

Does Foreign Direct Investment Spur Economic Growth and Development? A Comparative Study

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Abstract

The study empirically investigates whether and to what extent Foreign Direct Investment (FDI) spurs economic growth and development by taking development levels and the quality of host country institutions into account. The study uses the economic freedoms index to proxy the quality of host country institutions. This study examines a sample of 125 countries (38 developed, 58 developing and 29 least developed countries) over the 1980-2010 period by using the panel least squares method with fixed effects. Four main regressions are estimated in which per capita income, the human development index (HDI), the education index and the health index of the UNDP are used as the dependent variables. The results show that FDI spurs economic growth and development in developed, developing and the least developed countries. Nevertheless, the magnitudes of the effect of FDI on growth and development are non-uniform across country groups. It is found that FDI enhances growth and development in developing countries to a higher extent compared with developed and the least developed countries. The economic freedoms index also generated the expected positive coefficient which verifies the importance of high-quality institutions for growth and development.

JEL Classification: C23, F21, O43, O57

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1. Introduction

With the rise of globalization, worldwide FDI inflows increased dramatically in the last thirty years. Over time, many countries liberalized their FDI policies to attract more FDI inflows and to integrate more to the world economy. For example, in the 1993-2003 period, 94% of the 1,718 regulatory changes made by countries around the world were in favor of foreign investors (UNCTAD, 2006). In particular, the collapse of Soviet Union and the open market oriented policies started to be followed by many developing countries, such as China and India, have accelerated the pace of direct investments. This led to an increase in the share of inward FDI stock as percentage of the world GDP from 6 percent in 1980 to 30 percent in 2010 (a five-fold increase), according to the UNCTAD statistics.

According to the OECD (2002, p. 5): “FDI triggers technology spillovers, assists human capital formation, contributes to international trade integration, helps create a more competitive business environment, and enhances development”. In this regard, FDI attracting host countries expect that the positive effects of FDI outweigh the negative ones that FDI would enhance economic growth and development.

Although several OECD reports (2002, 2008) and some scholars (e.g. Ozturk, 2007; Li and Liu, 2005; Reiter and Steensma, 2010) show that FDI is beneficial for economic growth and development, there is still considerable empirical evidence that find FDI not to be beneficial for economic growth and development in host countries (e.g. Konings, 2001; Herzer et al., 2008). In sum, the results of the empirical studies on the host country effects of FDI remain indecisive.

This study aims to make an empirical contribution to this strand of economic literature by investigating the effects of FDI on economic growth and development in host countries. The study empirically investigates whether and to what extent FDI spurs growth and development by

taking development levels and the quality of host country institutions into account. The findings of previous studies pointed out that the effects of FDI on growth and development may differ between developed and developing countries since they have different economic and institutional structures (Moran, 2011). Additionally, poor institutional quality may put a strain on growth and development (Olofsdotter, 1998; Acemoglu et al., 2003). This study uses the economic freedoms index as a proxy for the quality of institutions.

This study uses a sample of 125 countries (38 developed, 58 developing, and 29 least developed countries) over the 1980-2010 period. The study adopts the panel least squares with fixed effects as the main empirical approach and estimates four main regressions which use per capita income, the human development index, the education index, and the health index of the UNDP as the dependent variables.

This study goes beyond the existing literature in four respects. First of all, the study classifies 125 countries as: developed, developing and the least developed countries in the analysis. This adds a comparative perspective to the study. Therefore, in the analysis it is clarified whether and to what extent the growth and the development effect of FDI differs across different development level country groups, which would be important in drawing policy implications. Numerous previous studies neglected the least developed countries, which have completely different economic and institutional structures than others (Tekin, 2012). Secondly, the study combines both the economic growth and the development effects of FDI in the same study. Many scholars studied these aspects generally by neglecting the development aspect or without mentioning it in an explicit way (Reiter and Steensma, 2010). In the study, a standard economic growth variable is used, which is measured by per capita GDP. Nevertheless, Stiglitz (2006) describes the development as a broader concept than per capita GDP, which involves

other aspects of human well-being (e.g., education, life expectancy, healthcare, environmental quality etc.). Due to its availability for a large set of countries and for a long time-span, we use the widely recognized the human development index (and its education and health sub-dimensions) of the UNDP to measure development. Thirdly, the study uses a comprehensive institutional variable, the economic freedoms index that measures forty-two different variables in five areas (see appendix A for details) which allows us to consider the role of quality of institutions in growth and development. In several previous studies, the dimensions of the economic freedoms index (e.g. inflation, trade freedoms) are used separately and sparsely (e.g. Li and Liu, 2005). Therefore, by using the economic freedoms index we can control a broader set of (institutional) variables which are potentially affecting growth and development. Only a few studies did this before in the FDI-growth context such as Azman-Saini et al. (2010) and Bengoa and Sanchez-Robles (2003).

The empirical findings of this study show that the FDI spurs growth and development in developed, developing and the least developed countries. Nevertheless, the magnitudes of the effect of FDI on growth and development are non-uniform across different country groups. More specifically, we found that FDI affects growth and development in developing countries to a higher extent compared with developed and the least developed countries. A 10 percent increase in per capita FDI raises per capita GDP by 3.9 percent in developing countries, 2.9 percent in developed countries and 1.8 percent in the least developed countries. In a similar vein, a 10 percent increase in per capita FDI leads to a 0.5 percentage increase in the HDI score in developing countries. In developed and the least developed countries the size of the effect is about 0.3. Finally, the results generated the expected positive and meaningful effect of economic freedoms on growth and development in all country groups. It testifies the importance of the

economic freedoms (i.e. high-quality institutions) for growth and development. The robustness checks of the findings with a technology gap, alternative FDI variables and estimation with random-effects confirmed our main findings. Firstly, the results would encourage policy makers to design and to follow the pro-FDI policies in developed, developing and the least developed countries. Second, the results would also provide strong evidence to policy-makers to work for a better institutional quality for growth and development.

The organization of the study is as follows. After this introduction, section 2 provides a detailed literature review. Section 3 explains the theoretical background of how FDI affects growth and development. Section 4 explains sources and transformation of data, and describes the sample groups. Section 5 presents and discusses the regression results. Section 6 concludes the study.

2. Literature Review

In this section, we present and discuss some selected empirical studies regarding the effects of FDI on economic growth and development.

Surveys

Blomstrom and Kokko (1997) review the empirical evidence on host country effects of FDI. The focus of the paper is the role of FDI in technology transfer to host countries and its diffusion. Blomstrom and Kokko (1997, p. 33) conclude that “FDI may promote economic development by contributing to productivity growth and exports in host countries”.

De Mello (1997) surveys the FDI-led growth studies in developing countries under the light of theoretical advancements. First, he finds that the relation between FDI and growth depends on country specific factors. Second, the effect of FDI can be lower in technology

laggards (e.g. the least developed countries) than technological leaders (e.g. developed countries), which supports the technology gap hypothesis of Findlay (1978).

Gorg and Greenaway (2004) surveys the studies which examined the productivity, wage and export spillovers stemming from FDI in developing, developed and transition economies. They conclude that the results on the importance of FDI spillovers are mixed at best. The authors explain the negative or neutral effect of FDI with the use inappropriate econometric methods and the use of inadequate datasets (e.g. sector limited cross-section data) from a methodological point of view.

The survey of OECD (2002) examines the contribution of FDI into host-country development. OECD (2002) finds that FDI is a major catalyst to development. In a similar vein, Ozturk (2007) surveys the recent studies on the FDI-growth nexus. He finds that the result of “FDI affects growth in a positive way” dominates. However, the results may change according to the econometric method followed and the sample groups analyzed (developed versus developing countries).

Empirical Studies

Stehrer and Woerz (2009) examine the effect of FDI on host country output growth. The study uses the OECD and non-OECD countries as a sample for the period 1981-2000. The results suggest a positive relationship between FDI and output as well as productivity and export. They find that attracting FDI enhances output growth. A 10 percent increase in FDI growth results in a 1.2 percent increase in output growth.

Li and Liu (2005) examine a panel of 84 countries over the period 1970-1999 to understand whether FDI triggers economic growth. Their results reveal that FDI not only promotes growth directly but also increases growth with its interaction terms. They further test

their hypothesis in two sub-samples: developed and developing countries by dividing the whole sample (84 countries). Again, the results confirm that in both developed and developing countries FDI promotes economic growth. They find that a 10 percent increase in FDI (as a percentage of GDP) leads to a 4.1 percentage-point increase in the rate of economic growth.

Johnson (2006) examines whether FDI has a positive effect on economic growth by triggering technology spillovers and physical capital accumulation. He uses a panel dataset consists of 90 developed and developing countries between 1980 and 2002. He performs the empirical analysis by using the OLS method and concludes that “FDI enhances economic growth in developing economies but not in developed economies” (Johnson, 2006, p. 43).

Ewing and Yang (2009) assess the impact of FDI in manufacturing sector on economic growth by using a dataset of 48 states in the US over the 1977-2001 period. In their model, the dependent variable is the growth rate of real per capita Gross State Product (GSP), whereas the main independent variable is FDI as a share of GSP. They employ some control variables which are investment as a share of GSP, growth rate of state employment, and human capital (schooling). They use the panel OLS estimation method and by allowing for fixed effects for states. They conclude that FDI promotes growth but the growth impact is not uniform across regions and sectors in the US. In their estimations, the human capital variable exerted the expected positive coefficient.

