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**Department of Economics and Business Economics**  
**Master's Thesis Economics (MAN-MTHEC)**

# **The FDI and Economic Growth Nexus**

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Nijmegen, 30 June 2023

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Specialisation: International Political Economy  
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*Abstract*

*Within the literature the relationship between foreign direct investment (FDI) and economic growth is being debated for a long time based on contradicting empirical findings. FDI and economic growth can be bi-directionally related and their effect can be dependent on the developmental stage of the country receiving the FDI. This paper researches the relationship between FDI and economic growth using a three staged least squares (3SLS) approach to control for endogeneity and simultaneity for 83 countries together and in subsamples based on their developmental stage from 1971 to 2020. The results indicate that FDI has a positive effect on economic growth but that economic growth does not have a positive effect on attracting FDI.*

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# 1 Introduction

This research studies the effect of Foreign Direct Investment (FDI) on economic growth. FDI is a term used to refer to investments made by investors from a foreign country. This process is mostly carried out by Multinational Enterprises (MNEs) from developed countries. Due to rapid globalization the total amount of FDI has increased (Nunnenkamp, 2002). In figure 1 a visual representation of the amount of FDI flow is given. The importance of FDI has therefore also been recognized more. For companies FDI has become an increasingly bigger part of its value chain and business model. For countries FDI has become a potential contributor to economic growth. Moreover, FDI has also been a factor in the balance of payments, technology transfer and employment for countries. In order to allow FDI into countries they need to have some form of accessibility of the domestic market for foreign companies (Alvarado et al., 2017). For countries FDI can be a source of knowledge and skills entering the country (Barieri et al., 2018; Sabir et al., 2019).

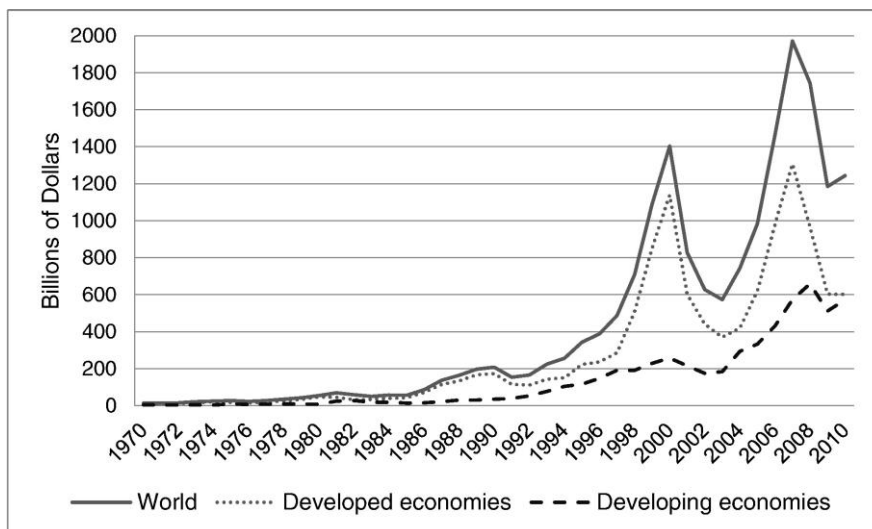


FIGURE 1 THE AMOUNT OF FDI FLOW

## 1.1 Research Objective & Research Question

This research aims to analyse the effect that FDI has on economic growth. The research aims to contribute to the existing literature debate by taking into account the likely endogeneity and simultaneity concerns as well as accounting for the possible differences in the effects between countries with different developmental stages.

The research question of the paper therefore is: ‘What is the relationship between FDI and economic growth?’

To answer the main research question some sub questions need to be answered:

- What conditions determine the effect that FDI has on economic growth?
- Is the effect that FDI has on economic growth direct or indirect?

## **1.2 Scientific Relevance**

Scholars have been debating whether there actually is a relationship between FDI and economic growth (Adnan et al., 2019; Alvarado et al., 2017; Azman-Saini et al., 2010; Bayar, 2017; Iamsiraroj, 2016; Liang et al., 2021; Muse & Mohd, 2021; Odhiambo, 2022; Reza et al., 2018; Sahu, 2021; Shah, 2017; Sokhanvar, 2019; Tanaya & Suyanto, 2022). Within the literature the effects of FDI on economic growth range from a positive significant, insignificant and even negative effect. Moreover, in the literature whether FDI has a direct effect on economic growth is debated. This research aims to give clarity within the debate as it makes use of a three staged least squares (3SLS) model to control for the likely endogeneity and simultaneity of the relationship between FDI and economic growth. Moreover, this research takes into account the developmental stages of the recipient countries of FDI as this could alter the effect that FDI has on economic growth and vice versa.

