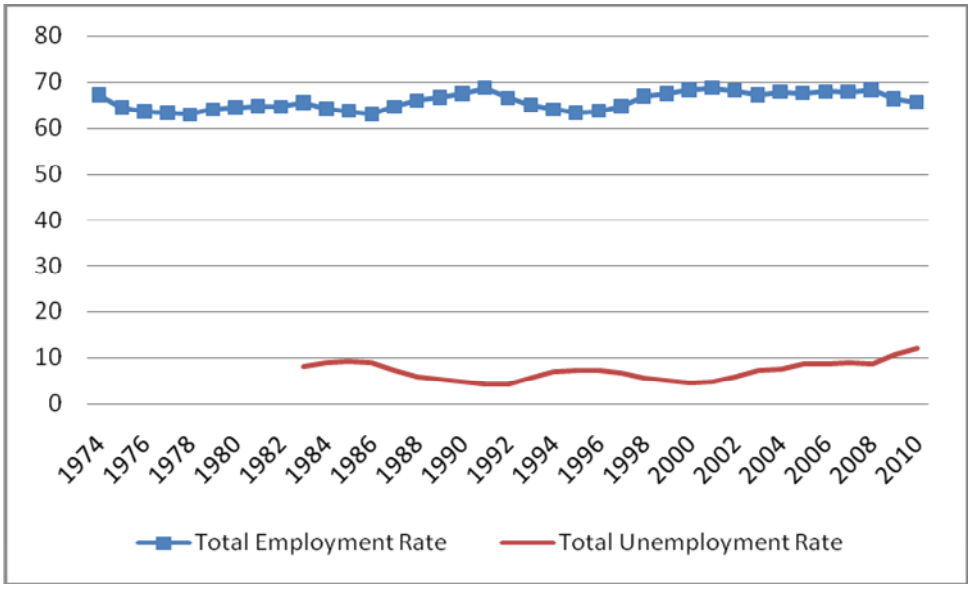
liberalization process witnessed the signing of an agreement in 1972 between Portugal and the European Commission upon improving trade relations and other contacts. EFTA membership and signing of the free trade agreement with the EC geared the modernization process of Portugal's industries from 1960 to 1973. However, by the early 1970s when the economic crisis hit the international markets, even the new industrial policy became defensive and was driven largely by social rather than economic goals (Corkill: 1993). It prioritised job protection, which required ever increasing subsidies, and generated a serious problem of low profitability in the industry (Martins: 1987, as cited in Corkill: 1993, p. 65). The industrial expansion was concentrated in large-scale enterprises using modern technology (Solsten: 1993). Hence, the industrial structure in Portugal suffered severe distortions for a decade following 1974.

**Figure: P-2**



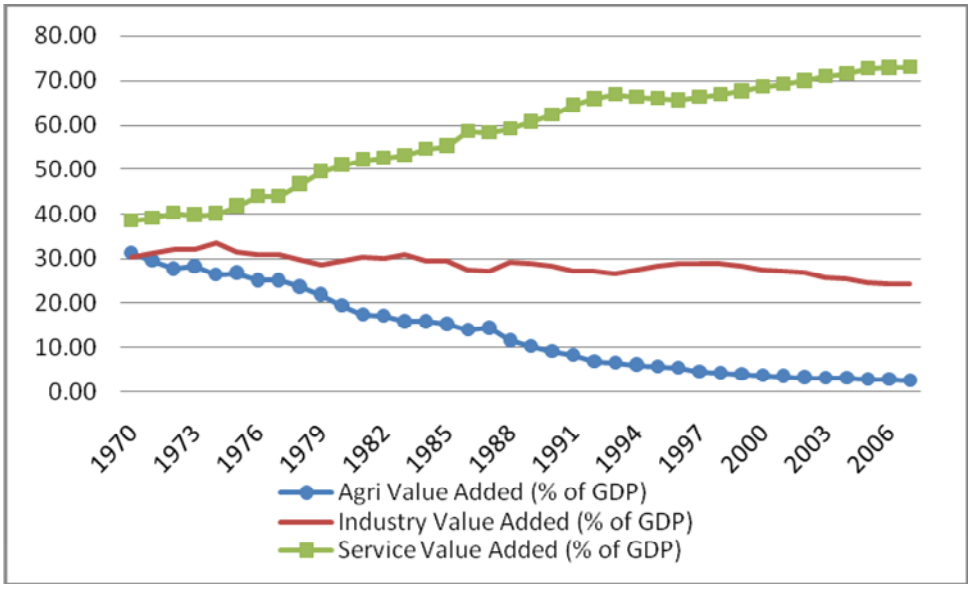

*Source: World Development Indicators, World Bank*

## Figure: P-3



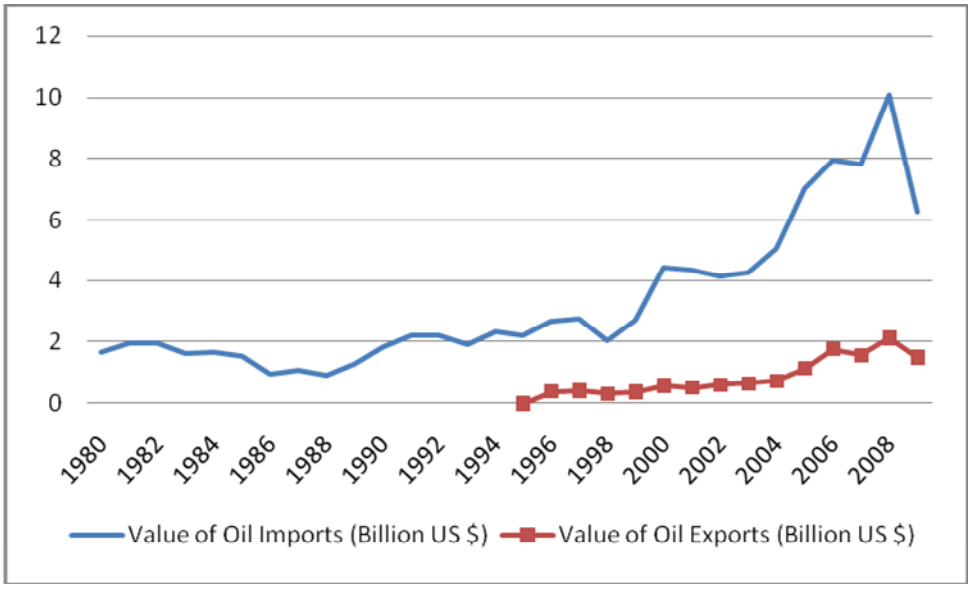

*Source: OECD Factbook 2009 & 2011-112*

## Figure: P-4



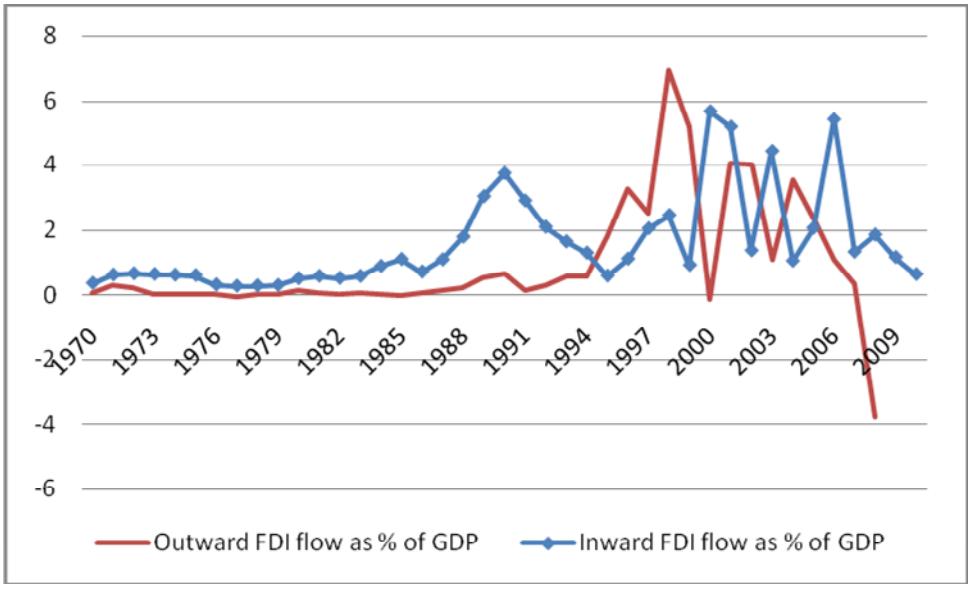

*Source: World Development Indicators 2009, The World Bank*

## Figure: P-5



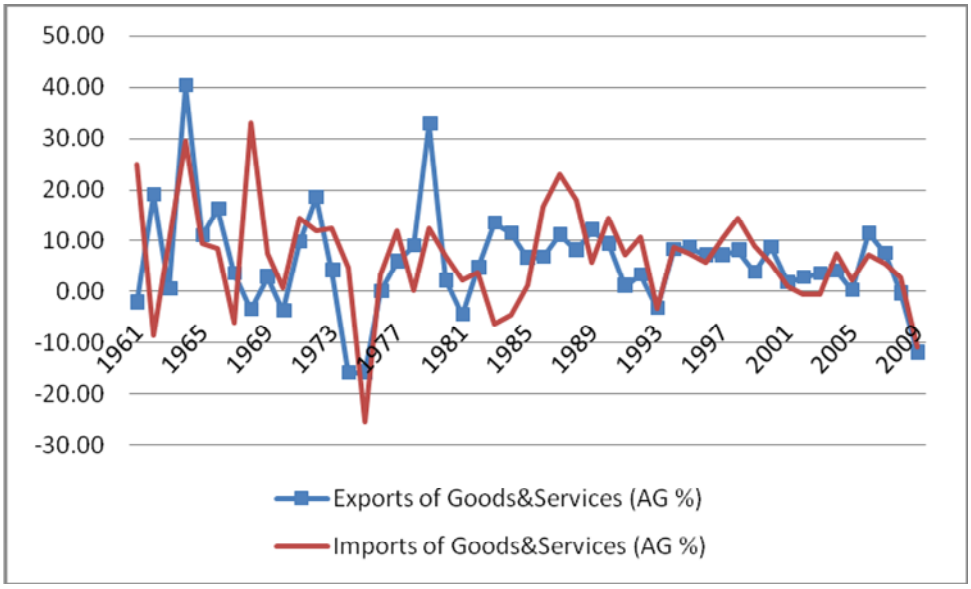

*Source: World Economic Outlook Database, Sept 2011, IMF*

## Figure: P-6



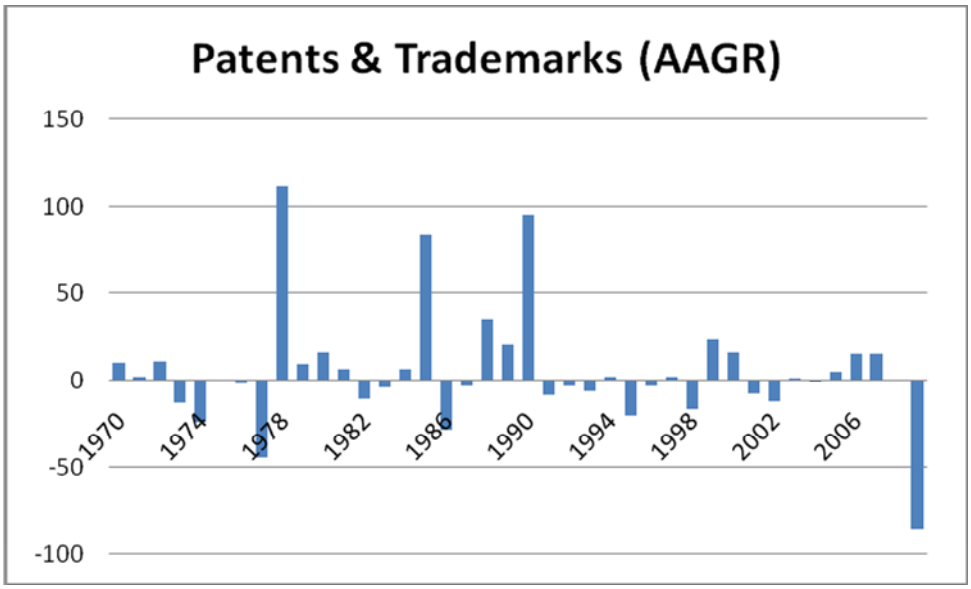

*Source: UNCTAD*

**Figure: P-7**




*Source: Author's Calculations, Absolute figures from World Bank national accounts data, and OECD National Accounts data files.*

**Figure: P-8**




*Source: WIPO*

The Portuguese economy, as a result of liberalization, grew at a rapid rate until 1974. It can be observed from Figure 2 that the GDP growth rate in the

economy increased from 6.63% in 1971 to 11.2% in 1973. Economists considered the period 1950-73 as the 'golden age' of Portuguese economic growth (Neves: 1996b and Corkill: 1999). This process of liberalization, however, started facing challenges in the form of 'political resistance and sharply divided opinion within the ruling class over the appropriate change of strategy for the country' (Neal: 2007, p. 359).

Structural change in the Portuguese economy occurred by 1973. Majority of the industrial firms were nationalized during this time leading to huge losses. Private and public consumption in the domestic market accelerated drastically between 1973 and 1975. This led to decline in the savings, fixed capital formation (see Figure 2) and a huge deficit in the balance of payments. Unit labor cost during this time increased leading to increase in the production costs. These factors together contributed to the decline in Portugal's ability to compete in the international market. The result of which was a fall in the exports of goods and services between 1973 and 1976. It is prominent from Figure 7 that the growth of exports of goods and services in 1973 was 4.18% which became negative during 1974-1975 and no growth was seen in the exports of goods and services in 1976. All these factors left the economy in a desperate state and the growth rate of the economy started dipping – it declined from 11.2% in 1973 to 4.35% in 1975. In 1974, Caetano was ousted by a military coup led by younger officers, who initiated attempts to integrate the Portuguese economy more closely with the Western Europe.

In 1974 and 1975, Portugal had to face the loss of her African colonies. This loss of colonial nations brought back the ex-colonials to Portugal. The recessionary situation that was felt largely in Europe during the twin oil

shocks of 1970s, too, brought back the emigrant Portuguese workers to their home land. This inflow of workers from colonies and other nations, inflexed the Portuguese economy with human and financial capitals (financial capital was brought back in the form of savings). This is evident from Figure 2 which shows a continuous increase in the rate of savings during 1975-1979. As a result of these increased savings, domestic investment in the economy increased and GDP started growing (see Figure 2). Employment rates remained stable (Figure 3) while the growth in exports of goods and services was recovered back during the later years of 1970s. "These capital infusions, plus the advantage of no longer spending large sums abroad to maintain military control of the colonies, helped Portugal weather the oil shocks better than would have been possible otherwise." (Neal: 2007, p.359). Nonetheless, it should be remembered that the domestic currency was being continuously devalued against the US dollar during 1975-1979. Since the late 1970s, Portugal has been trying to integrate the economy with rest of the developed Europe. Integrating into a larger and competitive market meant that the economy had to considerably change the industrial structure thus making it more competitive. Before entering into the EC, a survey among 40,000 industrial houses was conducted by the Confederation of Portuguese Industries, concerning the consequences from the accession. The results of the survey were mixed. On the one hand, some industrial houses feared that accession into EC would confiscate the protection that the government had been providing until now. In view of this they apprehended the fierce competition in the more competent international market – both EC and non-EC areas like the US, Japan, the NICs, and the EFTA group; termination of small and ineffective firms; and the fear that the domestic market would be

flooded by the much stronger Spanish industrial goods. As such, Portuguese products were considered inferior in comparison to many other European products. Corkill (1993), citing Hudson (1989), pointed that Portuguese producers faced handicaps such as high transportation and distribution costs, and technological, educational and infrastructural deficiencies; as a result of which 'the country was regarded as a dumping ground for cheap goods by many European companies' (p. 93). Further, there was a dire need to rationalize and restructure the traditional industries like steel and shipbuilding in order for them to compete in an open market. On the other hand, there were producers who looked forward to work in a free market compared to the earlier market restricted by quotas and voluntary restriction; a market which exerted a discipline and downward pressure on the high interest rates – thereby providing a conducive environment for investment.

The Portuguese economy faced a slowdown in the rate of economic growth during 1980s, as compared to the robust growth of the earlier decade. The Figure 2 shows a decline in the growth rate of GDP in Portugal during the initial years of the 1980s; it then turned negative during 1981-1984. The Portuguese economy faced a slowdown in the rate of economic growth during 1980s, as compared to the robust growth of the earlier decade. However, employment remained almost the same during the initial years of the 1980s because of worker emigration and military draft (Solsten: 1993). Inflation rates soared high (above 20%) and the financial conditions of the industries worsened which lowered the real earnings of the workers. The economy, however, started to grow in the second half of the 1980s (see Figure 2)

harvesting the benefits from lower oil prices (see Figure 5), declining interest rates and the pre-accession aid from Brussels.

Finally, in 1986, Portugal became fully integrated with the European countries through the membership in the European Community (EC). As a result, the industrial licensing policy was entirely abolished in 1986 and a new improved industrial policy was formulated which aimed at enhancing the country's international specialization and boost exports. Furthermore, care was taken in formulating this policy on the basis of Portugal's comparative advantage in the European markets. The results of this new liberalized industrial policy were impressive.

At the time of her entry into the EC, Portugal was a poor country dependent on the large agricultural sector[41]. It can be observed from Figure 4 that the contribution of the agricultural sector in the Portuguese economy remained higher during the 1970s and the 1980s. As a member of the EC, Portugal had to dismantle tariffs and trade restrictions as per the EC norms. This led to the expansion in trade with the EC member nations (see Figure 7) – and especially Portugal's trade with Spain expanded by leaps and bounds. The openness of the economy with the rest of the world grew faster as a member of the EC. Imports in the form of machinery, equipment and raw materials increased which facilitated in modernizing the industries in the economy. However, with the accession in the EC in 1986, there was intense pressure on Portuguese industries to restructure and upgrade its products. Only this would aid in surviving the more competitive international market. Entering

[41] Portugal has large number of small farms, the productivity of which was observed to be less in comparison to the EU average.

the EC, however, was not considered as the best alternative for Portuguese enhanced economic growth. An austere growth was predicted for Portugal as a member of the EC (see Ashoff: 1980, Marques Mendes and Thirwall: 1989). It was feared that the low tariff barriers against the non-EC and especially the Third World imports would increase the production cost of the Portuguese firms[42]. Cravinho (1984) supported this view providing justifications that Portuguese exporters depended on low-technology and cheap labor which deteriorated their competitive position in the international market. It was further felt that membership in the EC would marginally boost the export position of the nation as it already enjoyed the advantage of a Common Market (EFTA). Pitta e Cunha (1983) and Braga de Macedo (1984) doubted whether Portugal's institutional structure was ready to face changes that would be brought in by the contrasting institutional structure of the EC.

Solsten (1993) believes that Portugal's accession to the EC has been beneficial to the economy in a way that the aids provided by the EC helped in improving the backward infrastructure in the economy. Foreign investment started flowing into the economy (see Figure 6) to benefit from the low wages and privatization of state owned enterprises on a large scale. Neal (2007), however, points out the major reasons that could not hold the increasing FDI in Portuguese economy. Firstly, "the continued protection of workers from dismissal…", secondly, "the relative backwardness of the education level of the Portuguese population…" and the third, "the geographical location of the country made the markets of the EU less accessible…" (Neal: 2007, p. 361).

[42] It was observed that between 1985 and 1990, Portuguese firms experienced an increase of between 20% and 25% in their cost of production.

Nonetheless, Portugal as a low-wage economy, benefitted from falling trade barriers, bigger market, and greater competition.

Corkill (1999) observed that Portugal's accession to the EC acted as a 'catalyst and dynamic force across industry, finance…' (p. 111). This process also provided a short-term boost to the economy. He pointed out four factors conducive to the growth of the economy as a member of the EC:

1. The long transition period (extended to 10 years) and extensions granted for modernizing the economy
2. The prompt changes taking place within the EC itself provided a sanguine attitude to Portugal for faster economic union
3. The increasing demand in the international market and the favorable terms of trade encouraged Portuguese exports, output and employment, thereby, raising domestic consumption without aggravating the balance of payments situation and
4. The psychological impact of joining the EC created new and improved opportunities.

Stephen (2002) feels that the exceptional growth of Portugal during the 1980s and 1990s was mainly because of the internationalization of Portugal with the rest of the Europe.

At the beginning of the 1990s, Portugal was classified as an upper-middle-income economy by the World Bank. However, Portugal saw threat in the process of German reunification of 1991. Eastern Germany (along with other expanding EU members from east Europe) became an alternate to southern

Europe (especially Spain, Portugal, and Greece) because of the low wage costs, skilled labor force and the investment (capital) flow of West Germany into East Germany. This led to diversion of funds from South Europe to East Europe. Thus, Portugal suffered a reduction in economic growth after 1993. Europe has now become the dominant focus for international trade and a major source of foreign capital for Portugal.

Portugal depicted a murky picture during the 21st century. The growth rate of GDP in the economy kept declining in the initial years of the 2000s and it turned out to be -0.93% in 2003. Portugal, thus, was affected by the recession that prevailed in the international market during the 2000s. It recovered during the mid-2000s and once again it depicted a negative rate of growth during 2008-2009. Inflation, however, was kept under control throughout the decade. The rates of savings as well as domestic investment declined (Figure 2). Employment rates remained almost the same all through the decade while unemployment soared high (Figure 3). Inward flow of foreign investment dramatically increased during the period 2000-2006 and since then it is observed to be continuously declining (Figure 6). The growth in exports as well as imports of goods and services declined (Figure 7) while the cost of importing oil increased dramatically (Figure 5). The economy of Portugal is now being driven by the services' sector whose contribution in the economy during the 2000s increased only to some extent, while the value added by the industry and agriculture sectors is showing a declining trend. Thus, the economic performance of Portugal during the 2000s is found squatty in comparison to the earlier decade.

## Economic Growth in Portugal – An Empirical Analysis

To analyze and understand which factors explain the economic growth in Portugal for the period 1971-2009, the following linear regression model was estimated using the selected variables mentioned in Chapter 1:

$$(GDPpc) = B_0 + B_1(Invt) + B_2(SSER) + B_3(Open) + B_4(PT) + B_5(Govt) + B_6(FDI) + e \quad \text{.....(1)}$$

The results of the regression estimation of the above equation is shown in table 1

**Table: P-1**

**Model with all variables for 1971-2009**

| Variables | B | t-Stat | p-Value | Regression Statistics | |
|---|---|---|---|---|---|
| Constant | -0.298 | -0.401 | 0.968 | R | 0.531 |
| Invt | 0.253 | 1.561 | 0.128 | R Square | 0.282 |
| | | | | Adjusted R Square | 0.147 |
| SSER | 0.045 | 0.772 | 0.446 | Standard Error | 3.231 |
| Open | 0.081 | 0.866 | 0.393 | F | 2.095 |
| PT | -0.002 | -0.106 | 0.916 | Significance F | 0.081 |
| Govt | -0.808 | -1.454 | 0.156 | | |
| FDI | 0.357 | 0.754 | 0.457 | | |

The above table 1 shows that:

1. Statistically, the model is not significant, as a result we cannot reject the null hypothesis $H_0$: $B_1 = B_2 = \ldots = B_6 = 0$

2. Domestic investment, human capital openness and inflow of foreign investment have a positive and statistically insignificant effect on per capita GDP in Portugal over the period 1971-2009.

3. While, the growth rate in numbers of patents and trademarks and government consumption showed negative and statistically insignificant effect on GDP per capita over the period 1971-2009 for the Portuguese economy.

As a result of the above model which is statistically insignificant, the equation (1) is estimated using stepwise regression. This regression technique would facilitate in removing the unnecessary variables creating traffic and would emphasize only those factors that have worked upon to improve the economic growth of the Italian economy. The results are depicted in table 1.1

**Table: P- 1.1**

**Stepwise Regressions on Per Capita GDP for 1971-2009**

| Regression Model | Variables | R2 | Adj R2 | F-Value | p-Value |
|---|---|---|---|---|---|
| 1 | Invt | 0.212 | 0.190 | 9.931 | 0.003 |

**Significance of Coefficients for final model**

| Variables | B | t-Stat | p-Value |
|---|---|---|---|
| Constant | -8.352 | -2.412 | 0.021 |
| Invt | 0.407 | 3.151 | 0.003 |

Table 1.1 reveals the following:

1. The stepwise regression resulted into only one statistically significant model. The model considered domestic investment as a factor explaining economic growth in Portugal over the period 1971-2009.
2. Domestic investment, according to the economic literature, has a positive effect on the economic growth rate of an economy. Higher and more productive the domestic investment, higher would be the economic rate of growth of a country. This depiction is seen in the results from table 2 where a one percent increase in domestic investment in Portugal enhances the per capita GDP by 0.407 percentage points.

Further, in order to analyze the impact from the membership of European Union on the Portuguese economy, equation (1) is now estimated with the introduction of a dummy (EU2). This dummy variable is intended to explain the impact from integration into the EU on the economic growth of Portuguese economy. In view of this, equation (1) can now be written as:

$$(GDPpc) = B_0 + B_1(Invt) + B_2(SSER) + B_3(Open) + B_4(PT) + B_5(Govt) + B_6(FDI) + B_7(EU2) + e \quad \text{.....(2)}$$

The estimates of the above regression equation are presented in Table 2

**Table: P - 2**

| Variables | B | t-Stat | p-Value | Regression Statistics | |
|---|---|---|---|---|---|
| Constant | 3.982 | 0.604 | 0.55 | R | 0.681 |
| Invt | 0.334 | 2.311 | 0.028 | R Square | 0.464 |
| SSER | 0.003 | 0.052 | 0.959 | Adjusted R Square | 0.343 |
| Open | 0.002 | 0.026 | 0.979 | Standard Error | 2.837 |
| PT | 0 | 0.033 | 0.974 | F | 3.831 |
| Govt | -0.908 | -1.859 | 0.073 | Significance F | 0.004 |
| FDI | 0.028 | 0.065 | 0.948 | | |
| EU2 | 5.675 | 3.242 | 0.003 | | |

Table 2 reveals the following:

1. The model turns out to be significant with the introduction of EU2 as a variable explaining the economic growth in the Portuguese economy.
2. Increase in the level of domestic investment leads to higher economic rate of growth in an economy. This depiction is seen in the results from table 2 where a one percent increase in domestic investment in Portugal enhances the growth rate of per capita GDP by 0.334 percentage points. This would mean that the membership of EU has elevated the productive capacity of its domestic investment. Moreover, this result is found as statistically significant.
3. A positive and statistically insignificant causality was found among human capital improvement and the rate of growth of per capita GDP during 1971-2009 in Portugal.

4. Openness of the Portuguese economy and the inflow of foreign direct investment in the country have positively affected the rate of growth of per capita GDP. However, the estimates demonstrated in table 2 are statistically not significant.
5. Government consumption, in accordance with the economic literature, depicts a negative impact upon the rate of growth of GDP per capita. The result, however, is not statistically significant.
6. The impact of growth in number of patents and trademarks is showing the least impact upon the rate of growth of per capita GDP in Portugal for 1971-2009.

The equation (2) is then estimated through stepwise regression for 1971-2009. This would demonstrate the factors that have acted as drivers of economic growth in the economy over the period 1971-2009, especially after entering into the European Union. Moreover, this would aid in comparing the economic performance of the Portuguese economy pre-EU and post-EU membership. The results of regression equation (2) are shown in table 2.1

**Table: P-2.1**

**Stepwise Regression on Per Capita GDP for 1971-2009 with Dummy**

| Regression Model | Variables | R2 | Adj R2 | F-Value | p-Value |
|---|---|---|---|---|---|
| 1 | Invt | 0.212 | 0.190 | 9.931 | 0.003 |

**Significance of Coefficients for final model**

| Variables | B | t-Stat | p-Value |
|---|---|---|---|
| Constant | -8.352 | -2.412 | 0.021 |
| Invt | 0.407 | 3.151 | 0.003 |

Table 2.1 reveals the following:

1. The stepwise regression resulted into only one statistically significant model with only one significant factor acting as agent of economic growth in the economy. The model considered domestic investment as a factor explaining the growth in per capita GDP in Portugal over the period 1971-2009.
2. Higher and more productive domestic investment would lead to higher economic rate of growth in an economy. This depiction is seen in the results from table 2.1 where a one percent increase in domestic investment in Portugal enhances the per capita GDP by 0.407 percentage points. This would mean that the membership of EU has elevated the productive capacity of its domestic investment.
3. However, the results of the stepwise regression do not show EU2 as a factor explaining the rate of growth in the Portuguese economy. The earlier positive and statistically significant effect of EU membership is wiped out during the process of stepwise regression analysis. This may mean that the membership of EU, indeed, has helped the Portuguese economy to growth during 1971-2009; but has not acted as a driver of economic growth in the country.

