

## The Impact of Foreign Direct Investment on Economic Growth: A Case Study of South Korea \*

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### Abstract

*The purpose of this paper is to explore the impact of Foreign Direct Investment (FDI) on economic growth in South Korea. In this study I use the secondary data. This study covers the time period from 1980-2009. This study attempts to determine empirical impact of FDI on South Korean economy using macroeconomic annual time series data. FDI, domestic investment, employment, export and human capital are considered as the endogenous variables for economic growth. The multiple regression are employed in this study. This study finds that there is a strong and positive impact of FDI on South Korean economic growth. Furthermore, the study indicates that human capital, employment and export also have positive and significant impact, while domestic investment has no significant impact on South Korean economic growth. The interaction effects of FDI- human capital and FDI-export indicate that the transfer of high technology and knowledge has an adverse impact on South Korean economic growth.*

**JEL Classification Numbers:** F14, O12, O40, O53

**Keywords:** Foreign Direct Investment, Economic Growth, South Korea

### *I. Introduction*

The relationship between Foreign Direct Investment (FDI) and economic growth has been an interested issue for several decades. In the new growth theory, FDI is an important factor which contributes to economic growth through technology transfer efficiency improvement. FDI affects economic growth in several ways. It is argued that FDI has been a major channel for the access to advanced technologies by recipient countries and hence plays a central role in the technological progress of these countries (Borensztein, E., Gregorio, J.D. and Lee, J.W. (1998)). Findlay (1978) asserts that the host countries can benefit from the “contagion effect” associated with the advanced technology, management practices and marketing skills used by the foreign firms. Outputs from FDI activities are often exported mainly to third-country markets outside the host and source countries. As inputs, FDI activities have used capital goods and other intermediate inputs supplied by host and other foreign countries.

Thus FDI is associated with both import and export trade in goods, and the host country can benefit from an investment-led export growth. FDI is an agent for the transformation of both the host and source economics (Lyold, 1996). Multinational corporations (MNCs) have played a central role in developing the host countries’ production capacities which are often directed towards export-oriented activities. As a result, FDI contributes to the transformation of the industrial structure of host economy and the commodity composition of its exports. The presence of foreign firms in the economy with their superior endowments of technology and management skills will expose local firms to fierce competition (Chen, C., Chang, L. and Zhang, Y (1995)). Local firms may also be under pressure to improve their performance and to invest in research and development (R&D). Thus FDI enhances the marginal productivity of the capital stock in the host economies and thereby promote growth (Wang and Blomstrom (1992)). In addition, Lahiri and Ono (1998) observed that higher efficiency of foreign firms may help lower prices and hence increase consumers’ surplus. Furthermore, FDI raises employment by either creating new jobs directly or using local inputs (thus creating more jobs indirectly).

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According to Xiaoqin Fan and Paul M. Dickie (2000), FDI contributes to growth through several channels. It directly affects growth through being a source of capital formation. Capital formation refers to net additions to capital stock of an economy, including the creation of factories, new machinery and improved transportation. As a part of private investment, an increase in FDI will, by itself, contribute to an increase in total investment. An increase in investment directly contributes to growth. FDI also contributes to growth indirectly. FDI beneficially influences other macroeconomic variables, such as employment, export, consumption and saving. These, in turn, enhance growth.

FDI not only affects the level of investment, but also the quality of investment. In the view of industrial organization theory of FDI (Hymer, 1976), MNCs face some disadvantages imposed by both geographic and cultural distances when competing with indigenous firms. To overcome these inherent disadvantages, MNCs must possess some kind of ownership advantage in order to compete with local firms. These ownership advantages can be expressed as technology, cost effectiveness, established market and financial strength. These advantages enable them to operate in a foreign market. As such, FDI also consist of a bundle of intangible assets, including capital, new technology, management skills and market channels. The inflow of FDI can therefore contribute to improved technology, equipment and infrastructure in host countries.

Related to the technological advantages of FDI is the benefit accruing to domestic firms through the “spillover effects” (Caves, 1974; Globerman, 1979; Blomstrom and Persson, 1983; Athukorala and Menon, 1996). When FDI flows into a host country, there is a potential for FDI to act as a vehicle through which new ideas, technologies, and best working practices can be transferred to domestic firms. During this process, domestic firms can gain through several channels. The technology of local firms may improve as foreign firms demonstrate new technologies, provide technological assistance to their local suppliers and customers and train workers whom local firms may later employ. Furthermore, the competitive pressures from foreign firms may force local firms to operate more efficiently and stimulate them to introduce new technologies.

FDI also strengthens the capability of a host economy to reach international markets through its international links (Chia, 1995). Many MNCs use global trading and distribution channels established by parent firms to produce capital goods and intermediate inputs and to export their products.