## **1.3 Societal Relevance**

In a globalising world the amount of FDI has been increasing with it. With an increased amount of FDI the effects of FDI have become increasingly important for host countries. Whether countries should promote or bar off FDI has not been made clear by the scientific literature, which calls for clearance. Furthermore, for countries it is relevant to know what conditions cause the outcome of the effect that FDI has on economic growth. By knowing if FDI has a positive effect and under what conditions countries can implement policy to create an environment that allows them to profit for FDI or protect them from the harm FDI can do.

## **1.4 Methodology**

The paper uses data from the World Development Indicators from the World Bank from 1971 to 2020. The econometrical model is based on the endogenous growth model. For the analysis of the model a 3SLS model is used. Within the 3SLS model the direct effect of FDI on economic growth as well as the interaction effect of FDI and human capital, and FDI and the effect that economic growth has on FDI are included.

## **1.5 Structure of the thesis**

The thesis is structured as followed: First the thesis elaborates more on the relevant literature for the research. Secondly, the research elaborates on the methodological approach of the research. Thirdly, the research gives the results from the empirical analyses. Lastly, the results of the paper are discussed and a conclusion is drawn.

## **2 Theoretical Background**

### **2.1 Economic growth theory**

Examining the relationship between FDI and economic growth requires that the concept of economic growth is explained and defined. The upcoming chapter will therefore explain economic growth and the theories of economic growth. First of all, the ‘Classical’, ‘Neoclassical’ and ‘Endogenous’ economic growth theories are elaborated upon.

### **2.2 Classical Growth Theory**

The classical growth theory is formulated by Harrod and Domar in the Harrod-Domar model. In their model the economic system in the long run does not have an automatic equilibrating mechanism. If the economy does not follow the natural growth rate it will face growing unemployment or prolonged inflation (Hageman, 2009). The model states that the economic growth rate is dependent on the function of the savings and investment rate. There are two determining factors for the growth rate of a country. One of the factors is the relationship between the investments a country makes and the changes in capital stock. The other factor is the national income as a saving rate. The national income shows what the degree of saving of a country is. Combining the factors gives the theory that the economic growth of a country is increased by a higher saving rate and a higher ratio between capital and production (Dragoi, 2019).

For developing countries the model assumes that there are low rates of growth and development, which causes low rates of savings which in its turn reduces investment and thus lowers production and thus lowers savings. To escape the downward spiral countries can increase the economies both internally and externally. By increasing the saving rate, the investments will increase which will increase accumulated capital and thus increase economic growth. Economies of developing countries should thus gain sustained growth from capital

transfer from abroad. For countries without these issues the economy creates a cycle of self-sustained economic growth (Dragoi, 2019).

### **2.3 Neoclassical Growth Theory**

The neoclassical growth theory is developed by Solow who was inspired by the Harrod and Domar model. Solow contributed with his ‘neo-classical theory of economic growth’ to the understanding of what factors explain the difference in the rate of economic growth for countries of different developmental levels (Hageman, 2009). According to the neoclassical growth theory the main contributing factors of growth are the addition of more capital, labour, ideas and new technologies. According to the model an increase in investments will only temporarily increase economic growth as the growth of the labour force is a necessary condition to be met for sustainable growth. This means that without a growth in the labour force the economic growth from investments will only be temporary (Dragoi, 2019). A steady growth rate can be realised by having production, capital and labour increase by the same percentage. In order to achieve progress via the growth supply of the labour force should be increased as well as having high labour productivity levels and the addition of capital (Hageman, 2009).

The implication of the neoclassical growth theory on the theorized effect of FDI on economic growth would be that economic growth will only increase when the increase in FDI is simultaneous with the increase in the labour force.

### **2.4 Endogenous Growth Model**

Paul Romer and Robert Lucas are the main thinkers behind the development of the endogenous growth model that emerged in the 1980s. The endogenous growth model in contrast to the neoclassical growth models focusses on the acquisition of knowledge as a primary driver of growth. The models look into the way technological knowledge is acquisitioned and how it is transmitted (Dragoi, 2019). The role of R&D, externalities, the accumulation of physical and human capital are looked into to explain economic growth (Romer, 1994). In the context of endogenous growth of technologies and its impact on the domestic economic growth makes FDI a relevant factor for an increase in growth. FDI itself leads to more capital accumulation, which in its turn creates incentives to develop technologies for the domestic production, which in its turn increases the potential for growth. FDI in the sense of a MNE coming to the host country also increase the technological

development of a country through the spillover of knowledge, potentially increasing innovation or by increasing the skill of the domestic workforce through training (Dragoi, 2019). According to the endogenous growth model FDI affects economic growth through three routes. It affects economic growth directly, and indirectly through increasing technological progress and through increasing human capital.

