EFFECT OF FOREIGN DIRECT INVESTMENT ON ECONOMIC GROWTH AND DOMESTIC INVESTMENT: EVIDENCE FROM OECD COUNTRIES

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ABSTRACT

This study assesses the impact of foreign direct investment (FDI) inflows on economic growth and domestic investment in a panel of Economic Co-operation and Development (OECD) countries during the period of 1990–2017 by utilizing the method of fixed-effects and system generalized method of moments (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.

KEY WORDS

foreign direct investment, economic growth, domestic investment, crowding in/out, OECD

JEL CODES

E22, F21, F23, F43, O47

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 (Carković and Levine, 2005). 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).

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Although there exists a huge body of studies evaluating the effect of FDI on economic 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 et al. (2010) observe a growth-enhancing effect of FDI, while others suggest the relationship between these variables is negative (Mencinger, 2003; 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 FDI inflows 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 activi-

ties 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.

Taking into account all the potential factors that have been partially considered by existing studies and that could contribute to inconclusive conclusions about the impact of FDI on growth and domestic investment, this study aims to answer the following questions:

- Does FDI affect the growth rate of the host countries?
- What is the role of countries' absorptive capacity in the relationship between FDI and the economic growth of the host countries?
- Does FDI crowd in or out domestic investment in the receiving country?
- Does the origin of FDI matter in the relationship between FDI and growth rate and domestic investment?

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

2 LITERATURE REVIEW

In the literature, there are two growth theories, namely the neoclassical growth theory and the endogenous growth theory, according to which FDI is expected to contribute to the growth rate of the host country.

Felipe (1999) argues that 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 (Öztürk, 2007).

Borensztein et al. (1998) assert that according to endogenous growth theory, the pace of technological 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 amount of human capital. As a result, the absorptive potential of a developing nation is hampered by the host country's insufficient human capital.

Öztürk (2007) clarifies three major mechanisms via which FDI influences growth in the context of endogenous growth models. To begin, 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 (Öztürk, 2007).

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.

2.1 Possible Reasons for the Different Effects of FDI on Economic Growth and Some Empirical Evidence

As mentioned before, although lots of studies have been done 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 which 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 Ulubaşoğlu, 2015). However, it is possible to find the three possible outcomes, namely positive, negative and insignificant effect 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 forign affilitates 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 can occur 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). Linkage of foreign companies with the rest of economy also helps create positive spillovers like providing intermediate goods produced by local counterparts to foreign ones as argued by Blomström and Kokko (1998). The last conduit is export spillover, which may result in productivity increases in the host economy (Görg and Greenaway, 2004). 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 and Harrison, 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.

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 lead to increases in foreign debt and distortion in the tax system, which might crowd out local firms and a 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 (Öztürk, 2007; OECD, 2008). Another negative effect could appear through resource curse for countries with a greater size of 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 occur 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 a 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., Carković and Levine, 2005; Adams, 2009) do not find a significant effect of FDI on growth. The lack of a significant impact of FDI may be because of the insufficient level of development of the financial system, human capital, institutional quality, infrastructure level, etc. Additionally, overseas affiliates may be able to safeguard the dissemination of knowledge, granting them 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, 2008). All of these possible reasons provided to explain the potential reasons for the positive, negative and insignificant effect of FDI will be considered in this research.

Tab. 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 regarded to better represent the literature's ambiguous conclusions on the FDI-growth rate link.

2.2 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; Ang, 2009), while others (e.g., Agosin and Machado, 2005; Pilbeam and Oboleviciūtė, 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 investment of the host country (e.g., Liu et al., 2001).

Blomström 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 Oboleviciūtė (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

Tab. 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 method	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 Sánchez-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.
Carković and Levine (2005)	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 developing countries	OLS, GMM	Countries with a well-developed financial system get more benefits from FDI.
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.

Author(s)	Sample and Period	Method	Main Findings
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)	1970–1999, 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. (2021)	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.

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 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 our knowledge, all existing studies investigating the effects of FDI from various countries focus on industry and firm-level data (e.g., Collis et al., 1994; Banga, 2006; Waldkirch, 2010; Gee and Karim, 2011), 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). In conclusion, it is expected that the impact of FDI from developing countries on economic growth and domestic investment is less beneficial than that of FDI from developed countries.

3 DATA AND METHODOLOGY

The datasets utilised in the empirical analysis are described along with their sources in this section. The econometric methods are also defined together with their justifications for application.

3.1 Data

To begin, the rate of real per capita GDP growth is applied as a dependent variable and denoted by GROWTH. The data on GROWTH

is extracted from the World Bank national accounts.

Foreign direct investment inflows are represented by FDI, and it 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.

We also employ control variables widely used in the literature as growth rate determinants and briefly described below.

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

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 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 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.

Tab. 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

Tab. 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 with under 1% of the variation.