Hansen and Rand (2006) search for cointegration and causality relation between FDI and growth in a sample of 31 developing countries for the period 1970-2000 and they confirm the existence of cointegration. Moreover, their results indicate that FDI has a lasting positive impact on GDP irrespective of level of development. They interpret this finding “as the evidence in

favor of the hypothesis that FDI has an impact on GDP via knowledge transfers and adoption of new technologies” (Herzer et al., 2008, p. 797).

Azman-Saini et al. (2010) investigate the link between foreign direct investment (FDI) and economic growth by taking the role of economic freedoms (as a proxy for the institutional quality) into account. They use a panel dataset of 85 countries over the period 1976-2005. Their results reveal countries promote greater freedom of economic activities would gain significantly from the presence of multinational corporations due to the existence of a positive interaction term.

Bengoa and Sanchez-Robles (2003) investigate the interplay between economic freedoms, FDI and economic growth. They use 18 Latin American countries for the period 1970-1999. Their panel data estimations with the panel OLS method (fixed and random effects) show that FDI and economic freedoms are the growth-enhancing factors in these countries. They find that a 1 percent increase in FDI (as a percentage of GDP) may increase economic growth up to 0.5 percentage point. Therefore, policies to widen economic freedoms and to enhance FDI inflows can lead to an increase in economic growth.

Not all studies, as presented above, are in favor of FDI in the literature of FDI-led economic growth and development. For example, Herzer et al. (2008) examine the FDI-led growth hypothesis for 28 developing countries for the 1970-2003 period. According to their empirical investigation, only in 4 out of 28 developing countries FDI contributes to the long-run growth. Another similar study is conducted by Blomstrom et al. (1994) by using the data of 78 developing countries. They put forward that only in the high-income developing countries FDI triggers growth whereas the low-income countries cannot enjoy the growth effect of FDI.

Tekin (2012) investigates potential Granger causality among the real GDP, real exports and inward FDI in the least developed countries for the period between 1970 and 2009. It is one of the few studies that focuses on the least developed countries. His findings show that FDI Granger causes to growth only in two countries out of 18 countries whereas FDI Granger causes to exports in five out of 18 countries. The author explains the weak evidence in favor of FDI with the extremely low levels of FDI into the least developed countries. In none of countries, FDI does not have negative and statistically significant effect on growth. The author accepts this finding as an evidence of the non-existence of crowding out effect of FDI in the least developed countries.

As showed above, previous studies mainly examined whether FDI enhances economic growth. However, there are only a few studies which addressed the development effects of FDI in a more explicit way. For example, Reiter and Steensma (2010) examine the effect of FDI on development with a special focus on developing countries. They use the human development index (HDI) of the UNDP as a proxy for the level of development. Their analysis examines 49 developing countries over the period of 1980–2005. They find a positive and meaningful effect of per capita FDI on the human development index. Additionally, they conclude that the effect of FDI on development would be higher when there is no corruption.

Dollar and Kraay (2004) examine the interrelation between international trade, growth FDI, and poverty. They estimate their model with GMM and instrumental variable methods for more than 100 countries. They use ten-year averages over the period 1970-2000 period. They find that FDI and trade affect the well-being of people positively by increasing their income and decreasing poverty.

Basu and Guariglia (2007) examine FDI, inequality and growth relation by using a panel of 119 countries over the 1970-1999 period. The study uses an alternative Gini variable which measures the human capital inequality by using the data of education levels instead of income levels. They use five-year averages of the variables and estimate their model with OLS fixed effects and GMM. Their results reveal that: a) there is a positive relationship between FDI and educational inequality, b) FDI is positively related with growth, c) FDI flows lead to a decline in the share of agriculture in the host country.

Agosin and Machado (2005) examine the development effect of FDI by testing whether FDI crowds in or crowds out domestic investment. They use a panel dataset of 36 developing countries from Latin America, Asia and Africa for the period 1971-2000. The estimation results point out that FDI does not lead to a positive externality by crowding in domestic investment. The authors suggest that the benefit of FDI on development (via the channel of crowding in) in developing countries could not be confirmed.

We can summarize the findings of the literature review as follows:

1. The empirical literature is mixed on the effects of FDI on economic growth (UNCTAD, 1999). However, the positive effect of FDI on economic growth seems to be dominating in terms of number of findings (Ozturk, 2007).
2. The effect of FDI on development has weaker evidence both in terms of number of studies and their findings. In the literature, the effect of FDI on development is generally analyzed by focusing on: whether FDI increases per capita income, whether FDI generates technology spillovers, and whether FDI crowds in or crowds out domestic investment. Especially, the effect of FDI on human development is less investigated.

3. A little attention is paid to the least developed countries for different reasons such as the lack of data or low levels of FDI inflows to these countries in analyzing the growth and the development effects of FDI.
4. The previous findings show that both the effect of FDI on growth and development seem to differ across different development levels that our analysis takes this point into consideration.

3. Theoretical Background and Empirical Models

In this section, we present some definitions on FDI and explain the theoretical background of the FDI, growth and development relation. Then, we present the empirical models that we use.

3.1 Some Definitions on FDI

“Foreign direct investment is the category of international investment in which an enterprise resident in one country (the direct investor) acquires an interest of at least 10 % in an enterprise resident in another country (the direct investment enterprise)” (UNCTAD, 2010). What makes FDI different from foreign portfolio investment is the use of transferred capital in the host country. FDI means that foreign investors either invest into an existing company or establish a new company (i.e. factory, branch) in a host country. Since FDI is a form of physical investment, it is expected to have effects on the current account balance, gross capital formation, employment, productivity, economic growth, and development. In this regard, it gets a great deal of attention in empirical studies. However, we limit ourselves in this study on the effects of FDI on economic growth and development.

3.2 The Effects of FDI in Theory

In this section, we discuss the anticipated effects of FDI on capital accumulation and productivity (technology) spillover, which ultimately expected to increase per capita income of a host country. Then, we move on to the discussion of the effect of FDI on development.¹

3.2.1 The Effect of FDI on Capital Accumulation: Capital Widening

Since FDI is a type of physical investment it is expected to lead to an increase in the stocks of physical capital in host countries. Nonetheless, the effect may change regarding the type of FDI. When FDI leads to an establishment of a totally new facility (green-field investment), the increase in the stocks of capital would be significant. According to the neoclassical growth model of Solow (1956), the increase in physical capital stemming from FDI may increase per capita income level both in the short and long-run in the host economy by increasing the existing type of capital goods, but it would only enhance the growth rate of the economy during the transition period due to diminishing returns to capital. Nonetheless, the longevity of the transition period differs across countries but it still lasts for many years (Aghion and Howitt, 2009, p. 59). Therefore, in capital-scarce countries the *capital widening* effect might imply important welfare gains for economic agents. In this regard, FDI can be seen as an important growth-enhancing factor for these countries that may constitute an argument for pro-FDI policies.

On the other hand, a *brownfield* type of FDI may not lead to a considerable increase in the existing capital stock. Generally, a *brownfield* type of FDI changes the ownership status of the existing capital stock, and therefore its effect on growth may be limited (Johnson, 2006). It is worth mentioning that in here we assume FDI does not affect the host country technology level and we relax this assumption in the following section.

¹ For broader discussions: see Johnson (2006) and Ewing and Yang (2009).

3.2.2 The Effect of FDI on Productivity: Capital Deepening

The *capital deepening* effect implies the transfer of knowledge and technology together with FDI into a host economy. It is supposed that multinationals bring capital along with advanced technology and effective managerial systems to maximize their profits in host countries (OECD, 2002). This basic yet important reasoning implies that as FDI takes place productivity levels tend to increase that ultimately increases per capita income both in the short and in the long-run.

There are differences in the mechanisms how FDI affects growth among different growth models. Firstly, according to the neoclassical growth model of Solow (1956) FDI may prevent capital falling into diminishing returns due to the existence of continuous contribution to the technology growth. Secondly, the AK growth model of Frankel (1962) and Romer (1986), which constitutes the first wave of endogenous growth models, claim that FDI generates *learning by doing externalities* that gives a rise to the technology growth and therefore economic growth. Thirdly, the product variety model of Romer (1990) argues that productivity and economic growth come from expanding the *variety of specialized intermediate products*” (Aghion and Howitt, 2009, p. 69). The proponents claim that FDI expands the variety of specialized intermediate products by bringing foreigners’ intermediate products into a host country which would result in a higher economic growth. Moreover, host country researchers would be more likely to invent *new* intermediate products due to the spillovers from FDI. Finally, according to the Schumpeterian model of Aghion and Howitt (1992) growth comes from the improvement of the *quality* of the existing types of capital goods in a country. Therefore, an open economy would transfer the innovative technology and the new *quality improving* mechanisms with FDI that would foster productivity growth and economic growth.