## **2.5 FDI Theory**

## **2.6 Production Cycle Theory**

The production cycle theory was developed by Vernon in 1966. It consists of four stages of the production cycle: innovation, growth, maturity and decline (Vernon, 1992). These stages are relevant for FDI as the stage of the production cycle determines whether there will be FDI or not. First companies need to innovate to create a product that is in demand abroad due to the fact that they cannot make it abroad themselves. However, after a while companies from the importing countries will start to imitate the product increasing competition for the exporting firm. In order for the firm to maintain its market share it needs to set up production facilities abroad (Popovici & Calin, 2014; Denisia, 2010).

## **2.7 Eclectic Theory**

Eclectic Theory has been developed by Dunning and describes the process of firms entering foreign markets (Denisa, 2010). The Eclectic Theory by Dunning differentiates three parts of the determination FDI. The first part is about the firm having an advantage to be able to enter foreign markets and compete. For this research the firm advantage part is not relevant and is thus not discussed any further. The second part of the Eclectic Theory is about the determining factors for attracting FDI. The Eclectic Theory separates the specific advantages of countries in three categories: a) the economic benefits, b) political advantages and c) social advantages. The economic benefits consist of the costs of transportation, telecommunication networks, market size and more. The political advantages can be government policies that affect FDI. The social advantages consist of the distance between the home country and the country that firms want to invest in. If for example some countries are more open towards foreign firms or foreigners in general this is seen as a factor that contributes to the decision to invest in the country (Dunning, 1973). The third part of the Eclectic Theory is about how the MNE's will exploit their position in the market abroad. As the third part is not relevant for this research as well it is not discussed any further. Dunning further extended the analysis of

what attracts FDI and found the institutional state to be very important in determining whether a country can attract FDI. Dunning specifies these institutions as the economic openness, the developmental stage and the economic freedom (Dunning, 1980; Dunning, 1988).

### 3 Literature Review

#### 3.1 FDI

In the following chapter a literature review are given on the different conclusions about the relationship between FDI and economic growth. First of all, authors who have found positive relationship between FDI and economic growth are discussed and what conditions caused them to find a positive relationship. Secondly, authors who have found a negative relationship between FDI and economic growth are discussed and what conditions caused them to find a negative relationship.

#### 3.2 Effect of FDI

TABLE 1 EFFECT OF FDI ON ECONOMIC GROWHT

<b>Positive effect</b>	<b>Insignificant effect</b>	<b>Negative effect</b>
Adnan et al., 2019	Alfaro et al., 2004	Alvarado et al., 2017
Alfaro et al., 2004	Alvarado et al., 2017	Sokhanvar, 2019
Alvarado et al., 2017	Azman-Saini et al., 2010	Shittu et al., 2022
Bayar, 2017	Carkovic & Levine, 2005	
Kok & Acikgoz Ersoy, 2009	Sokhanvar, 2019	
Liang et al., 2021	Yilmer, 2023	
Muse & Mohd, 2021		
Reza et al., 2018		
Yilmer, 2023		
Shittu et al., 2022		

As stated in the table above within the literature there is a difference in the outcomes of the research on the effects that FDI has on economic growth. The differences in the outcomes can partially be attributed to the differences in the mathematical models used. The authors use different control variables and differ in whether they analyse a direct or indirect effect of FDI on economic growth.

Adnan et al. (2019) have found a positive effect of FDI on economic growth in the four major South Asian economies of Bangladesh, Pakistan, India and Sri Lanka. When doing the research they considered the control variables of human capital, trade openness, government expenditure and consumer price index (CPI) as determining factors for economic growth. This paper used expenditure in education as human capital due to data availability. All data was drawn from the World Development Indicators. The effects of trade openness, inflation, government expenditure and FDI are all significant in the long run for these countries.

Azman et al. (2010) have found that FDI can have a positive effect on economic growth, but that the effect that FDI on economic growth is not a direct effect. It is an effect that is dependent on economic freedom in the host countries. Thus host countries with more economic freedom gain from FDI and countries with less economic freedom do not. Azman et al. (2010) used the economic freedom index from the Fraser Institute as independent variable apart from FDI. The variables controlled for are population growth, investment ratio and life expectancy as a proxy for human capital. Azman et al. (2010) used a panel of 85 countries, dictated by the availability of data from 1976 to 2004. They did their analyses in 5 year periods. Life expectancy as proxy for human capital. Economic Freedom index from the Fraser institute. Economic freedom index measured via size of government, legal structure and security property rights, access to sound money, exchange with foreigners, regulation of capital, labour and business. Azman et al. classified countries in groups based on the economic freedom index. Then used interaction effects between the groups and FDI.