Tab. 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
finan_index	864	0.218	1.594	−2.539	5.344
school_enrol	896	102.858	15.276	51.869	168.904
polit_freedom	970	9.350	1.442	−4	10
rail_line	804	10.043	89.125	0.00572	812.254

We, therefore, use the first component as our financial indicator (finance_index).

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. Along the same line, The Polity Autocracy Indices ranges from ten to minus ten and consists of coding of the competitiveness of executive recruitment, the openness of executive recruitment, constraints on the chief executive, regulation of participation, and competitiveness of participation. 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.

Descriptive statistics for variables employed in the regression have been presented in Tab. 3 for OECD member countries over the period 1990–2017[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 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

[1]See Tab. 9 for the correlation matrix in the Annex.

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 most free, and the minimum is −10 referring to the least free as mentioned above. South Korea and Poland are the only two countries taking −8 index in 1980 and 1981 respectively, but all countries have managed to reach 10 index through 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.

3.2 Static Panel Data

Pooled ordinary least square (OLS) method is applied at 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, I used the below equation:

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

where y represents the rate of real per capita GDP growth of country i at time t, α is the constant term, $\mathrm{FDI}_{i,t}$ 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.

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. I 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 random-effects model is rejected, that means fixed-effects model perform better for my analysis.

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

$$y_{i,t} = \alpha + \beta_1 \, \mathrm{FDI}_{i,t} + \gamma \, X_{i,t} + \eta_i + u_{i,t} \qquad (2)$$

In contrast to the equation of polled-OLS, equation (2) 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.

3.3 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) 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 are likely to be an endogenous variable as 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; Azman-Saini et al., 2010).

$$\begin{aligned} y_{i,t} = \alpha\, y_{i,t-1} + & \\ + \beta_1\, \mathrm{FDI}_{i,t} + & \\ + \gamma\, X_{i,t} + & \\ + \eta_i + & \\ + \varepsilon_{i,t}, & \end{aligned} \tag{3}$$

where the lagged dependent variable is included as an independent variable, in contrast to equation (3).

To eliminate the time invariant effects, η_i, Arellano and Bond (1991) suggest transforming the equation (3) into first differences as below:

$$\begin{aligned} y_{i,t} - y_{i,t-1} = \alpha\, (y_{i,t-1} - y_{i,t-2}) + & \\ + \beta_2\, (\mathrm{FDI}_{i,t} - \mathrm{FDI}_{i,t-1}) + & \\ + \gamma\, (X_{i,t} - X_{i,t-1}) + & \\ + (\varepsilon_{i,t} - \varepsilon_{i,t-1}) & \end{aligned} \tag{4}$$

To overcome the endogeneity issue, the GMM model uses lagged values of explanatory variables as instruments. However, this transformation causes a new statistical issue that the transformed error term $\varepsilon_{i,t} - \varepsilon_{i,t-1}$ 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 is weakly exogenous. This technique is also known as difference GMM in the literature. The moment conditions are set following Arellano and Bond (1991):

$$E\left[y_{i,t-s} \cdot (\varepsilon_{i,t} - \varepsilon_{i,t-1})\right] = 0, \tag{5}$$

$$E\left[\mathrm{FDI}_{i,t-s} \cdot (\varepsilon_{i,t} - \varepsilon_{i,t-1})\right] = 0, \tag{6}$$

$$E\left[X_{i,t-s} \cdot (\varepsilon_{i,t} - \varepsilon_{i,t-1})\right] = 0 \tag{7}$$

$$\text{for } s \geq 2; \quad t = 3, \ldots, T.$$

Although the difference GMM is able to account for the simultaneiy bias and country specific heterogeneity, another shortcoming was pointed by Alonso-Borrego and Arellano (1999) 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 alternaive 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 4) in addition to the use of lagged differenced observations as instruments for level variables (equation 3). The additional conditions for the second part of the system, the regression in levels, could be written as follows:

$$E\left[(y_{i,t-s} - y_{i,t-s-1}) \cdot (\eta_i + \varepsilon_{i,t})\right] = 0, \tag{8}$$

$$E\left[(\mathrm{FDI}_{i,t-s} - \mathrm{FDI}_{i,t-s-1}) \cdot (\eta_i + \varepsilon_{i,t})\right] = 0, \tag{9}$$

$$E\left[(X_{i,t-s} - X_{i,t-s-1}) \cdot (\eta_i + \varepsilon_{i,t})\right] = 0 \tag{10}$$

$$\text{for } s = 1.$$

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.

4 RESULTS AND DISCUSSION

First, this research examines the effect of FDI inflows on the growth rate of the host economy over the period 1990–2017 for OECD countries. To be able to select the appropriate econometric method, we apply the Breusch-Pagan Lagrange multiplier test. The null hypothesis is in favour of the pooled-OLS against random/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 fixed effect panel model based on equation (2).

