Three Chapters on Foreign Direct Investment in OECD countries

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Abstract

This thesis comprises of three essays dealing with the effect of FDI on the economies of the host country and the relationship between institutional quality and FDI inflows to OECD economies. Chapter 2 assesses the impact of FDI inflows on economic growth and domestic investment in a panel of OECD countries during the period of 1990-2017 by utilizing the method of fixed-effects and system GMM. The findings show that FDI inflows are positively and significantly associated with the economic growth of the host economy. When considering the origin of FDI, we find that FDI from developed countries contributes to the growth rate in the receiving economy, while FDI from developing countries shows no significant effect. Importantly, FDI does not appear to crowd in or out domestic investment. Only FDI from developed countries is associated with crowding in of domestic investment.

Chapter 3 examines the impact of inward FDI flows in three sectors -- primary, manufacturing and services -- on economic growth in a panel of OECD countries during the 1996-2017 period. We find that FDI inflows into the manufacturing and service sectors are positively and significantly associated with economic growth, with the size of the growth-promoting effect in the manufacturing sector being generally higher than that in the service sector. In contrast, we find no evidence of a growth-promoting effect of FDI in the primary sector. We also examine the effect of FDI inflows into these three sectors on the host country's domestic investment and find evidence of a crowding-in effect of FDI flows in the manufacturing and service sectors whereas crowding-out effect has been found in the primary sector.

The main purpose of Chapter 4 is to investigate the effect of institutional quality on FDI inflows. The results reveal that institutional quality is an important factor attracting foreign direct investment (FDI) over the long term to countries with low quality of institutions. In the short term, in contrast, the relationship is not significant. Institutional quality does not play any significant role in attracting FDI to the countries with sound institutions in either long or short terms. When considering components of institutional quality, property rights have the greatest impact on FDI flows. Finally, when considering a non-linear relationship between institutional quality and FDI inflows, we find diminishing returns of institutional quality on FDI flows for the whole sample.

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Emre Gokceli

Declaration

I hereby declare that the thesis is based on my original work, except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Brunel University or other institutions.

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Supporting Publications

Journal

Essay 1 is published by European Journal of Business Science and Technology.

Essay 3 is submitted to Open Economies Review and it is currently under review.

Conference

I have presented Essay 1 at the Conference of Economic Competitiveness and Sustainability (ECOS), 25 March 2022.

I have also presented Essay 3 at the Conference of European Institute for Research and Development (EIRD), 14 May 2022

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List of Acronyms

ADF	Augmented Dickey-Fuller
AIC	Akanke's Information Criterion
ARDL	Autoregressive Distributed Lag
CADF	Cross-sectionally Augmented Dickey-Fuller
CCE	Common Correlated Effects
CD	Cross-Sectional Dependence
CIPS	Cross-sectionally Augmented lm-Pesaran-Shin
CS-ARDL	Cross-Sectional-Autoregressive-Distributed Lag
DFE	Dynamic Fixed Effects
ECT	Error Correction Term
EF	Index of Economic Freedom
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
ICRG	International Country Risk Guide
MG	Mean Group
MNE	Multinational Enterprise
N	Cross Section
OECD	Organisation for Economic Co-Operation and Development
OLS	Pooled Ordinary Least Squares
PCA	Principal Component Analysis
PMG	Pooled Mean Group
SIC	Schwarz's Information Criterion
T	Time Dimension
TFP	Total Factor Productivity
WGI	Worldwide Governance Indicators

1. Chapter 1: Introduction

Foreign direct investment has appeared to be the largest external source of finance in the world in the 1990s following the 1980 debt crisis (Aitken and Harrison, 1999). Global FDI inflows have increased significantly from $208.4 billion in 1990 to 1632.6 billion in 2017, an increase of 697%. Many countries put substantial effort in providing incentives to foreign firms, such as reduced income taxes or income tax vacations, exemptions from import duties, and infrastructure subsidies. This is explained by the belief that FDI has multiple positive effects, including productivity gains, technology transfers, the introduction of new processes, managerial skills, and know-how in the domestic market, employee training, international production networks, and market access (Alfaro et al., 2004). Additionally, FDI is also regarded as the most stable source of private capital (Sinha and Ghosh, 2021).

Although it is expected that FDI inflows have substantial benefits for the host economy, empirical research reveals inconclusive findings. Some studies, for example, find the effect of FDI on the host economy to be growth-promoting (see Li and Liu, 2005; and Azman-Saini et al., 2010), while others conclude that the impact is (e.g., Mencinger, 2003; and Kherfi and Soliman, 2005). Some research even finds no evidence of a significant effect of FDI on economic growth (see Nath, 2009, and Ang, 2009).

The relationship between FDI and domestic investment is another subject on which the literature has not reached a consensus. Some empirical analyses (e.g., Mileva, 2008, and Ang, 2009) identify a crowding-in effect of FDI on domestic investment, whereas others (e.g., Agosin and Machado, 2005, and Pilbeam and Oboleviciute, 2012) reveal crowding-out effect of FDI.

Chapter 2 aims to offer an insight into the effect of aggregate FDI on the growth rate and domestic investment of the host country over the period 1990-2017 using the pooled OLS, fixed effects, and system GMM. This chapter also takes into account the country's specific factors, such as the level of financial development, human capital, political freedom, and infrastructure, which may affect the host country's capacity to benefit from FDI. More importantly, the origin of FDI is considered in the relationship between FDI, economic growth, and domestic investment. Because the strategy that foreign affiliates implement in host countries may change based on the source country of FDI, which in turn affects their contribution to the host economy. FDI inflows from developed nations, for instance, are more involved in research and innovation (RD) and employ more advanced technology (Lua, 1998).

On the other hand, the strategy of FDI from developing countries is mostly to focus on exploiting cheaper labour and on exports rather than establishing linkages with the domestic market (Gee and Karim, 2011). In this context, it is anticipated that most of the spillovers such as know-how and technical transfer will be provided by FDI from developed countries. All the aforementioned points may explain the mixed findings of the literature, and considering all potential misguiding factors, the chapter sheds light on the role of FDI in the host country's economy.

The findings of Chapter 2 indicate that aggregate FDI inflows are associated with the economic growth of the host nation. When taking into account the origin of FDI, we find that FDI from developed countries helps to boost the growth rate of the receiving economy, whereas FDI from developing countries has no significant effect. Importantly, the results reveal little evidence of a significant effect of FDI on domestic investment. Nevertheless, FDI from developed nations does have a crowding in effect on domestic investment.

The literature extensively focuses on the role of aggregate FDI in the host countries' economies. However, as the scope of the linkages with the rest of the economy created by each sector differs, FDI inflows into different sectors may have different impacts on the growth rate and domestic investment of the receiving country. This aspect may also explain the mixed findings on the relationship between FDI, growth rate, and domestic investment, which motivates us to attempt to analyse the impact of sectoral FDI, including the primary, manufacturing, and services sectors, on economic growth and domestic investment in Chapter 3.

The findings of Chapter 3 indicate that FDI inflows into the manufacturing and service sectors are positively associated with economic growth, with the manufacturing sector generally experiencing a greater growth-promoting effect than the service sector. This finding supports to the argument that the manufacturing sector has a broad diversity of linkage activities with local businesses than other sectors so that the majority of the benefits, including the transfer of technology and management expertise, the introduction of new processes, and staff training, are mostly associated with FDI flows into the manufacturing sector (Alfaro, 2003). In contrast, FDI in the primary sector does not stimulate the growth of host countries. The insignificant effect is confirmed by the facts that the primary sector uses few local intermediate products and mostly export-oriented; hence, this sector has the weakest links to domestic companies (Aykut and Sayek, 2012). In addition, the results reveal a crowding-in

effect of FDI flows in the manufacturing and service sectors, but a crowding-out effect is observed in the primary sector.

As the contributions of FDI to the host economies have been widely anticipated in the literature, the subject of the determinants of FDI has captured the interest of researchers and has been extensively investigated. Among the potential determinants of FDI, the quality of institutions has been the most discussed topic (e.g., Wei, 2000; Daude and Stein, 2007; Busse and Groizard, 2008; Belgibayeva and Plekhanov (2019). However, contradictory results are found on the role of institutional quality on FDI inflows (see Buchanan et al., 2012; Aseidu, 2002; Baklouti and Boujelbene, 2014). More clearly, some studies have found that institutional quality is a significant factor in attracting more foreign investors, while others have found that a high level of institutional quality discourages FDI flows.

One of the main reasons for these mixed findings may be the choice of the variable to represent the quality of institutions, because different components of institutional quality may have a distinct or even opposing effect on FDI. For example, when corruption is used as a measure of institutional quality level, the study by Wei (2000) revealed that a lower corruption level is associated with more FDI flows. However, when property rights are employed to measure the level of institutional quality, some research finds that better-designed property rights play an important role in attracting more FDI (e.g., Lee and Mansfield, 1996; Masron and Abdullah, 2010). As a result, different components of institutions may have contradictory effects on FDI inflows. As a result, using a broad composite measure of institutional quality blurs the individual dimensions of institutional quality, which also may explain the mixed findings in the literature.

Chapter 4 therefore utilizes both a broad composite measure and individual components employing the Panel ARDL(PMG) and CS-ARDL methods over the period 1996-2017. These methods allow us to investigate the impact of institutional quality in the short and long run, which is another point that should be considered, given that the response of foreign investors to the improvement of institutions could take more time (Ren et al., 2012). This chapter also investigates the possibility that the relationship between institutional quality and FDI inflows may be non-linear. In other words, the initial positive effect of institutional quality will become smaller and smaller extent and eventually turn into negative beyond a certain threshold.

Before presenting the chapter's key conclusions, it is important to note that, based on the counties' total institution score, countries are divided into two groups: those with weaker

institutional quality and those with stronger institutional quality. The results indicate that institutional quality is a key factor in attracting foreign direct investment (FDI) to countries with weaker institutional quality over the long run. In contrast, the link is insignificant in the short run. We find no significant role of institutional quality in attracting FDI to countries with strong institutions, either in the long term or short term. When evaluating the components of institutional quality, property rights have the most significant impact on FDI flows. Last but not least, we find that institutional quality has diminishing returns on FDI flows across the whole sample.

The overall structure of the thesis consists of five chapters, including the present introduction, and a conclusion chapter.

2. Chapter 2: Effect of Foreign Direct Investment on Growth and Domestic Investment: Evidence from OECD Countries

2.1 Introduction

Foreign direct investment (FDI) has been the largest source of external finance in the world following the drying up of commercial bank lending in the 1990s (Carkovic and Levine, 2002). Many countries have offered various incentives such as income taxes, import duty exemption, subsidies for infrastructure, etc., in order to attract more inward foreign investment, driven by the belief that FDI provides much-needed capital accumulation and advanced technology transfer, supports employment creation, boosts acquisition of human capital, and encourages adoption of new managerial practises via different channels (Aitken and Harrison, 1999).

Although there exists a huge body of studies evaluating the effect of FDI on growth, the literature has not reached a consensus on the effects of FDI inflows. Most empirical studies such as Borensztein et al. (1998), Li and Liu (2005), and Azman-Saini, Baharumshah and Law (2010) observe a growth-enhancing effect of FDI, while others suggest the relationship between these variables is negative (Mencinger, 2003; and Kherfi and Soliman, 2005). Some empirical studies, such as Nath (2009) and Ang (2009), even find no significant effect of FDI on the growth of the host country. A review of 108 empirical studies by Iamsiraroj and Ulubaşoğlu (2015) reports that 43% of them found a positive and significant effect of FDI, 17% yielded negative and statistically significant results, while the rest (40%) claimed an insignificant impact of FDI on economic growth. This wide range of findings might stem from the data unavailability in either cross-country or time series examinations. Another possible reason behind the mixed results may be the potential endogeneity issue, as inward FDI flows lead to higher economic growth in the recipient economy, and the higher growth rate at the same time attracts more FDI to the country. In addition, the growth-promoting effect of FDI generally has been studied in the context of developing countries, which are highly heterogeneous with respect to the degree of market economy, level of democracy, real Gross domestic product (GDP) per capita, etc., which can bias the coefficient of variables included in the regressions. Last but not least, the origin of FDI inflows might be another factor leading to inconclusive results, as FDI inflows should not be treated homogeneously across economies in the literature. Because the source country of FDI inflows may determine the potential growth-promoting impact of FDI on the host economy. FDI inflows, for example, contribute

to the growth of the host nation by introducing cutting-edge technologies. However, the level of technology owned by foreign corporations determines the extent of technology transfer to domestic firms. Within this framework, the origin of foreign investments matters for this relationship because, as argued by Luo (1998), FDI inflows from developed countries are more engaged in research and development and operate with more advanced technology. Thus, technological transfer is mostly driven by foreign investments from developed nations (it is discussed in detail in the following section).

The purpose of this research is to examine the effect of inward foreign direct investment flows on the economic growth rate and whether this effect depends on the level of financial development, human capital, political freedom, and infrastructure development in the Organisation for Economic Co-operation and Development (OECD) member countries over the period 1990-2017. One of the things that makes this research different from existing studies is that updated data is applied for all variables. Another contribution is that the results are estimated by the pooled ordinary least squares (OLS) and fixed-effect panel regression to take into consideration country-specific factors. In order to deal with the potential endogeneity issue, the system generalized method of moments (GMM) designed by Arellano and Bover (1995) and Blundell and Bond (1998) was employed in order to obtain consistent and efficient results; this serves as a robustness check of the results estimated by the fixed-effects model. Furthermore, the origin of FDI is considered by dividing countries into two groups: FDI from developed and developing countries, to check if the origin of FDI matters in the link between FDI and the growth rate of the receiving economy. Finally, OECD member countries have been chosen as the sample countries because OECD member countries are similar with respect to market economies, democracy, and (most of them) can be regarded as developed countries. These countries also attract more than half of the world's FDI flows. These common features help reduce the potential biases.

This research also analyses the crowding in or out effect of inward FDI flows on domestic investment in OECD economies between 1990 and 2017. In terms of the crowding in/out impact, the literature suggests three possible outcomes. If domestic firms learn superior technology or managerial practises from foreign enterprises or engage in complementary activities such as backward and forward linkages, FDI may crowd in domestic investment. However, if indigenous businesses do not absorb superior technology, managerial skills, and so on, they will fall behind their multinational enterprise (MNE) competitors and be forced out of business. Finally, there is a possibility that FDI has no significant influence on domestic

investment. Additionally, we consider the source of FDI inflows when examining the relationship between FDI and domestic investment, which has been overlooked in previous research. FDI inflows from various countries may have a distinct effect on the host economy's domestic investment. As stated by Gee and Karim (2011), FDI from developing countries, for instance, concentrates more on export markets than collaboration with local firms, such as backward or forward linkages, which is less related to crowding in domestic investment. Accounting for these factors results in a more accurate assessment.

The remainder of the paper is organized as follows: Section 2 offers a brief review of the literature on the relationship between FDI and economic growth. Section 3 outlines the methodology and data used in the empirical research. Section 4 discusses the methods applied for the analysis. Section 5 presents the outcomes of regressions and discusses them. The results of the robustness check are shown in section 6. Finally, a conclusion and a summary are provided in section 7.

2.2 Literature Review

2.2.1 Definition of FDI

According to (OECD, 2008), FDI is defined as "a category of cross-border investment made by a resident in one economy (the direct investor) with the objective of establishing a lasting interest in an enterprise (the direct investment enterprise) that is resident in an economy other than that of the direct investor". In this definition, the words of "lasting interest" means the existence of a long-term relationship between the direct investor and enterprise and also influence of the investor on the management of the enterprise, which distinguish FDI from portfolio investment. In FDI, a minimum of 10% of the voting power is held by a foreign investor.

2.2.2 A Look into the Share of FDI Flows

Figure 2.1 shows the share of inward FDI over the period 1980-2017. The blue line represents the amount of inward FDI attracted by OECD countries as a percentage, while the orange line stands for developing countries. It is worth mentioning that OECD countries are almost entirely composed of developed countries. In comparison to developing countries, OECD countries have attracted the highest proportion of FDI flows across the period, despite a significant decline in capital flows in OECD countries since the start of the period (from 93% to 54% for OECD). However, over half of the total FDI inflows is still captured by OECD countries. It is important to highlight that there is a considerable increase in FDI flows to

developing countries by around 40% compared to the beginning of the period. The reason for the dramatic increase is that less developed countries have started to ease the restrictions against foreign investments and offer some incentives to attract more FDI. Additionally, LDCs became more economically dynamic and, hence, more appealing to FDI.

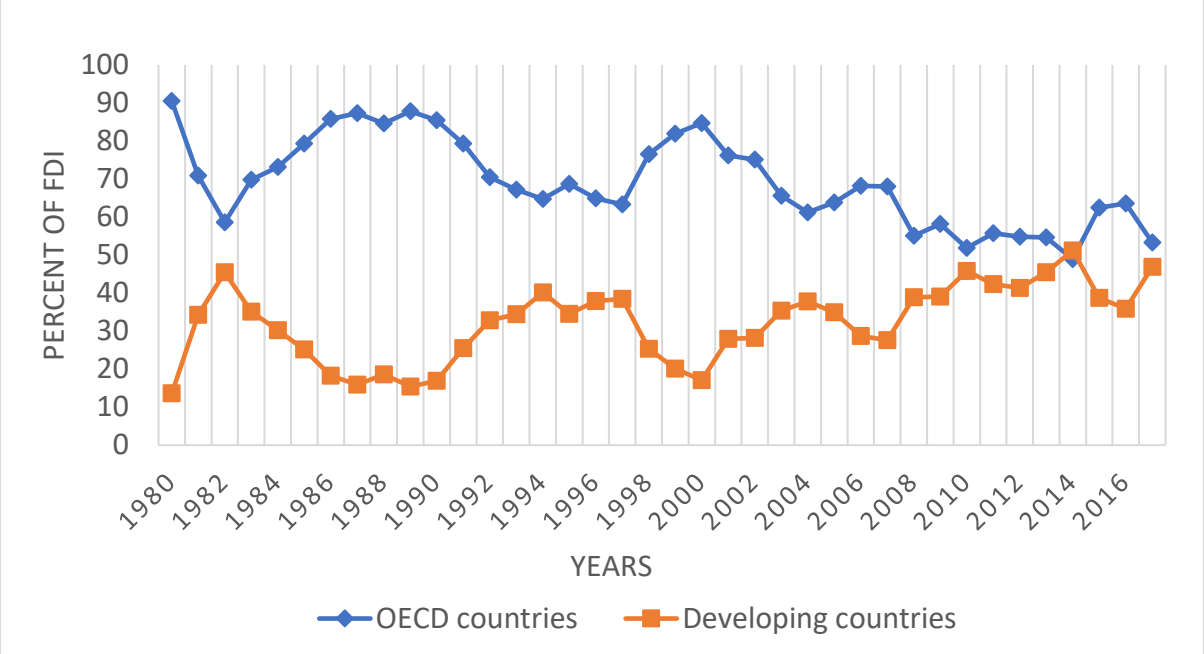


Figure 2.1: The share of FDI inflows between OECD and Developing Countries

Source: United Nations Conference on Trade and Development (UNCTAD)

2.2.3 What Theory Says

As Felipe (1999) argues, in the context of the neoclassical growth theory, the growth of an economy usually derives from two factors: factor accumulation and total factor productivity (TFP). The majority of studies in the literature usually focus on the relationship between factor inputs and growth rather than total factor productivity because of the challenges inherent in measuring TFP, selecting a suitable econometric method, and a dearth of sufficient data (Ilhan, 2007).

Bronzstein et al. (1998) argue that, according to endogenous growth theory, the pace of technical advancement is the primary determinant of the growth rate over the long run. Technical progress may take place in the host country as a result of technological dissemination by overseas multinational corporations. However, the deployment of these more advanced

technologies demands that the host economy have an adequate level of human capital. As a result, the absorptive potential of a developing nation is hampered by the host country's insufficient human capital.

Ilhan (2007) clarifies three major mechanisms via which FDI influences growth in the context of endogenous growth models. To begin with, FDI helps the recipient country accumulate capital by bringing new inputs and technology. Second, FDI augments the existing stock of knowledge and skills in the host country through labour training and the introduction of alternative managerial practices. Finally, FDI raises the intensity of competition among firms in the receiving economy by lowering entry barriers and eroding dominant businesses' market dominance.

To conclude, according to both neoclassical and endogenous growth models, FDI is predicted to have a crucial role in contributing to economic growth in the receiving economy. Although the growth theories predict the growth-promoting impact of FDI, in practice, empirical studies show inconclusive findings regarding the link between FDI inflows and economic growth.

2.2.4 Possible Reasons for the Different Effects of FDI on Economic Growth

As mentioned before, although lots of studies have been conducted concerning the link between FDI and the growth rate, no consensus has emerged among economists on the nature of this relationship. According to endogenous growth theories, FDI boosts growth directly by increasing capital stock and introducing new technologies, and indirectly through spillover effects that might take the shape of management capabilities, organisational expertise, and workforce development by labour training. Additionally, FDI can aid the host economy in acquiring access to global markets (Iamsiraroj and Ulubasoglu, 2015). However, it is possible to find the three possible outcomes, namely positive, negative, and insignificant effects of FDI, in the literature.

There are a number of channels through which the positive spillovers of FDI arise in the host economy. Imitation by local operators may provide an opportunity of spillover (Görg and Greenaway, 2004). Domestic firms try to replicate the same processes applied in foreign-owned operations in the local markets. The success of the simulation by local companies depends on the degree of complexity of the production. Any improvements in technology that result from imitation cause a productivity spillover to local firms. Skill acquisition can emerge as an essential channel for spillovers. Although MNEs tend to hire relatively more skilled

workers in the host country, they usually invest in training to make labour more qualified. In the case of the movement of workers from foreign to indigenous firms, they are carrying with them knowledge of new technology (Görg and Greenaway, 2004). However, labour mobility may be prevented by foreign affiliations by offering a higher wage (Glass and Saggi, 2002). Even if spillovers do not occur, the host country's welfare may increase as a result of the salary paid to the trained workers by the MNE to deter them from joining a local business (Fosfuri et al., 2001). Another way spillovers can occur is through competition, unless a multinational firm dominates an entire market in the recipient economy. When multinationals compete with domestic firms, they exert pressure on local firms to adopt new technology employed by the MNE or to use existing technology more efficiently to be able to keep producing in the market, as discussed by Görg and Greenaway (2004). As argued by Blomstrom and Kokko (1997), the linkage of foreign companies with the rest of the economy also helps create positive spillovers like providing intermediate goods produced by local counterparts to foreign ones. The last conduit is export spillover, which may result in productivity increases in the host economy. Export case studies indicate that enterprises that penetrate international markets lower entry costs for other potential exporters, either via learning effects or through the establishment of commercial ties (Aitken et al., 1999). Within this context, the entry of foreign affiliates may provide an opportunity for local businesses to learn how to access the worldwide market through partnership.

A negative effect of FDI inflows on the growth of the host economy might occur via distortion in the domestic economy. Once a foreign firm manages to gain monopoly status in the host economy, the foreign company may give up producing efficiently, just focusing on profits (Borensztein et al., 1998). Governments' expenditure on infrastructure to attract foreign investors might lead to increases in foreign debt and distortion in the tax system, which might crowd out local firms and decrease in total output in the domestic market. Having a large reliance on foreign capital could be harmful to the host country, especially if FDI inflows are highly volatile (Kherfi and Soliman, 2005). Foreign affiliates may repatriate their earnings to their parent firms in the form of dividends, resulting in significant capital outflows from the host nation to the home country, which in turn has a detrimental effect on the former's balance of payment (Ilhan, 2007, OECD, 2002). Another negative effect could appear through resource curses for countries with a larger natural resource sector. The entrance of foreign direct investment into nations with a natural resource sector increases the growth-hapering effect of natural resources (Hayat, 2018). Another possible way might be through the financial market.

If a foreign investor gets credits in the host economy, the allocation of limited financial resources will not be available for new local entrepreneurs. Also, the local firms suffering from obtaning loans might be forced out of business. If foreign entrepreneurs prefer to import inputs instead of collaborating with local suppliers, this could lead to less gain from FDI or may even be detrimental (Firebaugh, 1992).

Some studies (e.g., Carkovic and Levin, 2002; Adams, 2009) do not find a significant effect of FDI on growth. The lack of a significant impact of FDI may be due to the insufficient level of the financial system, human capital, institutional quality, infrastructure level, etc. Additionally, overseas affiliates may be able to protect the transmission of knowledge so as not to give the local companies a competitive advantage in the local market (Görg and Greenaway, 2004). Finally, knowledge spillovers occur only when domestic enterprises have the financial resources to invest in absorbing foreign technology, which may be limited by undeveloped domestic financial markets (Herzer et al., 2008). All of these possible reasons provided to explain the potential reasons for the positive, negative, and insignificant effects of FDI will be considered in this research.

2.2.5 Empirical Evidence Regarding the Effect of FDI on the Growth Rate

To gain benefits from FDI, some authors claim that the emerging positive effect of FDI depends on country-specific factors. For instance, Balasubramanyam et al. (1996) assert the role of FDI according to developing countries' trade policy regimes over the period 1970-1985. They also test the hypothesis of Bhagwati (1978), who claims that countries pursuing outwardly oriented trade policies attract more FDI and gain more efficient benefits than countries with inwardly oriented trade regimes. The results of their research are consistent with the Bhagwati hypothesis, and they conclude that the growth-enhancing effect of FDI is more significant in countries following an export promotion regime than in countries pursuing an import substitution regime. Similarly, Kohpaiboon (2010) examines how the trade regime shapes the effect of FDI on economic growth using time series data during the period 1970–1990 in Thailand. His empirical research affirms the theory of Bhagwati as well. Even he asserts that FDI has a detrimental effect on nations with an import substitution policy.

Borensztein et al. (1998) find that FDI benefits the receiving country as long as they have a sufficient absorptive capacity for advanced technology diffused by foreign-owned firms. Furthermore, countries that do not have a minimum threshold stock of human capital are not able to absorb the advanced technology brought by foreign firms, so FDI does not have a positive effect on economic growth there. In the same vein, Balasubramanyam et al. (1999)

conclude that human capital plays an important role in promoting the growth effect of FDI in the host country. In particular, countries reaching a threshold level of human capital and pursuing an export-oriented policy benefit more from foreign firms. Xu (2000) also found that the level of human capital plays a vital role in benefiting from technology diffusion from MNE affiliates. Therefore, developed countries could benefit more from foreign investment as they have more educated labor, compared to less developed countries. A similar empirical study by Durham (2004) demonstrates that there is no direct effect of FDI on economic growth, but the effects depend on the financial and institutional development of the receiving economy. Bengoa and Sanchez-Robles (2003) obtain a similar result and claim that the positive correlation between FDI and economic growth requires a sufficient level of human capital, economic stability, and liberalized markets in the host country. However, Olofsdotter (1998) finds that the interaction term of FDI with human capital and openness does not show any insignificant effect in any regressions. Regardless of the capability level, an increase in FDI is associated with economic growth in his study. Campos and Kinoshita (2002) support the findings of the latter study and conclude that there is no effect of human capital on the relationship between FDI and the growth rate in the host economy.

Alfaro et al. (2004) argue that FDI does not play an essential role in enhancing growth alone; in other words, its effect is ambiguous. However, countries with a well-developed financial sector are able to get significant benefits from foreign investment. The results are also robust to the inclusion of other variables determining economic growth and taking endogeneity into consideration. Their results are consistent with the findings of Carkovic and Levine (2002), who assess the effect of FDI on growth in countries with well-developed financial markets and identify a positive impact of FDI on growth in such countries. However, their results are weak because, in contrast to the OLS approach, the panel regressions do not reveal any significant coefficient of the interaction term of FDI with financial development. Hermes and Lensink (2003) and Iamsiraroj and Ulubaşoğlu (2015) end up with a similar result and point to the importance of the development of the financial market to gain more from foreign capital. Although Hermes and Lensink (2003) emphasized the role of the financial system in facilitating the gains from foreign investment, their empirical results show that the direct effect of FDI on recipient countries is significantly negative.

Table 2.1 summarises some prior empirical studies on FDI and economic growth in host countries. There is more research on FDI and economic growth, but the ones chosen are thought to be the best examples of the mixed results on the link between FDI and economic

growth. As seen from the table, although most research, such as Olofsdotter (1998), Li and Liu (2005), and Khaliq and Noy (2007), concludes the growth-enhancing effect of FDI on the growth rate of the host economy, some studies imply that the positive effect is dependent on the country-specific characteristics (Borensztein et al., 1998, Alfaro et al., 2004, and Ang 2009). Moreover, it has been found there is a negative effect of FDI on the receiving country's growth rate (e.g., Mencinger, 2003; Kherfi and Soliman, 2005; Awe, 2013).

Table 2.1. Summarise the findings of empirical studies on the link between FDI and growth.

Author(s)	**Sample and Period**	**Method**	**Main Findings**
Balasubramanyam, et al. (1996)	1970-1985, 46 countries	OLS and Generalised Instrumental Variable	FDI has a greater growth-promoting effect in countries that pursue an outward-oriented trade policy than in those that follow an import substitution regime.
Kohpaiboon (2003)	Thailand, 1970-1990	Engle-Granger merhod	FDI alone shows a negative effect on the growth rate of Thailand. However, its growth-promoting effect is captured with economic openness level. When comparing countries that follow an export promotion trade regime to those that pursue an import substitution regime, the growth effect is more likely to be greater.
Borensztein et al. (1998)	1970-1989 Developing countries	SUR technique, 3SLS	The growth-enhancing effect of FDI depends on the absorptive capacity of the host country.
Balasubramanyam et al. (1999)	1970-1985, 46 countries	OLS, Generalized Instrumental Variable Estimator (GIVE)	More FDI benefits have been recorded for countries that have reached a certain level of human capital and are pursuing an export-oriented policy.
Xu (2000)	1960-1993, 41 countries	Vector-autoregressive (VAR)	Developed countries could benefit more from foreign investment.

Durham (2004)	1979-1998, 80 countries	Cross-sectional OLS	The growth-stimulating effect depends on the level of financial and institutional development of the receiving country.
Bengoa and Sanchez-Robles (2003)	1970-1999, 18 Latin American countries	Fixed effects, Two-Stage GMM	FDI has a positive effect on countries that have a sufficient level of human capital, economic stability, and liberalized markets.
Olofsdotter (1998)	1980-1990, 50 countries	OLS, IV	FDI has a positive effect on the growth rate.
Campos and Kinoshita (2002)	1990-1998, 25 Central and Eastern European and form Soviet Union transition countries	Fixed effects, Granger Causality, Instrumental variables (IV)	The human capital of host countries does not play a significant role in the growth-promoting effect of FDI. FDI alone contributes to the receiving country's growth rate.
Carkovic and Levine (2002)	1960-1995, 72 developed and developing countries	Pooled OLS, GMM	The evidence for a positive link between FDI and growth rate is weak.
Alfaro *et al.* (2004)	1975-1995, 71 developed and developing countries	Pooled OLS, Instrumental Variable (IV)	FDI alone does not have a growth-promoting effect on the receiving country. Its positive effect is contingent on the development of financial market.
Ang (2009)	Malaysia	Vector Error Correction Model	FDI does not stimulate economic growth in the long run. However, the growth-enhancing effect is found through a well-established financial system.
Hermes and Lensink (2003)	67 developed and developing countries.	OLS, fixed and random effects	The direct effect of FDI on the growth rate is negative. However, FDI contributes to the growth rate of host country through a developed financial system.
Iamsiraroj and Ulubaşoğlu (2015)	1970-2009, 140 developed and	OLS, GMM	Countries with a well-developed financial system get more benefits from FDI.

	developing countries		
Azman-Saini et al. (2010)	1975-2004, 85 countries	GMM	FDI by itself does not have a direct effect on the growth rate of host countries. Its positive effect depends on the level of economic freedom.
Alguacil et al. (2011)	1976-2005, 26 developing countries	GMM	They stress the importance of the macroeconomic and institutional background that enables the recipient countries to gain more spillovers associated with foreign investments
Busse and Groizard, (2008)	1984-2003, 84 developed and developing countries	GMM	The key factor of enjoying the benefits of FDI in the receiving economy is regulations. However, FDI has a limited growth effect in countries with most heavily regulated.
Lensink and Morrissey (2006)	1970-1997,	OLS, Fixed effects, 2LSL	FDI has a positive effect on economic growth, but it is not entirely robust. However, FDI volatility always has a negative effect on the growth rate.
Adams (2009)	1990-2003, Sub-Saharan Africa countries	OLS, Fixed effects	The growth-stimulating effects is observed only in the OLS estimation. Therefore, its positive effect is not robust.
Li and Liu (2005)	1970 to 1999, 84 countries	Random effects	FDI has a substantial positive impact on economic growth for both developed and developing countries. Besides, the coefficient coefficient of FDI with technology gap is negative indicating that if there is a large gap gap between home country and host country, the growth-enhancing effect of FDI could not be occurred in the

			recipient country owing to the lack of absorptive capacity of technology.
Khaliq and Noy (2007)	1997-2006, Indonesia	Fixed effects	The positive effect of FDI on the economic growth of China.
Zhang (2006)	1992-2004, China, 28 Provinces	OLS, Fixed effects	The growth-promoting effect of FDI on China's income is found. The growth-enhancing impact appears to be greater in the coastal region than in the interior region.
Kherfi and Soliman (2005)	1979-2002 Central and Eastern European (CEE) and the Middle East and North Africa (MENA) countries	Fixed effects and 2LSL	The growth-promoting effect associated with FDI is observed for EU accession countries, while FDI has a negative influence on the growth rate of MENA and non-EU accession countries. They also see human capital as an important conduit through which FDI makes a positive contribution to economic growth in EU candidate nations.
Johnson (2006)	1980-2002, 90 countries	OLS and Random-effects	FDI inflows do not contribute to the growth of developed countries because of the possible explanation that domestic investment is not different from foreign investment in those countries.
Awe (2013)	1976-2006, Nigeria	2SLS	The relationship between FDI and the growth rate of the economy is negative. Capital flight via profit repatriation could be one of the causes of the inverse link.
Sarkar (2007)	1970-2002, 51 Least Developed Countries	Random effects, ARDL	The rising relationship between growth and FDI is observed for only 16 countries that have high incomes and trade openness in panel data analysis. Without making differentiation between countries based on the level of income and trade openness, the majority of

			countries do show no long-term relationship between FDI and economic growth.
Mencinger (2003)	1994-2001, 8 transition countries	Granger causality test	His empirical findings show a negative correlation between economic growth and FDI. The negative effect of FDI on economic growth is strengthened once the lagged FDI is used as an independent variable instead of FDI.
Hayat (2018)	1993-2012, 106 countries	Fixed effects	FDI accelerates growth rate of the receiving country. However, the growth-enhancing effect slows down with the existence of natural resources in the host economy.
Sirag et al. (2018)	1970-2014, Sudan	Cointegration test	FDI has a positive effect on the growth rate of Sudan. Furthermore, in the presence of financial development in the host economy, FDI contributes more to the economic growth rate.
Raza et al. (2019)	1996-2013, OECD countries	Fixed effects and GMM	In the presence of a good governance system, a positive link is found between FDI and economic growth
Asamoah et al. (2019)	1996-2016, 34 SSA countries	Structural equation modelling	A decreasing effect of FDI on economic growth is observed. This adverse effect increases without good institutional quality.
Louail and Zouita (2021)	1985-2019, 11 developing countries	PMG/Panel ARDL	They conclude that there is a positive relationship between FDI, economic growth and financial development in the long run, while no such proof is found in the short run.

2.2.6 Characteristics of FDI inflows from Different Countries

Research assessing the role of FDI inflows from different countries in contributing to the host countries' economies has been limited. To the best of my knowledge, all existing studies investigating the effects of FDI from various countries focus on industry and firm-level data, except for the study of Fortanier (2007), who utilized macro-economic data.

As previously stated, FDI from various countries may have varying effects on the host country's economy. The possible reasons are argued by various studies. Caves (1974), for example, emphasises that expansionary FDI contributes more to the host economy's intangible assets, such as knowledge transfer, organisation, and managerial skills. Additionally, this sort of FDI is typically equipped with advanced technology and operates in capital-intensive industries, resulting in increased market breadth and product differentiation in the host economy (Luo, 1998). Chen and Ku (2000) claim that foreign investments from developed countries are more of the expansionary type, whereas emerging-country FDI is more defensive in nature. Gee and Karim's (2011) findings are consistent with those who argue that FDI inflows should not be treated uniformly across countries. They contend that FDI from developed markets greatly contributes to technology transfer by introducing new inputs and technologies into the host country's production processes. Additionally, FDI from developed economies contributes new knowledge to host countries, using foreign experience in successfully managing host country enterprises. Also, foreign investment from developing markets typically seeks for efficiency and cost savings rather than product differentiation strategy. This type of investment normally benefits the host country in terms of export rather than contributes to new knowledge and technology spillovers, as argued by Gee and Karim (2011). To summarise, there is less to benefit from the FDI originated from developing countries than FDI inflows from developed countries.

2.2.7 Empirical Evidence Regarding the Origin of FDI inflows

In this part, I summarise some of the conclusions of studies regarding the effect of the origin of FDI inflows. As I mentioned before, there is relatively little research examining the effect of the origin of FDI on the economies of host nations.

Collis et al. (1994) analyse the effect of FDI inflows from European and North American countries on employment of the host country. Their findings point out that the country of origin matters in the impact of FDI on employment. Their results also indicate that

North American-owned companies tend to be more R&D intensive, which is attributed to knowledge transfer to the host country than European-owned counterparts.

Banga (2003) suggests that FDI inflows from various source countries have different effects on the export of the Indian manufacturing sector. The results of the study show that FDI inflows from the United States contribute to the export intensity of industries, while FDI from Japan is not observed to have a significant effect on Indian exports. Bagan (2006) extends his previous research on the impact of FDI from Japan and the U.S. on Indian manufacturing firms for the period of 1994 to 2000. The findings are consistent with the previous results and demonstrate that U.S. FDI has a positive effect on the export intensity of sectors, whereas Japanese FDI remains insignificant. A similar analysis is conducted by Waldkirch (2010) on the country of origin in determining FDI effects on the host economy. He concludes that the investment flows from the US have a contribution to the manufacturing sector, while an insignificant effect of FDI from non-US companies is observed.

Gee and Karim (2011) investigate the impact of FDI from various countries in the world. They find a growth-promoting effect of FDI from China, the US, and European Union countries on Malaysia's manufacturing sector. However, a negative effect is found in FDI from Japan and ASEAN-4 countries.

In contrast to previous studies, Fortainer (2007) studies the variation in the growth consequences of FDI from different countries of origin, using data on six major outward investor countries and 70 host economies over the period 1989-2002. His findings reveal that the growth-enhancing effect varies by both the country of origin and the host country's characteristics.

2.2.8 Crowding in or out Effect of FDI on Domestic Investment

Previous research has been inconclusive regarding the relationship between FDI inflows and domestic investment in the receiving country. Some empirical analyses detect a crowding-in effect of FDI on domestic investment (e.g., Mileva, 2008, and Ang, 2009), while others (e.g., Agosin and Machado, 2005, and Pilbeam and Oboleviciute, 2012) observe a significant crowding out effect of FDI. Other studies even fail to find any evidence of the crowding in or out effect of FDI on domestic invetsment of the host country (e.g., Liu *et al.,* 2001).

Blomstor and Kokko (1998) argue that foreign companies stimulate domestic ones through the absorption of new machinery and advanced technology brought by foreign firms.

Crowding in effect could be realised through human capital conduit. Foreign companies tend to hire workers endowed with more educated, talented, and higher levels of skills (De Backer and Sleuwaegen, 2003). Employees are trained by multinational corporations and continue to expand their knowledge by working with advanced technology throughout their employment. Having sufficient skills and knowledge encourages employees to set up their own companies in the future. MNEs also pay skilled workers more than the average wage, which lets them save money and start their own businesses. Another potential channel may occur through labor turnover, wherein local firms employ workers trained by foreign affiliates to be able to work with modern technology. These employees may encourage domestic firms to invest in modern technology to be able to compete with foreign counterparts or at least to use their existing technology more efficiently. Furthermore, crowding in effect may take place with complementary activities like backward linkages, e.g., local firms may provide intermediate goods for foreign companies, as argued by Pilbeam and Oboleviciute (2012). Mileva (2008) suggests that FDI may bring capital inflows to the host country, which reduces the interest rates and increases the availability of loans for local investors to finance new investment. With these potential channels, FDI inflows crowd in domestic investment in the receiving economy.

On the other hand, multinational enterprises (MNEs) can displace domestic producers if the latter are not able to absorb the superior technology, management skills, or other advantages introduced by foreign firms, as argued by Blomström and Kokko (1997). Moreover, domestic investment may be substituted by foreign firms if MNEs prevent the leakage of their superior tangible and intangible assets such as modern technology, management expertise, organisational know-how, and so on, or import inputs instead of looking for local suppliers (De Backer and Sleuwaegen, 2003; Mileva, 2008). Incentives, such as tax exemptions, offered by governments to attract more foreign investors may also lead to domestic investments being crowded out. Because foreign investments that benefit from tax exemption can displace local investments supplying similar goods and services. To conclude, unless local companies adapt to the advanced technology had by foreign counterparts or make use of the advantages introduced by MNEs or collaborate with them, such as providing inputs to foreign affiliates, they fall behind the competition with MNEs and could easily be forced out of business.

2.3 Data

This section describes the data used in the empirical study, including the rate of economic growth (used as a dependent variable), foreign direct investment (used as an independent variable), and other control variables that determine the rate of economic growth.

GROWTH is the rate of real per capita GDP growth. The data on GROWTH is extracted from the World Bank national accounts.

FDI equals the net inflows of foreign direct investment divided by GDP. The FDI is an investment to acquire a lasting management interest (minimum 10 per cent of voting stock) in an enterprise operating in an economy other than the investor's economy. The gross FDI states the total absolute values of inflows, apart from the values of outflows of foreign investments. As we focus on inflows to the economy, we prefer to use the net inflows, as in Alfaro et al. (2009). The data for FDI is taken from the World Development Indicator. The data on the origin of FDI is obtained by the OECD's International Direct Investment Statistics Yearbook.

Log (Initial GDP) refers to the value of countries' GDP lagged by four years converted from domestic currencies using constant 2010 U.S. dollars. The data regarding the initial GDP is attained from the World Development Indicator.

To examine the relationship between inward FDI flows and economic growth, we control for other variables widely used in the literature as a determining growth rate.

Inflation used as an independent variable is measured by the change in the consumer price index. It reflects the annual percentage change in the cost to the average consumer of obtaining a basket of goods and services. The data regarding inflation is from the International Monetary Fund.

Openness to trade equals to the ratio of exports plus imports to GDP. The data about exports and imports is obtained from the World Development Indicator.

Gross_capital_form is the ratio of gross capital formation (formerly gross domestic investment) to GDP and equals total investment composed of expenditures on the level of inventories and on the fixed assets of the economy. The data related to this variable extracted from the World Development Indicator.

Gov_exp. is Government Expenditure which is the ratio of total cash payments of the government's operating activities in providing goods and services to GDP. It also involves employees (such as wages and salaries), interest and subsidies, grants, social benefits, and other

expenses such as rent and dividends. The data on government expenditure is also taken from the World Development Indicator.

Population growth rate is the annual population growth rate based on the definition, which counts all residents regardless of status and citizenship. Population growth rate is presented by percentage. The data concerning the population is drawn from the World Development Indicator.

Landlocked refers to countries which are enclosed completely by land or their coastal strip lie on closed seas. In this study, landlocked is used as a dummy variable, and landlocked countries take the value of 1, and others get 0. In this research, there are just six landlocked countries out of 36 OECD members.

Finance index consists of three widely used ratios measuring financial development, namely deposit money banks' assets to GDP (%), liquid liabilities to GDP (%), and private credit by deposit money banks to GDP (%). I follow Samargandi et al. (2015) to combine these three variables using principal component analysis (PCA) to create a single proxy for financial development. They assert that using PCA has two advantages. Firstly, the variables are highly correlated to each other, which leads to the multicollinearity problem. Usage of PCA helps to overcome this issue. Secondly, there is no uniform argument concerning the most appropriate variables to present the level of financial development in the literature. I believe, therefore, that the summary indicator is better than the individual variables.