Even though FDI augments growth through direct as well as indirect channels, it is difficult to quantitatively measure the contribution of FDI to growth. This is especially true for the indirect effects of FDI. FDI can contribute to the upgrading of the whole industrial structure of economies through affecting macroeconomic variables such as employment, exports, consumption and saving. All of these factors contribute to technological progress and efficiency improvement, not only stimulate economic growth, but also directly to raising living standards within host countries.

The relationship between FDI and economic growth has motivated much empirical literature focusing on both industrial and developing countries. Neoclassical models of growth as well as endogenous growth models provide the basis for most of the empirical work on the FDI-growth relationship. However, empirical evidence has shown that the effect of FDI on economic growth is dependent upon a set of conditions in the host country’s or local economy, for example, the level of human capital, government policies, location and infrastructure. (Balasubramanyam, et al. (1996).

In the recent years, FDI policies has become one of the central economic policies for the developing countries, learned from the experiences of newly industrialized countries (NICs) like South Korea, Singapore, Hong Kong and Taiwan which promoted FDI as the catalyst of rapid economic growth in the early stage of their economic development.

The relationship between FDI and economic growth is one of the well studied subjects in the field of development economics especially after the advent of endogenous growth model (Borenztein, et al. 1995, Balasubramanyam, et al. 1996).

South Korea is one of the highly developed countries in the world with annual GDP of US\$ 1,014.48 billion in 2010 (IMF, 2011).

South Korea achieved double digit growth in the period of 1980s. South Korea's transformation to a wealthy developed country less than half a century is often called the miracle on the Han River and earned the recognition of "Asian Tiger" in the international community (Chin, 2004). South Korea is the 6<sup>th</sup> largest recipient of FDI in Asia and 19<sup>th</sup> in the world with US\$ 127.05 billion in 2010 (UNCTAD, World Investment Report, 2011). This indicates the significant presence of FDI in South Korean economy.

Before 1970s, South Korea's domestic saving was encouraged by raising interest rate and borrowed from abroad to invest in the economy and exports were encouraged by direct subsidies, all taxes and restriction on import quota (Savada and Shaw, 1990). After 1970s, South Korean Government made huge investment in heavy and chemical industries investing in steel, machinery, ship building, electronics and nonferrous metals (Lee, 2008). South Korea adopted export oriented international trade after the industrialization in 1980s. Enormous amount of FDI was started to inflow in South Korean industries. Hence South Korea achieved double digit growth after 1980s (Lee, 2008). Spillover effect of FDI is considered one of the most important of host countries to make competitive which increases the productivity of local resources. Indeed FDI encourages the capital formation as well as human capital formation.

Today, South Korea stands as one of the developed OECD member country in the world. South Koreans enjoy one of the world's highest standards of living with the per capita income of US\$ 20,756.25 (IMF, 2011) which was one of the poorest countries in the world with US\$ 100 in 1960s. FDI has been seen one of the big resources for industrial development in South Korea over the years. FDI stock increased to US\$ 127.05 billion in 2010 from US\$ 1.13 billion in 1980 (UNCTAD, World Investment Report, 2011) and South Korea has gained the name of "Miracle on the Han River". It is interesting to explore the impact of FDI on the rapid growth of Korean economy.

Despite natural resources availability in the country, economic policies and political environment also influence the inflow of FDI in the countries, The theoretical concept of impact of FDI is that FDI does not only bring capital but also brings technology, knowledge. FDI works as the catalyst for the economic growth of a country, especially for the developing country. FDI is not only a single factor determining the economic growth, rather foreign trade, domestic investment, employment level are also major factors affecting growth. How the growth is affected by these variables? Does high level of FDI increase the higher level of economic growth? What would be the interaction between FDI and trade, FDI and human capital and FDI and domestic investment to economic growth? The massive inflow of FDI and double digit growth in the economy in South Korea has attracted the study interest on it.

## ***II . An Overview of Economic Growth and FDI in South Korea***

### **II .1 South Korean Economy**

Having remained among the world's poorest countries before the 1960s, South Korea subsequently achieved and sustained rapid economic growth over a long period of time that raised the nation's status to a much higher level: joining the OECD in 1996 and hosting the G20 Summit in 2010 ( The Korean Economy, 2010). Despite a scarcity of natural resources and a limited domestic market, the achievements of the South Korean economy is a role model for the economic development of emerging countries.