Alvarado et al. (2017) studied Latin American countries and the effect that FDI has on economic growth. They found a difference in the effect based on the level of economic development. High-income countries had a positive effect from FDI, upper-middle-income countries had no significant effect from FDI and lower-middle-income countries had a negative effect. This suggests that the effect of FDI on economic growth is dependent on the level of economic development. Alvarado et al. (2017) used data from WDI World Bank from 1980-2014. They used the log of GDP as dependent variable for economic growth. The independent variables used are the logs of physical capital, labour force and inflows of FDI. They took the neoclassical growth model as determinants for the variables used. This means that physical capital and labour force are major determinants of the level of production. Apart from just the neoclassical growth model variables, the variables export, productive structure, fertility rate, trade, urbanization rate are controlled for.

Liang et al. (2021) found a positive relationship between FDI and economic growth as well. However, in contrast to Alvarado et al. (2017) they found that developing countries were the

once benefiting from FDI on economic growth instead of developed countries. Laing et al. (2021) had a larger sample size with 113 countries, which could indicate that the results of the analyses are dependent on the countries that are selected and that there is not necessarily one global effect of FDI. Liang et al. (2021) used data from UNCTAD and WDI from the World Bank. They controlled for the variables: population growth, trade openness, government consumption, inflation, GDP per Capita, Human capital, Gross domestic savings, Gross fixed capital formation unemployment, R&D. They did not account for any interaction effect and did not use any interaction variables. Lian et al. (2021) also used an instrumental variable approach to assess the relationship between FDI and economic growth.

Iamsiraroj (2016) looked at the effect that FDI has on economic growth through four channels. A direct effect, indirect effect through human capital, indirect effect through domestic capital and indirect effect through other factors. Iamsiraroj (2016) controlled for the existing economic conditions as they could influence economic growth. They used the endogenous growth model and the Solow growth model. The Solow growth model predicts that population growth results in lower steady state income as each worker has less capital to work with. They derive from the endogenous growth model that there is a minimal human capital requirement for absorptive capacity. They measured human capital through educational attainment. To control for the interaction between FDI and economic growth Iamsiraroj (2016) created an interaction effect between FDI and economic growth. Iamsiraroj (2016) created a model for the effect that FDI has on economic growth and for the effect that economic growth has on FDI. In the economic growth model Iamsiraroj (2016) controls for domestic investment, openness to trade, inflation, labour force growth, government expenditure, financial market development, human capital, the initial GDP per capita growth and economic freedom. Trade to GDP is used as a proxy for openness to trade in the host country. Credit in the private sector and economic freedom used as proxies for financial market development and market friendly locations. In the FDI model Iamsiraroj (2016) controls for labour force growth, human capital, domestic investment, telecommunications infrastructure, the exchange rate, openness to trade, political rights and civil liberties and economic freedom. The data ranges from 1971 to 2010 for 124 countries. The variables are averaged over five-year periods. For robustness checks they have grouped the countries by geographical location as well as running it for all countries. They used an 3SLS model to account for the endogeneity and simultaneity issues when analysing the relationship between FDI and economic growth. The results of the paper indicate that FDI increases economic growth and economic growth increases FDI inflows.

Muse & Mohd (2021) examined the impact of FDI on economic growth in Ehtiopia form 1981 to 2017. They used an Vector Autoregressions model to analyse the impact. The used the control variables initial growth rate, human capital, inflation, government consumption and gross fixed capital formation, openness to trade. Human capital is in this case measured as tertiary education. Openness to trade is measured via the trade as a percentage of GDP. They find that FDI has a significant and positive effect on economic growth.

Reza et al. (2018) used data from the World Development Indicators from 1990 to 2015 of Bangladesh. They analysed the effect that FDI has on economic growth and controlled for the initial economic growth rate, inflation, export, imports and the exchange rate. For the analyses they used the co-integration and Vector Error Correction Metrics (VECM) test. The finding of the paper are that there is a positive relationship from FDI inflows to GDP.

Shah, M. H. (2017) analysed the effect that economic growth has on attracting FDI. In their analyses they controlled for the market size, openness to trade, infrastructure and economic development. They analysed 43 African developing countries using annual data from 1990 to 2015. The results show that better infrastructure and openness to trade have significant effects on attracting FDI inflows.