Table 2.2 shows the result of the principal component analysis. The first component explains about 81% of the variation of the dependent variable, while the second component accounts for about 17%, and the last component corresponds to less than 1% of the variation. We, therefore, use the first component as our financial indicator (finance_index).

Table 2.2 Principal component analysis for financial development index

Number	Value	Difference	Proportion	Cumulative Proportion
1	2.437	1.916	0.8123	0.8123
2	0.520	0.477	0.1734	0.9857
3	0.0427	--	0.0143	1.0000

Human capital is represented by the school enrollment rate, which is the total number of children enrolled in the level of secondary regardless of age divided by the population that officially corresponds to the same level of the age group. The data concerning human capital is taken from the World Development Indicator.

The Polity IV dataset is employed as a proxy for political_freedom calculated by subtracting the autocracy index from the democracy index. The Polity Democracy Index takes values from zero to ten, arising from codings of the competitiveness of political participation, the openness and competitiveness of executive recruitment, and constraints on the chief executive. The data concerning political freedom is obtained from the Integrated Network for Social Conflict Research (INSCR) Database.

Finally, rail_line is presented by total kilometres length of railways divided by countries total area (square km), and the data are taken from World Development Indicator.

Table 2.3. Descriptive Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
gdppercap	970	2.11	3.21	-14.56	24.377
fdi	982	1.88	3.52	-3.339	26.328
inflation	970	4.62	9.931	-9.68	143.692
trade openness	994	85.689	51.980	16.014	423.984
gov_exp	900	31.949	11.546	1.878	62.242
population rate	1007	0.5594	0.8030	-2.574	6.0170
gross capital	978	22.858	4.058	11.518	39.404
finance index	864	0.218	1.594	-2.539	5.344
human capital	896	102.858	15.276	51.869	168.904
political freedom	970	9.350	1.442	-4	10
rail network	804	10.043	89.125	0.00572	812.254

Descriptive statistics for variables employed in the regression have been presented in Table 3.3 for OECD member countries over the period 1980-2017[1]. A considerable variation in the GDP growth across countries can be seen, with growth ranging from -14.56 per cent in Estonia in 2009 to 24.37 per cent in Ireland in 2015, the mean of growth rate is 2.11 per cent during this period. The share of FDI in GDP also demonstrates many variations with the mean of 3.52 per cent, ranging from -3.33 per cent in Ireland in 2005 to 26.32 per cent in the United States in 1999. Inflation varies significantly from -9.68 per cent in Latvia in 2009 to 143.69 per cent in Turkey in 1998, the average value of this variable is 4.62 per cent. Another considerable variation is shown in trade openness, ranging from 16.01 per cent in Japan in 1993 to 423.98 per cent in Luxembourg in 2017. The variable of gov_exp rate ranges from 1.87 per cent for Estonia in 2007 to 62.24 per cent for Ireland in 2010. While Estonia has the minimum population growth rate with -2.574 per cent in 1993, the maximum belongs to Israel with 6.0170 per cent in 1991. The average value of population growth rate is 0.55 per cent in the sample countries. The ratio of gross capital formation to GDP takes the minimum value of

[1] See Table A1 for the correlation matrix in Appendix A.

11.52 per cent in Greece in 2015 and the maximum value of 39.40 per cent in South Korea in 1991. Finan_index shows some variation, ranging from -2.54 index in Latvia in 1996 to 5.34 index in Iceland in 2007. School_enrolment rate ranges substantially from 51.87 per cent in Mexico in 1991 to 168.90 per cent in Australia in 2015. As for Polit_freedom variable, the maximum value is 10 points meaning the most free, and the minimum is -10, referring to the least free as mentioned above. South Korea and Poland are the only two countries to take -8 index in 1980 and 1981 respectively, but all countries have managed to reach 10 index throughout the period except Estonia, Israel, South Korea, Latvia, Mexico, and Turkey. Lastly, rail_line demonstrates sizeable variation, ranging from 0.005 kilometres in Canada in 2012 to 812.25 kilometres in Australia in 1997.

2.4 Methodology

2.4.1 Static Panel Data

Pooled ordinary least square (OLS) method is applied first to estimate the effect of FDI on economic growth for OECD countries, which yields a preliminary view of each growth determinants used in the regressions. To run the regressions based on OLS, we used the below equation:

$$y_{i,t} = \alpha + \beta_1 FDI_{i,t} + \gamma X_{i,t} + u_{i,t} \qquad (3)$$

where y represents the rate of real per capita GDP growth of country i at time t, α is the constant term, $FDI_{i,t}$ refers to aggregate FDI inflows to the host country. $X_{i,t}$ refers to the matrix of control variables that is often used to determine economic growth in the empirical growth literature. Lastly, $u_{i,t}$ denotes the error term as usual.

The pooled OLS is the simplest methodology. The weakness of this method is that it does not consider the time-series dimension of data. This method also fails to take into account the country-specific heterogeneity. By omitting the unobserved variables, which may be correlated with the other regressors, the pooled OLS estimation with heteroscedasticity will lead to biased and inconsistent parameter estimates. To deal with this problem, fixed effects or random effects models can be applied.

The assumption of the fixed effects model is that each country has its own unobserved time-invariant individual effect, so that this model estimates a separate constant term for each country. In contrast, according to the random-effects model, unobserved country-specific variables are distributed normally. One overall constant, therefore, is estimated. We applied

the Hausman test to determine which model is more applicable, and the results are reported at the bottom of the related tables. The null hypothesis suggesting a random-effects model is rejected, which means the fixed-effects model performs better for our analysis.

Accordingly, the fixed-effects model applied for the estimation of the effect of FDI on growth rate is based on the following equation;

$$y_{i,t} = \alpha + \beta_1 FDI_{i,t} + \gamma X_{i,t} + \eta_i + u_{i,t} \qquad (4)$$

In contrast to the equation of polled-OLS, equation (4) includes "η_i" which denotes the country-specific effects, which consider unobserved heterogeneity owing to time-invariant country characteristics.

The shorcoming of the fixed-effects model is that a possible simultaneity bais is not controlled which may occur with endogenous explanatory variables as explained in below.

2.4.2 Dynamic Panel Data

Numerous economic relationships are dynamic in nature, and one of the advantages of panel data is that it enables researchers to better grasp the identification of dynamic relationships. A dynamic relationship is characterised by the extent to which economic activity is affected by previous behavior. In this context, the existence of a lagged dependent variable among the regressors characterises these dynamic relationships (Baltagi, 2005).

For our panel estimation, we also use the generalised method of moments (GMM), which was introduced by Holtz-Eakin et al. (1988). Then, Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998) developed the method. The GMM estimation method takes into account country specific effects and any possible bias caused by omitted variables that are persistent over time, which cannot be captured by applying dummies because of the dynamic structure of the regression equation. More importantly, the GMM model controls for a possible simultaneity bias caused by some of the endogenous explanatory variables. For instance, Azman-Saini et al. (2010) state that FDI inflows is likely to be an endogenous variable as a higher growth rate attracts FDI to the host economy. The effect of FDI on the growth rate can be estimated by the following equation (see Alfaro et al., 2004, Durham, 2004, and Azman-Saini et al., 2010).

$$y_{i,t} = \alpha y_{i,\,t-1} + \beta_1 FDI_{i,t} + \gamma X_{i,t} + \eta_i + \varepsilon_{i,t} \qquad (5)$$

where the lagged dependent variable is included as an independent variable, in contrast to equation (5).

To eliminate the time invariant effects, η_i, Arellano and Bond (1991) suggest transforming the equation (5) into first differences as below:

$$y_{i,t} - y_{i,t-1} = \alpha(y_{i,t-1} - y_{i,t-2}) + \beta_2(FDI_{i,t} - FDI_{i,t-1}) + \gamma(X_{i,t} - X_{i,t-1}) + (\mathcal{E}_{i,t} - \mathcal{E}_{i,t-1}) \quad (6)$$

To overcome the endogeneity issue, the GMM model uses lagged values of explanatory variables as instruments. However, this transformation causes a new statistical issue in that the transformed error term $\mathcal{E}_{i,t} - \mathcal{E}_{i,t-1}$ is correlated with the lagged dependent variable $y_{i,t-1} - y_{i,t-2}$. As a solution, Arellano and Bond (1991) suggest that the lagged levels of the explanatory variables are used as instruments, which is valid under the two assumptions; the error is not serially correlated, and the lag of the regressors are weakly exogenous. This technique is also known as difference GMM in the literature. The moment conditions are set following Arellano and Bond (1991):

$$E[y_{i,t-s} . (\mathcal{E}_{i,t} - \mathcal{E}_{i,t-1})] = 0 \text{ for } s \geq 2;\ t = 3,\ldots\ldots T \quad (7)$$

$$E[FDI_{i,t-s} . (\mathcal{E}_{i,t} - \mathcal{E}_{i,t-1})] = 0 \text{ for } s \geq 2;\ t = 3,\ldots\ldots T \quad (8)$$

$$E[X_{i,t-s} . (\mathcal{E}_{i,t} - \mathcal{E}_{i,t-1})] = 0 \text{ for } s \geq 2;\ t = 3,\ldots\ldots T \quad (9)$$

Although the difference GMM is able to account for the simultaneiy bias and country specific heterogeneity, another shortcoming was pointed out by Alonso-Borrego and Arellano (1996) and Blundell and Bond (1998). They indicate that the lagged level of the variables becomes weak instruments when the regressors are persistent, which may cause biased parameter estimates in small samples and an increase in the variance of coefficients. An alternative method to deal with the weakness of the difference GMM is the system GMM proposed by Arellano and Bover (1995) and Blundell and Bond (1998). This method uses the lagged level observations as instruments for differenced variables (equation 6) in addition to the use of lagged differenced observations as instruments for level variables (equation 5). The additional conditions for the second part of the system, the regression in levels, could be written as follows:

$$E[(y_{i,t-s} - y_{i,t-s-1}).(\eta_i + \mathcal{E}_{i,t})] = 0 \text{ for } s = 1 \quad (10)$$

$$E[(FDI_{i,t-s} - FDI_{i,t-s-1}). (\eta_i + \mathcal{E}_{i,t})] = 0 \text{ for } s = 1 \quad (11)$$

$$E[(X_{i,t-s} - X_{i,t-s-1}). (\eta_i + \mathcal{E}_{i,t})] = 0 \text{ for } s = 1 \quad (12)$$

Due to the aforementioned advantages of the system GMM over other approaches, this model is our principal technique, and the results predicted using this method are provided in the section under "Robustness Check."

Two tests define the consistency of the GMM panel estimator: (i) the Hansen test is used to determine the instrument's validity, and (ii) Arellano-Bond AR (2) is used to determine the error term's second-order serial correlation, i.e., the error term is serially uncorrelated, and the moment conditions are correctly specified (Roodman, 2009).

If too many instruments are utilised in the system GMM, the model may become overfit (Roodman, 2009). Nonetheless, it remains unclear how many tools are excessive (Doytch and Uctum, 2011). According to Roodman's (2009) rule of thumb, the number of instruments should not exceed the number of sample nations.

2.5 Results and Discussion

2.5.1 Direct Effect of the Aggregate FDI Inflows on Economic Growth

The purpose of this empirical analysis is to assess the effect of FDI inflows on the growth rate of the receiving country. In addition to the direct effect of FDI inflows, we also check if the level of the financial system, human capital, political freedom, and infrastructure enable the host country to gain more benefits from FDI inflows.

To be able to select the appropriate econometric method, we first apply the Breusch-Pagan Lagrange multiplier test. The null hypothesis is in favour of the pooled-OLS against random or fixed effects. The result shows that the random/fixed effects model is more appropriate for our analysis since we reject the null hypothesis owing to the p-value, which is equal to zero for each equation. Next, the Hausman test is undertaken to choose between the random effects and fixed effects models. The test favours the fixed effects model against random effects; its p-value is always zero for each specification. Therefore, we proceed with running the regressions by using a fixed effects panel model based on equation (2).

The results of the fixed effect model are reported in Figure 2.2[2]. It can be seen from the figure that FDI has entered the regression positively and is statistically significant. Therefore, the figure demonstrates that FDI makes a positive contribution to economic growth in the host country: 1 percentage increase in FDI raises economic growth in OECD countries by 0.182

[2] The pooled OLS results are presented in Table A2 in appendix A. Mainly, the results show that an increase in FDI flows is related to a higher growth rate of host country. Also, these findings are in consistent with those estimated by the fixed effect.

percentage points throughout the period between 1990 and 2017. As can be seen from the chart, we used contemporaneous FDI instead of its lagged value. Because we use annual data, not monthly data, we think that current economic growth will be affected more by current foreign investment rather than its lagged value. The finding of growth-enhancing effect is consistent with the studies by Campos and Kinoshita (2002), Zhang (2006), and Iamsiraroj and Ulubasoglu (2015). Comparing the degree of FDI's effect on economic growth, Campos and Kinoshita (2002) and Iamsiraroj and Ulubasoglu (2015) found coefficients of 14% and 23%, respectively, which are comparable to our findings. The similar magnitude of FDI's growth-stimulating effect can be attributed to the selection of country groups comprised of developed countries. However, the coefficient of FDI estimated by Campos and Kinoshita (2002) is 45%, which is approximately four times larger than ours. As their study is based on China, which is one of the emerging countries and whose growth rate tends to increase higher than that of other industrialised nations, it is probable that the selection of China as the sample country explains the higher coefficient. Like the coefficient of FDI, the coefficients of trade openness and domestic investment are positive, indicating that they have a growth-promoting effect on the growth rate in the regression.

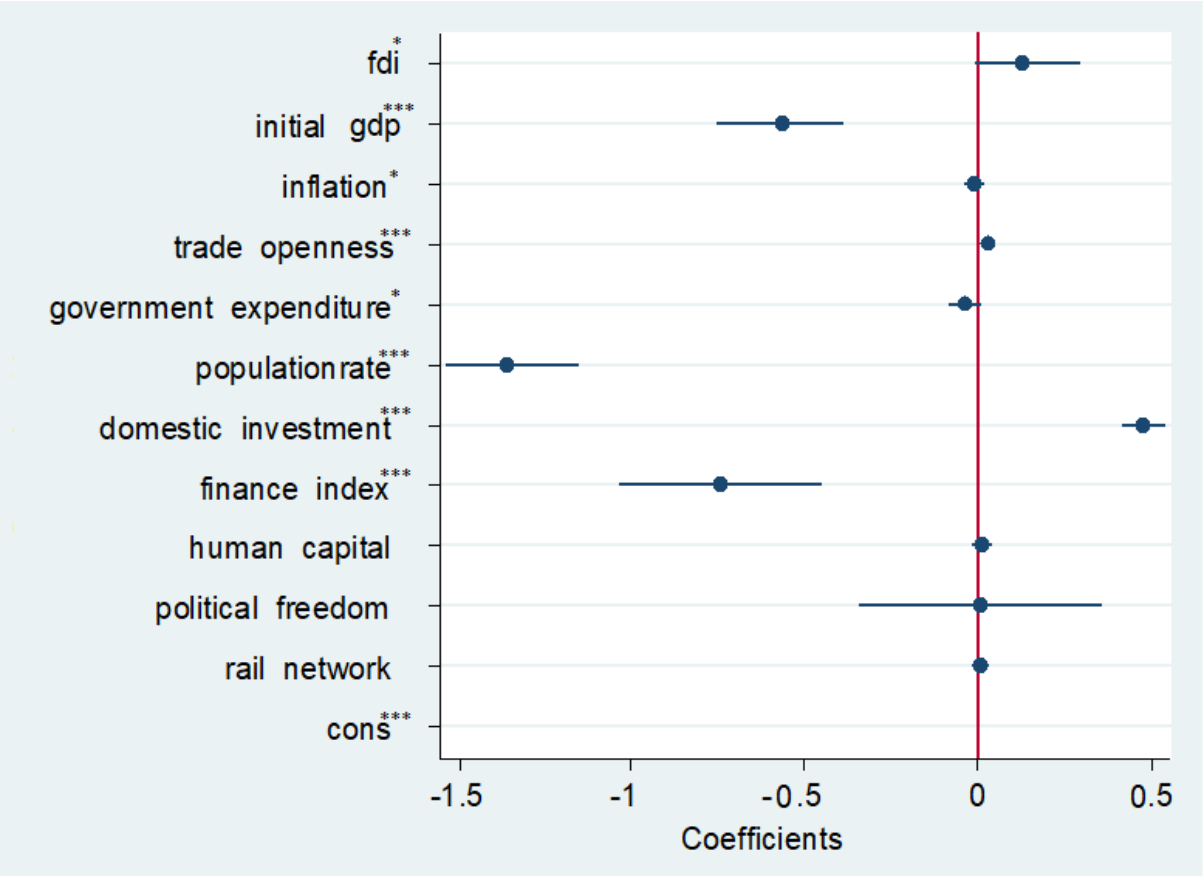
The log (initial GDP) becomes negative and significant, which lends support to the idea of convergence asserting that per capita income of poorer countries will tend to grow faster than richer economies (Barro, 1996). In a similar manner, government expenditure, inflation, and population growth rate affect the growth rate adversely and significantly in the regression.

The estimated effect of FDI on the growth rate is robust to the inclusion of more control variables. The finance index, representing the level of financial development, is included in the regression. The coefficient on finance index is negative and significant, indicating that any more development in the financial system is associated with a lower growth rate. The finding is consistent with the study by Samargandi et al. (2015), who suggest that there is an inverted U-shaped link between growth and financial development. The OECD countries in my sample are generally more financially developed, so they should be on the downward sloping part of the inverted U. The human capital variable is included in the model as well. Its effect seems positive and but insignificant[3]. In our sample, most countries are highly developed. Hence, the

[3] The regression results with different numbers of control variables using the fixed effects method are reported in Table A3 in Appendix A. As can be seen from the table, the coefficient of human capital entered the regression positively and significantly; however, it is not significant in the last column, showing that its growth-promoting effect is not robust. Similarly, the growth-enhancing effect of political freedom is not robust as it is significant in column 4 but insignificant in the last column.

possible reason for the insignificant coefficient of school attainment may be that in the developed countries, school enrolment rate is generally high and so the variation across these countries is limited. The results are in line with Li and Liu (2005), as they also find an insignificant effect of school attainment on economic growth for developed countries. The political freedom and rail network variables entered the regression positively; nevertheless, they are not statistically significant in the regression.

Figure 2.2. Effect of Aggregate FDI on Growth with Fixed Effects



Notes: The dependent variable is GDP per capita growth. FDI is measured by the net inflows of foreign direct investment divided by GDP. See data section for data sources and data definition. The model is estimated by using the fixed effects (individual effects) method. Cluster standard errors at the country level are employed in the model[4]. The Hausman test's p-value is 0.000 which favours the fixed effects method over the random effects. The adjusted R-squared is 0.44 indicating that 44% of the variation in the GDP growth rate are explained by the variables included in the regression. * p<0.10, ** p<0.05, *** p<0.01.

[4] It is worth noting that when the number of clusters is small, the standard error estimators are downwardly biased. Although there is no certain number of clusters for the estimation of standard errors, a general rule is to become concerned about estimators when the number of clusters falls below 35 (Ozler, 2012).

2.5.2 Conditional Effect of the Aggregate FDI inflows on Growth

To assess if the growth-promoting effect of FDI on economic growth depends on the level of financial development, political freedom, human capital, or infrastructure in the host country, we created interaction terms of FDI with each of these variables and used them as regressors in the regressions. Fixed effects panel model is used after undertaking the Hausman test, which is reported at the bottom of each specification.

The results of the regressions are presented in Table 2.4[5]. In the first column, the interaction term of FDI with financial development is included. FDI turns out to be insignificant. However, its interaction term shows up as significant and positive, suggesting that countries with more developed financial system are able to get the growth-stimulating effect of FDI. The results are compatible with the studies of Alfaro et al. (2004), Carkovic and Levine (2002), and Iamsiraroj and Ulubasoglu (2015), who find that countries benefit more from foreign investment as they improve their financial system.

The school enrollment rate as a proxy for human capital and its interaction term with FDI are included in column 2 instead of the finance index. The results suggest that school enrollment does not have a significant effect on economic growth. As outlined above, this might be because of the high level of schooling attainment in developed countries. FDI also does not exert a significant effect by itself. However, the interaction term with human capital enters the regression significantly positive, suggesting that the availability of educated labour is an important prerequisite to realising the growth-promoting effect in the receiving economy. This finding supports the results found by Borensztein et al. (1998), Balasubramanyam, Salisu and Sapsford (1999), and Xu (2000).

To look more closely at the relationship between FDI and economic growth, the interaction term of FDI with political freedom is included in column 3. In this regression, both FDI and its interaction with political freedom have significantly positive coefficients, which show that an increase in political freedom enables the receiving economy to get more benefit from FDI inflows.

In specification 4, the last interaction term of FDI with the rail_network is involved, and the results demonstrate that FDI exerts a positive effect on the growth rate by itself.

[5] The results estimated by the Pooled-OLS are released in Table A4 in appendix A. Briefly, the results are parallel to those predicted by the fixed effect.

However, the coefficient of the rail_network seems to be positive but insignificant. This is not surprising to find an insignificant effect of infrastructure effect in the literature, as Reinikka and Svensson (1999) claim that the effect of infrastructure on economic growth is at best ambiguous. Similarly, the interaction term appears with a positive but insignificant effect. The result is also consistent with Li and Liu (2005), who find that the interaction term with infrastructure has no effect on the economic growth of developed countries.

Regarding the signs of the control variables, they retain the same sign as those estimated in the previous regressions but with different magnitudes of coefficients.

Table 2.4. Conditional Effect Aggregate FDI on Growth with Fixed Effects

	(1) Growth	(2) Growth	(3) Growth	(4) Growth
fdi	-0.0606	-0.6311	0.5574*	0.0963*
	(-1.05)	(-1.54)	(1.82)	(1.70)
Initial gdp	-0.0002***	-0.0003***	-0.0003***	-0.0003***
	(-7.92)	(-7.95)	(-11.38)	(-11.35)
inflation	-0.0031	-0.0238	-0.0211	-0.0110
	(-0.21)	(-1.35)	(-1.33)	(-0.83)
trade openness	0.0464***	0.0177***	0.0570***	0.0656***
	(5.91)	(2.71)	(8.38)	(8.94)
government expenditure	-0.0800***	-0.1457***	-0.1465***	-0.1338***
	(-2.80)	(-4.78)	(-5.12)	(-4.43)
populationrate	-1.6234***	-2.2952***	-1.6746***	-1.8729***
	(-5.62)	(-7.32)	(-5.51)	(-5.86)
domestic investment	0.4153***	0.4176***	0.4224***	0.4545***
	(11.67)	(11.37)	(12.18)	(12.70)
finance index	-0.6925***			
	(-5.03)			
fdi*finance	0.0546*			
	(1.65)			
human capital	0.0095	-0.0054		
	(0.70)	(-0.34)		
fdi*human		0.0069**		
		(2.11)		
political freedom			-0.0048	
			(-0.04)	
fdi*political			0.0059**	
			(2.13)	
rail network				0.0003
				(1.60)
fdi*rail				0.0001
				(0.21)
_cons	-4.6674**	-2.6962	1.6321*	0.6878
	(-2.06)	(-1.18)	(1.80)	(1.38)
Hausman-test	86.34	50.98	91.30	96.76
	(0.000)	(0.000)	(0.000)	(0.000)
N	690	770	750	694

Note: The dependent variable is GDP per capita growth. FDI is measured by the net inflows of foreign direct investment divided by GDP. See data section for data sources and data definition. The model is estimated by using the fixed effects (individual effects) method. Cluster standard errors at the country level are employed in the model. t statistics are reported in parentheses. * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

2.5.3 Effect of the Origin of FDI on Growth

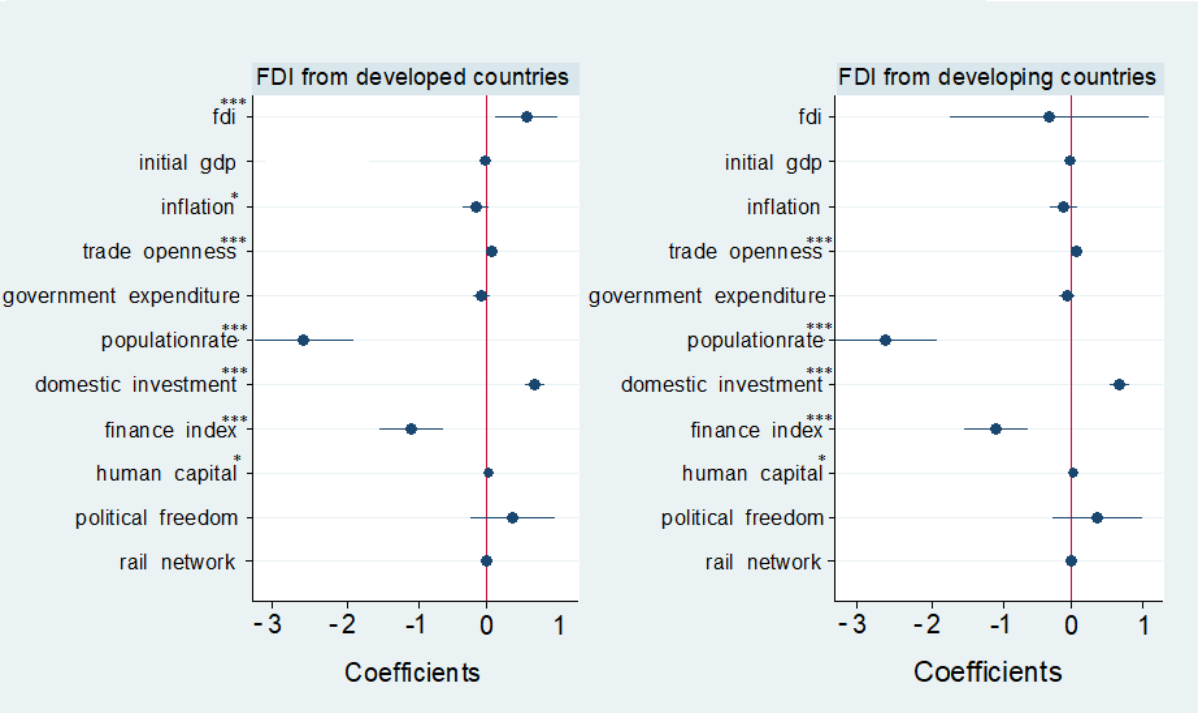
The objective of this section is to assess whether the effect of FDI inflows from different countries has an equal or differential effect on the economic growth of the host economies. In so doing, FDI inflows are separated into two groups; FDI from developed and developing countries to the host economies.[6]

We start the analysis with the fixed effect method after undertaking the Breusch-Pagan Lagrange multiplier test and the Hausman test. The results of the regression are reported in Figure 2.3[7].

The figure illustrates the effect of FDI from both developed and developing countries[8]. As seen, FDI from developed country has a positive and significant effect, suggesting that there is a positive relationship between FDI originating from developed countries and the growth rate of the host country. This contribution might be due to the fact that investors from developed economies follow the market effectiveness strategy in the host economy and behave in highly innovative and proactive ways, which eventually enables local companies to acquire the new technology used by foreign firms, which in turn contributes to economic growth. On the other hand, FDI from developing countries has no significant effect on the growth in the regression. The rationale for the insignificant might be that FDI from less developed countries focuses on countries with lower labour costs and less on innovation and long-term commitment to the host economy, as pointed out by Luo (1998). Hence, it is expected that FDI from these economies will not contribute to the host countries' growth rate. The results of my analysis confirm the findings of Luo (1998), Chen and Ku (2000), and Gee and Karim (2011). The impacts of control variables are more or less the same as those in the previous regressions in terms of the sign and significance level.

[6] Countries are classified as developed or developing based on their position on the IMF list.
[7] Pooled-OLS is applied for the analysis and included in Table A5 in Appendix A to compare the results.
[8] See Table A6 in Appendix A for the regression results estimated by the fixed effects with varying numbers of control variables.

Figure 2.3. Effect of FDI from Different Countries on Growth



Notes: The dependent variable is GDP per capita growth. FDI from developed and developing countries is measured by the net inflows of foreign direct investment originating from developed and developing countries divided by GDP, respectively. See data section for data sources and data definition. The model is estimated by using the fixed effects (individual effects) method. Cluster standard errors at the country level are employed in the model. The Hausman test's p-value is 0.000 which favours the fixed effects method over the random effects. The adjusted R-squared is 0.477 for FDI from developed countries, indicating that 47.7% of the variation in the GDP growth rate are explained by the independent variables included in the regression. The adjusted R-squared is 0.465 for FDI from developing countries, showing that 46.5% of the variation in the GDP growth rate are explained by the independent variables included in the regression. * p<0.10, ** p<0.05, *** p<0.01.

2.5.4 Crowding in or out Effect of FDI Inflows on Domestic Investment

In this section, we examine the impact of foreign direct investment on domestic investment of the receiving country. The ratio of gross fixed capital formation to GDP (GFCF) is used as the dependent variable in the model. The rate of FDI to GDP and other control variables determining GFCF used as regressors are similar to those employed in the previous regressions.

In the literature, to assess the crowding in or out effect of FDI on domestic investment, various variables are used as proxies for domestic investment. For instance, Adams (2009) subtracts FDI inflows from gross fixed capital formation (GFCF) to calculate domestic investment. However, according to the definition of GFCF given by the World Bank, FDI is not necessarily used only for financing fixed capital formation. Rather, FDI might also be used

to cover a deficit in the company or to pay off a loan. Therefore, it may not be possible to get the correct results once the domestic investment is calculated via this method. In some studies, like Kim and Seo (2003), gross fixed capital formation is directly used as a proxy for domestic investment, which might lead to misleading findings owing to the inclusion of (some part of) FDI in gross fixed capital formation. Also, in other studies, to evaluate the crowding in or out effect, total investment is calculated by adding domestic investment, and both current and lagged period FDI are used as dependent variables (e.g., Misun and Tomsk, 2002). If the coefficient of FDI is higher than one, it is assessed as a crowding in effect or else evaluated as a crowding out effect of FDI on domestic investment (Borensztein et al. 1998). As we do not know what proportion of FDI is used to finance capital formation, this method might prevent us from interpreting the results correctly.

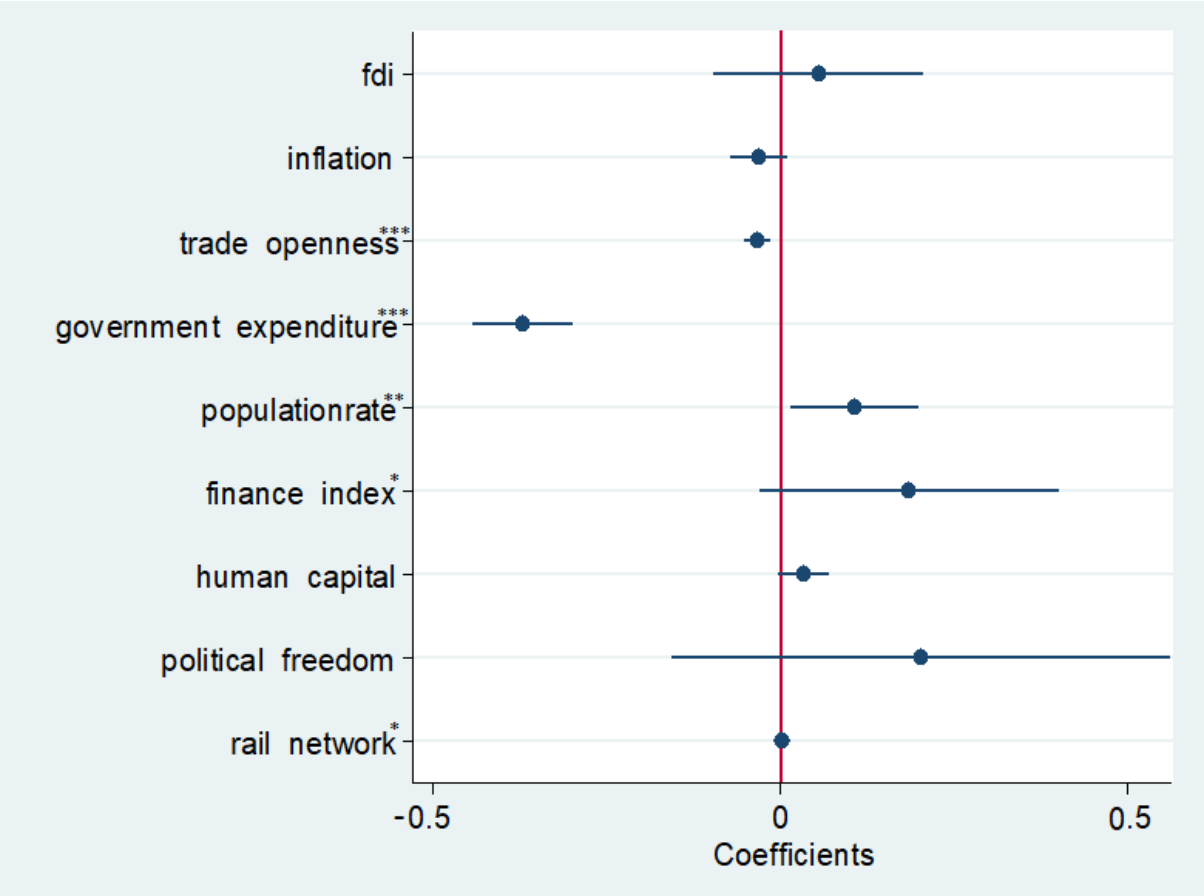
Therefore, we take into consideration the uncertainty about the proportion of FDI included in gross fixed capital formation: if the coefficient on FDI lies between 1 and 0, I am unable to say whether FDI leads to crowding in or out of domestic investment. If it is higher than one, then this implies a crowding in effect of FDI, while a crowding out effect is identified when the coefficient is lower than zero.

We examine the link between FDI and domestic investment rate by using the Fixed effect method. The results of the regressions are reported in Figure 2.4.[9] The effect of FDI is not statistically significant in the regression.[10] The other determinants of Gross Fixed Capital Formation have the expected signs. The sign of inflation, trade openness and government expenditure become negative. It is interesting to note that an increase in government expenditure causes lower capital formation, suggesting that government spending crowds out investment in OECD countries. In contrast, the effects of population growth rate, financial development, human capital, political freedom, and rail network are positive, although human capital and political freedom are not statistically significant.

[9] The results of estimations by the Pooled-OLS are given in Table A7 in appendix A.

[10] See Table A8 in Appendix A for the regression results estimated by the fixed effects with varying numbers of control variables. It is worth noting that FDI does not enter any regressions significantly except column 4 of the table, in which the coefficient on FDI is significant but lower than 1. In this case, neither crowding in nor out effect of FDI on domestic investment is observed occurs given that the uncertainty about the proportion of FDI included in gross fixed capital formation.

Figure 2.4 Effect of Aggregate FDI on Domestic Investment



Notes: The dependent variable is gross fixed capital formation (GFCF). FDI is measured by the net inflows of foreign direct investment divided by GDP. See data section for data sources and data definition. The model is estimated by using the fixed effects (individual effects) method. Cluster standard errors at the country level are employed in the model. The Hausman test's p-value is 0.000 which favours the fixed effects method over the random effects. The adjusted R-squared is 0.332, indicating that 33.2% of the variation in the GFCF rate are explained by the independent variables included in the regression. * p<0.10, ** p<0.05, *** p<0.01.

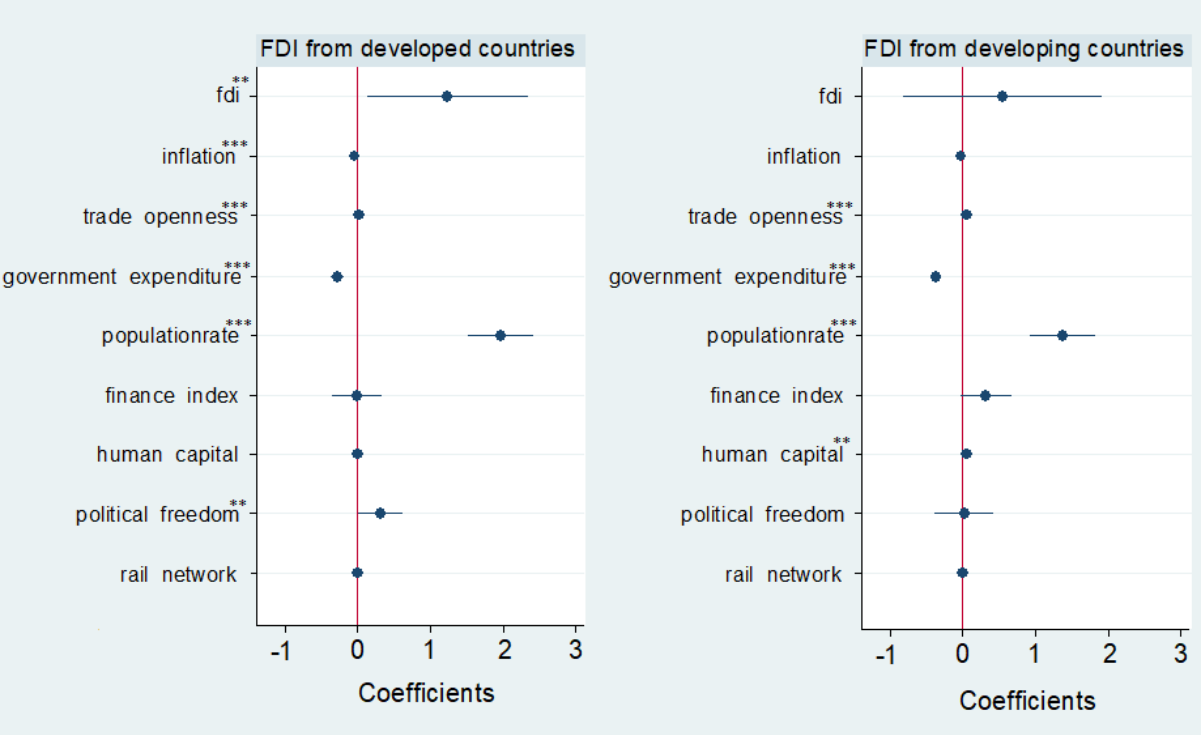
2.5.6 Effect of the Origin of FDI on Domestic Investment

This study also analyses whether the origin of FDI matters in the relationship between FDI inflows and domestic investment. Two kinds of FDI inflows are used as independent variables: FDI from developed and developing countries, as in the previous analysis.[11]

Figure 2.5 shows separate regressions for both FDI from developed countries and FDI from developing countries[12]. As seen from the figure, FDI from developed countries is positive and statistically significant. Most importantly, the coefficient of FDI is greater than one, suggesting that FDI inflows from developed countries crowd in domestic investment in the host economies. In contrast to FDI from developed countries, FDI from developing countries does not show a significant effect on the domestic investment of the host country. These findings are consistent with the discussion in the previous sections. Briefly, FDI from developed countries reveals more resources commitment and R&D intensity, leading them to operate with advanced technology, which facilitates technology transfer to local counterparts. Since they tend to cooperate more with local producers than FDI from developing countries which involve with labour-intensive production and focus on export markets instead of complementary activities, which prevents technology diffusion (Chen and Ku, 2000). To conclude, the country of origin matters in determining whether FDI impacts the domestic investment of the host country. About control variables, they show similar patterns as those reported in Figure 2.4.

[11] Results estimated by pooled OLS confirm those estimated by the fixed effects. See Table A9 in Appendix A.
[12] See Table A10 in Appendix A for the regression results estimated by the fixed effects with varying numbers of control variables.

Figure 2.5 Effect of FDI from Different Countries on Domestic Investment



Notes: The dependent variable is gross fixed capital formation (GFCF). FDI from developed and developing countries is measured by the net inflows of foreign direct investment originating from developed and developing countries divided by GDP, respectively. See data section for data sources and data definition. The model is estimated by using the fixed effects (individual effects) method. Cluster standard errors at the country level are employed in the model. The Hausman test's p-value is 0.000 which favours the fixed effects method over the random effects. The adjusted R-squared is 0.353 for FDI from developed countries, indicating that 35.3% of the variation in the GDP growth rate are explained by the independent variables included in the regression. The adjusted R-squared is 0.307 for FDI from developing countries, showing that 30.7% of the variation in the GDP growth rate are explained by the independent variables included in the regression. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

2.6. Robustness Check

To check the robustness of our findings, we employ the system GMM developed by Blundell and Bond (1998). The main reason for using the GMM panel estimator is to control for the potential endogeneity bias stemming from simultaneous causality, especially between the FDI flows and growth rate or between FDI and domestic investment, as explained in detail in the methodology section.

The consistency of the GMM estimator depends on two tests: the Hansen test to check the validity of instruments and the Arellano-Bond AR (2) to test the second-order serial correlation (Carkovic and Levine, 2002). Both test results are reported at the bottom of each column in the tables below. As shown, we could not reject the null hypothesis of the Hansen test; its p-value is always greater than 0.05, meaning that identifying restrictions are valid, which gives support to the choice of instruments. In a similar manner, failing to reject the null hypothesis regarding Arellano-Bond AR (2) implies that there is no second-order serial correlation.

The results regarding the effect of FDI inflows on the growth rate are set out in Table 2.5. Those results confirm the previous findings: FDI has a positive effect on the growth rate of the receiving economy. As for the control variables, they continue to have the expected signs of coefficients as in the previous results.

Table 2.6 shows the impact of FDI inflows on domestic investment estimated by the system GMM. As seen from the table, FDI enters positively and significantly only in three out of 6 regressions. Even in the column in which FDI is significant, the coefficient is less than 1 as those estimated by fixed effect. This means the effect of FDI on domestic investment is ambiguous.

Table 2.7 reports the results about the effect of FDI from different countries on economic growth. The findings support the previous results and show that the growth-enhancing effect has been found in FDI from developed countries rather than developing countries.

The origin of FDI is also considered in the nexus between FDI and domestic investment in Table 2.8. As seen, the impact of FDI on domestic investment differs according to the country of origin. More clearly, crowding in effect is found in FDI from developed countries, while FDI from developing countries does not have a significant effect.