The results of the fixed effect model are reported in Tab. 4[2]. It can be seen from the table that FDI has entered in all regressions positively and is statistically significant. Therefore, the table 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 a minimum of 0.104 and a maximum of 0.190 percentage through the period between 1990 and 2017. This result is consistent with many studies that find the growth-enhancing effect of FDI in the host economy (e.g., Carković and Levine, 2005; Li and Liu, 2005). Similarly, trade openness is also associated with a higher growth rate, which is perfectly in line with Barro (2000). In a similar way, domestic investment shows a positive effect on economic growth in all columns. This is anticipated, given that investment raises the stock of physical capital as a factor of production, which in turn will boost output.

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, 2000). As expected, inflation has a significantly negative effect on the growth rate, as it is an indicator of macroeconomic instability and gives support to the notion that macroeconomic instability is associated with a lower growth rate. Likewise, the negative coefficient on government expenditure indicates that an increase in government expenditure is associated with a decline in the economic growth of the host country, given that government spending may crowd out domestic investment, hence reducing economic growth. Additionally, it implies higher taxes, which discourages productive and profit-generating activity. The estimated coefficient on population growth is also significantly negative, as anticipated. This is because the newly created production is distributed over a larger population as the population growth rate increases.

The estimated effect of FDI on growth rate is robust to the inclusion of more control variables. The finance_index representing the level of financial development is included in regression 2. The coefficient on finance_index is negative and significant, indicating that any more development in financial system is associated with 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 that they should be on the downward sloping part of the inverted U. The human_capital variable is included in column 3. Its effect seems positive and significant in that column, but it is not statistically significant in the last regression so that the effect of human capital on the growth rate is not robust. In our sample, most countries are highly developed. Hence, the possible reason for the insignificant coefficient of school attainment in the last regression may be that in the developed countries, school enrolment rate is generally high and so the

[2]The pooled OLS results are presented in Tab. 10 in the Annex. 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.

Tab. 4: Regression coefficients for the impact of FDI on economic growth, Fixed Effect Method

	(1) Growth	(2) Growth	(3) Growth	(4) Growth	(5) Growth	(6) Growth
FDI	0.107**	0.190*	0.110**	0.104**	0.127**	0.182*
	(2.05)	(1.68)	(1.96)	(2.01)	(2.14)	(1.71)
log(initialGDP)	−0.597***	−0.457***	−0.651***	−0.614***	−0.715***	−0.564***
	(−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_openness	0.0583***	0.0569***	0.0577***	0.0585***	0.0708***	0.0639***
	(8.34)	(7.56)	(7.86)	(8.43)	(8.60)	(7.24)
gov_exp	−0.129***	−0.0641**	−0.131***	−0.128***	−0.113***	−0.0522*
	(−4.45)	(−2.28)	(−4.38)	(−4.37)	(−3.55)	(−1.68)
population_rate	−1.242***	−1.137***	−1.161***	−1.345***	−1.610***	−1.391***
	(−7.89)	(−7.74)	(−7.20)	(−8.05)	(−7.99)	(−7.36)
domestic_inv	0.407***	0.459***	0.413***	0.408***	0.449***	0.483***
	(12.04)	(13.66)	(11.78)	(11.87)	(12.01)	(12.89)
finance_index		−0.736***				−0.765***
		(−5.79)				(−4.92)
human_capital			0.0425***			0.0195
			(2.89)			(1.28)
political_freedom				0.235*		0.0142
			(1.80)			(0.08)
rail_network					0.00239	0.00142
					(1.30)	(0.82)
_cons	151.7***	112.0***	160.9***	154.3***	180.1***	136.4***
	(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^2	0.353	0.418	0.360	0.364	0.365	0.440
N	796	717	746	778	672	587

Note: t-statistics in parentheses, * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

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 is entered in regression 4 and shows a positive and significant effect on the growth but insignificant in the last column. The rail_network variable is in column 5 and also included in column 6. It has become positive for both regressions, but statistically insignificant.

This research also examines 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. To do so, 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 Tab. 5.[3] 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

[3]The results estimated by the Pooled-OLS are released in Tab. 11 in the Annex. Briefly, the results are parallel to those predicted by the fixed effect.

Tab. 5: Conditional Effect of Aggregate FDI on Growth with Fixed Effects

	(1) Growth	(2) Growth	(3) Growth	(4) Growth
FDI	−0.0606	−0.631	0.557*	0.0963*
	(−1.05)	(−1.54)	(1.82)	(1.70)
log(initialGDP)	−0.000222***	−0.000293***	−0.000269***	−0.000323***
	(−7.92)	(−7.95)	(−11.38)	(−11.35)
inflation	−0.00318	−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)
gov_exp	−0.0800***	−0.145***	−0.146***	−0.133***
	(−2.80)	(−4.78)	(−5.12)	(−4.43)
population_rate	−1.623***	−2.295***	−1.674***	−1.872***
	(−5.62)	(−7.32)	(−5.51)	(−5.86)
domestic_inv	0.415***	0.417***	0.422***	0.454***
	(11.67)	(11.37)	(12.18)	(12.70)
finance_index	−0.692***			
	(−5.03)			
fdi*finance	0.0546*			
	(1.65)			
human_capital	0.00946	−0.00545		
	(0.70)	(−0.34)		
fdi*human		0.00697**		
		(2.11)		
political_free			−0.00481	
			(−0.04)	
fdi*politic			0.00599**	
			(2.13)	
rail_network				0.000308
				(1.60)
fdi*rail				0.000127
				(0.21)
_cons	−4.667**	−2.696	1.632*	0.687
	(−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: t-statistics in parentheses, * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