## SPAIN

The three years of the First World War saw the Spanish economy in shatters. The problem of reconstruction was alarming when the hostilities ceased in 1939. Only a few months had gone by when the Second World War broke out and by the end of World War II in 1945, Spanish economy showed no optimism in an early return to normality or any easy solutions for its problems. World War as well as the Spanish Civil War (1936 - 1939) disturbed the early industrialization process in Spain. The period from 1939 – 1958 in Spain was characterized by the principles of autarky where self-sufficiency, great degree of state intervention and protection were called for.

This kind of economically closed policy was initially adopted by the government of Spain as a result of the isolation in which it found itself during the Second World War. Such autarkic policies were implemented even after 1945, because of the political and economic boycott of Spain by the countries of United Nations. Such protectionist policies, adopted by the then government, had adverse impact on the process of industrialization in Spain. When, after the Second World War, the Western European nations were seeking aid from the United States through the Marshall Plan, the Spanish government perceived its own plans of autarky and did not participate in the Marshall Plan. This non-participation, once again, led to isolation of the Spanish economy from other West European nations. This self-sufficiency generated a policy of import substitution which required heavy state subsidies for certain industries. At the same time imports were discouraged by heavy duties (Lawlor & Rigby et.al.: 1998, pp. 99-100) and complicated sets of multiple exchange rates were imposed. As a result, contrary to sustainable

economic growth, the economy witnessed very slow rate of growth from 1940 to 1950 (Report on The Economic Development of Spain: 1963; and Neal: 2007, p. 363). In order to improve the situation of the economy, economic loan and aid was received from the United States in 1951[43] and subsequently aid followed in 1953 from the Pact of Madrid. During this same time, the government started the process of industrialization. However, this industrialization process was highly controlled and regulated by the government which led to escalation of foreign trade deficits. The growing trade deficits, in turn, pressurized the reserves with the Central Bank; constraining the country's economic strategy (Neal: 2007). Hence, by the end of 1958, it was evident that drastic measures were needed to raise the Spanish economy from rubbles.

The most important step towards economic growth and integration in Spain was in the form of the Stabilization program of 1959 in cooperation with the OEEC and the IMF. The *Plan de Estabilización y Liberalización* or the Stabilization Plan was the basis for developing the Spanish economy. The objective of this Plan was to prepare the Spanish economy for subsequent development by stabilizing the prices and opening up the economy to foreign trade, migration, and capital movement (Lawlor, et.al.: 1998). Under this Plan, the local currency (peseta) was devalued, restrictions were imposed on both public and private spending, and a program of trade liberalization was adopted, according to the standards set by the OEEC (Report on The

[43] This resulted in the bilateral economic and defense agreements signed between Spain and the United States in 1953, providing aid in exchange for the establishment of the US military base in Spain (Lawlor & Rigby et.al. : 1998).

Economic Development of Spain: 1963). Spain became a member of the OEEC on 20th July 1959 and this marked the end of Spanish isolation from other European countries and opened the gate for a free economy based on international trade and economic cooperation. This liberalization process helped Spain in importing plant and machinery and thereby boosting the modernization of its industries. Spain's growth was now directed towards manufacturing (which was soon taken over by services) sector. With the expansion in trade, investment increased especially in the ever expanding exports sector. Modern industries of Spain during 1960s acted as the engines of early economic progress of the economy. A shift in the labor force from agriculture to industry was observed over a decade from 1961 to 1970; with improvement in the productivity levels. However, 'relatively little of the labor went into manufacturing, due to the regime's maintenance of restrictive controls on the industrial labor force' (Neal: 2007, p. 367). It can, therefore, be said that the increased output in the industrial sector, then, was mainly because of the increase in capital and productivity. Technology, too, played a crucial role in transiting the Spanish economy from autarky to expanded reproduction (Roman: 1997). "As a technologically backward country bent on modernization, imports of capital goods from industrially advanced countries allowed Spanish industry to raise the average level of labor productivity in order to improve its international competitiveness" (Roman: 1997, p. 116). "From 1960 on Spain shared in the general 'golden age' of economic growth experienced by the OECD countries generally…" (Neal: 2007, p. 364-365).

This Stabilization Plan was followed by a series of Development Plans (1964-67, 1968-71, and 1972-75) which were based on the French model[44].

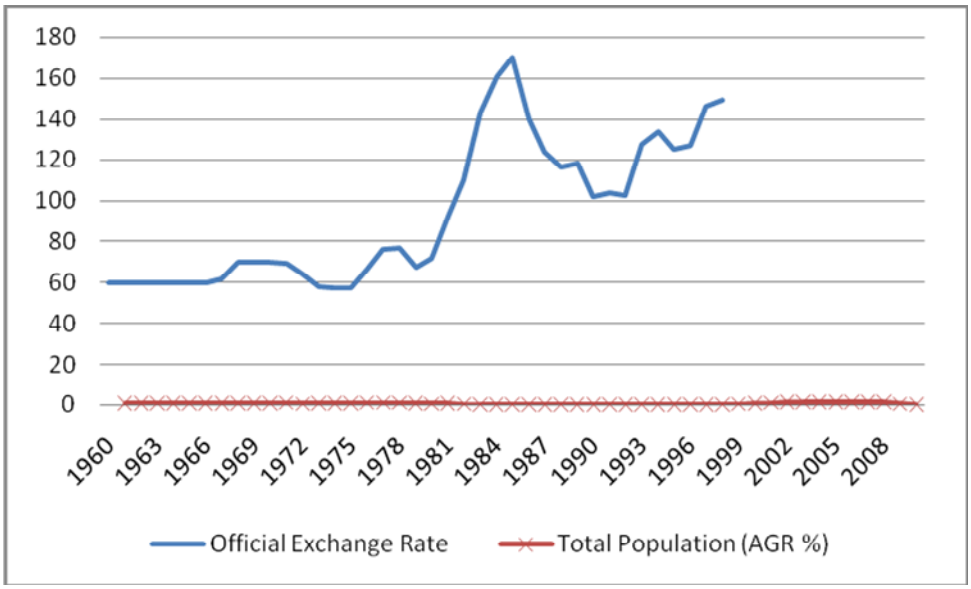
The period between 1961 and 1973 in Spain is often referred to as the *despegue economic* or economic take-off when the economy grew at an average real growth of 7% per year (Lawlor, et.al.: 1998) and vigorous industrialization started taking place. Such spectacular growth was made possible only by opening the Spanish economy under the Stabilization Plan – which resulted in the growth of Spanish exports. During this period, in 1970, Spain signed the preferential trade agreement with the then European Economic Community. This resulted in closer association with other European countries and alleviating the Spanish economy to the levels of these European countries. Industrial development is essentially, not only for the rapid growth of the economy, but also for significant progress toward increasing employment. In a report presented on the Economic Development of Spain to the IBRD in 1963 stated:

*The closer association of Spain with the economies of Western Europe and other areas that has been taking place since 1959, and Spain's recent decision to seek association with the Common Market, present industry with a new opportunity and a new challenge: the opportunity, to gain access to vast new markets on which a broader expansion can be based; the challenge, to meet*

[44] The main focus of these plans was to correct regional imbalance by relocating the industry outside the industrialized areas of Madrid, Barcelona, and Bilbao. The success of these plans, however, was only limited because of the short term time frame for implementation, insufficient finance to fund all the measures, among other political reasons.

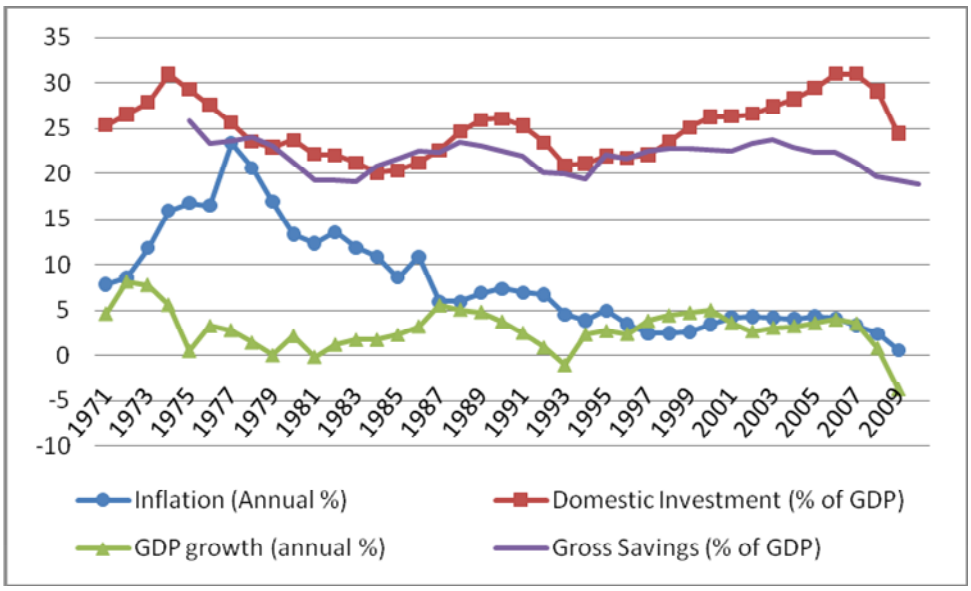
*the competition, both in these markets and within Spain itself, of European industries which are more advanced technically than those of Spain.*

**Figure: S-1**



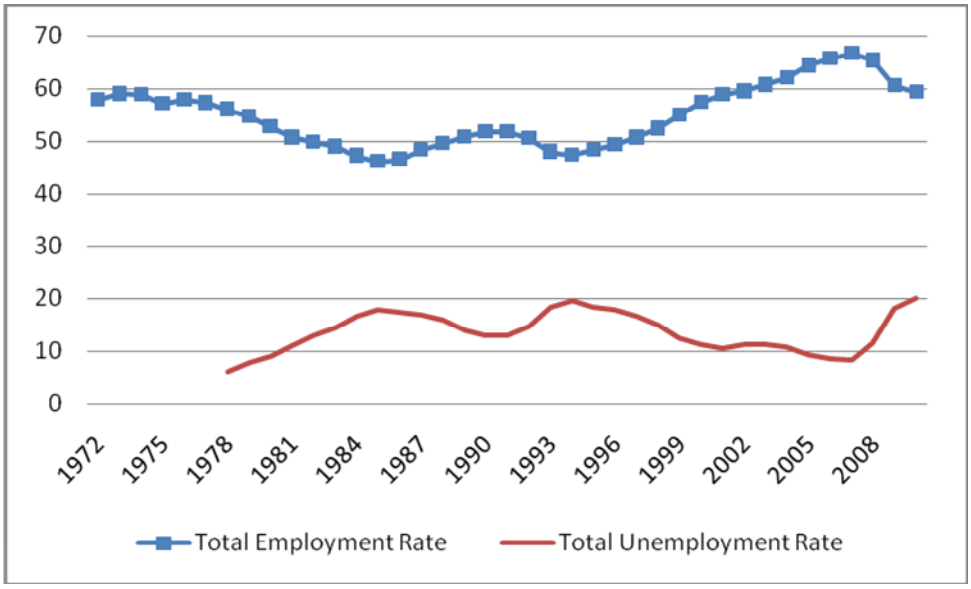

*Source: Author's Calculation, Absolute figure from World Development Indicators, World Bank*

**Figure: S-2**



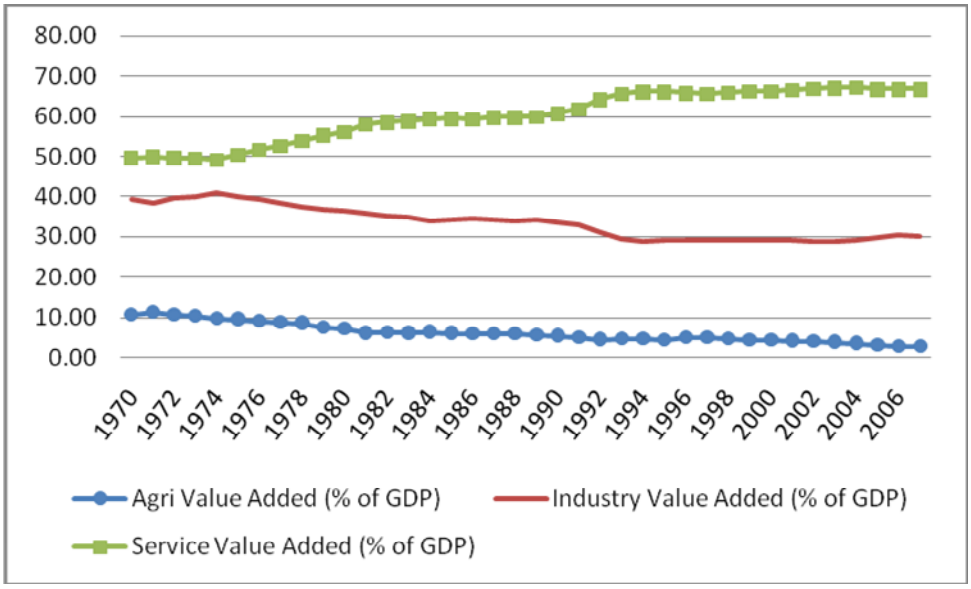

*Source: World Development Indicators, World Bank*

## Figure: S-3



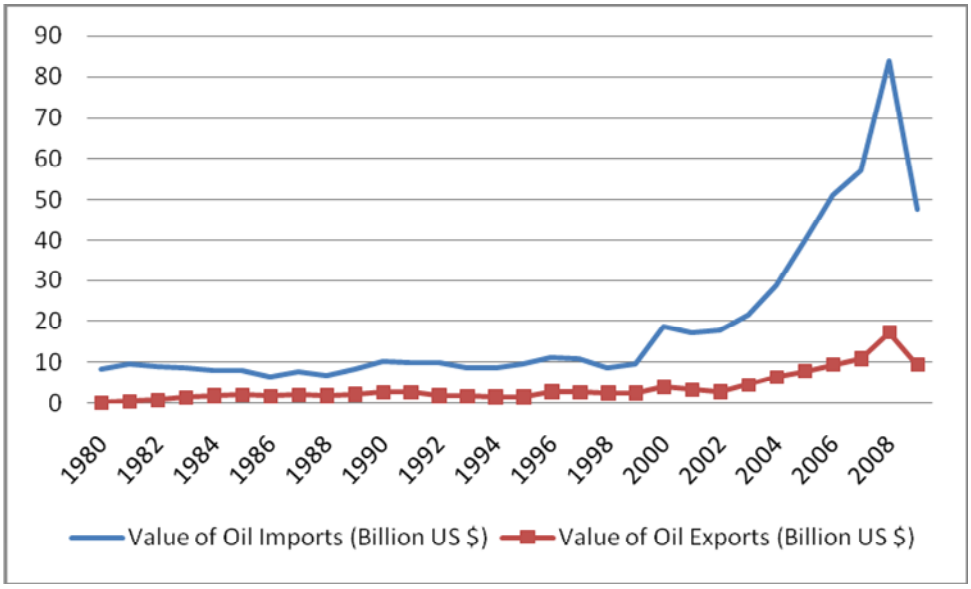

*Source: OECD Factbook 2009 & 2011-112*

## Figure: S-4



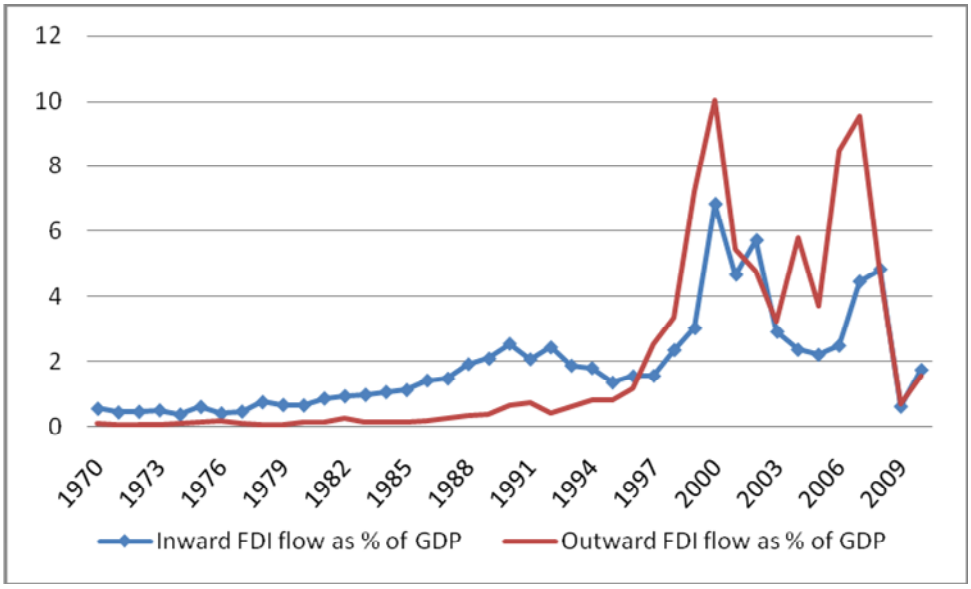

*Source: World Development Indicators 2009, The World Bank*

## Figure: S-5



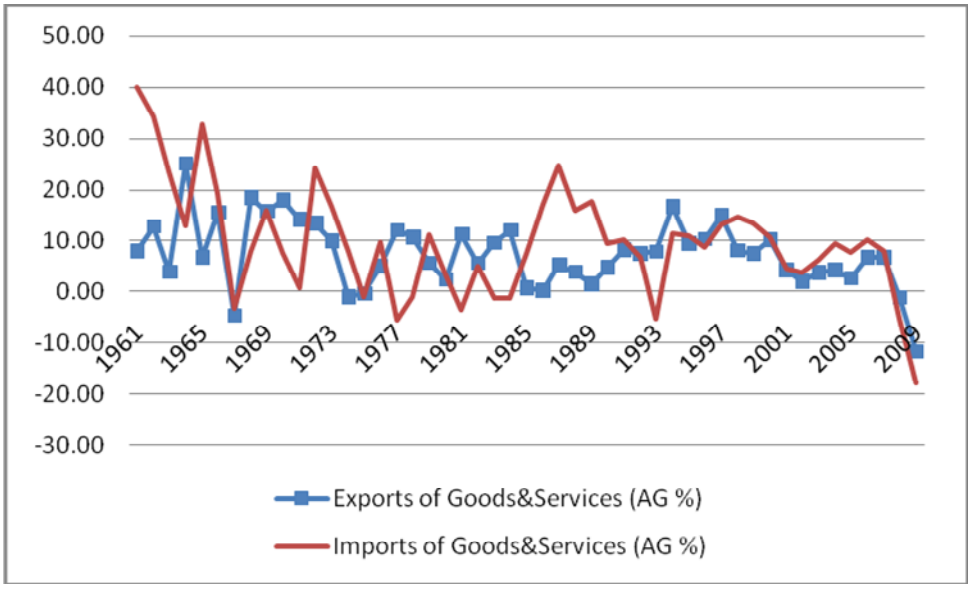

*Source: World Economic Outlook Database, Sept 2011, IMF*

## Figure: S-6



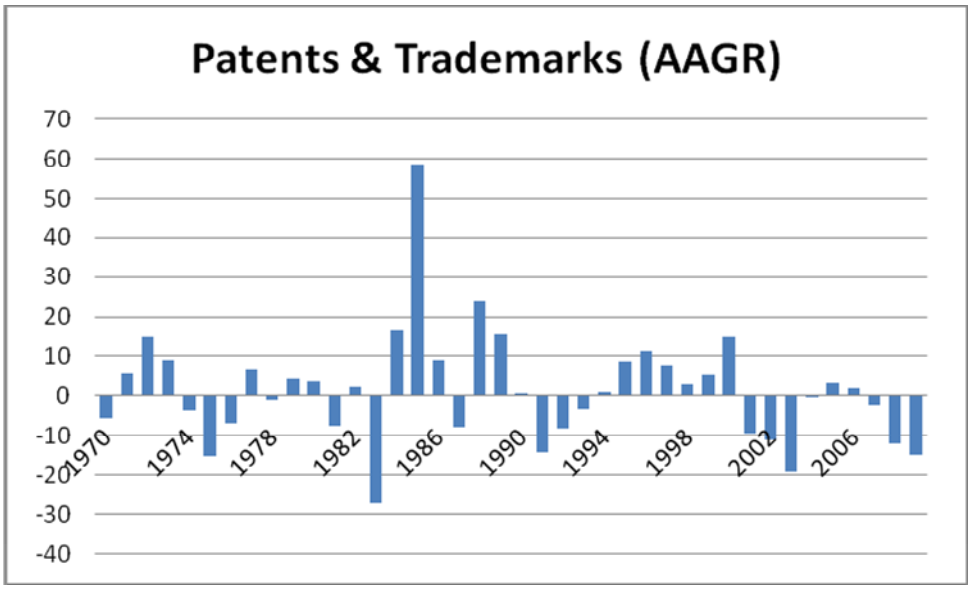

*Source: UNCTAD*

**Figure: S-7**




*Source: Author's Calculations, Absolute figures from World Bank national accounts data, and OECD National Accounts data files.*

**Figure: S-8**




*Source: WIPO*

The year 1973 came with a disheartening recession in many of the European countries because of the oil shock. After a decade of such impressive growth, the Spanish economy was hit hard by the oil crisis of 1973. This fact is observant from Figure 2 where the 7.79% growth in GDP during 1973 declined to 0.54% in 1975. For an economy which was excessively dependent on oil for energy, the impact of the 1973 oil crisis was severe. Lawlor, et.al. (1998) pointed that the impact of oil crisis was observed in the fact that external revenue of Spain dropped as a result of the recession in Europe and the balance of payments went into deficit; tourism – the most important sector of the country - was adversely affected; inward foreign investment slowed; and job cuts forced many emigrant workers to return to Spain. Recession in the industry during 1975 to 1985 was mainly because of the oil crisis and Spain's heavy dependence on the imported energy resources for her industries. Thus, before entering the EC in 1986, major restructuring of the economy had already taken place, despite of the authoritarian political regime of Franco. Spain, however, did not react promptly to this crisis because of an underestimation of the level of impact which the oil crisis would have and the crisis coincided with the last days of Franco and the disintegration of the political regime (Lawlor, et.al.:1998). And this led to an ever-increasing external deficit and reduction in the foreign inward investments (see Figure 6).

The decade between 1975 and 1985, following the death of Franco in 1975, was a period of political and social changes in Spain. The restructuring of the Spanish economy in the post-Franco period observed an erratic economic growth paths accompanied by short recessionary period during 1981. After

Franco's death in 1975, Spain's constitution was revised, yet, it lacked many of the strong institutions needed to govern the country effectively. In terms of policy making, Spain was 'a market taker rather than a market maker' (Gillingham: 2003). Labor costs increased during 1974-78, leading to a rise in the inflation rate in the country during 1977. It can be seen in Figure 2 that the inflation rate in Spain stayed at more than 20% during 1977-1978. However, Roman (1997) believes that the root cause of the rising real unit labor costs in industry is found in the declining productivity after 1973 and the stronger than average increases in wages. The Moncloa Pact was introduced by the democratic government in 1977. It was intended to bring down the high inflation rates and produce labor and political stability. According to the European Union historian, Gillingham, the so called Moncloa Pact provided "rituals of concentration to the process of democratic consolidation", making it possible to attain labor peace by preventing strikes and imposing wage reductions. This tunneled the way in reducing the high rates of inflation. The success of the Moncloa Pact can be observed in Figure 2 which shows the fall in the inflation rate after 1978. By 1985, the 23.38% inflation of 1977 was reduced to 8.59%. This Pact, according to Gillingham, however, was a bad bargain from the economic view point as it overpaid few of the workers at the expense of the many resulting in high levels of official unemployment in the economy. As a result the Pact had to be descended in 1986[45].

Spain still was excessively dependent on oil imports, and the second oil crisis of 1978 hit the Spanish economy hard. Its key industries – iron and steel, ship-building, and cement – were affected the most as they were all energy-

[45] For details on Moncloa Pact see Gilliangham: 2003.

intensive industries. Structural problems of earlier decades were yet not addressed and hence recovery from such crisis took a very long time. In 1982, economy's growth rate trimmed and inflation and unemployment rate increased to 13%. By 1983 growth in the economy regained its pace. This was because of the implementation of the Medium-term Economic program by the Spanish government from 1984 to 1988. From 1984-1988 the Spanish economy's GDP grew from 1.78% to 5.09%. Savings as well as domestic investment rates showed an increase (see Figure 2). However, the high rate of unemployment was the only macroeconomic problem which still remained to be tackled (see Figure 3). Gillingham (2003), however, feels that the high inflation rates were brought down by the Spanish government at the cost of crippling unemployment. The government policy of mid-1980s kept the interest rates extraordinarily high, overvaluing the peseta. This forced shutting down of the uncompetitive industries thereby channeling the investment into new sectors and increasing the value of financial assets. The European Union economic historian Gillingham, called this policy '…a daring, even ruthless policy of induced creative destruction." (p. 211). However, the policy showed devastating results – high unemployment and devaluation of local currency (see Figure 1). Unemployment rates remained as high as more than 13% and even 17% during 1985-1986.

By 1986 Spain became a full-fledged member of the European Community, which opened the doors for foreign inward investment in the economy, thereby recovering the economy from the melancholy of the early 1980s. Spain would have entered the EC before 1986, 'had the Mitterand not blocked' it in order to 'prevent dilution of French power' (Gillingham: 2003). Membership

into the European Community marked the beginning of a period of harmonization and adaptations (Lawlor et.al.: 1998) through which major restructuring process was undertaken. However, the highly protected Spanish industry was now facing the challenges of an open, competitive market since its accession in the EC in 1986. The high tariff rates and quotas which were protecting the domestic industry of Spain were now dismantled. With an overall improvement in the economy and the flow of foreign investment in the economy, industrial production grew during 1985-1990.

By the end of the seven year transition period in 1992, the Spanish economy showed signs of growth. By this time the Single European Act was enacted directing the removal of non-tariff barriers, thus, moving the Spanish economy from one phase to another in the process of liberalization. Nevertheless, towards the end of 1992, the economy again entered a recession phase – which lasted till the end of 1993. As a result, GDP growth in 1993 was -1.03% and savings and domestic investment rates declined (see Figure 2). Furthermore, German reunification and the opening of the Eastern Europe diverted much of foreign investment to these newly developing areas. This led to further worsening of the recession in Spain – because of shrinking inward foreign investment (see Figure 6). Following three years (i.e. from 1990 to 1993) the industrial output in Spain declined as a result of increasing real unit labor costs, reduced competitiveness and declining exports (as a result of appreciation of peseta in the international sphere) (Lawlor et.al.: 1998). Industrial growth rate, however, started to grow from 1994. Nonetheless, by 1995, this gloomy picture of the economy was showing some signs of

sanguinity. Once again the growth rate of GDP picked up its pace and stood at 5.05% in 2000.

Since then the GDP growth in Spain dipped only to recover back in 2003. Since then the growth rate in terms of GDP has been increasing till 2007. Gross savings in the Spanish economy remained almost stable while the rate of domestic investment escalated. Inflation rate, however, remained above 4% level from 2001-2006. The Spanish economy once again entered into a recessionary phase during 2009 (see Figure 2). Employment rates in the economy increased along with very high levels of unemployment rates. It can be observed from Figure 3 that the unemployment rates in Spain remained as high as more than 10% during 2000-2004. During 2005-2007, unemployment rates dipped still remaining high and it again soared and stood at 20.1% at the end of the decade (see Figure 3). Agriculture value added in the economy declined while contribution from the services' sector remained almost stable. Industrial value added declined in comparison to the pre-EU accession period because of the existence of large numbers of small and medium sized firms in the economy. Other reasons for declining value added by the industrial sector are the rigid labor market and increased labor costs, low levels of domestic investment in research and development, and high dependence on foreign investment in technology. Yet, the value added by the industrial sector remained at more than 30% by the end of the decade (see Figure 4). Inflow of foreign investment declined till 2006 and almost doubled during the next two years. However, 2009 showed a steep decline in FDI inflows (see Figure 6). Growth in exports and imports of goods and services declined and became negative during 2008-2009 (see Figure 7). Moreover,

balance of payments problem was aggravated by the steep rise in the value of oil imports (Figure 5). Hence, the impressive economic performance of the early years of the 2000s turned depressing by the end of the decade.