3.2.3 The Effect of FDI on Development

Unlike the well-established theoretical approaches on the effects of FDI on growth, it is often difficult to explain the effect of FDI on development within a sound framework. Basically, there are two reasons behind this argument. First, any mathematical and theoretical models have not been developed yet in development economics that would be comparable with the economic growth models. Second, it has not been agreed on in the development literature yet how to model development with FDI. Even worse there is no any consensus simply how to measure the development level of a country in the literature. The discussion of building up a better development index is beyond the scope of this study. Therefore, we use the most widely recognized development indicator: the human development index (HDI) developed by the UNDP and analyze its implications for the FDI-led development literature.

The Human Development Index (HDI) developed by the UNDP is a widely used index in the development literature not only because it is a comprehensive one but because it provides an objective well-being measure available for almost all countries in the world, including the least developed ones (Stiglitz, 2006). The human development index measures the average development of a country with respect to three *equally-weighted* dimensions:

- a) the economic performance through per capita GDP,
- b) the education index measured by the adult literacy index and the gross enrollment combined index,
- c) the health index measured by life expectancy (Dias et al., 2006, p. 1027).²

Basically, productivity gains and economic growth spurred by the capital widening and the

² Starting from 2010, the UNDP replaces per capita GDP with per capita GNI (gross national income). And the UNDP started to measure the education index by combining the mean years of schooling index and the expected years of schooling index.

capital deepening effects of FDI provide *governments* more room to invest in infrastructure, education, and healthcare systems. On the other hand, a higher per capita income level for the residents of a host country implies that *individuals* can afford more on education and health expenditures. Both of the channels (government and individual) suggest that more FDI would lead to a higher per capita income, an improved education index and a longer life expectancy for a host country. Therefore, theoretically it is expected that FDI would make a positive effect on all three dimensions of the HDI. To this end, researchers may use the HDI to examine the development effect of FDI in host countries (Reiter and Steensma, 2010).

It is generally assumed that the effect of FDI leads to a bigger GDP size that increases the share of an average household in GDP in a host country. Deininger and Squire (1996) find that economic growth helps poor by increasing their income share in a sample of 108 countries. Also findings of Dollar and Kraay (2004) support this argument that economic growth help poverty reduction and improve the well-being of residents.

According to Stiglitz (2006, p. 44), “a successful development means sustainable, equitable, and democratic development that focuses on increasing living standards, not just on measured GDP”. Therefore, “development is no longer seen primarily as a process of capital accumulation but rather as a process of organizational change” Hoff and Stiglitz (2001, p. 389). With an increased foreign presence in a host country, organizations (including private and public institutions) in a country may have an improved and more productive organizational structure due to spillovers (e.g. imitation, skills and technology transfer) stemming from FDI. This also will lead to a higher development levels for the residents (Gorg and Greenaway, 2004).

3.3 Institutions

The role of institutions in international trade theory and FDI is widely acknowledged as in the economic growth and development fields (North, 1991; Acemoglu and Johnson, 2005). Especially, the collapse of the Soviet Union, open market policies promoted around the world have contributed to the rise of institutional economics. Hall and Jones (1999, p. 97) describes better (economic) institutions as the one “which ensures that the returns are kept closely in line across the range of activities in an economy, from working in a factory to investing in physical or human capital to creating new ideas or transferring technologies from abroad, on the positive side, and from theft to corruption on the negative side”.

Some studies tried to capture the effect of institutions along with FDI by using some variables which can proxy a few aspects of the host country institutions. For instance, money growth, inflation, and degree of property rights are used to control for the quality of host country institutions (Borenzstein et al., 1998; Olofsdotter, 1998; Liu and Liu, 2005). Also a few studies used the composite institutional variables designed to measure the quality of institutions in a host country such as the economic freedoms index and the Kaufmann governance indices.

In this study, we accept a broad notion of institutions that are primarily affecting the economic activities, and therefore economic growth and development (Hsiao and Shen 2003; Acemoglu and Johnson, 2005). To do this, we use the economic freedoms index prepared by the Fraser Institute, which has five main dimensions and forty-two sub-dimensions (see section 4 details).³ The economic freedoms index is a composite institutional variable, which is used in some previous FDI studies such as in Azman-Saini et al. (2010), Bengoa and Sanchez-Robles

³ In the literature, there are two economic freedoms indices which have the same name. One is being prepared by the Fraser Institute which started in the 1970s. The other economic freedoms index is being prepared by the Heritage Foundation started in the 1990s. Apart from country and time-coverage differences, there are some definitional differences between two indices.

(2003). We chose to use the economic freedoms index due to its broad range of sub-dimensions that are relevant for growth and development, and its availability for a long-period of time and for a large number of countries including the least developed ones.

In sum, by introducing the economic freedoms index firstly one can be sure that he captures several aspects of a host country institutional quality, which are important for economic activities. Secondly, the use of economic freedoms helps him not to omit some relevant explanatory variables that are used in previous studies (e.g. government consumption expenditures, black market premium, inflation, etc.)

3.4 Final Remarks

Review of theories and some previous findings showed that the expected positive benefits of FDI on economic growth and development may outweigh some associated negative effects.⁴ This would leave the net effect of FDI on growth and development positive. Nevertheless, some scholars (e.g. Moran, 2011) claimed that the relative size of the net effect of FDI may change depending on the development level of a host country, which we take into account in the analysis.

⁴ Two examples of negative effects: FDI may crowd out domestic investment to some extent and may lead to a rise in the rate of unemployment due to increased labor mobility.

4. Empirical Models and Data

We can summarize the discussion in the previous section as follows: FDI is expected to improve productivity levels and to enlarge capital stock in host countries that result in higher per capita income. A higher per capita income implies more income for governments that they can provide better education and improved healthcare. With an increased income individuals can access to education and healthcare services to a higher extent by their own means which leads to an increase in development. We investigate this hypothesis with the following four main empirical models:

Growth Equation (1):

$$\log(\text{PGDP}_{i,t}) = \beta_0 + \beta_1 \log(\text{FDI}_{i,t}) + \beta_2 \log(\text{FDI}_{i,t-1}) + \beta_3 \text{ECONFR}_{i,t} + e_{i,t}$$

It identifies the effect of FDI and economic freedoms on economic growth measured by per capita GDP.

Development Equation (2):

$$\log(\text{HDI}_{i,t}) = \beta_0 + \beta_1 \log(\text{FDI}_{i,t}) + \beta_2 \log(\text{FDI}_{i,t-1}) + \beta_3 \text{ECONFR}_{i,t} + e_{i,t}$$

It identifies the effect of FDI and economic freedoms on development by using the human development index of the UNDP.

Education Equation (3):

$$\log(\text{Education}_{i,t}) = \beta_0 + \beta_1 \log(\text{FDI}_{i,t}) + \beta_2 \log(\text{FDI}_{i,t-1}) + \beta_3 \text{ECONFR}_{i,t} + e_{i,t}$$

It identifies the effect of FDI and economic freedoms on development by using the education index, which is the sub-dimension of the human development index of the UNDP.

Health Equation (4):

$$\log(\text{Health}_{i,t}) = \beta_0 + \beta_1 \log(\text{FDI}_{i,t}) + \beta_2 \log(\text{FDI}_{i,t-1}) + \beta_3 \text{ECONFR}_{i,t} + e_{i,t}$$

It identifies the effect of FDI and economic freedoms on development by using the health index, which is the sub-dimension of the human development index of the UNDP.

The variables are defined as follows:

PGDP	: Per Capita Gross Domestic Product (\$)
HDI	: Human Development Index Value
Education	: Education Index (a sub-dimension of HDI)
Health	: Health Index (a sub-dimension of HDI)
FDI _t	: Per Capita Inward Foreign Direct Investment Stock (\$)
FDI _{t-1}	: One Period Lagged Value of the FDI Variable
ECONFR	: The Value of the Economic Freedom Index
i	: 125 Countries Total; Grouped as Developed, Developing, and the Least Developed
t	: 1980-2010 (Five-Year Intervals, i.e.: 1980, 1985... 2010.)
e	: Error Term

4.1 Description of Variables

Table 1 summarizes the data sources of the variables used in the regressions and show the expected signs of the coefficients. We gather the per capita GDP data from the WDI (World Development Indicators) database, as Herzer et al. (2008) used. And we cross-checked the dataset from the UNDP database. The per capita GDP data are in current US\$. We take the logarithm of the variable in the estimations.

Table 1. Summary of Data Sources and Description

Variable	Data Source	Unit or Scale	Expected Sign
Per capita GDP	WDI and UNDP	US \$	
HDI	UNDP	scale 0 to 1	
Education	UNDP	scale 0 to 1	
Health	UNDP	scale 0 to 1	
FDI	UNCTAD	US \$	+
Economic Freedoms	Fraser Institute	scale 0 to 10	+

We fetch the human development index data from the UNDP database. We use both overall HDI score and its sub-indices (the education and the health indices) in the analysis. The HDI is widely used in the development literature, and therefore with its employment our results become comparable with other studies (Reiter and Steensma, 2010). We take the logarithm of the HDI and its sub-indices in the estimations, as we did in per capita GDP.⁵

We collect the per capita inward FDI stock data from the UNCTAD database. The data are available at the current US\$. This variable is used in some previous studies such as Chauffour (2011), Carkovic and Levine (2005), and Blonigen and Wang (2005).⁶ In the study, we work with the stock data instead of inflows data for three reasons. First, it is discussed in the literature (e.g. Johnson, 2006) that stock data are better to capture long-run effects of FDI in a host country. Second, the volatility of the FDI inflows data is higher compared with the inward FDI stock data. Third, the number of missing observations is relatively less in the inward FDI stock dataset. In our models, we also employ one-period lagged value of the FDI variable to capture a lagged effect of FDI on growth and development as in Agosin and Machado (2005),

⁵ In fact taking the logarithm of HDI, education and health indices did not much alter the direction of the results. However, this helps us in interpreting the results.