Table 2.5. Effect of FDI on Growth with System GMM

	(1) Growth	(2) Growth	(3) Growth	(4) Growth	(5) Growth	(6) Growth
lag growth	-0.1434*	-0.1052	-0.1776**	-0.1492*	-0.1334	-0.0915
	(-1.68)	(-1.60)	(-2.37)	(-1.84)	(-1.33)	(-1.21)
fdi	0.2253**	0.1175**	0.2025**	0.2249**	0.3468***	0.1995***
	(2.23)	(2.22)	(2.52)	(2.63)	(2.76)	(2.96)
inflation	-0.0641**	-0.0139	-0.0841***	-0.0440*	-0.0818***	-0.0285
	(-2.13)	(-0.73)	(-3.01)	(-1.90)	(-2.83)	(-1.09)
trade openness	0.0081	0.0064	0.0092	0.0088	0.0123	0.0078
	(0.75)	(0.99)	(0.93)	(0.99)	(0.98)	(1.00)
government expenditure	0.0023	0.0012	-0.0015	0.0087	0.0118	0.0211
	(0.05)	(0.04)	(-0.04)	(0.20)	(0.23)	(0.59)
populationrate	-1.7541**	-1.7353*	-1.5284***	-1.1478**	-1.6573***	-1.1685**
	(-2.34)	(-1.90)	(-3.54)	(-2.39)	(-3.23)	(-2.17)
domestic investment	0.5164***	0.4808***	0.4256***	0.5007***	0.4992**	0.5291***
	(3.76)	(5.02)	(3.90)	(4.00)	(3.42)	(4.17)
finance index		-0.3465*				-0.1972
		(-1.94)				(-0.81)
human capital			0.0078			0.0063
			(1.37)			(1.31)
political freedom				0.3613*		0.2484
				(1.68)		(0.67)
rail network					-0.0015	-0.0039
					(-0.16)	(-0.30)
_cons	-9.6475**	-9.1166***	-8.5896**	-6.4645	-10.1938**	-9.6403**
	(-2.22)	(-3.33)	(-2.10)	(-1.32)	(-2.14)	(-1.96)
Arellano-Bond AR (2) p-value	0.241	0.281	0410	0571	0.381	0.352
Hansen test of overid.	46.53	53.96	51.77	55.33	60.71	40.99
	(0.450)	(0.257)	(0.329)	(0.218)	(0.103)	(0.719)
N	843	763	786	824	710	620

Notes: The dependent variable is GDP per capita growth. FDI is measured by the net inflows of foreign direct investment divided by GDP. See data section for data sources and data definition. The model is estimated by using the system GMM proposed by Arellano and Bover (1995) and extended by Blundell and Bond (1998). GDP per capital, FDI and financial index are considered as endogenous variables. Collapse option is used to reduce the instrument count (since GMM becomes inconsistent as the number of instruments becomes too large). Robust option is used, which provides HAC variance-covariance matrix. To have t-stats and F stats instead of z-stats, "small" option is applied. Orthogonal option is included, which requests the forward orthogonal-deviations transform instead of first differencing. Nodiffsargan option is used to prevent reporting of certain difference in Sargan/Hansen statistics. *t* statistics in parentheses * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

Table 2.6. Effect of FDI on Domestic Investment with System GMM

	(1) GFCF	(2) GFCF	(3) GFCF	(4) GFCF	(5) GFCF	(6) GFCF
lag gfcf	0.3516***	0.3785***	0.3723***	0.3474***	0.3617***	0.3225***
	(6.12)	(6.51)	(6.73)	(6.58)	(7.33)	(5.94)
fdi	0.2978	0.2813*	0.3094**	0.2642**	0.1588	0.1376
	(1.33)	(1.71)	(1.97)	(2.11)	(1.34)	(1.51)
inflation	-0.0058	-0.0031	-0.0034	0.0048	-0.0039	-0.0094*
	(-1.15)	(-0.37)	(-0.42)	(0.84)	(-0.59)	(-1.92)
trade openness	0.0015	0.0014*	0.0009**	0.0007**	0.0021	0.0007
	(1.42)	(1.65)	(2.17)	(2.21)	(1.59)	(1.61)
government expenditure	-0.0048	-0.0058	-0.0059	-0.0076**	-0.0089*	-0.0098*
	(-0.95)	(-1.31)	(-1.35)	(-2.15)	(-1.81)	(-1.93)
populationrate	0.1494	0.0301	0.0348	0.1724*	0.08055	0.2072**
	(1.55)	(0.51)	(0.64)	(1.87)	(1.05)	(1.98)
domestic investment	0.6785***	0.6712***	0.6574***	0.6597***	0.6436***	0.6678***
	(9.23)	(15.21)	(15.24)	(16.68)	(17.72)	(14.07)
finance index		0.0675**				0.0214
		(2.41)				(0.72)
human capital			0.0058			0.0079
			(1.34)			(0.57)
political freedom				0.2625***		0.3682**
				(2.71)		(1.91)
rail network					-0.0071	0.0021
					(-1.17)	(1.09)
_cons	1.3512	0.6076	-0.2412	-1.7934	1.3177*	-2.3073
	(1.26)	(1.05)	(-0.37)	(-1.64)	(1.93)	(-1.42)
Arellano-Bond AR (2)p-value	(0.803)	(0.517)	(0.809)	(0.579)	(0.351)	(0.415)
Hansen test of overid	58.48	57.38	57.98	55.40	57.75	58.29
	(0.122)	(0.192)	(0.131)	(0.161)	(0.115)	(0.106)
N	850	769	713	695	624	624

Notes: The dependent variable is gross fixed capital formation (GFCF). FDI is measured by the net inflows of foreign direct investment divided by GDP. See data section for data sources and data definition. The model is estimated by using the system GMM proposed by Arellano and Bover (1995) and extended by Blundell and Bond (1998). GDP per capital, FDI and financial index are considered as endogenous variables. "Collapse" option is used to reduce the instrument count (since GMM becomes inconsistent as the number of instruments becomes too large). "Robust" option is used, which provides HAC variance-covariance matrix. To have t-stats and F stats instead of z-stats, "small" option is applied. "Orthogonal" option is included, which requests the forward orthogonal deviations transform instead of first differencing. "Nodiffsargan" option is used to prevent reporting of certain difference in Sargan/Hansen statistics. *t* statistics in parentheses * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

Table 2.7. Effect of FDI from Different Countries on Growth with System GMM

	(1) Growth	(2) Growth	(3) Growth	(4) Growth	(5) Growth	(6) Growth	(7) Growth	(8) Growth
lag gdp	-0.2063***	-0.0902**	0.0847	-0.2507***	-0.2072***	-0.2934***	0.1379**	-0.2705***
	(-3.16)	(-2.03)	(1.00)	(-3.47)	(-3.25)	(-5.36)	(2.05)	(-4.31)
fdi developed	0.2964*	0.6195**	0.6121*	0.536#**				
	(1.87)	(2.33)	(1.76)	(2.18)				
fdi developing					-1.5474	-0.1152	0.7681	1.4368
					(-1.59)	(-0.14)	(0.45)	(1.19)
inflation	-0.0637	-0.1332	-0.0614	-0.1146	-0.0493	-0.0584	-0.0856	-0.0900
	(-1.38)	(-1.28)	(-1.21)	(-1.46)	(-1.40)	(-1.07)	(-1.18)	(-1.19)
trade opennes	0.0791***	0.0296	0.0236	0.0441*	0.0913**-	0.0984	0.0515	-0.0809
	(3.49)	(1.56)	(0.83)	(1.96)	(3.02)	(1.54)	(1.39)	(-1.38)
government expenditure	-0.1004	-0.0062	-0.0452	-0.0085	-0.0542	-0.0631	-0.0523	-0.1015*-
	(-0.50)	(-1.08)	(-0.44)	(-1.09)	(-1.26)	(-1.62)	(-1.35)	(-2.07)
populationrate	-1.6002*	-1.3324	-2.7427	-0.1385	-0.8393	-0.1294	-1.3928	-1.5904
	(-1.93)	(-1.02)	(-1.60)	(-0.12)	(-0.55)	(-1.09)	(-1.11)	(-1.58)
domestic investment	0.7845***	0.2518**	0.3782**	0.3446***	0.7697***	0.2324*	0.2605**	0.3227*
	(6.53)	(2.26)	(2.37)	(2.99)	(6.40)	(1.87)	(2.21)	(1.85)
landlocked	-13.3921**	-6.6653**	-8.5147*	-9.0198**	-1.3514**	-0.9472	-0.6851	-0.7872
	(-2.95)	(-2.12)	(-1.80)	(-2.33)	(-2.69)	(-1.30)	(-1.22)	(-1.17)
finance index	-2.9636***	-2.2415***	-3.0087***	-2.77.43***	-2.1385***	-0.4819*	-0.4075	-1.7694***
	(-3.57)	(-2.92)	(-3.60)	(-3.90)	(-2.92)	(-1.88)	(-0.40)	(-2.59)
human capital		-0.0666	-0.1145	-0.0932		0.1665**	0.06597*	0.1413*
		(-0.85)	(-1.27)	(-1.11)		(2.29)	(1.65)	(1.86)
political freedom			2.0431*	0.9985**			1.1507*	1.4385*
			(1.84)	(2.01)			(1.80)	(1.91)
rail network				0.0744				-0.2392
				(0.54)				(-0.87)
_cons	-1.3472	2.1617	-4.4274**	-5.9093	6.3964	4.8897**	1.0935	-2.9104**
	(-0.93)	(0.15)	(-2.18)	(-0.65)	(0.38)	(2.76)	(0.59)	(-2.82)
Arellano-Bond AR (2)	0.452	0.797	0.507	0.202	0.242	0.416	0.479	0.420
Hansen test of overid.	50.77	47.88	45.75	38.76	35.66	43.62	50.15	52.34
	(0.141)	(0.214)	(0.359)	(0.526)	(0.666)	(0.361)	(0.211)	(0.182)
N	489	454	440	396	489	454	440	396

Notes: The dependent variable is GDP per capita growth. FDI from developed and developing countries is measured by the net inflows of foreign direct investment originating from developed and developing countries divided by GDP, respectively.See data section for data sources and data definition. The model is estimated by using the system GMM proposed by Arellano and Bover (1995) and extended by Blundell and Bond (1998). GDP per capital, FDI and financial index are considered as endogenous variables. "Collapse" option is used to reduce the instrument count (since GMM becomes inconsistent as the number of instruments becomes too large). "Robust" option is used, which provides HAC variance-covariance matrix. To have t-stats and F stats instead of z-stats, "small" option is applied. "Orthogonal" option is included, which requests the forward orthogonal deviations transform instead of first differencing. "Nodiffsargan" option is used to prevent reporting of certain difference in Sargan/Hansen statistics. *t* statistics in parentheses * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

Table 2.8. Effect of FDI from Different Countries on the Domestic Investment with System GMM

	(1) GFCF	(2) GFCF	(3) GFCF	(4) GFCF	(5) GFCF	(6) GFCF	(7) GFCF	(8) GFCF
lag gfcf	0.7935***	0.7814***	0.8157***	0.7956***	0.7932***	0.8079***	0.8134***	0.8326***
	(15.18)	(18.42)	(18.38)	(18.64)	(22.09)	(23.44)	(16.16)	(15.72)
fdi developed	1.0659*	1.0591*	1.0542*	1.0665**				
	(1.80)	(1.85)	(1.74)	(1.97)				
fdi developing					0.4255	0.4987*	0.2054	0.4105
					(1.60)	(1.65)	(1.26)	(1.49)
inflation	-0.00430	-0.00776	-0.0093	-0.0025	-0.0081	-0.0029	-0.0041	-0.0081
	(-0.46)	(-0.42)	(-0.11)	(-0.29)	(-1.38)	(-0.37)	(-0.46)	(-0.84)
trade openness	0.0033**	0.0008	0.0049***	0.0029	0.0019	0.0025	0.0054**	0.0082**
	(2.00)	(0.17)	(3.11)	(1.55)	(0.81)	(1.01)	(2.71)	(2.60)
government expenditure	-0.0307**	-0.0451*	-0.0303***	-0.0379***	-0.0349***	-0.0324***	-0.0294***	-0.0145*
	(-2.11)	(-1.78)	(-2.94)	(-3.36)	(-3.02)	(-2.84)	(-2.74)	(-1.80)
populationrate	0.1974	0.2115	0.1143	0.2868	0.1814	0.1473	0.2292	0.3724*
	(0.86)	-0.49)	(0.59)	(1.31)	(0.92)	(0.86)	(0.64)	(1.83)
finance index	0.2104**	0.2342***	0.1853**	0.2577***	0.2095**	0.2144***	0.1857**	0.3431**
	(2.35)	(2.80)	(2.24)	(3.02)	(2.56)	(2.98)	(2.28)	(2.39)
human capital		0.0017	0.0062*	0.0049		0.0086	0.0064	0.0197**
		(1.13)	(1.75)	(0.72)		(1.45)	(1.18)	(2.11)
political freedom			0.0311	0.0569			0.0326	0.1724
			(0.21)	(0.33)			(0.23)	(0.90)
rail network				0.0006***				0.0005*
				(3.09)				(1.84)
_cons	5.0964***	6.2587*	4.1343*	4.4037*	5.4414***	4.0319***	4.0475*	0.9442
	(3.53)	(1.79)	(1.94)	(1.68)	(5.74)	(3.62)	(1.78)	(1.27)
Arellano-Bond AR (2)	0.152	0.190	0.159	0.164	0.146	0.191	0.151	0.132
Hansen test of overid.	52.68	51.63	48.57	45.62	50.21	45.74	45.33	42.83
	(0.231)	(0.263)	(0.409)	(0.446)	(0.310)	(0.441)	(0.542)	(0.606)
N	489	453	437	393	489	453	437	393

Notes: The dependent variable is gross fixed capital formation (GFCF). FDI from developed and developing countries is measured by the net inflows of foreign direct investment originating from developed and developing countries divided by GDP, respectively. See data section for data sources and data definition. The model is estimated by using the system GMM proposed by Arellano and Bover (1995) and extended by Blundell and Bond (1998). GDP per capital, FDI and financial index are considered as endogenous variables. "Collapse" option is used to reduce the instrument count (since GMM becomes inconsistent as the number of instruments becomes too large). "Robust" option is used, which provides HAC variance-covariance matrix. To have t-stats and F stats instead of z-stats, "small" option is applied. "Orthogonal" option is included, which requests the forward orthogonal deviations transform instead of first differencing. "Nodiffsargan" option is used to prevent reporting of certain difference in Sargan/Hansen statistics. *t* statistics in parentheses * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

2.7 Conclusion

Inward foreign direct investment has become the most attractive external finance with drying up commercial bank lending in the 1990s. Countries have competed to attract more FDI by offering incentives with the expectation that foreign investment brings much-needed capital accumulation, advanced technology transfer, employment creation, skill acquisition, and new managerial practises (Aitken and Harrison, 1999). However, there is no consensus about the effect of FDI on economic growth in the literature. The inconclusive empirical results might stem from data unavailability, model misspecification such as disregarding potential simultaneous effect between GDP growth rate and FDI, country-specific factors, and so on, and treating FDI inflows homogenously across economies. This research has taken into consideration all such misguiding issues by using a set of different methods, more reliable and updated data and covering 36 sample countries, attracting over half of total FDI flows in the world.

Empirical findings show that FDI inflows have a positive effect on the growth of the host country. More specifically, the host countries with a well-established financial system, a higher level of human capital, and political freedom are able to gain more benefits from FDI inflows. This study also reveals that the origin of FDI matters in determining FDI's effects on the host country's economy. FDI inflows from developed countries contribute to the growth of the host country, while FDI from developing countries has no significant effect on the growth.

This study also analyses the effect of FDI inflows on domestic investment in the receiving country. The results indicate that the impact of FDI on domestic investment is insignificant. However, the impact of FDI on domestic investment differs according to the country of origin. Accordingly, FDI from developed countries crowds in domestic investment, whereas FDI from less developed economies has no significant effect.

This research has implications for policymakers that FDI inflows should not be treated homogenously across countries. The incentives to attract FDI should only be offered if the FDI can be expected to lead to positive spillovers such as the transfer of modern technology, management practices, etc. Furthermore, countries need to improve the financial system, have a more educated workforce, and have more political freedom to get the maximum benefit from FDI inflows. A possible extension of this research might be to evaluate the effects of different types of FDI inflows on growth rate and domestic investment in the receiving economy.

3. Chapter 3: Effect of Sectoral FDI on Growth and Domestic Investment: Evidence from OECD Countries

3.1 Introduction

Foreign Direct Investment (FDI) is an important source of external finance and an alternative to commercial bank lending (Carkovic and Levine, 2002). Countries compete to attract more FDI by offering incentives such as reduced corporate income tax, import duty exemption, subsidies for infrastructure, etc. This is because they believe that FDI will bring much-needed capital accumulation, provide advanced technology transfer, employment creation, skill acquisition, and new managerial practices (Aitken et al., 1999). Economic theory also highlights some channels through which the host economy may get benefits from FDI inflows: capital accumulation by introducing new technology, knowledge through labor training and mobility, and competition by overcoming the barriers to entry and reducing the market power of existing companies (Blomstrom et al., 1996; Borensztein et al., 1998; de Mello, 1999). However, while there is a large number of applied papers examining the link between FDI flows and growth, their empirical findings have been far from conclusive. The mixed results may be attributed to limited data availability, model misspecification like disregarding potential simultaneous effect between FDI and GDP growth rate, heterogeneous country selection, etc. (Carkovic and Levine, 2002). Another potentially important reason for the inconclusive findings in the literature could be the fact that the effect of FDI on the growth rate depends on the sector that the FDI flows into, which is something that much of the literature does not take into account. With this intuition, our research aims to investigate the effect of FDI inflows into three main sectors (namely primary, manufacturing, and service sectors), on economic growth during the period 1990-2017 for OECD economies. Besides considering the direct effect of FDI flows, this study also analyses whether the FDI effects can be conditional on the state of the financial system, human capital, political freedom, and infrastructure.

Moreover, while there is a huge body of literature scrutinising the impact of FDI on growth, there are relatively few studies focusing on the impact of FDI on domestic investment. Some empirical results indicate the existence of a crowding out effect of FDI on domestic investment; this can occur when local producers are unable to compete with incoming foreign investors because of the advanced technology used by the latter (Blomstrom and Kokko, 1998; Kim and Seo, 2003). Furthermore, higher efficiency of Multinational Enterprises (MNEs) may lead to domestic companies losing market share, leading to a crowding out effect in the host

country, as discussed in Mileva (2008). On the other hand, the presence of foreign-owned competition can force the local firms to use their resources more efficiently, encourage them to adopt modern technology by imitating the foreign firms, or collaborate with them via backward or forward linkages, bringing about a crowding-in effect as argued by Blomstrom and Kokko (1998). Most importantly, each sector might have different characteristics in terms of creating linkages with the rest of the economy, technology transfer, or other spillover effects from foreign to local firms. Therefore, this study assesses the link between sector-specific FDI inflows and domestic investment over the same period (1990-2017) in OECD members. Moreover, it allows for the possibility that host countries' financial systems, human capital, political freedom, and infrastructure affect the relationship between sectoral FDI flows and domestic investment. This research is one of the first to account for the effect of sectoral FDI flows on domestic investment for OECD economies, to the best of our knowledge.

Mindful of the possible reasons for inconclusive findings in the previous literature, we investigate the effect of sectoral FDI flows on economic growth and domestic investment using a broad range of econometric methods: pooled OLS, fixed-effect panel regression, and system GMM estimator of Arellano and Bover/Blundell and Bond. Furthermore, this study extends the number of control variables as determinants of the growth rate. The OECD member countries are selected as the sample group, as these countries have similar market economies, have a democratic set-up, and are regarded as developed economies (except for two countries – Mexico and Turkey). Also, these countries attracted over half of global FDI flows during the period analysed. The common features make the sample a less heterogeneous group, which helps to reduce the potential biases (Nunnenkamp and Spatz, 2003).

The remainder of the paper is organised as follows: Section 2 provides a brief review of the literature on the relationship between FDI and economic growth. The third section contains details regarding the origins of the data used in our empirical analysis. Section 4 presents the methodology and discusses the outcomes of regressions, while the conclusion and summary are provided in Section 5.

3.2 Literature Review

3.2.1 Review of Empirical Findings

There are many studies discussing the effect of aggregate FDI flows on the growth rate in the host economy. However, some of these studies suffer from a lack of robustness and tend to be weak (Carkovic and Levine, 2002). The empirical results are mixed and far from

conclusive. Ignoring the sectoral composition of FDI inflows and focusing instead on the aggregate FDI flows may well account for the mixed results regarding the FDI-growth nexus.

To the best of our knowledge, there are very few studies in the literature that evaluate the effect of FDI flows into the primary, manufacturing, and service sectors on the growth of the host countries. These findings mostly conclude that the growth-promoting effect of FDI on the growth rate is associated with the manufacturing sector, while some studies find an ambiguous or negative effect (e.g., Khan and Khan, 2011; Onakoya, 2012; Hanafy and Marktanner, 2019). As for the primary and service sectors, their role in the growth rate is found to have mostly negative or ambiguous effect except for some studies (See Table 3.1 for opposing findings).

Among the studies on the impact of sectoral FDI on the growth rate, the study by Doytch and Ucar (2012), which is the only study to employ the Blundell and Bond (1998) GMM estimator approach, is the closest to our research. However, there are several points that differentiate our study from theirs. First, in contrast to our study, the impact of the primary sector is outside the scope of their study. Secondly, their study analyses the service sector under two categories: financial and non-financial, while ours focuses on the service sector as a whole. Also, in their study, the absorptive capacity of the receiving countries is not included. Moreover, we have examined the influence of sectoral FDI on the growth rate only in OECD members, whereas they focus on a large sample of nations. Finally, again, the perspective of the relationship between sectoral FDI and domestic investment falls outside the scope of their study. While considering these points, our research seems to contribute to the literature from a different perspective in terms of the sample countries and time period, inclusion of the primary sector and countries' absorptive capacity, and analysis of the role of sectoral FDI on domestic investment.

We outline some research on the effect of sectoral FDI on the growth rate in Table 3.1. The studies summarised in the table show the inconclusive findings in the literature.

3.1 Summary of the findings of some research on the link between sectoral FDI and growth

Author(s)	Sample	Period	Main results
Alfaro (2003)	47 developing and developed countries	1981-1999	Primary sector: Negative effect. Manufacturing sector: Positive effect. Service sector: Ambiguous (insignificant) effect.
Aykut and Sayek, (2007)	33 developing and developed countries	1990-2002	Primary sector: Negative effect. Manufacturing sector: Positive effect. Service sector: Negative effect.
Khaliq and Noy, (2007)	Indonesia	1997-2006	Aggregate FDI: Positive effect. Mining and quarrying sector: Negative effect. Construction sector: Positive effect. Other sectors: Ambiguous effect.
Vu et al. (2008)	China and Vietnam	1990-2004	Primary sector: Positive effect. Manufacturing sector: Positive effect. Service sector: Positive effect. However, these countries benefit more from the FDI inflows in manufacturing sector.
Wang (2009)	12 Asian Economies	1987-1997	Manufacturing sector: Positive effect. Other sectors: Ambiguous effect. The growth effect of manufacturing FDI is underestimated by 48% owing to using aggregate FDI flows.
Vu and Noy, (2009)	6 Developed Countries	1989-1991 and 1992-2003	Aggregate FDI: Positive effect. Real estate sectors: Positive effect. Other sectors: Negative effect.
Doytch and Uctum (2011)	Latin America and the Caribbean; Europe and Central Asia South; East Asia and the Pacific	1990-2004	Aggregate FDI: Positive effect. Manufacturing sector: Positive effect. Service sector: Ambiguous effect.

Khan and Khan, (2011)	Pakistan	1981-2008	Primary sector: Positive effect. Manufacturing sector: Ambiguous effect. Service sector: Positive effect.
Onakoya (2012)	Nigeria	1970-2010	Aggregate FDI: Positive effect. Oil sector: Positive effect. Agriculture and manufacturing sectors: Negative effect.
Hanafy (2015)	26 Egyptian provinces	1992-2007	Aggregate FDI: Ambiguous effect. Primary sector: Negative effect. Manufacturing sector: Positive effect. Service sector: Ambiguous effect.
Ali and Asgher, (2016)	China, Pakistan, India, Bangladesh and Sri Lanka	2000-2015	Primary sector: Positive effect (relatively smaller). Manufacturing sector: Positive effect. Service sector: Ambiguous effect.
Phuyal and Sunuwar, (2018)	Nepal	2007-2016	Manufacturing sector: Positive effect. Tourism sector: Positive effect.
Hanafy and Marktanner, (2019)	Egyptian provinces	1992-2007	Aggregate FDI: Ambiguous effect. Agricultural sector: Negative effect. Manufacturing sector: Ambiguous effect. Service sector: positive effect (only if the host economy reaches the minimum threshold of domestic private investment).
Opoku et al. (2019)	38 African countries	1960-2014	Aggregate FDI: Positive effect. Primary sector: Positive effect. Manufacturing sector: Ambiguous effect. Service sector: Positive effect.
Ingham et al. (2020)	Egypt	1990-2007	Aggregate FDI: Positive effect. Petroleum sector: Positive effect. Manufacturing sector: Positive effect. Other sectors: Negative effect.

3.2.2 Channels through which Sectoral FDI Inflows could Impact on Growth and Domestic Investment

FDI inflows in each sector may have a different effect on the growth rate in the host country. The effect of FDI in the primary sector is mostly found to be detrimental to the host country's growth owing to a variety of factors (Alfaro, 2003, and Khaliq and Noy, 2007). The scope of linkages between foreign and local firms is often limited as this sector is mostly capital-intensive and uses few intermediate goods produced by domestic firms (UNCTAD World Investment Report 2017). This is also confirmed by Aykut and Sayek (2007), who claim that once FDI is attracted in the primary sector, especially in the mining and extracting subsector, the foreign investment mostly comes as a mega-project, and it tends to be capital-intensive in comparison with the other two sectors. Therefore, the potential positive spillovers, such as knowledge transfer from the foreign firm to the local economy, are limited as few local workers are employed. Furthermore, foreign firms may obtain a monopoly status in the sector due to the large scale of the project, which causes crowding out of local firms, discourages entrepreneurs from investing more, and encourages rent-seeking behaviour (Khaliq and Noy, 2007). What is more, FDI in the sector may bring about the Dutch disease, which tends to occur after the exploitation or discovery of large natural reserves such as oil and gas (Nunnenkamp and Spatz, 2003; Aykut and Sayek, 2007). Even though the discovery of new natural resources seems like good news, given that natural resources tend to be priced in U.S. dollars, their exports lead to the appreciation of the domestic currency. This, in turn, decreases the price competitiveness of manufacturing exports. As a consequence, exports fall and imports rise (Sachs and Warner, 2001; Sala-i-Martin and Subramanian, 2008). The appreciation of the domestic currency may also cause an increase in the unemployment rate, if domestic and multinational enterprises move their production to other countries in order to take advantage of lower costs there. On the other hand, FDI in this sector could have a positive effect on the countries suffering from a lack of capital and technology. It also could contribute to the balance of payments financing since foreign investment brings a large amount of foreign currency to the receiving economy (Aykut and Sayek, 2007). Therefore, the net effect of FDI inflows into the primary sector depends on the balance of positive and negative effects.

Unlike for the primary sector, the literature generally reveals that FDI in the manufacturing sector boosts economic growth in the receiving economy. This sector has potentially many more backward and forward linkages in the recipient economy. Backward linkages occur when domestic producers provide intermediate inputs for foreign firms, and

forward linkages emerge once multinational firms sell their final products on the local market. Further positive spillover effects may arise from employee turnover, which helps local firms produce more efficiently with current technology or absorb advanced technology once they employ the workers quitting foreign firms (Alfaro, 2003; Aykut and Sayek, 2007; Hanafy and Marktanner, 2019). Moreover, local companies are forced to produce more efficiently to be able to compete with foreign owned enterprises producing with advanced technology in the host economy. However, the resulting increased competitiveness could crowd out local firms unless they adopt modern technology or in the case when foreign firms seek to minimise the leakage of technology and management know-how so as to restrain the spillovers to the local firms. Finally, local producers may get benefits from the presence of foreign ones by utilizing their international network to increase the level of export and penetrate the international market. In view of these factors, the positive effects of FDI in the manufacturing sector are expected to dominate the negatives, which is confirmed by the results of Alfaro (2003) and Wang (2009), who document the growth-enhancing effect of FDI in the manufacturing sector.

Contrary to the primary and manufacturing sectors, output in the service sector is mostly non-tradable and requires proximity between customers and producers. Most FDI in this sector tends to be market-seeking where forward linkages potentially occur much more in the local market (Aykut and Sayek, 2007). However, the expectation regarding the effect of FDI in the service sector on the growth rate is not as straightforward as FDI in the manufacturing sector owing to the wide range of subsectors and the possibility that each one may display a different effect of FDI on the growth rate. As for the electricity, gas and water supply sectors, for instance, foreign suppliers may proceed with more advanced technology to be able to improve the quality and reduce the cost of the services as well as meeting the increasing demand in the local market (Aykut and Sayek, 2007). In the same manner, FDI in the banking sector is expected to have a significant effect on efficiency through the high level of competition and increased access to international financial markets (ibid). Besides, improved financial activities will affect all other sectors in the host economy positively (Hermes and Lensink, 2003). On the other hand, due to the capital intensity of the infrastructure sector, foreign investors could get superior market power, leading to crowding out of domestic firms and changing foreign firms' behaviour from market-seeking to rent-seeking, which could damage economic growth (Aykut and Sayek, 2007). Moreover, most foreign investment activity in the infrastructure subsector comes with privatization-led mergers and acquisitions, which do not contribute to the total amount of investment in the local economy. Therefore, we

can expect to see either a growth-promoting or growth-shrinking effect of FDI in the service sector in the literature.

3.3 Data

3.3.1 Data Definitions and Sources

The variables in the analysis of this chapter are already employed in the previous chapter except for data on FDI flows into three sectors. For the sake of completeness, the data will be presented again in Table 3.2.

Table 3.2. Definitions and sources of the variables

Variables	**Definition**	**Sources**
Growth	The rate of real per capita GDP growth.	World Development Indicator
FDI (Sectoral FDI)	FDI inflows into primary, manufacturing and service sectors are used as a log of (1+ the ratio of FDI inflows to GDP) for each sector.	OECD's International Direct Investment Statistics Yearbook (2002,2003,2004,2012,2013,2014,2018)
Log (Initial GDP)	GDP lagged by four years converted from domestic currencies using constant 2010 U.S. dollars.	World Development Indicator
Inflation	The annual percentage change in the cost to the average consumer of obtaining a standardized basket of goods and services. Measured by the change in the consumer price index.	International Monetary Fund Database
Openness	the ratio of exports plus imports to GDP and calculated by the authors.	World Development Indicator
GFCF	The ratio of gross capital formation to GDP. Composed of expenditures on the level of inventories in addition to the fixed assets of the economy.	World Development Indicator
Gov_exp	The ratio of total cash payments of the government's operating activities in providing goods and services to GDP.	World Development Indicator
Populationrate	The annual population growth rate based on the definition, which counts all residents regardless of status and citizenship.	World Development Indicator

Exchange rate	Represented by real effective exchange rate which is the nominal effective rate (a measure of the value of a currency against a weighted of several foreign currencies) divided by a price deflator or index of costs. The based year is 2010.	World Development Indicator
Landlocked	Refering to countries which are enclosed completely by land, or their coastal strip lie on closed seas. Used as a dummy variable, and landlocked countries take the value of 1, and others get 0.	
Finance index	Consisting of the three widely used ratios measuring financial development, namely deposit money banks' assets to GDP (%), liquid liabilities to GDP (%), and private credit by deposit money banks to GDP (%)[13].	International Monetary Fund Database
Human capital	Presented by school enrollment rate which is the total number of children enrolled at the secondary level regardless of age divided by the population that officially corresponds to the same level of the age group.	World Development Indicator
Political freedom	The Polity IV dataset employed as a proxy for this variable is calculated by subtracting autocracy index from democracy index.	Integrated Network for Social Conflict Research (INSCR) Database.
Rail network	Used as a proxy for infrastructure development and presented by total kilometres length of railways divided by countries total area (square km).	World Development Indicator

[13] As detailed in Chapter 2,We follow Samargandi et al. (2015) to combine these three variables using principal component analysis (PCA) to create a single proxy for financial development. They assert that using PCA has two advantages. Firstly, the variables are highly correlated to each other, which leads to the multicollinearity problem. Usage of PCA helps to overcome this issue. Secondly, there is no uniform argument concerning most appropriate variables to present the level of financial development in the literature. We believe, therefore, that the indicator called financial_index is better than other individual variables.

Table 3.3 presents descriptive statistics for the growth rate as well as the FDI inflows into the primary, manufacturing and service sectors and the control variables for the OECD member countries over the period 1990-2017. A considerable variation in the GDP growth across countries appears, with growth ranging from -14.56 per cent in Estonia in 2009 to 24.37 per cent in Ireland in 2015, the mean of growth rate is 2.11 per cent during this period. FDI inflows in the primary sector demonstrate less variation with the mean of 0.11 per cent compared to the other sectors, ranging from -0.47 per cent in Canada in 2017 to 1.901 per cent in Chile in 2012. FDI in the manufacturing sector varies from -3.15 per cent in Slovenia in 2009 to 4.91 per cent in Slovak Republic in 2000, the average value of this variable is 0.416 per cent. FDI in the service sector varies more than others, ranging from -3.125 per cent in Denmark in 2008 to 7.042 per cent in Luxembourg in 2015 with a mean of 0.868 per cent.

Table 3.3. Descriptive Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
Growth	970	2.11	3.21	-14.56	24.377
Fdi in primary	574	0.112	0.273	-0.469	1.901
Fdi in manufacturing	667	0.416	0.606	-3.154	4.909
Fdi in service	656	0.868	1.024	-3.125	7.042
inflation	970	4.62	9.931	-9.68	143.692
trade_openness	994	85.689	51.980	16.014	423.984
gov_exp	900	31.949	11.546	1.878	62.242
population rate	1007	0.5594	0.8030	-2.574	6.0170
gross capital	978	22.858	4.058	11.518	39.404
reer	987	97.8818	15.8089	43.0772	164.3789
finance index	864	0.218	1.594	-2.539	5.344
human capital	896	102.858	15.276	51.869	168.904
political freedom	970	9.350	1.442	-4	10
rail network	804	10.043	89.125	0.00572	812.254

3.3.2 Composition of FDI Inflows

The share of FDI inflows in three sectors, namely the primary, manufacturing, and service sectors, is shown in Figure 3.1 for the OECD economies during 1990-2017. Comparison of the shares of the three sectors points out that FDI inflows in the service sector always obtain the highest share among the sectors, although the two sectors are close to each other in some years. The share of FDI in the manufacturing sector lies above the share in the primary sector throughout the period.

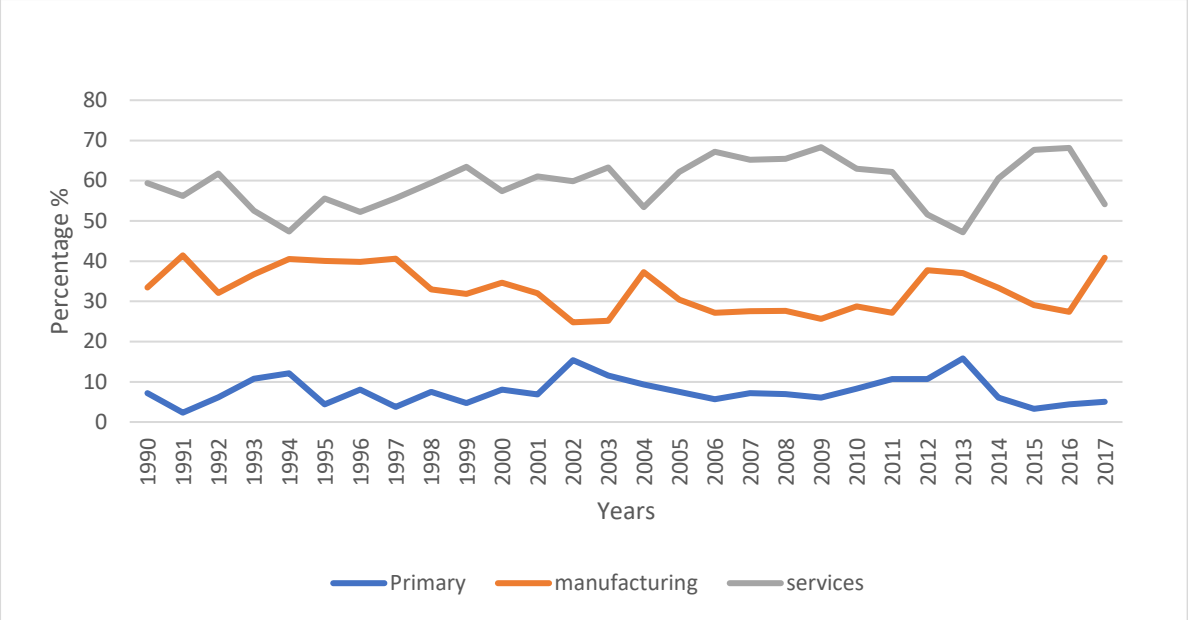


Figure 3.1: The share of Sectoral FDI Inflows in OECD Countries

Source: OECD's International Direct Investment Statistics Yearbook (from 2002 to 2018)

3.4 Methodology

This section describes the econometric methods which have been employed to analyse whether the effect of FDI on the growth rate and domestic investment is different across the primary, manufacturing and service sectors during the period between 1990 and 2017 for OECD members. The same methods are used in the first section, but they will be explained again for the sake of completeness.

3.4.1 Statics Panel Data

First, to establish a benchmark for the effect of different types of FDI on the host country's growth, we use the pooled OLS method, based on the following equation:

$$y_{i,t} = \alpha + \beta_1 FDI_{i,t} + \gamma X_{i,t} + u_{i,t} \qquad (1)$$

where y represents the rate of real per capita GDP growth of country i at time t, α is the constant term, $FDI_{i,t}$ refers to FDI flows in the primary, manufacturing and service sectors respectively. $X_{i,t}$ stands for the matrix of control variables widely used in the empirical growth literature as determining economic growth. Lastly, $u_{i,t}$ stands for the error term as usual.

The pooled OLS is the simplest method and puts all observations together into a pool, which can lead to two major shortcomings: (i) it ignores the country-specific heterogeneity, leading to omitted variable bias; (ii) it does not take into consideration the potential endogeneity issue, which in turn may produce biased and inconsistent parameter estimates as described by Doytch and Uctum (2011).

Next, we employ the fixed-effects model after undertaking the Hausman test which is in favour of fixed effects against random effects for our panel data analysis. The equation applied to run the regression is as follows:

$$y_{i,t} = \alpha + \beta_1 FDI_{i,t} + \gamma X_{i,t} + \eta_i + u_{i,t} \quad (2)$$

The only difference in equation (2) from (1) is "η_i" which denotes the country-specific effects, which consider unobserved heterogeneity owing to time-invariant country characteristics. For instance, the landlocked dummy in our regression was eliminated due to the fixed-effects model due to being a country-specific factor. All other variables are the same regressors as in equation (1).

The main shortcoming of this method is that it fails to account for the possible endogeneity problem in the model. To avoid the pitfall, the dynamic panel estimator of system GMM is employed.

3.4.2 Dynamic Panel Data

We apply the Generalized Method of Moments (GMM) panel estimator which was first introduced by Holtz-Eakin, Newey, and Rosen (1988) and subsequently developed by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998). The main reason for using the GMM panel estimator is to control for the simultaneity bias caused by the possibility that some independent variables, especially FDI flows in the sectors in our study, might be endogenous, that is to say, an increase in growth may attract more FDI inflows in the host country. GMM also uses the time-series variation in the data, which accounts for unobserved country-specific effects, which could not be done by applying country-specific dummies owing to the dynamic structure of the regression equation and allows for the use of the lagged dependent variable as a regressor (Azman-Saini et al., 2010). We follow the equation, which is similar to Azman-Saini et al. (2010), Gui-Diby (2014), and Hanafy and Marktanner (2019).

$$y_{i,t} = \alpha y_{i,\,t-1} + \beta_1 FDI_{i,t} + \gamma X_{i,t} + \mathcal{E}_{i,t} \quad (3)$$

where the lagged dependent variable is included, in contrast to equation (2). The error term $\mathcal{E}_{i,t}$ consists of the time-invariant country effect η_i and random disturbance term $v_{i,t}$

$$\mathcal{E}_{i,t} = \eta_i + v_{i,t} \quad (4)$$

Arellano and Bond (1991) propose taking the fist-differences of equation (3) to eliminate country specific effects as η_i does not vary with time as follows:

$$y_{i,t} - y_{i,t-1} = \alpha(y_{i,t-1} - y_{i,t-2}) + \beta_2(FDI_{i,t} - FDI_{i,t-1}) + \gamma(X_{i,t} - X_{i,t-1}) + (\mathcal{E}_{i,t} - \mathcal{E}_{i,t-1}) \quad (5)$$

However, equation (5) creates a new statistical issue that the new error term $\mathcal{E}_{i,t} - \mathcal{E}_{i,t-1}$ is correlated with the lagged dependent variable $y_{i,t-1} - y_{i,t-2}$. As a solution, Arellano and Bond (1991) suggest the use of lagged levels of the variables as instruments, which is valid on condition that the error terms are not serially correlated, and the lagged variables are weakly exogenous (Azman-Saini, Baharumshah, and Law 2010). This technique is known as difference GMM in the literature and the moment conditions are written as follows:

$$E[y_{i,t-s} \cdot (\mathcal{E}_{i,t} - \mathcal{E}_{i,t-1})] = 0 \text{ for } s \geq 2;\ t = 3,\ldots\ldots T \quad (6)$$

$$E[FDI_{i,t-s} \cdot (\mathcal{E}_{i,t} - \mathcal{E}_{i,t-1})] = 0 \text{ for } s \geq 2;\ t = 3,\ldots\ldots T \quad (7)$$

$$E[X_{i,t-s} \cdot (\mathcal{E}_{i,t} - \mathcal{E}_{i,t-1})] = 0 \text{ for } s \geq 2;\ t = 3,\ldots\ldots T \quad (8)$$

However, the weakness of the technique is shown by Alonso-Borrego and Arellano (1996) and Blundell and Bond (1998) pointing out that if the explanatory variables are persistent over time, making the lagged levels weak instruments for their differences, which causes an increase in the variance of coefficients. Besides, weak instruments could lead to biased parameter estimates in small samples. Arellano and Bover (1995) and Blundell and Bond (1998) proposed a system GMM estimator that combines the difference equation (5) and the level equation (3). The condition means that the unobserved country specific effect is not correlated with the regressors' difference even if it is correlated with their levels (Doytch and Uctum, 2011). The additional conditions are written as follows:

$$E[(y_{i,t-s} - y_{i,t-s-1}).(\eta_i + \mathcal{E}_{i,t})] = 0 \text{ for } s = 1 \quad (9)$$

$$E[(FDI_{i,t-s} - FDI_{i,t-s-1}).(\eta_i + \mathcal{E}_{i,t})] = 0 \text{ for } s = 1 \quad (10)$$

$$E[(X_{i,t-s} - X_{i,t-s-1}).(\eta_i + \mathcal{E}_{i,t})] = 0 \text{ for } s = 1 \quad (11)$$

The consistency of the GMM estimator depends on the two tests: (i) the Hansen test is used to check the validity of instruments; Arellano-Bond AR (2) is used to test the second-order serial correlation, that is, the error term is serially uncorrelated and the moment conditions are correctly specified (Roodman, 2009).

The system GMM could create the problem of overfitting of the model if too many instruments are used (Roodman, 2009). However, it has not been clarified in the literature how many instruments are too many (Doytch and Uctum, 2011). According to the rule of thumb by Roodman (2009), it is recommended that the number of instruments should not exceed the number of countries.

3.5. Results and Discussion

3.5.1 Direct Effect of Sectoral FDI on Growth

The purpose of the empirical analysis is to determine whether the effect of FDI on the growth rate is different across the three sectors. As well as the direct effect of sectoral FDI inflows, we also check if improvements in the financial system, human capital, political freedom, and infrastructure allow the receiving economy to reap more benefits from FDI inflows across the same sectors.

We are unable to examine the effect of subsectors on the growth rate owing to the unavailability of data. The consequences of such an absence on the results could be that we get different findings than what we found, especially in the service sector. Even though the primary and manufacturing sectors do not have a wide range of subsectors (the primary sectors, for example, mainly consist of two subsectors), the subsectors of the service sector range from education to financial activities, from transportation and storage to real estate activities, which may lead us to have different results. Since some subsectors may have an insignificant or even negative impact on the growth rate (such as construction and water supply because of possible monopoly power that foreign firms may get), while others may contribute to it (such as financial activities and education). The distinction between FDI from developed and less developed countries is also not examined in this chapter, given that the data on the origin of FDI is not available on a sectoral basis.

To ascertain the appropriate estimation method, we conducted the Breusch-Pagan Lagrange multiplier test. The null hypothesis is in favour of the pooled-OLS against random/fixed effects. The test shows that the random/fixed effects model is more appropriate for our analysis as we reject the null hypothesis because it’s the p-value is zero for each

equation. The Hausman test is then employed to choose between the random effects and fixed effects models. The test favours the fixed effects model against random effects: its p-value is always zero for each specification. Therefore, the fixed effects method is applied in the analysis.[14]

Figure 3.2 exhibits the findings of analysing the impact of FDI flows to the primary sector on the growth rate[15]. As can be seen, FDI in the primary sector has no significant effect on the growth rate of the host country. It is not surprising to find an insignificant effect of FDI in the primary sector, given that this sector is predominantly capital-intensive and employs few intermediate goods produced by domestic firms; consequently, the extent of linkages between foreign and domestic firms is typically constrained, as discussed in the preceding section. This finding is consistent with studies conducted by Hanafy, (2015) and Hanafy and Marktanner, (2019).