## Economic Growth in Spain – An Empirical Analysis

To analyze and understand which factors explain the economic growth in Spain for the period 1971-2009, the following linear regression model is estimated using the selected variables mentioned in chapter 1:

$$(GDPpc) = B_0 + B_1(Invt) + B_2(SSER) + B_3(Open) + B_4(PT) + B_5(Govt) + B_6(FDI) + e \quad \text{.....(1)}$$

The results of the regression estimation of the above equation is shown in table 1

**Table: S-1**

**Model with all variables for 1971-2009**

| Variables | B | t-Stat | p-Value | Regression Statistics | |
|---|---|---|---|---|---|
| Constant | 8.164 | 1.842 | 0.075 | R | 0.664 |
| Invt | 0.017 | 0.133 | 0.895 | R Square | 0.440 |
| | | | | Adjusted R | |
| SSER | 0.137 | 1.894 | 0.067 | Square | 0.336 |
| Open | 0.003 | 0.044 | 0.965 | Standard Error | 1.880 |
| PT | 0.050 | 2.128 | 0.041 | F | 4.198 |
| Govt | -1.306 | -2.734 | 0.010 | Significance F | 0.003 |
| FDI | 0.299 | 0.925 | 0.362 | | |

It can be observed from table 1 that:

1. Domestic investment has a positive and statistically insignificant effect on the rate of growth of per capita GDP in Spain over the period 1971-2009. A one percent increase in domestic investment in the economy leads to 0.017 percentage points increase in the growth rate of per capita GDP.
2. SSER has positive and statistically insignificant impact upon the growth of per capita GDP in Spain for 1971-2009. A one percent improvement in the human capital in Spain would increase the rate of economic growth of the economy by 0.137 percentage points.
3. The growth in GDP per capita during 1971-2009 was positively affected by the openness of the economy. A one percent increase in the economy's total trade as percentage of GDP would improve the growth of per capita GDP by 0.003 percentage points. However, this result was found to be statistically insignificant.
4. Improvement in the growth rate of numbers of patents and trademarks showed positive and statistically significant effect on growth of GDP per capita over the period 1971-2009 for the Spanish economy. A one percent increase in the growth of number of patents and trademarks would increase the growth rate of per capita GDP by 0.50 percentage points.
5. Government consumption, as per the existing economic literature, tends to reduce the growth in an economy. The results in Table: 1 affirms this hypothesis as an increase in government consumption by one percent reduces the growth of per capita GDP by 1.306 percentage points. Moreover, this result is found to be statistically significant.

6. Inflow of foreign investment into the Spanish economy from 1971-2009 has assisted the growth of GDP per capita in the economy by 0.299 percentage points. However, it is found to be statistically insignificant.

Furthermore, in order to analyze which factor/s among the other selected ones have acted as drivers of economic growth in Spain, during the period 1971-2009, the above equation (1) is estimated using stepwise regression. This regression technique would facilitate in removing the unnecessary variables creating traffic and would emphasize only those factors that have worked upon to improve the economic growth of the Spanish economy. The results are depicted in table 2

**Table: S- 1.1**

**Stepwise Regressions on Per Capita GDP for 1971-2009**

| Regression Model | Variables | R2 | Adj R2 | F-Value | p-Value |
|---|---|---|---|---|---|
| 1 | Govt | 0.158 | 0.135 | 6.926 | 0.012 |
| 2 | Govt, SSER | 0.334 | 0.297 | 9.030 | 0.001 |
| 3 | Govt, SSER, PT | 0.414 | 0.363 | 8.229 | 0.000 |

**Significance of Coefficients for final model**

| Variables | B | t-Stat | p-Value |
|---|---|---|---|
| Constant | 8.122 | 4.497 | 0.000 |
| Govt | -1.476 | -3.504 | 0.001 |
| SSER | 0.177 | 2.929 | 0.006 |
| PT | 0.046 | 2.179 | 0.036 |

Table 1.1 reveals the following:

1. The stepwise regression resulted into three different statistically significant models. The first model considered government consumption as a factor explaining economic growth in Spain over the period 1971-2009. The second equation considered SSER along with government consumption, while the third equation included the growth in number of total patents and trademarks in model two as factors explaining economic growth in Spain over the period 1971-2009.
2. Government consumption depicts a result which is in accordance with the existing economic literature which states that government consumption has a negative impact on the rate of economic growth of a nation. An increase of 1% in government consumption in the Spanish economy during 1971-2009 would deteriorate the rate of growth of GDP per capita by 1.476 percentage points. Moreover, this result is found statistically significant.
3. SSER is showing a positive and statistically significant effect upon the rate of growth of GDP per capita for the period 1971-2009. It may thus be inferred that improvement in human capital is indeed improving the process of economic growth in the Spanish economy. In fact an increase in SSER by 1% increases the growth of per capita GDP by 0.177 percentage points. This result falls in line with the existing economic literature that states a positive relation between SSER and growth rate of GDP per capita.
4. Growth in total patents and trademarks, according to the economic literature, has a positive effect on the economic growth rate of an

economy. Improved technology would aid in the process of economic growth of an economy. This depiction is seen in the results from table 1.1 where a one percent increase in the growth rate of total patents and trademarks in Spain elevates the per capita GDP by 0.046 percentage points.

Further, in order to analyze the impact from the membership of European Union on the Spanish economy, equation (1) is now estimated with the introduction of a dummy (EU2). This dummy variable is intended to explain the impact from integration into the EU in the Spanish economy. In view of this, the equation (1) can now be written as:

$$(GDPpc) = B_0 + B_1(Invt) + B_2(SSER) + B_3(Open) + B_4(PT) + B_5(Govt) + B_6(FDI) + B_7(EU2) + e \quad \text{.....(2)}$$

Equation (2) is then estimated through stepwise regression. This would demonstrate the factors that have acted as drivers of economic growth in the Spanish economy during 1971-2009, especially after entering into the European Union. Moreover, this would aid in comparing the economic performance of the Spanish economy pre-EU and post-EU membership. The results of regression equation (2) are shown in table 2 and table 2.1.

**Table: S- 2**

**Model with all variables including dummy (EU2) for 1971-2009**

| Variables | B | t-Stat | p-Value | Regression Statistics | |
|---|---|---|---|---|---|
| Constant | 21.456 | 5.502 | 0.000 | R | 0.854 |
| Invt | -0.163 | -1.684 | 0102 | R Square | 0.728 |
| | | | | Adjusted R | |
| SSER | -0.081 | -1.275 | 0.212 | Square | 0.667 |
| Open | 0.121 | 2.516 | 0.017 | Standard Error | 1.33 |
| PT | 0.047 | 2.834 | 0.008 | F | 11.881 |
| Govt | -10.17 | -2.977 | 0.006 | Significance F | 0.000 |
| FDI | -0.129 | -0.538 | 0.594 | | |
| EU2 | 6.368 | 5.734 | 0.000 | | |

**Table: S- 2.1**

**Stepwise Regressions on Per Capita GDP for 1971-2009 with Dummy**

| Regression Model | Variables | R2 | Adj R2 | F-Value | p-Value |
|---|---|---|---|---|---|
| 1 | Govt | 0.158 | 0.135 | 6.926 | 0.012 |
| 2 | Govt, EU2 | 0.546 | 0.521 | 21.678 | 0.000 |
| 3 | Govt, EU2, PT | 0.664 | 0.635 | 23.034 | 0.000 |

**Significance of Coefficients for final model**

| Variables | B | t-Stat | p-Value |
|---|---|---|---|
| Constant | 15.219 | 8.096 | 0.000 |
| Govt | -1.034 | -7.247 | 0.000 |
| EU2 | 5.199 | 6.403 | 0.000 |
| PT | 0.056 | 3.497 | 0.001 |

Table 2 reveals the following:

1. Domestic investment has a negative and statistically insignificant effect on the rate of growth of per capita GDP in Spain over the period 1971-2009. A one percent increase in domestic investment in the economy leads to 0.163 percentage points reduction in the growth rate of per capita GDP. This result is in sharp contrast to the economic literature on economic growth.
2. SSER has negative and statistically insignificant impact upon the growth of per capita GDP in Spain for 1971-2009. A one percent improvement in the human capital in Spain would impair the rate of economic growth of the economy by 0.081 percentage points. This result, however, casts doubts from the theoretical view point.
3. The growth in GDP per capita during 1971-2009 was positively affected by the openness of the economy. A one percent increase in the economy's total trade as percentage of GDP would improve the growth of per capita GDP by 0.121 percentage points. Moreover, this result was found to be statistically significant.
4. Increment in the growth rate of numbers of patents and trademarks showed positive and statistically significant effect on growth of GDP per capita over the period 1971-2009 for the Spanish economy. A one percent increase in the growth of number of patents and trademarks would increase the growth rate of per capita GDP by 0.047 percentage points.
5. Government consumption, as per the existing economic literature, tends to reduce the growth in an economy. The results in Table: 2 affirm this hypothesis as an increase in government consumption by one percent

reduces the growth of per capita GDP by 1.017 percentage points. Moreover, this result is found to be statistically significant.

6. Inflow of foreign investment into the Spanish economy from 1971-2009 has impaired the growth of GDP per capita in the economy by 0.129 percentage points. However, it is found to be statistically insignificant.
7. The membership of the European Union is a significant factor in explaining the economic growth in the Spanish economy since 1971. It can be seen from table 2 that the membership of the EU (the coefficient of EU2) is statistically highly significant. Spanish's membership in the EU raises the economic rate of growth of the economy by 6.368 percentage points.

Table 2.1 depicts the following:

1. The stepwise regression resulted into three different statistically significant models. The first model considered government consumption as a factor explaining economic growth in Spain over the period 1971-2009. The second equation considered government consumption and EU2 as drivers of economic growth in Spain. While, the third equation considered government consumption, EU2 and growth in total number of patents and trademarks as factors explaining economic growth in Spain during the period 1971-2009. However, SSER is no more considered as a driving force to economic growth after the membership in the EU.
2. Government consumption depicts a result which asserts with the economic literature which states that government consumption has a negative impact on the economic growth of an economy. An increase of 1% in government consumption in Spain would decrease the growth rate of GDP per capita by 1.034 percentage points. Moreover, this result is found to be

statistically significant. Nonetheless, the negative impact of government consumption in Spain after its membership in the EU has trimmed.

3. European Union plays a vital role in elevating the economic growth of Spain. The membership of the EU has had a positive effect on the growth rate of the Spanish economy. This can be seen from table 2.1, since its membership in the EU in 1986, the Spanish economy has grown by 5.199 percentage points.
4. Technological advancements, according to the literature on economic growth, have a positive impact on the rate of economic growth of any economy. The results of the regression in table 2.1 affirm the theory of economic growth which establishes a positive relation between the rate of economic growth and technological advancements. It can be observed from table 2.1 that 0.056 percentage points of growth in per capita GDP over 1971-2009 in Spain is the result of technological advancements. The significance of technology as a driver of economic growth in Spain, after its membership in the EU, has enhanced.

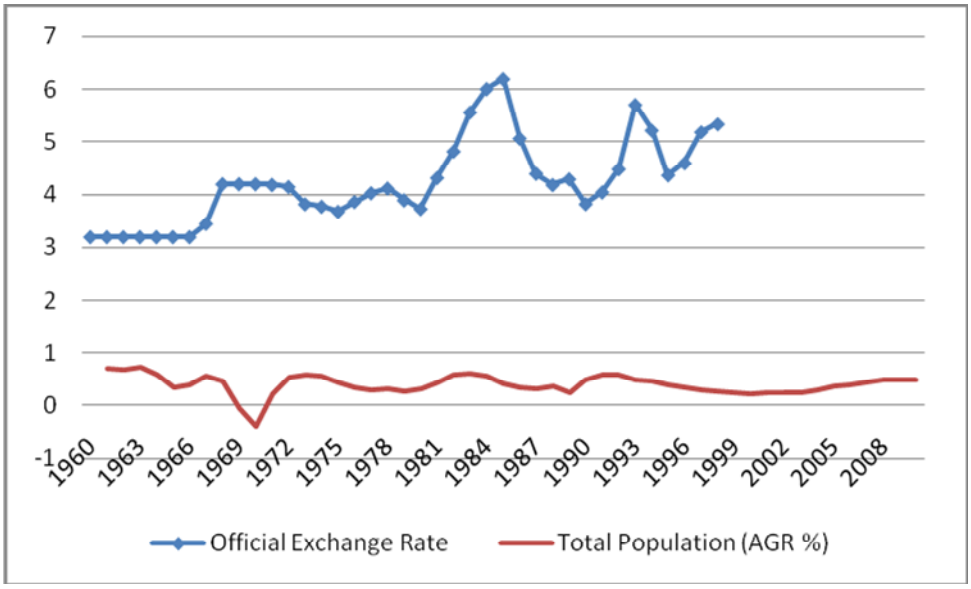
## FINLAND

By the end of the Second World War, Finland's productive units were in great despair with poor availability of raw material. Finland was crippled by the loss caused due to World War II. Despite of the crisis caused by the war, Finland progressively reformed her domestic industries. Since then, Finland has been enjoying a steady growth path.

The Finnish government eschewed from the Marshall aid (predominantly because of the then prevalent political situation). On the contrary, the Finns opted for a bilateral trade agreement with the Soviet Union in 1947 (which ended in 1991 with the fall of the Soviet Union). In 1948, Finland became a member of the World Bank and the International Monetary Fund (IMF), and in 1950 a member of the General Agreement on Tariffs and Trade (GATT). Membership of these international institutions led to the liberalization of the Finnish economy. By the end of the 1950s, many of the tariff barriers and import restrictions were eased. Governmental policies provided for a favorable ground for investment which led to the high rates of domestic investment in the economy (investment rates in the economy remained high until the end of the 1980s). It can be observed from Figure 2 that the rates of domestic investment in the economy fluctuated somewhere between more than 22% to more than 30% during 1971-1989. Finland signed an agreement with the European Free Trade Agreement (EFTA) area in 1961 – which popularly came to be known as the *Finnefta*. Finland's liberalization provided her with a vast Soviet as well as the West European markets. Figure 7 shows considerable high rates of growth in terms of exports of goods and services in Finland during the 1960s. The trading patterns with these nations acted as a major

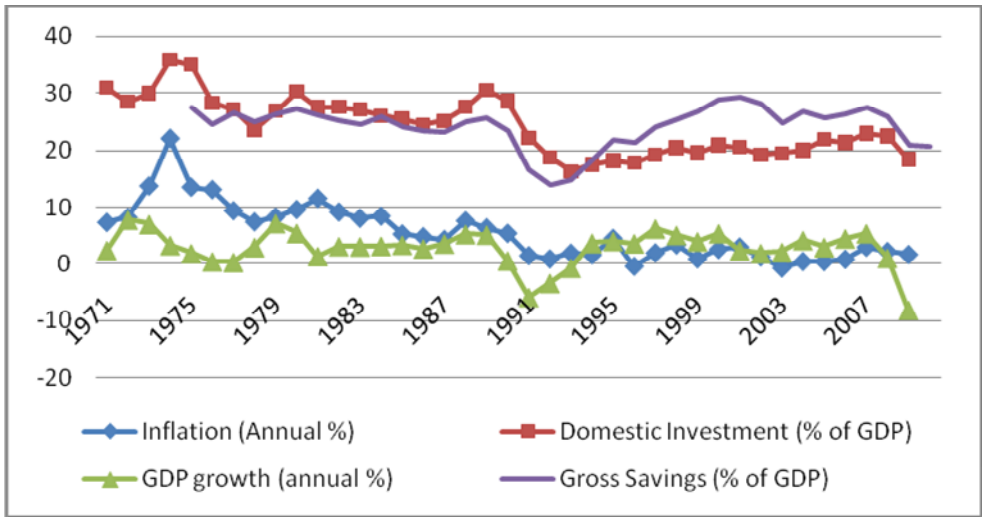
reason in diversifying the industrial structure (especially manufacturing) of the economy. The 1960s economic growth was mainly led by increased labour productivity rather than increased labour inputs. (Hjerpee: 2008).

**Figure: F-1**




*Source: Author's Calculation, Absolute figure from World Development Indicators, World Bank*

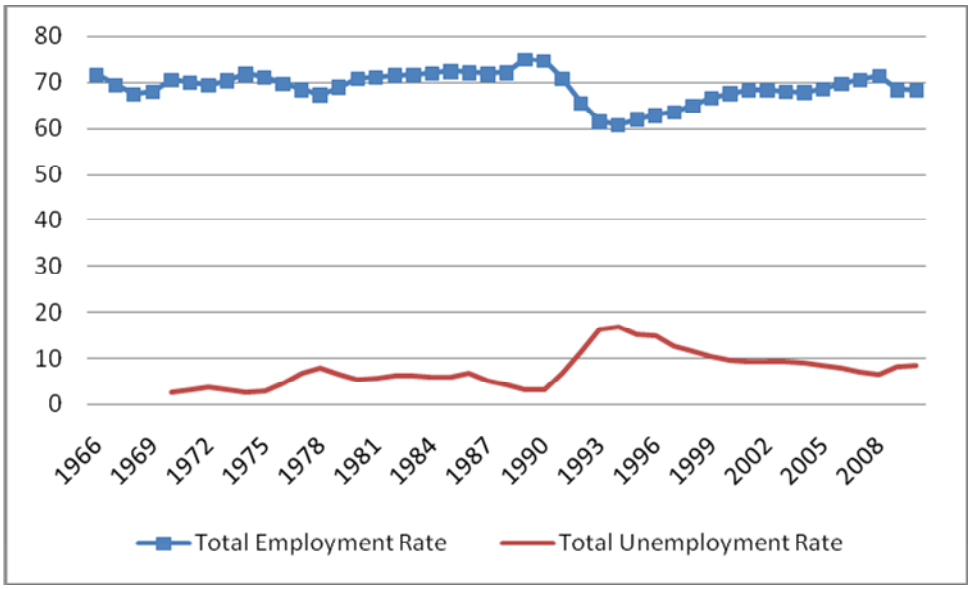
**Figure: F-2**




*Source: World Development Indicators, World Bank*

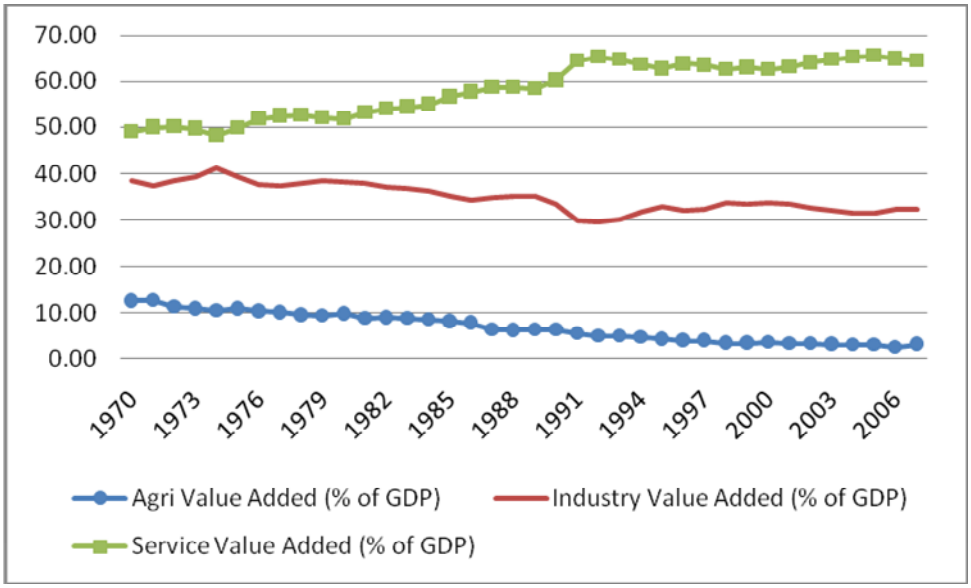
Finland's dependency on the oil imports from the Soviet Union was much high. This meant that the oil crisis of the 1970s would pressurize the economy through increase in the inflation rate coupled with high unemployment rates (as the case with many of the European nations). Nonetheless, the inflation rates especially during the first half of the 1970s remained very high but reduced by the end of the 1970s (see Figure 2). On the other hand, Figure 3 shows that the unemployment rates in the economy stayed low till 1977 and increased only during 1978-1979. Domestic investment and savings remained at higher levels, however, the growth rate of GDP declined till 1977 and recovered soon to be at 7.12% in 1979. Exports of goods and services grew at significant rates during the latter half of the 1970s (see Figure 7) and the domestic currency was continuously appreciated against the US dollar during the decade with a short period of devaluation from 1975-1978 (see Figure 1). This aided in maintaining the balance of payments situation in the economy. However, the energy crisis did not affect Finland the way it affected the rest of the European nations. Finland could easily survive such devastating macroeconomic situation because of the bilateral trade agreements with the Soviet Union.

## Figure: F-3



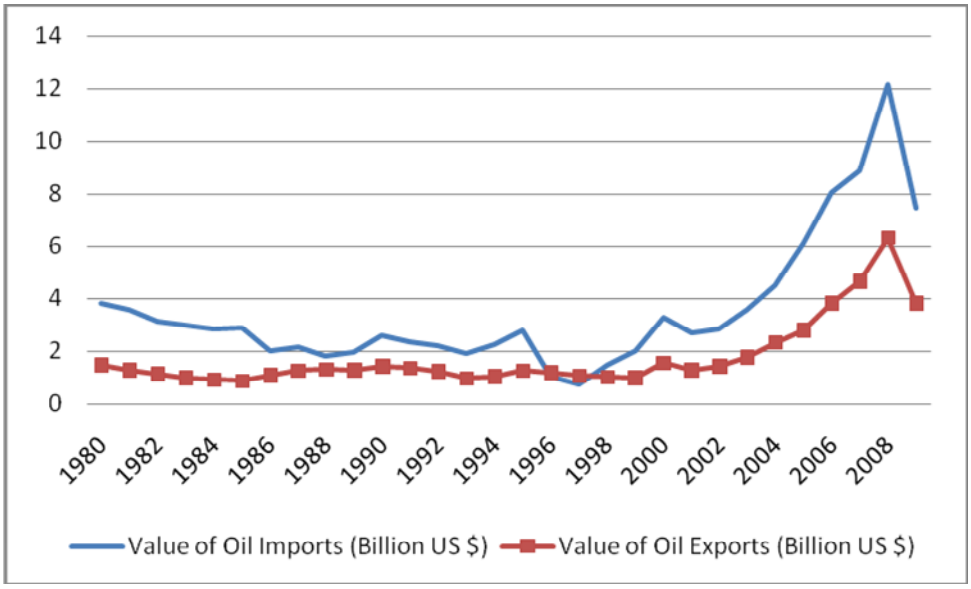

*Source: OECD Factbook 2009 & 2011-112*

## Figure: F-4



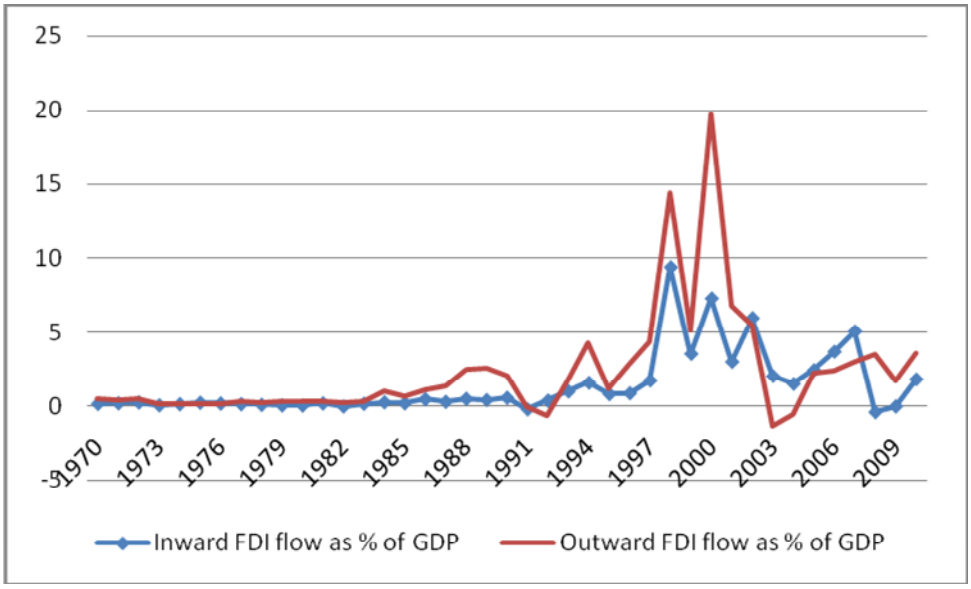

*Source: World Development Indicators 2009, The World Bank*

## Figure: F-5



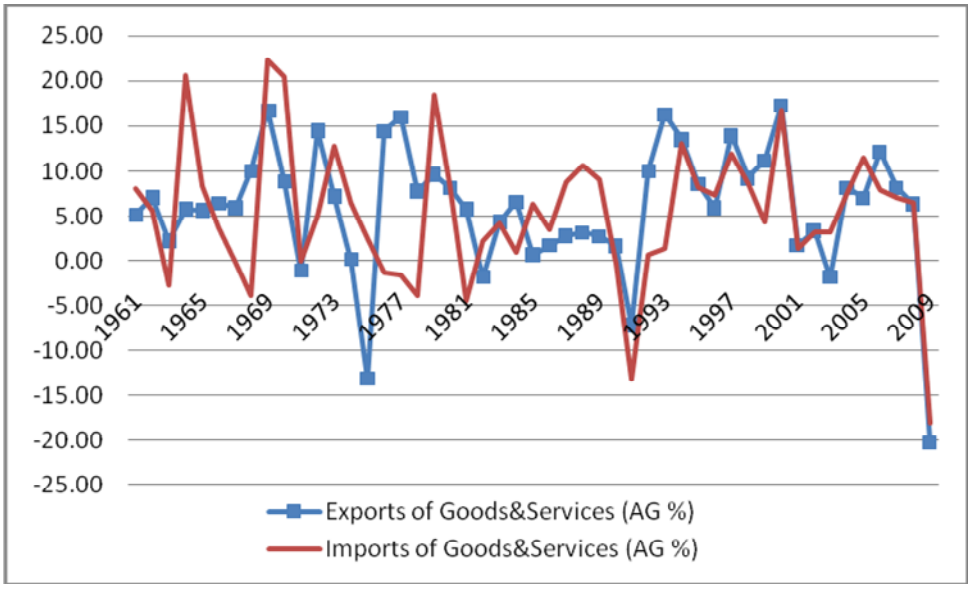

*Source: World Economic Outlook Database, Sept 2011, IMF*

## Figure: F-6



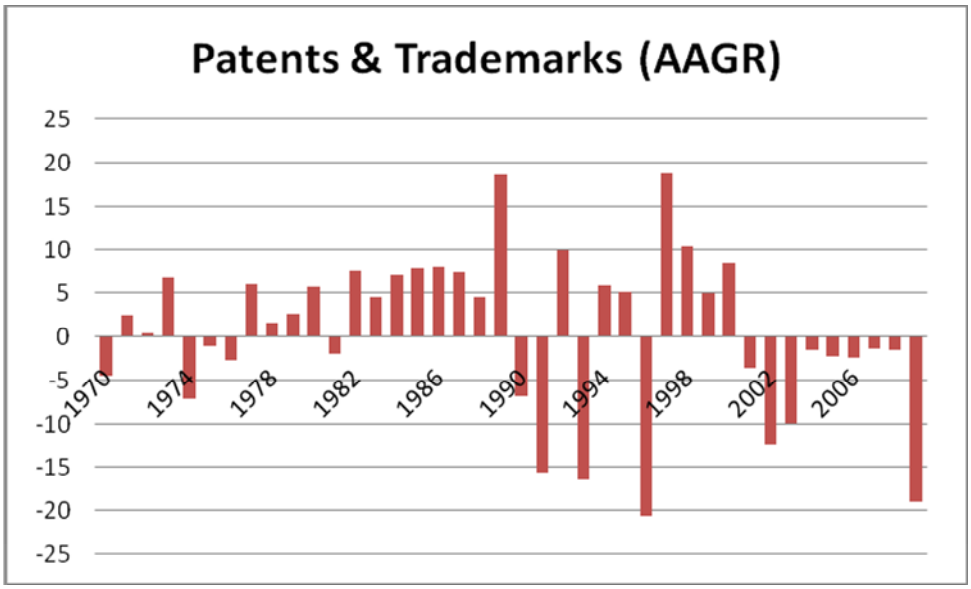

*Source: UNCTAD*

**Figure: F-7**




*Source: Author's Calculations, Absolute figures from World Bank national accounts data, and OECD National Accounts data files.*

**Figure: F-8**




*Source: WIPO*

The economic performance of Finland during the initial years of the 1980s was propitious. Unemployment was observed to remain low (see Figure 3),

with ‘no major indebtedness problems in the external dimension or in the public sector.’ (Honkapohja et.al: 2009). The growth rate in Finland in the 1980s was higher than many of the West European nations. When the West European countries depicted a low and even negative growth in GDP, the growth rate of GDP in Finland during the 1980s was observed, as per Figure 2, to be more than 3% p.a. It can, hence, be said that Finland in the 1980s started catching-up with the other mature economies of West Europe. Domestic investment stayed above 24%, while the inflation rate reduced from a soaring 11% in 1981 to 4% in 1987 (Figure 2). By the end of the 1980s the economic growth in Finland accelerated which led to over-heating in the economy. In fact, the growth in GDP was observed to be more than 5% p.a. during 1988-1989. The factors, as pointed out by Honkapohja et. al. in their book, leading to the boom of the late 1980s are:

1. Deregulation of domestic financial markets and liberalization of international capital flows (i.e. private borrowings from abroad). These liberalization policies were implemented when the domestic interest rates were much higher compared to interest rates in other nations. This led to an explosion of domestic bank credit and large international capital inflows (for detailed analysis on the financial crunch of the late 1980s in Finland, see Honkapohja et. al: 2009, chapter 2).