⁶ As we discuss in the robustness check section, we alternatively used the FDI stock as percentage of GDP.

UNCTAD (1999, p. 336). As explained, we expect a positive coefficient for the contemporaneous FDI variable and for its lagged form.

Finally, we use the economic freedoms index data compiled by the Fraser Institute. As discussed in the previous section, in our regressions the composite economic freedoms index helps us to proxy the quality of institutions in host countries and to capture the effect of some previously used relevant explanatory variables in the literature such as black market premium, inflation, and money growth etc. (Basu and Guariglia, 2007; Li and Liu, 2005; Borensztein et al., 1998). While choosing our institutional variable, we tried to find: a comprehensive (embeds different aspects of institutions), an objective (has a clear definition of indexing), and internationally comparable index.

The Economic Freedoms Index of the Fraser Institute: The index is comprehensive in its view of economic freedoms as well as in its worldwide coverage of 141 countries. Forty-two data points are used which are based on objective datasets and surveys to construct a summary index. The index measures the degree of economic freedom in five broad areas:

1. Size of Government: Expenditures, Taxes, and Enterprises,
2. Legal Structure and Security of Property Rights,
3. Access to Sound Money,
4. Freedom to Trade Internationally,
5. Regulation of Credit, Labor, and Business.⁷

The index takes a snapshot of economies in terms of five key broad institutional structures. In this regard, by employing the composite economic freedoms index we take forty-two institutional aspects into account, which are measured in a standardized way. Therefore, the index is comparable across countries. The scale of the index lies between 0 and 10. An increase

⁷ See Table A in the appendix and Gwartney et al. (2011) for details.

in the index implies an improvement in economic freedoms, and hence we expect a positive sign for the coefficient in the estimations.

4.2 Description of Groups

We collected and constructed our dataset for the 1980-2010 period over five-year intervals due to data limitations. In the literature, there are several studies which use five-year intervals such as Chauffour (2011), UNCTAD (1999), and Bengoa and Sanchez-Robles (2003). We could collect the data for total 125 countries due to data limitations. In our panel dataset, T (time-unit) is 7 and N (cross-section unit) is 125 countries. Thus, we have totally (7×125) 875 observations for *all countries* group. The countries are listed in Table B in the appendix.

After the collection of data, we classify the countries as developed, developing and the least developed countries by using their HDI scores in the UNDP (2010) report, as Tekin (2012) did. The *developed countries* are the countries which have very high human development scores according to the UNDP (2010). Countries with high human development and medium human development scores constitute the *developing countries* group. The *least developed countries* group comprises the countries with low human development scores according to the UNDP (2010). In each group, we have different number of countries. The developed countries group has 38, the developing countries group has 58, and the least developed countries group has 29 countries. Finally, the *all countries* group represents the total 125 countries.

Finally, we present the correlation matrix of the variables used in the regression analysis for *all countries* group. Figures in Table 2 give an idea about the power and the sign of the relationship between these variables. First of all, per capita GDP and development variables are highly and positively correlated. For instance, the correlation coefficient is 0.90 between per capita GDP and HDI. Second, there is also a strong positive relationship (0.80) between the

education and the health indices, even though they are individually reflecting different aspects of the well-being of a country. Third, FDI (and its lagged form) exhibits a positive and powerful correlation with the per capita GDP variable and with the development indicators. For instance, the correlation between FDI and per capita GDP is 0.80. And the correlation between FDI and HDI is 0.72. It implies that FDI, per capita GDP and development go hand in hand in a positive way. Finally, the correlation matrix shows that economic freedoms and per capita GDP are highly and positively correlated, as expected. It is 0.70. On the other hand, both the per capita GDP variable and the development indicators have a meaningful positive relationship with economic freedoms, as expected. In sum, the correlation matrix provided us a preliminary indication that FDI, economic growth and development variables are positively related. We make a regression analysis in section 5 to analyze whether and to what extent these relationships are economically and statistically significant.

Table 2. Correlation Matrix (All Countries Group, 125 countries)

	PGDP	HDI	EDUCA	HEALTH	FDI_t	FDI_{t-1}	ECONFR
PGDP	1						
HDI	0.901	1					
EDUCA	0.807	0.942	1				
HEALTH	0.794	0.924	0.801	1			
FDI_t	0.861	0.794	0.756	0.664	1		
FDI_{t-1}	0.807	0.721	0.678	0.593	0.947	1	
ECONFR	0.709	0.668	0.624	0.607	0.731	0.691	1

4.3 Stylized Facts

We conclude section 4 with Table 3 which documents the evolution of per capita GDP, development, FDI (as a percentage of GDP) and economic freedoms variables for developed, developing and the least developed countries by using the values for 1980 and 2010. By doing this, we aim to provide a set of stylized facts which may be important to consider in interpreting

the estimation results. Over the 1980-2010 period, all country groups registered significant increases in the variables that we analyze. However, there are also important differences across country groups concerning the degree of average changes in the variables. Strictly speaking:

- a) The per capita GDP increased remarkably in all country groups. However, the change in the level of per capita GDP is the highest for developed countries. It increased by 51 percent. For developing and the least developed countries the average change is 42 and 10 percent, respectively.
- b) The HDI, the education and the health indices increased in a significant manner for all country groups. Unlike the change in per capita GDP, the highest average change in the HDI score occurred in the least developed countries group. The average HDI score increased by 37 percent for the least developed countries. Developed and developing countries also raised their HDI scores about 18 and 33 percent, respectively. In addition, the education and health indices registered to a significant rise in all country groups, as the HDI score did.
- c) The share of the inward FDI stock in GDP increased by 118 percent in developed, 232 percent in developing and 217 percent in the least developed countries in the 1980-2010 period. In other words, all countries integrated to the world economy to a higher extent by attracting more foreign investors.
- d) The average economic freedoms index improved in all county groups but mostly in developing countries, which increased by 27 percent. In the least developed countries the magnitude of the increase is 22 percent and in developed countries it is 17 percent. It implies that during the globalization process all country groups upgraded their institutional quality at different degrees.

Table 3. Selected Macroeconomic Variables in 1980 and 2010

		Per Capita GDP (\$)	HDI	Education Index	Health Index	FDI (as % GDP)	Economic Freedoms
Developed Countries	Average Value in 1980	21109.96	0.74	0.65	0.83	34.45	6.32
	Average Value in 2010	31974.16	0.87	0.87	0.94	75.25	7.41
	% Change	51.46	17.92	34.20	13.17	118.42	17.20
Developing Countries	Average Value in 1980	6362.54	0.52	0.44	0.69	13.11	5.20
	Average Value in 2010	9010.82	0.69	0.66	0.81	43.48	6.61
	% Change	41.62	32.69	50.00	17.39	231.66	27.12
Least Developed Countries	Average Value in 1980	1139.45	0.30	0.19	0.45	8.03	4.80
	Average Value in 2010	1257.71	0.41	0.39	0.56	25.50	5.86
	% Change	10.38	36.67	105.26	24.44	217.56	22.08

Source: Author's calculations from the Fraser Institute, UNCTAD, UNDP and WDI.

5. Regression Analysis

We run four main regressions by the using the panel OLS method with fixed effects and the White heteroscedasticity consistent standard errors. Many studies employ the same approach, such as Bengoa and Sanchez-Robles (2003) and Johnson (2006). We employ the panel OLS method because:

- the number of observations in our dataset is limited due to 5-year period data (instead of annual) which leads to estimation problems when using dynamic estimation methods.
- panel OLS is the most common estimation method in the literature, which allows us to directly compare our results with other studies.
- we can take time or country fixed effects into consideration, which is generally neglected in other estimation methods.

- panel OLS best fits to our data among others that generated better estimations (e.g. higher t-statistics, adjusted R-square, F-statistics, and log-likelihood ratios).

The panel OLS method is the application the of the usual OLS method to the panel series. A panel series dataset has both a time-unit dimension (T) and a cross-unit dimension (N). Thus, neither cross-section nor time-series estimators of OLS method can generate unbiased results. In this respect, panel OLS estimators take both time and cross-section units into consideration in the estimation process. However, there can be cross-country differences within time-series, which can lead to endogeneity problems (Aghion and Howitt, 2009, p. 452). Hence, estimation results without taking cross-country differences into consideration might lead to misinferences about coefficients. To deal with this problem, “the *fixed effect* estimators of panel OLS is developed, which captures the omitted variables that are present in each country and that are constant over time” (Aghion and Howitt, 2009, p. 453). On the other hand, “the *random-effect* estimation assumes that the intercept of an individual unit is a random draw from a much larger population with a constant mean value” (Gujarati, 2003, p. 652).⁸

In the literature, a formal and common way to determine between fixed and random effects is the Hausman specification test, which tests the null of random effects versus fixed effects. The Hausman test results favor the fixed effects for our dataset and therefore we used the fixed effects in estimating the regressions. This allows us also to take the country-specific factors which are not changing over time such as language and culture etc. On the other hand, the use of the economic freedoms index enables us to control for the country-specific institutional factors which changes over time.