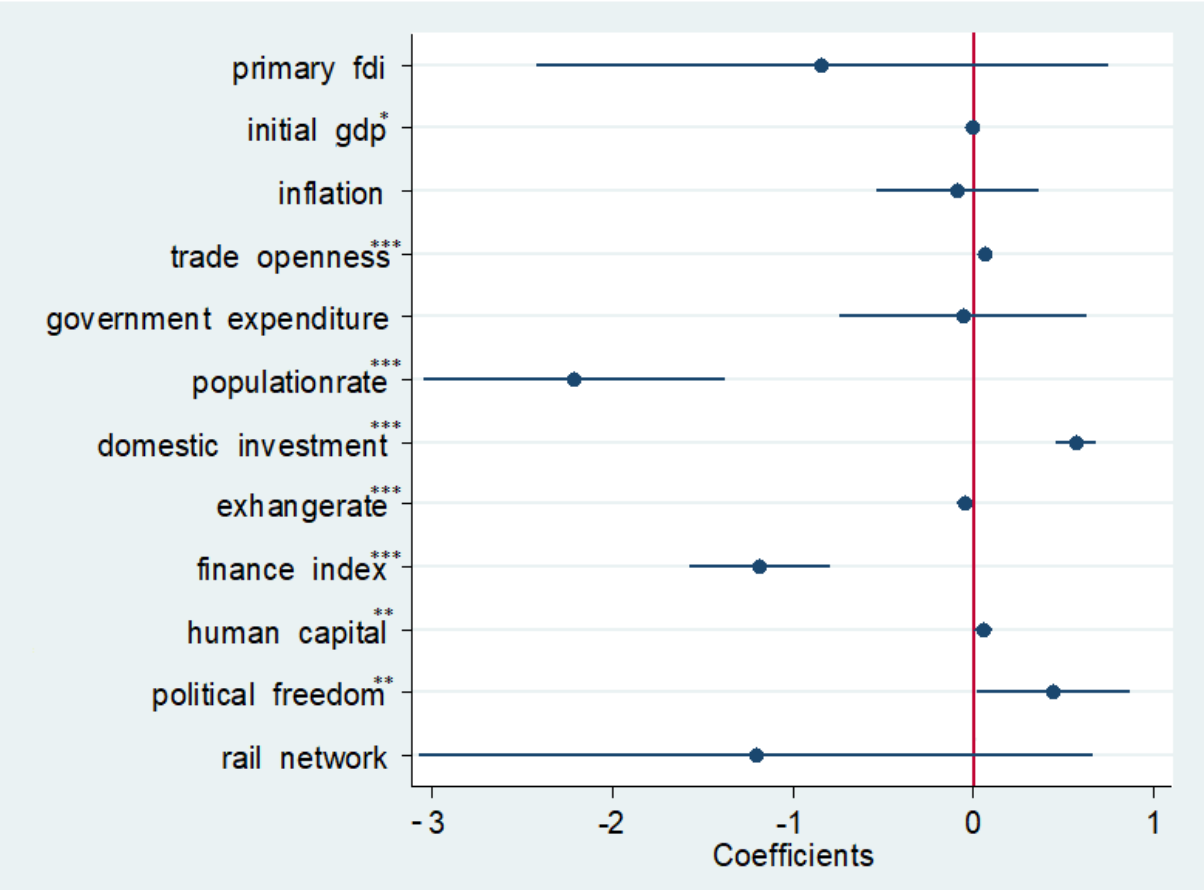
With regard to the control variables, trade openness exerts a significantly positive impact on the growth rate in the regression. Similarly, domestic investment exerts a significantly positive effect on the growth rate, as predicted. This was expected, as investment increases the stock of physical capital as a factor of production, and this leads to higher output. Inflation seems to have a negative but insignificant effect on the growth rate. Likewise, the coefficient for government expenditures is negative but statistically insignificant. Regarding the population growth rate, it has a negative relationship with the growth rate. This is because the newly created output is shared among more people given that our dependent variable is GDP growth per capita. The exchange rate seems to have a negative effect on the growth rate as expected: an increase in the exchange rate means that exports become more expensive and imports get cheaper, which brings about a loss in trade competitiveness. As for the effect of financial development, we observe a negative and significant effect on the growth rate. This finding is in line with the empirical results by Law and Singh (2014), and Samargandi et al. (2015), who suggest that financial development enhances the growth rate up to a point, beyond which the effect of further financial development turns out to be negative. In other words, an

[14] The pooled OLS results are presented in Table B1 in Appendix B. Mainly, the findings suggest that an increase in FDI flows in the manufacturing and service sectors is associated with higher economic growth in the host economy whereas no significant effect of FDI can be observed in the primary sector. In terms of the magnitude of the growth-enhancing effect, the manufacturing sector contributes more to the growth rate than the service sector.

[15] See Table B2 in Appendix B for the regression results estimated by the fixed effects with varying numbers of control variables.

inverted U-shape has been found between financial development and economic growth. In our case, the level of financial development can be identified along the downward-sloping part of the inverted U-shape as our sample countries are generally more financially developed. The coefficient of human capital is positive and significant. As the presence of a more educated workforce leads to more output in the economy. Political freedom has a growth-promoting effect, whereas rail network does not exert a significant effect on the growth rate. Lastly, initial GDP shows up with a negative and significant coefficient in five cases, which supports the idea of convergence.

Table 3.2. Effect of FDI in the Primary Sector on Growth



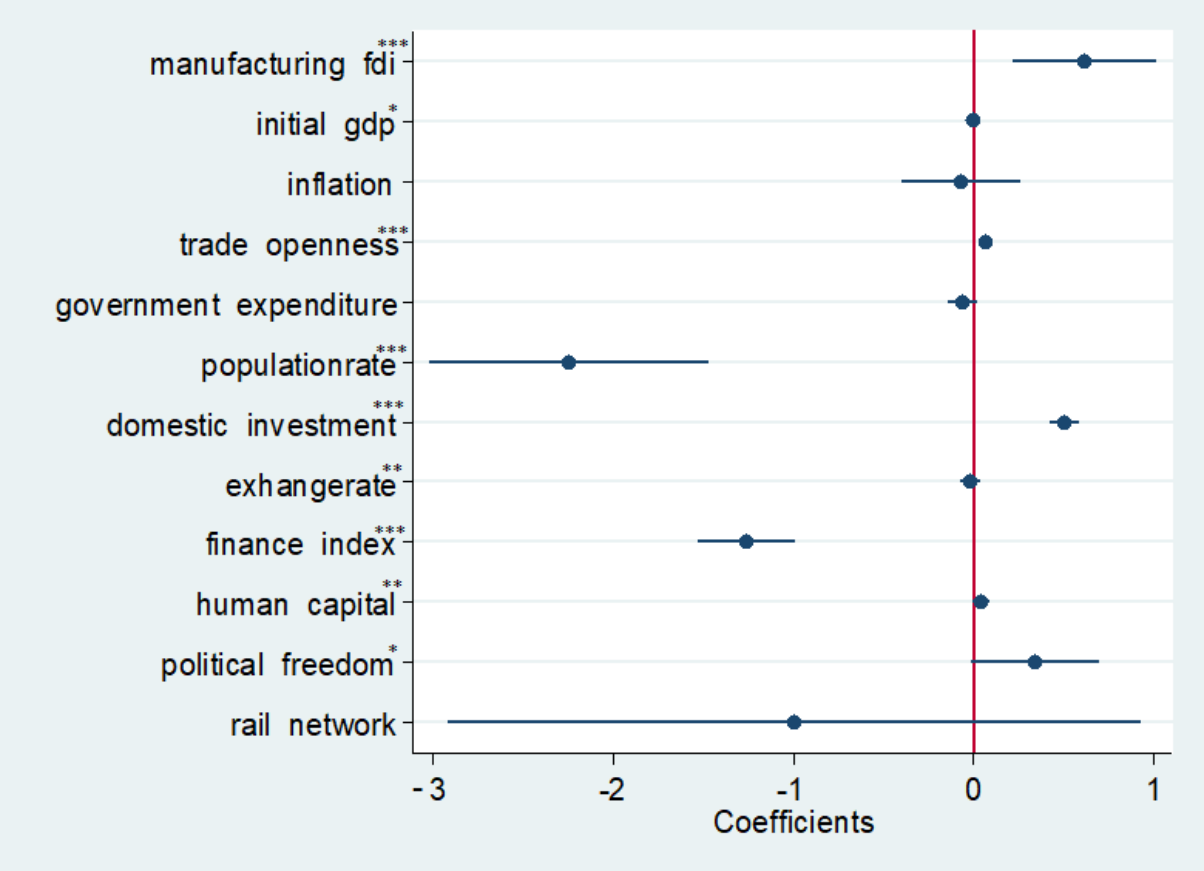
Notes: The dependent variable is GDP per capita growth. Primary FDI is as a log of (1+ the ratio of FDI inflows into the primary sector to GDP). See data section for data sources and data definition. The model is estimated by using the fixed effects (individual effects) method. Cluster standard errors at the country level are employed in the model. The Hausman test's p-value is 0.000 which favours the fixed effects method over the random effects. The adjusted R-squared is 0.45 indicating that 45% of the variation in the GDP growth rate are explained by the variables included in the regression. * p<0.10, ** p<0.05, *** p<0.01.

Figure 3.3 shows the effect of FDI flows into the manufacturing sector on growth. The result suggests that a change in the sectoral composition of FDI inflows in favour of the manufacturing sector should translate to an increase in the growth rate[16]. In other words, it seems to have a positive and statistically significant effect at the 1% level. The finding of a growth-promoting effect of FDI in this sector is in line with the studies by Alfaro (20003), Wang (2009) and Doytch and Uctum (2011). The positive effect of foreign investment in the manufacturing sector is expected because of the potential spillovers which may occur via following channels: Backward linkage may take place when domestic companies offer intermediate inputs to foreign enterprises, thereby creating a new production area and increasing the total output of the host country. Forward linkage is a potential way through which manufacturing FDI contributes to the growth rate when multinational corporations sell their final products, which require advanced technology to generate, on the local market. Introduction of new processes, managerial know how, knowledge transfer and the adoption of advanced technology through labour turnover could be another means by which manufacturing FDI can boost the growth rate. More specifically, local companies hire employees who have been trained by foreign affiliates to work with modern technology. These employees may persuade domestic companies to invest in modern technology in order to compete with overseas rivals, or at least to use their current technology more effectively (Alfaro, 2003; Aykut and Sayek, 2007; Hanafy and Marktanner, 2019). These workers also teach the locals the new processes and managerial skills they've acquired while working for multinational companies. International commerce could be an alternative channel through which FDI in the manufacturing sector promotes economic growth. World trade is generally related to the manufacturing sector, and local businesses in this sector learn how to reach the international market through partnerships with foreign subsidiaries, so increasing the export volume and economic growth rate of the host country.

As for the control variables, their results are comparable to those of the previous analysis in terms of sign and level of significance.

[16] See Table B2 in Appendix B for the regression results estimated by the fixed effects with different numbers of control variables.

Figure 3.3. Effect of FDI in the Manufacturing Sector on Growth



Notes: The dependent variable is GDP per capita growth. Manufacturing FDI is as a log of (1+ the ratio of FDI inflows into the manufacturing sector to GDP). See data section for data sources and data definition. The model is estimated by using the fixed effects (individual effects) method. Cluster standard errors at the country level are employed in the model. The Hausman test's p-value is 0.000 which favours the fixed effects method over the random effects. The adjusted R-squared is 0.46 indicating that 46% of the variation in the GDP growth rate are explained by the variables included in the regression. * p<0.10, ** p<0.05, *** p<0.01.

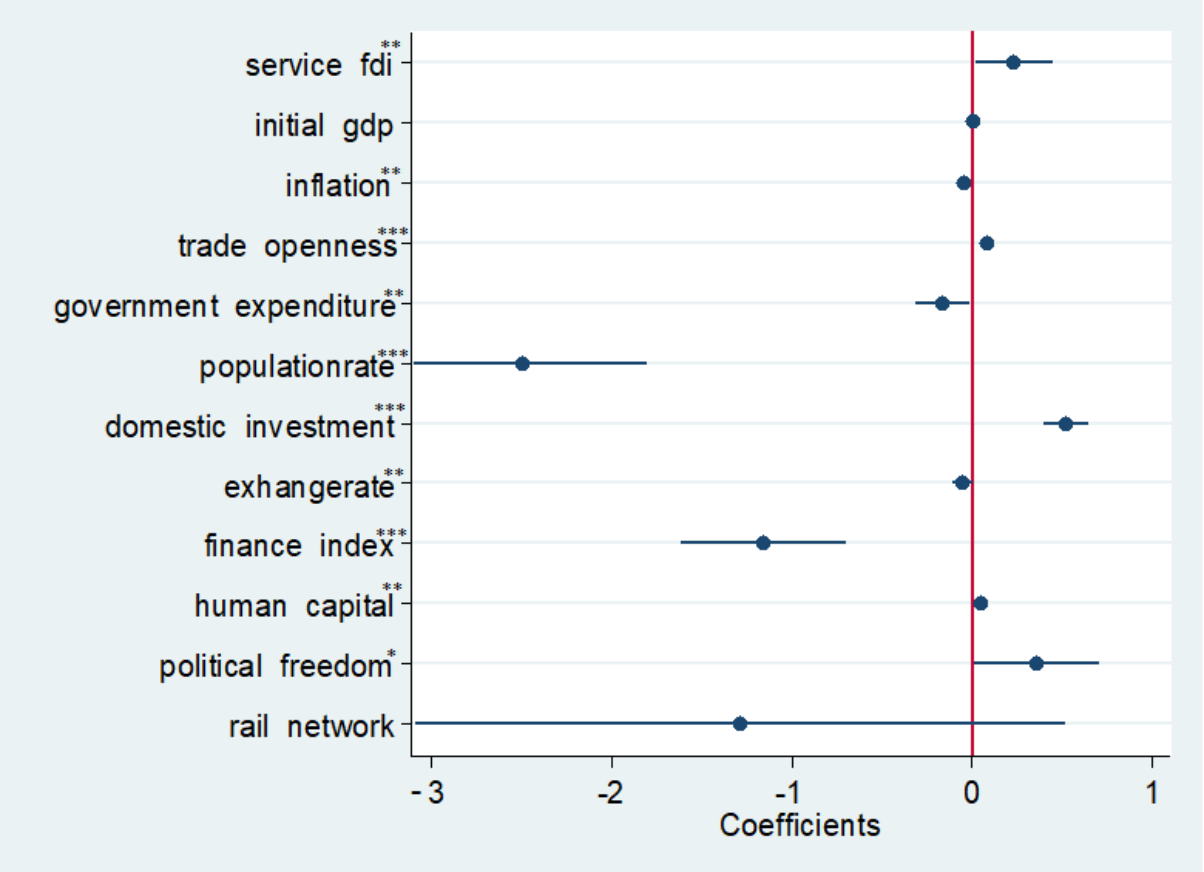
The impact of FDI in the service sector is examined and the findings are demonstrated in Figure 3.4[17]. As shown, a higher growth rate is associated with more FDI flows to the service sector. The growth-enhancing effect is also found in the FDI in manufacturing sector. Comparing the relative magnitude of both sector's effects, we can see that the effect of manufacturing FDI is almost three times larger than that of FDI in the service sector: 0.622 vs 0.229, respectively. The channels outlined to explain the growth-enhancing effect of manufacturing FDI also apply to this sector, except for backward linkage and international trade because of the characteristics of the service sector. Even though the service sector consists of a wide range of subsectors and each of them may have a different or even opposing effect

[17] See Table B2 in Appendix B for the regression results estimated by the fixed effects with different numbers of control variables.

on the growth rate (as explained before), our expectation is to find a growth-promoting effect of the service sector. Since a substantial portion of the service industry is comprised of subsectors that contribute significantly to economic growth. The subsector of financial activities, for instance, accounts for over 60 percent of the service sector which mainly contribute to the host country's economy through two channels: First, financial institutions make it easier to mobilise savings, leaving more resources available to finance investment. Second, they screen and assess investment projects, which increases efficiency (Hermes and Lensink, 2003), which in turn increase the output in the economy. The presence of other sectors that are less likely to contribute to the growth rate (or even have a growth-shrinking effect) may have caused a reduction in the growth-enhancing impact of the service sector on economic growth. This may also be confirmed by the fact that the growth-stimulating effect of the primary sector is approximately three times lower than the manufacturing sector.

Concerning the control variables, they continue to have the same effect on the growth rate as in previous findings, with the exception of government expenditure, which turns out to be statistically significant, indicating that government expenditure is associated with a lower growth rate in the host country. An increase in government expenditure may crowd out domestic investment, leading to lower economic growth. Also, it implies higher taxes, which creates a disincentive to engage in productive and profit-bearing activities.

Figure 3.4. Effect of FDI in the Service Sector on Growth



Notes: The dependent variable is GDP per capita growth. Service FDI is as a log of (1+ the ratio of FDI inflows into the service sector to GDP). See data section for data sources and data definition. The model is estimated by using the fixed effects (individual effects) method. Cluster standard errors at the country level are employed in the model. The Hausman test's p-value is 0.000 which favours the fixed effects method over the random effects. The adjusted R-squared is 0.45 indicating that 45% of the variation in the GDP growth rate are explained by the variables included in the regression. * p<0.10, ** p<0.05, *** p<0.01.

3.5.2 Conditional Effect of Sectoral FDI on Growth

Our findings regarding the effect of direct sectoral FDI on growth show that an increase in FDI flows in the manufacturing and service sectors is associated with a higher growth rate, whereas the effect of FDI in the primary sector remains insignificant in all regressions. In this section, we examine whether developments in the financial system, human capital, political freedom, or infrastructure help the host economy improve its absorptive capacity to get more benefits from FDI inflows in primary, manufacturing, and service sectors. In accordance with this purpose, we need to create a set of interaction terms with financial development index,

human capital, political freedom, and rail network for each main sector and use them as regressors in the regressions.[18]

The results obtained with the fixed effects model are shown in Table 3.4. To save space and avoid repetition, we focus on the effects of the three sectors and their interaction terms instead of reporting and interpreting each individual variable (It is important to note that the control variables are virtually identical to those reported in prior regressions). The first four columns are dedicated to the effect of FDI in the primary sector and its interaction terms on the growth rate. In column (1) and (2), neither FDI in the primary sector nor its interaction term with the level of financial development or human capital have a significant effect on the growth rate, respectively. Regarding column (3), although the coefficient of the primary sector does not enter the regression significantly, its interaction term with political freedom is positive and significant. That is, political freedom plays an important role in enabling the host economy to gain growth-promoting effect from FDI flows into the primary sector. In a similar vein, the interaction term with the rail network shows up with a positive and significant effect, while FDI in the primary sector does not exert a significant effect. The positive sign of the interaction term indicates that countries with well-developed rail network are able to reap benefits from FDI flows in the primary sector. The cost of transportation should play an important role in the primary sector given that quarrying and mining constitute an important part of the sector. Hence, improvements in the rail network let the host economy gain more from FDI in the sector. However, this interaction term and the one with political freedom are only significant at the 10% level.

In columns (5) to (8), we analyse the impact of FDI in the manufacturing sector and its interaction terms. The coefficients of the manufacturing sector and its interaction term with finance enter the regression with positive and statistically significant coefficients in column (5), suggesting that FDI and financial development reinforce each other in promoting economic growth.[19] This finding is in line with Carkovic and Levine (2002), Alfaro *et al.* (2004), and

[18] The findings estimated by the Pooled-OLS method to make a comparison the results with those estimated by the Fixed effect are reported in Table B3 in Appendix B. The results show that FDI in primary sector contributes to economic growth on condition that the host economies reach a threshold level of political freedom and rail network. FDI into the manufacturing and service sectors always has a growth-enhancing effect on the growth rate, however, the promoting effect is getting greater with a development of financial sector, human capital and political freedom.

[19] The effect of financial development on its own on economic growth is negative.

Iamsiraroj and Ulubaşoğlu (2015). Mainly, there are two channels through which a well-established financial system may help the host economy to benefit more from FDI in the sector. First, financial institutions make it easier to mobilise savings, leaving more resources available to finance investment. Second, they screen and assess investment projects, which increases efficiency (Hermes and Lensink, 2003). In column (6), both the manufacturing sector and its interaction term with human capital have a positive and significant impact on the growth rate, suggesting that countries with more educated people draw more benefits from FDI flows in the sector as expected. The results confirm the studies by Borensztein et al. (1998), Balasubramanyam et al. (1999), and Xu (2000). It is well known that multinational corporations are technologically more advanced and invest heavily in research and development (Borensztein et al., 1998). In this sense, once they invest in a country, they need workers who can work with advanced technology in the host country. The presence of an educated work force enables foreign firms to employ more workers, which increases the spillover effects from foreign to local firms via labour turnover, which in turn contributes to economic growth. In column (7), FDI in the manufacturing sector shows a negative and significant effect on the growth rate, while the interaction term with political freedom exerts a significantly positive effect. Once we get the mean value of the manufacturing sector and its interaction to calculate the net effect of two variables on growth, we find that the net effect is positive. This means that FDI in the manufacturing sector has a negative effect in non-democratic countries and a positive effect in democratic ones.[20] The finding suggests that FDI only improves growth performance if it takes place in an environment characterised by a sufficient extent of political freedom. Lastly, although the coefficient of the manufacturing sector enters into the regression positively and significantly, its interaction term with the rail network does not have a significant effect in specification (8), which shows that there is no complementary effect between rail network and FDI in the manufacturing sector.

[20] According to this calculation (coefficient of manufacturing FDI*its mean value + coefficient of interaction term with political freedom*its mean value=0) "-1.665*0.416+0.309*X=0 and X=2.268" the threshold value of political freedom becomes 2.268. Countries with political freedom above this threshold (2.269) are able to get benefit from manufacturing FDI. As shown in Table 3, mean value of our sample countries is 9.35 which suggest that FDI in the manufacturing sector makes a positive contribution to the growth rate in OECD members.

Table 3.4. Effect of interaction terms of Sectoral FDI on Growth with Fixed-Effects

	(1) growth	(2) growth	(3) growth	(4) growth	(5) growth	(6) growth	(7) growth	(8) growth	(9) growth	(10) growth	(11) growth	(12) growth
primary	-0.1852	-1.3314	-3.7892	0.6936								
	(-0.20)	(-0.30)	(-1.04)	(1.03)								
manufacturing					0.7068***	1.3677**	-1.6651**	0.6492***				
					(3.37)	(2.48)	(-2.27)	(3.00)				
service									0.2324*	0.6038*	-1.6467***	0.4659**
									(1.80)	(1.91)	(-3.11)	(2.37)
.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.
finance index	-1.0601***				-1.0436***				-1.3045***			
	(-7.22)				(-7.37)				(-8.94)			
primary*finance	0.0231											
	(0.04)											
human capital		0.0358*	0.0504*			0.3052*				0.0358*		
		(1.83)	(1.64)			(1.68)				(1.66)		
primary*huma		0.0009										
		(0.02)										
political freedom			0.2621				-0.0325				-0.3406	
			(1.40)				(-0.21)				(-1.42)	
primary*polity			0.356*									
			(1.95)									
rail network				0.0012				0.0529				0.0278
				(0.60)				(0.38)				(0.18)
primary*rail				0.0032*								
				(1.65)								
manufacturing*finance					0.2497**							
					(2.10)							
manufacturing *human						0.2391***						
						(2.79)						
manufacturing *polity							0.3098***					
							(2.73)					
manufacturing *rail								-0.0007				
								(-0.22)				
service*finance									0.2431***			
									(2.79)			
service*human										0.01498**		
										(1.98)		
service*polity											0.7961***	
											(3.12)	
service*rail												-0.0026
												(-0.41)
_cons	-9.2028***	-8.3551**	-9.2785	-7.0914***	-7.8562***	-5.8346*	-3.3772	-4.9849	-10.402***	-7.5124**	2.5168	-3.7066
	(-3.50)	(-2.53)	(-1.73)	(-4.91)	(-3.33)	(-1.86)	(-1.33)	(-1.50)	(-6.43)	(-2.30)	(0.73)	(-0.89)
Hausman-test	78.91	60.84	75.45	57.49	74.78	61.13	69.88	69.85	73.39	56.38	80.08	80.00
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R-squared	0.402	0.297	0.374	0.289	0.395	0.265	0.270	0.283	0.369	0.276	0.279	0.351
N	443	482	364	419	514	548	548	490	548	485	501	395

Notes: The dependent variable is GDP per capita growth. Primary, manufacturing and service FDI are measured as a log of (1+ the ratio of FDI inflows into the three sectors to GDP, respectively). See data section for data sources and data definition. The model is estimated by using the fixed effects (individual effects) method. Cluster standard errors at the country level are employed in the model. * p<0.10, ** p<0.05, *** p<0.01.

Specifications (9) to (12) provide the regression results regarding FDI in the service sector and its interactions. In column (9), service FDI makes a positive contribution to the growth rate by itself, and also its interaction with financial development displays a significant and positive effect[21], which supports the hypothesis that a well-established financial system has an important role in facilitating the spillover effects from foreign firms to the host economy. The results mirror the findings obtained for the manufacturing sector. Similarly, FDI in the service sector and its interaction term with human capital are positive and significant in the next column. In column (11), even though FDI in the sector seems to have a significantly negative effect on growth, its interaction term with political freedom shows a positive and significant impact. Hence, the net effect is positive once mean values are put in the equation. This finding is parallel to the study by Alguacilet et al. (2011). In the last column, we find again a growth-promoting effect associated with FDI inflows in the service sector, while the interaction term with the rail network does not show a significant effect.

3.5.3 Effect of Sectoral FDI flows on Domestic Investment

This section aims to measure the possible crowding in or out of domestic investment due to FDI inflows in the primary, manufacturing and service sectors. The literature has not reached a consensus regarding the effect of FDI on domestic investment. Mixed findings could arise from the use of different econometric methods, choice of country or country group, selection of time period, limited data availability, model misspecification, etc. In addition to these factors, another possibility is that each sector might have different effects on domestic investment, which is the main motivation for us to do this analysis, in addition to the fact that to date, no one has investigated the impact of sectoral FDI flows on domestic investment in OECD countries, to the best of our knowledge.

With the entry of multinational enterprises (MNEs) to the local market, three possible results may emerge with respect to domestic investment, namely crowding out, crowding in and no significant effect. As for the first case, unless the local firms absorb the superior technology possessed by foreign firms, collaborate with the foreign entity via backward or forward linkages, or benefit from advantages held by foreign producers such as international networks, managerial know-how, etc., they may fall behind in competition with MNEs. Then, the least efficient local producers may be forced out of business, as argued by Blomstor and

[21] Considering the service sector, the financial index continues to have a negative impact on growth.

Kokko (1998) and Kim and Seo (2003). This situation leads to a crowding out effect of FDI on domestic investment. On the other hand, if the local firms manage to reap the benefits of MNEs, which causes crowding in effect of FDI as argued by Pilbeam and Oboleviciute (2012). Lastly, a significant relationship between FDI flows and domestic investment may not be found as in the study of Liu *et al.* (2001).

To analyse the effect of the sector-specific FDI flows on domestic investment in the host country, the ratio of gross fixed capital formation to GDP is employed as the dependent variable. This is regressed on the log of the ratio of FDI flows to GDP into three main sectors along with the same additional controls as in the previous analysis except for the growth variable, which causes a collinearity issue.

This research continues with the application of the fixed effects method after undertaking the Breusch-Pagan Lagrange multiplier test for the adequacy of the Pooled-OLS model and the Hausman test to make a choice between fixed and random effects. The findings show that the fixed effects method is an appropriate one for this analysis.[22]

Figure 3.5 depicts the outcomes of an analysis of the impact of FDI inflows on the primary sector[23]. The coefficient on FDI flows into the primary sector appears negative and significant; that is, the FDI inflows into this sector crowd out domestic investment. As mentioned before, the linkages in this sector are limited. What is more, foreign firms reduce competition in the sector once they come as mega-projects. Therefore, it is expected that there would be a crowding out effect on domestic investment.

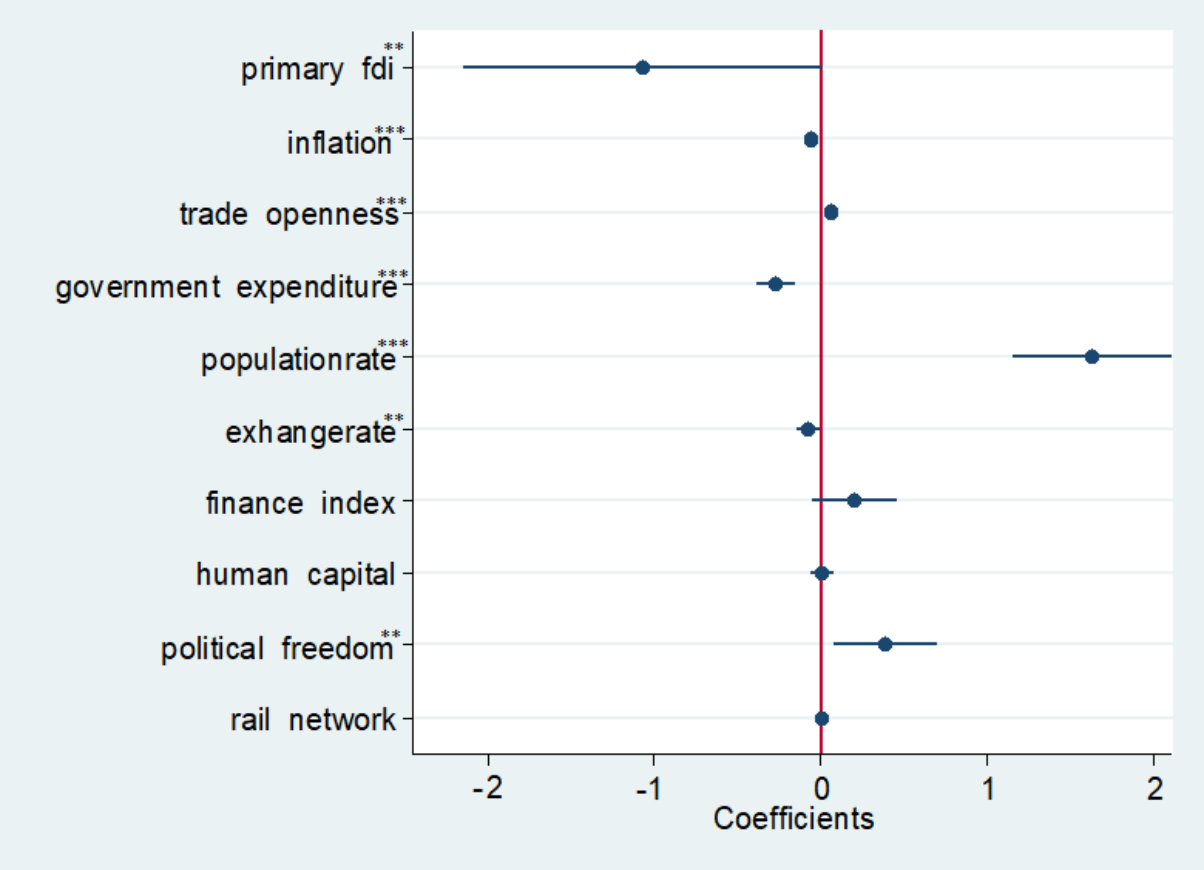
Considering the control variables, inflation, trade openness, and exchange rate have a negative impact on domestic investment. In a similar vein, government expenditure comes up negative and significant in all regressions, supporting a crowding out effect on domestic investment while an increase in population rate causes more domestic investment. Financial development index, human capital and rail network do not exert a significant effect on domestic

[22] The results estimated by Pooled-OLS and set out in Table B4 in appendix B are similar to those obtained with the fixed effects model. That is, they show crowding out effect of the primary FDI on domestic investment but crowding in effect of FDI in manufacturing and service sectors.

[23] See Table B5 in appendix B for the varying number of control variables.

investment. Finally, political freedom enters the regressions positively, showing that an increase in the democracy index leads to higher domestic investment.

Figure 3.5. Effect of FDI in Primary Sector on Domestic Investment



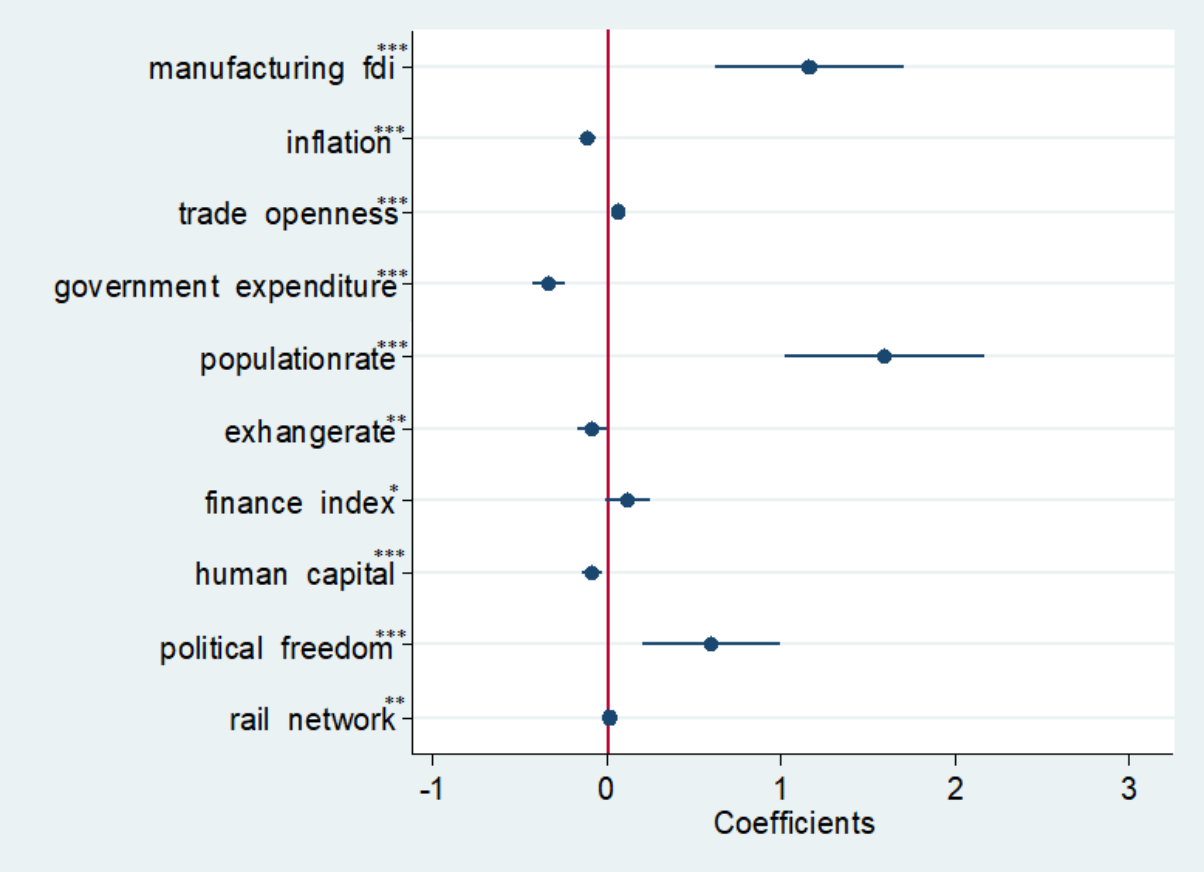
Notes: The dependent variable is gross fixed capital formation GFCF. Primary FDI is measured as a log of (1+ the ratio of FDI inflows into the primary sector to GDP). See data section for data sources and data definition. The model is estimated by using the fixed effects (individual effects) method. Cluster standard errors at the country level are employed in the model. The Hausman test's p-value is 0.000 which favours the fixed effects method over the random effects. The adjusted R-squared is 0.34 indicating that 34% of the variation in the GDP growth rate are explained by the variables included in the regression. * p<0.10, ** p<0.05, *** p<0.01.

The results of the effect of FDI flows into the manufacturing sector are illustrated in Figure 3.6[24]. FDI in the manufacturing sector seems to have a positive and significant effect in the regression, suggesting that an increase in FDI flows into the manufacturing sector crowds in domestic investment in the host country. One should pay attention to the magnitude of the positive coefficient to decide whether the crowding in of investment occurs. According to the definition of gross fixed capital formation (GFCF) taken from the World Bank, "Gross capital formation consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories, while foreign direct investment (FDI) relates to financing-that is, the purchase of shares in foreign companies where the buyer has a lasting interest (10 percent or more of voting stock)". Therefore, some but not necessarily all of FDI can form part of GFCF. As a result, we can interpret the coefficient as unambiguously implying crowding in as long as it is larger than one. In the case of being between zero and one, its effect is inconclusive. In our case, the coefficient of FDI in the manufacturing sector is greater than one, implying a crowding in of domestic investment by FDI inflows.

In regard to control variables, contrary to prior findings, human capital and rail network enter the regression positively and significantly, indicating that the presence of a more educated labor force and a more developed rail network encourage domestic investment in the host country. The effect of the other control variables is identical to that of the previous study.

[24] See Table B5 in appendix B for the varying number of control variables.

Figure 3.6. Effect of FDI in Manufacturing Sector on Domestic Investment



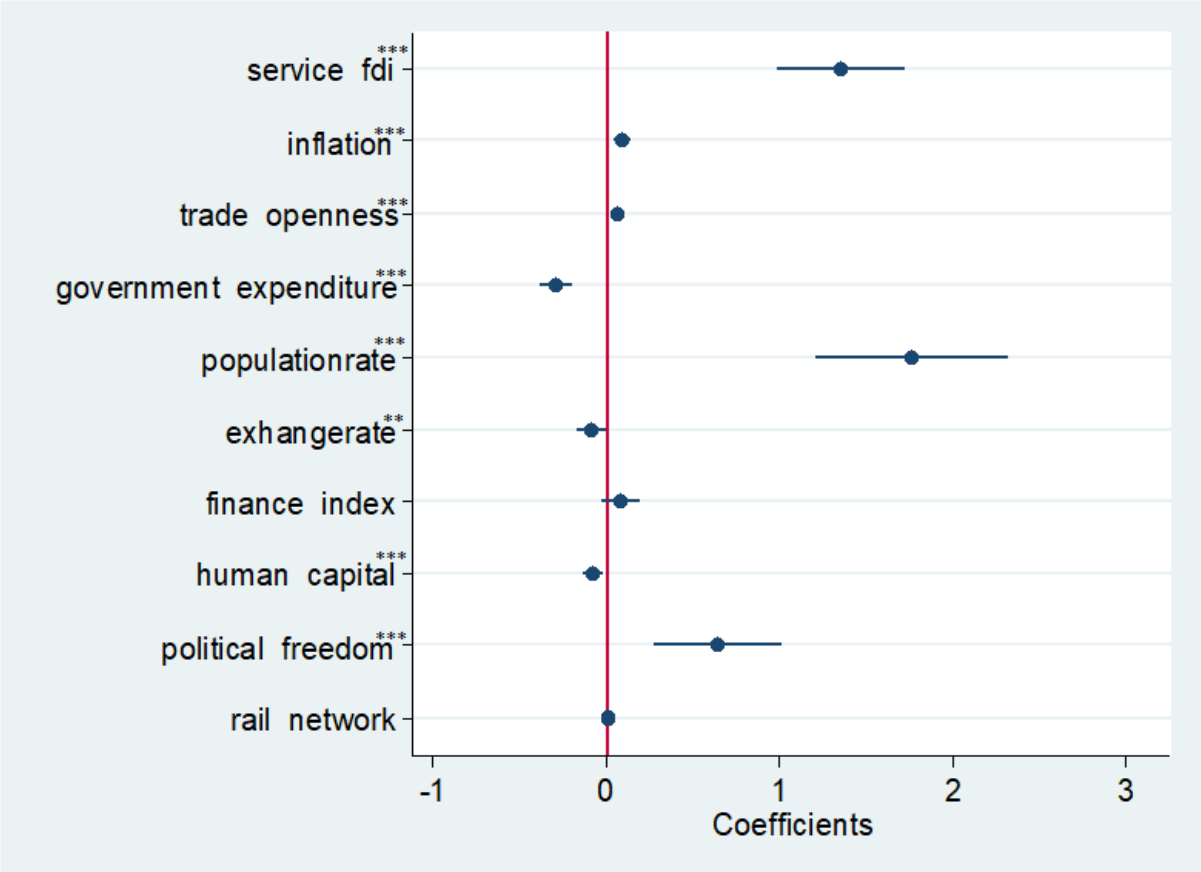
Notes: The dependent variable is gross fixed capital formation GFCF. Manufacturing FDI is measured as a log of (1+ the ratio of FDI inflows into the manufacturing sector to GDP). See data section for data sources and data definition. The model is estimated by using the fixed effects (individual effects) method. Cluster standard errors at the country level are employed in the model. The Hausman test's p-value is 0.000 which favours the fixed effects method over the random effects. The adjusted R-squared is 0.35 indicating that 35% of the variation in the GDP growth rate are explained by the variables included in the regression. * p<0.10, ** p<0.05, *** p<0.01.

Analyzing the effect of the service sector on the growth rate, Figure 3.7 illustrates the results[25]. FDI flows into the service sector enter the regressions as positive and statistically significant, suggesting crowding in of domestic investment as the coefficients are greater than one. The crowding in effect in both the manufacturing and service sectors is expected since backward and forward linkages are relatively much more common than in the primary sector. The competition level is also high in these sectors, in contrast to the primary sector. Lastly, the spillovers in the form of knowledge transfer, managerial know-how, and access to the international market could take place relatively more in these sectors via labour turnover and

[25] See Table B5 in appendix B for the varying number of control variables.

collaboration with foreign companies as suggested by Wang (2009). Regarding the effects of control variables, they are identical to those reported in the previous regression.

Figure 3.7. Effect of FDI in Service Sector on Domestic Investment



Notes: The dependent variable is gross fixed capital formation GFCF. Service FDI is measured as a log of (1+ the ratio of FDI inflows into the service sector to GDP). See data section for data sources and data definition. The model is estimated by using the fixed effects (individual effects) method. Cluster standard errors at the country level are employed in the model. The Hausman test's p-value is 0.000 which favours the fixed effects method over the random effects. The adjusted R-squared is 0.35 indicating that 35% of the variation in the GDP growth rate are explained by the variables included in the regression. * p<0.10, ** p<0.05, *** p<0.01.

We also assess whether the effect of FDI flows in the different sectors on domestic investment depends on the development of financial development, level of human capital, political freedom, and infrastructure.

The fixed effects results are set out in Table 3.5.[26] FDI flows into the primary sector are included in columns 1 to 4. In the first column, although FDI in the primary sector shows up with a negative and significant coefficient, its interaction term with the finance index enters the regression positively and significantly. The net effect is negative, suggesting that the crowding out effect is decreasing with the development of the financial system in the host economy. In column 2, FDI in the primary sector crowds out domestic investment by itself, but its interaction term with human capital is not statistically significant. In columns 3 and 4, the coefficients of primary sector FDI are negative and significant, while the interaction terms with political freedom and rail line are both positive and significant. The net effects of both are negative, indicating that the crowding out effect of FDI flows in the primary sector is getting lower with the higher level of political freedom and more development of infrastructure in the host economy.

In column 5, the coefficient on the manufacturing sector FDI is just under one, suggesting that it most probably crowds in domestic investment by itself. The interaction term with the finance index comes up with a significantly positive coefficient, suggesting that FDI in the manufacturing sector crowds in more domestic investments with a well-developed financial system as the full effect is more than 1. In specification 6, although the manufacturing sector FDI does not enter the regressions significantly, the interaction with human capital is positive and significant, demonstrating that a more educated workforce helps FDI in the manufacturing sector to crowd in domestic investment. In specification 7, although the manufacturing sector FDI again enters the regressions significantly negative, the interaction with political freedom is positive and significant. The net value is positive, supporting that FDI flows in the manufacturing sector crowd in domestic investment as long as countries have a certain level of political freedom. In column 8, the manufacturing sector FDI crowds in domestic investment by itself. Its interaction term with rail network, however, enters the regression insignificantly.