Sokhanvar (2019) studied the relationship between FDI and economic growth in seven European countries with a high share of FDI to GDP and a high share of tourism to GDP and found a negative relationship for five of the seven countries. Sokhanvar, A. (2019) used data from 1995-2014 from the World Development Indicators from the World Bank. They only used FDI, economic growth and tourism as variables in the analyses. They used a unit root test for stationarity.

Carkovic & Levine (2002) have not found a relationship between FDI and economic growth in the host country. They used a dataset of 72 developed and developing countries.

Adams et al. (2015) found that FDI itself does not have a direct effect on economic growth but that FDI when interacted with regulation variables does have a positive effect.

Yimer (2023) investigated the effect that FDI inflows on economic growth have in Africa from 1990 to 2016. Yimer (2023) bases his model on the endogenous growth model which indicates that there are direct effects FDI on economic growth and interaction effects with human capital and institutional variables. The control variables used are: measures of openness and financial system development, international commodity price, institutional and political factors. The results from the paper are that the long run effect of FDI on growth is significant and positive in investment and factor driven economies. However in the short run

the effect is insignificant for factor driven economies. For fragile economies the effect of FDI is insignificant in both the short run and the long run.

### 3.3 Causality Flows FDI and Economic Growth

Bayar (2017) researched the effect of FDI on economic growth and its nexus in Central and Eastern EU countries. The research found a positive effect of FDI on economic growth in these countries. Moreover, they also analysed the causality and found that a unidirectional causality flows from FDI to economic growth. Bayar (2017) used WDI from the World Bank and Unctad for data between 2003 and 2015. They utilized a Basher and Westlund cointegration test and a Dumitrescu and Hurlin panel causality test.

Choe (2003) has analysed 80 countries and found that there was a bi-directional causality between FDI and growth. However, the causal impact of FDI on growth was weak. Basu et al. (2003) used a panel 23 countries from Africa, Asia, Latin American and Europe and found that the causality flows both ways in open economies in both the long run and the short run. In closed economies the causality only flows from GDP growth to FDI in the long run.

Odhiambo (2022) has analysed the nexus between FDI and economic growth in Kenya. In the study the results indicate that there is a unidirectional causal flow from economic growth to FDI. The results maintain their consistency when differentiating between the short run and the long run. Odhiambo (2022) used data from World Development Indicators from 1980 to 2018. Economic growth proxied by real GDP per capita as real GDP per Capita takes into account the overall population of a country and takes into consideration adjustments for changes in inflation. The variables that are controlled for are broad money supply and openness to trade. Money supply is measured by broad money as a percentage of GDP, while openness to trade is measured by the sum of exports as imports as a ratio of GDP. Odhiambo (2022) did not use any interaction effect.

Tanaya & Suyanto (2022) have analysed the causal nexus between FDI and economic growth in Indonesia as a major upcoming economy. They found evidence for a short and long run causal direction from GDP to FDI. The relationship they found is unidirectional. Tanaya & Suyanto (2022) used data from 1970-2018 from World Development Indicators. They used an Autoregressive Distributed Lag method for cointegration for their analyses. They only used GDP and FDI in their analyses.

### 3.4 Variables

Important variables controlled for by the scientific literature that affect the effect that FDI and economic growth have on each other are: openness to trade, labour force growth, development stage, inflation, human capital, domestic investment, government expenditure, financial sector development, infrastructure, exchange rate, political rights and civil liberties and economic freedom. Therefore, these variables will be included in this research as well to best estimate the effect that FDI has on economic growth.

#### 3.4.1 GDP per capita growth

The growth of GDP per capita can be predicted by the growth of GDP per capita of the year before as it is stable over the years. Therefore, the literature that has analysed the relationship between economic growth and FDI has controlled for the initial GDP per capita growth (Adnan et al., 2019; Alvarado et al., 2017; Azman-Saini et al., 2010; Bayar, 2017; Iamsiraroj, 2016; Liang et al., 2021; Muse & Mohd, 2021; Odhiambo, 2022; Reza et al., 2018; Sahu, 2021; Shah, 2017; Sokhanvar, 2019; Tanaya & Suyanto, 2022).

#### 3.4.2 Human Capital

Human capital has a positive effect on economic growth and attracts FDI. Human capital affects economic growth through the increase in the productivity of labour and physical capital (Lucas, 1998). Human capital as measured through the increase in the skill of the labour force and thus an increase in the education of the labour force affects the productivity of physical capital by being better trained to use physical capital more productively. This also means that if physical capital increases through technological development the need for a more skilled labour force also increases (Pelinescu, 2015)

#### 3.4.3 FDI x Human Capital

According to the endogenous growth model FDI does not only affect economic growth directly, but also through an interaction effect with human capital (Iamsiraroj, 2016). In order to capture the effect that FDI has through increasing human capital an interaction effect between FDI and human capital is needed to use.