In the early stage of economic development, the government fostered import-substitution industries which produced such basic intermediate materials such as cement and fertilizers. After that, it promoted labor-intensive export industries such as textiles and plywood, which had international competitiveness because of low labor costs and were capable of absorbing the unemployed and underemployed human resources (The Korean Economy, 2010). Extensive export promotion measures were taken to support export industries. Low interest rate policy loans and various forms of preferential tax treatment such as tax exemptions and tax rebates were given to support export industries. Several specialized banks were established and in order to encourage foreign capital inflow, the Foreign Capital Inducement Act was passed in 1966 and foreign banks were allowed to open branches since 1967 (The Korean Economy, 2010).

South Korea as a colony of Japan (1910-1945), Japan played an important role in Korea's economic development. By the end of its colonial period, Japan had built extensive infrastructure in roads, railroads, electrical power, government buildings and ports that facilitated the modernization of South Korean economy. However, most infrastructures were destroyed during Korea war (Savada and Shaw, 1990).

In the early 1970s, South Korea experienced dramatic changes and challenges both at home and abroad. Internationally, a new climate of protectionism spread rapidly, along with the world-wide stagflation caused by the first oil crisis. Labor-intensive light industries, whose competitiveness was gradually weakening as a result of rapid wage increases, faced fierce competition from other developing countries. These circumstances forced the Korean to modify its strategic objectives. The government induced industrial restructuring by promoting heavy and chemical industries such as shipbuilding, iron and steel, automobiles, machinery and petrochemicals. Investments in these sectors were encouraged by tax and financial incentives (The Korean Economy, 2010).

In 1980s South Korea faced the second oil crisis and domestic political turmoil. South Korea had a negative growth, real GDP growth rate declined from 8.4 percent in 1979 to -1.9 percent in 1980 (figure 1). The government shifted the priority in economic policy from growth to stability, opening-up of the economy and also deregulation. Tight monetary and fiscal policies contributed greatly to the construction of a stable foundation as did the renewed stability of international oil prices (The Korean Economy, 2010). From 1986 to 1988, GDP growth rate was double digit. This was owing to the “three lows”, low oil prices, low international interest rates and low value of the U.S. dollar in terms of the Japanese yen.

In 1990s, South Korea faced the problem of high cost and low efficiency. High costs had become endemic with high wages, high land prices and high interest rates. The financial and real sectors became less efficient because market principles could not operate properly in a socio-economic environment characterized by over-regulation. (The Korean Economy, 2010). Due to the Asian financial crisis, on November 1997 the government had to turn to the IMF to request stand-by funds. In signing up for the financial aid package, the government had to pursue macroeconomic stabilization and structural reform in the financial sector, the labor market and accelerate trade. The Korean economy pulled itself out of the crisis in 1999, the GDP growth rate increased from -5.7 percent in 1998 to 10.7 percent in 1999 (figure 1).

After overcome the financial crisis, the Korean economy continued to grow steadily until 2007. The global financial crisis originally from the subprime mortgage in the United States in 2007 following the bankruptcy of Lehman Brothers in September 2008, which was a big impact to the Korean economy. The GDP growth rate declined from 5.1 percent in 2007 to 2.3 percent in 2008. South Korea has returned to a stable growth track in 2010 with a real GDP growth rate 6.2 percent.

The South Korean development experience was impressive and provided important lessons for developing countries. South Korea was one of the poorest countries in the world in the late 1950s. South Korea transformed from a poor agricultural economy into a newly industrializing countries (NICs). Its real GDP growth rate was double digit in 1983 and during the period 1986-1988 which was 12.2 percent, 12.2 percent, 12.3 percent and 11.7 percent in 1983, 1986, 1987 and 1988, respectively (figure 1). The annual GDP growth sought negative growth in 1998 due to the Asian financial crisis. After the Asian financial crisis, the annual growth took place in a higher rate. The GDP growth rate was 10.7 percent and 8.8 percent in 1999 and 2000, respectively. This high GDP growth rate was due to the reforms in FDI policies in 1998.

South Korea became a member of OECD in 1996. This remarkable and steady growth was accompanied by drastic structural changes. The rapid contraction of the primary sector was matched in by a dramatic expansion of the manufacturing industry. The share of agriculture dropped from 40 percent in 1960 to 6.3 percent in 1996, while the share of manufacturing rose from 12 to 31 percent (Nicolas, Francoise, 2003). The successive changes in South Korea's industrial policies can be summarized as follows (Nicolas, Francoise, 2003): 1) The first period (1961-1971) can be characterized as a period of “easy import-substitution” of non-durable goods and intermediate materials. 2) The second period (1972-1981), export growth together with industrial deepening were maintained as priorities. 3) The third period (1982-1997) was a period of economic liberalization and globalization.