studies of Alfaro et al. (2004), Carković and Levine (2005), and Iamsiraroj and Ulubaşoğlu (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 et al. (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. 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.

This research also considers the origin of FDI due to the possibility that FDI from different countries may follow different strategies, which influences their contribution to the host economy. To accomplish this, FDI inflows are separated into two groups; FDI from developed and developing countries to the host economies.[4]

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 regressions are reported in Tab. 6[5].

In columns 1 to 4 of Tab. 6, the effect of FDI from developed countries is analysed. As seen, developed country FDI has a positive and significant effect in all columns, suggesting that there is a positive relationship between FDI 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 reported in columns 5 to 8 has no significant effect on the growth in any specification. 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.

To examine the effect of FDI on domestic investment, 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 that determine GFCF are the same as those used in 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

[4]Countries are classified as developed or developing based on the IMF classification.

[5]See Tab. 12 for the results estimated by Pooled-OLS in the Annex.

Tab. 6: Effect of FDI from Different Countries on Growth

	(1) Growth	(2) Growth	(3) Growth	(4) Growth	(5) Growth	(6) Growth	(7) Growth	(8) Growth
FDI_developed	0.499*	0.512*	0.487*	0.553***				
	(2.59)	(2.53)	(2.39)	(2.68)				
FDI_developing					−0.434	−0.510	−0.348	−0.283
					(−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	−0.106	−0.0813	−0.173*	−0.0200	−0.0732	−0.0397	−0.106
	(−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)
gov_exp	−0.110*	−0.121*	−0.117*	−0.0782	−0.0936*	−0.101*	−0.0953*	−0.0556
	(−2.24)	(−2.34)	(−2.17)	(−1.39)	(−1.91)	(−1.96)	(−1.77)	(−0.98)
population_rate	−2.159***	−2.205***	−2.485***	−2.626***	−2.235***	−2.254***	−2.507***	−2.663***
	(−5.71)	(−5.42)	(−5.85)	(−5.92)	(−5.85)	(−5.49)	(−5.85)	(−5.93)
domestic_inv	0.550***	0.587***	0.557***	0.654***	0.568***	0.599***	0.568***	0.661***
	(11.16)	(10.89)	(9.72)	(10.37)	(11.47)	(11.05)	(9.84)	(10.35)
finance_index	−1.014***	−1.003***	−1.171***	−1.150***	−1.060***	−1.047***	−1.195***	−1.161***
	(−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			0.208*	0.398			0.241*	0.416
			(1.72)	(1.32)			(1.83)	(1.37)
rail_network				0.00260				0.00203
				(1.55)				(1.43)
_cons	−12.97***	−16.17***	−16.91***	−24.64***	−12.78***	−16.70***	−18.01***	−25.36***
	(−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^2	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: t-statistics in parentheses, * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

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., Mišun and Tomšík, 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 Tab. 7.[6] The effect of FDI is not statistically significant in all columns except column 4, 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 occurs given that the uncertainty about the proportion of FDI included in gross fixed capital formation. The other determinants of Gross Fixed Capital Formation have the expected signs. The sign of inflation, trade openness and government expenditure become negative and significant. It is worth noting 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 net-

[6]The results of estimations by the Pooled-OLS are given in Tab. 13 in the Annex.

Tab. 7: 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)
gov_exp	−0.360***	−0.385***	−0.351***	−0.352***	−0.359***	−0.359***
	(−12.90)	(−13.47)	(−12.14)	(−12.79)	(−12.06)	(−11.51)
population	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		0.417**				0.167*
		(3.28)				(1.67)
human_capital			0.0257*			0.0297*
			(1.74)			(1.81)
political_free				0.337***		0.173
				(2.68)		(0.99)
rail_network					0.175	0.00472*
					(1.28)	(1.69)
_cons	37.27***	38.37***	39.22***	39.66***	39.71***	40.74***
	(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^2	0.311	0.333	0.314	0.316	0.314	0.332
N	874	793	814	854	736	644

Note: t-statistics in parentheses, * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

work are significantly positive, although the significance level of the latter one is only 10%.