#### 3.4.4 Labour force growth

The growth of the labour force is thought to have an effect on both economic growth and FDI inflows. According to the neoclassical growth model FDI can only have an effect on economic growth if there is also sufficient growth in the labour force (Hageman, 2009). Prskawetz et al. (2007) have found that the availability of a labour force has a significant impact on economic growth. Cruz & Ahmed (2018) found a positive and significant relationship between labour force growth and GDP per capita growth. Bloom et al. (2010) state that labour force growth also affects FDI as an increase in the labour force makes for a more attractive environment for companies to invest for multiple reasons. Two of the main reasons given are the possibility for cheap labour and the increase in the internal market. Tyers et al. (2007) also state that an increase in the labour force will increase GDP and attract FDI. However, they also state that an increase in the labour force reduces GDP per capita.

#### 3.4.5 Domestic investment

Domestic investment has a positive relationship with economic growth (Gao, 2002). The dynamic between domestic investment and FDI is however subject to debate among scholars. Domestic investment can be seen as complementary with FDI and as a substitute to FDI. Lautier & Moreaub (2012) have found that domestic investment is a catalyst for attracting FDI. Ndikumana & Verick (2008) have found that FDI increases domestic investment just as domestic investment increases FDI. Moses et al. (2013) have found the opposite result, in their study domestic investment, both public and private, decreases FDI inflows.

#### 3.4.6 Openness to trade

Trade is known to have an effect on economic growth. However, there is a debate among scholars about the effect that trade has on economic growth (Singh, 2010). For example Busse & Königer (2012) and Makki & Somwaru (2004) have found a positive and highly significant effect of trade on economic growth. Kim & Lin (2009) state that trade only has a positive effect on economic growth when a certain economic developmental stage has been reached. For countries in the lower economic developmental stage trade has a negative effect on economic growth, whereas for countries in the higher economic developmental stage trade has a positive effect on economic growth.

#### 3.4.7 Government expenditure

Wagner's Law indicates that government expenditure has a significant and positive effect on economic growth (Wu et al., 2010). Akitoby et al. (2006) have found that most of the

literature states that Wagner's Law holds for developed countries, but less so for developing countries.

#### 3.4.8 Economic freedom

Economic freedom has been found to be a significant factor for the attraction of FDI and for economic growth (Bengoa & Sanchez-Robles, 2003; Hossain, 2016; Kapuria-Foreman, 2007). Countries with more economic freedom benefit in the form of increased economic growth (Piątek et al., 2013). It is probable that economic freedom, FDI and economic growth are variables that all affect each other.

#### 3.4.9 Inflation rate

The inflation rate has also been found to have an effect on economic growth as an inflation rate that is too high decreases economic growth (Barro, 1995). However, with the inflation rate it is not a case of the lower the better. The inflation rate only has a negative effect when it is too high (Tien, 2021).

#### 3.4.10 Financial sector development

Developing the financial sector has been found to have a positive and significant effect on economic growth (Yang, 2019; Guru & Yadav, 2019; Valickova et al., 2015). Therefore, this research controls for the development of the financial sector in the host country of FDI inflows.

#### 3.4.11 Infrastructure

The infrastructure of the host country of FDI plays a role in its ability to attract FDI. According to the literature a better developed infrastructure attracts more FDI (Shah, 2014; Kaur, 2016). Infrastructure development attracts FDI via the distribution of produced goods and through the facilitation of the production process. The returns on investments increase as productivity increases and it reduces the operation costs (Shah, 2014). In the literature the level of infrastructure development is measured through the development of the telecommunication network (Shah, 2014; I).

#### 3.4.12 Exchange rate

Another predictor for FDI inflows is the exchange rate. A stable exchange rate is an indication that the country is macroeconomically stable (Tan et al., 2021). Alshubiri (2022) found a significant effect of the exchange rate on the ability for countries to attract FDI. An unstable exchange rate deters FDI (Eregha, 2019).

### 3.4.13 Political rights and civil liberties

Multinationals have been accused of investing in countries that exercise a repressive regime and ignore the lack of political rights and civil liberties. However, the literature states that an increase in political rights and civil liberties increases FDI inflow (Busse, 2003; Madani & Nobakht, 2014; Zvezdanović Lobanova et al., 2021). Political rights and liberties are an indication that the host country is a suitable place for investment without the risk that a repressive regime would intervene in the market which could influence the risk of an investment (Jakobsen & De Soysa, 2006).