During the initial period of South Korea's economic development, the government established the Economic Planning Board in 1961, which played a key role in economic policy-making. As a result of financial reform in 1961, all commercial banks became in essence the property of the state and were placed under the direct control of the Ministry of Finance. The government provided subsidies, financial assistance and tax breaks to key industries to promote exports and industrial upgrading. A major consequence of the intervention was the emergence of large industrial conglomerates (*chaebols*). As a means of promoting exports, the government established the General Trading Companies (GTCs).

The GTCs, which were usually selected among the chaebols, were given special benefits and were in charge of handling export business for other exporters as well as for themselves. One major consequence of the development is the existence of a close business-government relationship.

The sharp slowdown in export growth in 1996, merchandise export growth dropped from more than 30 percent in 1995 to 4 percent in 1996 (ADB,1997). This was the result of a number of factors, both internal and external such as the depreciation of the won, the decline on world demand for electronic products, and the falling in world prices of electronic products, ships, automobiles and garments which affecting 50 percent of Korea's total exports. A major Asian financial and currency crisis broke out in November 1997. The won depreciated 50 percent during the first two-week span. The Korean crisis was the result of over-investment rather than overconsumption. Investments in over-capacities were due to the chaebols.

## **II.2 South Korea's Inward Foreign Direct Investment Policy**

South Korean policy makers adopted the interventionist approaches during 1960s and 1970s. Technology transfer requirements to domestic firms were used by South Korea in the 1960s so as to encourage technology transfer. FDI were directed towards the export oriented manufacturing industries and import substitution products. The government took a rather favorable toward export-oriented foreign companies with the creation of Free Trade Zones (FTZ) based on the Free Export Zone Establishment Act on January 1970. The government realized that FDI could play more of a role in the development strategy of the country. A first move took place in 1981 with the opening up of a large number of business categories to foreign investment. The basic direction of FDI policy was not really changed until 1984 with the revision of the Foreign Capital Inducement Act, which reflected a less stringent Government control on FDI (Seong, 1997). The liberalization of FDI rules was seen as a possible way of helping the economy in its attempt to upgrade technologically and to restructure the industry toward higher value-added and more sophisticated production. While licensing had proved to be an efficient channel for transferring mature technology. New technology was found to be better transferred through joint venture and wholly-owned subsidiaries (Chaponniere, 1997).

One reason for inviting FDI in the developing countries is to transfer the technology which could be very expensive if not through FDI. Foreign firms bring technology from which local firms learn method of productions and improve efficiency thereby increase competitive advantage. Korean firms obtained technological know how from Japanese firms because Japanese firms were the dominant firms operating in South Korea during 1970s.

South Korea has undergone three periods of change in its inward FDI policy ([www.isn.ethz.ch](http://www.isn.ethz.ch)). The first was between 1960 and 1980, when South Korea was building its industrial base and pursued an export-led growth development strategy. The second was between 1984-1997, when South Korea had begun to realize the importance of FDI. The third period began in 1998 after the Asian financial crisis.

## **II.3 Trend of FDI Inflows**

Before the mid 1980s, FDI inflows were minimal. The real take off occurred in the second half of the 1980s. FDI inflows remained modest first because South Korea is not a natural resource-rich country and because of the restrictive policies. The FDI inflows in South Korea during the period 1980 to 2011 is reported in figure 2. The general pattern in FDI inflows can be clearly related to changes in FDI policy. 1980s was the period of liberalization and globalization across the world. South Korea's FDI policy shifted from intervention to market oriented economy in 1980s. Market oriented economists believed that FDI could play role in the restructuring of industrial sector through competition (Bishop, 1997). South Korea opened many other sectors up to 100 percent for foreign investors since 1984. The FDI inflows increased from \$143.14 million in 1980 to \$422.35 million in 1984.

In 1987 further 26 more manufacturing sectors were opened for foreign investment while service sector remained restricted. FDI inflows increased almost double from \$532.20 million in 1985 to \$1,063.85 million in 1987. South Korea's competitiveness was decreased in 1987-1989 due to the rises in labour cost which reduced the foreign direct investment in South Korea (Bishop, 1997). FDI inflows decreased from \$1,063.85 million in 1987 to \$802.64 million in 1990. Because the international economic environment after 1993 made South Korea more market oriented because of the new GATT agreement required member countries give greater access to their markets and to be OECD's member, South Korea had to give similar market access for the member countries as other market oriented countries provided.