2. Escalation in terms of trade for Finland resulting from falling energy prices, rising world market prices of forest products and strong business cycle upswings for West European economies and

3. Economic policies – especially the fiscal policy – lacked in stabilizing the aggregate demand in the economy.

This boom led to high inflation rate in the economy. Rates of inflation were 7.65% and 6.39% during 1988 and 1989 respectively. Domestic demand increased which resulted into weakening of the external balance and serious current account problems. As a result domestic currency had to be devalued against the US dollar in the international market. Deregulation in the financial sector increased competition among banks which led to increased risk-taking by the banks. This, however, resulted into increased indebtedness of the private sector. High domestic interest rates compared to foreign interest rates attracted huge capital inflow in the economy. All these factors resulted in increased asset prices. Thus, by the end of the 1980s, Finland started showing sluggish growth rates.

In 1990, economic growth in Finland was only 0.51 percent and the economy entered one of the most severe recessions. Savings and domestic investment rates declined accompanied by high inflation rates (Figure 2), while the growth in exports and imports of goods and services dipped (Figure 7). “By many measures, it was more severe than the depression of the 1930s.” (Honkapohja et. al: 2009, p. 4). The crisis of the 1990s was caused by external factors and inefficiencies in domestic macroeconomic policies. The collapse of the Soviet Union (1990/91) along with the collapse of the bilateral trade agreement with Russia, recession in the West European nations, ‘problems in adjusting to the new liberal order of international capital movement’ (Hjerpee: 2008), and the German reunification were the external shocks which resulted into Finland’s depression. “However, external shocks are not

nearly the whole story. If there had been no additional factors, Finland would have experienced a recession, but not a severe depression." (Honkapohja et. al: 2009, p. 50). The crisis also featured internal factors like the banking crisis (which changed the structure of the financial sector of the economy), high interest rates, the bursting of credit bubble which led to indebtedness on the part of the consumers – this can be observed from the reduced rates of savings in the economy during 1991-1993 (Figure 2). This was accompanied by a boom in the home prices, wage rigidity, high labor costs, and decline in productivity. By 1993, unemployment was soaring high at 16.2% and GDP growth became negative. The major cause of concern during these years was the low investment rates or the capital shortage (see Figure 2).

Finland's recovery from such severe crisis was indeed remarkable. Honkapohja et. al. (2009) attributes the success of the 1990s to macroeconomic policies and political developments, 'which provided economic predictability and stability for the Finnish economy.' Privatization was considered as a key policy as it aided in improving Finnish export performance and attracting valuable foreign capital. The membership of the EU in 1995 was a major breakthrough in the process of liberalizing the Finnish economy. Since then the structure of the Finnish economy had changed from a traditional industrial country to a high-technology economy. The contribution of the industry and services' sectors, in terms of value added, in the economy increased (Figure 4). Financial system, which was tightly regulated in the first half of the 1980s, has been liberalized (market-based), and well integrated in line with other West European financial systems. Since 1994, Finnish economy has shown signs of improvement. The balance of payments, which

was a major concern for the economy until 1990, started showing signs of improvement.

The resources which remained idle during the period of crisis were reallocated and diverted towards more productive units. Finland's GDP per capita also started increasing since the mid 1990s. One of the major factors leading to such profound growth rates in Finland, as identified by many economists (Maliranta: 2003, Böckerman & Maliranta: 2007, Honkapohja et.al: 2009), was labor productivity. "One of the key factors in the growth of labor productivity in Finland during 1994-2003", along with efficient use of inputs and technological progress, "is an increase in the skill level of the labor force." (Honkapohja et.al: 2009, p. 75). The Finnish economy during the 1990s became a high-tech economy. Figure 8 shows a remarkable increase in the growth of number of patents and trademarks in the economy during the late 1990s. Finland now leads the world market of foreign trade in communication (ICT) goods. The major contribution in this sector comes from one company named Nokia.

Finland's accession to the European Union in 1995 and joining of the common currency boosted the openness of the economy to high levels (Neal: 2007). As a result the growth in exports and imports of goods and services showed a significant increase (Figure 7). EU's membership opened the doors for Finland's products to a larger West European market. Gillingham (2003) feels that Finland's membership to the EU have transformed her mixed economy to a market oriented economy. Finland has been successful in exploiting the economic opportunities provided by the EU's membership through her strong macroeconomic policies. Membership of the EU aided in initiating a program

of macroeconomic stabilization, thus improving the growth in the economy in the mid 1990s.

Thus, Finland's success story "...involves a historical egalitarianism, a strong sense of community, an innate practicality, the intelligent application of brains and bravon, farsighted leadership and plenty of good luck." (Gillingham: 2003, p. 359). However, the economy is still vulnerable to economic problems from rapidly ageing population (see Figure 1), persistent high unemployment levels since the 1990s crisis (see Figure 7), and pressures from globalization on production activities, labor market and public finances. (Honkapohja et.al: 2009).

## Economic Growth in Finland – An Empirical Analysis

To analyze and understand which factors explain the economic growth in Finland for the period 1971-2009, the following linear regression model is estimated using the selected variables mentioned in chapter 1:

$$(GDPpc) = B_0 + B_1(Invt) + B_2(SSER) + B_3(Open) + B_4(PT) + B_5(Govt) + B_6(FDI) + e \quad \text{.....(1)}$$

The results of the regression estimation of the above equation is shown in table 1

**Table: F- 1**

**Model with all variables for 1971-2009**

| Variables | B | t-Stat | p-Value | Significance of the model | |
|---|---|---|---|---|---|
| Constant | 19.705 | 1.911 | 0.065 | R | 0.797 |
| Invt | -0.217 | -1.482 | 0.148 | R Square | 0.636 |
| SSER | 0.052 | 1.028 | 0.312 | Adjusted R Square | 0.568 |
| Open | 0.066 | 1.737 | 0.092 | Standard Error | 2.135 |
| PT | 0.160 | 3.945 | 0.000 | F | 9.317 |
| Govt | -1.071 | -4.275 | 0.000 | Significance F | 0.000 |
| FDI | 0.082 | 0.358 | 0.722 | | |

The above table 1 observed that:

1. Domestic investment has a negative and statistically insignificant effect on the growth rate of per capita GDP in Finland over the period 1971-2009. A one percent increase in domestic investment in the economy leads to 0.217 percentage points reduction in the growth rate of per capita GDP. Thus, the negative impact of domestic investment in Finland may be due to a policy followed by the domestic government. This forms a subject matter of future research.
2. SSER has positive and statistically insignificant impact upon the per capita GDP in Finland for 1971-2009.
3. The growth rate of GDP per capita during 1971-2009 was positively affected by the total trade as percentage of GDP. A one percent increase in the economy's openness would improve the growth of per capita GDP

by 0.066 percentage points. However, this result was found to be statistically insignificant.

4. Improvement in the growth rate of numbers of patents and trademarks showed positive and statistically significant effect on the growth of GDP per capita over the period 1971-2009 for the Finnish economy. A one percent increase in the growth rate number of patents and trademarks would increase the economic growth of the economy by 0.16 percentage points. This may depict the rise and success of Finland as a technologically advanced nation.
5. Government consumption, as per the existing economic literature, tends to reduce the growth in an economy. The results in Table: 1 confirms this hypothesis when an increase in government consumption by one percent reduces the growth of per capita GDP in Finland by 1.071 percentage points. Moreover, this result is found to be statistically highly significant.
6. Inflow of foreign investment into the Finnish economy from 1971-2009 has assisted the GDP per capita to grow in the economy. However, this result casts doubts from a statistical viewpoint.

Furthermore, in order to analyze which factor/s among the other selected ones have acted as drivers of economic growth in Finland, during the period 1971-2009, the above equation (1) is estimated using stepwise regression. This regression technique would facilitate in removing the unnecessary variables creating traffic and would emphasize only those factors that have worked upon to improve the economic growth of the Finnish economy. The results are depicted in table 1.1

**Table: F- 1.1**

**Stepwise Regression on Per Capita GDP for 1971-2009**

| Regression Model | Variables | R2 | Adj R2 | F-Value | p-Value |
|---|---|---|---|---|---|
| 1 | PT | 0.286 | 0.266 | 14.79 | 0.000 |
| 2 | PT, Govt | 0.43 | 0.398 | 13.553 | 0.000 |
| 3 | PT, Govt, Open | 0.565 | 0.528 | 15.169 | 0.000 |
| 4 | PT, Govt, Open, Invt | 0.614 | 0.568 | 13.499 | 0.000 |

**Significance of Coefficients for final model**

| Variables | B | t-Stat | p-Value |
|---|---|---|---|
| Constant | 26.509 | 3.055 | 0.004 |
| PT | 0.161 | 4.097 | 0.000 |
| Govt | -1.073 | -4.446 | 0.000 |
| Open | 0.077 | 2.246 | 0.031 |
| Invt | -0.284 | -2.063 | 0.047 |

Table 1.1 reveals the following:

1. The stepwise regression resulted into four different statistically significant models. The first model considered growth in total number of patents and trademarks as a factor explaining economic growth in Finland over the period 1971-2009. The second equation considered government consumption along with growth in total number of patents and trademarks as factors explaining the per capita GDP in the Finnish economy during 1971-2009. The third model included openness among the variables in the second model, while the final regression model showed growth in total number of patents and trademarks, government consumption, openness and domestic investment as the drivers of economic growth in Finland for the period 1971-2009.

2. The growth in total number of patents and trademarks has escalated the rate of economic growth in the Finnish economy by 0.161 percentage points. This exemplifies the significant of technology in the economic growth of Finland since 1971.
3. Government consumption depicts a result confirming the existing economic literature which states that government consumption has a negative impact on the economic growth of a nation. It can be seen from table 1.1 that an increase of 1% in government consumption in Finland reduces the growth of GDP per capita by 1.073 percentage points. Moreover, this result is found statistically highly significant.
4. Openness is found to have a positive and statistically highly significant effect on the growth of per capita GDP in Finland. An increase of one percent in the ratio of total trade to GDP increased the growth of per capita GDP by 0.077 percentage points. Openness has acted as a driving force in the process of economic growth in Finland since 1971.
5. Domestic investment, however, contradicts the theory on economic growth by depicting a negative effect on the economic growth of the nation. It can be seen from table 1.1 that a one percent increase in domestic investment reduces the growth of the economy by 0.284 percentage points.

Further, in order to analyze the impact from the membership of European Union on the Finnish economy, equation (1) is now estimated with the introduction of a dummy (EU1). This dummy variable is intended to explain the impact from integration into the EU in the Finnish economy. In view of this, the equation (1) can now be written as:

$$(GDPpc) = B_0 + B_1(Invt) + B_2(SSER) + B_3(Open) + B_4(PT) + B_5(Govt) + B_6(FDI) + B_7(EU1) + e \quad \text{.....(2)}$$

The results of the above regression are shown in table 2:

**Model with all variables including dummy (EU1) for 1971-2009**

| **Variables** | **B** | **t-Stat** | **p-Value** | Regression Statistics | |
|---|---|---|---|---|---|
| Constant | 19.881 | 1.842 | 0.075 | R | 0.798 |
| Invt | -0.215 | -1.414 | 0.168 | R Square | 0.636 |
| | | | | Adjusted R | |
| SSER | 0.051 | 0.941 | 0.354 | Square | 0.554 |
| Open | 0.063 | 1.077 | 0.290 | Standard Error | 2.169 |
| PT | 0.161 | 3.861 | 0.001 | F | 7.739 |
| Govt | -1.069 | -4.176 | 0.000 | Significance F | 0.000 |
| FDI | 0.079 | 0.333 | 0.741 | | |
| EU2 | 0.117 | 0.068 | 0.946 | | |

The above table 2 observed that:

1. Domestic investment has a negative and statistically insignificant effect on the growth rate of per capita GDP in Finland over the period 1971-2009. A one percent increase in domestic investment in the economy leads to 0.215 percentage points reduction in the growth rate of per capita GDP.
2. SSER has positive and statistically insignificant impact upon the per capita GDP in Finland for 1971-2009.
3. The growth rate of GDP per capita during 1971-2009 was positively affected by the total trade as percentage of GDP. A one percent increase in

the economy's openness would improve the growth of per capita GDP by 0.063 percentage points. However, this result was found to be statistically insignificant.

4. Improvement in the growth rate of numbers of patents and trademarks showed positive and statistically significant effect on the growth of GDP per capita over the period 1971-2009 for the Finnish economy. A one percent increase in the growth rate number of patents and trademarks would increase the economic growth of the economy by 0.161 percentage points. This may depict the rise and success of Finland as a technologically advanced nation.
5. Government consumption, as per the existing economic literature, tends to reduce the economic growth rate in an economy. The result in table 2 confirms this hypothesis when an increase in government consumption by one percent reduces the growth of per capita GDP in Finland by 1.069 percentage points. Moreover, this result is found to be statistically highly significant.
6. Inflow of foreign investment into the Finnish economy from 1971-2009 has assisted the GDP per capita to grow in the economy. However, this result casts doubts from a statistical viewpoint.
7. Surprisingly, the impact of EU membership did not turn out to a significant factor in explaining the rate of economic growth in the Finnish economy.

Equation (2) is then estimated through stepwise regression. This would demonstrate the factors that have acted as drivers of economic growth in the economy during 1971-2009, especially after entering into the European Union since 1995. Moreover, this would aid in comparing the economic performance

of the Finnish economy pre-EU and post-EU membership. The results of regression estimates of the equation (2) are shown in table 2.1

**Table: F- 2.1**

**Stepwise Regressions on Per Capita GDP for 1971-2009 with Dummy**

| Regression Model | Variables | R2 | Adj R2 | F-Value | p-Value |
|---|---|---|---|---|---|
| 1 | PT | 0.286 | 0.266 | 14.790 | 0.000 |
| 2 | PT, Govt | 0.430 | 0.398 | 13.553 | 0.000 |
| 3 | PT, Govt, EU1 | 0.578 | 0.542 | 16.008 | 0.000 |

**Significance of Coefficients for final model**

| Variables | B | t-Stat | p-Value |
|---|---|---|---|
| Constant | 16.250 | 5.133 | 0.000 |
| PT | 0.167 | 4.117 | 0.000 |
| Govt | -0.733 | -4.639 | 0.000 |
| EU1 | 2.892 | 3.516 | 0.001 |

Table 2.1 reveals the following:

1. The stepwise regression resulted into three different statistically significant models. The first model considered growth in total number of patents and trademarks as a factor explaining economic growth in Finland over the period 1971-2009. The second equation considered government consumption along with growth in total number of patents and trademarks as factors explaining the per capita GDP in the Finnish economy during 1971-2009. While, the third model EU1 among the variables in the second model as the drivers of economic growth in Finland for the period 1971-2009.

2. The growth in total number of patents and trademarks has escalated the rate of economic growth in the Finnish economy by 0.167 percentage points – higher in comparison to the pre-EU period. This exemplifies the significant of technology in the economic growth of Finland after its membership in the EU.
3. Government consumption depicts a result confirming the existing economic literature which states that government consumption has a negative impact on the economic growth of a nation. It can be seen from table 2.1 that an increase of 1% in government consumption in Finland reduces the growth of GDP per capita by 0.733 percentage points. Moreover, this result is found statistically highly significant. Compared to the pre-EU period the negative impact of government consumption has reduces in the post-EU period.
4. Membership of the EU has a positive impact on the rate of economic growth of the Finnish economy. Since its membership in the EU in 1995, Finland's economic growth has increased by 2.892 percentage points. This shows a significant impact of economic integration upon the economic growth of the Finnish economy.

# CHAPTER 6

# CONCLUSIONS

How can one measure the rate of economic growth and development in an economy? The answer to this question is provided by the various theories of economic growth and development developed from time to time. The advancements on the statistical front have made it possible to test these theories empirically. Economic models were developed in order to account for economic growth in an economy. These economic growth theories and models provide with the basic ingredients essential for the process of economic growth in a country. With the passage of time new dimensions in measuring economic growth of a nation has emerged. These newer dimensions have been empirically tested from time to time for different countries with differing conclusions. The factors put forth by the various theories of economic growth can significantly explain the disparities in economic growth across the nations of the world.

However, the conventional variables put forward by the earlier growth theories tend to explain major variations in the economic growth of any nation even during recent times. These conventional variables viz. income inequality, physical and human capital accumulations, technology and research and development, international trade and foreign investments, institutions and policies and economic growth among others are analyzed and examined in the present research.

In view of this, the thesis intended to examine disparities in economic growth across the European Union member nations using the conventional dummies.

European Union is selected for analysis purpose because the existing economic literature, testified empirically, states that economic integration tend to escalate the rate of economic growth in its member economies (see deMelo et.al.: 1992; Landau: 1995; Henrekson et.al.: 1997; Vanhoudt: 1998). This is validated and substantiated by examining the theories of Customs Union along with the economic literature on economic integration. Further, the existing economic literature on international trade states that with the liberalization of trade, it is possible for an economy to enjoy comparative and at times even absolute advantage in the international market. This (liberalization of trade) would further lead to increased welfare in the domestic economy.

In light of this, the objective of the thesis is also to examine whether the membership of European Union has increased the economic rate of growth in the member nations or not? For this purpose, Germany, Italy, the United Kingdom, Portugal, Spain and Finland are selected for analysis from different phases of development of the European Union. Moreover, the drivers of economic growth in the countries selected for analysis, for the period 1971-2009, are also analyzed. The distinctive drivers of economic growth in each economy would assist in explaining the disparities in economic growth among the EU member countries selected for the analysis.

With this objective of research in mind, stepwise linear regression is estimated for each individual country selected for the study for the period 1971-2009. This time period is considered for the study because internationally comparable data are available since 1970. Moreover, the 1970s is followed by end of the golden age of economic growth in most of the European nations.

The time-series regression is estimated using the conventional variables explaining the economic growth of a nation. The rate of economic growth in an economy is measured by the (annual growth rate of) per capita GDP. The variables employed to estimate the economic growth in a country are physical capital described by domestic investment, human capital described by secondary school enrolment rate, openness described by total trade as ratio to GDP, annual growth in total residential and non-residential patents and trademarks which is the result of research and development activity, foreign direct investment flow and total government consumption. Furthermore, in order to estimate the impact of economic integration on the domestic country, a dummy variable (EU) is later added in the time-series linear regression model.

In accordance to the literature review in Chapter 3, it is expected that

a. Physical capital i.e. domestic investment is expected have a positive and significant effect on the rate of growth of the economy. It is because, an increase in the domestic investment would lead to an increase in the levels of output and incomes thereby improving the conditions of growth in a country.

b. Human capital is expected to have a positive and significant impact upon the rate of economic growth of a nation. This may be due to the reason that better educated and more skilled, thereby, more productive labor force in the economy would assist in increasing the level of output in the economy. This would further enhance the economic growth of the nation.

c. From the times of Smith and Ricardo, liberalization and opening of an economy are considered as momentous factors leading to increase in trade of a country. Further, increase in trade is expected to boost the rate of growth of a nation. As a result, openness is expected to have a positive and significant effect on the rate of growth of a country.

d. Foreign investment is expected to create the spillover effect thereby escalating the rate of economic growth of an economy.

e. Technological developments direct the increment in the total factor productivity, inducing capital accumulations, thereby, increasing the levels of output and income in a country.

f. Government consumption, on the other hand, is expected to impair the rate of growth in an economy.

g. Economists advocate economic integration as regional integration allows a country to trade preferentially in the international market. As a result it is expected in my study that the membership from the EU should have a positive impact in the rate of growth of the countries under study.

The data is compiled from World Bank, World Intellectual Property Organization (WIPO), Organization for Economic Cooperation and Development (OECD), International Monetary Fund (IMF) and United Nations Conference on Trade And Development (UNCTAD).

The stepwise linear regression aided in recognizing the factors/variables which have acted as drivers of economic growth in each of the individual country under study. These factors are summarized in the Tables A and B

**TABLE: A**

| COUNTRY | GROWTH DRIVERS (1971-2009) |
|---|---|
| Germany (1971-2009) | Domestic Investment |
| Germany (1991-2009) | Government Consumption and Domestic Investment |
| Italy | Government Consumption |
| The UK | Government Consumption and Technology |
| Portugal | Domestic Investment |
| Spain | Government Consumption, Human Capital and Technology |
| Finland | Technology, Openness, Government Consumption and Domestic Investment |

**TABLE: B**

| COUNTRY | GROWTH DRIVERS POST-EU MEMBERSHIP |
|---|---|
| Portugal(1986-2009) | Domestic Investment |
| Spain(1986-2009) | Government Consumption, EU Membership and Technology |
| Finland(1995-2009) | Technology, EU Membership and Government Consumption |

The above Tables A and B demonstrates different factors which drive the economic growth of the countries under study. The consequences of these differing economic drivers lead to differences in the rate of economic growth across the countries under study. This is evident from Table C which provides the results of a linear regression ln (GDPpc) = $B_0$ + $B_1$ (Time).

**TABLE C**

| COUNTRY | ANNUAL GROWTH RATE (%) |
|---|---|
| Germany(1971-2009) | 1.9 |
| Germany(1991-2009) | 1.3 |
| Italy(1971-2009) | 1.9 |
| The UK(1971-2009) | 2.1 |
| Portugal (1971-2009) | 2.5 |
| Portugal (1986-2009) | 2.2 |
| Spain(1971-2009) | 2.2 |
| Spain (1986-2009) | 2.3 |
| Finland(1971-2009) | 2.2 |
| Finland (1995-2009) | 2.9 |

It is noticed from the above table that Germany and Italy are growing at an annual rate of 1.9% from 1971-2009, while from 1991-2009 Germany observed an annual growth of 1.3% in its economy. The United Kingdom is observed to grow at 2.1% rate of growth annually from 1971-2009. On the one hand, Portugal is found to grow at a comparatively higher growth rate of 2.5%

annually, while on the other hand, Spain and Finland are observed to grow at an annual rate of 2.2% over the time period 1971-2009. Since its membership in the EU in 1986 Portugal is growing annually at 2.2% and Spain is growing at 2.3% p.a. Finland depicts a very high rate of growth (2.9%p.a.) since 1995.

The disparity in the above depicted rate of economic growth is due to the factors listed in Tables A and B. It can be observed from Tables A and B that:

1. In Germany, over the period 1971-2009, domestic investment has positively affected the economic growth rate. This is in agreement to the conclusions drawn by various research like Solow: 1956, 1957; Landes: 1969; Barro: 1991; Benhabib & Spiegel: 1994, Sala-i-Martin: 1997; Plumper & Graff: 2001, which states that domestic investment has positive impact on the rates of growth of per capita GDP. The policies that were formulated to uplift the East German economy after the reunification of 1990 suffocated the working of industries in the German economy. As a result major portion of the domestic savings was invested abroad. Despite of this, domestic investment depicts a positive impact upon the rate of growth of the German economy since its reunification in 1991. Moreover, government consumption depicted a negative impact on economic growth of the German economy during 1991-2009. This is a much expected result and falls in line with the existing literature viz. Grier: 1989; Barro: 1991; Barro: 1992; Easterly: 1993; Devarajan, Swaroop & Zou: 1996.

2. Government consumption is the only factor which exhibits a significant impact upon the rate of growth of the Italian economy during 1971-2009. No other factors, selected for the study, were found to impact the economic

growth of the Italian economy over 1971-2009. Moreover, the impact of government consumption on economic growth is in accordance to the expectations i.e. government consumption is negatively affecting the rate of economic growth in Italy.

3. The economic growth in the UK, who has, at most times, stayed aloof from the policies of the European Union, was found to be affected significantly by its technological advancements and government consumption. As per the theoretical expectations, technological advancements are augmenting the rate of growth of the British economy, whilst government consumption shows a negative impact.

4. For the Portuguese economy, over the entire time span of 1971-2009, the only factor that significantly affected the economic growth is domestic investment. Domestic investment is found to improve the rate of economic growth in Portugal. All other explanatory factors have no significant role to play in the process of economic growth in Portugal. The positive and significant impact of domestic investment on economic growth rate of the country may be attributed to the improvements made since the 1980s and the 1990s with respect to the liberalization of the economy (Ram: 1987; Knight, Loayza & Villanueva: 1993; Frankel & Romer: 1999; Pomeranz: 2000; Afonso: 2001; Galor & Mountford: 2003). Further, Portugal has modernized its industrial sector which have led to improved policies and working of institutions in the economy. As a result of better infrastructural facilities, it is possible for the economy to enlarge its domestic investment thereby improving economic growth of the economy. Even after its membership in the European Union, the factor that drives the economic

growth of Portugal has not changed. Domestic investment, nevertheless, is observed to be the only factor driving the rate of economic growth of the Portuguese economy.

5. In case of Spain, government consumption, human capital and technological advancements have driven the rate of economic growth of the country over 1971-2009. The impact of these driving forces is as per the expectation from the theoretical view point. Government consumption is negatively affecting economic growth, while human capital and technological advancements are positively affecting the growth rate. I agree with Romer & Weil: 1992; Mankiw: 1995; Glodin & Katz: 2001; Mitch: 2001 who proved that educated and skilled human capital assist in enhancing the rate of economic growth of an economy. However, since its membership in the EU in 1986, the drivers of economic growth have changed considerably. Earlier human capital was one of the explanatory factors explaining the growth rate of the country, and since its membership in the EU, human capital is no longer the driving force of economic growth in the Spanish economy. Rather, the drivers of economic growth now are government consumption (whose negative impact on economic growth after the EU membership has reduced by 0.44 percentage points), EU membership, and technological advancements (whose positive impact on economic growth since the membership in the EU has increased by only 0.01 percentage points). In fact, more than 5 percentage points of economic growth of Spain is accredited to its membership in the EU.

6. The drivers of economic growth in Finland for 1971-2009 have been (i) technological advancements, (ii) openness, (iii) government consumption

and (iv) domestic investment. Finland is the only country, among the other selected for the study, whose growth rate is positively and significantly affected by openness. This is in agreement with the existing economic literature which establishes a positive relationship between openness of a country and its economic growth rate (Ram: 1987; Knight, Loayza & Villanueva: 1993; Frankel & Romer: 1999; Pomeranz: 2000; Afonso: 2001; Galor & Mountford: 2003). Government consumption is found to affect negatively on the growth rate, once again, a much expected result; while technological advancement is one of the major drivers of economic growth depicting a positive and significant impact on growth rate. This result is in affirmation to the economic literature that shows a positive linkage between technological progress and economic growth (see Fagerberg: 1987, 1988; Grossman & Helpman: 1991; Aghion & Howitt: 1992; Jaffe & Trajtenberg: 2002; Jones: 2002; Frankema & Lindblad: 2006). However, domestic investment showed an unexpected result. Unlike Landes: 1969; Barro: 1991; Benhabib & Spiegel: 1994, Sala-i-Martin: 1997; Plumper & Graff: 2001; domestic investment, in Finland during 1971-2009, is found to affect the rate of economic growth in a negative manner. Finland's drivers of economic growth have changed considerably since its membership in the EU in 1995. Earlier openness and domestic investment had a significant impact upon the economic growth of the economy; however, since its membership in the EU, they no longer affect the rate of economic growth. The factors which have acted as drivers of economic growth for the Finnish economy, since its EU membership, are technological advancement, EU membership and government consumption. The affects of these variables are as expected. Nearly 3

percentage point growth in the Finnish economy is accredited to its membership in the EU. Hence, technology has played a major role in driving the economic growth of Finland during the pre-EU and post-EU.

Succinctly, the disparities in economic growth of the nations under study can be observed from the differences in the factors that have led the path to economic growth in an economy. The present research calls for government consumption and domestic investment, among others, as principal factors affecting the rate of economic growth of the nations under study. Moreover, significant and higher impact of EU membership on economic growth of Spain and Finland could be observed. No growth effects of EU membership were observed for Portugal.