[26] See Table B6 in Appendix B for pooled OLS results.

Table 3.5. Conditional Effect of Sectoral FDI on Domestic Investment with Fixed-Effect

	(1) GFCF	(2) GFCF	(3) GFCF	(4) GFCF	(5) GFCF	(6) GFCF	(7) GFCF	(8) GFCF	(9) GFCF	(10) GFCF	(11) GFCF	(12) GFCF
primary	-2.1843***	-2.7569*	-2.5734**	-1.6772*								
	(-4.04)	(-1.68)	(-2.19)	(-1.85)								
manufacturing					1.2404***	-1.1208***	-1.7362**	1.2084***				
					(4.88)	(-3.09)	(-2.49)	(5.06)				
service									1.4462***	1.4184**	-1.5882*	1.4436***
									(6.95)	(2.36)	(-1.87)	(8.03)
.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.
finance	0.1204			0.1567**	0.0184				0.0371	0.0835		
	(0.69)			(1.99)	(1.11)				(1.20)	(1.53)		
primary*finance	1.4631**											
	(2.27)											
human_capital		0.0242				0.0663***				0.0364*		
		(1.51)				(3.75)				(1.70)		
primary*human		-0.0381										
		(-0.80)										
polity			0.2971*	0.3224**			-0.1268	0.2724*			-0.0848	
			(1.93)	(2.18)			(-0.64)	(1.77)			(-0.39)	
primary*polity			3.3318**									
			(2.01)									
rail network				-0.1491				-0.1426				-0.2123
				(-0.99)				(-0.74)				(-1.50)
primary*rail				0.0025*								
				(1.76)								
manufacturing*finance					0.0938**							
					(2.14)							
manufacturing*human						0.8715***						
						(3.64)						
manufacturing*polity							0.933***					
							(2.89)					
manufacturing*rail								0.0033				
								(0.47)				
service*finance									0.3147***			
									(2.86)			
service*human										0.0189**		
										(2.41)		
service*polity											0.6314**	
											(2.48)	
service*rail												-0.0016
												(-0.03)
_cons	3.8842***	3.5251***	3.7344***	3.2867***	3.7585***	4.4874***	3.9732***	3.9134***	4.0047***	3.8246***	3.6331***	3.9472***
	(20.76)	(17.86)	(18.49)	(11.60)	(23.17)	(20.69)	(17.51)	(11.66)	(27.95)	(14.60)	(15.61)	(15.66)
Hausman-test	35.95	68.47	36.33	45.44	26.81	26.50	28.46	28.80	21.51	23.85	30.66	2042
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.003)	(0.004)	(0.000)	(0.004)
R-Squared	0.276	0.317	0.242	0.331	0.304	0.308	0.290	0.303	0.295	0.363	0.325	0.337
N	483	494	512	390	567	562	601	534	565	527	591	529

Notes: The dependent variable gross fixed capital formation (GFCF). Primary, manufacturing and service FDI are measured as a log of (1+ the ratio of FDI inflows into the three sectors to GDP, respectively). See data section for data sources and data definition. The model is estimated by using the fixed effects (individual effects) method. Cluster standard errors at the country level are employed in the model. * p<0.10, ** p<0.05, *** p<0.01.

The remaining columns examine the effect of FDI in the service sector on domestic investment. In columns 9 and 10, both the coefficients of FDI in the service sector and their interaction terms with financial development and human capital become significantly positive. That means that a more developed financial system and the presence of a more educated workforce help the host country to crowd in more domestic investment. In specification 11, although FDI in the service sector shows crowding out, its interaction with political freedom becomes significantly positive. The net effect is positive. In the last column, FDI in the sector has a crowding in effect by itself since its interaction term with the railway network is not statistically significant.

Regarding the control variables, all their coefficients have the expected sign as before, and their significance levels and magnitudes differ little from the previous estimations.

3.6. Robustness Check

To check the robustness of our findings, we employ the system GMM developed by Blundell and Bond (1998). The main reason for using the GMM panel estimator is to control for the potential endogeneity bias stemming from simultaneous causality, especially between the FDI flows and growth rate, as explained in detail in the methodology section.

The consistency of the GMM estimator depends on two tests: the Hansen test to check the validity of instruments and the Arellano-Bond AR (2) to test the second-order serial correlation (Carkovic and Levine, 2002). Both test results are reported at the bottom of each column in the tables below. As shown, we could not reject the null hypothesis of the Hansen test, its p-value is always greater than 0.05, meaning that identifying restrictions are valid, which gives support to the choice of instruments. In a similar manner, failing to reject the null hypothesis regarding Arellano-Bond AR (2) implies that there is no second-order serial correlation, that is, the error term is serially uncorrelated and the moment conditions are correctly specified (Roodman, 2009).

The results are set out in Table 3.6. They confirm the previous findings: FDI flows into both the manufacturing and service sectors are associated with an increase in economic growth in the host country, whereas FDI flows into the primary sector have no significant effect on the growth rate. As for the control variables, they continue to have the expected signs of coefficients as in the previous results.

The results of the robustness check regarding the conditional effect of FDI flows in the three sectors on the growth rate are shown in Table 3.7. FDI in the primary sector does not have a significant effect on the growth rate by itself; however, it makes a positive contribution together with political freedom and well-developed infrastructure. Regarding the manufacturing and service sectors, FDI in these sectors makes a positive contribution to the growth rate by itself. Furthermore, the growth stimulus effect is greater with the development of a financial system, a more educated labor force and a higher level of political freedom. A developed infrastructure enables the receiving economy to benefit more from FDI in the service sector.

Table 3.8 shows the impact of FDI flows into the three sectors on domestic investment estimated by the system GMM. As seen from the table, the crowding out effect of the primary sector on domestic investment remains in all cases, while FDI in the manufacturing and service sectors retains the crowding in effect as in the previous findings.

The results for the conditional effect of sectoral FDI on domestic investment are set out in Table 3.9. FDI in the primary sector crowds out domestic investment. However, the crowding out effect decreases with improvement in political freedom and infrastructure in the host economy. FDI flows in the manufacturing and service sectors crowd in domestic investment. Furthermore, development in the financial markets, human capital and political freedom lead to more crowding in in both sectors.

Table 3.6. Effect of Sectoral FDI on Growth with System GMM

	(1) growth	(2) growth	(3) growth	(4) growth	(5) growth	(6) growth	(7) growth	(8) growth	(9) growth
lag gdp	-0.0183	-0.0287**	0.0651	-0.0947	-0.0151	-0.0178**	0.0501	0.0441	0.0924
	(-0.16)	(-2.11)	(0.68)	(-0.70)	(-1.03)	(-2.09)	(0.45)	(0.36)	(1.11)
primary	1.2617	0.0862	-1.1971						
	(0.85)	(0.03)	(-0.91)						
manufacturing				1.1385*	1.2187*	1.3963**			
				(1.81)	(1.72)	(2.16)			
service							1.2472**	0.8474*	1.0265*
							(2.34)	(1.75)	(1.80)
inflation	-0.0131	0.1402	0.1134	0.0252	0.0069	-0.0369	-0.0198	-0.1232*	0.1218
	(-0.29)	(0.95)	(1.03)	(0.45)	(0.04)	(-0.32)	(-0.45)	(-1.78)	(0.85)
trade openness	-0.0250	0.1654	-0.0317	0.0238	-0.0260	-0.0484	-0.0324	-0.0158	-0.0287
	(-0.55)	(1.54)	(-0.71)	(0.50)	(-0.33)	(-0.68)	(-1.45)	(-0.65)	(-1.10)
government expenditure	0.0462	-0.0428	-0.0110	-0.0584	-0.0129	-0.0360	0.0027	-0.2704*	-0.1195
	(0.63)	(-0.22)	(-0.20)	(-0.58)	(-0.13)	(-0.40)	(0.05)	(-1.66)	(-1.56)
populationrate	-0.5197**	-1.2273	-2.4124	-0.8471***	-0.9706***	-0.9482***	-1.5872**	-1.0221***	-1.0282**
	(-2.05)	(-0.25)	(-0.92)	(-3.54)	(-3.01)	(-2.96)	(-2.54)	(-4.00)	(-2.25)
domestic investment	0.9562***	1.0524***	0.7115**	0.9616***	1.0942***	1.1547***	0.7312***	0.6515**	0.3376*
	(3.33)	(2.85)	(2.44)	(3.15)	(3.26)	(3.23)	(2.65)	(2.04)	(1.67)
finance index	-2.2903**	-2.8114*	-2.6578**	-2.7774***	-2.6443*	-2.9692**	-1.9114**	-0.5119	-2.2371***
	(-2.09)	(-1.97)	(-2.49)	(-3.68)	(-1.95)	(-2.67)	(-2.37)	(-0.51)	(-2.85)
human capital		0.2541	0.1274		-0.0366	-0.0687		0.1516***	0.0417
		(0.86)	(0.75)		(-0.04)	(-0.86)		(2.62)	(0.65)
political freedom			1.5867*			0.8085			2.4482*
			(1.74)			(0.66)			(1.68)
_cons	-7.0512**	-2.5279	-7.4384**	-5.9931**	-7.6023	-8.4315**	-5.6359***	-2.8964*	-5.2941**
	(-2.14)	(-0.43)	(-2.40)	(-2.38)	(-1.62)	(-2.13)	(-3.32)	(-1.69)	(-2.50)
Arellano-Bond AR (2)	0.130	0.157	0.161	0.065	0.247	0.279	0.055	0.061	0.054
Hansen test of overid.	53.69	4.34	42.94	35.97	32.78	30.64	30.70	27.32	60.46
	(0.20)	(0.88)	(0.51)	(0.83)	(0.87)	(0.90)	(0.924)	(0.977)	(0.062)
N	417	385	370	446	458	447	443	412	398

Notes: The dependent variable is GDP per capita growth. Primary, manufacturing and service FDI are measured as a log of (1+ the ratio of FDI inflows into the three sectors to GDP, respectively). See data section for data sources and data definition. The model is estimated by using the system GMM proposed by Arellano and Bover (1995) and extended by Blundell and Bond (1998). GDP per capital, FDI and financial index are considered as endogenous variables. "Collapse" option is used to reduce the instrument count (since GMM becomes inconsistent as the number of instruments becomes too large). "Robust" option is used, which provides HAC variance-covariance matrix. To have t-stats and F stats instead of z-stats, "small" option is applied. "Orthogonal" option is included, which requests the forward orthogonal deviations transform instead of first differencing. "Nodiffsargan" option is used to prevent reporting of certain difference in Sargan/Hansen statistics. *t* statistics in parentheses * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

Table 3.7. Conditional Effect of Sectoral FDI on Growth with System GMM

	(1) growth	(2) growth	(3) growth	(4) growth	(5) growth	(6) growth	(7) growth	(8) growth	(9) growth	(10) growth	(11) growth	(12) growth
lag gdp	-0.3404***	0.0256	0.00495	-0.2253**	0.0230	0.1687	0.1172	0.1939	0.0263	0.0545	0.1465	0.0922
	(-3.09)	(0.19)	(0.04)	(-2.32)	(0.18)	(1.53)	(0.91)	(1.44)	(0.21)	(0.43)	(1.13)	(0.61)
primary	1.6901	1.0273	0.5005	-2.0547								
	(0.61)	(0.54)	(0.20)	(-0.91)								
manufacturing					1.2322**	0.7336*	0.7258*	0.6653*				
					(2.54)	(1.88)	(1.74)	(1.96)				
services									0.9614*	0.7771*	0.7025	0.4627
									(1.69)	(1.71)	(1.13)	(1.03)
finance index	-7.6307*				-1.9791***				-1.6335*	-0.7836		
	(-1.83)				(-2.78)				(-1.87)	(-1.10)		
primary*finance	-0.3461											
	(-0.28)											
human capital		0.4312***				0.0863				0.0383		
		(4.23)				(1.08)				(0.48)		
primary*human		-0.0053										
		(-1.60)										
political freedom			1.1934				0.9297				1.7572	
			(1.34)				(1.46)				(1.29)	
primary*polity			0.0607									
			(1.95)*									
rail network				-0.0885				-0.0668				-0.0752
				(-0.98)				(-0.83)				(-0.39)
primary*rail				0.0798*								
				(1.83)								
manufacturing*finance					1.3704**							
					(2.02)							
manufacturing*human						0.0190**						
						(2.37)						
manufacturing*polity							0.1472*					
							(1.94)					
manufacturing*rail								0.0878				
								(0.56)				
service*finance									0.6117*			
									(1.93)			
service*human										0.0069*		
										(1.93)		
service*polity											0.1264**	
											(2.08)	
service*rail												0.0327***
												(2.88)
_cons	-4.4482	8.9064	-5.6988	-3.9853	-5.6312*	2.1051	-3.8834	2.1497	-7.345***	-5.9844**	-4.5406	-4.9487
	(-0.57)	(0.30)	(-1.28)	(-0.99)	(-1.92)	(0.12)	(-0.18)	(0.86)	(-3.14)	(-2.55)	(-1.27)	(-1.19)
Arellano-Bond AR (2)	0.110	0.062	0.581	0.563	0.212	0.064	0.124	0.074	0.104	0.114	0.239	0.170
Hansen test of overid	40.04	33.12	53.82	50.69	36.45	35.97	53.49	49.09	39.88	49.03	36.17	42.64
	(0.55)	(0.90)	(0.15)	(0.22)	(0.78)	(0.83)	(0.20)	(0.38)	(0.60)	(0.21)	(0.85)	(0.57)
N	374	387	386	386	369	384	387	361	363	349	372	349

Notes: The dependent variable is GDP per capita growth. Primary, manufacturing and service FDI are measured as a log of (1+ the ratio of FDI inflows into the three sectors to GDP, respectively). See data section for data sources and data definition. The model is estimated by using the system GMM proposed by Arellano and Bover (1995) and extended by Blundell and Bond (1998). GDP per capital, FDI flows into the sectors and financial index are considered as endogenous variables. "Collapse" option is used to reduce the instrument count (since GMM becomes inconsistent as the number of instruments becomes too large). "Robust" option is used, which provides HAC variance-covariance matrix. To have t-stats and F stats instead of z-stats, "small" option is applied. "Orthogonal" option is included, which requests the forward orthogonal deviations transform instead of first differencing. "Nodiffsargan" option is used to prevent reporting of certain difference in Sargan/Hansen statistics. *t* statistics in parentheses * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

Table 3.8. Effect of Sectoral FDI on Domestic Investment with System GMM

	(1) GFCF	(2) GFCF	(3) GFCF	(4) GFCF	(5) GFCF	(6) GFCF	(7) GFCF	(8) GFCF	(9) GFCF	(10) GFCF	(11) GFCF	(12) GFCF
lag gfcg	0.1295**	0.1216**	0.1187**	0.1502**	0.2547***	0.2562***	0.2848***	0.2283***	0.1991**	0.2284***	0.2438***	0.1967***
	(2.68)	(2.29)	(2.14)	(2.22)	(2.96)	(3.24)	(3.83)	(2.81)	(2.43)	(3.48)	(3.72)	(3.59)
primary	-2.9694***	-3.1092***	-2.8948***	-2.9279***								
	(-8.79)	(-9.18)	(-6.10)	(-4.78)								
manufacturing					1.5805**	1.6782**	1.6491**	1.6037**				
					(2.32)	(2.09)	(2.03)	(2.04)				
services									1.7653**	1.7961**	1.7724**	1.7349**
									(2.27)	(2.26)	(2.43)	(2.47)
inflation	-0.0273	-0.0513	-0.0982	-0.0054	-0.0620	-0.0349*	-0.0226*	-0.0246	-0.0387	-0.0699	-0.0558*	-0.0709
	(-1.50)	(-1.26)	(-1.44)	(-1.23)	(-1.27)	(-1.88)	(-1.94)	(-1.07)	(-1.14)	(-1.59)	(-1.70)	(-1.52)
trade openness	0.0970	0.0104	0.0481*	0.0324	0.0158**	0.0171*	0.0168**	0.0169**	0.0269	0.0268	0.0217*	0.0197**
	(1.17)	(1.13)	(1.65)	(1.44)	(1.97)	(1.94)	(1.99)	(1.96)	(1.57)	(1.52)	(1.75)	(2.07)
government expenditure	-0.0183	-0.0105	0.0161	0.0251	-0.0803*	-0.0692	-0.0783*	-0.0981*	-0.0352	0.0292	-0.0298	-0.0760
	(-0.44)	(-0.32)	(0.51)	(0.72)	(-1.66)	(-1.61)	(-1.82)	(-1.87)	(-0.38)	(0.43)	(-0.46)	(-0.81)
populationrate	1.4895***	1.4181**	1.0884*	0.5942	0.5579	1.4354	1.6357	1.4315	0.8943	0.9771	0.9442	0.8824
	(3.13)	(2.55)	(1.77)	(1.23)	(0.59)	(1.27)	(1.60)	(1.34)	(1.08)	(1.10)	(1.00)	(0.87)
domestic investment	0.7291***	0.7254***	0.8217***	0.8169***	0.3746***	0.4005***	0.3732**	0.3881***	0.5235***	0.4704***	0.3881***	0.3673**
	(11.45)	(10.76)	(13.24)	(12.76)	(2.86)	(2.94)	(2.70)	(2.98)	(4.91)	(4.69)	(3.17)	(2.48)
finance index	0.5109	0.4986*	0.3493	0.3234*	0.3867*	0.1908	0.03116*	0.1372	0.2381	0.1854	0.2152*	0.2722*
	(1.56)	(1.65)	(1.00)	(1.89)	(1.77)	(1.36)	(1.76)	(1.24)	(1.59)	(1.61)	(1.70)	(1.77)
human capital		0.0301**	0.0237	0.0545*		0.0333	0.0385	0.0395		0.0288	0.0157	0.0445
		(2.31)	(1.57)	(1.81)		(0.72)	(0.80)	(0.92)		(0.86)	(0.33)	(0.97)
political freedom			0.4607*	0.4745*			0.3314	0.2942*			0.3315*	0.4649*
			(1.70)	(1.67)			(0.92)	(1.76)			(1.87)	(1.91)
rail network				0.0035*				0.0059				0.0015
				(1.76)				(1.52)				(0.46)
_cons	-1.6227	-0.2398	-5.4116	-1.6581*	1.5572	1.2945	2.1759	1.8008*	1.1907*	2.9112	1.8535	1.7126
	(-0.29)	(-0.00)	(-0.78)	(-1.87)	(1.19)	(1.31)	(0.91)	(1.93)	(1.92)	(0.94)	(1.53)	(1.27)
Arellano Bond AR (2) p-value	0.523	0.474	0.472	0.473	0.152	0.186	1.67	1.64	1.69	1.57	1.36	1.20
Hansen's J statistic	45.30	36.79	33.25	31.85	43.79	54.24	53.54	49.77	39.93	51.11	49.77	44.27
	(0.460)	(0.736)	(0.858)	(0.847)	(0.565)	(0.189)	(0.207)	(0.326)	(0.723)	(0.280)	(0.289)	(0.503)
N	313	297	297	297	494	457	446	407	497	462	447	409

Notes: The dependent variable is gross fixed capital formation (GFCF). Primary, manufacturing and service FDI are measured as a log of (1+ the ratio of FDI inflows into the three sectors to GDP, respectively). See data section for data sources and data definition. The model is estimated by using the system GMM proposed by Arellano and Bover (1995) and extended by Blundell and Bond (1998). GFCF, FDI flows in the three sectors and financial index are considered as endogenous variables. "Collapse" option is used to reduce the instrument count (since GMM becomes inconsistent as the number of instruments becomes too large). "Robust" option is used, which provides HAC variance-covariance matrix. To have t-stats and F stats instead of z-stats, "small" option is applied. "Orthogonal" option is included, which requests the forward orthogonal deviations transform instead of first differencing. "Nodiffsargan" option is used to prevent reporting of certain difference in Sargan/Hansen statistics. *t* statistics in parentheses * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

Table 3.9. Conditional Effect of Sectoral FDI on Domestic Investment with System GMM

	(1) GFCF	(2) GFCF	(3) GFCF	(4) GFCF	(5) GFCF	(6) GFCF	(7) GFCF	(8) GFCF	(9) GFCF	(10) GFCF	(11) GFCF	(12) GFCF
Lag (GFCF)	0.2614***	0.3208***	0.3512***	0.3581***	0.2913**	0.4457***	0.2604*	0.1954	0.2735**	0.2812*	0.3178***	0.3559***
	(3.95)	(8.15)	(5.31)	(6.76)	(2.71)	(4.10)	(2.73)	(1.79)	(3.40)	(2.17)	(5.01)	(5.38)
primary	-1.7158***	-2.1605**	-2.4353*	-1.2571***								
	(-6.15)	(-2.50)	(-1.91)	(-3.83)								
manufacturing					1.8042**	-3.3245*	-1.3482*	1.6241**				
					(2.40)	(-1.69)	(-1.70)	(1.98)				
services									1.4923**	-1.3755*	-1.0754**	1.1032**
									(2.03)	(-1.82)	(-1.96)	(2.12)
.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.
finance index	0.0817	0.0488***	0.0333	0.0247	0.0203*	0.0355*	0.0419*	0.0715	0.0664	0.0548	0.0309	0.0200
	(1.08)	(2.69)	(1.35)	(1.08)	(1.72)	(1.69)	(1.83)	(1.57)	(1.30)	(1.02)	(0.84)	(0.64)
primary*finance	-0.1802											
	(-0.48)											
human capital		0.0171				0.0379				0.0770	0.0145*	0.0950
		(1.16)				(1.26)				(1.49)	(1.72)	(0.36)
primary*human		0.0437										
		(1.09)										
political freedom			0.3672**				0.3832				0.0907	
			(2.10)				(1.30)				(0.42)	
primary*polity			0.0498									
			(0.40)									
rail network				0.0013**				0.0079				3.6484
				(2.58)				(0.15)				(0.67)
primary*rail				0.0054*								
				(1.92)								
manufacturing* finance					0.1422**							
					(2.10)							
manufacturing *human						0.0396*						
						(1.89)						
manufacturing *polity							0.4937**					
							(2.15)					
manufacturing *rail								-0.0198				
								(-0.54)				
service*finance									0.6472**			
									(2.03)			
service*human										0.0480**		
										(2.16)		
service*polity											0.3605***	
											(2.60)	
service*rail												-6.0814
												(-0.67)
_cons	-1.5758	-1.1414	-1.4403	0.06115	1.1751**	1.6708**	3.6407	1.1482*	2.8992	2.9924	3.6167***	1.8981
	(-0.34)	(-0.17)	(-0.64)	(0.04)	(2.31)	(2.40)	(0.94)	(1.75)	(1.11)	(1.53)	(3.17)	(0.48)
Arellano-Bond AR (2)	0.408	1.09	1.29	1.03	1.05	1.38	1.44	1.55	1.66	1.18	1.21	1.33
Hansen test of overid	59.72	45.50	54.86	60.90	46.40	49.35	54.16	51.12	42.35	42.06	51.15	54.52
	(0.084)	(0.277)	(0.174)	(0.084)	(0.498)	(0.540)	(0.355)	(0.390)	(0.665)	(0.638)	(0.314)	(0.156)
N	417	334	300	353	493	394	439	395	397	398	361	361

Notes: The dependent variable is gross fixed capital formation (GFCF). Primary, manufacturing and service FDI are measured as a log of (1+ the ratio of FDI inflows into the three sectors to GDP, respectively). See data section for data sources and data definition. The model is estimated by using the system GMM proposed by Arellano and Bover (1995) and extended by Blundell and Bond (1998). GFCF, FDI flows in the three sectors and financial index are considered as endogenous variables. "Collapse" option is used to reduce the instrument count (since GMM becomes inconsistent as the number of instruments becomes too large). "Robust" option is used, which provides HAC variance-covariance matrix. To have t-stats and F stats instead of z-stats, "small" option is applied. "Orthogonal" option is included, which requests the forward orthogonal deviations transform instead of first differencing. "Nodiffsargan" option is used to prevent reporting of certain difference in Sargan/Hansen statistics. *t* statistics in parentheses * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

3.7 Conclusion

The effect of FDI flows on the growth rate has been of interest to policymakers because of the belief that FDI is an engine of growth, transferring both tangible and intangible assets such as physical capital, advanced technology, better managerial skills, etc., via different channels (Aitken and Harrison, 1999). Although endogenous growth theory suggests a positive effect of FDI on the host country's economic growth, the empirical findings are far from conclusive (Wang, 2009). We believe that one reason for the inconclusive evidence is the use of aggregate FDI inflows in most studies. This is because FDI in different sectors might have a heterogeneous impact on growth in the host economy. If so, then using aggregate FDI blurs the real effect and leads to ambiguous results, as evident in the literature. In this framework, we focus on the link between disaggregated FDI inflows (in the primary, manufacturing and services sectors) and economic growth, as well as domestic investment, in the host economy, and this we believe is an important contribution of our paper to the literature in the area.

The empirical findings show that the effect of FDI flows into the manufacturing and service sectors is always positive and statistically significant. Moreover, the extent of the growth-promoting effect in the manufacturing sector is higher than that of the service sector in all cases. On the contrary, no significant effect of FDI in the primary sector has been observed. Our findings confirm the previous findings of Findlay (1978) and Wang and Blomström (1992), suggesting that positive spillovers such as advanced technology transfer or know-how management are associated with the manufacturing and service sectors rather than the primary sector.

We also explore whether the effect of sector-specific FDI flows on the growth rate depends on the host economies' absorptive capacity and other factors. The results suggest that countries with a well-developed financial system, a high level of human capital, and political freedom are able to get more benefits from FDI flows into the manufacturing and service sectors. The role of political freedom is especially noteworthy: FDI in both the manufacturing and service sectors appears to have a negative impact on growth in the absence of democracy but a positive one in democratic countries. Regarding the primary sector, the benefits depend on the level of political freedom and infrastructure development. In other words, the host economy benefits from FDI inflows into the primary sector only if its level of political freedom or infrastructure is sufficiently high.

Another controversial issue associated with FDI flows is the impact of FDI on domestic investment in the receiving economy. One of the possible reasons behind the mixed results in the previous literature might be the use of total FDI flows, as the impact of FDI flows on domestic investment varies across sectors. We find evidence of a crowding-in effect of FDI flows in the manufacturing and service sectors, whereas crowding out effect has been observed in the primary sector. These findings remain unchanged when we allow for the conditional effect of sectoral FDI on domestic investment. Having a well-functioning financial system, a higher level of human capital, and a greater political freedom, foreign investment flows in the manufacturing and service sectors help to crowd in domestic investment. In the same vein, FDI in the primary sector crowds out less domestic investment if the host economy has a high level of political freedom and more developed infrastructure.

This research has implications for policymakers that not all forms of FDI have an equally beneficial effect on the host country's economic growth. The growth-enhancing and crowding-in effects are observed in the manufacturing and service sectors. Therefore, this study suggests that FDI should be encouraged in the manufacturing and service sectors more than in the primary sector. Furthermore, to maximise the benefits accruing from FDI a well-established financial market, extensive political freedom, and an educated workforce are also necessary. Political freedom and rail infrastructure also help make the contribution of primary sector FDI positive both with respect to stimulating growth and crowing in domestic investment. Lastly, further research could be conducted to assess the impact of FDI flows in sub-categories of these sectors, especially FDI in the service sector, since the service sector includes a wide range of sub-sectors, and each one might have a different effect on growth and domestic investment. Another possible extension of this research might be to examine the impact of FDI flows on the growth rate in different sectors instead of the overall growth rate of the economy.

4. Chapter 4: Institutional Quality and FDI: Evidence from OECD Countries

4.1 Introduction

Countries have engaged in intense competition to attract more foreign direct investment (FDI) Since the 1990s, (Aitken and Harrison, 1999), and worldwide FDI inflows have grown dramatically. Between 1990 and 2017, FDI inflows surged by 697 percent, from 204.8 billion to 1,632.6 billion US dollars.[27] Because of the fact that FDI has been recognised as a significant contributor to the growth rate of the host country via inflows of capital, facilitating transfer of advanced technology, managerial skills, organisational expertise, accessing or expanding international networks, etc. This being the case, the subject of FDI determinants has caught researchers' attention and been extensively studied throughout the years (Chowdhury and Mavrotas, 2005; Li and Liu, 2005; and Nath, 2009). Institutional quality plays a potential role in attracting FDI by reducing uncertainty and transaction costs (North, 2000; and Alguacil et al., 2011); alternatively, it may discourage FDI by increasing production costs, for instance due to excessive regulations (Busse and Groizard, 2008), as detailed in the literature review section. However, institutional factors as determinants of FDI are disregarded or are incorporated in models in a relatively small proportion (Ren et al., 2012). The challenge of selecting a measurement to capture the institutional quality or availability of the data for a short period might account for its exclusion. Nonetheless, there is some recent research evaluating the relationship between FDI inflows and institutional quality, and the literature does not reach a conclusion regarding the effect of institutional quality on FDI inflows (Choi and Samy, 2008; Ali et al., 2010; and Peres et al., 2018).

Previous research has certain limitations in terms of identifying the relationship between FDI and institutional quality and yielded mixed findings. Some studies have revealed that the quality of institutions is an important factor in encouraging FDI (e.g., Lysandrov et al., 2016; and Herrera-Echeverri et al., 2014), while others have concluded that it discourages FDI inflows to the destination country (e.g., Ezeoha and Cattaneo, 2012; and Busse and Groizard, 2008). Even some studies have not found a significant relationship between the quality of institutions and FDI inflows (e.g., Belgibayeva and Plekhanov, 2019; and Peres et al., 2018). The following plausible reasons may account for the contradicting findings in the literature: To

[27] Source: UNCTAD. Available at: https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=96740

begin, prior empirical research has focused exclusively on narrow aspects of institution, such as corruption, political stability, and democracy, obscuring the influence of other dimensions of institutions that are not included in the model (e.g., Wei, 2000; Addison and Heshmati, 2003; Masron and Abdullah, 2010). On the other hand, a number of studies focuses only on broad composite measures of institutional quality, which causes the effect of individual dimensions of institutional quality to be blurred (e.g., Alguacil et al., 2011; Buchanan et al., 2012; Owusu-Nantwi, 2019). Since various single variables may have a distinct effect on FDI inflows. Turedi (2018), for example, concludes that property rights are associated with attracting FDI whereas corruption does not have a significant effect on FDI. In addition, data scarcity may contribute to the inconclusive findings, as it is mostly available after the 2000s, particularly for developing countries. Finally, empirical research based on cross-country analysis may introduce difficulties with data comparability and heterogeneity, making the findings doubtful in nature (Ahmad et al., 2018).

Taking into account the existing discussion on the effect of institutional quality on FDI flows, we aim to contribute to the literature in the following ways. First, we utilised the panel autoregressive distributed lag of pooled mean group (ARDL-PMG) model introduced by Pesaran et al., (1999) to investigate the impact of institutional quality on FDI flows in the short and long terms in OECD countries.[28] Country-specific heterogeneity is taken into consideration with the usage of this approach (Samargandi et al,. 2015; Ditzen, 2018). The panel ARDL approach is applicable when all variables are cointegrated at level or first difference (Attiaoui et al (2017).[29] In addition, the method is more applicable to datasets in which the cross section (N) is smaller than the period (T). Notably, by incorporating delays of endogenous and exogenous factors, this method also overcome the potential endogeneity issue and produces consistent and effective findings. (Samargandi et al., 2015; Attiaoui et al., 2017; and Asteriou et al., 2021). In addition to the ARDL-PMG technique, we used the Cross-sectional-autoregressive-distributed lag (CS-ARDL) method, which acts as a robustness check because of its consideration of cross-sectional dependence, as explained in the section on methods. Second, we used both broad composite measures of institutional quality and specific sub-components measuring different aspects of institutional quality, namely property rights, corruption, and democratic accountability. Our final contribution to the literature is an

[28] Countries are divided into two groups based on their total institution score: Countries with weaker institutional quality and countries with stronger institutional quality. See the data section for details.
[29] As reported in section 5.1, the variables have a mixed order of cointegration.

examination of whether the link between institutional quality and FDI flows is linear. It is important to note that we are unable to examine the relationship between sectoral FDI and institutional quality using the panel ARDL-PMG method because of missing data.

Our findings indicate that institutional quality, as defined by an overall score, is a key determinant of foreign direct investment (FDI) for countries with weaker institutional quality, while the effect of institutions is not significant for countries with stronger institutional quality in the long run. Regarding particular aspects of institutions, property rights, democratic accountability, and corruption play a significant impact in boosting FDI flows to weaker-group nations in the long run. However, property rights have the greatest impact on FDI flows. Furthermore, property rights are the sole factor that matters for countries with a higher level of institutions. Finally, our empirical research indicates that the link between institutional quality and FDI flows is not necessarily linear. More clearly, it is observed that there is an inverted U-shaped relationship between them in the long run.

The remainder of the chapter is structured as follows: Section 2 presents a short review of the literature on the relationship between institutions and FDI and discusses the mixed findings of this literature. Section 3 explains the variables considered as the determinants of FDI flows to host economies. Section 4 discusses the diagnostic tests and econometric methods utilised in the empirical analysis. Section 5 presents the empirical findings and their interpretations. Section 6 concludes the chapter and discusses policy implications.

4.2 Literature Review

4.2.1 What are institutions?

North (1990) describes institutions as the constraints devised by human beings on human interaction in political, social, and economic contexts. People impose limitation on themselves in all civilizations, from the most rudimentary to the most modern, in order to regulate their interactions with others. The restrictions come in the form of official and informal regulations that help lessen the uncertainty associated with human behaviour involved in economic activities (North, 1990). He points out that the formal institutions include rules, regulations, property rights, and so on, while informal constraints may occur as norms of conduct, behavioural standards, and customs.

North (1990) raises awareness of the importance of institutional quality and reveals the link between institutional quality and economic activities in an economy based on transaction and production costs. Weak institutions are associated with higher levels of uncertainty, leading to a risk premium being included in the transaction cost. Since parties to an economic

transaction have insufficient knowledge of their counterparts' intentions, there is uncertainty about the outcome of the transaction. In addition, uncertainty increases production costs by causing supply chain disruptions, such as excessive red tape that lengthens the time required to get any type of permit or licence (Ali et al., 2010).

4.2.2 Relationship Between Institutional Quality and FDI Flows

The literature on the relationship between foreign direct investment (FDI) and institutional quality concludes that institutional quality is widely seen as an attractive factor for the flows of FDI (see Alguacil et al., 2011, Buchanan et al., 2012, and Owusu-Nantwi 2019). Nonetheless, some research suggests the relationship between institutions and FDI flows is insignificant (e.g., Barro, 2000; Aseidu, 2002; Sethi et al., 2003), as well as some findings indicating a reverse link between them (e.g., Egger and Winner, 2005; Busse and Groizard, 2008; Baklouti and Boujelbene, 2014).

Naude and Krugell, 2007 identify the determinants of FDI flows and reach the conclusion that institutional quality (measured by political stability, accountability, regulatory quality, and rule of law) plays an important role in attracting FDI to countries in Africa. Tun et al. (2012) use an aggregate index of institutional quality to examine the link between institutions and FDI. They claim that institutional quality can provide a better investment climate for investors in terms of fewer operating costs, less uncertainty, and more productivity prospects. Therefore, they conclude that institutional quality has a positive effect on FDI flows. The study by Masron and Nor (2013) supports this finding.

Benassy-Quere et al., (2007) provide several reasons why institutional quality may be relevant in drawing in foreign investment. Initially, they assert that superior institutions (such as effective governance and strong enforcement of property rights) make a country more trustworthy, which in turn makes it an appealing investment destination for foreign investors. A second argument is that bad institutions are viewed as an additional cost to FDI, especially in the event of corruption, which makes each stage of the bureaucratic process costly. Finally, they claim that due to significant sunk costs, FDI is highly susceptible to any type of uncertainty coming from policy reversals, bribery, or inadequate enforcement of property rights. Similarly, Buchana et al. (2012) argue that poor institutional quality creates an unstable investment climate in the host country, which discourages foreign entrepreneurs and raises the volatility of FDI.

Similarly, Daude and Stein (2007) identify two plausible ways through which institutional quality affects the flow of FDI into the host country. First, they argue that poor institutions may function as a tax by increasing the cost of conducting business. Second, inadequate contract enforcement may cause uncertainty regarding future benefits and have a negative impact on investment levels. Since investors must pay bribes to get licences and permits, corruption may discourage investment by increasing the cost of doing business. This conclusion is supported by Wei (2000), who notes that international investors view corruption as a transaction cost since it results in the payment of bribes and the waste of resources.

The effect of institutional quality on inward FDI may manifest itself via the grabbing hand and helping hand mechanisms, according to Egger and Winner (2005), Quazi (2014), and Turedi (2018). The former (grabbing hand) represents a negative effect of corruption on FDI inflows through these possible channels: (i) companies will be required to pay bribes to public authorities for licences, tax assessment, police protection, etc., which will act as a tax and increase the overall cost of doing business and reduce investment profitability, (ii) corruption comes with the risk of losing credibility and brand reputation if the MNEs are involved in an international corruption scandal, (iii) corruption deals are not enforceable by the courts, so the parties must assume additional contract-related risks. In this context, corruption reduction results in increased FDI inflows to host countries. The latter (helping hand) demonstrates a favourable correlation between corruption and FDI inflows since overseas affiliates can expedite the bureaucratic processes to get any type of legal approval for their firm by offering bribes. Furthermore, bribery may help by lowering salaries and boosting corporate profits by allowing businesses to keep tax burdens low. Moreover, paying bribes may assist them in securing government-funded projects, therefore increasing their earnings. Consequently, the net effect of corruption depends on which effect dominates. Begibayeva and Plekhanov (2015) also support the idea that corruption may play a role in attracting or deterring FDI flows to the host countries. Their findings show an ambiguous effect of institutional quality, represented by corruption, on inward FDI. Since they find that most of the time corruption makes investors want to stay away, but in some cases (especially when parent companies are based in countries with higher corruption levels), corruption may be seen to get around rules and regulations.

Similar to the mechanism of grabbing hand and helping hand, Meon and Sekkat (2005) examine the relationship between corruption, investment, and growth to test the "sand the wheels" hypothesis against the "grease the wheels" hypothesis. Before describing the theories, it is worthwhile to note that the basic question of the theories is whether corruption boosts or

lowers investment and growth when governance quality is poor. The "grease the wheels" theory is described as follows: If corruption alleviates the negative effects of poor governance, investment and economic growth will be greater with corruption than without it. But if corruption makes the bad effects of this situation worse, investment and economic growth will slow down, according to the “sand the wheels” theory. Their findings support the latter.

Busse and Groizard (2008) also propose an explanation for the negative impact of institutional quality on FDI inflows. They argue that excessive regulations are likely to restrict the flow of capital in the form of FDI. A lot of government regulations can make it hard for businesses to start and close because they make entrepreneurs go through a lot of bureaucratic procedures that take up their time and money. This discourages the investment of other potential foreign investors in the host economy or restricts the extension of the current foreign affiliates. The findings are parallel to the conclusion of Kapuria-Foreman (2007) who reveals that government intervention, which is a measure of institutional quality in their study, discourages MNEs from investing in host nations. Another restricted effect of regulations on FDI inflows might occur in the labour market. The strict regulations on hiring and laying off workers are also a major source of concern for foreign investors operating in or planning to invest abroad (Javorcik and Spatareanu, 2005). This conclusion is supported by the findings of Haaland et al. (2003), who indicate a negative correlation between FDI and a flexible labour market.

Ezeoha and Cattaneo (2012) utilise property rights measurement as a proxy for institutional quality based on Sub-Saharan African countries. They conclude that the effect of better-designed property rights is not clear and may even potentially discourage FDI flows to these countries. The negative effect may arise from the ineffectiveness and insufficiency of property and contract rules in these nations to stimulate the flow of FDI. Caetano and Galego (2009) also reach a similar conclusion that property rights and trade freedom as proxies for institutional quality discourage the inflow of FDI to EU nations. They explain that the negative relationship may be due to the performance of some new EU countries, which have lower levels of these variables (property rights and trade freedom) but perform well in terms of FDI inflows.

Table 4.1 summarises the previous empirical studies on the relationship between institutional quality and FDI inflows to host economies. There is some other research on institutions and FDI; however, the selected studies are considered to be the most representative of the literature's mixed results.

Table 4.1. Summary of the studies on the link between institutions and FDI

Author(s)	Sample and Period	Estimation Method	Aspects of institutional quality	Effect on FDI
Lee and Mansfield (1996)	14 countries, 1990-1992	OLS, Tobit	Intellectual property protection	Positive effect.
Wei (2000)	45 countries, 1980-1999	OLS, Modified Tobit	Corruption	Negative effect.
Asiedu (2002)	71 countries	OLS	Political instability	Insignificant effect.
Globerman and Shapiro (2002)	114 countries, 1995-1997	Tobit	Governance infrastructure	Positive effect.
Addison and Heshmati, (2003)	110 countries, 1970-1999	OLS, GLS, and Fixed effects	Democracy	Positive effect.
Sethi et al, (2003)	28 countries, 1981-2000	OLS,	Political stability	Insignificant effect.
Egger and Winner (2005)	73 countries, 1995-1999	Fixed effects, Hausman Taylor	Corruption	Positive effect.

Jakobsen and de Soysa 2006)	53 countries, 1984-2004	Panel corrected standard error (PCSE), Generalised estimation equation (GEE)	Democracy, property rights protection	Positive effect.
Daude and Stein (2007)	80 countries, 1982-2002	OLS, IV estimation, random effects, fixed effects, GMM	Six dimensions of institutions used separately (from WGI)	Different effects of various aspects. Negative effects of unpredictable policies, an excessive regulatory burden, and a lack of commitment.
Busse and Hefeker (2007)	83 countries, 1984-2003	Fixed effects, GMM	Government stability, socio-economic conditions, investment profile, internal and external conflict, corruption, military in politics, religious tensions, law and order, ethnic tensions. Democratic accountability and quality bureaucracy	Positive effect.
Kapuria-Foreman (2007)	76 countries, 1990-1989	OLS, 2SLS	Overall index, property rights, regulation, government intervention, barriers to capital flows.	Insignificant effect of overall index. Positive effects of government intervention, barriers to capital flows. Negative effect of protection of property rights.
Naude and Krugell (2007)	43 countries, 1970-1990	OLS, GMM	political stability, accountability, regulatory, and rule of law	Positive effect.

Busse and Groizard (2008)	84 countries, 1994-2003	GMM	Regulation	Negative effect.
Choi and Samy (2008)	90 countries, 1985-2005	OLS, fixed effects, random effects, ECM	Democracy	Positive effect (but weak).
Caetano and Galego (2009)	42 countries, 1995-2005	Fixed effects	Property rights, trade freedom, corruption, business freedom and government size	Insignificant effect of corruption and business freedom. Negative effect of property rights and trade freedom.
Fukumi and Nishijima (2010)	19 countries,	Fixed effects, 2LSL	Law and order, Bureaucratic efficiency, and curruption	Positive effect.
Ali et al. (2010)	69 countries, 1981-2005	Random effects	Property rights security	Positive effect.
Masron and Abdullah (2010)	8 members of ASEAN, 1996-2008	Fixed effects	Property rights security	Positive effect.
Alguacil et al. (2011)	26 countries, 1976-2005	OLS, GMM	Overall score (WGI)	Positive effect.
Buchanan et al. (2012)	164 countries, 1996-2006	IV method	Overall score (WGI)	Positive effect.