## 3.5 Hypothetical model

From the theoretical background and literature review a model to capture the dynamics between FDI and economic growth can be derived. In the figure below the dynamics between FDI and economic growth are presented visually. The line C1 represents the effect that FDI has on economic growth. The effect of other factors that also influence economic growth are labelled as C2. As can be seen in the figure C2 comes from human capital, domestic capital and other factors. C3 represents the interaction effect between FDI and human capital. C4 and C5 represent the effects that economic growth, domestic capital, human capital and other factors can have on attracting FDI. C6 represents an indirect effect of FDI through other channels. This paper focusses on the channels C1, C2, C3, C4 and C5.

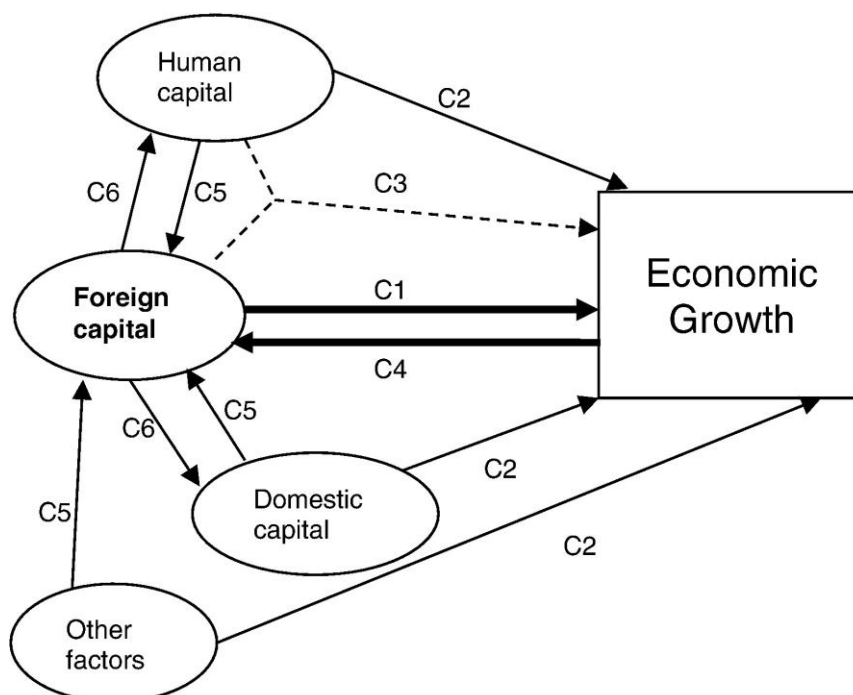


FIGURE 2. THE RELATIONSHIP BETWEEN FDI AND ECONOMIC GROWTH

### 3.6 Hypotheses

Based on the theoretical background and the literature review the following hypotheses about the nexus between FDI and economic growth are drawn:

- Hypothesis 1

As a country receives more FDI, its economic growth increases as well

- Hypothesis 2

FDI increases economic growth through the increase in human capital

- Hypothesis 3

An increase in economic growth attracts more FDI

- Hypothesis 4

Developing countries experience a higher increase in economic growth by attracting FDI than developed countries

## 4 Methodology

In the following section the methodological approach of the paper are elaborated upon. First of all the data used is elaborated upon. Secondly the model used is elaborated upon. Lastly the variables used is elaborated upon.

### 4.1 Data

The paper will be using data from the World Development Indicators (World Bank) to measure the characteristics of the host country. Host countries are the countries that are the recipient of FDI. To measure the economic freedom of countries the data is drawn from the Economic Freedom index from the Fraser Institute. To measure the political rights and civil liberties the data is drawn from the freedom house dataset. The data period will be between 1970 and 2020 as this gives the opportunity to include as many countries as possible. After dropping countries with too many missing 81 countries have been selected for the study. The variables have been averaged over five-year periods in order to be compatible with the datasets from the Freedom House and Fraser Institute as they have 5 year averages as standard for their variables. Moreover, within the literature using 5 year averages is standard for

assessing the relationship between FDI and economic growth (Azman et al., 2010; Iamsiraroj, 2016).