In 1993 the government announced timetable for opening many industries which were restricted earlier. So the FDI inflows increased from \$1,044.27 million in 1993 to \$3,205.48 million. FDI inflows were slowly increasing before the 1997 crisis. The amount of FDI inflows was \$1,970.43 million in 1995 and \$3,205.48 million in 1996. FDI inflows began to increase from 1997 and maintained increase until 2002 when FDI began to decrease. FDI inflows was \$6,971.14 million in 1997 which was more than double in the 1996. There were two main factors for the increased of FDI inflows after the 1997 crisis (1) the policy reform, including granting permission for M&A, new taxation incentives and fewer restrictions on foreign ownership. (2) the depreciation of the won. At the end of 1997, the value of the won depreciated by 40.4 percent against \$US and by 33.2 percent against the Japanese yen compared with its value at the end of 1996 (Min, Byung S.(2006). FDI inflows peaked in 1999 and 2000, \$15,544.62 and \$15,264.88 million, respectively. Majority of FDI during 1999 and 2000 came from the M&A. From 2001 to 2003, FDI inflows followed by a downturn because the labour unrest, uncertainty regarding North Korea's program and the competition (low-cost manufacturing) from China. FDI inflows increased almost double in 2004. FDI inflows in 2003 was only \$6,470.55 million compared with \$12,795.59 million in 2004. FDI inflows were declined from 2004-2009. In 2010 FDI inflows increased from \$11,484.14 million in 2009 to \$13,071.02 million and continued increasing in 2011 to \$13,669.44 million which was the highest since 1999 (the FDI inflows was \$15,544.62 million).

Despite the European fiscal crisis, FDI inflows in South Korea still increased, reflecting other countries' confidence in South Korea's economy reflecting other countries' confidence in South Korea's economy. The Ministry of Knowledge Economy of South Korea expected the FDI inflows will decrease to around \$13 billion in 2012 due to the risks factors such as the deepening European fiscal crisis and the double-dip recession of the world economy.

### ***III . Review of Literature***

The massive literature on the role of FDI on economic growth has shown various types of effects (positive, no effects or ambiguous) in various countries.

Agrawal et al. (2011) investigated the effect of FDI on economic growth of China and India for the time period of 1993-2009. They built the modified growth model from the basic growth model. The factors included in growth model were GDP, Human Capital, Labor Force, FDI and Gross Capital Formation. After running OLS method of regression, they found that 1% increase in FDI would result in 0.07% increase in GDP of china and 0.02% increase in GDP of India. They also found that China's growth is more affected by FDI than India's growth. The majority of the foreign investors prefer china over India for investment because China has a bigger market size than India, offers easy accessibility to export market, government incentives, developed infrastructure, cost – effectiveness, and macro-economic climate.

Agama (2010) examined the impacts of exports and FDI on economic growth of South Asian countries namely Bangladesh, India, Pakistan and Sri Lanka. The study used secondary data ranging from 1980 to 2009 and simple log linear regression model. He found that the impacts of exports and FDI are statistically significant. He proposes that the policy makers of each country of South Asia should diversify the country's exports to enlarge exports volume and increase FDI inflows because it have the potential of accelerating economic growth in the future of South Asian economies.

Hoang et al. (2010) examined the effects of FDI on economic growth in Vietnam by using the panel data model across Vietnam's sixty-one provinces in 1995-2006. They found that there is a strong and positive effect of FDI on economic growth in Vietnam as a channel of increasing the stock of capital. Human capital and trade in Vietnam are not yet the channels that give access to advance technology and knowledge transfers from FDI inflows to increase Vietnam's economic growth.

Mallick and Moore (2008) estimated the endogenous growth model by using panel data for 60 developing countries during 1970-2003. They found that FDI inflows have a positive and significant effect on economic growth across all income groups. But the indirect impact of FDI on economic growth through their contribution to investment could be weaker in the lower income group countries. Chang (2007) used the ADF test, the Peron test, and Divot and Andrew's unit-root test to test the stationary of the variable in Taiwan. He applied the Johansen cointegration test, the multivariate error correction model, and the Granger causality test. He found that these are no causal relationship between FDI inflows and economic growth.

De Gregorio (2003) has noted that technologies and knowledge that are not readily available to host country, investors may be brought to them along with FDI and led to productivity growth. FDI may also bring in expertise that the country does not possess, and foreign investors may have access to global markets. In the empirical studies during the period 1950-1985, he found that increasing aggregate investment by 1 percentage point of GDP increased economic growth of Latin American countries by 0.1% to 0.2% a year. But increasing FDI by the same amount increased growth by 0.6% a year. This indicated that FDI is three times more efficient than domestic investment.

Huang (2003) pointed out that Chinese partners were eager to form foreign invested enterprises with foreign investors because Chinese investment policies were more friendly to foreign invested enterprises than to domestic firms. Having exploited the preferential policies and even possessed privileges in competing for local scarce resources, these joint ventures eventually crowded out domestic investment.

Kim and Seo (2003) analyzed the dynamic relationship between FDI and economic growth and domestic investment in Korea for the period of 1959-1999 using vector auto regression models. They found that there was some positive effects of FDI on economic growth but insignificant. Their findings show that FDI does not crowd out domestic investment in Korea.