The disparities in economic growth among the member nations of EU is there to prevail and stay even if the efforts are made to take the EU towards a more positive integrated market economy. Doubts are felt whether the economic growth in the long-run can survive with the prevalence of common currency (the Euro) and increasing members in the EU. This formulates the area for further research. Furthermore, the policy impacts of economic integration on the variables employed in the present research forms a part of future research too.

# APPENDIX

## I) Definition of the variables under study.

1. **GDP per capita (constant 2000 US$):** GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. (Source: World Development Indicators, World Bank)

2. **GDP growth (annual %):** Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2000 U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. (Source: World Development Indicators, World Bank)

3. **Gross Capital Formation (% of GDP):** Gross capital formation (formerly gross domestic investment) consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and

industrial buildings. Inventories are stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales, and "work in progress." According to the 1993 SNA, net acquisitions of valuables are also considered capital formation. (Source: World Development Indicators, World Bank)

4. **Secondary School enrollment (% gross):** Gross enrollment ratio is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown. Secondary education completes the provision of basic education that began at the primary level, and aims at laying the foundations for lifelong learning and human development, by offering more subject- or skill-oriented instruction using more specialized teachers. (Source: World Development Indicators, World Bank)

5. **Population Growth (Annual %):** Annual population growth rate for year t is the exponential rate of growth of midyear population from year t-1 to t, expressed as a percentage. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship – except for refugees not permanently settled in the country of asylum, who are generally considered part of the population of the country of origin. (Source: World Development Indicators, World Bank)

6. **Trade (% of GDP):** Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product. (Source: World Development Indicators, World Bank)

7. **Total Residential and Non-Residential Patents and Trademarks:** Resident filing refers to an application filed at an Office of or acting for the State in which the first-named applicant in the application concerned has residence. Non-resident filing refers to an application filed at an Office of or acting for the State in which the first-named applicant in the application concerned does not have residence. (Source: WIPO Statistics Database, January 2011 (Annual Growth Rate is author's calculations) (Missing values were filled in by linear interpolation)) Note: Counts are based on the patent filing date.

8. **General government final consumption expenditure (% of GDP)**: General government final consumption expenditure (formerly general government consumption) includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditures on national defense and security, but excludes government military expenditures that are part of government capital formation. (Source: World Development Indicators, World Bank)

9. **Inflation, GDP deflator (annual %):** Inflation as measured by the annual growth rate of the GDP implicit deflator shows the rate of price change in the economy as a whole. The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant local currency. (Source: World Development Indicators, World Bank)

10. **Official exchange rate (LCU per US$, period average):** Official exchange rate refers to the exchange rate determined by national

authorities or to the rate determined in the legally sanctioned exchange market. It is calculated as an annual average based on monthly averages (local currency units relative to the U.S. dollar). (Source: World Development Indicators, World Bank)

11. **Gross savings (% of GDP):** Gross savings are calculated as gross national income less total consumption, plus net transfers. (Source: World Development Indicators, World Bank)

12. **Imports of goods and services (constant 2000 US$):** Imports of goods and services represent the value of all goods and other market services received from the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments. Data are in constant 2000 U.S. dollars. (Source: World Development Indicators, World Bank) (Annual Growth Rate is author's calculations).

13. **Exports of goods and services (constant 2000 US$):** Exports of goods and services represent the value of all goods and other market services provided to the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income

(formerly called factor services) and transfer payments. Data are in constant 2000 U.S. dollars. (Source: World Development Indicators, World Bank) (Annual Growth Rate is author's calculations).

14. **FDI inflows and outflows (% of GDP):** FDI inflows and outflows comprise capital provided (either directly or through other related enterprises) by a foreign direct investor to a FDI enterprise, or capital received by a foreign direct investor from a FDI enterprise. FDI includes the three following components: equity capital, reinvested earnings and intra-company loans. Data on FDI flows are presented on net bases (capital transactions' credits less debits between direct investors and their foreign affiliates). Net decreases in assets or net increases in liabilities are recorded as credits, while net increases in assets or net decreases in liabilities are recorded as debits. Hence, FDI flows with a negative sign indicate that at least one of the three components of FDI is negative and not offset by positive amounts of the remaining components. These are called reverse investment or disinvestment. (GDP data source: UNCTAD, based on data from UN DESA, Statistics Division (GDP - Gross domestic product)
15. **Employment Rates:** Employment rates are calculated as the ratio of the employed to the working age population. Employment is generally measured through household labor force surveys. According to the ILO Guidelines, employed persons are defined as those aged 15 or over who report that they have worked in gainful employment for at least one hour in the previous week or who had a job but were absent from work during the reference week. Those not in employment consist of persons

who are classified as either unemployed or inactive, in the sense that they are not included in the labor force for reasons of study, incapacity or the need to look after young children or elderly relatives. (Source: OECD Factbook 2009 and 2011-2012).

16. **Unemployment Rates:** Unemployed persons are defined as those who report that they are without work, that they are available for work and that they have taken active steps to find work in the last four weeks. The ILO Guidelines specify what actions count as active steps to find work; these include answering vacancy notices, visiting factories, construction sites and other places of work, and placing advertisements in the press as well as registering with labor offices. The unemployment rate is defined as the number of unemployed persons as a percentage of the labor force, where the latter consists of the unemployed plus those in paid employment. (Source: OECD Factbook 2009 and 2011-2012).
17. **Agriculture Value Added (% of GDP):** Agriculture corresponds to ISIC divisions 1-5 and includes forestry, hunting, and fishing, as well as cultivation of crops and livestock production. Value added is the net output of a sector after adding up all outputs subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. (Source: World Development Indicators, World Bank)
18. **Services etc Value Added (% of GDP):** Services corresponds to ISIC divisions 50-99 and they include value added in wholesale and retail trade (including hotels and restaurants), transport, and government, financial, professional, and personal services such as

education, health care, and real estate services. Also included are imputed bank service charges, import duties, and any statistical discrepancies noted by national compliers as well as discrepancies arising from rescaling. Value added is the net output of a sector after adding up all outputs subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. (Source: World Development Indicators, World Bank)

19. **Industry Value Added (% of GDP):** Industry corresponds to ISIC divisions 10-45 and includes manufacturing (ISIC divisions 15-37). It comprises value added in mining, manufacturing, construction, electricity, water, and gas. Value added is the net output of a sector after adding up all outputs subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. (Source: World Development Indicators, World Bank)

## II) DATA TABLES

**TABLE: F-1 Macro Economic Situation - Finland**

| Years | Official Exchange Rate | Total Population (AGR %) | Years | Official Exchange Rate | Total Population (AGR %) |
|---|---|---|---|---|---|
| 1960 | 3.20 | - | 1986 | 5.07 | 0.33 |
| 1961 | 3.20 | 0.70 | 1987 | 4.40 | 0.31 |
| 1962 | 3.20 | 0.67 | 1988 | 4.18 | 0.36 |
| 1963 | 3.20 | 0.71 | 1989 | 4.29 | 0.22 |
| 1964 | 3.20 | 0.57 | 1990 | 3.82 | 0.48 |
| 1965 | 3.20 | 0.33 | 1991 | 4.04 | 0.56 |
| 1966 | 3.20 | 0.37 | 1992 | 4.48 | 0.56 |
| 1967 | 3.45 | 0.55 | 1993 | 5.71 | 0.48 |
| 1968 | 4.20 | 0.46 | 1994 | 5.22 | 0.45 |
| 1969 | 4.20 | -0.06 | 1995 | 4.37 | 0.37 |
| 1970 | 4.20 | -0.39 | 1996 | 4.59 | 0.33 |
| 1971 | 4.18 | 0.22 | 1997 | 5.19 | 0.29 |
| 1972 | 4.15 | 0.52 | 1998 | 5.34 | 0.26 |
| 1973 | 3.82 | 0.56 | 1999 | - | 0.24 |
| 1974 | 3.77 | 0.54 | 2000 | - | 0.21 |
| 1975 | 3.68 | 0.43 | 2001 | - | 0.23 |
| 1976 | 3.86 | 0.32 | 2002 | - | 0.24 |
| 1977 | 4.03 | 0.28 | 2003 | - | 0.24 |
| 1978 | 4.12 | 0.30 | 2004 | - | 0.29 |
| 1979 | 3.90 | 0.25 | 2005 | - | 0.34 |
| 1980 | 3.73 | 0.31 | 2006 | - | 0.38 |
| 1981 | 4.32 | 0.42 | 2007 | - | 0.43 |
| 1982 | 4.82 | 0.56 | 2008 | - | 0.47 |
| 1983 | 5.57 | 0.60 | 2009 | - | 0.48 |
| 1984 | 6.01 | 0.54 | 2010 | - | 0.46 |
| 1985 | 6.20 | 0.41 | | | |

Source: World Development Indicators, World Bank

**TABLE: F-2 Macro Economic Situation - Finland**

| Years | Inflation Rate (Annual %) | Domestic Investment (% of GDP) | GDP growth (Annual %) | Gross Savings (% of GDP) |
|---|---|---|---|---|
| 1971 | 7.36 | 30.82 | 2.36 | - |
| 1972 | 8.24 | 28.38 | 7.74 | - |
| 1973 | 13.77 | 29.81 | 6.98 | - |
| 1974 | 22.07 | 35.73 | 3.24 | - |
| 1975 | 13.57 | 34.90 | 1.80 | 27.37 |
| 1976 | 13.12 | 28.20 | 0.34 | 24.50 |
| 1977 | 9.42 | 27.00 | 0.24 | 26.52 |
| 1978 | 7.45 | 23.54 | 2.92 | 24.90 |
| 1979 | 8.30 | 26.80 | 7.12 | 26.19 |
| 1980 | 9.64 | 30.15 | 5.39 | 27.17 |
| 1981 | 11.59 | 27.33 | 1.29 | 26.15 |
| 1982 | 9.20 | 27.45 | 3.05 | 25.13 |
| 1983 | 8.10 | 27.01 | 3.02 | 24.48 |
| 1984 | 8.46 | 25.91 | 3.11 | 25.90 |
| 1985 | 5.31 | 25.42 | 3.30 | 23.95 |
| 1986 | 4.82 | 24.35 | 2.64 | 23.39 |
| 1987 | 4.32 | 25.06 | 3.49 | 23.21 |
| 1988 | 7.65 | 27.43 | 5.22 | 24.96 |
| 1989 | 6.39 | 30.44 | 5.08 | 25.55 |
| 1990 | 5.43 | 28.48 | 0.51 | 23.40 |
| 1991 | 1.50 | 22.14 | -6.00 | 16.66 |
| 1992 | 0.92 | 18.77 | -3.48 | 14.02 |
| 1993 | 1.92 | 16.32 | -0.81 | 14.90 |
| 1994 | 1.64 | 17.50 | 3.65 | 18.46 |
| 1995 | 4.52 | 18.19 | 3.96 | 21.89 |
| 1996 | -0.36 | 17.78 | 3.57 | 21.38 |
| 1997 | 1.99 | 19.17 | 6.21 | 24.09 |
| 1998 | 3.41 | 20.37 | 5.03 | 25.37 |
| 1999 | 0.93 | 19.56 | 3.91 | 26.65 |
| 2000 | 2.61 | 20.86 | 5.32 | 28.65 |

| | | | | |
|---|---|---|---|---|
| 2001 | 3.01 | 20.47 | 2.28 | 29.16 |
| 2002 | 1.27 | 19.15 | 1.83 | 28.00 |
| 2003 | -0.69 | 19.42 | 2.01 | 24.81 |
| 2004 | 0.48 | 19.99 | 4.12 | 26.70 |
| 2005 | 0.46 | 21.85 | 2.92 | 25.63 |
| 2006 | 0.85 | 21.30 | 4.41 | 26.16 |
| 2007 | 2.99 | 22.89 | 5.34 | 27.27 |
| 2008 | 2.23 | 22.38 | 0.98 | 25.78 |
| 2009 | 1.70 | 18.44 | -8.23 | 20.83 |

Source: World Development Indicators, World Bank

**TABLE: F-3 Total Employment and Unemployment - Finland**

| Years | Total Employment Rate | Total Unemployment Rate | Years | Total Employment Rate | Total Unemployme Rate |
|---|---|---|---|---|---|
| 1966 | 71.6 | - | 1988 | 72 | 4.2 |
| 1967 | 69.3 | - | 1989 | 74.9 | 3.1 |
| 1968 | 67.3 | - | 1990 | 74.7 | 3.2 |
| 1969 | 67.9 | - | 1991 | 70.7 | 6.7 |
| 1970 | 70.4 | 2.6 | 1992 | 65.5 | 11.6 |
| 1971 | 69.9 | 3 | 1993 | 61.4 | 16.2 |
| 1972 | 69.3 | 3.6 | 1994 | 60.7 | 16.8 |
| 1973 | 70.3 | 3.1 | 1995 | 61.9 | 15.1 |
| 1974 | 71.7 | 2.5 | 1996 | 62.8 | 14.9 |
| 1975 | 71 | 2.9 | 1997 | 63.5 | 12.7 |
| 1976 | 69.6 | 4.5 | 1998 | 64.8 | 11.4 |
| 1977 | 68.4 | 6.6 | 1999 | 66.6 | 10.3 |
| 1978 | 67.2 | 7.9 | 2000 | 67.5 | 9.6 |
| 1979 | 68.9 | 6.5 | 2001 | 68.3 | 9.1 |
| 1980 | 70.7 | 5.3 | 2002 | 68.3 | 9.1 |
| 1981 | 71.1 | 5.7 | 2003 | 67.9 | 9.1 |
| 1982 | 71.4 | 6.1 | 2004 | 67.8 | 8.9 |
| 1983 | 71.5 | 6.1 | 2005 | 68.5 | 8.4 |
| 1984 | 71.8 | 5.9 | 2006 | 69.6 | 7.7 |

| | | | | | |
|---|---|---|---|---|---|
| 1985 | 72.3 | 6 | 2007 | 70.5 | 6.9 |
| 1986 | 72 | 6.7 | 2008 | 71.3 | 6.4 |
| 1987 | 71.7 | 4.9 | 2009 | 68.4 | 8.2 |
| | | | 2010 | 68.3 | 8.4 |

Source: OECD Factbook 2009 and OECD Factbook 2011-2012

**TABLE: F-4 Value Added by Major Sectors - Finland**

| Years | Agriculture Value Added (% of GDP) | Industry Value Added (% of GDP) | Services etc Value Added (% of GDP) |
|---|---|---|---|
| 1970 | 12.71 | 38.26 | 49.03 |
| 1971 | 12.76 | 37.19 | 50.05 |
| 1972 | 11.40 | 38.43 | 50.18 |
| 1973 | 11.01 | 39.25 | 49.74 |
| 1974 | 10.54 | 41.19 | 48.28 |
| 1975 | 11.01 | 39.10 | 49.88 |
| 1976 | 10.45 | 37.67 | 51.88 |
| 1977 | 10.15 | 37.34 | 52.50 |
| 1978 | 9.62 | 37.77 | 52.61 |
| 1979 | 9.46 | 38.40 | 52.13 |
| 1980 | 9.91 | 38.21 | 51.88 |
| 1981 | 8.94 | 37.80 | 53.26 |
| 1982 | 9.07 | 36.89 | 54.04 |
| 1983 | 8.85 | 36.69 | 54.46 |
| 1984 | 8.67 | 36.28 | 55.05 |
| 1985 | 8.22 | 35.06 | 56.72 |
| 1986 | 7.91 | 34.29 | 57.80 |
| 1987 | 6.43 | 34.81 | 58.77 |
| 1988 | 6.30 | 34.92 | 58.78 |
| 1989 | 6.34 | 35.09 | 58.57 |
| 1990 | 6.33 | 33.33 | 60.34 |
| 1991 | 5.57 | 29.85 | 64.58 |
| 1992 | 4.98 | 29.47 | 65.54 |
| 1993 | 5.06 | 30.09 | 64.85 |

| | | | |
|---|---|---|---|
| 1994 | 4.68 | 31.57 | 63.75 |
| 1995 | 4.35 | 32.82 | 62.83 |
| 1996 | 4.04 | 31.97 | 63.99 |
| 1997 | 4.05 | 32.27 | 63.67 |
| 1998 | 3.50 | 33.77 | 62.73 |
| 1999 | 3.45 | 33.40 | 63.16 |
| 2000 | 3.53 | 33.69 | 62.77 |
| 2001 | 3.38 | 33.30 | 63.32 |
| 2002 | 3.35 | 32.45 | 64.21 |
| 2003 | 3.18 | 31.98 | 64.84 |
| 2004 | 3.05 | 31.51 | 65.44 |
| 2005 | 2.96 | 31.33 | 65.70 |
| 2006 | 2.54 | 32.40 | 65.06 |
| 2007 | 3.19 | 32.26 | 64.56 |

Source: World Development Indicators 2009, World Bank

**TABLE: F- 5 Value of Oil Imports and Exports - Finland**

| Years | Value of Oil Imports (Billion US $) | Value of Oil Exports (Billion US $) |
|---|---|---|
| 1980 | 3.819 | 1.484 |
| 1981 | 3.577 | 1.283 |
| 1982 | 3.125 | 1.149 |
| 1983 | 2.972 | 0.994 |
| 1984 | 2.818 | 0.921 |
| 1985 | 2.883 | 0.893 |
| 1986 | 1.988 | 1.092 |
| 1987 | 2.139 | 1.26 |
| 1988 | 1.803 | 1.324 |
| 1989 | 1.935 | 1.29 |
| 1990 | 2.574 | 1.448 |
| 1991 | 2.33 | 1.369 |
| 1992 | 2.186 | 1.236 |
| 1993 | 1.909 | 0.969 |

| | | |
|---|---|---|
| 1994 | 2.234 | 1.06 |
| 1995 | 2.771 | 1.268 |
| 1996 | 1.002 | 1.205 |
| 1997 | 0.726 | 1.066 |
| 1998 | 1.449 | 1.036 |
| 1999 | 1.997 | 0.993 |
| 2000 | 3.263 | 1.554 |
| 2001 | 2.694 | 1.301 |
| 2002 | 2.813 | 1.44 |
| 2003 | 3.567 | 1.782 |
| 2004 | 4.496 | 2.324 |
| 2005 | 6.103 | 2.799 |
| 2006 | 8.081 | 3.803 |
| 2007 | 8.893 | 4.644 |
| 2008 | 12.173 | 6.296 |
| 2009 | 7.475 | 3.815 |

Source: World Economic Outlook Database, September 2011

**Table F-6 Foreign Direct Investment Flow - Finland**

| **Years** | **Inward FDI flow % of GDP** | **Outward FDI flow as % of GDP** |
|---|---|---|
| 1970 | 0.160 | 0.463 |
| 1971 | 0.202 | 0.371 |
| 1972 | 0.254 | 0.418 |
| 1973 | 0.067 | 0.078 |
| 1974 | 0.142 | 0.118 |
| 1975 | 0.234 | 0.090 |
| 1976 | 0.183 | 0.097 |
| 1977 | 0.141 | 0.220 |
| 1978 | 0.096 | 0.174 |
| 1979 | 0.062 | 0.285 |
| 1980 | 0.053 | 0.258 |
| 1981 | 0.190 | 0.250 |

| | | |
|---|---|---|
| 1982 | -0.007 | 0.164 |
| 1983 | 0.167 | 0.284 |
| 1984 | 0.264 | 0.945 |
| 1985 | 0.200 | 0.620 |
| 1986 | 0.470 | 1.042 |
| 1987 | 0.295 | 1.258 |
| 1988 | 0.495 | 2.437 |
| 1989 | 0.418 | 2.539 |
| 1990 | 0.567 | 1.950 |
| 1991 | -0.197 | -0.099 |
| 1992 | 0.369 | -0.684 |
| 1993 | 0.991 | 1.614 |
| 1994 | 1.569 | 4.273 |
| 1995 | 0.813 | 1.146 |
| 1996 | 0.865 | 2.804 |
| 1997 | 1.720 | 4.302 |
| 1998 | 9.365 | 14.380 |
| 1999 | 3.541 | 5.080 |
| 2000 | 7.258 | 19.743 |
| 2001 | 2.996 | 6.720 |
| 2002 | 5.956 | 5.456 |
| 2003 | 2.022 | -1.389 |
| 2004 | 1.496 | -0.571 |
| 2005 | 2.428 | 2.159 |
| 2006 | 3.682 | 2.312 |
| 2007 | 5.062 | 2.929 |
| 2008 | -0.383 | 3.437 |
| 2009 | -0.002 | 1.610 |
| 2010 | 1.806 | 3.511 |

Source: UNCTAD

**TABLE: F-7 Exports and Imports of Goods & Services - Finland**

| Years | Exports of Goods & Services (AGR %) | Imports of Goods & Services (AGR %) |
|---|---|---|
| 1961 | 5.14 | 8.06 |
| 1962 | 7.07 | 5.61 |
| 1963 | 2.19 | -2.78 |
| 1964 | 5.81 | 20.60 |
| 1965 | 5.61 | 8.26 |
| 1966 | 6.41 | 3.54 |
| 1967 | 5.95 | -0.30 |
| 1968 | 9.98 | -3.93 |
| 1969 | 16.74 | 22.28 |
| 1970 | 8.81 | 20.39 |
| 1971 | -1.16 | -0.17 |
| 1972 | 14.48 | 5.02 |
| 1973 | 7.22 | 12.76 |
| 1974 | 0.11 | 6.50 |
| 1975 | -13.14 | 2.50 |
| 1976 | 14.40 | -1.44 |
| 1977 | 16.04 | -1.73 |
| 1978 | 7.78 | -3.95 |
| 1979 | 9.65 | 18.45 |
| 1980 | 8.10 | 8.55 |
| 1981 | 5.80 | -4.59 |
| 1982 | -1.87 | 2.21 |
| 1983 | 4.33 | 4.11 |
| 1984 | 6.53 | 0.92 |
| 1985 | 0.63 | 6.36 |
| 1986 | 1.69 | 3.49 |
| 1987 | 2.76 | 8.79 |
| 1988 | 3.16 | 10.63 |
| 1989 | 2.75 | 9.02 |
| 1990 | 1.65 | -0.34 |
| 1991 | -7.20 | -13.29 |

| | | |
|---|---|---|
| 1992 | 10.02 | 0.57 |
| 1993 | 16.32 | 1.29 |
| 1994 | 13.50 | 12.99 |
| 1995 | 8.53 | 8.19 |
| 1996 | 5.91 | 7.24 |
| 1997 | 13.94 | 11.87 |
| 1998 | 9.23 | 8.65 |
| 1999 | 11.10 | 4.24 |
| 2000 | 17.26 | 16.71 |
| 2001 | 1.71 | 1.35 |
| 2002 | 3.35 | 3.23 |
| 2003 | -1.90 | 3.20 |
| 2004 | 8.17 | 7.40 |
| 2005 | 7.02 | 11.44 |
| 2006 | 12.15 | 7.87 |
| 2007 | 8.17 | 7.02 |
| 2008 | 6.33 | 6.48 |
| 2009 | -20.27 | -18.08 |

Source: World Bank national accounts data, and OECD National Accounts data files

**TABLE: F- 8 Total Residential & Non-Residential Patents & Trademarks - Finland**

| Years | Patents & Trademarks |
|---|---|
| 1970 | -4.484 |
| 1971 | 2.488 |
| 1972 | 0.303 |
| 1973 | 6.655 |
| 1974 | -7.199 |
| 1975 | -1.121 |
| 1976 | -2.679 |
| 1977 | 5.944 |
| 1978 | 1.570 |

| | |
|---|---|
| 1979 | 2.530 |
| 1980 | 5.620 |
| 1981 | -2.025 |
| 1982 | 7.590 |
| 1983 | 4.506 |
| 1984 | 7.022 |
| 1985 | 7.915 |
| 1986 | 8.028 |
| 1987 | 7.469 |
| 1988 | 4.508 |
| 1989 | 18.589 |
| 1990 | -6.877 |
| 1991 | -15.683 |
| 1992 | 9.914 |
| 1993 | -16.512 |
| 1994 | 5.776 |
| 1995 | 5.107 |
| 1996 | -20.710 |
| 1997 | 18.763 |
| 1998 | 10.404 |
| 1999 | 4.920 |
| 2000 | 8.544 |
| 2001 | -3.543 |
| 2002 | -12.407 |
| 2003 | -9.971 |
| 2004 | -1.523 |
| 2005 | -2.255 |
| 2006 | -2.491 |
| 2007 | -1.424 |
| 2008 | -1.498 |
| 2009 | -19.161 |

Source: WIPO

Annual Growth Rate: Author's Calculations

**TABLE: G-1 Macro Economic Situation - Germany**

| Years | Official Exchange Rate | Total Population (AGR %) |
|---|---|---|
| 1960 | 4.200 | - |
| 1961 | 4.033 | 0.861 |
| 1962 | 4.000 | 0.872 |
| 1963 | 4.000 | 0.818 |
| 1964 | 4.000 | 0.550 |
| 1965 | 4.000 | 0.914 |
| 1966 | 4.000 | 0.750 |
| 1967 | 4.000 | 0.213 |
| 1968 | 4.000 | 0.283 |
| 1969 | 3.943 | 0.730 |
| 1970 | 3.660 | 0.747 |
| 1971 | 3.507 | 0.829 |
| 1972 | 3.189 | 0.449 |
| 1973 | 2.673 | 0.306 |
| 1974 | 2.588 | 0.029 |
| 1975 | 2.460 | -0.380 |
| 1976 | 2.518 | -0.460 |
| 1977 | 2.322 | -0.193 |
| 1978 | 2.009 | -0.106 |
| 1979 | 1.833 | 0.027 |
| 1980 | 1.818 | 0.255 |
| 1981 | 2.260 | 0.147 |
| 1982 | 2.427 | -0.106 |
| 1983 | 2.553 | -0.272 |
| 1984 | 2.846 | -0.353 |
| 1985 | 2.944 | -0.190 |
| 1986 | 2.171 | 0.039 |
| 1987 | 1.797 | 0.144 |
| 1988 | 1.756 | 0.391 |
| 1989 | 1.880 | 0.778 |
| 1990 | 1.616 | 0.865 |

| | | |
|---|---|---|
| 1991 | 1.660 | 0.731 |
| 1992 | 1.562 | 0.762 |
| 1993 | 1.653 | 0.660 |
| 1994 | 1.623 | 0.444 |
| 1995 | 1.433 | 0.155 |
| 1996 | 1.505 | 0.331 |
| 1997 | 1.734 | 0.194 |
| 1998 | 1.760 | -0.029 |
| 1999 | - | 0.049 |
| 2000 | - | 0.150 |
| 2001 | - | 0.150 |
| 2002 | - | 0.213 |
| 2003 | - | 0.040 |
| 2004 | - | -0.030 |
| 2005 | - | -0.057 |
| 2006 | - | -0.113 |
| 2007 | - | -0.134 |
| 2008 | - | -0.190 |
| 2009 | - | -0.253 |
| 2010 | - | -0.244 |

Source: World Development Indicators, World Bank

**TABLE: G-2 Macro Economic Situation - Germany**

| Years | Inflation (Annual %) | Domestic Investment (% of GDP) | GDP growth (Annual %) | Gross Savings (% of GDP) |
|---|---|---|---|---|
| 1971 | 7.621 | 29.671 | 3.133 | 27.261 |
| 1972 | 4.532 | 28.534 | 4.300 | 26.045 |
| 1973 | 6.300 | 27.310 | 4.777 | 25.441 |
| 1974 | 7.275 | 24.676 | 0.890 | 23.392 |
| 1975 | 5.667 | 22.780 | -0.867 | 20.237 |
| 1976 | 3.306 | 23.843 | 4.949 | 20.605 |
| 1977 | 3.101 | 23.502 | 3.347 | 20.319 |
| 1978 | 3.546 | 23.783 | 3.008 | 21.289 |

| | | | | |
|---|---|---|---|---|
| 1979 | 4.278 | 25.585 | 4.150 | 20.957 |
| 1980 | 5.451 | 25.376 | 1.409 | 19.650 |
| 1981 | 4.175 | 22.952 | 0.529 | 17.722 |
| 1982 | 4.581 | 21.594 | -0.395 | 17.644 |
| 1983 | 2.808 | 22.330 | 1.572 | 18.430 |
| 1984 | 1.989 | 22.108 | 2.823 | 18.643 |
| 1985 | 2.125 | 21.561 | 2.328 | 19.023 |
| 1986 | 3.000 | 21.580 | 2.287 | 20.758 |
| 1987 | 1.280 | 21.028 | 1.402 | 20.051 |
| 1988 | 1.690 | 21.710 | 3.707 | 21.146 |
| 1989 | 2.879 | 22.619 | 3.897 | 21.907 |
| 1990 | 3.397 | 23.159 | 5.255 | 22.989 |
| 1991 | 3.085 | 24.039 | 5.108 | 22.158 |
| 1992 | 5.400 | 23.488 | 1.912 | 21.807 |
| 1993 | 3.984 | 22.163 | -1.002 | 20.792 |
| 1994 | 2.493 | 22.459 | 2.472 | 20.482 |
| 1995 | 2.009 | 22.338 | 1.677 | 20.534 |
| 1996 | 0.638 | 21.278 | 0.791 | 20.209 |
| 1997 | 0.263 | 21.331 | 1.737 | 20.401 |
| 1998 | 0.590 | 21.847 | 1.862 | 20.713 |
| 1999 | 0.192 | 21.797 | 1.871 | 20.226 |
| 2000 | -0.672 | 22.300 | 3.058 | 20.174 |
| 2001 | 1.125 | 20.346 | 1.514 | 19.919 |
| 2002 | 1.431 | 18.072 | 0.010 | 19.949 |
| 2003 | 1.097 | 17.853 | -0.375 | 19.621 |
| 2004 | 1.071 | 17.631 | 1.161 | 22.271 |
| 2005 | 0.618 | 17.269 | 0.685 | 22.305 |
| 2006 | 0.312 | 18.135 | 3.700 | 24.560 |
| 2007 | 1.630 | 19.261 | 3.269 | 26.639 |
| 2008 | 0.774 | 19.376 | 1.083 | 25.533 |
| 2009 | 1.173 | 16.540 | -5.127 | 22.268 |