Finally, this study analyses whether the origin of FDI matters in the relationship between FDI inflows and domestic investment. FDI from two different country groups is employed as the independent variable: FDI from developed and developing countries, as in the previous analysis.[7]

In Tab. 8, the first four specifications include FDI inflows from developed countries. The coefficients of FDI in the four columns are positive and statistically significant. Most importantly, they are greater than one, suggesting that FDI inflows from developed countries crowd in domestic investment in the host economies. However, in the last four columns, 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 Tab. 5.

[7]Results estimated by pooled OLS confirm those estimated by the fixed effects.

Tab. 8: 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	1.213**	1.216**	1.204**	1.207**				
	(2.33)	(2.30)	(2.25)	(2.26)				
FDI_developing					0.526	0.532	0.581	0.498
					(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)
gov_exp	−0.224***	−0.222***	−0.232***	−0.231***	−0.333***	−0.326***	−0.309***	−0.321***
	(−7.90)	(−7.52)	(−7.97)	(−7.44)	(−11.30)	(−10.61)	(−10.58)	(−10.30)
population_rate	1.062***	1.137***	1.692***	1.893***	1.247***	1.375***	1.805***	1.323***
	(10.65)	(10.25)	(8.50)	(8.68)	(4.65)	(4.24)	(5.81)	(6.37)
finance_index	0.181*	0.146	0.0350	−0.0374	0.219*	0.175	0.150	0.247
	(1.66)	(1.25)	(0.29)	(−0.29)	(1.65)	(1.23)	(1.03)	(1.60)
human_capital		0.00910*	0.00431	−0.00263		0.0263	0.0354**	0.0441**
		(1.68)	(0.28)	(−0.16)		(1.47)	(2.13)	(2.53)
political_freedom			0.280*	0.297**			0.0639	0.0535
			(1.93)	(1.98)			(0.42)	(0.34)
rail_network				−0.00145				0.00434
				(−0.48)				(1.19)
_cons	31.85***	31.02***	29.08***	29.71***	24.899*	21.978	11.10**	23.60**
	(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^2	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

Note: t-statistics in parentheses, * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

4.1 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 (Carković and Levine, 2005). 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 Tab. 14 in the Annex. 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.

Tab. 15 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.

Tab. 16 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 Tab. 17. 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.

5 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.

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7 ANNEX

Tab. 9: Correlation Matrix

	Growth	FDI	Inflation	Trade_open.	Gov_exp	Population	Dom._inv	Fin._index	Human_cap	Pol._free	Rail_net.
Growth	1.0000										
FDI	0.1001	1.0000									
Inflation	−0.1092	−0.0787	1.0000								
Trade_openness	0.1392	−0.2809	−0.1577	1.0000							
Gov_exp	−0.1868	−0.1104	0.1377	0.1224	1.0000						
Population	−0.2115	0.1563	0.1967	−0.1115	−0.0844	1.0000					
Domestic_inv	0.3981	−0.2071	0.1269	0.0434	−0.3443	0.0423	1.0000				
Finance_index	−0.3870	0.0326	−0.3607	0.0543	0.0055	0.1489	−0.1800	1.0000			
Human_cap	0.1031	0.0100	−0.4086	0.2461	0.2375	−0.1168	−0.1688	0.3163	1.0000		
Political_free	0.1094	0.0940	−0.3078	0.1268	0.1505	−0.3658	−0.2225	0.2897	0.3010	1.0000	
Rail_network	0.0907	0.7602	−0.0360	−0.3285	−0.1719	0.1334	−0.1453	−0.0965	−0.1322	0.0588	1.0000

Tab. 10: Effect of Aggregate FDI on Growth with Pooled-OLS

	(1) Growth	(2) Growth	(3) Growth	(4) Growth	(5) Growth	(6) Growth
FDI	0.149***	0.0778*	0.153***	0.146***	0.158***	0.122**
	(3.52)	(1.90)	(3.27)	(3.43)	(3.33)	(2.33)
log(initialGDP)	−0.609***	−0.292***	−0.578***	−0.725***	−0.733***	−0.493***
	(−6.20)	(−2.76)	(−5.36)	(−6.50)	(−5.93)	(−2.87)
inflation	−0.0153	−0.0161	−0.0259*	−0.0168	−0.0140	−0.00921
	(−1.38)	(−1.54)	(−1.74)	(−1.47)	(−1.18)	(−0.62)
trade_openness	0.00528	0.00414*	0.00103	−0.00774	0.00758	0.00399
	(1.22)	(1.64)	(1.41)	(1.32)	(1.28)	(1.21)
gov_exp	−0.0254***	−0.0368***	−0.0222**	−0.0248**	−0.0191*	−0.0261**
	(−2.65)	(−3.86)	(−2.20)	(−2.58)	(−1.77)	(−2.31)
population_rate	−0.000595	−0.00237*	−0.000126	−0.00218	−0.00233	0.0143**
	(−1.17)	(−1.71)	(−1.03)	(−1.62)	(−1.58)	(2.05)
domestic_inv	0.247***	0.212***	0.243***	0.238***	0.247***	0.214***
	(9.86)	(8.63)	(9.32)	(9.05)	(8.66)	(7.44)
landlocked	−1.212***					−1.317***
	(−3.71)					(−3.46)
finance_index		−0.653***				−0.714***
		(−9.09)				(−7.21)
human_capital			0.00222			0.00984
			(0.26)			(1.05)
political_freedom				0.0519		0.223**
				(0.62)		(2.22)
rail_network					−0.00515	−0.00254
					(−0.43)	(−0.91)
_cons	12.96***	5.980*	11.82***	15.82***	16.08***	7.462
	(4.62)	(2.04)	(3.97)	(4.94)	(4.54)	(1.65)
R^2	0.221	0.315	0.218	0.231	0.233	0.317
N	825	745	769	805	694	605