Braunstein and Epstein (2002) used a regression model with province-level panel data from 1986 to 1999. They found that FDI had crowded out domestic investment in China. They pointed out that benefits of FDI had almost disappeared as a result of intense competition of FDI among the regions in China, which has forced regions to reduce taxes, regulations on environmental protection, wages and working conditions.

Zhang (2001) tested the causality between FDI inflows and economic growth by using annual real FDI stock and real GDP data for 11 high-income and low-income developing countries in East Asia and Latin America. The Johansen cointegration test, the error-correlation model and the Granger causality test were applied. He concluded that the impact of FDI on host countries is country-specific. FDI inflows appeared to enhance growth in East Asian countries such as Taiwan. FDI tends to be more likely to promote economic growth when host countries adopt liberalize trade regime, improve education and human capital.

Ramirez (2000) His empirical works on Mexico supported the positive effect of FDI inflows on economic growth. He employed the Johansen cointegration test and the error-correction model for the period 1960 -1995. He showed that the growth rate of the private and foreign capital stock, as well as the export variable, have a positive and significant effect on the labor productivity growth rate.

Balasubramanyam et al. (1996) examined the role which FDI plays in the growth process in the context of 46 developing countries with different trade policy regimes over the period 1970 to 1985. From their cross-sectional panel data analysis, they found that FDI enhancing growth in those countries which pursue an outwardly oriented trade policy than it is in those countries adopting an inwardly oriented trade policy.

Borensztein et al. (1995) used an endogenous growth model to show the impact of FDI on economic growth. They analyzed FDI flows from industrialized countries to 69 developing countries during the period 1970 to 1989. They found that FDI is an important vehicle for the transfer of technology, contributing relatively more to growth than domestic investment. However, the higher productivity of FDI holds only when the host country has a minimum threshold stock of human capital.

#### ***IV. Methodology and Data***

##### **IV.1 Data Source**

A sample period of 29 years has been selected for the study for the period 1980-2009 with annual time series. Different sources were used to collect the data. The FDI inflows was obtained from Bank of Korea. The data for real GDP growth rate, GDP, employment, domestic investment and export were obtained from the world bank. For the human capital, there are various indicators of human capital stock. Due to the diverse use of human capital in different fields of research, the lack of data and theoretical debates, there is no clear consensus of what should be the proxy for human capital. In this study, the enrolment in total secondary school was used as a proxy for human capital. This statistics was obtained from UNESCO Institute for statistics.

## IV.2 Methodology

The purpose of this paper is to examine the impact of FDI on economic growth in South Korea over the 1980-2009 period. This study employs the endogenous growth theory as developed by Balasubramanyam et al. 1996 and empirical literature growth models. The impact of FDI on economic growth is analyzed by using the following econometric equation.

$$g = a + b_1 I + b_2 FDI + b_3 L + b_4 X + b_5 H + c_1 FDI * I + c_2 FDI * H + C_3 FDI * X + e$$

where:

g	=	real GDP growth rate
I	=	domestic capital investment
FDI	=	foreign direct investment
L	=	employment
X	=	export
H	=	human capital

Hypotheses

1)  $\frac{\partial g}{\partial FDI} > 0$   $\frac{\partial g}{\partial I} > 0$  This study expects that FDI inflows and domestic investment have a positive

effect on economic growth. Output growth can additionally result from a wider range of goods in FDI and domestic investment related production.

2)  $\frac{\partial g}{\partial H} > 0$  High quality labour force should produce more from a given resources.

3)  $\frac{\partial g}{\partial X} > 0$   $\frac{\partial g}{\partial FDI * X} > 0$  Trade leads to specialization and expanding potential markets which allows

domestic firms to take advantage of economies of scale, more competitive. . So I expect that both export and the interaction between FDI and export are positive in promoting economic growth.

4)  $\frac{\partial g}{\partial L} > 0$  Labour is one of the important factors of economic growth. Increasing labour force could gain

in total production and economic growth.

5)  $\frac{\partial g}{\partial FDI * I} > 0$  It is assumed that there is a positive interaction between FDI and domestic investment.

The combined effect of FDI and domestic investment in economic growth and an expected positive coefficient for the interaction term would indicate that FDI and domestic investment reinforce (complementary) to each other.

6)  $\frac{\partial g}{\partial FDI * H} > 0$  I expect a positive interaction between FDI and human capital in accelerating the

economic growth because the application of advanced technologies of FDI requires a sufficient level of human capital in the host country.