Source: World Development Indicators, World Bank

**TABLE: G-3 Total Employment & Unemployment - Germany**

| Years | Total Employment Rate | Total Unemployment Rate |
|---|---|---|
| 1970 | 66.9 | - |
| 1971 | 66.7 | - |
| 1972 | 66.5 | - |
| 1973 | 66.8 | - |
| 1974 | 65.9 | - |
| 1975 | 64.4 | - |
| 1976 | 64.2 | - |
| 1977 | 64.2 | - |
| 1978 | 64.4 | - |
| 1979 | 65 | - |
| 1980 | 65.2 | - |
| 1981 | 64.3 | - |
| 1982 | 62.8 | - |
| 1983 | 61.3 | - |
| 1984 | 61.1 | - |
| 1985 | 61.6 | - |
| 1986 | 62.4 | - |
| 1987 | 62.7 | - |
| 1988 | 63.1 | - |
| 1989 | 63.5 | - |
| 1990 | 64.1 | - |
| 1991 | 67.1 | 4.2 |
| 1992 | 66.2 | 6.3 |
| 1993 | 65.1 | 7.6 |
| 1994 | 64.5 | 8.2 |
| 1995 | 64.6 | 8 |
| 1996 | 64.3 | 8.7 |
| 1997 | 63.8 | 9.7 |
| 1998 | 64.7 | 9.4 |
| 1999 | 65.2 | 8.6 |
| 2000 | 65.6 | 8 |

| | | |
|---|---|---|
| 2001 | 65.8 | 7.9 |
| 2002 | 65.3 | 8.7 |
| 2003 | 64.6 | 9.8 |
| 2004 | 65 | 10.5 |
| 2005 | 65.5 | 11.2 |
| 2006 | 67.2 | 10.2 |
| 2007 | 69 | 8.8 |
| 2008 | 70.2 | 7.6 |
| 2009 | 70.4 | 7.7 |
| 2010 | 71.2 | 7.1 |

Source: OECD Factbook 2007 and OECD Factbook 2011-2012

**TABLE: G-4 Value Added by Major Sectors - Germany**

| Years | Agriculture Value Added (% of GDP) | Industry Value Added (% of GDP) | Service Value Added (% of GDP) |
|---|---|---|---|
| 1970 | 3.67 | 48.09 | 48.24 |
| 1971 | 3.44 | 46.73 | 49.83 |
| 1972 | 3.42 | 45.68 | 50.90 |
| 1973 | 3.25 | 45.11 | 51.64 |
| 1974 | 2.96 | 44.30 | 52.73 |
| 1975 | 3.13 | 42.08 | 54.79 |
| 1976 | 3.16 | 42.33 | 54.51 |
| 1977 | 3.06 | 41.97 | 54.97 |
| 1978 | 2.92 | 42.00 | 55.08 |
| 1979 | 2.62 | 41.70 | 55.68 |
| 1980 | 2.40 | 41.06 | 56.54 |
| 1981 | 2.39 | 40.05 | 57.57 |
| 1982 | 2.52 | 39.52 | 57.96 |
| 1983 | 2.19 | 39.24 | 58.57 |
| 1984 | 2.16 | 38.81 | 59.02 |
| 1985 | 1.92 | 39.05 | 59.03 |
| 1986 | 1.92 | 39.13 | 58.95 |
| 1987 | 1.70 | 38.41 | 59.89 |

| | | | |
|---|---|---|---|
| 1988 | 1.77 | 38.10 | 60.12 |
| 1989 | 1.87 | 37.69 | 60.44 |
| 1990 | 1.49 | 37.34 | 61.17 |
| 1991 | 1.38 | 36.62 | 62.00 |
| 1992 | 1.29 | 35.49 | 63.23 |
| 1993 | 1.22 | 33.20 | 65.57 |
| 1994 | 1.25 | 32.86 | 65.90 |
| 1995 | 1.27 | 32.15 | 66.58 |
| 1996 | 1.32 | 31.24 | 67.44 |
| 1997 | 1.31 | 31.01 | 67.68 |
| 1998 | 1.24 | 30.93 | 67.83 |
| 1999 | 1.23 | 30.26 | 68.51 |
| 2000 | 1.26 | 30.25 | 68.48 |
| 2001 | 1.36 | 29.68 | 68.96 |
| 2002 | 1.15 | 29.15 | 69.70 |
| 2003 | 0.98 | 28.86 | 70.16 |
| 2004 | 1.09 | 29.18 | 69.73 |
| 2005 | 0.88 | 28.96 | 70.16 |
| 2006 | 0.85 | 29.38 | 69.77 |
| 2007 | 0.92 | 30.09 | 68.99 |

Source: World Development Indicators, World Bank

**TABLE: G-5 Value of Oil Imports and Exports- Germany**

| Years | Value of Oil Imports (Billion US $) | Value of Oil Exports (Billion US $) |
|---|---|---|
| 1980 | 26.792 | 2.293 |
| 1981 | 28.351 | 2.628 |
| 1982 | 29.642 | 2.392 |
| 1983 | 27.083 | 2.088 |
| 1984 | 22.668 | 1.782 |
| 1985 | 23.758 | 1.576 |
| 1986 | 32.812 | 2.12 |
| 1987 | 19.069 | 1.908 |

| | | |
|---|---|---|
| 1988 | 17.343 | 2.017 |
| 1989 | 13.706 | 1.814 |
| 1990 | 18.799 | 2.324 |
| 1991 | 23.343 | 3.441 |
| 1992 | 22.525 | 3.403 |
| 1993 | 21.613 | - |
| 1994 | 20.321 | - |
| 1995 | 10.082 | 0.34 |
| 1996 | 12.379 | 0.89 |
| 1997 | 11.497 | 0.877 |
| 1998 | 8.853 | 0.827 |
| 1999 | 9.768 | 0.586 |
| 2000 | 30.786 | 1.632 |
| 2001 | 30.246 | 2.532 |
| 2002 | 30.471 | 2.53 |
| 2003 | 40.947 | 3.931 |
| 2004 | 47.425 | 4.968 |
| 2005 | 65.757 | 4.312 |
| 2006 | 83.027 | 4.186 |
| 2007 | 83.998 | 4.227 |
| 2008 | 122.258 | 5.259 |
| 2009 | 76.544 | 3.615 |

Source: World Economic Outlook Database (Sept 2011) (IMF).

**TABLE: G-6 Foreign Direct Investment Flows- Germany**

| **Years** | **Inward FDI flow % of GDP** | **Outward FDI flow % of GDP** |
|---|---|---|
| 1970 | 0.369 | 0.512 |
| 1971 | 0.451 | 0.499 |
| 1972 | 0.654 | 0.623 |
| 1973 | 0.530 | 0.503 |

| | | |
|---|---|---|
| 1974 | 0.503 | 0.492 |
| 1975 | 0.141 | 0.458 |
| 1976 | 0.262 | 0.519 |
| 1977 | 0.162 | 0.411 |
| 1978 | 0.222 | 0.544 |
| 1979 | 0.203 | 0.583 |
| 1980 | 0.037 | 0.511 |
| 1981 | 0.042 | 0.579 |
| 1982 | 0.100 | 0.402 |
| 1983 | 0.229 | 0.493 |
| 1984 | 0.076 | 0.675 |
| 1985 | 0.124 | 0.798 |
| 1986 | 0.229 | 0.994 |
| 1987 | 0.168 | 0.695 |
| 1988 | 0.086 | 1.073 |
| 1989 | 0.512 | 1.115 |
| 1990 | 0.173 | 1.414 |
| 1991 | 0.261 | 1.268 |
| 1992 | -0.101 | 0.902 |
| 1993 | 0.018 | 0.858 |
| 1994 | 0.332 | 0.879 |
| 1995 | 0.477 | 1.548 |
| 1996 | 0.270 | 2.083 |
| 1997 | 0.567 | 1.935 |
| 1998 | 1.126 | 4.066 |
| 1999 | 2.616 | 5.070 |
| 2000 | 10.434 | 2.976 |
| 2001 | 1.397 | 2.099 |
| 2002 | 2.654 | 0.939 |
| 2003 | 1.325 | 0.238 |
| 2004 | -0.371 | 0.748 |
| 2005 | 1.701 | 2.722 |
| 2006 | 1.906 | 4.067 |
| 2007 | 2.409 | 5.125 |

| | | |
|---|---|---|
| 2008 | 0.116 | 2.122 |
| 2009 | 1.130 | 2.348 |
| 2010 | 1.393 | 3.167 |

Source: UNCTAD

**TABLE: G-7 Exports & Imports of Goods & Services- Germany**

| Years | Exports of Goods & Services (AGR %) | Imports of Goods & Services (AGR %) |
|---|---|---|
| 1971 | 2.35 | 7.37 |
| 1972 | 6.18 | 6.48 |
| 1973 | 10.72 | 3.65 |
| 1974 | 11.79 | 0.44 |
| 1975 | -6.14 | 2.92 |
| 1976 | 10.29 | 10.88 |
| 1977 | 4.00 | 3.66 |
| 1978 | 2.77 | 5.45 |
| 1979 | 4.97 | 9.63 |
| 1980 | 5.46 | 3.09 |
| 1981 | 7.22 | -2.96 |
| 1982 | 3.70 | -0.78 |
| 1983 | -0.50 | 2.70 |
| 1984 | 8.86 | 5.27 |
| 1985 | 7.46 | 4.03 |
| 1986 | -1.19 | 3.24 |
| 1987 | 0.74 | 4.58 |
| 1988 | 5.66 | 5.47 |
| 1989 | 10.28 | 8.59 |
| 1990 | 11.35 | 10.77 |
| 1991 | 11.02 | 10.90 |
| 1992 | -0.75 | 2.78 |
| 1993 | -4.89 | -4.69 |
| 1994 | 8.02 | 8.25 |
| 1995 | 6.35 | 6.51 |

| | | |
|---|---|---|
| 1996 | 6.05 | 3.53 |
| 1997 | 11.71 | 8.22 |
| 1998 | 7.96 | 9.45 |
| 1999 | 5.94 | 8.55 |
| 2000 | 13.53 | 10.17 |
| 2001 | 6.44 | 1.23 |
| 2002 | 4.29 | -1.44 |
| 2003 | 2.46 | 5.36 |
| 2004 | 10.25 | 7.28 |
| 2005 | 7.71 | 6.65 |
| 2006 | 13.07 | 11.92 |
| 2007 | 7.65 | 5.01 |
| 2008 | 2.54 | 3.27 |
| 2009 | -14.28 | -9.38 |

Source: World Bank national accounts data, and OECD National Accounts data files.

Annual Growth Rate: Author's Calculations.

**TABLE: G-8 Total Residential & Non-Residential Patents and Trademarks-Germany**

| **Years** | **Patents & Trademarks (AAGR)** |
|---|---|
| 1970 | -1.489 |
| 1971 | -1.465 |
| 1972 | 5.997 |
| 1973 | -3.873 |
| 1974 | -7.226 |
| 1975 | -3.355 |
| 1976 | 4.391 |
| 1977 | -1.946 |
| 1978 | -1.919 |
| 1979 | 9.189 |
| 1980 | -17.519 |

| | |
|---|---|
| 1981 | -3.501 |
| 1982 | 1.776 |
| 1983 | 1.309 |
| 1984 | -1.192 |
| 1985 | 9.463 |
| 1986 | -0.891 |
| 1987 | 0.785 |
| 1988 | 5.566 |
| 1989 | 3.197 |
| 1990 | 0.272 |
| 1991 | 3.326 |
| 1992 | 1.060 |
| 1993 | 4.867 |
| 1994 | 12.457 |
| 1995 | 5.090 |
| 1996 | 7.096 |
| 1997 | 7.030 |
| 1998 | 11.393 |
| 1999 | 6.972 |
| 2000 | 9.752 |
| 2001 | -13.246 |
| 2002 | -9.775 |
| 2003 | 3.281 |
| 2004 | 3.493 |
| 2005 | 5.158 |
| 2006 | 0.537 |
| 2007 | 2.324 |
| 2008 | -0.736 |
| 2009 | -6.297 |

Source: WIPO

**TABLE: I 1- Macro Economic Situation - Italy**

| Years | Official Exchange Rate | Total Population (AGR %) |
|---|---|---|
| 1960 | 623.988 | - |
| 1961 | 625.000 | 0.670 |
| 1962 | 625.000 | 0.681 |
| 1963 | 625.000 | 0.731 |
| 1964 | 625.000 | 0.825 |
| 1965 | 625.000 | 0.846 |
| 1966 | 625.000 | 0.781 |
| 1967 | 625.000 | 0.727 |
| 1968 | 625.000 | 0.633 |
| 1969 | 625.000 | 0.567 |
| 1970 | 625.000 | 0.530 |
| 1971 | 620.359 | 0.468 |
| 1972 | 583.217 | 0.568 |
| 1973 | 582.996 | 0.680 |
| 1974 | 650.343 | 0.658 |
| 1975 | 652.849 | 0.599 |
| 1976 | 832.335 | 0.500 |
| 1977 | 882.388 | 0.425 |
| 1978 | 848.663 | 0.357 |
| 1979 | 830.862 | 0.290 |
| 1980 | 856.447 | 0.206 |
| 1981 | 1136.765 | 0.120 |
| 1982 | 1352.510 | 0.074 |
| 1983 | 1518.848 | 0.035 |
| 1984 | 1756.961 | 0.023 |
| 1985 | 1909.439 | 0.028 |
| 1986 | 1490.810 | 0.005 |
| 1987 | 1296.070 | 0.011 |
| 1988 | 1301.628 | 0.048 |
| 1989 | 1372.093 | 0.076 |
| 1990 | 1198.102 | 0.083 |
| 1991 | 1240.613 | 0.070 |

| | | |
|---|---|---|
| 1992 | 1232.406 | 0.069 |
| 1993 | 1573.666 | 0.062 |
| 1994 | 1612.445 | 0.021 |
| 1995 | 1628.933 | 0.003 |
| 1996 | 1542.947 | 0.029 |
| 1997 | 1703.097 | 0.055 |
| 1998 | 1736.207 | 0.030 |
| 1999 | - | 0.019 |
| 2000 | - | 0.048 |
| 2001 | - | 0.056 |
| 2002 | - | 0.310 |
| 2003 | - | 0.782 |
| 2004 | - | 0.991 |
| 2005 | | 0.742 |
| 2006 | - | 0.571 |
| 2007 | - | 0.736 |
| 2008 | - | 0.769 |
| 2009 | - | 0.603 |
| 2010 | - | 0.483 |

Source: World Development Indicators, World Bank

**TABLE: I – 2 -Macro Economic Situation- Italy**

| Years | Inflation (Annual %) | Domestic Investment (% of GDP) | GDP growth (Annual %) | Gross Savin (% of GDP) |
|---|---|---|---|---|
| 1971 | 7.179 | 23.802 | 1.818 | 25.214 |
| 1972 | 5.633 | 22.904 | 3.690 | 24.506 |
| 1973 | 12.739 | 26.323 | 7.126 | 24.697 |
| 1974 | 20.246 | 29.730 | 5.500 | 25.447 |
| 1975 | 16.983 | 23.745 | -2.090 | 23.780 |
| 1976 | 17.454 | 26.562 | 7.125 | 25.341 |
| 1977 | 18.477 | 24.409 | 2.561 | 25.349 |
| 1978 | 13.945 | 23.855 | 3.240 | 25.765 |
| 1979 | 15.451 | 24.388 | 5.959 | 25.864 |

| | | | | |
|---|---|---|---|---|
| 1980 | 20.816 | 26.731 | 3.430 | 24.483 |
| 1981 | 18.787 | 24.660 | 0.844 | 22.240 |
| 1982 | 17.541 | 23.702 | 0.414 | 21.928 |
| 1983 | 15.097 | 22.218 | 1.169 | 22.512 |
| 1984 | 10.762 | 23.280 | 3.226 | 22.602 |
| 1985 | 9.175 | 23.139 | 2.798 | 22.203 |
| 1986 | 7.488 | 21.718 | 2.860 | 21.801 |
| 1987 | 6.009 | 22.098 | 3.192 | 21.641 |
| 1988 | 6.650 | 22.548 | 4.194 | 21.699 |
| 1989 | 6.197 | 22.298 | 3.388 | 20.988 |
| 1990 | 8.395 | 22.345 | 2.053 | 20.674 |
| 1991 | 7.541 | 22.020 | 1.534 | 19.817 |
| 1992 | 4.400 | 21.426 | 0.773 | 18.876 |
| 1993 | 3.911 | 18.867 | -0.888 | 19.564 |
| 1994 | 3.551 | 18.745 | 2.152 | 19.595 |
| 1995 | 4.966 | 19.835 | 2.827 | 21.686 |
| 1996 | 4.810 | 19.167 | 1.095 | 21.996 |
| 1997 | 2.562 | 19.358 | 1.872 | 22.232 |
| 1998 | 2.623 | 19.621 | 1.401 | 21.396 |
| 1999 | 1.783 | 20.061 | 1.464 | 21.037 |
| 2000 | 1.912 | 20.695 | 3.693 | 20.492 |
| 2001 | 2.963 | 20.580 | 1.818 | 20.777 |
| 2002 | 3.261 | 21.130 | 0.454 | 20.857 |
| 2003 | 3.116 | 20.668 | -0.017 | 19.864 |
| 2004 | 2.635 | 20.799 | 1.532 | 20.350 |
| 2005 | 2.058 | 20.690 | 0.656 | 19.607 |
| 2006 | 1.837 | 21.615 | 2.036 | 19.713 |
| 2007 | 2.573 | 21.870 | 1.482 | 20.075 |
| 2008 | 2.756 | 21.238 | -1.323 | 18.047 |
| 2009 | 2.270 | 18.911 | -5.217 | 16.205 |

Source: World Development Indicators, World Bank

**TABLE: I-3 Total Employment & Unemployment- Italy**

| Years | Total Employment Rate | Total Unemployment Rate |
|---|---|---|
| 1970 | 52 | - |
| 1971 | 51.9 | - |
| 1972 | 51 | - |
| 1973 | 51.1 | - |
| 1974 | 51.5 | - |
| 1975 | 51.4 | - |
| 1976 | 51.5 | - |
| 1977 | 53.4 | - |
| 1978 | 53.2 | - |
| 1979 | 53.4 | 5.8 |
| 1980 | 53.9 | 4.8 |
| 1981 | 54 | 5.5 |
| 1982 | 53.5 | 6.5 |
| 1983 | 52.6 | 7.4 |
| 1984 | 52 | 7.8 |
| 1985 | 51.9 | 8.2 |
| 1986 | 51.9 | 8.9 |
| 1987 | 51.9 | 9.6 |
| 1988 | 52 | 9.7 |
| 1989 | 52 | 9.7 |
| 1990 | 52.6 | 8.9 |
| 1991 | 52.6 | 8.5 |
| 1992 | 52.3 | 8.8 |
| 1993 | 52.5 | 9.8 |
| 1994 | 51.5 | 10.6 |
| 1995 | 51.2 | 11.2 |
| 1996 | 51.4 | 11.2 |
| 1997 | 51.6 | 11.2 |
| 1998 | 52.2 | 11.4 |
| 1999 | 52.9 | 11 |
| 2000 | 53.9 | 10.1 |
| 2001 | 54.9 | 9.1 |

| | | |
|---|---|---|
| 2002 | 55.6 | 8.7 |
| 2003 | 56.2 | 8.5 |
| 2004 | 57.4 | 8.1 |
| 2005 | 57.5 | 7.7 |
| 2006 | 58.4 | 6.8 |
| 2007 | 58.7 | 6.1 |
| 2008 | 58.7 | 6.8 |
| 2009 | 57.5 | 7.8 |
| 2010 | 56.9 | 8.4 |

Source: OECD Factbook 2009 and OECD Factbook 2011-2012

**TABLE: I-4 Value Added by Major Sectors- Italy**

| Years | Agriculture Value Added (% of GDP) | Industry Value Added (% of GDP) | Service Value Added (% of GDP) |
|---|---|---|---|
| 1970 | 8.75 | 39.29 | 51.96 |
| 1971 | 8.34 | 38.30 | 53.35 |
| 1972 | 7.60 | 37.42 | 54.98 |
| 1973 | 8.09 | 38.64 | 53.28 |
| 1974 | 7.23 | 40.24 | 52.53 |
| 1975 | 7.48 | 38.59 | 53.93 |
| 1976 | 7.01 | 39.67 | 53.32 |
| 1977 | 6.74 | 39.02 | 54.24 |
| 1978 | 6.64 | 37.97 | 55.38 |
| 1979 | 6.34 | 37.83 | 55.83 |
| 1980 | 6.02 | 38.07 | 55.91 |
| 1981 | 5.62 | 37.11 | 57.28 |
| 1982 | 5.38 | 36.20 | 58.42 |
| 1983 | 5.47 | 35.03 | 59.50 |
| 1984 | 4.97 | 34.82 | 60.21 |
| 1985 | 4.67 | 34.28 | 61.05 |
| 1986 | 4.48 | 33.29 | 62.23 |
| 1987 | 4.30 | 33.07 | 62.64 |
| 1988 | 3.88 | 32.71 | 63.41 |

| | | | |
|---|---|---|---|
| 1989 | 3.77 | 33.01 | 63.22 |
| 1990 | 3.49 | 32.09 | 64.42 |
| 1991 | 3.58 | 31.12 | 65.30 |
| 1992 | 3.45 | 30.60 | 65.95 |
| 1993 | 3.32 | 30.09 | 66.59 |
| 1994 | 3.31 | 30.11 | 66.59 |
| 1995 | 3.31 | 30.28 | 66.42 |
| 1996 | 3.30 | 29.74 | 66.96 |
| 1997 | 3.20 | 29.49 | 67.31 |
| 1998 | 3.09 | 29.39 | 67.52 |
| 1999 | 3.02 | 28.69 | 68.30 |
| 2000 | 2.80 | 28.43 | 68.78 |
| 2001 | 2.67 | 28.11 | 69.22 |
| 2002 | 2.56 | 27.78 | 69.65 |
| 2003 | 2.53 | 27.08 | 70.39 |
| 2004 | 2.52 | 27.00 | 70.47 |
| 2005 | 2.20 | 26.90 | 70.90 |
| 2006 | 2.11 | 26.83 | 71.06 |
| 2007 | 2.04 | 27.03 | 70.93 |

Source: World Development Indicators, World Bank

**TABLE: I-5 Value of Oil Imports & Exports- Italy**

| Years | Value of Oil Imports (Billion US $) | Value of Oil Exports (Billion US $) |
|---|---|---|
| 1980 | 17.706 | 3.066 |
| 1981 | 25.503 | 4.38 |
| 1982 | 26.769 | 5.589 |
| 1983 | 27.048 | 4.861 |
| 1984 | 27.933 | 4.851 |
| 1985 | 31.027 | 5.817 |
| 1986 | 14.708 | 3.412 |

| | | |
|---|---|---|
| 1987 | 14.721 | 3.129 |
| 1988 | 11.462 | 2.65 |
| 1989 | 15.205 | 3.06 |
| 1990 | 17.621 | 3.76 |
| 1991 | 15.168 | 3.629 |
| 1992 | 14.401 | 3.659 |
| 1993 | 12.243 | 3.316 |
| 1994 | 12.031 | 3.327 |
| 1995 | 12.871 | 2.913 |
| 1996 | 15.469 | 3.471 |
| 1997 | 14.891 | 3.751 |
| 1998 | 10.268 | 3.03 |
| 1999 | 12.867 | 3.85 |
| 2000 | 20.059 | 6.127 |
| 2001 | 18.031 | 5.55 |
| 2002 | 18.653 | 5.566 |
| 2003 | 22.111 | 6.397 |
| 2004 | 28.757 | 8.349 |
| 2005 | 38.948 | 11.227 |
| 2006 | 47.965 | 13.871 |
| 2007 | 54.682 | 15.908 |
| 2008 | 67.824 | 19.741 |
| 2009 | 41.439 | 11.42 |

Source: World Economic Outlook Database (Sept 2011), IMF

**TABLE: I-6 Foreign Direct Investment Flows- Italy**

| **Years** | **Inward FDI flow % of GDP** | **Outward FDI flow % of GDP** |
|---|---|---|
| 1970 | 0.571 | 0.105 |
| 1971 | 0.458 | 0.338 |
| 1972 | 0.481 | 0.158 |
| 1973 | 0.393 | 0.163 |
| 1974 | 0.310 | 0.106 |

| | | |
|---|---|---|
| 1975 | 0.294 | 0.156 |
| 1976 | 0.050 | 0.074 |
| 1977 | 0.455 | 0.226 |
| 1978 | 0.157 | 0.053 |
| 1979 | 0.110 | 0.142 |
| 1980 | 0.125 | 0.161 |
| 1981 | 0.272 | 0.335 |
| 1982 | 0.150 | 0.235 |
| 1983 | 0.279 | 0.474 |
| 1984 | 0.313 | 0.446 |
| 1985 | 0.246 | 0.398 |
| 1986 | -0.028 | 0.398 |
| 1987 | 0.538 | 0.270 |
| 1988 | 0.792 | 0.548 |
| 1989 | 0.283 | 0.224 |
| 1990 | 0.560 | 0.672 |
| 1991 | 0.208 | 0.613 |
| 1992 | 0.254 | 0.470 |
| 1993 | 0.367 | 0.707 |
| 1994 | 0.212 | 0.485 |
| 1995 | 0.428 | 0.509 |
| 1996 | 0.281 | 0.513 |
| 1997 | 0.416 | 1.027 |
| 1998 | 0.352 | 1.321 |
| 1999 | 0.576 | 0.560 |
| 2000 | 1.219 | 1.122 |
| 2001 | 1.331 | 1.922 |
| 2002 | 1.193 | 1.405 |
| 2003 | 1.089 | 0.602 |
| 2004 | 0.973 | 1.115 |
| 2005 | 1.124 | 2.353 |
| 2006 | 2.106 | 2.258 |
| 2007 | 1.900 | 4.290 |
| 2008 | -0.472 | 2.917 |

| | | |
|---|---|---|
| 2009 | 0.950 | 1.007 |
| 2010 | 0.463 | 1.024 |

Source: UNCTAD

**TABLE: I-7 Exports & Imports of Goods & Services- Italy**

| Years | Exports of Goods & Services (AGR %) | Imports of Goods &Services (AGR %) |
|---|---|---|
| 1961 | 14.75 | 13.73 |
| 1962 | 10.36 | 14.93 |
| 1963 | 6.48 | 22.54 |
| 1964 | 10.80 | -6.15 |
| 1965 | 19.98 | 2.00 |
| 1966 | 11.18 | 14.03 |
| 1967 | 7.17 | 13.49 |
| 1968 | 13.87 | 5.88 |
| 1969 | 11.76 | 19.29 |
| 1970 | 5.82 | 16.01 |
| 1971 | 7.44 | 2.98 |
| 1972 | 8.47 | 9.95 |
| 1973 | 5.99 | 9.65 |
| 1974 | 7.15 | 3.07 |
| 1975 | 1.68 | -14.15 |
| 1976 | 11.96 | 13.56 |
| 1977 | 10.64 | 1.55 |
| 1978 | 10.86 | 5.96 |
| 1979 | 7.80 | 11.99 |
| 1980 | -8.36 | 5.57 |
| 1981 | 6.84 | -0.81 |
| 1982 | -1.31 | -0.05 |
| 1983 | 3.80 | -3.06 |
| 1984 | 7.70 | 12.82 |
| 1985 | 3.57 | 4.28 |
| 1986 | 1.68 | 5.32 |

| | | |
|---|---|---|
| 1987 | 4.11 | 12.03 |
| 1988 | 5.19 | 5.96 |
| 1989 | 8.53 | 8.55 |
| 1990 | 6.86 | 9.63 |
| 1991 | -2.12 | 2.22 |
| 1992 | 6.81 | 6.93 |
| 1993 | 8.70 | -11.65 |
| 1994 | 9.61 | 7.77 |
| 1995 | 12.40 | 9.31 |
| 1996 | 1.50 | -0.49 |
| 1997 | 5.14 | 9.36 |
| 1998 | 2.50 | 9.41 |
| 1999 | -0.39 | 4.89 |
| 2000 | 11.93 | 9.77 |
| 2001 | 2.60 | 1.75 |
| 2002 | -2.86 | 0.23 |
| 2003 | -2.00 | 1.20 |
| 2004 | 4.87 | 4.17 |
| 2005 | 1.09 | 2.08 |
| 2006 | 6.22 | 5.94 |
| 2007 | 4.56 | 3.78 |
| 2008 | -3.88 | -4.32 |
| 2009 | -19.13 | -14.54 |

Source: World Bank National Accounts Data and OECD National Accounts files.