Ezeoha and Cattaneo (2012)	38 countries, 1995-2009	GMM	Rule of law	Negative effect (but weak).
Ren et al. (2012)	14 countries, 1984-2009	Panel ARDL	Investment profile, internal conflict, military in politics, democracy, and bureaucracy quality	Insignificant effect in the short run. there is no significant link between institutional quality and FDI. Positive effect of investment profile, internal conflict, and bureaucracy quality in the long run.
Staats and Biglaiser (2012)	17 countries, 1996-2007	PCSE, Fixed effects	Judicial strength and rule of law	Positive effect.
Tun et al. (2012)	77 countries, 1981-2005	GMM	Aggregate index	Positive effect.
Baklouti and Boujelbene (2014)	8 countries, 1996-2008	Fixed effects	Regulation quality, government effectiveness, and corruption	Negative effect of regulation and corruption. Positive effect of government effectiveness.
Herrera-Echeverri, et al (2014)	89 countries, 2004-2009	PCSE, random effects GLS	Overall score (WGI)	Positive effect.
Belgibayeva and Plekhanov (2019)	52 countries, 2004-2011	Pooled-OLS, Fixed effects,	corruption	Insignificant effect.
Lysandrou et al (2016)	52 countries, 2006-2012	GMM	Public governance, private governance	Positive effect.

Ahmad et al. (2018)	Pakistan,	ARDL	Single indicator obtained by PCA method (data from ICRG)	Insignificant effect in the primary sector. Positive effect in the manufacturing and services sectors in the long run.
Aziz (2018)	16 countries, 1984-2012	GMM	Doing business, economic freedom, and ICGR	Positive effect.
Peres et al. (2018)	110 countries, 2002-2012	OLS, IV	Corruption, rule of law	Positive effect in developed countries. Insignificant impact in developing countries.
Turedi, (2018)	49 countries, 2002-2015	OLS, Fixed and Random effects, GMM	Rule of law, corruption	Positive effect of rule of law. Insignificant effect of corruption.
Owusu-Nantwi (2019)	South America, 1996-2015	2SLS, fixed effects	Overall score (WGI)	Positive effect.

4.3 Data

The data set covers 36 OECD countries from 1996 to 2017.[30] The starting year of our research, 1996, is motivated by the availability of institutional quality data for the whole countries. In this section, we will define the dependent, independent and control variables that have been used widely in prior research as drivers of FDI flows (see Daude and Stein, 2007; Ali et al., 2010; Buchanan et al., 2012; Fukumi and Nishijima, 2010; Ahmad et al., 2018; and Aziz, 2018). [31]

FDI (%GDP) used as a dependent variable is measured as the net inflows of foreign direct investment divided by GDP. FDI is an investment to acquire a lasting management interest (minimum 10 per cent of voting stock) in an enterprise operating in an economy other than the investor's economy. Gross FDI is the total of absolute inflows and outflows of foreign investment. As we focus on the inflows to the economy, we prefer to use the net inflows, as in Alfaro et al., (2009). The net inflows are defined as "the sum of equity, reinvestment of earnings, other long-term capital and short-term capital as shown in the balance of payments" by the World Bank. The data for FDI is taken from the World Bank's World Development Indicators.

This research utilises data from three sources in order to evaluate the quality of institutions: the Index of Economic Freedom (EF), the Worldwide Governance Indicators (WGI), and the International Country Risk Guide (ICRG).

First, we employed the EF index from the Heritage Foundation to examine the link between institutional quality and FDI flows. It is comprised of 12 quantitative and qualitative indices, ranging from property rights to financial freedom, with each receiving a score between 0 and 100.[32] The higher the scores, the greater the quality of the institution. The advantage of using data from Heritage is that it provides an overall score of institutional quality, eliminating the requirement to apply the principal component analysis technique to obtain an overall index. Furthermore, the data is provided for annual frequency beginning with 1996. The log of the index of economic freedom is employed as a proxy of institutional quality.

[30] As explained in the chapter 1, our sample countries are OECD members because of their common features (such as following the liberal economy or attracting more than half of the world's foreign investments). In addition, there is no missing data regarding institutional quality and FDI inflows for OECD nations.
[31] See Table C1 in Appendix C for Data Descriptive.
[32] The components of EF index are listed in Table C2 in Appendix C.

We used the data from WGI to evaluate the reliability of findings in which the economic freedom index is used as a measure of institutions.[33] WGI comprises six dimensions of governance: Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law, and Corruption Control. Each component's value ranges from 0 to 100 (greater value indicates better institutional quality). Utilizing PCA techique, institutional quality can be measured with a single score.

Table 4.2 reports the principal component analysis results. As seen, approximately 85% of the variance in the dependent variable is explained by the first component, which is the only one with an eigenvalue larger than 1. Consequently, it is evident that the first principal component has the highest explanatory ability. Therefore, we will use it to measure the quality of institutions.

Table 4.2. Principal Component Analysis for the data from WGI

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	5.095	4.576	0.849	0.849
Comp2	0.519	0.355	0.0865	0.936
Comp3	0.164	0.0571	0.0273	0.963
Comp4	0.106	0.0359	0.0177	0.981
Comp5	0.0704	0.0252	0.0117	0.992
Comp6	0.0453	.	0.0075	1.000

We also utilised ICRG data to check the reliability of findings estimated by the economic freedom index as a measure of institutions.[34] The following is the list of ICRG indicators spanning political and social factors. Investment profile (its value ranges from 0 to 12 points), corruption (from 0 to 12), law and order (from 0 to 6), bureaucratic quality (from 0 to 4), democratic accountability (from 0 to 6), and internal conflict (from 0 to 12). For each indication, a greater value indicates a higher quality. Principal Component Analysis (PCA) is used again to generate a single measure to represent the institutional quality.

[33] WGI data is available at: https://info.worldbank.org/governance/wgi/Home/Reports
[34] ICRG data is available at: https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/4YHTPU

The results of the PCA are presented in Table 4.3. The only component with an eigenvalue larger than 1 is the first component, which accounts for around 65% of the variation in the dependent variable. We will thus employ it to measure the quality of institutions in this study.

Table 4.3. Principal Component Analysis for the data from ICRG

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	3.877	3.059	0.651	0.646
Comp2	0.818	0.364	0.136	0.782
Comp3	0.453	0.107	0.075	0.858
Comp4	0.346	0.0011	0.057	0.915
Comp5	0.345	0.185	0.056	0.973
Comp6	0.160	.	0.026	1.000

As was previously stated, focusing on the aggregate score may hide the effect of individual dimensions, as various dimensions may have different impacts on FDI flows. Taking this possibility into account, we chose the three aspects of institutions —property rights, corruption, and democratic accountability—that are most commonly used in the literature.

Inflation, used as an independent variable, is measured as the change in the consumer price index. It indicates the yearly percentage change in the cost to the average consumer of obtaining a standardized basket of goods and services. The data on inflation comes from the database of the International Monetary Fund.

Trade openness is the ratio of exports plus imports to GDP. The data on exports and imports is obtained from the World Bank's World Development Indicators.

GDP used in the log form is employed to capture the market size of the receiving country. GDP is converted from domestic currencies to US dollars using 2010 official exchange rates. The data regarding the GDP is obtained from the World Development Indicators of the World Bank.

Tariff rate is defined as the unweighted average of effectively applied rates for all products subject to tariffs calculated for all traded goods. The data is gathered from the World Bank's World Development Indicators.

Countries are classified into two groups according to their total institutional quality score. To begin, the mean of the sample nations' overall scores is computed, and any country scoring below the mean is included in the group of countries with weaker institutional quality, while those rated above the mean are included in the group of countries with stronger institutional quality. The reason of splitting countries into two groups is to analyse whether the effect of institution quality on foreign investment is similar between the two groups. Since the institutional quality of countries in the stronger group was already better at the start of the period, and improvement in this group was relatively low, whereas the institutional quality of countries in the weaker group has improved significantly. There are 20 countries in the group of stronger institutional quality, while 16 countries are included in the other group.[35]

4.4 Methodology

This study first applies the panel autoregressive distributed lag (ARDL) method developed by Pesaran et al. (1999) to examine relationships between aggregate FDI flows, institutional quality, and other variables, namely, domestic investment, trade openness, inflation, real GDP, and tariffs over the period of 1996–2017. As stated by Liu et al. (2019) the ARDL is a dynamic model and can be classified as an Error Correction Model. In this context, the method offers three advantages over other static models and restricted dynamic models as argued by eberhardt and Presbiteor (2015). First, it enables us to distinguish between short-term and long-term behaviour. In addition, we can evaluate the error correction term, which reveals the speed of the economy's long-run equilibrium adjustment. Finally, the statistical significance of the error correction term allows us to test for cointegration. The panel ARDL method is also superior regardless of whether the variables are cointegrated at level, I (0), or at first difference, I (1), or have a mixed order of cointegration (I(0) or I(1)), unless they are cointegrated of order 2 (Pesaran and Shin, 1998, Attiaoui et al., 2017). Furthermore, the ARDL technique is more appropriate to apply to such a dataset in which the cross section (N) is less than the period (T).[36] As clarified by Pesaran (1999), using the traditional methods such as fixed effect, instrumental variables, and GMM may lead to erroneous conclusions in the case

[35] See Table C3 in Appendix C for the list of countries.
[36] This is not a strong suggestion of the method. Some research in the literature employed the ARDL approach when N is bigger than T (e.g., Samargandi et al., 2051; Uzar, 2020; Canh et al., 2021).

of a larger time dimension (T) than (N). Similarly, Roodman (2009) argues that the GMM method is prone to produce spurious results for situation with small N and large T. Since, the autocorrelation test becomes unreliable due to the small N. Moreover, as the time period increases, so does the number of instruments, leading to the rejection of the null hypothesis and lowering the reliability of the Sargan test of over-identification. The panel ARDL approach is therefore better than others for this research. Notably, by including lags of endogenous and exogenous variables, this technique eliminates the possible endogeneity problem and generates consistent and efficient results. (Samargandi et al., 2015; Attiaoui et al., 2017; and Asteriou et al., 2021).[37] However, this technique's validity, consistency, and efficiency are contingent on two requirements. First, the coefficient in the error correction term must be between 0 and -2, which shows convergence in the long run (Asteriou et al., 2021; and Okumus et al., 2021). A second important requirement is that the residuals of the error correction model are serially uncorrelated (Samargandi et al., 2015). As a requirement of the panel ARDL method, we will apply some preliminary tests before proceeding with the ARDL-PMG technique.

The ARDL approach is applied based on the three alternative estimators: the mean group (MG), the pooled mean group (PMG), and dynamic fixed effects (DFE). Each estimator's underlying assumptions are presented in the following section to give a deep insight into the fundamental characteristics of the three distinct estimators in the dynamic panel framework (See section 4.3).

Although the panel ARDL model is regarded as one of the most popular estimators for heterogeneous panel data, this model's drawback is that it does not account for the cross-sectional dependence error (Chudik and Pesaran, 2015). To deal with this issue, this study also applies the CS-ARDL model in addition the panel ARDL model. Finally, the half-panel jacking method is also used due to the small-time dimension (lower than 50) as suggested by Chudik and Pesaran (2015).

4.4.1 Cross-Sectional Dependence Test

We investigate the cross-sectional dependence in the error term by utilising the cross-sectional dependence (CD) test developed by Pesaran (2021). The estimators may not produce an accurate interpretation if cross-sectional dependence is not taken into account. The CD test

[37] See section 4.3. for more information.

is applicable for the dataset in which N > T and T > N (Okumus et al., 2021). The CD test is based on the following equation:

$$CD = \sqrt{2T/N(N-1)} \sum_{i=1}^{N-1} \cdot \sum_{j=i+1}^{N} \rho_{ij} \quad (1)$$

Where CD → N (0,1) for N→ ∞ (De Hoyos and Sarafidis, 2006). The null and alternative hypothesis are constructed as follows:

H_0: There is no cross-sectional dependence

H_1: There is a cross-sectional dependence

4.4.2 Unit Root Test

In the literature, first-generation and second-generation unit root tests are used to test for the presence of unit root in the variables. In the presence of cross-sectional dependence, the former is inapplicable to test the stationarity of the regressors, since it generates large biases in the predicted results (Sabir et al., 2020). The second-generation tests are based on the heterogeneity assumption and account for cross-sectional dependence, yielding more accurate findings (Uzar, 2020).

Pesaran (2007) developed a second-generation unit root test based on extending the Augmented Dickey-Fuller (ADF) test by incorporating lagged cross-sectional averages and its first difference into the model to address the issue of cross-sectional dependence (Okumus, et al. 2021). This test is known as CADF, and it can be used in both N<T and N>T situations (ibid). We follow the equation, which is similar to that of Mercan and Karakaya (2015).

$$Y_{i,t} = (1-\Phi_i)\mu_i + \Phi_i y_{i,t-1} + u_{i,t} \quad (2)$$

$$u_{i,t} = \gamma_i f_t + \varepsilon_{it} \quad (3)$$

where f_t denotes unobservable common effects of individual country, ε_{it} indicates individual specific error. The equation could be rewritten as follows:

$$\Delta y_{i,t} = \alpha_i + \beta_i y_{i,t-1} + \gamma_i f_t + \varepsilon_{it} \quad (4)$$

The null and alternative hypothesis are constructed as the following:

H_0: There is a unit root.

H_1: There is no unit root.

Pesaran (2007) also calculates CIPS statistics by findings the average t statistics of each cross-section unit based on the below equation:

$$CIPS\ (N,T) = N^{-1} \sum_{i=1}^{N} t_I\ (N,T) \qquad (5)$$

In this study, we apply both unit root tests, CADF and CIPS tests, to check if the variables are stationary.

4.4.3 Panel ARDL-PMG and CS-ARDL Tests

There are three estimators commonly applied for such panel datasets; the mean group (MG) introduced by the work of Pesaran and Smith (1995) the pooled mean group (PMG) developed by Pesaran et al. (1999), and dynamic fixed effects (DFE). In contrast to the MG, which utilises the average coefficient value, the PMG estimator employs both pooling and averaging (see Pesaran et al., 1999). The assumption of the MG estimator is that the short run and long run coefficients are heterogeneous across individuals, while the PMG estimator allows the short run coefficients, intercepts, and error variance to differ but constrains the long run coefficients to be homogenous for each country. As stated by Samargandi et al. (2015), the short-run assumption of heterogeneity in both PMG and MG estimators might be justified by local norms and regulations, making the approaches more appropriate against DFE. However, the homogenous assumption of PMG in the long run makes the estimator superior to the MG. We anticipate long-term homogeneity for our sample countries due to their similarities in terms of liberal trade policy. According to Pesaran et al. (1999), any shocks or economic crises affect the whole group in a similar way due to the liberal trade or arbitrage circumstances. Hence, PMG appears to be the more appropriate model to use in the research. Furthermore, it is also argued by Asteriou et al., (2021) that MG is consistent for the panel including a larger number of N, which is another reason why PMG was chosen for our study as the cross-section (N) is 20 and 16 for the two groups. In terms of long run homogeneity, the approach of dynamic fixed effect (DFE) has comparable features to the PMG estimator. However, the technique also assumes that the adjustment speed coefficient and the short run coefficient are homogenous across countries. Moreover, this strategy is also more likely to suffer from simultaneity bias in small cases (Asteriou et al., 2021). Similarly, the MG estimator is more vulnerable to outliers when cross-section dimensions are small (Samargandi et al., 2015).

The selection of the model among the PMG, MG, and DFE is based on the Hausman test. Before conducting the Hausman test, the PMG estimator appears to provide more efficient estimates than other estimators, based on the detailed discussion of their assumptions in the

preceding paragraph. In addition to the assumptions, we applied the Hasuman test to determine which of the PMG, MG, and DFE estimators is the most suitable. The null hypothesis suggests that there is no significant difference between PMG and MG or PMG and DFE. If the null hypothesis is rejected, we will proceed with PMG to this analysis. Alternatively, if the null hypothesis is not rejected due to the p-value ($p>0.05$), I will have to select between the MG or DFE.

For the ARDL-PMG analysis of the link between institutional quality and FDI flows, we use the following equation:

$$\Delta y_{it} = \alpha_i + \theta_i (y_{i,t-1} - \gamma_i d_{i,t-1} - \lambda_i x_{i,t-1}) + \sum_{j=1}^{p-1} \Phi_{ij} \Delta y_{i,t-1} + \sum_{j=1}^{q-1} \Omega_{ij} \Delta d_{i,t-1}$$

$$+ \sum_{j=1}^{q-1} \psi_{ij} \Delta x_{i,t-1} + \mu_i + \varepsilon_{it} \qquad (6)$$

where i and t refer to country and time respectively, y is the ratio of FDI to GDP, d represents institutional quality, x stands for control variables: domestic investment (%GDP), trade openness, inflation, real GDP, tariff. The symbols of Φ, Ω, ψ denote the short run coefficients of the lagged FDI, institutional quality, and other control variables, respectively. The long run coefficients of institutional quality and other control variables are represented by γ and λ notations. θ is error correction coefficient, indicating the speed of adjustment towards the long run equilibrium. μ is used as a proxy for group effects. Finally, ε is the error term with zero mean and constant variance.

The shortcoming of the typical panel ARDL approach is that the method may be misleading in the presence of cross-sectional dependence (Chudik and Pesaran, 2013). Because of that reason, this research applies the CS-ARDL approach which overcomes the problem of cross-sectional dependence by augmenting the panel ARDL regressions with lagged dependent variable and lagged cross-section averages into the model. It has been suggested that the introduction of lagged cross-section averages largely addresses the endogeneity issue (see Pesaran et al., 1999; Okumus et al., 2021). The CS-ARDL model is also an ARDL version of the Dynamic Common Correlated Estimator, making it applicable whenever the variables included in the regressions have a mixed order of cointegration (at level or at first difference), unless they are cointegrated of order 2. This study employs the CS-ARDL as a robustness check based on the following equation because of its advantages.

$$\Delta y_{it} = \alpha_i + \theta_i (y_{i,t-1} - \gamma_i d_{i,t-1} - \lambda_i x_{i,t-1} + \theta_i^{-1} n_i \bar{y}_t + \theta_i^{-1} \vartheta_i \bar{\gamma}_t + \theta_i^{-1} \varphi_i \bar{x}_t) + \sum_{j=1}^{p-1} \Phi_{ij} \Delta y_{i,t-1} + \sum_{j=1}^{q-1} \Omega_{ij}$$
$$\Delta d_{i,t-1} + \sum_{j=1}^{q-1} \psi_{ij} \Delta x_{i,t-1} + \sum_{j=0}^{p-1} \omega_{ik} \Delta \bar{y}_{t-1} + \sum_{j=0}^{p-1} \kappa_{ik} \Delta \bar{d}_{t-1} + \sum_{j=0}^{p-1} \varrho_{ik} \Delta \bar{x}_{t-1} + \mu_i + \varepsilon_{it} \quad (7)$$

where $\bar{y}_t$, $\bar{d}_t$ and $\bar{x}_t$ refer to the cross section average of y_{it}, d_{it} and x_{it} (FDI inflows, institutional quality and control variables, respectively).

Chudik and Pesaran (2015) note that when the time dimension is less than 50, the CCE mean group estimator may be subject to time series bias. In this study, the time dimension is 22 years (less than 50). Chudik and Pesaran (2015) recommended the half-panel jack-knife method developed by Dhaene and Jochns (2012) to overcome the small time series bias.

$$\hat{\pi}_{MG} = 2\hat{\pi}_{MG} - \frac{1}{2}(\hat{\pi}_{MG}^{a} + \hat{\pi}_{MG}^{b}) \quad (8)$$

where $\hat{\pi}_{MG}^{a}$ refers to the CCE mean group estimators calculated using the first half time dimension (t = 1,2,……,[T/2]) and $\hat{\pi}_{MG}^{b}$ stands for the estimators computed using the second half time period t = [T/2] + 1, [T/2] + 2, …..T.

4.5 Results and Discussion

4.5.1 Preliminary Tests

This study uses Pesaran's cross-sectional dependence (CD) test to see if there is cross-sectional dependence before running unit root tests. As noted by Gaibulloev et al., (2014) cross-sectional dependence might potentially exist between sample countries due to globalisation. In a similar vein, De Hoyos and Sarafidis (2006) remark that cross-sectional dependence is more likely to emerge in the errors of panel data models as a result of the liberalisation of international commerce in recent decades. Therefore, it seems necessary to check for the presence of cross-sectional dependence before going through unit root tests. Table 4.4 reports the results of the Pesarans' CD test for the models of two group countries separately. The p-values of the two models are less than 0.05, allowing us to reject the null hypothesis of no cross-sectional dependence. The presence of cross-sectional dependence shows that an economic crisis or shock that appears in a country affects the other sample countries.

Table 4.4. Pesaran's Cross-sectional dependence test

Models	Pesaran statistics with p values	Average value of off-diagonal elements
FDI^{L}= f(ins, inf, domes, trade, gdp, tariff)	6.053 (0.000)	0.243
FDI^{H}= f(ins, inf, domes, trade, gdp, tariff)	2.294 (0.021)	0.234

P-Values are reported in parenthesis.

This study employs the CIPS and CADF unit root tests to check the stationary of the models. Table 4.5 indicates the results of the CIPS unit root test for both groups. It is observed that FDI flows, domestic investment, trade openness, inflation, and tariffs are stationary at level, I (0), while institutional quality and GDP have unit roots. However, those two variables turn out to be stationary at their first difference, I(1), in model 1. In model 2, all variables are stationary at levels except for domestic investment and trade openness, which do not have a unit root at first difference.

Table 4.6 shows the results of the PDAF unit root test for both models. The variables show a similar pattern to the CIPS test results except for FDI, which is stationary at I(1) in model 1. Model 2 variables produce similar results, with the exception of institutional quality and tariff, which are non-stationary at the level and stationary at the first difference. Consequently, none of the variables in the two models are cointegrated in the second difference based on CIPS and CADF unit root tests.

Table 4.5. CIPS Panel unit root test results

Variables	Countries with weaker ins.quaity (Model 1)				Countries with stronger ins.quality (Model 2)			
	I(0) level		**I(1) first-difference**		**I(0) level**		**I(1) first-difference**	
	constant	**Constant & trend**	**constant**	**Constant & trend**	**constant**	**Constant & trend**	**constant**	**Constant & trend**
FDI	-3.891***	-3.989***	-	-	-3.876***	-4.105***	-	-
Inst_quality	-2.184	-2.336	-4.405***	-4.535***	-2.507***	-3.012***	-	-
Domestic_inv	-2.284**	-2.462**	-	-	-1.756	-1.945	-4.392***	-4.383***
Trade_openness	-2.979***	-2.997***	-	-	-1.676	-1.723	-3.427***	-3.461***
Inflation	-2.756***	-3.140***	-	-	-3.948***	-4.380***	-	-
GDP	-1.837	-2.63	-4.444***	-4.524***	-3.151***	-3.513***	-	-
tariff	-3.905***	-3.872***	-	-	-3.531***	-4.126***	-	-

t statistics in parentheses * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$. Null hypothesis: there is no unit root test

Table 4.6. CADF Panel unit root test results

Variables	Countries with weaker ins.quality				Countries with stronger ins.quality			
	I(0) level		**I(1) first-difference**		**I(0) level**		**I(1) first-difference**	
	constant	**Constant & trend**	**constant**	**Constant & trend**	**constant**	**Constant & trend**	**constant**	**Constant & trend**
FDI	0.883	2.214	-4.393***	-4.096***	-2.904***	-2.213**	-	-
Inst_quality	0.883	2.214	-4.393***	-4.096***	-1.326	-0.306	-4.858***	-1.582***
Domestic_inv	-4.827***	-4.281***	-	-	2.044	3.032	-4.696***	-2.569***
Trade_openness	-2.786***	-2.360***	-	-	-0.077	-1.613	-4.068***	-2.124**
Inflation	-4.499***	-3.717***	-	-	-5.159***	-4.426***	-	-
GDP	-1.262	-0.495	-5.552***	-2.776***	-1.627*	-0.282	-7.580***	-5.947***
tariff	-3.213***	-3.013***	-	-	-1.152	-0.698	-8.386***	-8.414***

t statistics in parentheses * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$. Null hypothesis: there is no unit root test

4.5.2 Effect Institutional Quality and FDI measured by the overall index

The findings estimated by the panel ARDL-PMG indicate the relationship of institutional quality with FDI flows, domestic investment, trade openness, inflation, GDP and tariffs for the two groups of OECD members. As previously described, the Hausman test is applied to choose the most appropriate method among PMG, MG, and DFE. The null hypothesis is in favour of the PMG, while the alternative hypothesis suggests that either the MG or the DFE are consistent. We are not able to reject the null hypothesis because the p-value is greater than 0.10, as can be seen at the bottom of Tables 7 and 8, thus we proceeded with the analysis with the PMG model.

Table 4.7 demonstrates that institutional quality has a positive and significant effect on FDI flows in the long run for the group of countries with lower institutional quality scores. In other words, an increase of one unit in institutional quality is associated with an increase of 0.298% in FDI flows to those economies in the specification 1. Institutional quality continues to exert a significant role in determining FDI inflows in regressions 2 and 3 in the long term. In the short run, however, the coefficient of institutional quality is shown to be insignificant in all regressions. The effect of institutional quality may not be observed in the short run, since the reaction of foreign investors to the enhancement of institutions may take a longer time. Thus, in the short run, it is likely that there will be no relationship between institutional quality and FDI flows. The findings are in line with those obtained by Ren et al. (2012).

The coefficient of domestic investment is positive and significant in regression 1 (Table 4.7) in the long run, which indicates that an increase in domestic investment attracts more FDI inflows to this group of countries. However, it turns out to be insignificant in columns 2 and 3. Therefore, its role in attracting FDI is weak. Our finding is supported by the study of Buchanan et al., (2012). The relationship between domestic investment and FDI inflows is far from conclusive in the literature. The presence of local companies which are able to provide the requisite quality of intermediate goods to existing multinational enterprises (MNEs) may encourage more foreign investment into the host nations. On the other hand, the presence of local firms operating effectively with advanced technology may discourage international investors from entering the host country due to the difficulty of competing with them in the same industry. Hence, the net effect of domestic investment on the flow of foreign direct investment is contingent on whether the positive or negative effects dominates. Trade openness is another control variable that has a positive and significant effect on FDI flows in the long run. The variable is an important factor for foreign affiliates producing tradable goods and

services or those requiring access to the international market to import intermediate goods. In this framework, more trade liberalisation is associated with more FDI flows to the host economy in the long run. This result is corroborated by the statistically significant and negative coefficient of the tariffs variable in the long run. Higher tariffs seem to get in the way of free trade; hence, they impede FDI flows to the host nation. The finding is consistent with the study by Ali et al. (2010). Inflation also has a negative effect in the long run, indicating that an increase in price level discourages FDI flows to the host countries. GDP shows a positive and significant effect on FDI flows in both the short and long run. This is due to the fact that a larger market size corresponds to a greater demand for goods and services in the host economy, which in turn boosts more FDI flows. However, the role of GDP in attracting FDI flows depends on the type of FDI, as argued by Asideu, (2002) and Ali et al. (2010). They claim that GDP is an important determinant for market-seeking FDI while it is not an important factor for resource-seeking FDI. Finally, the error correction term (ECT) is expected to be negative, between 0 and -2. The values of ECT range from -0.691 to -0.831 as anticipated, which indicates that the model converges towards the long run relationship.

Table 4.8 presents the results of an examination of the relationship between FDI and institutional quality for the countries with stronger institutional quality. In contrast to the prior estimations, the coefficient of institutional quality has no significant effect on FDI either in the short or long terms. It is probable that the insignificance of the effect is due to the countries' better institutional quality over the period (1996–2017), which has restrained the variation in the total institutional index. It is also likely that different subcomponents of the overall institutional score have distinct effects on FDI flows. In other words, some components constituting the overall index of institutional quality may be more important than others. Furthermore, it is likely that some dimensions of institutions stimulate FDI into the host economy while others may not have a significant effect on it. Lastly, the relationship between institutional quality and FDI flows may not be monotonic.[38] More clearly, beyond a certain threshold, FDI inflows may increase by smaller and smaller extents or may even decrease. We will take into consideration all the possibilities in the following sections.

[38] It is examined in the next section.

Table 4.7. Results of Overall Index with Panel ARDL-PMG for Weaker Group

Dependent Variable (FDI)	Regression 1	Regression 2	Regression 3
Long run results			
institutional quality (EF)	0.2984*** (4.25)		
institutional quality (WGI)		0.0551** (2.52)	
institutional quality (ICGR)			0.3612** (2.19)
domestic investment	0.0065*** (4.88)	0.0025 (1.33)	0.0011 (1.54)
trade openness	0.0036** 2.14	0.0025*** (4.56)	0.0068* (1.73)
Inflation	-0.0023* (-1.77)	-0.0032 (-1.37)	-0.0060** (-2.13)
log gdp	0.0005** (2.48)	0.0002*** (3.50)	0.0005*** (2.61)
tariffs	-0.1518 (-1.45)	-0.0402** (-2.24)	-0.0277 (-1.35)
Short run results			
ECT	-0.7791*** (0.000)	-0.6914*** (-7.33)	-0.8316*** (-8.92)
institutional quality (EF)	-0.0191 (-0.65)		
institutional quality (WGI)		0.8797 (0.75)	
institutional quality (ICGR)			0.3192 (1.19)
domestic investment	0.0695 (1.03)	-0.0019 (-0.03)	0.0541 (0.82)
trade openness	0.0401* (1.73)	0.0272* (1.74)	0.0195 (1.26)
Inflation	0.0373 (1.01)	-0.0675 (-1.04)	-0.00912 (-1.15)
log gdp	0.0004*** (3.41)	0.0007 (1.11)	0.0002*** (3.04)
tariffs	0.0642 (0.41)	0.0023 (0.11)	-0.0229 (-1.17)
Constant	0.7826*** (3.20)	3.2574*** (6.48)	1.0938*** (3.88)
Hausman chi^2 P-value in bracket	5.54 (0.236)	8.41 (0.209)	1.22 (0.942)

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The lag structure is ARDL (1, 1, 1, 1, 1, 1,1) the lag order is selected using Akanke's Information Criterion (AIC) and Schwarz's Information Criterion (SIC). The order of variables is: FDI, institutional quality, domestic investment, trade openness, inflation, log_GDP, and tariffs.

Table 4.8. Results of Overall Index with Panel ARDL-PMG for Stronger Group

Dependent Variable (FDI)	**Regression 1**	**Regression 2**	**Regression 3**
Long run results			
institutional quality (EF)	-0.2324 (0.59)		
institutional quality (WGI)		0.6821 (0.56)	
institutional quality (ICGR)			0.1432 (1.53)
domestic investment	0.0064** (2.33)	0.0165 (1.12)	0.0211*** (8.80)
trade openness	0.0013** (2.12)	0.0090*** (2.65)	0.0056*** (3.24)
Inflation	0.0006 (-0.11)	0.0377 (1.39)	-0.0110* (-1.88)
log gdp	0.0006*** (3.83)	0.0003* (1.73)	0.0001 (0.84)
tariffs	-0.0176 (-1.06)	-0.0441 (-1.41)	-0.0219** (-2.49)
ECT	-0.7437*** (-10.02)	-0.6592*** (-7.12)	-0.8754*** (-9.63)
institutional quality (EF)	-0.6754 (-0.66)		
institutional quality (WGI)		0.0395 (0.02)	
institutional quality (ICGR)			1.2893 (1.19)
domestic investment	-0.0069 (-0.07)	-0.0128 (-1.37)	-0.0896 (-0.72)
trade openness	0.0025 (0.17)	0.0126 (0.32)	0.0385 (0.87)
Inflation	-0.0758 (-0.34)	-0.0751 (-0.38)	0.1317 (1.61)
log gdp	-0.0007 (0.490)	0.0009 (0.78)	-0.0004 (-0.78)
tariffs	-0.1471 (-0.46)	-0.3167 (-1.06)	-0.1893*** (-3.30)
Constant	2.8392*** (5.03)	2.0524*** (4.11)	2.3982*** (3.75)
Hausman chi^{2} **P-value in bracket**	3.22 (0.665)	1.82 (0.873)	4.97 (0.419)

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The lag structure is ARDL (1, 1, 1, 1, 1, 1,1) the lag order is selected using Akanke's Information Criterion (AIC) and Schwarz's Information Criterion (SIC). The order of variables is: FDI, institutional quality, domestic investment, trade openness, inflation, log_GDP, and tariffs.

4.5.2.1 Relationship Between the Quality of Institutions and Economic Growth

In this research, we also analyse if an improvement in institutional quality has an impact on the growth rate through an increase in FDI inflows to the host country. To do that, first we selected Mexico as a representative nation from the country group with weaker institutional quality and stimulated how FDI would increase if institutional quality improved by one percent using the ARDL method. Table 4.9 displays the results of the regression analysis. As demonstrated, one percent increase in institutional quality is associated with a 0.23 percent increase in FDI flows to Mexico. If Mexico were another OECD country and they were also homogenous, to assess the effect of one percent increase in FDI flows on the growth rate, we would look at the coefficient of FDI evaluated in the regression shown in Figure 2.2 in the second chapter. Its coefficient is 0.182, which indicates that one percent rise corresponds to a 0.182% increase in the growth rate. Within this perspective, an increase in FDI of 0.023 percent is associated with an increase in the growth rate of the host country of 0.0042 percent[39]. To conclude, if Mexico were like other nations, a one percent increase in FDI flows would be associated with a 0.0042 percent increase in Mexico, holding other factors constant.

[39] We use the following calculation to establish the quantitative relationship between institutional quality and economic growth: 0.182*0.023 = 0.0042.

Table 4.9. Effect of Institutional Quality on Economic Growth

Dependent Variable (FDI)	Regression 1	Regression 2	Regression 3
Long run Results			
institutional quality (EF)	2.3605*** (3.86)		
institutional quality (WGI)		1.1216*** (3.34)	
institutional quality (ICRG)			1.8848** (2.31)
domestic investment	0.6943** (2.92)	0.6481** (2.28)	0.7289** (2.26)
trade openness	0.1344* (1.85)	0.2326 (1.17)	0.1734* (1.68)
inflation	0.0019 (1.11)	0.0018 (1.53)	-0.2041* (-1.91)
log gdp	0.4226** (2.31)	0.1274** (2.13)	0.1648* (1.77)
tariff	-0.1213** (2.07)	-0.2094** (2.04)	-0.3568** (2.10)
Short Run Results			
ECT	-0.8941*** (-3.20)	-0.6324*** (-3.52)	-0.5913*** (-3.71)
institutional quality (EF)	1.6166 (1.47)		
institutional quality (WGI)		0.5301 (0.86)	
institutional quality (ICRG)			0.5699 (0.80)
domestic investment	0.6557 (1.37)	0.0317 (0.16)	0.5179 (1.01)
trade openness	-0.3037 (-1.42)	0.1235 (1.10)	0.1768 (0.89)
inflation	-0.0737 (-0.59)	-0.2025 (-0.85)	-0.2534* (-1.70)
log gdp	0.2328 (0.67)	0.1469 (0.28)	0.3649 (1.14)
tariff	-0.0964* (-1.87)	-0.3552* (-1.92)	-0.1639* (-1.81)

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The lag structure is ARDL (1, 1, 1, 1, 1, 1,1) the lag order is selected using Akanke's Information Criterion (AIC) and Schwarz's Information Criterion (SIC). The order of variables is: FDI, institutional quality, domestic investment, trade openness, inflation, log_GDP, and tariffs.

4.5.3 Relationship Between Components of Institutional Quality and FDI

As noted earlier, we analyse the influence of different dimensions of institutional quality on FDI flows separately in this section. This study employs the three most widely used components of institutions in the literature (namely, property rights, corruption, and democratic accountability). Table 4.10 indicates their effects on FDI flows for the group with weaker institutions. As demonstrated, all three aspects have a positive and significant effect on FDI flows in the long run. That is to say, stronger enforcement of rights, lower corruption levels (a higher score of corruption reflects lower levels of corruption), and more democratic accountability encourage more FDI flows to the host countries. However, property rights tend to have a greater impact on FDI than the other aspects. As for control variables, they continue to have similar signs to the preceding regression results.

Table 4.11 displays the results for the nations with better institutions. As can be seen, neither corruption nor democratic accountability have a significant impact on FDI flows to these nations. Nevertheless, the coefficient of property rights is positive and statistically significant, indicating that property rights play an important role in attracting more FDI to the host economies. These results are consistent with the study of Masron and Abdullah (2010) and Ali et al. (2012) who contend that institutional quality whose measurement is directly related to property rights aspects is strongly associated with more FDI flows compared to other components. Moreover, they assert that inadequately protected property rights result in two types of risks foreign investors may face, namely direct hazard and indirect hazard. The direct hazard refers to the potential for a host country's government to act opportunistically and seize some of the advantages from FDI or perhaps nationalise them. Indirect hazard can be described as follows: if they have better access to the political process, local competitors or partners might persuade the government to favour domestic investors over foreign investors. These two potential risks apply to all types of foreign investments in all industries. Finally, it is worth noting that in countries with stronger institutions, the effects of property rights on FDI inflows are larger than in those with weaker institutions. Given that property rights are the only significant component of institutional quality in the stronger group, its coefficient may be greater than that of the other group.

Table 4.10. Results of Components with Panel ARDL-PMG for Weaker Group

Dependent Variable (FDI)	Regression 1	Regression 2	Regression 3
Long run results			
property rights	0.0129** (2.09)		
corruption		0.0109*** (4.18)	
democratic accountability			0.0086* (1.66)
domestic investment	0.0025 (119)	0.0040 (0.56)	0.0018 (0.83)
trade openness	0.0032 (1.07)	0.0010*** (6.77)	0.0031 (1.00)
inflation	-0.0070** (-2.43)	-0.0059*** (-4.80)	-0.0056* (-1.92)
log gdp	0.0004*** (2.60)	0.0005*** (3.18)	0.0004** (2.23)
Short run results			
ECT	-0.8585*** (-9.39)	-0.8384*** (-8.03)	-0.8258*** (-8.57)
property rights	-0.0074 (-0.02)		
corruption		0.2012 (1.01)	
democratic accountability			-0.5634 (-1.38)
domestic investment	0.0845 (0.94)	0.0807 (1.23)	0.0142 (0.33)
trade openness	0.0334* (1.76)	0.0191 (1.42)	0.0123 (0.73)
inflation	-0.0335 (-0.71)	-0.0458 (-0.66)	-0.0633 (-0.62)
log gdp	0.0003*** (3.95)	0.0002** (2.33)	0.0004*** (4.19)
Constant	1.0415*** (3.57)	0.9096*** (3.39)	0.9262*** (3.54)
Hausman chi^2 **P-value in bracket**	3.98 (0.408)	6.98 (0.137)	7.00 (0.136)

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The lag structure is ARDL (1, 1, 1, 1, 1, 1) the lag order is selected using Akanke's Information Criterion (AIC) and Schwarz's Information Criterion (SIC). The order of variables is: FDI, institutional quality, domestic investment, trade openness, inflation, and log_GDP.

Table 4.11. Results of Components with Panel ARDL-PMG for Stronger Group

Dependent Variable (FDI)	Regression 1	Regression 2	Regression 3
Long run results			
property rights	0.0798*** (3.39)		
corruption		0.00165 (0.38)	
democratic accountability			-0.0402 (-0.33)
domestic investment	0.0220 (1.26)	0.0112*** (2.68)	0.0099 (0.51)
trade openness	0.0104*** (3.01)	0.0011 (1.16)	0.0176*** (3.65)
inflation	-0.1254*** (-3.56)	-0.0157* (-1.74)	-0.0898** (-2.39)
log gdp	0.0004** (2.33)	0.0004*** (2.82)	0.0003** (2.24)
Short run results			
ECT	-0.6252*** (-6.89)	-0.8386*** (-8.03)	-0.6558*** (-6.92)
property rights	-0.0844 (-0.95)		
corruption		0.0126 (0.10)	
democratic accountability			-0.7862 (-1.36)
domestic investment	0.0329 (0.34)	0.1564 (1.57)	0.0563 (0.50)
trade openness	0.0013 (0.03)	0.0091 (0.24)	0.0563 (0.73)
inflation	-0.0722 (-0.46)	-0.0389 (-0.26)	-0.0929 (-0.54)
log gdp	0.0001 (0.83)	-0.0007 (-0.73)	-0.0001 (-0.85)
Constant	2.2673*** (3.38)	1.6158*** (3.20)	3.1074*** (5.03)
Hausman chi^2 **P-value in bracket**	1.98 (0.740)	4.09 (0.394)	2.40 (0.663)

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The lag structure is ARDL (1, 1, 1, 1, 1, 1) the lag order is selected using Akanke's Information Criterion (AIC) and Schwarz's Information Criterion (SIC). The order of variables is: FDI, institutional quality, domestic investment, trade openness, inflation, and log_GDP.

4.5.4 Is the Relationship Between Institutional Quality and FDI Inflows Linear?

While institutional quality plays a significant role in attracting FDI flows to nations with weaker institutional quality levels, it has no significant effect on countries with higher institutional quality levels. The insignificant effect causes us to question the link between institutions and FDI. Is the relationship really linear and monotonic? Do institutional improvements display diminishing returns with respect to encouraging foreign entrepreneurs to invest in the host nation? To address the questions, we combined the two groups of nations and used the square of the institutional variable as a regressor, which is common practise applied by many works in the literature (e.g., Eberhardt and Presbitero, 2015; Samargandi et al., 2015).

The results are detailed in Table 4.12. In each regression, three distinct institutional quality data sets are utilised separately. In all columns, the coefficients of institutional quality are positive and statistically significant (FE, WGI, and ICRG), but their square coefficients are negative, indicating that the relationship between institutions and FDI flows is inverted U-shaped. Nevertheless, the negative coefficients are quite near to zero. For instance, based on the second regression, the threshold value is 7.16, showing that countries with a WGI value of 7.16 no longer attract FDI due to their institutional quality.[40] For countries that have surpassed the threshold value, any additional improvement in institutional quality discourages FDI inflow. In our sample, the mean value of the institutional quality (WGI) is lower than the threshold, indicating that institutional quality matters for attracting FDI. Nonetheless, as the quality of institutions improves, FDI inflows will increase by smaller and smaller extents up to the threshold. The other regressions also confirm this outcome. As for control variables, their sign remains the same as in earlier regression analysis.

[40] To calculate the threshold value, we take the derivate of the equation 6 (for the long term part, that is, $\Delta y_{it} = \alpha_i + \theta_i (y_{i, t-1} - \gamma_i d_{i, t-1} - \lambda_i x_{i, t-1})$). Based on the calculation: ($\Delta y = ECT^*(- \beta_1.X - \beta_2.X^2)$, when we substitute the values into the equation, 0 = -0.0662.(0.0211 – 2.(-0.00147).X) X = 7,16. The same calculation method can be applied for other variables.

Table 4.12. Results for Panel ARDL (PMG) estimator (all countries)

Dependent Variable (FDI)	Regression 1	Regression 2	Regression 3
Long run results			
institutional quality (EF)	0.0684*** (3.63)		
Square of (EF)	-0.0004*** (-3.57)		
institutional quality (WGI)		0.0211*** (3.52)	
Square of (WGI)		-0.0014** (-2.87)	
institutional quality (ICGR)			0.0409*** (3.48)
Square of (ICGR)			-0.0003* (-1.66)
domestic investment	0.0027** (2.02)	0.0061 (1.03)	0.0251*** (2.62)
trade openness	0.0013*** (5.08)	0.0034** (2.15)	0.0013* (0.91)
Inflation	-0.0036* (-1.78)	-0.0174** (-1.98)	-0.0029** (2.13)
log gdp	0.0005** (2.13)	0.0002* (1.68)	0.0005*** (3.64)
tariff	-0.0202** (-2.34)	-0.0139 (-1.60)	-0.0415*** (-3.33)
Short run results			
ECT	-0.7548*** (-13.14)	-0.6623*** (-9.56)	-0.6447*** (-7.04)
institutional quality (EF)	0.1916 (1.18)		
Square of (EF)	-0.0014 (-1.10)		
institutional quality (WGI)		0.6097 (0.77)	
Square of (WGI)		-0.0317 (-0.75)	
institutional quality (ICGR)			0.1472 (0.83)
Square of (ICGR)			0.0043 (0.76)
domestic investment	0.0536 (0.73)	-0.0639 (-0.74)	0.0112** (2.11)
trade openness	0.0032 (0.52)	0.0096 (0.37)	0.0223 (1.05)
Inflation	-0.0569 (-0.81)	-0.0118** (-2.34)	-0.0393 (-0.58)
log gdp	0.0005 (1.44)	0.0008 (1.11)	0.0006 (1.10)
tariff	-0.0351 (-1.19)	0.0054 (1.33)	-0.0590 (-0.51)
Constant	1.6814*** (6.63)	1.0213*** (9.60)	1.1638*** (7.39)
Hausman chi^2 **P-value in bracket**	2.75 (0.599)	1.60 (0.661)	1.22 (0.942)

4.6 Robustness

In our robustness tests, we take into account cross-sectional dependence, which may bring about erroneous results estimated by the panel ARDL-PMG approach, as mentioned in the methodology section. The CS-ARDL approach takes into consideration the cross-sectional dependence and provides more accurate results. In the beginning, we examine the impact of institutional quality on FDI flows to countries with weaker institutional levels. The coefficient of institutional quality (FE) is positive and statistically significant in the long run, as shown in Table 4.13.[41] This indicates that these nations can attract more FDI since their institutions make it easier for multinational corporations to conduct business there. These results are robust to the inclusion of institutional quality (WGI) and ICRG variables in regressions two and three respectively. In the short run, none of the coefficients of institutional quality exert a significant effect. This means that institutions do not matter in the short run in stimulating more FDI flows to the host economies.