⁸ For a review of panel OLS fixed and random effects, see Gujarati (2003, pp. 640-651) and Verbeek (2008, pp. 359-369).

In our estimations, we eliminated a potential heteroscedasticity problem that might lead to biased standard errors by using the White cross-section heteroscedasticity consistent covariance method. We also eliminated a possible autocorrelation problem, which might lead to biased estimators by applying autoregressive process, when it is necessary.

5.1 Main Results

Panel A of Table 4 tabulates the estimation results of the economic growth equation. According to the estimation results, all explanatory variables included into the regression have important effects on economic growth in all country groups. The coefficients of FDI and economic freedoms generated the expected positive sign. Both the coefficients of the contemporaneous FDI and economic freedoms are statistically significant at the conventional significance levels. The only exception is the effect of the lagged FDI variable in developing countries, which is negative and statistically insignificant.

In details, the results show that a 10 percent increase in per capita FDI leads to a 2.9 percent increase in per capita GDP in developed countries and 3.9 percent rise in developing countries in the same period. In the least developed countries, the size of this effect is 1.8 and it is 3.1 for *all countries* group. In all four groups, the contemporaneous FDI coefficients are statistically significant at the 1 percent significance level. Although the coefficient of the lagged FDI is positive in all four groups except developing countries, it is statistically insignificant.

In a nutshell, we found that FDI makes a positive and meaningful effect on per capita income in all four groups. Nevertheless, the biggest positive effect of FDI arises in developing countries. It might be explained with the relative backwardness of developing countries in terms of per capita income (Aghion and Howitt, 2009). Interestingly, the least developed countries have the smallest contemporaneous FDI coefficient which implies that FDI increases their per

capita income relatively less than developed and developing countries. It can be partly explained with the low levels of FDI in the least developed countries and poor infrastructure that might limit spillover effects stemming from FDI (OECD, 2002, p. 10; Tekin, 2012).

Finally, the coefficient of economic freedoms is estimated with the expected positive sign in all four groups. It is statistically significant at the conventional significance levels. The size of the coefficient is 0.27 for developed countries, 0.06 for developing countries, and 0.11 in the least developed countries group. For example, the coefficient of economic freedoms can be interpreted as follows: a 1 point increase in economic freedoms leads to a 0.27 percent in per capita GDP in developed countries. In sum, the economic freedoms variable, which we used to proxy the quality of institutions, generated the expected positive sign in our estimations. It means that better institutions, showed by an increase in the *economic freedoms* index value, help countries to have an increased per capita income.

Panel B of Table 4 presents the estimation results of the development equation. According to the estimation results, the contemporaneous FDI variable and economic freedoms affect the human development index (HDI) positively in all four groups. In details, a 1 percent increase in per capita FDI leads to a 0.03 percentage increase in HDI in developed countries and a 0.05 percentage rise in developing countries, and a 0.03 percentage rise in the least developed countries. If a human development level is already high in a country, it is possible to have a smaller effect of FDI on development (Moran, 2011). For the least developed countries, a smaller positive effect of FDI on human development than developing countries can be explained with the same arguments as in the growth effect of FDI. The lagged FDI variable also plays a positive role on development in developed and in the least developed countries. On the other hand, economic freedoms positively affect development in all four country groups that

highlights the beneficiary effect of economic freedoms on development. The size of the coefficient varies between 0.02 (developed countries) and 0.06 (the least developed countries).

In sum, the regression results point out that more FDI and improved economic freedoms spur development in all countries which are at different development levels. In simple terms, it is found that FDI is beneficial for growth and development. Nonetheless, the magnitude of the effects differs across different country groups depending on the level of development.

Table 4. The Effect of FDI on Growth and Development

Panel A. Dependent Variable: log (Per Capita GDP)				
	Developed Countries	Developing Countries	Least Developed Countries	All Countries
log FDI_t	0.2994*** (0.000)	0.3945*** (0.000)	0.1833*** (0.000)	0.3103*** (0.000)
log FDI_{t-1}	0.0044 (0.914)	-0.0004 (0.982)	0.0186 (0.627)	0.0282 (0.194)
ECONFR	0.2715*** (0.005)	0.0621** (0.038)	0.1102* (0.103)	0.1080*** (0.000)
F-s tat.	31.86*** (0.000)	39.46*** (0.000)	15.57*** (0.000)	147.77*** (0.000)
Ad.R-sq.	0.8629	0.8849	0.7395	0.9659
Panel B. Dependent Variable: log (Human Development Index)				
	Developed Countries	Developing Countries	Least Developed Countries	All Countries
log FDI_t	0.0301*** (0.000)	0.0501*** (0.000)	0.0363*** (0.023)	0.0405*** (0.000)
log FDI_{t-1}	0.0051* (0.083)	-0.0041 (0.172)	0.0209** (0.052)	0.0001 (0.984)
ECONFR	0.0231*** (0.000)	0.0264*** (0.000)	0.0633*** (0.000)	0.0381*** (0.000)
F-s tat.	44.81*** (0.000)	41.90*** (0.000)	22.20*** (0.000)	154.23*** (0.000)
Ad.R-sq.	0.9017	0.8927	0.8151	0.9683

Notes: (1) Models are estimated with panel OLS fixed effects and with intercept terms. (2) The intercept terms are not reported for the sake of simplicity. (3) Probabilities are in parentheses. (4) (***) Significant at 1%; (**) Significant at 5%; (*) Significant at 10%. (5) All countries sample consists of developed, developing and the least developed countries.

Table 5 provides the estimation results of the equations in which the education and the health indices are used as the dependent variables. As explained before, the education and the health indices constitute the two other sub-dimensions of the HDI apart from per capita income. Panel A of Table 5 shows that the contemporaneous FDI variable and economic freedoms affect the education index in a positive way. The coefficients are statistically significant at the 1 percent significance level. In details, the biggest contemporaneous FDI coefficients are observed in developing countries (0.082) and in the least developed countries (0.085). For the developed countries, the coefficient is 0.05. The magnitude of the coefficient of the economic freedoms index is 0.03 for developed countries, 0.04 for developing countries, and 0.10 for the least developed countries. It confirms the positive role of economic freedoms for a higher education index. The lagged effect of FDI is negative and statistically significant in developing countries group (0.01). However, it is remarkably smaller than the size of the contemporaneous FDI coefficient, which is 0.08. Therefore, the net effect of FDI on the education index seems to remain positive over time in developing countries. In the remaining three groups, the lagged FDI coefficient is not statistically significant. In sum, FDI and economic freedoms make a positive effect on the education index as in the estimation results with HDI.

Finally, Panel B of Table 5 presents the estimation results for the health index. The results show that the contemporaneous FDI and economic freedoms affect the health index in a positive way, as in the education index. The coefficients of the contemporaneous FDI variable and economic freedoms are statistically significant at the 1 percent significance level except the least developed countries. More precisely, the contemporaneous FDI coefficients are as follows: 0.01 for developed countries, 0.02 for developing countries and 0.01 for the least developed countries. The coefficient of the economic freedoms index is 0.01 for developed countries, 0.02

for developing countries and 0.06 for the least developed countries. These results imply that more FDI and higher economic freedoms increase the health index in all country groups. The lagged effect of FDI on the health index is not found statistically significant in any group.

Table 5. The Effect of FDI on Education and Health Indices

Panel A. Dependent Variable: log (Education Index)				
	Developed Countries	Developing Countries	Least Developed Countries	All Countries
log FDI_t	0.0576*** (0.000)	0.0825*** (0.000)	0.0851*** (0.005)	0.0767*** (0.000)
log FDI_{t-1}	0.0032 (0.700)	-0.0121** (0.036)	0.0016 (0.936)	-0.0117 (0.240)
ECONFR	0.0368*** (0.000)	0.0494*** (0.000)	0.1091*** (0.000)	0.0671*** (0.000)
F-stat.	35.84*** (0.000)	32.28** (0.000)	19.79*** (0.000)	70.08*** (0.000)
Ad.R-sq.	0.8794	0.8641	0.7952	0.9322
Panel B. Dependent Variable: log (Health Index)				
	Developed Countries	Developing Countries	Least Developed Countries	All Countries
log FDI_t	0.0179*** (0.000)	0.0259*** (0.000)	0.0108 (0.693)	0.0191* (0.067)
log FDI_{t-1}	0.0071*** (0.005)	-0.0032 (0.194)	0.0101 (0.582)	0.0002 (0.967)
ECONFR	0.0098** (0.020)	0.0262*** (0.004)	0.0619* (0.013)	0.0363*** (0.000)
F-stat.	48.82*** (0.000)	21.13*** (0.000)	11.04*** (0.000)	62.08*** (0.000)
Ad.R-sq.	0.9062	0.7994	0.6564	0.9209

Notes: (1) Models are estimated with panel OLS fixed effects and with intercept terms. (2) The intercept terms are not reported for the sake of simplicity. (3) Probabilities are in parentheses. (4) (***) Significant at 1%; (**) Significant at 5%; (*) Significant at 10%. (5) All countries sample consists of developed, developing and the least developed countries.