Annual Growth Rate: Author's Calculations.

**TABLE: I-8 Total Residential & Non-Residential Patents & Trademarks-Italy**

| Years | Patents & Trademarks |
|---|---|
| | AGR % |
| 1970 | -3.800 |
| 1971 | -3.961 |
| 1972 | 4.648 |
| 1973 | -9.459 |
| 1974 | -5.315 |
| 1975 | -4.154 |
| 1976 | 1.623 |
| 1977 | 1.379 |
| 1978 | 3.077 |
| 1979 | -14.765 |
| 1980 | -7.223 |
| 1981 | -3.395 |
| 1982 | 1.324 |
| 1983 | -3.340 |
| 1984 | 3.867 |
| 1985 | 19.455 |
| 1986 | -13.928 |
| 1987 | 11.841 |
| 1988 | 18.007 |
| 1989 | -2.772 |
| 1990 | -4.379 |
| 1991 | -5.864 |
| 1992 | -4.272 |
| 1993 | -3.168 |
| 1994 | 23.279 |
| 1995 | 9.018 |
| 1996 | 21.789 |
| 1997 | 2.566 |
| 1998 | 4.527 |
| 1999 | 3.305 |

| | |
|---|---|
| 2000 | 15.851 |
| 2001 | -4.547 |
| 2002 | -2.437 |
| 2003 | -0.620 |
| 2004 | 4.399 |
| 2005 | 3.863 |
| 2006 | -0.704 |
| 2007 | 4.584 |
| 2008 | -2.849 |
| 2009 | -27.759 |

Source: WIPO

**TABLE: P-1 Macro Economic Situation - Portugal**

| Years | Official Exchange Rate | Total Population (AGR %) |
|---|---|---|
| 1960 | 28.750 | |
| 1961 | 28.750 | -0.061 |
| 1962 | 28.750 | 0.920 |
| 1963 | 28.750 | 0.685 |
| 1964 | 28.750 | 0.450 |
| 1965 | 28.750 | 0.070 |
| 1966 | 28.750 | -0.220 |
| 1967 | 28.750 | -0.064 |
| 1968 | 28.750 | 0.133 |
| 1969 | 28.750 | -0.196 |
| 1970 | 28.750 | -0.583 |
| 1971 | 28.360 | -4.425 |
| 1972 | 27.053 | -0.150 |
| 1973 | 24.515 | 0.023 |
| 1974 | 25.408 | 1.402 |
| 1975 | 25.553 | 3.873 |
| 1976 | 30.229 | 2.881 |
| 1977 | 38.277 | 1.069 |
| 1978 | 43.937 | 1.089 |

| | | |
|---|---|---|
| 1979 | 48.923 | 1.078 |
| 1980 | 50.062 | 1.087 |
| 1981 | 61.546 | 0.870 |
| 1982 | 79.473 | 0.614 |
| 1983 | 110.780 | 0.434 |
| 1984 | 146.390 | 0.347 |
| 1985 | 170.395 | 0.224 |
| 1986 | 149.587 | -0.007 |
| 1987 | 140.882 | -0.167 |
| 1988 | 143.954 | -0.260 |
| 1989 | 157.458 | -0.311 |
| 1990 | 142.555 | -0.413 |
| 1991 | 144.482 | 0.394 |
| 1992 | 134.998 | 0.282 |
| 1993 | 160.800 | 0.110 |
| 1994 | 165.993 | 0.241 |
| 1995 | 151.106 | 0.290 |
| 1996 | 154.244 | 0.279 |
| 1997 | 175.312 | 0.338 |
| 1998 | 180.104 | 0.396 |
| 1999 | - | 0.444 |
| 2000 | - | 0.509 |
| 2001 | - | 0.657 |
| 2002 | - | 0.733 |
| 2003 | - | 0.701 |
| 2004 | - | 0.583 |
| 2005 | - | 0.452 |
| 2006 | - | 0.331 |
| 2007 | - | 0.227 |
| 2008 | - | 0.133 |
| 2009 | - | 0.095 |
| 2010 | - | 0.097 |

Source: World Development Indicators, World Bank

**TABLE: P-2 Macro Economic Situation - Portugal**

| Years | Inflation (Annual %) | Domestic Investment (% of GDP) | GDP growth (Annual %) | Gross Savings (% of GDP) |
|---|---|---|---|---|
| 1971 | 5.017 | 25.925 | 6.632 | - |
| 1972 | 7.805 | 28.535 | 8.016 | - |
| 1973 | 9.466 | 31.043 | 11.201 | - |
| 1974 | 18.865 | 29.441 | 1.143 | - |
| 1975 | 16.230 | 19.313 | -4.348 | 14.566 |
| 1976 | 16.274 | 24.603 | 6.900 | 17.620 |
| 1977 | 26.400 | 29.907 | 5.603 | 21.935 |
| 1978 | 22.348 | 31.395 | 2.816 | 26.482 |
| 1979 | 19.437 | 30.380 | 5.639 | 28.841 |
| 1980 | 20.903 | 33.782 | 4.589 | 28.672 |
| 1981 | 17.609 | 35.594 | 1.618 | 25.163 |
| 1982 | 20.690 | 35.127 | 2.135 | 23.378 |
| 1983 | 24.605 | 29.113 | -0.173 | 21.570 |
| 1984 | 24.676 | 22.895 | -1.880 | 18.874 |
| 1985 | 21.735 | 21.252 | 2.807 | 20.711 |
| 1986 | 20.451 | 23.008 | 4.141 | 24.762 |
| 1987 | 10.097 | 27.185 | 6.381 | 27.344 |
| 1988 | 11.165 | 30.255 | 7.489 | 27.909 |
| 1989 | 10.514 | 28.093 | 6.441 | 28.088 |
| 1990 | 13.145 | 27.525 | 3.951 | 26.886 |
| 1991 | 10.086 | 25.556 | 4.368 | 24.287 |
| 1992 | 11.446 | 24.769 | 1.089 | 24.446 |
| 1993 | 7.376 | 21.989 | -2.043 | 21.954 |
| 1994 | 7.278 | 22.788 | 0.965 | 20.746 |
| 1995 | 3.429 | 24.022 | 4.283 | 23.610 |
| 1996 | 2.342 | 24.242 | 3.660 | 20.720 |
| 1997 | 3.926 | 26.287 | 4.383 | 20.787 |
| 1998 | 3.793 | 28.177 | 5.050 | 21.473 |
| 1999 | 3.296 | 28.784 | 4.077 | 20.486 |
| 2000 | 3.244 | 28.499 | 3.926 | 18.263 |

| | | | | |
|---|---|---|---|---|
| 2001 | 3.576 | 27.785 | 1.967 | 17.753 |
| 2002 | 3.740 | 25.819 | 0.710 | 18.029 |
| 2003 | 3.009 | 23.564 | -0.931 | 17.795 |
| 2004 | 2.468 | 24.062 | 1.558 | 16.559 |
| 2005 | 2.517 | 23.630 | 0.757 | 14.171 |
| 2006 | 2.778 | 23.134 | 1.440 | 12.974 |
| 2007 | 3.182 | 22.828 | 2.386 | 13.195 |
| 2008 | 1.582 | 23.152 | -0.008 | 10.951 |
| 2009 | 0.545 | 19.916 | -2.506 | 9.643 |

Source: World Development Indicators, World Bank

**TABLE: P-3 Total Employment & Unemployment - Portugal**

| Years | Total Employment Rate | Total Unemployment Rate |
|---|---|---|
| 1974 | 67.1 | - |
| 1975 | 64.4 | - |
| 1976 | 63.5 | - |
| 1977 | 63.2 | - |
| 1978 | 62.9 | - |
| 1979 | 63.9 | |
| 1980 | 64.3 | - |
| 1981 | 64.6 | - |
| 1982 | 64.5 | - |
| 1983 | 65.5 | 8.1 |
| 1984 | 64.1 | 8.9 |
| 1985 | 63.6 | 9.1 |
| 1986 | 63 | 8.8 |
| 1987 | 64.5 | 7.2 |
| 1988 | 65.9 | 5.8 |
| 1989 | 66.6 | 5.2 |
| 1990 | 67.4 | 4.8 |
| 1991 | 68.6 | 4.2 |
| 1992 | 66.5 | 4.1 |
| 1993 | 64.9 | 5.5 |

| | | |
|---|---|---|
| 1994 | 64 | 6.8 |
| 1995 | 63.2 | 7.2 |
| 1996 | 63.6 | 7.2 |
| 1997 | 64.7 | 6.7 |
| 1998 | 66.8 | 5.6 |
| 1999 | 67.4 | 5 |
| 2000 | 68.3 | 4.5 |
| 2001 | 68.6 | 4.6 |
| 2002 | 68.1 | 5.7 |
| 2003 | 67.1 | 7.1 |
| 2004 | 67.8 | 7.5 |
| 2005 | 67.5 | 8.6 |
| 2006 | 67.9 | 8.6 |
| 2007 | 67.8 | 8.9 |
| 2008 | 68.2 | 8.5 |
| 2009 | 66.3 | 10.6 |
| 2010 | 65.6 | 12 |

Source: OECD Factbook 2009 and OECD Factbook 2011-2012

**TABLE: P-4 Value Added by Major Sectors - Portugal**

| Years | Agriculture Value Added (% of GDP) | Industry Value Added (% of GDP) | Service Value Added (% of GDP) |
|---|---|---|---|
| 1970 | 31.19 | 30.34 | 38.47 |
| 1971 | 29.59 | 31.36 | 39.05 |
| 1972 | 27.73 | 32.09 | 40.18 |
| 1973 | 28.21 | 32.11 | 39.68 |
| 1974 | 26.40 | 33.58 | 40.02 |
| 1975 | 26.77 | 31.48 | 41.75 |
| 1976 | 25.15 | 30.98 | 43.87 |
| 1977 | 25.15 | 30.99 | 43.86 |
| 1978 | 23.67 | 29.70 | 46.63 |
| 1979 | 21.88 | 28.67 | 49.45 |
| 1980 | 19.57 | 29.51 | 50.91 |

| | | | |
|---|---|---|---|
| 1981 | 17.53 | 30.42 | 52.05 |
| 1982 | 17.25 | 30.17 | 52.58 |
| 1983 | 15.97 | 30.87 | 53.16 |
| 1984 | 15.97 | 29.43 | 54.60 |
| 1985 | 15.41 | 29.39 | 55.20 |
| 1986 | 14.03 | 27.48 | 58.49 |
| 1987 | 14.51 | 27.24 | 58.25 |
| 1988 | 11.67 | 29.13 | 59.20 |
| 1989 | 10.28 | 29.01 | 60.71 |
| 1990 | 9.18 | 28.45 | 62.36 |
| 1991 | 8.37 | 27.17 | 64.46 |
| 1992 | 6.92 | 27.15 | 65.93 |
| 1993 | 6.60 | 26.57 | 66.83 |
| 1994 | 6.19 | 27.48 | 66.33 |
| 1995 | 5.80 | 28.25 | 65.95 |
| 1996 | 5.54 | 28.87 | 65.59 |
| 1997 | 4.64 | 29.08 | 66.28 |
| 1998 | 4.30 | 28.84 | 66.86 |
| 1999 | 3.99 | 28.33 | 67.68 |
| 2000 | 3.78 | 27.58 | 68.64 |
| 2001 | 3.60 | 27.27 | 69.13 |
| 2002 | 3.32 | 26.79 | 69.89 |
| 2003 | 3.25 | 25.82 | 70.93 |
| 2004 | 3.17 | 25.39 | 71.44 |
| 2005 | 2.84 | 24.53 | 72.63 |
| 2006 | 2.93 | 24.32 | 72.75 |
| 2007 | 2.65 | 24.46 | 72.89 |

Source: World Development Indicators, World Bank

**TABLE: P-5 Value of Oil Imports & Exports - Portugal**

| Years | Value of Oil Imports (Billion US $) | Value of Oil Exports (Billion US $) |
|---|---|---|
| 1980 | 1.678 | - |
| 1981 | 1.962 | - |
| 1982 | 1.953 | - |
| 1983 | 1.619 | - |
| 1984 | 1.686 | - |
| 1985 | 1.533 | - |
| 1986 | 0.973 | - |
| 1987 | 1.099 | - |
| 1988 | 0.911 | - |
| 1989 | 1.306 | - |
| 1990 | 1.841 | - |
| 1991 | 2.191 | - |
| 1992 | 2.219 | - |
| 1993 | 1.919 | - |
| 1994 | 2.319 | - |
| 1995 | 2.211 | 0 |
| 1996 | 2.681 | 0.396 |
| 1997 | 2.737 | 0.434 |
| 1998 | 2.048 | 0.313 |
| 1999 | 2.696 | 0.377 |
| 2000 | 4.412 | 0.586 |
| 2001 | 4.33 | 0.52 |
| 2002 | 4.15 | 0.617 |
| 2003 | 4.247 | 0.649 |
| 2004 | 5.079 | 0.732 |
| 2005 | 7.016 | 1.14 |
| 2006 | 7.935 | 1.76 |
| 2007 | 7.812 | 1.566 |
| 2008 | 10.086 | 2.127 |
| 2009 | 6.292 | 1.5 |

Source: World Development Indicators, World Bank

**TABLE: P-6 Foreign Direct Investment Flows - Portugal**

| Years | Inward FDI flow % of GDP | Outward FDI flow % of GDP |
|---|---|---|
| 1970 | 0.362 | - |
| 1971 | 0.617 | - |
| 1972 | 0.659 | 0.063 |
| 1973 | 0.639 | 0.296 |
| 1974 | 0.614 | 0.214 |
| 1975 | 0.605 | 0.042 |
| 1976 | 0.314 | 0.026 |
| 1977 | 0.274 | 0.013 |
| 1978 | 0.285 | 0.026 |
| 1979 | 0.298 | -0.031 |
| 1980 | 0.507 | 0.038 |
| 1981 | 0.581 | 0.029 |
| 1982 | 0.518 | 0.155 |
| 1983 | 0.578 | 0.074 |
| 1984 | 0.885 | 0.046 |
| 1985 | 1.098 | 0.084 |
| 1986 | 0.715 | 0.049 |
| 1987 | 1.086 | -0.024 |
| 1988 | 1.786 | 0.082 |
| 1989 | 3.028 | 0.159 |
| 1990 | 3.740 | 0.210 |
| 1991 | 2.897 | 0.536 |
| 1992 | 2.091 | 0.649 |
| 1993 | 1.638 | 0.157 |
| 1994 | 1.292 | 0.292 |
| 1995 | 0.588 | 0.591 |
| 1996 | 1.110 | 0.602 |
| 1997 | 2.043 | 1.810 |
| 1998 | 2.452 | 3.288 |
| 1999 | 0.917 | 2.531 |
| 2000 | 5.671 | 6.950 |

| | | |
|---|---|---|
| 2001 | 5.191 | 5.217 |
| 2002 | 1.364 | -0.113 |
| 2003 | 4.429 | 4.079 |
| 2004 | 1.047 | 4.033 |
| 2005 | 2.055 | 1.104 |
| 2006 | 5.422 | 3.551 |
| 2007 | 1.323 | 2.377 |
| 2008 | 1.850 | 1.087 |
| 2009 | 1.159 | 0.350 |
| 2010 | 0.635 | -3.766 |

Source: UNCTAD

**TABLE: P-7 Exports & Imports of Goods & Services - Portugal**

| Years | Exports of Goods&Services (AG %) | Imports of Goods&Services (AG %) |
|---|---|---|
| 1961 | -2.08 | 24.92 |
| 1962 | 19.15 | -8.51 |
| 1963 | 0.60 | 9.86 |
| 1964 | 40.38 | 29.46 |
| 1965 | 11.06 | 9.47 |
| 1966 | 16.32 | 8.42 |
| 1967 | 3.58 | -6.02 |
| 1968 | -3.39 | 33.05 |
| 1969 | 2.89 | 7.60 |
| 1970 | -3.67 | 0.88 |
| 1971 | 9.88 | 14.51 |
| 1972 | 18.55 | 12.04 |
| 1973 | 4.18 | 12.65 |
| 1974 | -15.71 | 4.76 |
| 1975 | -15.59 | -25.22 |
| 1976 | 0.00 | 3.40 |
| 1977 | 5.90 | 12.00 |
| 1978 | 9.09 | 0.18 |

| | | |
|---|---|---|
| 1979 | 32.97 | 12.58 |
| 1980 | 2.22 | 6.92 |
| 1981 | -4.44 | 2.33 |
| 1982 | 4.67 | 3.87 |
| 1983 | 13.61 | -6.14 |
| 1984 | 11.64 | -4.44 |
| 1985 | 6.67 | 1.41 |
| 1986 | 6.76 | 16.88 |
| 1987 | 11.21 | 23.06 |
| 1988 | 8.18 | 17.98 |
| 1989 | 12.20 | 5.90 |
| 1990 | 9.49 | 14.51 |
| 1991 | 1.16 | 7.24 |
| 1992 | 3.24 | 10.71 |
| 1993 | -3.27 | -3.30 |
| 1994 | 8.39 | 8.83 |
| 1995 | 8.84 | 7.42 |
| 1996 | 7.17 | 5.84 |
| 1997 | 7.24 | 10.56 |
| 1998 | 8.20 | 14.56 |
| 1999 | 3.83 | 9.00 |
| 2000 | 8.80 | 5.56 |
| 2001 | 1.81 | 0.99 |
| 2002 | 2.77 | -0.46 |
| 2003 | 3.63 | -0.45 |
| 2004 | 4.09 | 7.59 |
| 2005 | 0.23 | 2.27 |
| 2006 | 11.59 | 7.17 |
| 2007 | 7.58 | 5.51 |
| 2008 | -0.28 | 2.82 |
| 2009 | -11.83 | -10.80 |

Source: World Bank national accounts data, and OECD National Accounts data files.

**TABLE: P-8 Total Residential & Non-Residential Patents & Trademarks - Portugal**

| Years | Patents & Trademarks (AGR %) |
|---|---|
| 1970 | 10.089 |
| 1971 | 1.784 |
| 1972 | 10.791 |
| 1973 | -13.013 |
| 1974 | -23.870 |
| 1975 | -0.497 |
| 1976 | -1.949 |
| 1977 | -44.474 |
| 1978 | 111.960 |
| 1979 | 9.020 |
| 1980 | 15.810 |
| 1981 | 6.394 |
| 1982 | -10.762 |
| 1983 | -4.140 |
| 1984 | 5.896 |
| 1985 | 83.584 |
| 1986 | -28.678 |
| 1987 | -3.619 |
| 1988 | 34.598 |
| 1989 | 20.126 |
| 1990 | 95.131 |
| 1991 | -8.229 |
| 1992 | -3.043 |
| 1993 | -6.396 |
| 1994 | 1.664 |
| 1995 | -20.335 |
| 1996 | -3.548 |
| 1997 | 1.431 |
| 1998 | -16.418 |
| 1999 | 23.179 |
| 2000 | 16.046 |

| | |
|---|---|
| 2001 | -8.162 |
| 2002 | -12.321 |
| 2003 | 0.864 |
| 2004 | -0.863 |
| 2005 | 4.687 |
| 2006 | 14.953 |
| 2007 | 14.960 |
| 2008 | 0.324 |
| 2009 | -86.090 |

Source: WIPO

**TABLE: S-1 Macro Economic Situation - Spain**

| Years | Official Exchange Rate | Total Population (AGR %) |
|---|---|---|
| 1960 | 60.000 | - |
| 1961 | 60.000 | 0.948 |
| 1962 | 60.000 | 1.051 |
| 1963 | 60.000 | 1.049 |
| 1964 | 60.000 | 1.051 |
| 1965 | 60.000 | 1.053 |
| 1966 | 60.000 | 1.051 |
| 1967 | 61.667 | 1.053 |
| 1968 | 70.000 | 1.051 |
| 1969 | 70.000 | 1.052 |
| 1970 | 70.000 | 1.053 |
| 1971 | 69.469 | 1.217 |
| 1972 | 64.271 | 0.755 |
| 1973 | 58.260 | 1.051 |
| 1974 | 57.686 | 0.968 |
| 1975 | 57.407 | 1.047 |
| 1976 | 66.903 | 1.188 |
| 1977 | 75.962 | 1.197 |
| 1978 | 76.668 | 1.130 |
| 1979 | 67.125 | 0.897 |

| | | |
|---|---|---|
| 1980 | 71.702 | 0.749 |
| 1981 | 92.322 | 0.950 |
| 1982 | 109.859 | 0.535 |
| 1983 | 143.430 | 0.469 |
| 1984 | 160.761 | 0.399 |
| 1985 | 170.044 | 0.353 |
| 1986 | 140.048 | 0.289 |
| 1987 | 123.478 | 0.234 |
| 1988 | 116.487 | 0.212 |
| 1989 | 118.378 | 0.199 |
| 1990 | 101.934 | 0.175 |
| 1991 | 103.912 | 0.265 |
| 1992 | 102.379 | 0.331 |
| 1993 | 127.260 | 0.311 |
| 1994 | 133.958 | 0.269 |
| 1995 | 124.689 | 0.234 |
| 1996 | 126.662 | 0.231 |
| 1997 | 146.414 | 0.264 |
| 1998 | 149.395 | 0.350 |
| 1999 | - | 0.516 |
| 2000 | - | 0.844 |
| 2001 | - | 1.136 |
| 2002 | - | 1.457 |
| 2003 | - | 1.671 |
| 2004 | - | 1.636 |
| 2005 | - | 1.655 |
| 2006 | - | 1.655 |
| 2007 | - | 1.728 |
| 2008 | - | 1.508 |
| 2009 | - | 0.775 |
| 2010 | - | 0.377 |

Source: World Development Indicators, World Bank

**TABLE: S-2 Macro Economic Situation - Spain**

| Years | Inflation (Annual %) | Domestic Investment (% of GDP) | GDP growth (Annual %) | Gross Savings (% of GDP) |
|---|---|---|---|---|
| 1971 | 7.846 | 25.352 | 4.649 | - |
| 1972 | 8.518 | 26.558 | 8.150 | - |
| 1973 | 11.850 | 27.906 | 7.788 | - |
| 1974 | 15.945 | 30.966 | 5.619 | - |
| 1975 | 16.782 | 29.277 | 0.542 | 25.856 |
| 1976 | 16.490 | 27.634 | 3.304 | 23.305 |
| 1977 | 23.383 | 25.637 | 2.839 | 23.554 |
| 1978 | 20.631 | 23.504 | 1.463 | 23.987 |
| 1979 | 16.932 | 22.913 | 0.042 | 23.062 |
| 1980 | 13.355 | 23.699 | 2.209 | 21.174 |
| 1981 | 12.351 | 22.080 | -0.132 | 19.234 |
| 1982 | 13.582 | 21.960 | 1.246 | 19.310 |
| 1983 | 11.884 | 21.129 | 1.770 | 19.153 |
| 1984 | 10.865 | 20.028 | 1.785 | 20.811 |
| 1985 | 8.595 | 20.245 | 2.321 | 21.609 |
| 1986 | 10.879 | 21.129 | 3.253 | 22.471 |
| 1987 | 5.944 | 22.521 | 5.547 | 22.389 |
| 1988 | 5.936 | 24.649 | 5.094 | 23.514 |
| 1989 | 6.896 | 25.940 | 4.827 | 22.988 |
| 1990 | 7.326 | 26.096 | 3.781 | 22.466 |
| 1991 | 6.935 | 25.299 | 2.546 | 21.876 |
| 1992 | 6.711 | 23.402 | 0.929 | 20.066 |
| 1993 | 4.537 | 20.871 | -1.031 | 19.939 |
| 1994 | 3.880 | 21.054 | 2.383 | 19.452 |
| 1995 | 4.933 | 21.897 | 2.757 | 22.068 |
| 1996 | 3.459 | 21.705 | 2.417 | 21.669 |
| 1997 | 2.384 | 22.064 | 3.869 | 22.508 |
| 1998 | 2.480 | 23.453 | 4.468 | 22.770 |
| 1999 | 2.627 | 25.122 | 4.746 | 22.801 |
| 2000 | 3.453 | 26.278 | 5.050 | 22.561 |

| | | | | |
|---|---|---|---|---|
| 2001 | 4.198 | 26.354 | 3.648 | 22.420 |
| 2002 | 4.309 | 26.630 | 2.704 | 23.364 |
| 2003 | 4.143 | 27.384 | 3.096 | 23.805 |
| 2004 | 4.024 | 28.275 | 3.267 | 22.950 |
| 2005 | 4.286 | 29.481 | 3.614 | 22.395 |
| 2006 | 4.123 | 30.984 | 4.019 | 22.283 |
| 2007 | 3.342 | 30.983 | 3.574 | 21.255 |
| 2008 | 2.402 | 29.088 | 0.860 | 19.662 |
| 2009 | 0.601 | 24.420 | -3.723 | 19.211 |

Source: World Development Indicators, World Bank

**TABLE: S-3 Total Employment & Unemployment - Spain**

| Years | Total Employment Rate | Total Unemployment Rate |
|---|---|---|
| 1972 | 57.8 | - |
| 1973 | 59 | - |
| 1974 | 58.9 | - |
| 1975 | 57.1 | - |
| 1976 | 57.9 | - |
| 1977 | 57.3 | - |
| 1978 | 56 | 6 |
| 1979 | 54.7 | 7.7 |
| 1980 | 52.7 | 9 |
| 1981 | 50.7 | 11 |
| 1982 | 49.8 | 13 |
| 1983 | 49 | 14.3 |
| 1984 | 47.2 | 16.6 |
| 1985 | 46.2 | 17.8 |
| 1986 | 46.5 | 17.5 |
| 1987 | 48.3 | 16.8 |
| 1988 | 49.6 | 15.8 |
| 1989 | 50.8 | 13.9 |
| 1990 | 51.8 | 13 |
| 1991 | 51.8 | 13 |

| | | |
|---|---|---|
| 1992 | 50.5 | 14.7 |
| 1993 | 48 | 18.3 |
| 1994 | 47.4 | 19.5 |
| 1995 | 48.3 | 18.4 |
| 1996 | 49.3 | 17.8 |
| 1997 | 50.7 | 16.7 |
| 1998 | 52.4 | 15 |
| 1999 | 55 | 12.5 |
| 2000 | 57.4 | 11.1 |
| 2001 | 58.8 | 10.4 |
| 2002 | 59.5 | 11.1 |
| 2003 | 60.7 | 11.1 |
| 2004 | 62 | 10.6 |
| 2005 | 64.3 | 9.2 |
| 2006 | 65.7 | 8.5 |
| 2007 | 66.6 | 8.3 |
| 2008 | 65.3 | 11.4 |
| 2009 | 60.6 | 18 |
| 2010 | 59.4 | 20.1 |