The findings regarding the relationship between institutional quality and FDI for countries with higher institutional levels are presented in Table 4.14.[42] As seen, the results are similar to those estimated by the panel ARDL-PMG method, as none of the coefficients on institutional quality enter the regressions significantly. More specifically, FDI is no longer drawn to these countries by further improvements in the quality of their institutions. Regarding control variables, they always have a significant role in attracting or discouraging FDI flows in the long term, but they have an insignificant effect in the short term. In conclusion, FDI flows are determined by the control variables only in the long run.

[41] Findings obtained by the half-panel jackknife method are similar to those estimated by CS_ARDL. See Table C4 in Appendix C.

[42] Results obtained by the half-panel jackknife method are reported in Table C5 in Appendix C.

Table 4.13. Results of Overall Index with Panel CS-ARDL for Weaker Group

Dependent Variable (FDI)	Regression 1	Regression 2	Regression 3
Long run results			
institutional quality (EF)	0.9952** (1.99)		
institutional quality (WGI)		0.9194*** (2.99)	
institutional quality (ICGR)			0.4663** (2.14)
domestic investment	0.1945* (1.71)	0.3874 (0.59)	0.113* (1.76)
trade openness	0.0491 (1.29)	0.0329 (0.43)	0.0343 (1.12)
Inflation	-0.3115* (-1.85)	-0.0181* (-1.73)	-0.3257 (-0.97)
log gdp	0.0002 (0.92)	0.0005 (0.48)	0.0001 (0.43)
tariff	-0.2254 (-1.00)	-0.3156 (-0.34)	-0.5918 (-0.18)
Short run Results			
FDI_{t-1}	0.3192*** (5.70)	0.3601* (1.71)	0.4415*** (4.74)
institutional quality (EF)	0.1247 (1.59)		
institutional quality (WGI)		0.6219 (0.58)	
institutional quality (ICGR)			0.2665 (0.38)
domestic investment	0.2372* (1.68)	0.1216*** (3.78)	0.1942 (1.18)
trade openness	0.0551 (1.31)	0.0601 (1.55)	0.0284 (1.07)
Inflation	-0.4313* (-1.69)	-0.1287 (-0.15)	-0.6254 (-0.94)
log gdp	0.0002 (0.87)	0.0009 (0.59)	0.0003 (1.63)
tariff	-0.3332 (-0.98)	-0.6216 (-0.59)	-0.2553 (-0.41)
ECT	-0.3198*** (-23.53)	-0.3562*** (-6.50)	-0.4417*** (-15.50)
CD **P-value in bracket**	1.17 (0.243)	1.50 (0.133)	0.48 (0.632)

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The lag structure is ARDL (1, 1, 1, 1, 1, 1,1) the lag order is selected using Akanke's Information Criterion (AIC) and Schwarz's Information Criterion (SIC). The order of variables is: FDI, institutional quality, domestic investment, trade openness, inflation, log_GDP, and tariffs.

Table 4.14. Results of Overall Index with Panel CS-ARDL for Stronger Group

Dependent Variable (FDI)	Regression 1	Regression 2	Regression 3
Long run results			
institutional quality (EF)	0.5468 (1.16)		
institutional quality (WGI)		0.8172 (1.03)	
institutional quality (ICGR)			-0.2936 (-0.19)
domestic investment	0.7365* (1.70)	0.1379* (1.69)	0.6312*** (2.72)
trade openness	0.0581 (0.98)	0.0320 (0.57)	0.0755 (1.01)
Inflation	-0.1748** (-1.96)	-0.2094 (-0.69)	-0.7193* (-1.75)
log gdp	0.0003*** (3.80)	0.0003 (1.14)	0.0002 (0.54)
tariff	-0.1525 (-1.10)	-0.3487** (-2.40)	-0.1253 (-0.96)
Short-run results			
FDI_{t-1}	0.7852** (2.39)	0.9438*** (10.22)	0.4214*** (3.53)
institutional quality (EF)	1.5034 (1.02)		
institutional quality (WGI)		-1.8520 (-1.08)	
institutional quality (ICGR)			0.3417 (0.19)
domestic investment	1.7025 (1.43)	0.2677 (1.27)	0.8665*** (2.63)
trade openness	0.1067 (0.46)	0.0664 (0.59)	0.1283 (1.08)
Inflation	-0.1883 (-1.29)	-0.4297 (-0.66)	-0.9072* (-1.66)
log gdp	-0.0005 (-0.75)	-0.0005 (-0.92)	-0.0004 (-0.89)
tariff	-0.2712 (-1.49)	-0.6473** (-2.37)	-0.2687 (-0.89)
ECT	-0.7857*** (-3.15)	-0.9435*** (-21.06)	-0.4216*** (-11.93)
CD **P-value in bracket**	0.65 (0.516)	1.33 (0.183)	1.36 (0.175)

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The lag structure is ARDL (1, 1, 1, 1, 1, 1,1) the lag order is selected using Akanke's Information Criterion (AIC) and Schwarz's Information Criterion (SIC). The order of variables is: FDI, institutional quality, domestic investment, trade openness, inflation, log_GDP, and tariffs.

This study also tests the robustness of the results of the positive relationship between certain aspects of institutional quality and FDI flows to both groups of countries. Table 4.15 shows the estimation results for countries with a weaker level of institutional quality.[43] The regressions encompass property rights, corruption, and democratic accountability separately. As seen in the table, all the variables are significant and positive, indicating that an improvement in any of them promotes FDI flows to those economies. Nevertheless, the positive effect of property rights is greater than the other two aspects. These findings confirm those estimated by the panel ARDL-PMG method. However, contrary to the Panel ARDL-PMG estimation, property rights exert a positive impact on FDI in the short run, but it is weak (significant at 10% level).

The estimation findings for countries with higher institutional levels are presented in Table 4.16.[44] As shown, while property rights exert a positive effect on FDI, democratic accountability and corruption do not enter the regressions significantly. These results are comparable to those calculated by the ARDL-PMG panel approach. The majority of control variables exhibit the same pattern as previous estimates.

Using the CS-ARDL method on the whole sample, this study conducts an additional robustness test to determine if the link between institutions and FDI inflows is linear[45]. Table 4.17 reports the results. As demonstrated, in regression 1 and 2, the institutional quality coefficient is positive and statistically significant. However, the square terms are negative and significant, which confirms the inverted U-shaped relationship between institutions and FDI flows[46]. Obviously, nations with a WGI score of 8.3 will not be able to attract additional FDI because of the rise in institutional quality. Since the average value of the countries in our sample is below the threshold value, the improvement in the quality of institutions continues to attract foreign investment, albeit at a decreasing rate. Contrary to the findings obtained by the ARDL-PMG method, the coefficient of square ICRG does not enter the regression significantly in column 3.

[43] See Table C6 for the findings estimated by the half-panel jackknife method in Appendix C.
[44] See Table C7 for the results obtained by the half-panel jackknife method in Appendix C
[45] The findings obtained by the half-panel jackknife method are similar to those estimated by CS_ARDL. See Table C8 in Appendix C.
[46] For example, the institutional quality (WGI) threshold is 8.3 based on the calculation: ($\Delta y = -0.601*(-0.0163.X - (-0.000973.X^2)$), when we take the derivate of the equation and substitute the values into the equation, we get: X = 8,3.

Table 4.15. Results of Components with Panel CS-ARDL for Weaker Group

Dependent Variable (FDI)	Regression 1	Regression 2	Regression 3
Long run results			
property rights	0.2865** (2.34)		
corruption		0.2136** (2.01)	
democratic accountability			0.2098* (1.73)
domestic investment	0.0873* (1.65)	0.0982* (1.79)	0.1197 (1.25)
trade openness	0.0143 (0.69)	0.0095 (1.25)	0.0105 (0.52)
Inflation	-0.1285* (-1.74)	-0.3197** (-2.11)	-0.2358 (-1.65)
log gdp	0.0005 (1.43)	0.0002 (1.48)	0.0001** (2.29)
Short run results			
FDI_{t-1}	0.4038*** (6.36)	0.4242*** (6.26)	0.4561*** (5.20)
property rights	0.1926* (1.79)		
corruption		0.2302 (0.66)	
democratic accountability			0.1567 (1.60)
domestic investment	0.1258 (1.52)	0.1426 (0.79)	0.1282 (1.10)
trade openness	0.0189 (0.67)	0.0259 (0.58)	0.0302 (0.82)
Inflation	-0.1876* (-1.76)	-0.4085** (-2.10)	-0.2891 (-1.49)
log gdp	0.0008 (1.43)	0.0004 (0.15)	0.0007* (1.92)
ECT	-0.4037*** (-22.15)	-0.4242*** (-21.01)	-0.4564*** (-16.58)
CD **P-value in bracket**	1.60 (0.11)	1.06 (0.290)	0.83 (0.407)

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The lag structure is ARDL (1, 1, 1, 1, 1, 1) the lag order is selected using Akanke's Information Criterion (AIC) and Schwarz's Information Criterion (SIC). The order of variables is: FDI, institutional quality, domestic investment, trade openness, inflation, and log_GDP.

Table 4.16. Results of Components with Panel CS-ARDL for Weaker Group

Dependent Variable (FDI)	Regression 1	Regression 2	Regression 3
Long run results			
property rights	0.2958** (2.13)		
corruption		0.2097 (0.54)	
democratic accountability			0.2743 (0.28)
domestic investment	0.2174 (1.56)	0.2862* (1.68)	0.3095* (1.84)
trade openness	0.0107 (0.17)	0.0174 (0.20)	0.0499 (0.56)
Inflation	-0.5513** (-2.18)	-0.6064** (-2.091)	-0.4925** (-2.23)
log gdp	0.0001 (1.33)	0.0002 (0.82)	0.0003 (1.18)
Short run results			
FDI_{t-1}	0.5587*** (4.99)	0.5775*** (5.31)	0.5136*** (4.86)
property rights	0.1325 (0.63)		
corruption		0.1537 (0.85)	
democratic accountability			0.1278 (0.85)
domestic investment	0.3293 (1.54)	0.4607 (1.58)	0.4702* (1.75)
trade openness	0.0164 (1.16)	0.0194 (1.13)	0.0945 (0.63)
Inflation	-0.7789* (-1.84)	-0.6112** (-2.11)	-0.7753** (-2.10)
log gdp	0.0002 (0.44)	0.0003 (0.68)	0.0008 (1.12)
ECT	-0.5598*** (-13.93)	-0.5774*** (-14.51)	-0.5135*** (-14.31)
CD **P-value in bracket**	0.87 (0.386)	0.89 (0.374)	0.99 (0.323)

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The lag structure is ARDL (1, 1, 1, 1, 1, 1) the lag order is selected using Akanke's Information Criterion (AIC) and Schwarz's Information Criterion (SIC). The order of variables is: FDI, institutional quality, domestic investment, trade openness, inflation, and log_GDP.

Table 4.17. Results for Panel CS-ARDL estimator (all countries)

Dependent Variable (FDI)	Regression 1	Regression 2	Regression 3
Long run results			
institutional quality (EF)	0.0303** (2.26)		
Square of (EF)	-0.0002** (-2.13)		
institutional quality (WGI)		0.0163* (1.83)	
Square of (WGI)		-0.0009* (-1.65)	
institutional quality (ICGR)			0.0195* (1.72)
Square of (ICGR)			-0.0001 (-1.16)
Domestic investment	0.0646* (1.71)	0.0249* (1.92)	0.0767 (1.01)
trade openness	0.0346* (1.77)	0.0405 (1.41)	0.0011* (1.91)
Inflation	-0.0139* (-1.65)	-0.0302 (-1.35)	-0.0185* (-1.68)
log gdp	0.0005 (1.30)	0.0003* (1.71)	0.0009 (1.35)
tariff	-0.3714 (-1.43)	-0.2257 (-1.49)	-0.0481 (-1.25)
Short run results			
FDI_{t-1}	1.1425*** (9.54)	1.0027*** (12.00)	0.7313*** (13.39)
institutional quality (EF)	0.0395 (0.79)		
Square of (EF)	-0.0014 (-0.35)		
institutional quality (WGI)		0.1698* (1.72)	
Square of (WGI)		-0.0003 (-0.68)	
institutional quality (ICGR)			0.1417 (1.05)
Square of (ICGR)			0.0024 (0.96)
Domestic investment	0.0257 (0.64)	0.0739 (0.56)	0.0314* (1.66)
trade openness	0.0162 (0.77)	0.0771 (1.52)	0.0231 (0.54)
Inflation	-0.0783 (-0.61)	-0.0541 (-1.13)	-0.0534* (-1.73)
log gdp	0.0003 (1.44)	0.0007* (1.70)	0.0002 (1.38)
tariff	-0.0454 (-1.32)	-0.0056 (-0.81)	-0.0102 (-1.14)
ECT	-0.6218*** (-17.89)	-0.6015*** (-13.96)	-0.6312*** (-13.57)
CD **P-value in bracket**	1.07 (0.286)	1.17 (0.242)	0.91 (0.362)

4.7 Conclusion

This study empirically explores the effect of institutional quality on FDI inflows in the short and long terms using the Panel ARDL-PMG and CS-ARDL methods during the period 1996-2017 for OECD member countries. Even though it is generally agreed that institutions have an important role in attracting FDI, the literature is far from conclusive on this topic. This study takes into account all potential confounding factors that have been overlooked by previous research, such as using only the overall institution score or a single aspect of institutions, data unavailability, etc. The key findings of this study can be summed up as follows:

Institutional quality is a significant factor in attracting foreign direct investment (FDI) flows in the long term to countries which have lower institutional quality as a group, while it is unclear whether it encourages FDI flows to these countries in the short run. This result indicates that foreign investors can certainly benefit from the improvement of institutions over the long term. As for the individual components of institutional quality, our findings indicate that the various components of institutional quality do not affect FDI flows equally. Although FDI is driven by all three factors (namely property rights, democratic accountability and corruption), property rights have the greatest impact on FDI flows. Regarding countries with better institutional quality as a group, the overall score of institutional quality does not play a significant role in attracting FDI in both long and short terms. In terms of individual components, the only significant determinant of FDI is property rights.

The other contribution of this study to the literature is an evaluation of whether the relationship between institutional quality and FDI flows is linear. Our findings show there is an inverted U-shaped link between institutional quality and FDI inflows in the whole sample of OECD countries. More clearly, diminishing returns of institutional quality on FDI flows is observed for countries below the threshold. This means that when these countries improve their institutions, they attract less foreign investment than they did before. Institutional quality will no longer attract more FDI flows for countries reaching the threshold. Even for countries that surpass the threshold, further institutional improvements will discourage FDI flows.

These results are robust to the utilisation of data on institutions from various sources, namely Economic Freedom (EF), Worldwide Governance Indicators (WGI) and International Country Risk Guide (ICRG), and the incorporation of control variables used in various research. Further robustness check is also performed using the CS-ARDL technique, which is

superior to the ARDL-PMG in considering cross-sectional dependence, and the half-panel jack-knife method, as detailed in the methodology section.

The findings of this research suggest some implications for policymakers. On the basis of these findings, policymakers may enhance the inflow of FDI in OECD countries in the weaker group by strengthening the quality of overall institutions over the long term. Nevertheless, the different components of institutional quality do not affect FDI in the same manner, as previously stated. In this context, greater attention should be paid to enforcing property rights in order to increase FDI flows rather than on other dimensions. Regarding nations in the stronger group, policymakers should concentrate on specific components of institutions to determine which aspect of institutions matters for FDI inflows, as the overall score of institutional quality does not show a significant impact on FDI. When considering the individual dimensions, policymakers should give priority to securing property rights over all other considerations. Finally, governments should assess their nation's position in the inverted U-shaped relationship between institutions and FDI to judge the extent to which FDI flows would respond to an incremental improvement in institutional quality. Thus, attempts to increase institutional quality will have a limited impact in improving the effectiveness of FDI flows in nations near the institutional quality threshold.

5. Chapter 5: Concluding Remarks

The motivation for undertaking research collected in this thesis stemmed from the fact that there is no consensus in the literature regarding the effect of FDI on the growth rate and domestic investment of the recipient countries. Similarly, the determinants of FDI flows in general, and the role of institutional quality in attracting or discouraging FDI inflows, remain unclear. The potential factors that may account for the mixed results in the literature, as explained in the preceding chapters in detail, are just partially considered by some studies. While taking into account these factors, we attempt to re-examine the relationship between FDI, economic growth, and domestic investment; and the link between institutional quality and FDI in the host countries.

Chapter 2 focuses on the effect of aggregate FDI on the growth rate and domestic investment in the recipient economies using pooled OLS, fixed effects and system GMM over the period 1990-2017. Even though a huge amount of work has been undertaken on this topic, the role of aggregate FDI in this relationship is not conclusive. Many studies fail to account for the absorptive capacities of countries, which may be one of the causes for the contradictory results (e.g., Adams, 2009; Bengoa and Sanchez-Robles, 2003;). For instance, it is anticipated that incoming foreign enterprises will transmit more advanced technology to their counterparts in the host economy. However, a lack of sufficient educated workforce to absorb and work with the modern technology may prevent this type of spillover from occurring (e.g., Bengoa and Sanchez-Robles, 2003; Balasubramanyam, et al., 1999; Kherfi and Soliman, 2005). Similarly, the level of financial development, political freedom and infrastructure may play a role in the link between FDI and economic growth (e.g., Hermes and Lensink, 2003;, Iamsiraroj and Ulubaşoğlu, 2015; Raza et al., 2019). More importantly, the origin of FDI may have a crucial role in the growth-promoting effect. As argued by Luo (1998), FDI inflows from developed nations are more active in R&D and use more modern technologies. Thus, it is anticipated that much of the technology transfers will be associated with foreign investments from developed nations.

The findings of Chapter 2 indicate that aggregate FDI, indeed, contributes positively to the growth of the host nation. When considering the countries' absorptive capacities, the results reveal that host countries with a well-established financial system, a more educated workforce, and greater political freedom benefit more from FDI. This chapter also finds that the origin of FDI matters in determining the impacts of FDI on the host country’s economy. The results

show that FDI inflows originating from developed countries contribute to the growth of the host country, while FDI from developing countries shows no significant effect on the growth rate. This finding is consistent with the studies by Luo (1998) and Gee and Karim (2011), who state that FDI from developed countries is commonly equipped with advanced technology and operates in capital-intensive industries. In this context, positive spillovers such as the transfer of advanced technology and management practices and the introduction of new processes are more likely to occur with FDI from developed countries.

In the second chapter, we also perform an analysis of the effect of FDI on domestic investment in the receiving country. The results reveal that overall FDI has no significant effect on domestic investment. However, this conclusions changes when we account for the origin of FDI. Accordingly, FDI from developed nations helps crowd in domestic investment, whereas FDI from less developed nations has no significant effect. This result is parallel to the previous finding and confirms that FDI from developed countries tends to bring in advanced technologies and create more linkages with local companies than foreign investors from developing countries.

Our analysis in this chapter is limited in that it does not consider the types of FDI. Further research could extend this by dividing the types of FDI into brownfield investment and greenfield investment, given that each type may have different effects on growth and domestic investment.

It is likely that focusing only on aggregate FDI flows is one reason why the literature has produced inconclusive results regarding the role of FDI in economic growth and domestic investment.

Chapter 3 is a step in the direction of such disaggregate analysis, but instead of FDI types, it considers the sectors into which the investments flow. As the degree of FDI's linkage with the rest of the economy may depend on sectors, each sector might contribute differently to the host country's economy. Within this framework, Chapter 3 investigates the effects of FDI in the primary, manufacturing and services sectors on the growth rate and domestic investment.

The results reveal that FDI in the manufacturing and services sectors is associated with a higher growth rate in the host economy. Furthermore, the magnitude of the growth-promoting impact in the manufacturing sector is always greater than that in the service sector. On the other hand, we find no evidence of a significant effect of FDI flows in the primary sector. Based on

these findings, our results confirm the hypothesis that positive spillovers, such as advanced technology transfer or know-how management, are more prevalent in the manufacturing and service sectors than in the primary sector (see Findlay, 1978; Wang and Blomstrom, 1992).

Regarding the host countries' absorptive capacity, it has been found that a well-developed financial system, the existence of a more educated labour force, and more political freedom allow the host economy to benefit more from FDI flows into the manufacturing and service sectors. In the primary sector, the benefits depend on the development of infrastructure. Taking into account the subsectors of the primary sector, such as quarrying and mining, the cost of transportation should play an important role in this sector so that upgrades to the rail network allow the host economy to gain more from FDI in the sector.

Chapter 3 also shows that there is a crowding-in effect of FDI flows in the manufacturing and service sectors, whereas a crowding-out effect has been found in the primary sector. FDI flows in the manufacturing and service sectors crowd in more domestic investment when the host country has a better-functioning financial system, a more educated labour force, and more political freedom. Similarly, FDI in the primary sector crowds out less domestic investment if the host economy has greater political freedom and a more developed infrastructure.

Chapter 3 is limited to the three main and rather broad sectors. Future research might analyse the impact of FDI flows in sub-categories of these sectors, particularly FDI in the service sector which encompasses a diverse array of sub-sectors, given that each sub-category of the main sectors may have a distinct impact on growth and domestic investment.

Chapter 4 contributes to the research on the importance of institutional quality in attracting FDI flows to OECD countries between 1996 and 2007 using the panel ARDL-PMG and CS-ARDL techniques. These methods allow us to scrutinize the relationship between institutions and FDI flows over the short and long terms, which is an important advantage of these methods given that foreign investors' response to the strengthening of institutions may not be evident in the short term (Ren et al., 2012). First, we split the sample into two groups as countries with weaker and stronger institutional quality, based on their total institution score. In doing so, we account for the fact that nations in the stronger group have better institutions from the beginning of the period, and that their improvements in terms of institutional quality have been rather limited, which may prevent us from finding a significant impact on FDI flows.

In addition, this chapter employs three distinct data sources (Economic Freedom Index (EF), Worldwide Governance Indicators (WGI), and International Country Risk Guidance (ICRG).

Furthermore, we consider a different approach to selecting variables representing institutional quality. First, broad composite measures of institutional quality are employed to analyse the impact of institutions on FDI. EF data provides an overall index, while others (WGI and ICRG) do not. Therefore, we applied the PCA method to generate a single broad variable for the two datasets. Second, we also focus on individual components of institutions given that distinct individual constituents may produce different or even opposing outcomes.

Finally, this chapter also explores the possibility that the relationship between institutional quality and FDI inflows may be non-linear. To put it differently, the positive effect of institutions may become smaller or even negative beyond a certain threshold.

The findings of this chapter demonstrate that the impact of institutional quality on FDI inflows for the two groups is significantly distinct. Institutional quality plays an important role in attracting FDI to countries with weaker institutions in the long term, while it is not a significant determinant of FDI for countries in the stronger group. However, in the short term, there is no significant effect of institutions for either group. Considering the individual components of institutions, all the components have a positive and significant effect on FDI flows to countries with weaker institutions in the long term. It is worth emphasising that property rights among the components have the greatest impact on FDI. As for the countries in the stronger group, the only significant determinant of FDI is property rights. Finally, the results indicate that there is an inverted U-shaped relationship between institutional quality and FDI inflows in the whole sample. Based on this result, the positive role of institutional quality will diminish and could even turn negative beyond a certain point.

Since the scope of this chapter is limited to the effects of institutional quality on aggregate FDI flows, future studies could focus on sectoral FDI to determine in which sectors institutional quality is most effective.

The implications of this thesis for policymakers can be defined as follows: First, FDI inflows should not be treated equally across nations. Incentives to attract FDI should only be granted if the FDI is anticipated to result in positive spillovers, such as the transfer of modern technology and management skills, etc. Second, since the positive effect of foreign investments on a sectoral basis is observed only in the manufacturing and service sectors, FDI should be encouraged in these sectors rather than the primary sector. Finally, in order to maximise the

benefits of both aggregate and sectoral FDI, with the exception of the primary sector, the host nation should have a well-established financial market, a more educated labour force, and political freedom. For the primary sector, a more developed rail network is a precondition to benefiting from FDI in this sector.

In addition to the aforementioned implications, this thesis also has some suggestions for policymakers regarding the policies aiming to attract more FDI. First of all, since our findings indicate that the results of institutional quality will occur in the long term, the return on institutional improvement in terms of encouraging FDI should not be anticipated in the near future. Furthermore, the level of countries in terms of institutional quality plays an important role in attracting more FDI. As seen in our findings, the general improvement of institutions does not help boost FDI inflows in countries with stronger institutions. Besides, property rights are the component of institutions that have the greatest impact on attracting FDI, so more efforts should be put into this constituent. Finally, it should be noted that any attempts to strengthen institutional quality will have a limited impact on attracting FDI flows in nations near the institutional quality threshold.

6. Appendix A

Table A1. Correlation Matrix

	growth	FDI	inflation	trade openness	government exp	Population	Domestic invest.	finance index	human capital	political freedom	rail network
growth	1.000										
FDI	0.1001	1.000									
inflation	-0.1092	-0.0787	1.000								
trade openness	0.1392	-0.2809	-0.1577	1.000							
government exp	-0.1868	-0.1104	0.1377	0.1224	1.000						
population	-0.2115	0.1563	0.1967	-0.1115	-0.0844	1.000					
domestic invest.	0.3981	-0.2071	0.1269	0.0434	-0.3443	0.0423	1.000				
finance index	-0.3870	0.0326	-0.3607	0.0543	0.0055	0.1489	-0.1800	1.000			
human capital	0.1031	0.0100	-0.4086	0.2461	0.2375	-0.1168	-0.1688	0.3163	1.000		
political freedom	0.1094	0.0940	-0.3078	0.1268	0.1505	-0.3658	-0.2225	0.2897	0.3010	1.000	
rail network	0.0907	0.7602	-0.0360	-0.3285	-0.1719	0.1334	-0.1453	-0.0965	-0.1322	0.0588	1.000

Table A2. Effect of Aggregate FDI on Growth with Pooled-OLS

	(1) Growth	(2) Growth	(3) Growth	(4) Growth	(5) Growth	(6) Growth
fdi	0.1492***	0.0778*	0.1538***	0.1467***	0.1583***	0.1225**
	(3.52)	(1.90)	(3.27)	(3.43)	(3.33)	(2.33)
log gdp	-0.6095***	-0.2926***	-0.5784***	-0.7252***	-0.7334***	-0.4938***
	(-6.20)	(-2.76)	(-5.36)	(-6.50)	(-5.93)	(-2.87)
inflation	-0.0153	-0.0161	-0.0259*	-0.0168	-0.0140	-0.0092
	(-1.38)	(-1.54)	(-1.74)	(-1.47)	(-1.18)	(-0.62)
trade openness	0.0053	0.0041*	0.0010	-0.0077	0.0076	0.0039
	(1.22)	(1.64)	(1.41)	(1.32)	(1.28)	(1.21)
government expenditure	-0.0254***	-0.0368***	-0.0222**	-0.0248**	-0.0191*	-0.0261**
	(-2.65)	(-3.86)	(-2.20)	(-2.58)	(-1.77)	(-2.31)
populationrate	-0.0006	-0.0024*	-0.0001	-0.0021	-0.0023	0.0143**
	(-1.17)	(-1.71)	(-1.03)	(-1.62)	(-1.58)	(2.05)
domestic investment	0.2473***	0.2125***	0.2431***	0.2384***	0.2472***	0.2143***
	(9.86)	(8.63)	(9.32)	(9.05)	(8.66)	(7.44)
landlocked	-1.2125***					-1.3176***
	(-3.71)					(-3.46)
finance index		-0.6537***				-0.7148***
		(-9.09)				(-7.21)
human capital			0.0022			0.0098
			(0.26)			(1.05)
political freedom				0.0519		0.2235**
				(0.62)		(2.22)
rail network					-0.0051	-0.0025
					(-0.43)	(-0.91)
_cons	12.9627***	5.9803*	11.8259***	15.8218***	16.0834***	7.4628
	(4.62)	(2.04)	(3.97)	(4.94)	(4.54)	(1.65)
R-Squared	0.221	0.315	0.218	0.231	0.233	0.317
N	825	745	769	805	694	605

Notes: The dependent variable is GDP per capita growth. FDI is measured by the net inflows of foreign direct investment divided by GDP. See data section for data sources and data definition. The model is estimated by using the pooled OLS. Cluster standard errors at the country level are employed in the model. t statistics are reported in parentheses. * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

Table A3. Effect of Aggregate FDI on Growth with Fixed Effects

	(1) Growth	(2) Growth	(3) Growth	(4) Growth	(5) Growth	(6) Growth
fdi	0.1074**	0.1902*	0.1103**	0.1046**	0.1271**	0.1827*
	(2.05)	(1.68)	(1.96)	(2.01)	(2.14)	(1.71)
Initial gdp	-0.5971***	-0.4574***	-0.6516***	-0.6149***	-0.7157***	-0.5643***
	(-10.64)	(-6.73)	(-10.44)	(-10.90)	(-10.04)	(-6.35)
inflation	-0.0284**	-0.0306**	-0.0193	-0.0281**	-0.0274*	-0.0301*
	(-2.12)	(-2.49)	(-1.12)	(-2.09)	(-1.93)	(-1.81)
trade opennes	0.0583***	0.0569***	0.0577***	0.0585***	0.0708***	0.0639***
	(8.34)	(7.56)	(7.86)	(8.43)	(8.60)	(7.24)
government expenditure	-0.1296***	-0.0641**	-0.1317***	-0.1286***	-0.1135***	-0.0522*
	(-4.45)	(-2.28)	(-4.38)	(-4.37)	(-3.55)	(-1.68)
populationrate	-1.2424***	-1.1378***	-1.1613***	-1.3451***	-1.6106***	-1.3913***
	(-7.89)	(-7.74)	(-7.20)	(-8.05)	(-7.99)	(-7.36)
domestic investment	0.4078***	0.4595***	0.4132***	0.4085***	0.4497***	0.4839***
	(12.04)	(13.66)	(11.78)	(11.87)	(12.01)	(12.89)
finance index		-0.7369***				-0.7654***
		(-5.79)				(-4.92)
human capital			0.0425***			0.0195
			(2.89)			(1.28)
political freedom				0.2354*		0.0142
				(1.80)		(0.08)
rail network					0.0023	0.0014
					(1.30)	(0.82)
_cons	151.7343***	112.6941***	160.931***	154.3352***	180.18394***	136.4671***
	(10.38)	(6.27)	(10.08)	(10.55)	(9.74)	(5.92)
Hausman-test	145.31	116.02	137.70	151.23	136.88	104.61
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R-Squared	0.353	0.418	0.360	0.364	0.365	0.440
N	796	717	746	778	672	587

Notes: The dependent variable is GDP per capita growth. FDI is measured by the net inflows of foreign direct investment divided by GDP. See data section for data sources and data definition. The model is estimated by using the fixed effects (individual effects) method. Cluster standard errors at the country level are employed in the model. t statistics are reported in parentheses. * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

Table A4. Effect Conditional FDI on Growth with pooled OLS

	(1) Growth	(2) Growth	(3) Growth	(4) Growth
fdi	0.0962***	-0.294	-0.735*	0.210***
	(2.94)	(-1.12)	(-1.71)	(4.21)
log gdp	-0.00362***	-0.00451***	-0.00415***	-0.00525***
	(-4.27)	(-5.25)	(-4.59)	(-5.11)
inflation	-0.0136	-0.0257*	-0.0316***	-0.0210*
	(-1.29)	(-1.79)	(-2.95)	(-1.74)
trade openness	0.00324	0.00353	0.00953***	0.00227
	(1.32)	(1.48)	(4.75)	(0.86)
government expenditure	-0.0376***	-0.0274***	-0.0267***	-0.0221**
	(-4.19)	(-2.89)	(-2.96)	(-2.16)
populationrate	-0.494***	-0.587***	-0.907***	-0.735***
	(-3.72)	(-4.29)	(-6.79)	(-4.45)
domestic investment	0.218***	0.244***	0.253***	0.252***
	(9.01)	(9.83)	(10.12)	(8.90)
finance index	-0.640***			
	(-7.85)			
fdi*finance	0.0556**			
	(2.44)			
human capital		-0.00687		
		(-0.71)		
fdi*human		0.00430*		
		(1.66)		
political freedom			0.312***	
			(3.15)	
fdi*politic			0.0817*	
			(1.88)	
rail network				-0.000431
				(-0.81)
fdi*network				-0.000118
				(-0.22)
_cons	7.815***	9.500***	9.597**	10.46***
	(3.15)	(3.51)	(2.45)	(3.36)
R-squared	0.340	0.241	0.262	0.256
N	746	770	806	695

Notes: The dependent variable is GDP per capita growth. FDI is measured by the net inflows of foreign direct investment divided by GDP. See data section for data sources and data definition. The model is estimated by using the pooled OLS. Cluster standard errors at the country level are employed in the model. t statistics are reported in parentheses. * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

Table A5. Effect of FDI from Different Countries on Growth with Pooled-OLS

	(1) Growth	(2) Growth	(3) Growth	(4) Growth	(5) Growth	(6) Growth	(7) Growth	(8) Growth
fdi developed	0.3025*	0.3533**	0.3061**	0.3117*				
	(1.77)	(1.99)	(2.27)	(1.66)				
fdi developing					0.1416	0.3417	0.6125	0.6151
					(0.16)	(0.37)	(0.57)	(0.56)
initial gdp	-4.41e-14*	-4.48e-14*	-4.96e-14*	-4.38e-14	-5.58e-14	-5.59e-14	-5.55e-14*	-1.58e-14
	(-1.71)	(-1.67)	(-1.88)	(-1.03)	(-1.57)	(-1.53)	(-1.79)	(-1.22)
inflation	-0.0091*	-0.0050	-0.0091	-0.0021	-0.0079*	-0.0028	-0.0069	0.0046
	(-1.80)	(-1.32)	(-1.51)	(-0.12)	(-1.69)	(-1.18)	(-1.39)	(1.28)
trade openness	0.0065**	0.0062*	0.0050	0.0065*	0.0076**	0.0072**	0.0055	0.0069*
	(2.12)	(1.86)	(1.42)	(1.76)	(2.44)	(2.10)	(1.50)	(1.80)
government expenditure	-0.0225*	-0.0203	-0.0203	-0.0140**	-0.0208*	-0.0183	-0.0187	-0.0152
	(-1.86)	(-1.56)	(-1.45)	(-1.96)	(-1.72)	(-1.40)	(-1.34)	(-1.03)
populationrate	-0.4167**	-0.3615*	-0.3342	0.4003*	-0.4074**	-0.3648*	-0.3456	0.5202**
	(-2.15)	(-1.72)	(-1.41)	(1.68)	(-2.08)	(-1.72)	(-1.45)	(2.02)
domestic investment	0.2286***	0.2245***	0.2243***	0.2354***	0.2308***	0.2271***	0.2286***	0.2445***
	(7.37)	(6.83)	(6.07)	(6.26)	(7.43)	(6.91)	(6.16)	(6.45)
landlocked	-1.0847***	-0.9713**	-1.0327**	-0.8558*	-0.9601***	-0.8308**	-0.9137**	-0.8504*
	(-2.93)	(-2.29)	(-2.27)	(-1.89)	(-2.63)	(-1.98)	(-2.03)	(-1.87)
finance index	-0.5817***	-0.5886***	-0.6721***	-0.5872***	-0.5878***	-0.5966***	-0.6821***	-0.6412***
	(-7.66)	(-7.08)	(-7.13)	(-6.00)	(-7.71)	(-7.13)	(-7.21)	(-6.25)
human capital		0.0092	0.0032	0.0102*		0.0093	0.0035	0.0076
		(0.94)	(0.30)	(1.87)		(0.95)	(0.32)	(0.64)
political freedom			0.2716*	0.1342**			0.2816*	0.2001
			(1.80)	(2.14)			(1.86)	(1.47)
rail network				0.0043				0.0026
				(0.12)				(1.07)
_cons	-2.6708***	-3.6775**	-5.4194***	-4.3376***	-2.8558**	-3.9079**	-5.7064**	-6.1562**
	(-2.59)	(-2.65)	(-2.70)	(-2.69)	(-2.77)	(-2.81)	(-2.85)	(-3.16)
R-Squared	0.249	0.247	0.246	0.251	0.245	0.241	0.242	0.246
N	552	511	459	447	552	511	459	447

Notes: The dependent variable is GDP per capita growth. FDI from developed and developing countries is measured by the net inflows of foreign direct investment originating from developed and developing countries divided by GDP, respectively. See data section for data sources and data definition. The model is estimated by using the pooled OLS. Cluster standard errors at the country level are employed in the model. t statistics are reported in parentheses. * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

Table A6: Effect of FDI from Different Countries on Growth with Fixed Effects

	(1) Growth	(2) Growth	(3) Growth	(4) Growth	(5) Growth	(6) Growth	(7) Growth	(8) Growth
fdi developed	0.4995**	0.5124**	0.4872**	0.5538***				
	(2.59)	(2.53)	(2.39)	(2.68)				
fdi developing					-0.4342	-0.5101	-0.3484	-0.2836
					(-0.65)	(-0.74)	(-0.47)	(-0.38)
initial gdp	-2.20e-13*	-1.88e-13	-1.80e-13	-5.48e-13	-1.71e-13	-1.52e-13	-1.60e-13	-4.44e-13
	(-1.65)	(-1.50)	(-1.48)	(-1.63)	(-1.50)	(-1.41)	(-1.43)	(-1.51)
inflation	-0.0226	-0.1063	-0.0813	-0.1739*	-0.0201	-0.0732	-0.0397	-0.1068
	(-1.30)	(-1.59)	(-1.11)	(-1.82)	(-1.14)	(-1.10)	(-0.54)	(-1.12)
trade openness	0.0830***	0.0780***	0.0782***	0.0867***	0.0717***	0.0656***	0.0671***	0.0733***
	(7.19)	(6.29)	(6.21)	(6.50)	(6.53)	(5.57)	(5.62)	(5.81)
government expenditure	-0.1107**	-0.1213**	-0.1179**	-0.0782	-0.0936*	-0.1011**	-0.0953*	-0.0556
	(-2.24)	(-2.34)	(-2.17)	(-1.39)	(-1.91)	(-1.96)	(-1.77)	(-0.98)
populationrate	-2.1598***	-2.2056***	-2.4854***	-2.6267***	-2.2315***	-2.2542***	-2.5074***	-2.6635***
	(-5.71)	(-5.42)	(-5.85)	(-5.92)	(-5.85)	(-5.49)	(-5.85)	(-5.93)
domestic investment	0.5503***	0.5874***	0.5578***	0.6542***	0.5681***	0.5997***	0.5685***	0.6613***
	(11.16)	(10.89)	(9.72)	(10.37)	(11.47)	(11.05)	(9.84)	(10.35)
finance index	-1.0141***	-1.0035***	-1.1717***	-1.1509***	-1.0606***	-1.0472***	-1.1957***	-1.1615***
	(-6.34)	(-5.99)	(-6.10)	(-5.40)	(-6.58)	(-6.21)	(-6.18)	(-5.39)
human capital		0.0305	0.0241	0.0386*		0.0377*	0.0318	0.0467*
		(1.35)	(1.04)	(1.68)		(1.66)	(1.36)	(1.90)
political freedom			0.2081*	0.3982			0.2415*	0.4164
			(1.72)	(1.32)			(1.83)	(1.37)
rail network				0.0026				0.0021
				(1.55)				(1.43)
_cons	-12.9724***	-16.1737***	-16.9183***	-24.6403***	-12.7834***	-16.7092***	-18.0183***	-25.3673***
	(-5.14)	(-4.71)	(-3.67)	(-4.85)	(-5.03)	(-4.83)	(-3.89)	(-4.94)
Hausman-test	98.99	95.99	95.96	94.34	123.58	125.79	125.69	122.15
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R-Squared	0.438	0.436	0.441	0.477	0.429	0.427	0.431	0.465
N	552	511	495	447	552	511	495	447

Note: The dependent variable is GDP per capita growth. FDI from developed and developing countries is measured by the net inflows of foreign direct investment originating from developed and developing countries divided by GDP, respectively. See data section for data sources and data definition. The model is estimated by using the fixed effects (individual effects) method. Cluster standard errors at the country level are employed in the model. t statistics are reported in parentheses. * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

Table A7. Effect of FDI on Domestic Investment with Pooled-OLS

	(1) GFCF	(2) GFCF	(3) GFCF	(4) GFCF	(5) GFCF	(6) GFCF
fdi	0.1713***	0.1641***	0.1557***	0.1435***	0.1776***	0.1528**
	(3.29)	(3.07)	(2.76)	(2.81)	(2.99)	(2.36)
inflation	0.0146	0.00012	0.0086	-0.0004	0.0143	-0.0119
	(1.08)	(0.01)	(0.47)	(-0.03)	(1.04)	(-0.63)
trade openness	-0.0048*	-0.0048	-0.0027	-0.0043	-0.0061*	-0.0022
	(-1.72)	(-1.48)	(-0.90)	(-1.55)	(-1.96)	(-0.58)
government expenditure	-0.1292***	-0.1371***	-0.1236***	-0.1257***	-0.1389***	-0.1426***
	(-11.33)	(-11.31)	(-10.23)	(-11.16)	(-11.25)	(-10.56)
population	0.0073*	0.0077**	0.0088**	0.0089**	0.0120**	0.0135**
	(1.92)	(2.01)	(2.14)	(2.40)	(2.01)	(1.98)
finance index		0.1823**				0.2335**
		(2.07)				(2.07)
human capital			0.0230**			0.0099
			(2.28)			(0.85)
political freedom				0.3974***		0.2482**
				(4.15)		(2.06)
rail network					0.0045	0.0049
					(0.49)	(0.47)
_cons	27.9752***	28.2871***	29.9926***	31.6224***	28.6734***	31.9462***
	(55.35)	(52.15)	(25.23)	(31.36)	(48.74)	(19.24)
R-Squared	0.214	0.228	0.212	0.241	0.237	0.263
N	873	792	813	853	735	643

Notes: The dependent variable is gross fixed capital formation (GFCF). FDI is measured by the net inflows of foreign direct investment divided by GDP. See data section for data sources and data definition. The model is estimated by using the Pooled OLS method. Cluster standard errors at the country level are employed in the model. t statistics are reported in parentheses. * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