Note: t-statistics in parentheses, * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

Tab. 11: 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(initialGDP)	−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)
gov_exp	−0.0376***	−0.0274***	−0.0267***	−0.0221**
	(−4.19)	(−2.89)	(−2.96)	(−2.16)
population_rate	−0.494***	−0.587***	−0.907***	−0.735***
	(−3.72)	(−4.29)	(−6.79)	(−4.45)
domestic_inv	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_free			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^2	0.340	0.241	0.262	0.256
N	746	770	806	695

Note: t-statistics in parentheses, * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

Tab. 12: 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	0.302*	0.353**	0.306**	0.311*				
	(1.77)	(1.99)	(2.27)	(1.66)				
FDI_developing					0.141	0.341	0.612	0.615
					(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	−0.00909*	−0.00500	−0.00915	−0.00209	−0.00786*	−0.00278	−0.00697	0.00462
	(−1.80)	(−1.32)	(−1.51)	(−0.12)	(−1.69)	(−1.18)	(−1.39)	(1.28)
trade_openness	0.00648**	0.00623*	0.00503	0.00650*	0.00758**	0.00723**	0.00554	0.00696*
	(2.12)	(1.86)	(1.42)	(1.76)	(2.44)	(2.10)	(1.50)	(1.80)
gov_exp	−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)
population_rate	−0.416**	−0.361*	−0.334	0.400*	−0.407**	−0.364*	−0.345	0.520**
	(−2.15)	(−1.72)	(−1.41)	(1.68)	(−2.08)	(−1.72)	(−1.45)	(2.02)
domestic_inv	0.228***	0.224***	0.224***	0.235***	0.230***	0.227***	0.228***	0.244***
	(7.37)	(6.83)	(6.07)	(6.26)	(7.43)	(6.91)	(6.16)	(6.45)
landlocked	−1.084***	−0.971**	−1.032**	−0.855*	−0.960***	−0.830**	−0.913**	−0.850*
	(−2.93)	(−2.29)	(−2.27)	(−1.89)	(−2.63)	(−1.98)	(−2.03)	(−1.87)
finan_index	−0.581***	−0.588***	−0.672***	−0.587***	−0.587***	−0.596***	−0.682***	−0.641***
	(−7.66)	(−7.08)	(−7.13)	(−6.00)	(−7.71)	(−7.13)	(−7.21)	(−6.25)
human_capital		0.00920	0.00316	0.0102*		0.00934	0.00346	0.00760
		(0.94)	(0.30)	(1.87)		(0.95)	(0.32)	(0.64)
political_freedom			0.271*	0.134**			0.281*	0.200
			(1.80)	(2.14)			(1.86)	(1.47)
rail_line				0.00434				0.00257
				(0.12)				(1.07)
_cons	−2.670***	−3.677**	−5.419***	−4.337***	−2.855**	−3.907**	−5.706**	−6.156**
	(−2.59)	(−2.65)	(−2.70)	(−2.69)	(−2.77)	(−2.81)	(−2.85)	(−3.16)
R^2	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

Note: t-statistics in parentheses, * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

Tab. 13: Effect of FDI on Domestic Investment with Pooled-OLS

	(1) GFCF	(2) GFCF	(3) GFCF	(4) GFCF	(5) GFCF	(6) GFCF
FDI	0.171***	0.164***	0.155***	0.143***	0.177***	0.152**
	(3.29)	(3.07)	(2.76)	(2.81)	(2.99)	(2.36)
inflation	0.0146	0.000125	0.00856	−0.000438	0.0143	−0.0119
	(1.08)	(0.01)	(0.47)	(−0.03)	(1.04)	(−0.63)
trade_openness	−0.00484*	−0.00481	−0.00269	−0.00426	−0.00606*	−0.00222
	(−1.72)	(−1.48)	(−0.90)	(−1.55)	(−1.96)	(−0.58)
gov_exp	−0.129***	−0.137***	−0.123***	−0.125***	−0.138***	−0.142***
	(−11.33)	(−11.31)	(−10.23)	(−11.16)	(−11.25)	(−10.56)
population	0.00726*	0.00774**	0.00886**	0.00889**	0.0120**	0.0135**
	(1.92)	(2.01)	(2.14)	(2.40)	(2.01)	(1.98)
finan_index		0.182**				0.233**
		(2.07)				(2.07)
human_capital			0.0230**			0.00993
			(2.28)			(0.85)
political_free				0.397***		0.248**
				(4.15)		(2.06)
rail_network					0.00453	0.00497
					(0.49)	(0.47)
_cons	27.97***	28.28***	29.99***	31.62***	28.67***	31.94***
	(55.35)	(52.15)	(25.23)	(31.36)	(48.74)	(19.24)
R^2	0.214	0.228	0.212	0.241	0.237	0.263
N	873	792	813	853	735	643