Table 6 summarizes the estimation results in where we investigated the effect of FDI on growth and development by using four different dependent variables. According to Table 6, we confirm that more FDI improves per capita GDP, HDI, the health and the education indices in all

country groups. In none of the country groups, we did not find that FDI variable and economic freedoms make any negative effect on the well-being of people measured by per capita income, HDI, the education and the health indices, unlike some scholars claimed such as Herzer et al. (2008). Nevertheless, the size of the FDI effect is non-uniform across different levels of development. The biggest positive effect of FDI on per capita GDP, HDI, and health indices takes place in the *developing countries group* which is in line with the findings of Castejon and Woerz (2006). They found evidence for more significant effects of FDI in developing economies (catching-up economies) than developed countries. The findings of Tekin (2012) support our results who finds a relatively smaller growth effect of FDI for the least developed countries. On the other hand, we found that in the *least developed* countries FDI affects the education index (a sub-dimension of HDI) to a *higher* extent along with developing countries relative to developed countries and *all countries* groups.

When we take all four well-being dimensions into account, the biggest beneficiary from FDI is developing countries rather than developed and the least developed countries. Moreover, our results support the view of Moran (2011) and Blonigen and Wang (2005). They claim that it might be inappropriate to analyze the effects of FDI for a set of countries which are at different levels of development. This might lead to loss of information and misinferences from results. For instance, the size of the FDI effect on HDI is 0.0405 for *all countries* group, however, for the developing countries group it is 0.0501.

All in all, the results reveal that FDI and economic freedoms improve the well-being of people living in different countries by increasing four main indicators: per capita GDP, HDI, the education and the health indices. Broadly speaking, our results are in line with Hansen and Rand

(2006), Reiter and Steensma (2010) that they found meaningful and positive effect of FDI on economic growth and development.

Table 6. The Effect of FDI on Growth and Development: Summary Results

Dependent Variable	Independent Variable	Developed Countries	Developing Countries	Least Developed Countries	All Countries
Per capita GDP	log FDI _t	0.2994	0.3945	0.1833	0.3103
HDI	log FDI _t	0.0301	0.0501	0.0363	0.0405
Education	log FDI _t	0.0576	0.0825	0.0851	0.0767
Health	log FDI _t	0.0179	0.0259	0.0108*	0.0191

Notes: (1) The figures are replaced from the main estimation results in Tables 4 and 5 for illustrative purposes. (2) All coefficients are significant at the conventional significance levels except the value with *. (3) **Bold** figures denote the **biggest** coefficient among four groups (developed, developing, the least developed, all).

5.2 Robustness Checks

This section presents the results of the main robustness checks. We make four main robustness checks apart from re-sampling of the dataset (changing the length of period and the number of countries in the groups):

- i. introducing the technology gap variable
- ii. the use of inward FDI stock as a percentage of GDP
- iii. estimation with panel OLS random effects
- iv. introducing foreign portfolio investment

5.2.1 Introducing the Technology Gap Variable

In the literature of the effects of FDI some authors use a technology gap variable to test whether the technology gap between the country using the most advanced technology (e.g. the United States) and the host countries matters (Gorg and Greenaway, 2004). The technology gap hypothesis was first claimed by Findlay (1978) and tested by several authors (Konings, 2001; Li and Liu, 2005).

According to the technology gap hypothesis, countries with a low level development level use less advanced technologies with more unskilled labor force and therefore they have a low absorption capacity to benefit from advanced technologies. In this regard, a higher technology gap between countries prevents the stemming of positive spillover effects such as technology and managerial skills backed by foreign investors. Hence, a wider technology gap associates with a higher negative effect on growth and development of the host countries. Therefore, the expected sign for the technology gap variable, especially for developing and the least developed countries is negative in the regression in Table 7. Developed countries (or countries which use the advanced technology) can benefit from the existence of a (limited) technology gap because they have the necessary technology and infrastructure to imitate and apply the new technologies. However, developed countries are bounded with the stringent copyright agreements and patent rules that might limit such an effect. In this regard, the net effect of technology gap might be ambiguous for developed countries (Li and Liu, 2005).

We follow a standard definition used to measure the technology gap. It simply measures the country's technology level by measuring its distance to the country with most advanced technology level. For empirical purposes, we chose the reference country as the United States by following Li and Liu (2005, p. 396). More precisely, it is defined as:

$$\text{TECHNOLOGY GAP}_{i,t} = \left(\frac{\text{US per capita GDP}_t - \text{Host country per capita GDP}_{i,t}}{\text{Host country per capita GDP}_{i,t}} \right)$$

Table 7 presents the estimation results of the regression in which we examine the effect of FDI on growth with the technology gap variable. According to the estimation results, the contemporaneous FDI variable and economic freedoms affect growth positively in all four country groups, as in the estimation results without the technology gap variable. These coefficients are statistically significant at the 1 percent significance level. Again, the biggest

positive effect of contemporaneous FDI belongs to developing countries. The lagged effect of FDI has the expected positive sign with a statistically significant coefficient in the least developed countries. Economic freedoms positively affect growth as expected and the coefficient varies between 0.09 and 0.15.

Table 7. The Effect of FDI on Growth with Technology Gap Variable

Dependent Variable: log (Per Capita GDP)				
	Developed Countries	Developing Countries	Least Developed Countries	All Countries
log FDI_t	0.2879*** (0.000)	0.3123*** (0.000)	0.1375*** (0.000)	0.2887*** (0.000)
log FDI_{t-1}	-0.0022 (0.531)	-0.0020 (0.161)	0.0351* (0.1075)	0.0319 (0.203)
ECONFR	0.1409*** (0.017)	0.0766*** (0.019)	0.1674*** (0.000)	0.1290*** (0.000)
TECHGAP	-0.0390*** (0.000)	-0.0280*** (0.000)	-0.0042*** (0.000)	-0.0051*** (0.000)
F-stat.	54.07*** (0.000)	63.34*** (0.000)	29.68*** (0.000)	174.24*** (0.000)
Ad.R-sq.	0.9173	0.9268	0.8524	0.9712

Notes: (1) Models are estimated with panel OLS fixed effects and with intercept terms. (2) The intercept terms are not reported for the sake of simplicity. (3) Probabilities are in parentheses. (4) (***) Significant at 1%; (**) Significant at 5%; (*) Significant at 10%. (5) All countries sample consists of developed, developing and the least developed countries. (6) TECHGAP denotes the technology gap variable defined in the text.

Finally, the technology gap variable generated a negative sign in all groups, which is statistically significant at the 1 percent significance level. This is in line with our expectations and the findings of Li and Liu (2005), who used the same definition with us. It implies that a higher degree of technology gap between the US and the host countries makes a negative effect on growth in all country groups.⁹ A future study can investigate the causality mechanism of the negative effect with alternative technology gap variables, which is beyond the scope of this

⁹ We also get similar results, when we introduce technology gap into the HDI, the education and the health regressions.

study. In sum, the results confirm that our main estimation results are robust to the inclusion of a relevant variable into the regression.

5.2.2 The Use of Inward FDI Stock as a Percentage of GDP

Table 8 presents the estimation results for the education equation in which we replace the per capita FDI variable with the *inward FDI stock as a percentage of GDP* variable. The inward FDI stock as a percentage of GDP was used in some previous studies such as Carkovic and Levine (2005) and Blonigen and Wang (2005). The data for the inward FDI stock as a percentage of GDP gathered from the UNCTAD database.

Table 8. The Effect of FDI on Education Index with Alternative FDI Variable

Dependent Variable: log (Education Index)				
	Developed Countries	Developing Countries	Least Developed Countries	All Countries
FDIG_t	0.0007*** (0.000)	0.0005 (0.221)	0.0041*** (0.002)	0.0008*** (0.000)
FDIG_{t-1}	-0.0001 (0.481)	0.0012** (0.013)	0.0028** (0.021)	0.0001 (0.255)
ECONFR	0.1101*** (0.000)	0.1058*** (0.000)	0.1418*** (0.000)	0.1213*** (0.000)
F-stat.	18.05*** (0.000)	23.59*** (0.000)	17.61*** (0.000)	57.31*** (0.000)
Ad.R-sq.	0.7777	0.8203	0.7732	0.9172

Notes: (1) Models are estimated with Panel OLS fixed effects and with intercept terms. (2) The intercept terms are not reported for the sake of simplicity. (3) Probabilities are in parentheses. (4) (***) Significant at 1%; (**) Significant at 5%; (*) Significant at 10%. (5) All countries sample consists of developed, developing and the least developed countries. (6) FDIG denotes the inward FDI stock as percentage of GDP variable.