## V. Empirical Results

The estimation results of the impact of FDI inflow on economic growth in South Korea are as followings:

$$g = -77.8359 + 0.1559 I + 61.8664 FDI + 0.004 L + 0.6925 X + 0.0118 H$$

$$(-3.307)^{***} \quad (0.315) \quad (3.4089)^{***} \quad (1.1886) \quad (1.9312)^* \quad (4.3374)^{***}$$

$$-0.1977 FDI * I - 0.0082 FDI * H - 0.6990 FDI * X$$

$$(-0.3072) \quad (-2.5384)^{**} \quad (-3.1870)^{***} \quad (1)$$

$$R^2 = 0.7468 \quad \text{Adjusted } -R^2 = 0.6503 \quad \text{DW statistics} = 1.9227$$

From equation (1), the impact of FDI on economic growth is positive and significance at 99% confidence level. The effect of human capital and export on economic growth also positive. The interaction of FDI and domestic investment has a negative impact on economic growth so FDI inflow crowds out the domestic investment instead of complementary as expected. However, the coefficient is not significant so I omit this variable and run the regression obtaining equation (2).

$$g = -76.9321 + 0.0531 I + 58.2021 FDI + 0.0004 L + 0.6942 X + 0.0122 H$$

$$(-3.365)^{***} \quad (0.149) \quad (4.3458)^{***} \quad (1.4067) \quad (1.9773)^* \quad (5.3929)^{***}$$

$$-0.0089 FDI * H - 0.6965 FDI * X \quad (2)$$

$$(-4.0544)^{***} \quad (-3.2452)^{***}$$

$$R^2 = 0.7456 \quad \text{Adjusted } -R^2 = 0.6647 \quad \text{DW statistics} = 1.9269$$

From equation (2), the impact of FDI on economic growth is positive and significance at 99% confidence level. The coefficient of domestic investment indicates the positive impact on economic growth but insignificant so I omit this variable and run the regression obtaining equation (3).

$$g = -74.4020 + 56.8529 FDI + 0.005 L + 0.6482 X + 0.0123 H - 0.0088 FDI * H$$

$$(-4.9627)^{***} \quad (5.8840)^{***} \quad (2.3413)^{**} \quad (3.9437)^{***} \quad (5.5239)^{***} \quad (-4.3823)^{***}$$

$$-0.6712 FDI * X \quad (3)$$

$$(-5.2282)^{***}$$

$$R^2 = 0.7454 \quad \text{Adjusted } -R^2 = 0.6789 \quad \text{DW statistics} = 1.9468$$

Note: (1) The t statistic is in the parentheses

(2) \*, \*\* and \*\*\* indicate significance level of 10, 5 and 1 percent, respectively

FDI has a positive and significant impact on economic growth. Employment, export and human capital also has the positive and significant impact on economic growth. The FDI and human capital and FDI and export interaction terms are negative and significant impact. This indicates that there are the links between FDI and economic growth when allowing this relationship to vary with export and human capital.

## VI. Conclusions

South Korea stands as one of the developed OECD member country in the world. South Koreans enjoy one of the world's highest standards of living and South Korea has gained the name of "Miracle on the Han River". It is interesting to explore the impact of FDI on the rapid growth of Korean economy. The massive inflow of FDI and double digit growth in the economy in South Korea has attracted the study interest on it. The purpose of this study is to explore the impact of FDI inflow on South Korean economic growth by using the data from 1980-2009. This study shows that there is a strong and positive impact of FDI on South Korean economic growth. The human capital, export and employment are also have positive impact on South Korean economic growth. The interaction effects of FDI and human capital and FDI and export indicate that the transfer of high technology and knowledge has an adverse impact on South Korean economic growth.