Note: t-statistics in parentheses, * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

Tab. 14: Effect of FDI on Growth with System GMM

	(1) Growth	(2) Growth	(3) Growth	(4) Growth	(5) Growth	(6) Growth
Lag (Growth)	−0.143*	−0.105	−0.177**	−0.149*	−0.133	−0.0915
	(−1.68)	(−1.60)	(−2.37)	(−1.84)	(−1.33)	(−1.21)
FDI	0.225**	0.117**	0.202**	0.224**	0.346***	0.199***
	(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	0.00809	0.00638	0.00920	0.00880	0.0123	0.00786
	(0.75)	(0.99)	(0.93)	(0.99)	(0.98)	(1.00)
gov_exp	0.00231	0.00118	−0.00154	0.00866	0.0118	0.0211
	(0.05)	(0.04)	(−0.04)	(0.20)	(0.23)	(0.59)
population_rate	−1.754**	−1.735*	−1.528***	−1.147**	−1.657***	−1.168**
	(−2.34)	(−1.90)	(−3.54)	(−2.39)	(−3.23)	(−2.17)
domestic_inv	0.516***	0.480***	0.425***	0.500***	0.499**	0.529***
	(3.76)	(5.02)	(3.90)	(4.00)	(3.42)	(4.17)
finance_index		−0.346*				−0.197
		(−1.94)				(−0.81)
human_capital			0.00782			0.00639
			(1.37)			(1.31)
political_free				0.361*		0.248
				(1.68)		(0.67)
rail_network					−0.00150	−0.00389
					(−0.16)	(−0.30)
_cons	−9.647**	−9.116***	−8.589**	−6.464	−10.19**	−9.640**
	(−2.22)	(−3.33)	(−2.10)	(−1.32)	(−2.14)	(−1.96)
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)
Arellano-Bond AR (2) p-value	0.241	0.281	0.410	0.571	0.381	0.352
N	843	763	786	824	710	620

Note: t-statistics in parentheses, * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

Tab. 15: Effect of FDI on Domestic Investment with System GMM

	(1) GFCF	(2) GFCF	(3) GFCF	(4) GFCF	(5) GFCF	(6) GFCF
Lag (GFCF)	0.351***	0.378***	0.372***	0.347***	0.361***	0.322***
	(6.12)	(6.51)	(6.73)	(6.58)	(7.33)	(5.94)
FDI	0.297	0.281*	0.309**	0.264**	0.158	0.137
	(1.33)	(1.71)	(1.97)	(2.11)	(1.34)	(1.51)
inflation	−0.00583	−0.00304	−0.00337	0.00481	−0.00394	−0.00948*
	(−1.15)	(−0.37)	(−0.42)	(0.84)	(−0.59)	(−1.92)
trade_openness	0.00157	0.00142*	0.000927**	0.000724**	0.00218	0.0007621
	(1.42)	(1.65)	(2.17)	(2.21)	(1.59)	(1.61)
gov_exp	−0.00483	−0.00583	−0.00592	−0.00761**	−0.00892*	−0.00985*
	(−0.95)	(−1.31)	(−1.35)	(−2.15)	(−1.81)	(−1.93)
population_rate	0.149	0.0301	0.0348	0.172*	0.0805	0.207**
	(1.55)	(0.51)	(0.64)	(1.87)	(1.05)	(1.98)
domestic_inv	0.678***	0.671***	0.657***	0.659***	0.643***	0.667***
	(9.23)	(15.21)	(15.24)	(16.68)	(17.72)	(14.07)
finance_index		0.0675**				0.0214
		(2.41)				(0.72)
human_capital			0.00581			0.00795
			(1.34)			(0.57)
political_free				0.262***		0.368**
				(2.71)		(1.91)
rail_network					−0.00719	0.00201
					(−1.17)	(1.09)
_cons	1.351	0.607	−0.241	−1.793	1.317*	−2.307
	(1.26)	(1.05)	(−0.37)	(−1.64)	(1.93)	(−1.42)
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)
Arellano-Bond AR (2) p-value	0.803	0.517	0.809	0.579	0.351	0.415
N	850	769	713	695	624	624

Note: t-statistics in parentheses, * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