The estimation results in Table 8 are qualitatively similar to the estimation results with the per capita FDI variable.¹⁰ According to the estimation results in Table 8, the contemporaneous FDI variable and economic freedoms affect the education index positively in

¹⁰ In addition, we gathered FDI asset as a percentage of GDP data from Mark II database of Lane and Milesi-Ferretti (2007) for the 1980-2005 period. These estimation results also confirmed the main findings.

all four country groups. These coefficients are statistically significant at the 1 percent significance level except for developing countries. However, for developing countries a positive and statistically significant lagged FDI effect is estimated. It also confirms the positive effect of FDI on education in developing countries. In sum, our results are robust to the change in FDI variable.

5.2.3 Estimation with Panel OLS Random Effects

Table 9 presents the estimation results with panel OLS random effects for the HDI equation. The results are in line with the estimation results with panel OLS fixed effects in Table 4.¹¹

Table 9. The Effect of FDI on Development with Random Effects

Dependent Variable: log (Human Development Index)				
	Developed Countries	Developing Countries	Least Developed Countries	All Countries
log FDI_t	0.0286*** (0.000)	0.0537*** (0.000)	0.0357*** (0.008)	0.0488*** (0.000)
log FDI_{t-1}	0.0048** (0.036)	-0.0064 (0.132)	0.0149*** (0.003)	-0.0004 (0.931)
ECONFR	0.0232*** (0.000)	0.0257*** (0.000)	0.0699*** (0.000)	0.0377*** (0.000)
F-stat.	265.19*** (0.000)	162.85*** (0.000)	35.57*** (0.000)	234.05*** (0.000)
Ad.R-sq.	0.8058	0.622	0.4101	0.5232

Notes: (1) Models are estimated with panel OLS random effects and with intercept terms. (2) The intercept terms are not reported for the sake of simplicity. (3) Probabilities are in parentheses. (4) (***) Significant at 1%; (**) Significant at 5%; (*) Significant at 10%. (5) All countries sample consists of developed, developing and the least developed countries.

According to the estimation results, the contemporaneous FDI variable and economic freedoms affect HDI positively in all country groups. These coefficients are statistically significant at the 1 percent significance level. The size of the contemporaneous FDI effect lies

¹¹ Estimation with panel OLS random effects generated qualitatively similar results to the results with fixed effects also for the growth, the education and the health equations. All results are available upon request.

between 0.02 and 0.05. As in the estimation with fixed effects, the biggest contemporaneous FDI effect is estimated as 0.05 for developing countries. The lagged FDI variable generates a statistically significant and positive effect in developed and the least developed countries. In a nutshell, our estimations with random effects generated qualitatively similar results to the estimation with fixed effects.

5.2.4 Introducing Foreign Portfolio Investment

Foreign direct investment and foreign portfolio investment comprise the two main legs of the international capital flows. In this study, we concentrated on the FDI leg of this setting. Compared with the foreign portfolio investment, it is assumed that FDI is beneficial for growth and development since it is a kind of *real* investment. It means that foreign investors aim to profit for a long period of time that they form a totally new company or acquire at least ten percent of an existing company in a host country which gives them an effective voice in the management. To this end, both the capital widening and the capital deepening effects stemming from FDI are expected to affect host countries positively over time, as discussed in the theory section. Thus, FDI is expected to make a contribution to the host country economic growth and development.

Foreign portfolio investments are the investments which go into the financial instruments and securities generally for a short or medium term and do not give foreign investors an effective voice in the management (Kim and Singal, 2000; Errunza, 2001). Therefore, its effect on growth and development might be mainly stemming from the capital widening channel. In other words, portfolio investors bring additional capital from other countries, which was not available before the investment (Errunza and Losq, 1985). Nevertheless, some scholars argue that foreign portfolio investments not only expand the available capital stock and financial instruments but

also help host countries to build up a sound and functioning financial system, which is a key for growth and development (King and Levine 1993; Levine, 2001). Therefore, portfolio investments would also promote the quality of financial instruments and financial system, which may help host countries in financing the growth and development.

On the other hand, a strand of economists label portfolio investments as the *hot money* such as Korinek (2011), Guo and Huang (2010). They discuss that in the short and medium run portfolio investments are not beneficial for growth and development due to the capital flights and dividend transfers from host countries. Especially, it is harmful for economic growth and development in economically turbulent times (Guo and Huang, 2010; Kim and Wei, 1999). Therefore, the net effect of portfolio investments is a subject of debate theoretically and empirically in the literature.

We investigate the effect of foreign portfolio investment on growth and development as a complementary argument to our FDI discussion by keeping the abovementioned discussion in our mind (Durham, 2004). We use the per capita portfolio asset data for 125 countries over the 1980-2005 period. The data gathered from the updated version of the Mark II database of Lane and Milesi-Ferretti (2007). The estimation results with panel OLS fixed effects in Table 10 are qualitatively similar to the estimation results with the per capita FDI stock variable.

According to the estimation results in Table 10, the contemporaneous portfolio variable and economic freedoms affect growth and development positively in developed and developing countries. The coefficients of the growth and the development effects of portfolio investments are economically meaningful and statistically significant at the 1 percent significance level. As in the main estimations with FDI variable, the biggest beneficiary from portfolio investment is developing countries owing to the size of the coefficients of portfolio variables, as Levine and

Zervos (1996) and Errunza (2001) found. For *all countries* group, both contemporaneous and lagged portfolio investment variables generated positive coefficients in the growth equation. For the development equation only the lagged portfolio effect is statistically significant and positive in *all countries* group.

For the least developed countries estimation results show that contemporaneous portfolio investment affects growth and development in a negative way. These coefficients are statistically significant at the conventional significance levels. It implies that portfolio investment seems to be harmful for the least developed countries temporarily. More precisely, a 10 percent increase in per capita portfolio assets in *period t* leads to a 0.4 percent decrease in per capita GDP in the same period. However, in the next period (*period t+1*) per capita GDP will increase 1.3 percent due to a 10 percent increase in per capita portfolio assets in *period t*. Thus, the net effect of portfolio investment remains positive on growth and development in the least developed countries, when we take the lagged effect into account (Errunza, 2001; Levine, 2001).

There might be several reasons for the contemporaneous negative effect of portfolio investment on growth and development in the least developed countries:

- High economic and politic instability attracts more speculative portfolio investments (for a short period) to the least developed countries.
- As a consequence of a higher perceived investor risk, in the least developed countries nominal interest rates are significantly higher than in developed and developing countries. Therefore, attracting portfolio investment is more costly.
- The level of domestic financial resources is not sufficient and instruments are not strong enough to fight with the negative effects in case of capital flights and large-scale profit transfers.

Table 10. The Effect of Portfolio Investment on Growth and Development

Panel A. Dependent Variable: log (Per Capita GDP)				
	Developed Countries	Developing Countries	Least Developed Countries	All Countries
log PORTFOLIO_t	0.1011** (0.037)	0.1666*** (0.000)	-0.0431** (0.043)	0.1148*** (0.003)
log PORTFOLIO_{t-1}	0.0942** (0.04)	0.0615*** (0.000)	0.1312*** (0.000)	0.0962*** (0.002)
ECONFR	0.2915*** (0.000)	0.1104*** (0.000)	-0.0459 (0.706)	0.1631*** (0.000)
F-stat.	21.57*** (0.000)	32.69*** (0.000)	7.15*** (0.001)	93.45*** (0.000)
Ad.R-sq.	0.8363	0.9152	0.7365	0.9638
Panel B. Dependent Variable: log (Human Development Index)				
	Developed Countries	Developing Countries	Least Developed Countries	All Countries
log PORTFOLIO_t	0.0074*** (0.002)	0.0228*** (0.000)	-0.0188*** (0.001)	0.0001 (0.994)
log PORTFOLIO_{t-1}	0.0161*** (0.000)	0.0148*** (0.000)	0.0274*** (0.000)	0.0238*** (0.000)
ECONFR	0.0247*** (0.000)	0.0080 (0.280)	0.0291* (0.109)	0.0259*** (0.000)
F-stat.	33.32*** (0.000)	31.07*** (0.000)	20.64*** (0.000)	128.45*** (0.000)
Ad.R-sq.	0.8911	0.9111	0.8972	0.9711

Notes: (1) Models are estimated with panel OLS fixed effects and with intercept terms. (2) The intercept terms are not reported for the sake of simplicity. (3) Probabilities are in parentheses. (4) (***) Significant at 1%; (**) Significant at 5%; (*) Significant at 10%. (5) All countries sample consists of developed, developing and the least developed countries. (6) PORTFOLIO denotes the per capita portfolio asset variable.

Finally, the estimation results with portfolio investment show that more economic freedoms associate with a positive growth in developed, developing and *all* country groups. Economic freedoms also contribute to the development that the coefficient of economic freedoms is found with the expected positive sign in all country groups. It lies between 0.008 and 0.02. In sum, the results point out that:

- Foreign portfolio investment makes a contribution to the growth in developed and developing countries, as FDI does.