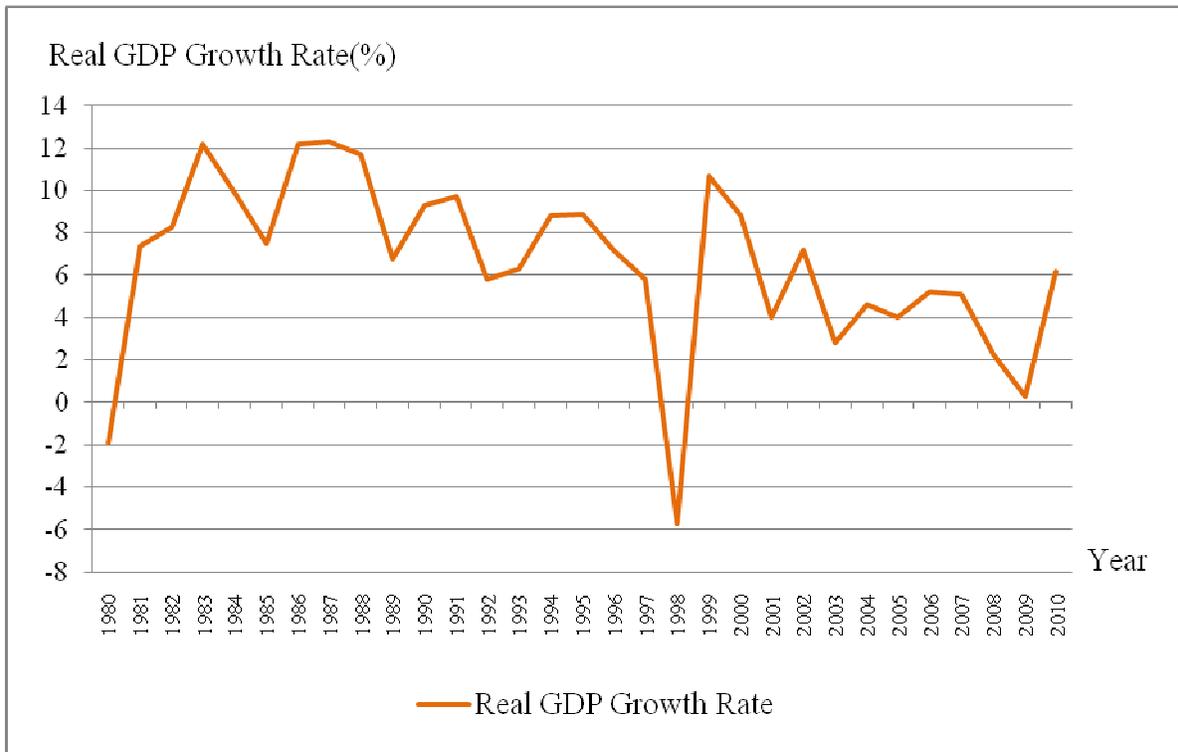
## VII. Acknowledgment

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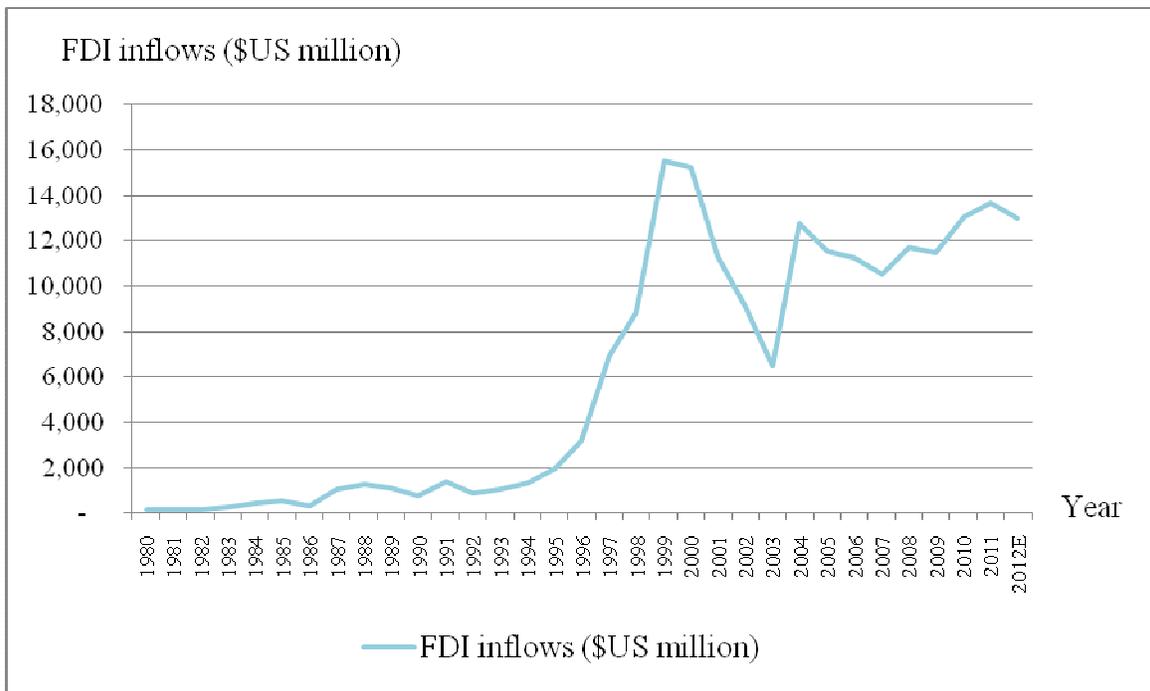
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**Figure 1 Real GDP Growth Rate**  
 Source : Bank of Korea



**Figure 2 FDI Inflows in South Korea from 1980 to 2011**  
 Source: Bank of Korea