Table A8. Effect of FDI on Domestic Investment with Fixed-Effects

	(1) GFCF	(2) GFCF	(3) GFCF	(4) GFCF	(5) GFCF	(6) GFCF
fdi	0.0410	0.0621	0.0346	0.0438*	0.0355	0.0582
	(0.71)	(1.04)	(1.57)	(1.78)	(1.57)	(0.85)
inflation	-0.0264*	-0.0288*	-0.0308	-0.0246*	-0.0301*	-0.0319
	(-1.77)	(-1.94)	(-1.63)	(-1.69)	(-1.95)	(-1.60)
trade openness	-0.0450***	-0.0506***	-0.0420***	-0.0409***	-0.0434***	-0.0380***
	(-7.52)	(-7.05)	(-6.39)	(-6.95)	(-6.74)	(-4.57)
government expenditure	-0.3603***	-0.3851***	-0.3515***	-0.3527***	-0.3596***	-0.3598***
	(-12.90)	(-13.47)	(-12.14)	(-12.79)	(-12.06)	(-11.51)
populationrate	0.0479**	0.0430*	0.0569**	0.0520**	0.0420*	0.0911**
	(2.15)	(1.88)	(2.35)	(2.39)	(1.64)	(2.52)
finance index		0.4172**				0.1675*
		(3.28)				(1.67)
human capital			0.0257*			0.0297*
			(1.74)			(1.81)
political freedom				0.3375***		0.1739
				(2.68)		(0.99)
rail network					0.1754	0.0047*
					(1.28)	(1.69)
_cons	37.2736***	38.3747***	39.2257***	39.6626***	39.7147***	40.7434***
	(29.73)	(28.57)	(21.75)	(24.81)	(18.85)	(16.85)
Hausman-test	44.92	52.54	42.77	43.75	37.92	36.97
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R-Squared	0.311	0.333	0.314	0.316	0.314	0.332
N	874	793	814	854	736	644

Notes: The dependent variable is gross fixed capital formation (GFCF). FDI is measured by the net inflows of foreign direct investment divided by GDP. See data section for data sources and data definition. The model is estimated by using the fixed effects (individual effects) method. Cluster standard errors at the country level are employed in the model. t statistics are reported in parentheses. * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

Table A9. Effect of FDI from Different Countries on the Domestic Investment with Pooled-OLS

	(1) GFCF	(2) GFCF	(3) GFCF	(4) GFCF	(5) GFCF	(6) GFCF	(7) GFCF	(8) GFCF
fdi developed	1.3704***	1.3672***	1.3601***	1.3336**				
	(2.77)	(2.69)	(2.70)	(2.47)				
fdi developing					0.2908	0.1607	0.4575	0.2451
					(0.31)	(0.87)	(0.46)	(0.74)
inflation	-0.0045	-0.0037	-0.0064	-0.0013	-0.0021	-0.0053	-0.0032	-0.0098
	(-0.28)	(-0.17)	(-0.30)	(-0.60)	(-0.13)	(-1.02)	(-0.15)	(-0.46)
trade openness	0.0028	0.0063*	0.0070*	0.0077**	0.0048	0.0084**	0.0088**	0.0097**
	(0.80)	(1.66)	(1.90)	(2.03)	(1.33)	(2.18)	(2.31)	(2.46)
government expenditure	-0.1475***	-0.1487***	-0.1443***	-0.1517***	-0.1452***	-0.1458***	-0.1412***	-0.1484***
	(-9.76)	(-9.31)	(-9.16)	(-9.19)	(-9.57)	(-9.07)	(-8.95)	(-8.98)
populationrate	0.4762*	0.4504	-0.0442	0.2378	0.4303	0.3896	-0.1012	0.1807
	(1.77)	(1.58)	(-0.15)	(0.73)	(1.59)	(1.36)	(-0.33)	(0.73)
finance index	0.2286**	0.2807**	0.2273*	0.3341**	0.2516**	0.3001***	0.2547**	0.3615***
	(2.18)	(2.51)	(1.91)	(2.58)	(2.40)	(2.67)	(2.13)	(2.77)
human capital		0.0004	0.0071	0.0018		0.0021	0.0044	0.0015
		(0.04)	(0.58)	(0.13)		(0.17)	(0.37)	(0.43)
political freedom			0.3936**	0.3357**			0.3672**	0.3114**
			(2.42)	(1.98)			(2.24)	(1.82)
rail network				0.0037				0.0062
				(0.08)				(1.08)
_cons	26.8965***	26.6018***	29.7461***	30.3537***	26.7752***	26.7134***	29.6571***	30.3528***
	(44.59)	(20.23)	(16.37)	(15.12)	(43.89)	(20.18)	(16.20)	(15.12)
R-squared	0.184	0.189	0.201	0.233	0.173	0.176	0.195	0.223
N	551	510	494	446	551	510	494	446

Notes: The dependent variable is gross fixed capital formation (GFCF). FDI from developed and developing countries is measured by the net inflows of foreign direct investment originating from developed and developing countries divided by GDP, respectively. See data section for data sources and data definition. The model is estimated by using the Pooled OLS method. Cluster standard errors at the country level are employed in the model. t statistics are reported in parentheses. * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

Table A10. Effect of FDI from Different Countries on Domestic Investment with Fixed-Effects

	(1) GFCF	(2) GFCF	(3) GFCF	(4) GFCF	(5) GFCF	(6) GFCF	(7) GFCF	(8) GFCF
fdi developed	1.2138**	1.2163**	1.2049**	1.2075**				
	(2.33)	(2.30)	(2.25)	(2.26)				
fdi developing					0.5261	0.5323	0.5817	0.4985
					(0.82)	(0.80)	(0.87)	(0.74)
inflation	-0.0516***	-0.0579***	-0.0602***	-0.0630***	-0.0290**	-0.0338*	-0.0274	-0.0180
	(-4.37)	(-3.65)	(-3.89)	(-3.98)	(-2.15)	(-1.87)	(-1.61)	(-1.01)
trade openness	0.0451***	0.0455***	0.0395***	0.0364***	0.0745***	0.0712***	0.0610***	0.0632***
	(5.93)	(5.54)	(4.85)	(4.28)	(8.70)	(7.78)	(7.10)	(6.95)
government expenditure	-0.2242***	-0.2224***	-0.2326***	-0.2312***	-0.3337***	-0.3264***	-0.3092***	-0.3216***
	(-7.90)	(-7.52)	(-7.97)	(-7.44)	(-11.30)	(-10.61)	(-10.58)	(-10.30)
populationrate	1.0621***	1.1378***	1.6927***	1.8934***	1.2473***	1.3752***	1.8054***	1.3237***
	(10.65)	(10.25)	(8.50)	(8.68)	(4.65)	(4.24)	(5.81)	(6.37)
finance index	0.1813*	0.1464	0.0350	-0.03747	0.2191*	0.1752	0.1503	0.2475
	(1.66)	(1.25)	(0.29)	(-0.29)	(1.65)	(1.23)	(1.03)	(1.60)
human capital		0.0091*	0.0043	-0.0026		0.0263	0.0354**	0.0441**
		(1.68)	(0.28)	(-0.16)		(1.47)	(2.13)	(2.53)
political freedom			0.2803*	0.2972**			0.0639	0.0535
			(1.93)	(1.98)			(0.42)	(0.34)
rail network				-0.0014				0.0043
				(-0.48)				(1.19)
_cons	31.8549***	31.0238***	29.0817***	29.7142***	24.8998*	21.9787	11.1016**	23.6051**
	(26.18)	(15.74)	(13.09)	(12.70)	(1.68)	(1.48)	(2.33)	(2.42)
Hausman-test	36.29	35.71	28.61	21.90	52.73	47.89	53.69	56.04
	(0.000)	(0.000)	(0.000)	(0.005)	(0.000)	(0.000)	(0.000)	(0.000)
R-Squared	0.376	0.375	0.330	0.353	0.273	0.268	0.281	0.307
N	551	510	494	446	551	510	494	446

Notes: The dependent variable is gross fixed capital formation (GFCF). FDI from developed and developing countries is measured by the net inflows of foreign direct investment originating from developed and developing countries divided by GDP, respectively. See data section for data sources and data definition. The model is estimated by using the fixed effects (individual effects) method. Cluster standard errors at the country level are employed in the model. t statistics are reported in parentheses. * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

7. Appendix B

Table B1. Effect of Sectoral FDI on Growth with Pooled-OLS

	(1) growth	(2) growth	(3) growth	(4) growth	(5) growth	(6) growth	(7) growth	(8) growth	(9) growth	(10) growth
primary	0.1424	0.5752	0.2001							0.8588
	(0.30)	(1.04)	(0.32)							(1.28)
manufacturing				0.9535***	0.9221***	0.9915***				1.1414***
				(4.70)	(4.27)	(4.37)				(4.38)
service							0.4026**	0.4642***	0.4034**	0.3346*
							(2.54)	(2.83)	(2.36)	(1.66)
initial gdp	4.91e-15	2.17e-14	2.12e-14	-3.79e-14	-5.00e-14	-5.54e-14	-3.40e-14	-2.92e-14	-2.90e-14	2.31e-14
	(0.09)	(0.39)	(0.31)	(-0.77)	(-0.92)	(-0.91)	(-0.65)	(-0.52)	(-0.47)	(0.35)
inflation	-0.0064	-0.0052	-0.0486**	-0.0072	-0.0077	-0.0340	-0.0092	-0.0062	-0.0388*	-0.0084
	(-0.52)	(-0.32)	(-2.06)	(-0.65)	(-0.48)	(-1.52)	(-0.77)	(-0.38)	(-1.69)	(-0.52)
trade openness	0.0088**	0.0095**	0.0095**	0.0020	0.0010	0.0002	0.0041	0.0039	0.0046	-0.0012
	(2.32)	(2.35)	(2.21)	(0.61)	(0.27)	(0.05)	(1.09)	(1.00)	(1.11)	(-0.24)
government expenditure	-0.0143	-0.0110	-0.0074	-0.0210*	-0.0171	-0.0127	-0.0208*	-0.0169	-0.0144	0.0077
	(-0.95)	(-0.71)	(-0.44)	(-1.72)	(-1.29)	(-0.90)	(-1.65)	(-1.26)	(-1.02)	(0.45)
populationrate	-0.4158*	-0.4475*	-0.4596	-0.7161***	-0.6672***	-0.6617***	-0.5118**	-0.4581**	-0.4793*	-1.0415***
	(-1.78)	(-1.88)	(-1.55)	(-3.57)	(-3.00)	(-2.61)	(-2.48)	(-2.08)	(-1.91)	(-3.47)
domestic investment	0.2727***	0.2762***	0.2806***	0.2291***	0.2282***	0.2454***	0.2417***	0.2358***	0.2391***	0.3192***
	(7.20)	(7.11)	(6.31)	(7.03)	(6.43)	(6.20)	(7.06)	(6.54)	(5.98)	(7.33)
landlocked	-1.2426**	-1.0358*	-1.2757**	-0.9932***	-0.8916**	-0.9782**	-1.1846***	-1.0859**	-1.1478**	-1.4421**
	(-2.41)	(-1.84)	(-2.09)	(-2.66)	(-2.06)	(-2.11)	(-3.06)	(-2.48)	(-2.45)	(-2.46)
exhangerate	-0.0069	-0.0060	-0.0015	-0.0015	-0.0006	0.0011	-0.0040	-0.0020	0.0005	-0.0049
	(-1.00)	(-0.85)	(-0.20)	(-0.24)	(-0.10)	(0.15)	(-0.60)	(-0.29)	(0.07)	(-0.65)
finance index	-0.5996***	-0.5551***	-0.6136***	-0.5957***	-0.6072***	-0.5917***	-0.6066***	-0.6041***	-0.5962***	-0.5595***
	(-6.12)	(-5.42)	(-5.17)	(-7.85)	(-7.21)	(-6.20)	(-7.68)	(-7.08)	(-6.12)	(-4.66)
human capital		0.0104	0.0036		0.0068	0.0017		0.0069	0.0019	0.0019
		(0.98)	(0.29)		(0.67)	(0.16)		(0.64)	(0.17)	(0.16)
political freedom			0.3592*			0.3144**			0.3152**	0.0650
			(1.95)			(2.04)			(1.98)	(0.47)
rail network										0.0014
										(0.43)
_cons	-4.2106***	-5.7292***	-8.7254***	-2.5649**	-3.2886**	-6.4195***	-2.9681***	-3.8062**	-6.6436***	-6.8117***
	(-3.31)	(-3.73)	(-3.77)	(-2.45)	(-2.29)	(-3.08)	(-2.71)	(-2.54)	(-3.11)	(-3.57)
R-squared	0.26	0.25	0.28	0.29	0.28	0.29	0.26	0.25	0.26	0.33
N	445	436	368	533	482	427	517	485	428	366

Notes: The dependent variable is GDP per capita growth. Primary, manufacturing and service FDI are measured as a log of (1+ the ratio of FDI inflows into the three sectors to GDP, respectively). See data section for data sources and data definition. The model is estimated by using the fixed effects (individual effects) method. Cluster standard errors at the country level are employed in the model. * p<0.10, ** p<0.05, *** p<0.01.

Table B2. Effect of Sectoral FDI on growth with Fixed-effects method

	(1) growth	(2) growth	(3) growth	(4) growth	(5) growth	(6) growth	(7) growth	(8) growth	(9) growth	(10) growth
primary	-0.1735	-0.8098	-0.7402							-0.3522
	(-0.29)	(-1.02)	(-0.94)							(-0.64)
manufacturing				0.5874***	0.5813***	0.6015***				0.8817***
				(2.95)	(2.76)	(2.75)				(3.36)
service							0.3146**	0.3172**	0.1327**	0.1201*
							(2.25)	(2.13)	(2.18)	(1.65)
initial gdp	-3.93e-13*	-3.50e-13	-3.84e-13*	-4.31e-13**	-3.98e-13*	-3.97e-13*	-9.66e-14	-1.32e-13	-2.52e-13	4.66e-14
	(-1.94)	(-1.51)	(-1.67)	(-2.21)	(-1.78)	(-1.76)	(-0.35)	(-0.43)	(-0.82)	(0.14)
Inflation	-0.0124	-0.0351	-0.0753	-0.0122	-0.0186	-0.0541	-0.0236**	-0.0740**	-0.0459**	0.0491
	(-0.87)	(-0.17)	(-0.37)	(-0.89)	(-0.10)	(-0.28)	(-2.31)	(-2.12)	(-2.41)	(1.48)
trade openness	0.0537***	0.0471***	0.0517***	0.0430***	0.0407***	0.0414***	0.0737***	0.0664***	0.0696***	0.0701***
	(5.24)	(4.30)	(4.64)	(4.91)	(4.36)	(4.34)	(6.60)	(5.64)	(5.80)	(5.20)
government expenditure	-0.0606*	-0.0589	-0.0443	-0.0508	-0.0550	-0.0499	-0.1262**	-0.141***	-0.1436**	-0.0890
	(-1.77)	(-1.47)	(-1.07)	(-1.44)	(-1.50)	(-1.30)	(-2.48)	(-2.65)	(-2.57)	(-1.31)
populationrate	-1.7021***	-1.6524***	-2.1905***	-2.1092***	-2.0639***	-2.2451***	-2.2634***	-2.1927***	-2.5542***	-2.0141***
	(-4.07)	(-3.72)	(-4.70)	(-5.68)	(-5.23)	(-5.49)	(-5.57)	(-5.13)	(-5.74)	(-3.66)
domestic investment	0.5448***	0.5467***	0.5353***	0.4712***	0.4764***	0.4782***	0.5257***	0.5552***	0.5276***	0.5183***
	(11.76)	(11.38)	(10.60)	(10.83)	(10.52)	(10.14)	(10.11)	(9.98)	(9.08)	(8.00)
exhangerate	-0.0269**	-0.0279**	-0.0392***	-0.0194*	-0.0214*	-0.0231*	-0.0160	-0.0248	-0.0405**	-0.0107*
	(-2.26)	(-2.16)	(-2.90)	(-1.80)	(-1.83)	(-1.88)	(-1.08)	(-1.51)	(-2.25)	(-2.26)
finance index	-1.0145***	-1.0562***	-1.1853***	-1.1176***	-1.1824***	-1.2012***	-0.9748***	-0.9237***	-1.0472***	-1.1889***
	(-7.27)	(-7.10)	(-7.15)	(-8.84)	(-8.76)	(-8.34)	(-5.69)	(-5.17)	(-4.98)	(-5.06)
human capital		0.0439**	0.0456**		0.0380**	0.0378**		0.0536**	0.0460*	0.0671
		(2.10)	(2.16)		(2.22)	(2.15)		(2.35)	(1.97)	(1.84)
political freedom			0.3483*			0.2905*			0.3024	0.4781
			(1.95)			(1.69)			(1.03)	(1.57)
rail network										-5.3497
										(-0.86)
_cons	-8.5702***	-12.8041***	-8.9107**	-6.9063***	-10.6628***	-7.9559**	-9.6872**	-13.9872***	-13.7514***	127.6241
	(-3.40)	(-3.71)	(-2.38)	(-3.06)	(-3.65)	(-2.41)	(-3.20)	(-3.57)	(-2.69)	(0.72)
Hausman-test	81.10	74.47	76.49	72.80	72.95	70.96	87.38	83.64	91.02	60.06
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R-Squared	0.39	0.39	0.41	0.38	0.39	0.39	0.43	0.43	0.43	0.43
N	457	425	409	531	495	481	409	386	370	292

Notes: The dependent variable is GDP per capita growth. Primary, manufacturing and service FDI are measured as a log of (1+ the ratio of FDI inflows into the three sectors to GDP, respectively). See data section for data sources and data definition. The model is estimated by using the fixed effects (individual effects) method. Cluster standard errors at the country level are employed in the model. * p<0.10, ** p<0.05, *** p<0.01.

Table B3. Conditional of Effect Sectoral FDI on growth with pooled OLS

	(1) growth	(2) growth	(3) growth	(4) growth	(5) growth	(6) growth	(7) growth	(8) growth	(9) growth	(10) growth	(11) growth	(12) growth
primary	0.3764	4.1062	-4.0392*	0.8251								
	(0.76)	(1.27)	(-1.71)	(1.29)								
manufacturing					0.8816***	-1.3168	-2.3352**	0.8647***				
					(3.58)	(-1.38)	(-2.12)	(3.57)				
service									0.3032*	-0.9753	-2.988***	0.3632**
									(1.78)	(-1.26)	(-3.41)	(2.18)
.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.
finance index	-0.571***				-0.518***				-0.727***			
	(-5.53)				(-5.07)				(-7.30)			
primary*finance	-0.318											
	(-0.79)											
human capital		0.00138				-0.0187				-0.0224		
		(0.12)				(-1.64)				(-1.47)		
primary*human		-0.0343										
		(-1.09)										
political freedom			-0.0402				-0.157				-0.223	
			(-0.34)				(-1.41)				(-1.58)	
primary*polity			0.409*									
			(1.77)									
rail network				-0.00203***				0.000467				-0.00701
				(3.11)				(0.27)				(-0.15)
primary*rail				0.00362***								
				(-2.95)								
manufacturing*finance					0.309*							
					(1.84)							
manufacturing*human						0.0181**						
						(2.15)						
manufacturing*polity							0.314***					
							(2.97)					
manufacturing*rail								-0.00942				
								(-0.29)				
service*finance									0.158**			
									(2.25)			
service*human										0.0128*		
										(1.83)		
service*polity											0.319***	
											(3.79)	
service*rail												0.000937
												(0.15)
_cons	-4.403***	-6.182***	-4.565**	-6.883***	-2.346**	-2.440	-2.809*	-5.473***	-2.795***	-1.798	-2.391	-5.125***
	(-3.41)	(-4.26)	(-2.70)	(-3.49)	(-2.03)	(-1.58)	(-1.77)	(-4.37)	(-2.85)	(-0.92)	(-1.29)	(-4.08)
R-squared	0.26	0.19	0.19	0.20	0.30	0.18	0.19	0.18	0.26	0.19	0.19	0.18
N	444	474	473	419	451	546	566	489	550	463	500	487

Notes: The dependent variable is GDP per capita growth. Primary, manufacturing and service FDI are measured as a log of (1+ the ratio of FDI inflows into the three sectors to GDP, respectively). See data section for data sources and data definition. The model is estimated by using the fixed effects (individual effects) method. Cluster standard errors at the country level are employed in the model. * p<0.10, ** p<0.05, *** p<0.01.

Table B4. Effect of Sectoral FDI on Domestic Investment with OLS Method

	(1) GFCF	(2) GFCF	(3) GFCF	(4) GFCF	(5) GFCF	(6) GFCF	(7) GFCF	(8) GFCF	(9) GFCF	(10) GFCF	(11) GFCF	(12) GFCF
primary	-1.8598**	-3.1274***	-4.0456***	-4.2523***								
	(-2.46)	(-3.57)	(-4.66)	(-4.79)								
manufacturing					1.0337***	1.0382***	1.0071**	1.1813***				
					(3.05)	(3.02)	(2.56)	(3.03)				
service									1.3024***	1.2439***	1.1972***	1.0783***
									(5.23)	(4.96)	(4.80)	(4.32)
gdp	0.2446***	0.2479***	0.2392***	0.2146***	0.2867***	0.2952***	0.2646***	0.2933***	0.2142***	0.2301***	0.2237***	0.2028***
	(3.54)	(3.56)	(3.46)	(3.05)	(4.50)	(4.58)	(4.09)	(4.47)	(3.51)	(3.72)	(3.58)	(3.18)
inflation	-0.0782***	-0.0905***	-0.0776***	-0.0892***	-0.0648***	-0.0794***	-0.0667***	-0.0585**	-0.0648***	-0.0779***	-0.0636***	-0.0692***
	(-4.02)	(-3.52)	(-3.12)	(-3.63)	(-3.53)	(-3.25)	(-2.76)	(-2.42)	(-3.58)	(-3.22)	(-2.67)	(-2.91)
trade openness	-0.0196***	-0.0170***	-0.0163***	-0.0166***	-0.0229***	-0.0201***	-0.0191***	-0.0210***	-0.0339***	-0.0302***	-0.0293***	-0.0282***
	(-4.14)	(-3.51)	(-3.50)	(-3.60)	(-4.86)	(-4.05)	(-3.83)	(-4.17)	(-6.70)	(-5.85)	(-5.80)	(-5.56)
government expenditure	-0.1353***	-0.1324***	-0.1471***	-0.1682***	-0.1513***	-0.1456***	-0.1537***	-0.1721***	-0.1442***	-0.1386***	-0.1425***	-0.1589***
	(-6.35)	(-6.16)	(-7.03)	(-7.92)	(-8.09)	(-7.56)	(-8.06)	(-8.73)	(-7.91)	(-7.34)	(-7.71)	(-8.37)
populationrate	1.5248***	1.2974***	1.9932***	2.5506***	0.9293***	0.7502**	1.1544***		1.0031***	0.9125***	1.3446***	1.7662***
	(4.01)	(3.35)	(4.71)	(5.87)	(2.73)	(2.11)	(2.97)		(3.09)	(2.71)	(3.72)	(4.76)
exhangerate	0.0306***	0.0350***	0.0467***	0.0429***	0.0352***	0.0365***	0.0445***	0.0377***	0.0424***	0.0434***	0.0525***	0.0048***
	(2.85)	(3.27)	(4.45)	(4.01)	(3.50)	(3.64)	(4.42)	(3.61)	(4.25)	(4.34)	(5.26)	(4.72)
finance index	-0.5226***	-0.5672***	-0.7254***	-0.8568***	-0.2737**	-0.2784**	-0.4232***	-0.4386***	-0.3677***	-0.3682***	-0.4436***	-0.6031***
	(-3.33)	(-3.48)	(-4.23)	(-4.85)	(-2.12)	(-2.05)	(-3.00)	(-2.95)	(-2.90)	(-2.77)	(-3.16)	(-4.04)
human capital		0.0014	-0.0086	-0.0051		-0.0065	-0.0089	-0.0083		-0.0009	-0.0042	0.0024
		(0.09)	(-0.55)	(-0.29)		(-0.45)	(-0.62)	(-0.51)		(-0.06)	(-0.29)	(0.15)
political freedom			0.9258***	0.9971***			0.5742***	0.3393*			0.5881***	0.6418***
			(4.31)	(4.64)			(3.02)	(1.87)			(3.12)	(3.37)
rail network				-0.0049				-0.0019				-0.0048
				(-0.97)				(-0.37)				(-0.96)
_cons	29.891***	29.5662***	22.0814***	21.9514***	30.0105***	30.3114***	25.3018***	28.9062***	30.1227***	29.7424***	24.4764***	23.9617***
	(33.51)	(16.46)	(9.25)	(8.68)	(38.87)	(19.26)	(11.38)	(13.03)	(40.52)	(18.56)	(11.14)	(10.27)
R-Squared	0.294	0.296	0.335	0.380	0.320	0.313	0.323	0.337	0.335	0.326	0.345	0.374
N	457	425	409	373	532	496	481	442	533	498	482	444

Notes: The dependent variable is gross fixed capital formation (GFCF). Primary, manufacturing and service FDI are measured as a log of (1+ the ratio of FDI inflows into the three sectors to GDP, respectively). See data section for data sources and data definition. The model is estimated by using the Pooled OLS method. Cluster standard errors at the country level are employed in the model. t statistics are reported in parentheses. * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

Table B5. Effect of Sectoral FDI on Domestic Investment with Fixed-Effect

	(1) GFCG	(2) GFCG	(3) GFCG	(4) GFCG	(5) GFCG	(6) GFCG	(7) GFCG	(8) GFCG	(9) GFCG	(10) GFCG	(11) GFCG	(12) GFCG
primary	-1.1082*	-1.3924*	-1.1668*	-1.0891**								
	(-1.91)	(-1.82)	(-1.68)	(-1.98)								
manufacturing					1.2882***	1.3078***	1.2234***	1.1802***				
					(5.31)	(5.22)	(4.81)	(4.59)				
service									1.4557***	1.4024***	1.3781***	1.3756***
									(7.96)	(7.62)	(7.35)	(7.21)
inflation	-0.0630***	-0.0695***	-0.0693***	-0.0753***	-0.0652***	-0.0967***	-0.101***	-0.103***	-0.0570***	-0.0842***	-0.0854***	-0.0876***
	(-5.22)	(-4.14)	(-4.29)	(-4.53)	(-4.05)	(-4.63)	(-4.87)	(-4.94)	(-3.69)	(-4.17)	(-4.27)	(-4.33)
trade openness	0.0609***	0.0647***	0.0541***	0.0545***	0.0636***	0.0569***	0.0547***	0.0512***	0.0631***	0.0561***	0.0534***	0.0524***
	(7.20)	(7.18)	(6.04)	(5.82)	(6.22)	(5.31)	(5.11)	(4.67)	(6.48)	(5.45)	(5.15)	(4.92)
government expenditure	-0.2203***	-0.2228***	-0.2384***	-0.2473***	-0.2883***	-0.2764***	-0.2974***	-0.3082***	-0.2394***	-0.2258***	-0.2394***	-0.2583***
	(-6.64)	(-6.45)	(-7.02)	(-6.85)	(-7.36)	(-6.91)	(-7.42)	(-7.33)	(-6.59)	(-6.05)	(-6.44)	(-6.66)
populationrate	1.2564***	1.3368***	1.5172***	1.6674***	1.9673***	1.8672***	1.5573***	1.5957***	1.9083***	1.8472***	1.6521***	1.7877***
	(9.43)	(9.07)	(6.40)	(6.38)	(7.24)	(6.75)	(5.83)	(5.76)	(7.62)	(7.18)	(6.37)	(6.49)
exhangerate	-0.0759**	-0.0743**	-0.0733**	-0.0662**	-0.0596*	-0.0664**	-0.0834***	-0.0795**	-0.0622**	-0.0679**	-0.0848***	-0.0783**
	(-2.52)	(-2.41)	(-2.44)	(-2.15)	(-1.90)	(-2.13)	(-2.65)	(-2.47)	(-2.06)	(-2.25)	(-2.79)	(-2.50)
finance index	0.0346	0.0460	0.2132*	0.2171	0.0259	0.0225	0.0980	0.1162*	0.0132	0.0531	0.1045	0.0833
	(1.03)	(1.36)	(1.72)	(1.47)	(1.17)	(1.14)	(1.59)	(1.67)	(1.01)	(1.34)	(1.62)	(1.48)
human capital		0.0175*	0.0079	0.0089		0.0576***	0.0662***	0.0749***		0.0523***	0.0608***	0.0661***
		(1.86)	(0.40)	(0.42)		(3.12)	(3.59)	(3.94)		(2.87)	(3.35)	(3.56)
political freedom			0.3992**	0.4144**			0.5748***	0.6353***			0.6014***	0.6483***
			(2.35)	(2.36)			(3.23)	(3.46)			(3.48)	(3.60)
rail network				0.0022				0.0052**				0.0039
				(0.15)				(2.51)				(0.87)
_cons	3.2994***	3.1779***	2.9192***	3.1428***	3.7546***	4.2992***	3.9381***	4.1037***	3.5342***	4.0083***	3.5904***	1.0627
	(25.27)	(13.10)	(11.14)	(11.08)	(23.17)	(18.27)	(14.86)	(15.00)	(23.34)	(17.65)	(13.92)	(1.33)
Hausman-test	65.54	70.62	55.00	44.98	28.03	27.90	26.02	33.23	22.80	23.53	21.90	24.17
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R-squared	0.372	0.378	0.315	0.340	0.314	0.324	0.313	0.345	0.346	0.360	0.340	0.361
N	443	414	398	364	567	527	513	472	566	527	511	471

Notes: The dependent variable is gross fixed capital formation (GFCF). Primary, manufacturing and service FDI are measured as a log of (1+ the ratio of FDI inflows into the three sectors to GDP, respectively). See data section for data sources and data definition. The model is estimated by using the fixed effects (individual effects) method. Cluster standard errors at the country level are employed in the model. t statistics are reported in parentheses. * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

Table B6. Conditional Effect of Sectoral FDI on Growth with pooled OLS

	(1) GFCF	(2) GFCF	(3) GFCF	(4) GFCF	(5) GFCF	(6) GFCF	(7) GFCF	(8) GFCF	(9) GFCF	(10) GFCF	(11) GFCF	(12) GFCF
primary	-2.5945***	-1.1342*	-1.3014***	-3.4543***								
	(-3.31)	(-1.73)	(-3.50)	(-3.85)								
manufacturing					0.7166*	-2.8024	-3.9081**	1.0165***				
					(1.73)	(-1.31)	(-2.25)	(3.36)				
services									1.5756***	-2.1322**	-1.4094	1.0571***
									(5.65)	(-2.05)	(-1.20)	(4.13)
.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.
finance index	-0.6671***	-0.5718***	-0.7732***	-0.6784***	-0.4371***	-0.2671**	-0.3262**		-0.2856*			
	(-4.12)	(-3.36)	(-4.65)	(-3.99)	(-2.61)	(-1.97)	(-2.26)		(-1.65)			
primary*finance	2.022***											
	(3.14)											
human capital		-0.0226				-0.0296				-0.0461		
		(-1.39)				(-1.54)				(-1.18)		
primary*human		0.0753										
		(1.15)										
political freedom		0.9151***	0.9908***				0.4817**		0.6821***		0.1665	
		(4.59)	(4.77)				(2.53)		(3.75)		(1.02)	
primary*polity			0.1075***									
			(2.77)									
rail network				-0.0031				-0.0022				-0.0028
				(-1.07)				(-0.88)				(-0.41)
primary*rail				0.0097**								
				(2.07)								
manufacturing* finance					0.4301**							
					(2.01)							
manufacturing *human						0.0365*						
						(1.83)						
manufacturing *polity							0.4715***					
							(2.82)					
manufacturing *rail								0.0041				
								(0.90)				
service*finance									0.2465*			
									(1.95)			
service*human										0.0312***		
										(3.30)		
service*polity											0.2691**	
											(2.38)	
service*rail												0.0028
												(0.33)
_cons	29.88***	23.11***	20.98***	31.13***	31.28***	32.79***	25.84***	29.66***	22.86***	33.36***	27.54***	29.91***
	(33.83)	(10.26)	(9.91)	(34.54)	(37.29)	(15.81)	(13.41)	(41.46)	(11.69)	(18.71)	(16.43)	(41.91)
R-Squared	0.310	0.354	0.347	0.359	0.304	0.317	0.338	0.375	0.363	0.353	0.370	0.378
N	457	420	440	391	566	496	551	519	515	553	573	513

Notes: The dependent variable is gross fixed capital formation (GFCF). Primary, manufacturing and service FDI are measured as a log of (1+ the ratio of FDI inflows into the three sectors to GDP, respectively). See data section for data sources and data definition. The model is estimated by using the Pooled OLS method. Cluster standard errors at the country level are employed in the model. t statistics are reported in parentheses. * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

8. Appendix C

Table C1. Data Descriptive

Variable	Obs	Mean	Std.Dev.	Min	Max
Fdi	786	1.79	3.46	-3.394	26.328
institutional quality (EF)	791	4.24	0.1008	3.906	4.427
square_of_EF	791	4917.807	958.514	2470.09	7005.69
institutional quality (WGI)	792	0.0705	1.0001	-4.383	1.106
square_of_(WGI)	792	0.999	1.635	0.000159	19.2095
institutional quality (ICRG)	756	0.0287	1.381	-6.909	1.863
square_of_(ICRG)	756	1.906	6.0034	0.000191	47.732
trade openness	792	90.964	54.207	18.349	423.984
domestic investment	788	23.438	4.292	9.818	41.538
inflation	792	3.454	7.017	-1.7	85.7
log gdp	792	26.598	1.618	22.886	30.464
tariff	783	2.862	1.914	0.49	168.904

Table C2. Components of EF

Economic Freedom Components
Property Rights
Government Integrity
Judicial Effectiveness
Tax Burden
Government Spending
Fiscal Health
Business Freedom
Labor Freedom
Monetary Freedom
Trade Freedom
Investment Freedom
Financial Freedom

Table C3. The List of Countries

Countries with weaker institutional quality	Countries with stronger institutional quality
Belgium	Australia
Czech Republic	Austria
France	Canada
Greece	Chile
Hungary	Denmark
Israel	Estonia
Italy	Finland
Latvia	Germany
Lithuania	Iceland
Mexico	Ireland
Poland	Japan
Portugal	Korea
Slovak	Luxembourg
Slovenia	Netherlands
Spain	New Zealand
Turkey	Norway
	Sweden
	Switzerland
	United Kingdom
	Unites States

Table C4. Results of Overall Index with CS-ARDL (Jack-knife) for Weaker Group

Dependent Variable (FDI)	**Regression 1**	**Regression 2**	**Regression 3**
Long run results			
institutional quality (EF)	1.8164** (2.23)		
institutional quality (WGI)		1.1426** (1.99)	
institutional quality (ICGR)			0.7162* (1.77)
domestic investment	0.7044* (1.67)	0.1921* (1.76)	0.4486* (1.70)
trade openness	0.1634** (2.38)	0.0489 (0.20)	0.2292 (1.32)
Inflation	-0.7748 (-1.55)	-0.7965* (-1.67)	-0.7457* (-1.67)
log gdp	0.0005 (0.86)	0.0001 (1.51)	0.0001 (1.51)
tariff	-0.6697 (-0.96)	-0.4336 (-1.34)	-0.7052 (-1.01)
Short run Results			
FDI_{t-1}	0.6435** (2.20)	0.3987** (2.11)	0.3254* (1.75)
institutional quality (EF)	1.4254 (1.35)		
institutional quality (WGI)		1.1391 (0.67)	
institutional quality (ICGR)			0.8642 (0.86)
domestic investment	0.2315 (1.04)	0.1228 (0.87)	0.1086 (0.78)
trade openness	0.3524 (1.29)	0.4796 (1.58)	0.3053 (0.73)
Inflation	-0.3195 (-1.21)	-0.1792 (-0.55)	-0.1744* (-1.94)
log gdp	0.0001 (1.35)	0.0005 (0.64)	0.0007 (1.10)
tariff	-0.1134 (-0.79)	-0.1472 (-0.59)	-0.2296 (-1.01)
ECT	-1.6454*** (-3.07)	-0.3567*** (-1.05)	-0.4258*** (-2.77)
CD **P-value in bracket**	0.38 (0.702)	1.11 (0.268)	0.39 (0.694)

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The lag structure is ARDL (1, 1, 1, 1, 1, 1,1) the lag order is selected using Akanke's Information Criterion (AIC) and Schwarz's Information Criterion (SIC). The order of variables is: FDI, institutional quality, domestic investment, trade openness, inflation, log_GDP, and tariffs.

Table C5. Results of Overall Index with CS-ARDL (Jack-knife) for Stronger Group

Dependent Variable (FDI)	**Regression 1**	**Regression 2**	**Regression 3**
Long run results			
institutional quality (EF)	0.2794 (1.41)		
institutional quality (WGI)		0.3823 (1.08)	
institutional quality (ICGR)			0.4397 (1.55)
domestic investment	0.4583* (1.91)	0.4727* (1.94)	0.5796* (1.82)
trade openness	0.2514 (1.06)	0.1012 (0.69)	0.1217 (1.41)
Inflation	-0.1421* (-1.66)	-0.3648 (-0.53)	-0.3015** (-2.20)
log gdp	0.0006 (1.34)	0.0008 (1.06)	0.0006 (1.31)
tariff	-0.3426 (-1.06)	-0.2342* (-1.73)	-0.1715 (-1.41)
Short-run results			
FDI_{t-1}	0.9728*** (3.29)	0.9474*** (3.25)	0.7616*** (3.94)
institutional quality (EF)	0.7238 (0.30)		
institutional quality (WGI)		-0.2232 (-0.69)	
institutional quality (ICGR)			0.2301 (0.70)
domestic investment	0.4594 (1.30)	0.2713* (1.83)	0.1155* (1.93)
trade openness	0.1426 (0.30)	0.4292 (1.09)	0.2114 (0.68)
Inflation	-0.0721 (-1.05)	-0.0722 (-0.72)	-0.1175* (-1.87)
log gdp	-0.0008 (-0.35)	-0.0006 (-0.68)	-0.0005 (-0.95)
tariff	-0.1712 (-0.60)	-0.1164 (-1.37)	-0.1657 (-1.22)
ECT	-1.1315*** (-2.63)	-1.2082*** (-4.17)	-1.2835*** (-4.46)
CD **P-value in bracket**	1.63 (0.102)	0.82 (0.413)	1.50 (0.135)

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The lag structure is ARDL (1, 1, 1, 1, 1, 1,1) the lag order is selected using Akanke's Information Criterion (AIC) and Schwarz's Information Criterion (SIC). The order of variables is: FDI, institutional quality, domestic investment, trade openness, inflation, log_GDP, and tariffs.

Table C6. Results of Components with Panel CS-ARDL (Jack-Knife) for Weaker Group

Dependent Variable (FDI)	Regression 1	Regression 2	Regression 3
Long run results			
property rights	0.1214** (2.15)		
corruption		0.1082* (1.98)	
democratic accountability			0.1035** (2.08)
domestic investment	0.2974** (1.98)	0.6766* (1.65)	0.2218* (1.78)
trade openness	0.0558 (0.62)	0.0333 (0.70)	0.0988 (1.04)
inflation	-0.1426 (-1.53)	-0.1767* (-1.68)	-0.2663* (-1.79)
log gdp	0.0007 (1.60)	0.0007 (0.97)	0.0007* (1.70)
Short run results			
FDI_{t-1}	0.2412*** (3.36)	0.6786** (2.14)	0.7717** (2.16)
property rights	0.8252 (1.11)		
corruption		0.1746 (0.81)	
democratic accountability			0.3471 (1.07)
domestic investment	0.1375 (1.19)	0.1423 (0.40)	0.1884 (0.54)
trade openness	0.0935 (0.48)	0.0271* (1.79)	0.0162 (1.01)
inflation	-0.1078* (-1.77)	-0.0797* (-1.67)	-0.1327 (-1.42)
log gdp	0.0005 (0.92)	0.0001 (1.51)	0.0007 (1.05)
ECT	-0.3413*** (-3.58)	-0.6782*** (-4.79)	-0.7484*** (-4.94)
CD **P-value in bracket**	0.50 (0.615)	1.46 (0.144)	1.21 (0.225)

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The lag structure is ARDL (1, 1, 1, 1, 1, 1,1) the lag order is selected using Akanke's Information Criterion (AIC) and Schwarz's Information Criterion (SIC). The order of variables is: FDI, institutional quality, domestic investment, trade openness, inflation, log_GDP, and tariffs.

Table C7. Results of Components with Panel CS-ARDL (Jack-Knife) for Stronger Group

Dependent Variable (FDI)	Regression 1	Regression 2	Regression 3
Long run results			
property rights	0.2794** (1.98)		
corruption		0.1345 (0.95)	
democratic accountability			0.1276 (0.38)
domestic investment	0.6546* (1.91)	0.1221 (1.51)	0.1055 (1.02)
trade openness	0.0101 (0.60)	0.0141 (0.45)	0.0417 (1.22)
inflation	-0.1378 (-1.27)	-0.4819* (-1.65)	-0.2793* (-1.73)
log gdp	0.0002* (1.89)	0.0001 (1.43)	0.0001* (1.67)
Short run results			
FDI_{t-1}	0.7905** (2.28)	0.6929*** (3.31)	0.6763*** (3.57)
property rights	0.7905 (0.92)		
corruption		0.7827 (0.96)	
democratic accountability			0.4872 (1.24)
domestic investment	0.0986 (0.97)	0.3135** (2.17)	0.1556 (0.98)
trade openness	0.0806 (0.31)	0.1567 (0.55)	0.3921 (0.85)
inflation	-0.1568 (-1.42)	-0.1616 (-1.01)	-0.4025 (-0.41)
log gdp	0.0002 (0.90)	0.0002 (0.70)	0.0001 (1.57)
ECT	-0.8476*** (-3.56)	-0.9267*** (-3.98)	-0.6665*** (-3.41)
CD **P-value in bracket**	0.39 (0.694)	1.21 (0.227)	0.73 (0.468)

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The lag structure is ARDL (1, 1, 1, 1, 1, 1,1) the lag order is selected using Akanke's Information Criterion (AIC) and Schwarz's Information Criterion (SIC). The order of variables is: FDI, institutional quality, domestic investment, trade openness, inflation, log_GDP, and tariffs.

Table C8. Results of Linearity Test with Panel CS-ARDL (Jack-Knife) for All Countries

Dependent Variable (FDI)	Regression 1	Regression 2	Regression 3
Long run results			
institutional quality (EF)	0.0226** (2.07)		
square of (EF)	-0.0001* (-1.92)		
institutional quality (WGI)		0.0209*** (2.94)	
square of (WGI)		-0.0009* (-1.93)	
institutional quality (ICGR)			0.0159* (1.89)
square of (ICGR)			-0.0007* (-1.74)
domestic investment	0.3156* (1.68)	0.0547 (1.16)	0.1413 (0.86)
trade openness	0.0214 (1.56)	0.0713 (0.42)	0.0108* (1.94)
inflation	-0.0132 (-1.13)	-0.0179* (-1.68)	-0.0151* (-1.72)
log gdp	0.0001* (1.83)	0.0002* (1.74)	0.0004* (1.81)
tariff	-0.2596** (-2.02)	-0.2314 (-1.15)	-0.2451 (-1.33)
Short run results			
FDI_{t-1}	-0.6689*** (-3.46)	-0.8448*** (-3.15)	-0.8587*** (-3.75)
institutional quality (EF)	0.2996 (0.18)		
square of (EF)	-0.0049 (-0.14)		
institutional quality (WGI)		0.1275 (1.13)	
square of (WGI)		-0.000519 (-1.44)	
institutional quality (ICGR)			0.1587 (1.07)
square of (ICGR)			0.0016 (1.29)
domestic investment	0.2156* (1.76)	0.0424 (1.12)	0.1474 (1.51)
trade openness	0.0164 (1.01)	0.0381 (1.51)	0.0134 (1.04)
inflation	-0.0308 (-0.59)	-0.0127 (-1.32)	-0.0185* (-1.81)
log gdp	0.0009 (0.90)	0.0002* (1.65)	0.0002* (1.84)
domestic investment	-0.2725** (-1.99)	-0.1017 (-1.01)	-0.1576 (-1.51)
ECT	-0.7331*** (-2.93)	-0.7442*** (-3.04)	-0.7935*** (-2.86)
CD **P-value in bracket**	1.57 (0.116)	1.24 (0.213)	1.15 (0.251)

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