Source: OECD Factbook 2009 and OECD Factbook 2011-2012

**TABLE: S-4 Value Added by Major Sectors - Spain**

| Years | Agriculture Value Added (% of GDP) | Industry Value Added (% of GDP) | Service Value Added (% of GDP) |
|---|---|---|---|
| 1970 | 10.92 | 39.52 | 49.57 |
| 1971 | 11.48 | 38.58 | 49.95 |
| 1972 | 10.83 | 39.55 | 49.62 |
| 1973 | 10.54 | 40.06 | 49.39 |
| 1974 | 9.88 | 40.96 | 49.17 |
| 1975 | 9.71 | 39.92 | 50.37 |
| 1976 | 9.17 | 39.26 | 51.57 |
| 1977 | 8.96 | 38.44 | 52.60 |
| 1978 | 8.77 | 37.41 | 53.82 |

| | | | |
|---|---|---|---|
| 1979 | 7.75 | 36.97 | 55.28 |
| 1980 | 7.25 | 36.59 | 56.16 |
| 1981 | 6.25 | 35.74 | 58.01 |
| 1982 | 6.34 | 35.16 | 58.50 |
| 1983 | 6.22 | 34.91 | 58.87 |
| 1984 | 6.53 | 34.08 | 59.39 |
| 1985 | 6.18 | 34.35 | 59.47 |
| 1986 | 6.02 | 34.77 | 59.21 |
| 1987 | 5.99 | 34.24 | 59.77 |
| 1988 | 6.09 | 34.08 | 59.83 |
| 1989 | 5.65 | 34.35 | 60.00 |
| 1990 | 5.56 | 33.65 | 60.79 |
| 1991 | 5.19 | 32.90 | 61.91 |
| 1992 | 4.59 | 31.17 | 64.24 |
| 1993 | 4.85 | 29.56 | 65.59 |
| 1994 | 4.82 | 28.98 | 66.21 |
| 1995 | 4.50 | 29.39 | 66.11 |
| 1996 | 5.09 | 29.12 | 65.79 |
| 1997 | 5.01 | 29.28 | 65.71 |
| 1998 | 4.86 | 29.10 | 66.03 |
| 1999 | 4.47 | 29.20 | 66.33 |
| 2000 | 4.38 | 29.23 | 66.39 |
| 2001 | 4.26 | 29.19 | 66.56 |
| 2002 | 4.02 | 28.95 | 67.03 |
| 2003 | 3.96 | 28.93 | 67.11 |
| 2004 | 3.62 | 29.19 | 67.19 |
| 2005 | 3.18 | 29.99 | 66.83 |
| 2006 | 2.87 | 30.39 | 66.73 |
| 2007 | 2.91 | 30.28 | 66.82 |

Source: World Development Indicators, World Bank

**TABLE: S-5 Value of Oil Imports & Exports - Spain**

| Years | Value of Oil Imports (Billion US $) | Value of Oil Exports (Billion US $) |
|---|---|---|
| 1980 | 8.38 | 0.139 |
| 1981 | 9.786 | 0.337 |
| 1982 | 9.067 | 0.733 |
| 1983 | 8.848 | 1.327 |
| 1984 | 8.239 | 1.765 |
| 1985 | 8.098 | 1.951 |
| 1986 | 6.61 | 1.651 |
| 1987 | 7.935 | 2.024 |
| 1988 | 6.846 | 1.799 |
| 1989 | 8.362 | 2.066 |
| 1990 | 10.258 | 2.603 |
| 1991 | 10.194 | 2.592 |
| 1992 | 10.125 | 1.785 |
| 1993 | 8.773 | 1.684 |
| 1994 | 8.732 | 1.503 |
| 1995 | 9.616 | 1.454 |
| 1996 | 11.169 | 2.678 |
| 1997 | 11.112 | 2.621 |
| 1998 | 8.685 | 2.37 |
| 1999 | 9.851 | 2.367 |
| 2000 | 18.751 | 3.994 |
| 2001 | 17.31 | 3.171 |
| 2002 | 17.774 | 2.792 |
| 2003 | 21.793 | 4.49 |
| 2004 | 28.973 | 6.436 |
| 2005 | 40.003 | 7.852 |
| 2006 | 51.128 | 9.478 |
| 2007 | 57.277 | 10.853 |
| 2008 | 83.855 | 17.269 |
| 2009 | 47.659 | 9.479 |

Source: World Economic Outlook Database (Sept 2011) IMF

**TABLE: S-6 Foreign Direct Investment Flows - Spain**

| Years | Inward FDI flow % of GDP | Outward FDI flow % of GDP |
|---|---|---|
| 1970 | 0.558 | 0.108 |
| 1971 | 0.446 | 0.055 |
| 1972 | 0.467 | 0.064 |
| 1973 | 0.511 | 0.068 |
| 1974 | 0.379 | 0.090 |
| 1975 | 0.613 | 0.153 |
| 1976 | 0.415 | 0.167 |
| 1977 | 0.473 | 0.090 |
| 1978 | 0.756 | 0.065 |
| 1979 | 0.670 | 0.064 |
| 1980 | 0.661 | 0.138 |
| 1981 | 0.867 | 0.138 |
| 1982 | 0.937 | 0.269 |
| 1983 | 0.977 | 0.147 |
| 1984 | 1.060 | 0.149 |
| 1985 | 1.121 | 0.143 |
| 1986 | 1.414 | 0.155 |
| 1987 | 1.477 | 0.241 |
| 1988 | 1.922 | 0.338 |
| 1989 | 2.093 | 0.366 |
| 1990 | 2.552 | 0.643 |
| 1991 | 2.074 | 0.738 |
| 1992 | 2.440 | 0.401 |
| 1993 | 1.877 | 0.622 |
| 1994 | 1.801 | 0.798 |
| 1995 | 1.352 | 0.783 |
| 1996 | 1.550 | 1.137 |
| 1997 | 1.561 | 2.519 |
| 1998 | 2.359 | 3.369 |
| 1999 | 3.034 | 7.183 |
| 2000 | 6.815 | 10.025 |

| | | |
|---|---|---|
| 2001 | 4.664 | 5.435 |
| 2002 | 5.715 | 4.767 |
| 2003 | 2.922 | 3.250 |
| 2004 | 2.371 | 5.796 |
| 2005 | 2.214 | 3.701 |
| 2006 | 2.495 | 8.443 |
| 2007 | 4.457 | 9.505 |
| 2008 | 4.830 | 4.688 |
| 2009 | 0.624 | 0.665 |
| 2010 | 1.745 | 1.536 |

Source: UNCTAD

**TABLE: S-7 Exports & Imports of Goods & Services - Spain**

| Years | Exports of Goods & Services (AG %) | Imports of Goods & Services (AG %) |
|---|---|---|
| 1961 | 7.96 | 40.13 |
| 1962 | 12.76 | 34.44 |
| 1963 | 3.84 | 23.52 |
| 1964 | 24.99 | 13.00 |
| 1965 | 6.76 | 32.93 |
| 1966 | 15.51 | 19.38 |
| 1967 | -4.62 | -3.26 |
| 1968 | 18.41 | 8.11 |
| 1969 | 15.76 | 15.99 |
| 1970 | 17.98 | 7.47 |
| 1971 | 14.20 | 0.70 |
| 1972 | 13.40 | 24.30 |
| 1973 | 10.00 | 16.70 |
| 1974 | -1.00 | 8.00 |
| 1975 | -0.40 | -0.90 |
| 1976 | 5.00 | 9.80 |
| 1977 | 12.10 | -5.50 |
| 1978 | 10.70 | -1.00 |

| | | |
|---|---|---|
| 1979 | 5.60 | 11.40 |
| 1980 | 2.30 | 3.22 |
| 1981 | 11.29 | -3.61 |
| 1982 | 5.57 | 4.93 |
| 1983 | 9.61 | -1.20 |
| 1984 | 12.04 | -1.33 |
| 1985 | 0.67 | 7.55 |
| 1986 | 0.23 | 17.18 |
| 1987 | 5.27 | 24.79 |
| 1988 | 3.82 | 16.08 |
| 1989 | 1.43 | 17.72 |
| 1990 | 4.69 | 9.62 |
| 1991 | 8.25 | 10.34 |
| 1992 | 7.51 | 6.82 |
| 1993 | 7.84 | -5.23 |
| 1994 | 16.67 | 11.44 |
| 1995 | 9.40 | 11.07 |
| 1996 | 10.32 | 8.83 |
| 1997 | 14.99 | 13.27 |
| 1998 | 8.02 | 14.85 |
| 1999 | 7.48 | 13.65 |
| 2000 | 10.24 | 10.82 |
| 2001 | 4.18 | 4.51 |
| 2002 | 1.96 | 3.74 |
| 2003 | 3.67 | 6.22 |
| 2004 | 4.18 | 9.64 |
| 2005 | 2.54 | 7.73 |
| 2006 | 6.69 | 10.22 |
| 2007 | 6.72 | 7.96 |
| 2008 | -1.11 | -5.26 |
| 2009 | -11.58 | -17.81 |

Source: World Bank national accounts data, and OECD National Accounts data files.

**TABLE: S-8 Total Residential & Non-Residential Patents & Trademarks - Spain**

| Years | Patents & Trademarks (AGR %) |
|---|---|
| 1970 | -5.588 |
| 1971 | 5.874 |
| 1972 | 14.980 |
| 1973 | 8.840 |
| 1974 | -3.544 |
| 1975 | -15.263 |
| 1976 | -6.851 |
| 1977 | 6.629 |
| 1978 | -1.170 |
| 1979 | 4.396 |
| 1980 | 3.655 |
| 1981 | -7.701 |
| 1982 | 2.108 |
| 1983 | -27.305 |
| 1984 | 16.459 |
| 1985 | 58.518 |
| 1986 | 9.111 |
| 1987 | -7.718 |
| 1988 | 23.865 |
| 1989 | 15.391 |
| 1990 | 0.515 |
| 1991 | -14.238 |
| 1992 | -8.074 |
| 1993 | -3.304 |
| 1994 | 0.831 |
| 1995 | 8.581 |
| 1996 | 11.301 |
| 1997 | 7.669 |
| 1998 | 2.956 |
| 1999 | 5.541 |
| 2000 | 14.936 |

| | |
|---|---|
| 2001 | -9.564 |
| 2002 | -10.988 |
| 2003 | -19.321 |
| 2004 | -0.482 |
| 2005 | 3.281 |
| 2006 | 1.850 |
| 2007 | -2.370 |
| 2008 | -12.115 |
| 2009 | -15.060 |

Source: WIPO

**TABLE: U-1 Macro Economic Situation - The UK**

| Years | Official Exchange Rate | Total Population (AGR %) |
|---|---|---|
| 1960 | 0.357 | - |
| 1961 | 0.357 | 0.829 |
| 1962 | 0.357 | 0.918 |
| 1963 | 0.357 | 0.625 |
| 1964 | 0.357 | 0.683 |
| 1965 | 0.357 | 0.665 |
| 1966 | 0.357 | 0.539 |
| 1967 | 0.362 | 0.578 |
| 1968 | 0.417 | 0.464 |
| 1969 | 0.417 | 0.447 |
| 1970 | 0.417 | 0.308 |
| 1971 | 0.411 | 0.532 |
| 1972 | 0.400 | 0.302 |
| 1973 | 0.408 | 0.225 |
| 1974 | 0.428 | 0.023 |
| 1975 | 0.452 | -0.018 |
| 1976 | 0.557 | -0.025 |
| 1977 | 0.573 | -0.033 |
| 1978 | 0.522 | 0.005 |
| 1979 | 0.472 | 0.090 |

| | | |
|---|---|---|
| 1980 | 0.430 | 0.120 |
| 1981 | 0.498 | 0.035 |
| 1982 | 0.572 | -0.036 |
| 1983 | 0.660 | 0.034 |
| 1984 | 0.752 | 0.158 |
| 1985 | 0.779 | 0.227 |
| 1986 | 0.682 | 0.232 |
| 1987 | 0.612 | 0.213 |
| 1988 | 0.562 | 0.222 |
| 1989 | 0.611 | 0.261 |
| 1990 | 0.563 | 0.299 |
| 1991 | 0.567 | 0.310 |
| 1992 | 0.570 | 0.271 |
| 1993 | 0.667 | 0.240 |
| 1994 | 0.653 | 0.255 |
| 1995 | 0.634 | 0.265 |
| 1996 | 0.641 | 0.255 |
| 1997 | 0.611 | 0.258 |
| 1998 | 0.604 | 0.292 |
| 1999 | 0.618 | 0.334 |
| 2000 | 0.661 | 0.358 |
| 2001 | 0.695 | 0.366 |
| 2002 | 0.667 | 0.369 |
| 2003 | 0.612 | 0.405 |
| 2004 | 0.546 | 0.506 |
| 2005 | 0.550 | 0.595 |
| 2006 | 0.543 | 0.617 |
| 2007 | 0.500 | 0.645 |
| 2008 | 0.544 | 0.667 |
| 2009 | 0.642 | 0.665 |
| 2010 | 0.647 | 0.675 |

Source: World Development Indicators, World Bank

**TABLE: U-2 Macro Economic Situation - The UK**

| Years | Inflation (Annual %) | Domestic Investment (% of GDP) | GDP growth (Annual %) | Gross Saving (% of GDP) |
|---|---|---|---|---|
| 1971 | 9.336 | 19.652 | 2.024 | 21.875 |
| 1972 | 8.103 | 19.115 | 3.566 | 19.583 |
| 1973 | 7.394 | 22.503 | 7.128 | 21.128 |
| 1974 | 14.771 | 22.753 | -1.360 | 19.015 |
| 1975 | 27.131 | 19.259 | -0.627 | 17.914 |
| 1976 | 15.245 | 20.996 | 2.644 | 20.226 |
| 1977 | 13.629 | 20.516 | 2.394 | 20.174 |
| 1978 | 11.659 | 20.166 | 3.241 | 20.483 |
| 1979 | 14.580 | 20.407 | 2.688 | 19.266 |
| 1980 | 19.380 | 17.600 | -2.087 | 18.010 |
| 1981 | 11.258 | 15.990 | -1.216 | 17.406 |
| 1982 | 7.292 | 16.635 | 2.203 | 16.771 |
| 1983 | 5.426 | 17.436 | 3.691 | 17.345 |
| 1984 | 4.576 | 18.361 | 2.692 | 17.345 |
| 1985 | 5.818 | 18.245 | 3.624 | 17.145 |
| 1986 | 3.420 | 18.050 | 4.014 | 15.944 |
| 1987 | 5.348 | 18.999 | 4.562 | 16.288 |
| 1988 | 6.280 | 21.385 | 5.032 | 16.555 |
| 1989 | 7.324 | 22.113 | 2.281 | 16.418 |
| 1990 | 7.729 | 20.183 | 0.779 | 15.475 |
| 1991 | 6.459 | 17.174 | -1.392 | 14.774 |
| 1992 | 3.759 | 16.395 | 0.147 | 13.558 |
| 1993 | 2.877 | 15.943 | 2.222 | 13.321 |
| 1994 | 1.582 | 16.659 | 4.280 | 15.215 |
| 1995 | 2.678 | 17.150 | 3.052 | 15.214 |
| 1996 | 3.619 | 16.880 | 2.885 | 15.679 |
| 1997 | 2.788 | 17.215 | 3.307 | 16.753 |
| 1998 | 2.217 | 18.366 | 3.607 | 17.592 |
| 1999 | 2.100 | 18.090 | 3.473 | 15.403 |
| 2000 | 1.185 | 17.659 | 3.916 | 14.635 |
| 2001 | 2.125 | 17.456 | 2.461 | 15.064 |

| | | | | |
|---|---|---|---|---|
| 2002 | 3.097 | 17.077 | 2.097 | 15.124 |
| 2003 | 3.073 | 16.727 | 2.808 | 14.948 |
| 2004 | 2.520 | 17.063 | 2.951 | 14.938 |
| 2005 | 2.031 | 17.053 | 2.173 | 14.362 |
| 2006 | 3.052 | 17.520 | 2.788 | 14.043 |
| 2007 | 2.992 | 18.202 | 2.685 | 15.478 |
| 2008 | 2.967 | 16.690 | -0.065 | 14.892 |
| 2009 | 1.446 | 13.519 | -4.875 | 11.757 |

Source: World Development Indicators, World Bank

**TABLE: U-3 Total Employment & Unemployment - The UK**

| Years | Total Employment Rate | Total Unemployment Rate |
|---|---|---|
| 1971 | - | 3.4 |
| 1972 | - | 3.7 |
| 1973 | - | 2.7 |
| 1974 | | 2.6 |
| 1975 | - | 4.1 |
| 1976 | - | 5.4 |
| 1977 | - | 5.8 |
| 1978 | - | 5.7 |
| 1979 | - | 4.7 |
| 1980 | - | 5.8 |
| 1981 | - | 8.8 |
| 1982 | - | 10.1 |
| 1983 | - | 10.9 |
| 1984 | 65.9 | 10.9 |
| 1985 | 66.7 | 11.2 |
| 1986 | 67.1 | 11.3 |
| 1987 | 67.8 | 10.3 |
| 1988 | 69.9 | 8.5 |
| 1989 | 72 | 7.1 |
| 1990 | 72.5 | 6.9 |
| 1991 | 70.8 | 8.6 |

| | | |
|---|---|---|
| 1992 | 69 | 9.8 |
| 1993 | 68.2 | 10.2 |
| 1994 | 68.7 | 9.3 |
| 1995 | 69.2 | 8.5 |
| 1996 | 69.7 | 7.9 |
| 1997 | 70.6 | 6.8 |
| 1998 | 71 | 6.1 |
| 1999 | 71.5 | 5.9 |
| 2000 | 72.2 | 5.4 |
| 2001 | 72.5 | 5 |
| 2002 | 72.3 | 5.1 |
| 2003 | 72.6 | 5 |
| 2004 | 72.7 | 4.7 |
| 2005 | 72.6 | 4.8 |
| 2006 | 72.5 | 5.4 |
| 2007 | 72.3 | 5.3 |
| 2008 | 72.7 | 5.7 |
| 2009 | 70.6 | 7.6 |
| 2010 | 70.3 | 7.8 |

Source: OECD Factbook 2009 and OECD Factbook 2011-2012

**TABLE: U - 4 Value Added by Major Sectors - The UK**

| Years | Agriculture Value Added (% of GDP) | Industry Value Added (% of GDP) | Service Value Added (% of GDP) |
|---|---|---|---|
| 1970 | 2.97 | 43.70 | 53.34 |
| 1971 | 2.94 | 43.03 | 54.03 |
| 1972 | 2.92 | 42.51 | 54.57 |
| 1973 | 2.90 | 42.08 | 55.02 |
| 1974 | 2.88 | 41.56 | 55.55 |
| 1975 | 2.82 | 40.42 | 56.76 |
| 1976 | 2.71 | 41.01 | 56.28 |
| 1977 | 2.58 | 41.24 | 56.18 |
| 1978 | 2.44 | 41.39 | 56.17 |

| | | | |
|---|---|---|---|
| 1979 | 2.32 | 41.73 | 55.95 |
| 1980 | 2.20 | 42.25 | 55.55 |
| 1981 | 2.12 | 41.79 | 56.08 |
| 1982 | 2.05 | 41.39 | 56.57 |
| 1983 | 1.96 | 40.78 | 57.26 |
| 1984 | 1.87 | 40.26 | 57.87 |
| 1985 | 1.79 | 39.63 | 58.59 |
| 1986 | 1.84 | 38.96 | 59.20 |
| 1987 | 1.87 | 37.84 | 60.29 |
| 1988 | 1.92 | 37.00 | 61.08 |
| 1989 | 1.98 | 36.40 | 61.62 |
| 1990 | 1.89 | 34.92 | 63.18 |
| 1991 | 1.79 | 32.90 | 65.30 |
| 1992 | 1.82 | 31.66 | 66.52 |
| 1993 | 1.87 | 31.02 | 67.11 |
| 1994 | 1.82 | 31.39 | 66.79 |
| 1995 | 1.90 | 31.63 | 66.47 |
| 1996 | 1.75 | 31.42 | 66.83 |
| 1997 | 1.41 | 30.63 | 67.96 |
| 1998 | 1.23 | 29.16 | 69.61 |
| 1999 | 1.15 | 28.20 | 70.65 |
| 2000 | 1.04 | 28.04 | 70.92 |
| 2001 | 0.96 | 26.98 | 72.06 |
| 2002 | 0.98 | 25.58 | 73.44 |
| 2003 | 1.01 | 24.43 | 74.56 |
| 2004 | 0.98 | 23.88 | 75.14 |
| 2005 | 0.93 | 24.19 | 74.88 |
| 2006 | 0.91 | 24.01 | 75.08 |
| 2007 | 0.94 | 23.08 | 75.98 |

Source: World Development Indicators, World Bank

**TABLE: U-5 Value of Oil Imports & Exports - The UK**

| Years | Value of Oil Imports (Billion US $) | Value of Oil Exports (Billion US $) |
|---|---|---|
| 1980 | 14.381 | 15.032 |
| 1981 | 12.91 | 19.18 |
| 1982 | 11.186 | 19.25 |
| 1983 | 8.918 | 19.372 |
| 1984 | 11.057 | 20.224 |
| 1985 | 10.87 | 21.279 |
| 1986 | 6.67 | 12.556 |
| 1987 | 7.786 | 14.416 |
| 1988 | 6.493 | 11.276 |
| 1989 | 8.366 | 10.369 |
| 1990 | 11.499 | 14.41 |
| 1991 | 10.634 | 12.888 |
| 1992 | 9.82 | 12.662 |
| 1993 | 9.03 | 12.953 |
| 1994 | 7.876 | 13.905 |
| 1995 | 7.989 | 14.812 |
| 1996 | 9.555 | 17.067 |
| 1997 | 9.3 | 16.768 |
| 1998 | 6.586 | 11.625 |
| 1999 | 7.565 | 14.763 |
| 2000 | 13.718 | 23.627 |
| 2001 | 13.716 | 21.333 |
| 2002 | 13.831 | 21.5 |
| 2003 | 18.357 | 23.875 |
| 2004 | 28.039 | 29.675 |
| 2005 | 40.029 | 36.033 |
| 2006 | 47.848 | 42.699 |
| 2007 | 53.619 | 45.55 |
| 2008 | 70.462 | 59.697 |
| 2009 | 43.308 | 38.597 |

Source: World Economic Outlook Database (Sept 2011) IMF

**TABLE: U-6 Foreign Direct Investment Flows -The UK**

| Years | Inward FDI flow % of GDP | Outward FDI flow % of GDP |
|---|---|---|
| 1970 | 1.191 | 1.342 |
| 1971 | 1.253 | 1.407 |
| 1972 | 0.744 | 1.243 |
| 1973 | 1.486 | 2.719 |
| 1974 | 2.210 | 2.211 |
| 1975 | 1.403 | 1.269 |
| 1976 | 1.323 | 1.909 |
| 1977 | 1.725 | 1.626 |
| 1978 | 1.164 | 2.095 |
| 1979 | 1.531 | 2.968 |
| 1980 | 1.868 | 1.454 |
| 1981 | 1.142 | 1.823 |
| 1982 | 1.103 | 0.755 |
| 1983 | 1.112 | 1.139 |
| 1984 | -0.079 | 1.762 |
| 1985 | 1.221 | 2.384 |
| 1986 | 1.451 | 3.032 |
| 1987 | 2.096 | 4.469 |
| 1988 | 2.416 | 4.371 |
| 1989 | 3.314 | 4.091 |
| 1990 | 3.008 | 1.772 |
| 1991 | 1.406 | 1.554 |
| 1992 | 1.417 | 1.625 |
| 1993 | 1.509 | 2.653 |
| 1994 | 0.872 | 3.036 |
| 1995 | 1.726 | 3.765 |
| 1996 | 2.004 | 2.792 |
| 1997 | 2.445 | 4.532 |
| 1998 | 5.105 | 8.436 |
| 1999 | 5.855 | 13.406 |
| 2000 | 8.038 | 15.795 |

| | | |
|---|---|---|
| 2001 | 3.577 | 4.001 |
| 2002 | 1.491 | 3.120 |
| 2003 | 0.902 | 3.342 |
| 2004 | 2.541 | 4.133 |
| 2005 | 7.719 | 3.545 |
| 2006 | 6.390 | 3.530 |
| 2007 | 6.987 | 9.690 |
| 2008 | 3.443 | 6.060 |
| 2009 | 3.279 | 2.046 |
| 2010 | 2.047 | 0.491 |

Source: UNCTAD

**TABLE: U-7 Exports & Imports of Goods & Services - The UK**

| Years | Exports of Goods & Services (AG %) | Imports of Goods & Services (AG %) |
|---|---|---|
| 1961 | 3.22 | -0.70 |
| 1962 | 1.61 | 2.09 |
| 1963 | 4.84 | 4.18 |
| 1964 | 3.78 | 10.84 |
| 1965 | 4.39 | 1.12 |
| 1966 | 5.22 | 2.46 |
| 1967 | 1.00 | 7.23 |
| 1968 | 12.71 | 7.94 |
| 1969 | 9.25 | 2.92 |
| 1970 | 6.29 | 5.46 |
| 1971 | 6.92 | 5.38 |
| 1972 | 1.08 | 9.91 |
| 1973 | 12.30 | 11.17 |
| 1974 | 7.34 | 1.16 |
| 1975 | -2.90 | -6.54 |
| 1976 | 9.11 | 5.16 |
| 1977 | 6.85 | 1.92 |
| 1978 | 1.86 | 3.77 |

| | | |
|---|---|---|
| 1979 | 3.77 | 9.64 |
| 1980 | -0.33 | -3.46 |
| 1981 | -0.49 | -2.74 |
| 1982 | 1.11 | 4.93 |
| 1983 | 2.01 | 6.56 |
| 1984 | 6.74 | 9.88 |
| 1985 | 5.85 | 2.52 |
| 1986 | 4.16 | 6.87 |
| 1987 | 5.86 | 7.89 |
| 1988 | 0.60 | 12.78 |
| 1989 | 4.56 | 7.42 |
| 1990 | 5.28 | 0.56 |
| 1991 | -0.16 | -4.41 |
| 1992 | 4.17 | 6.76 |
| 1993 | 4.48 | 3.32 |
| 1994 | 9.18 | 5.92 |
| 1995 | 9.44 | 5.53 |
| 1996 | 8.78 | 9.74 |
| 1997 | 8.15 | 9.71 |
| 1998 | 3.12 | 9.27 |
| 1999 | 3.74 | 7.92 |
| 2000 | 9.14 | 8.95 |
| 2001 | 3.01 | 4.78 |
| 2002 | 1.00 | 4.90 |
| 2003 | 1.84 | 2.16 |
| 2004 | 5.01 | 6.92 |
| 2005 | 7.90 | 7.09 |
| 2006 | 11.08 | 9.11 |
| 2007 | -2.57 | -0.78 |
| 2008 | 1.03 | -1.24 |
| 2009 | -11.10 | -12.26 |

Source: World Bank national accounts data, and OECD National Accounts data files.

**TABLE: U-8 Total Residential & Non-Residential Patents & Trademarks - The UK**

| Years | Patents & Trademarks (AGR %) |
|---|---|
| 1970 | -2.651 |
| 1971 | -2.288 |
| 1972 | 2.826 |
| 1973 | 0.028 |
| 1974 | -6.510 |
| 1975 | -5.150 |
| 1976 | 0.156 |
| 1977 | 0.700 |
| 1978 | -3.092 |
| 1979 | -6.543 |
| 1980 | -3.563 |
| 1981 | -2.623 |
| 1982 | -3.945 |
| 1983 | -1.616 |
| 1984 | -2.055 |
| 1985 | 1.194 |
| 1986 | 24.815 |
| 1987 | -9.242 |
| 1988 | 7.393 |
| 1989 | 1.379 |
| 1990 | -2.234 |
| 1991 | -7.809 |
| 1992 | 0.136 |
| 1993 | -1.982 |
| 1994 | 9.926 |
| 1995 | -4.807 |
| 1996 | -5.891 |
| 1997 | 6.543 |
| 1998 | 3.708 |
| 1999 | 5.170 |
| 2000 | 7.113 |

| | |
|---|---|
| 2001 | -7.629 |
| 2002 | -2.891 |
| 2003 | -2.147 |
| 2004 | -0.843 |
| 2005 | -0.812 |
| 2006 | -0.200 |
| 2007 | 0.967 |
| 2008 | -9.772 |
| 2009 | -5.208 |

Source: WIPO

## III) ABBREVIATIONS USED IN THE THESIS

**ACUSE** – Action Committee for the United States of Europe

**CIS –** Community Innovation Survey

**CAP –** Common Agricultural Policy

**EU –** European Union

**EC –** European Community

**EFTA –** European Free Trade Agreement

**EEA –** European Economic Area

**EEC –** European Economic Community

**ECSC** – European Coal and Steel Community

**EDC** – European Defense Community

**EMU** – European Monetary Union

**FDI –** Foreign Direct Investment

**GDP –** Gross Domestic Product

**GNI –** Gross National Product

**GPTs –** General Purpose Technologies

**GATT –** General Agreement on Tariffs and Trade

**IMF -** International Monetary Fund

**NATO** – North American Treaty Organization

**NICs** – Newly Industrialized Countries

**OEEC –** Organization of European Economic Co-operation

**R & D –** Research and Development

**SSER** – Secondary School Enrolment Rate

**UNESCO -** United Nations Educational, Scientific and Cultural Organization

**UK –** The United Kingdom

**UNCTAD -** United Nations Conference on Trade And Development

**WIPO -** World Intellectual Property Organization

**WEU –** Western European Union

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