Tab. 16: 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)	−0.206***	−0.0902**	0.0847	−0.250***	−0.207***	−0.293***	0.137**	−0.270***
	(−3.16)	(−2.03)	(1.00)	(−3.47)	(−3.25)	(−5.36)	(2.05)	(−4.31)
FDI_developed	0.296*	0.619**	0.612*	0.536**				
	(1.87)	(2.33)	(1.76)	(2.18)				
FDI_developing					−1.547	−0.115	0.768	1.436
					(−1.59)	(−0.14)	(0.45)	(1.19)
inflation	−0.0637	−0.133	−0.0614	−0.114	−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_openness	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)
gov_exp	−0.100	−0.00623	−0.0452	−0.00857	−0.0542	−0.0631	−0.0523	−0.101**
	(−0.50)	(−1.08)	(−0.44)	(−1.09)	(−1.26)	(−1.62)	(−1.35)	(−2.07)
population_rate	−1.600*	−1.332	−2.742	−0.138	−0.839	−0.129	−1.392	−1.590
	(−1.93)	(−1.02)	(−1.60)	(−0.12)	(−0.55)	(−1.09)	(−1.11)	(−1.58)
domestic_inv	0.785***	0.251**	0.378**	0.344***	0.769***	0.232*	0.260**	0.322*
	(6.53)	(2.26)	(2.37)	(2.99)	(6.40)	(1.87)	(2.21)	(1.85)
landlocked	−13.92**	−6.665**	−8.514*	−9.019**	−1.351**	−0.947	−0.685	−0.787
	(−2.95)	(−2.12)	(−1.80)	(−2.33)	(−2.69)	(−1.30)	(−1.22)	(−1.17)
finan_index	−2.963***	−2.241***	−3.008***	−2.773***	−2.138***	−0.481*	−0.407	−1.769***
	(−3.57)	(−2.92)	(−3.60)	(−3.90)	(−2.92)	(−1.88)	(−0.40)	(−2.59)
human_capital		−0.0666	−0.114	−0.0932		0.166**	0.0659*	0.141*
		(−0.85)	(−1.27)	(−1.11)		(2.29)	(1.65)	(1.86)
political_freedom			2.043*	0.998**			1.150*	1.438*
			(1.84)	(2.01)			(1.80)	(1.91)
rail_network				0.0744				−0.239
				(0.54)				(−0.87)
_cons	−1.347	2.161	−4.427**	−5.909	6.396	4.889**	1.093	−2.910**
	(−0.93)	(0.15)	(−2.18)	(−0.65)	(0.38)	(2.76)	(0.59)	(−2.82)
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)
Arellano-Bond AR (2)	0.452	0.797	0.507	0.202	0.242	0.416	0.479	0.420
N	489	454	440	396	489	454	440	396

Note: *t*-statistics in parentheses, * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

Tab. 17: 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)	0.793***	0.781***	0.815***	0.795***	0.793***	0.807***	0.813***	0.832***
	(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					0.425	0.498*	0.205	0.410
					(1.60)	(1.65)	(1.26)	(1.49)
inflation	−0.00430	−0.00776	−0.00935	−0.00258	−0.00807	−0.00293	−0.00402	−0.00813
	(−0.46)	(−0.42)	(−0.11)	(−0.29)	(−1.38)	(−0.37)	(−0.46)	(−0.84)
trade_openness	0.00330**	0.000846	0.00499***	0.00287	0.00194	0.00250	0.00539**	0.00820**
	(2.00)	(0.17)	(3.11)	(1.55)	(0.81)	(1.01)	(2.71)	(2.60)
gov_exp	−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)
population_rate	0.197	0.211	0.114	0.286	0.181	0.147	0.229	0.372*
	(0.86)	(−0.49)	(0.59)	(1.31)	(0.92)	(0.86)	(0.64)	(1.83)
finan_index	0.210**	0.234***	0.185**	0.257***	0.209**	0.214***	0.185**	0.343**
	(2.35)	(2.80)	(2.24)	(3.02)	(2.56)	(2.98)	(2.28)	(2.39)
human_capital		0.00174	0.00617*	0.00495		0.00858	0.00641	0.0197**
		(1.13)	(1.75)	(0.72)		(1.45)	(1.18)	(2.11)
political_free			0.0311	0.0569			0.0326	0.172
			(0.21)	(0.33)			(0.23)	(0.90)
rail_network				0.000626***				0.000544*
				(3.09)				(1.84)
_cons	5.096***	6.258*	4.134*	4.403*	5.441***	4.031***	4.047*	0.944
	(3.53)	(1.79)	(1.94)	(1.68)	(5.74)	(3.62)	(1.78)	(1.27)
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)
Arellano-Bond AR (2)	0.152	0.190	0.159	0.164	0.146	0.191	0.151	0.132
N	489	453	437	393	489	453	437	393

Note: *t*-statistics in parentheses, * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$

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