- The size of the effect of portfolio investment on growth and development is smaller than the size of the FDI effect on growth and development. It implies that FDI is more beneficial than portfolio investments, all else equal.
- A negative contemporaneous effect of portfolio investment on growth and development takes place in the least developed countries, unlike FDI does. However, the coefficient of the lagged portfolio variable confirms the existence of a larger positive effect than the initial negative effect, which leaves the net effect positive.¹²

In sum, the results of this section suggest that main findings of the study are robust to changes in the estimation method and the replacement of the variables.

6. Discussion and Conclusions

This study examined the effect of FDI on economic growth and development by taking development levels and the quality of host country institutions into account, which was less investigated in the literature. Especially, a little attention is paid to the least developed countries and the development effect of FDI.

The study used a large sample of countries (125 countries) to analyze its research question over the 1980-2010 period in which countries are grouped as developed, developing and the least developed countries. In the study, the economic freedoms index of the Fraser Institute is used to proxy the quality of institutions and its implications for growth and development apart from the FDI variable.

A preliminary data analysis showed that all country groups became more integrated to the world economy and increased their well-being in terms of per capita income, HDI, the education and the health indices over the 1980-2010 period (see Table 3). The correlation matrix also

¹² For instance Korinek (2011) and Guo and Huang (2010) discuss a kind of Tobin tax on portfolio investment which can hamper its negative effects mainly stemming from the speculative attacks.

illustrated that FDI, growth, development, and economic freedoms are all positively correlated. We made a regression analysis to investigate how and to what extent FDI affected growth and development along with economic freedoms.

First of all, the regression analysis reveals that FDI has a meaningful positive effect on growth in all country groups as in Hansen and Rand (2006). However, the size of the effect is not uniform across country groups. Strictly speaking, developing countries benefit more than developed and the least developed countries owing to relatively larger size of the coefficient. This result can be partly explained by the advantage of backwardness in terms of per capita income levels and the existence of functioning institutions.

Second, the results confirm that FDI fosters development in all country groups, as in the growth effect of FDI. Three regressions with HDI, the education and the health indices testified this result. Again, the biggest beneficiary country group is found as developing countries due to the magnitude of the development effect, which is 0.05 for the HDI equation.

Third, the findings testify the importance of economic freedoms (a proxy for the quality of *institutions*) for growth and development. The results show that improved economic freedoms enhances a country's well-being (measured by per capita GDP, HDI, the education and the health indices).

Fourth, the robustness checks of the regressions confirm that the main findings of the study are robust to the change in the estimation method or the FDI variable used. An interesting result is found especially when we replaced foreign direct investment with foreign portfolio investment. The positive effect of FDI is found to be larger in all country groups than the effect of foreign portfolio investment. In addition, we found that (contemporaneous) portfolio

investment makes a small negative effect on growth and development in the least developed countries, which turns positive over time (the lagged effect).

In sum, our study showed that FDI and better institutional quality spurs economic growth and development in all country groups. Unlike some scholars claimed (e.g. Herzer et al., 2008), we did not find any remarkable negative effect of FDI on growth and development. The possible implications of our findings are as follows:

- The major implication of the finding “FDI spurs growth and development” is that: countries should follow pro-FDI policies. Especially, our results would encourage policy makers to remove and re-adjust the existing restrictive FDI policies. As shown in the study, all countries even the least developed countries enjoy the beneficiary effects of FDI both on growth and development.
- The positive role of economic freedoms on growth and development would motivate policy-makers to attach a special importance to the upgrading the quality of institutions (e.g. economic freedoms) of host countries.
- Especially for developing countries, the sustainability of FDI inflows has a particular importance for ensuring high economic growth rates (UNCTAD, 2010). Our results support this view of UNCTAD (2010) in a way that we showed developing countries benefit more from FDI (in terms of growth and development) than developed and the least developed countries. Therefore, developing countries should attach a special importance to the sustainability of FDI by providing a pro-FDI economic and politic environment.
- Our results would suggest policy-makers to treat FDI as a part of national development policies since FDI brings more economic growth and help governments in providing

better life standards to their residents such as residents can have a higher education enrollment and can have a higher life expectancy. But this might not occur automatically (OECD, 2002). It is important to remind that the primary motivation of the foreign investors is neither host country economic growth nor development but is to maximize their profits in the medium and the long-run. Therefore, government policies and institutions that governments provide are important in maximizing the expected benefits of FDI for a host country. In this regard, governments can play an important role in maximizing the effects of FDI on growth and development by guiding and channeling (not forcing) FDI towards less developed regions within a host country or providing incentives for investments in some key sectors for the host country development.

- To maximize the benefits of FDI to host countries governments would try to harmonize national development policies with FDI policies. This requires a new investment paradigm (UNCTAD, 2010, p. 158; Moran, 2011). For example, regional development agencies should work in coherence with national investment promotion agencies. The case of Ireland was a good example of such a harmonized policy (Onis and Senses, 2007).
- During the whole reform process the *communication* aspect should not be neglected. In the societies, there may be a group of people consists of top-key bureaucrats, businessmen, academicians and citizens who are skeptical on the effects of FDI on the society or who are totally against FDI.¹³ Therefore, the reform process should be coupled with an effective communication policy including trainings and conferences with public,

¹³ In some developing and the least developed countries this problem arises time to time, especially during the privatizations of the stated owned enterprises.

business world and multinationals which would increase the effectiveness of the FDI policies and institutional reforms.

In this study, we concentrated on the growth and development effects of FDI. Future studies would investigate the effect of FDI on growth and development from different angles with alternative indicators. For instance, a future study can analyze how FDI affects income inequality and poverty, especially in the least developed countries. Another study can look at the environmental effects of FDI since the quality of environment has been increasingly seen as a part of development. Finally, a future study can replace our findings with sectoral FDI datasets to examine the effects of FDI in different sectors, if datasets allow.

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Appendix: Table A. The Areas and Components of the Economic Freedom Index

<p>Area 1: Size of Government: Expenditures, Taxes, and Enterprises</p> <p>A General government consumption spending</p> <p>B Transfers and subsidies as a percentage of GDP</p> <p>C Government enterprises and investment</p> <p>D Top marginal tax rate</p> <p>Area 2: Legal Structure and Security of Property Rights</p> <p>A Judicial independence (GCR)</p> <p>B Impartial courts (GCR)</p> <p>C Protection of property rights (GCR)</p> <p>D Military interference in rule of law and the political process (CRG)</p> <p>E Integrity of the legal system (CRG)</p> <p>F Legal enforcement of contracts (DB)</p> <p>G Regulatory restrictions on the sale of real property (DB)</p> <p>Area 3: Access to Sound Money</p> <p>A Money Growth</p> <p>B Standard deviation of inflation</p> <p>C Inflation: Most recent year</p> <p>D Freedom to own foreign currency bank accounts</p> <p>Area 4: Freedom to Trade Internationally</p> <p>A Taxes on international trade</p> <p>B Regulatory Trade Barriers</p> <p>C Size of the trade sector relative to expected</p> <p>D Black-market exchange rates</p> <p>E International capital market controls</p> <p>Area 5: Regulation of Credit, Labor, and Business</p> <p>A Credit market regulations</p> <p>B Labor market regulations</p> <p>C Business Regulations</p>
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Source: Gwartney et al. (2011). A more detailed list and the data sources of the components are also available in Gwartney et al. (2011).

Appendix: Table B. The List of Countries

Developed Countries (38 Countries)			
Australia	Finland	Japan	Slovakia
Austria	France	Korea S.	Slovenia
Bahrain	Germany	Luxembourg	Spain
Barbados	Greece	Malta	Sweden
Belgium	Hong Kong	Netherlands	Switzerland
Canada	Hungary	New Zealand	United Arab Emirates
Cyprus	Iceland	Norway	United Kingdom
Czech Republic	Ireland	Poland	United States
Denmark	Israel	Portugal	
Estonia	Italy	Singapore	
Developing Countries (58 Countries)			
Albania	Croatia	Kazakhstan	Philippines
Algeria	Dominican R.	Kuwait	Romania
Argentina	Ecuador	Latvia	Russian Federation
Azerbaijan	Egypt	Lithuania	South Africa
Bahamas	El Salvador	Malaysia	Sri Lanka
Belize	Fiji	Mauritius	Syrian Arab Republic
Bolivia	Gabon	Mexico	Thailand
Botswana	Guatemala	Morocco	Trinidad and Tobago
Brazil	Guyana	Namibia	Tunisia
Bulgaria	Honduras	Nicaragua	Turkey
Chile	India	Oman	Ukraine
China	Indonesia	Pakistan	Uruguay
Colombia	Iran	Panama	Venezuela
Congo	Jamaica	Paraguay	
Costa Rica	Jordan	Peru	
The Least Developed Countries (29 Countries)			
Bangladesh	Ghana	Myanmar	Tanzania (Un. Rep.)
Benin	Guinea-Bissau	Nepal	Togo
Burundi	Haiti	Niger	Uganda
Cameroon	Kenya	Nigeria	Zambia
Central African Rep.	Madagascar	Papua New Guinea	Zimbabwe
Chad	Malawi	Rwanda	
Congo (Dem. Rep.)	Mali	Senegal	
Côte d'Ivoire	Mauritania	Sierra Leone	

Notes: Total 125 Countries. The UNDP (2010) HDI scores are used for the classification.