## 4.2 Model Economic Growth

Based on the endogenous growth model the following mathematical expression for the effect FDI has on economic growth will be used.

$$EG_{it} = \beta_0 + \beta_1 FDI_{it} + \beta_2 FDI_{it} \times \beta_3 HC_{it} + \beta_4 HC_{it} + \beta_5 C_{it} + \varepsilon_{it}$$

In the mathematical equation for economic growth subscript  $i$  indexes countries, and subscript  $t$  indexes time.  $EG$  is the variable economic growth,  $\beta_0$  is the intercept, FDI is logically for FDI, HC is for human capital,  $C$  is for the control variables added in the model, and  $\varepsilon$  is the error term.

The control variables for the economic growth model are GDP per capita growth lagged, population growth, domestic investment, openness to trade, government expenditure, inflation rate, financial sector development, and economic freedom.

Based on the literature the following mathematical expression for the effect of economic growth on attracting FDI will be used.

$$FDI_{it} = \beta_0 + \beta_1 EG_{it} + \beta_2 C_{it} + \mu_{it}$$

In the mathematical equation for FDI subscript  $i$  indexes countries and subscript  $t$  indexes time. Just like with the economic growth model FDI stands for FDI, EG stands for economic growth and  $C$  stand for control variables. The  $\mu$  stands for the error term.

The control variables for the FDI model are population growth, openness to trade, human capital, domestic investment, infrastructure, economic freedom, exchange rate, political rights and civil liberties.

## 4.3 Econometric models

Because the relationship between FDI and economic growth is likely to be bidirectional based on the literature, an model that accounts for endogeneity and simultaneity needs to be used to correctly asses the relationship. This paper follows the example of Iamsiraroj (2016) for the techniques to address potential endogeneity and simultaneity concerns. Iamsiraroj (2016) uses a three staged least squares (3SLS) method over seemingly unrelated regression (SUR), two

staged least squares (2SLS) and generalized methods of moments (GMM) as 3SLS takes into account the cross-correlation equations and by doing so the efficiency for the large sample is improved. By taking into account the cross-correlation equations the 3SLS model estimates also addresses correlation between the error terms of the system of equations.

For the 3SLS model instrumental variables are used because the independent variable is not independent from the disturbances. A common technique for choosing instrumental variables is taking the exogenous variables and the lagged exogenous variables. They are considered to be the best instrumental variables as they are correlated with the endogenous variables, but are uncorrelated with the disturbances. The logic behind this is that lagged variables cannot be correlated with the disturbances of the present as they are basically variables from the past. To test for the validity and strength of the instruments the Sargan test for overidentifying restrictions is most commonly used. The Sargan test assesses the correlation between the set of instruments and the residuals.

Because according to the literature it is likely that there is a difference in effect for countries of different developmental stages the model is estimated for all countries and countries grouped in their developmental stages. The subsamples are based on the rating that the World Bank gives these countries and ranks from low income, lower middle income, upper middle income and high income. In Appendix 1 a table shows what countries are included in the research and in what category they have been put in.

In this paper the results of the general-to-specific models are shown. These only include the variables that remain statistically significant after a general-to-specific modelling strategy was implemented. This means that the most significant variable is dropped out at a time. When the model only includes significant variables it is a specific model.

#### **4.4 Operationalization of the variables**

Important variables controlled for by the scientific literature that affect the effect that FDI and economic growth have on each other are: openness to trade, labour force growth, development stage, inflation, human capital, domestic investment, government expenditure, financial sector development, infrastructure, exchange rate, real interest rate, political rights and civil liberties and economic freedom. Therefore, these variables will be included in this research as well to best estimate the effect that FDI has on economic growth. An overview of the variables is given in the Appendix 1.

#### 4.4.1 Economic growth

To measure the economic growth of a country the log of the GDP per capita is taken from the dataset from the World Development Indicators ranging from 1971 to 2020.

#### 4.4.2 FDI

The amount of FDI the country receives is measured by taking the net FDI inflows from the World Development Indicators from 1971 to 2020. The variable is then taken as a percentage of the GDP to get the FDI to GDP ratio.

#### 4.4.3 Initial GDP per capita growth

To measure the initial GDP per capita growth the GDP per capita is taken from the World Development Indicators from 1971 to 2020. The variable is then logged to get the growth rates and is lagged to represent the initial GDP per capita growth.

#### 4.4.4 Labour force growth

In order to measure the labour force growth the population measurement from the World Development Indicators is taken from 1971 to 2020. The World Development Indicators also have the labour force growth, but due to limited data availability the population measurement is taken over the labour force measurement. The population variable is then logged to represent the growth in the labour force.

#### 4.4.5 Human Capital

Human capital is measured by using education as a proxy. Therefore an index of the primary, secondary and tertiary education measurements from the World Development Indicators is made. The data from the World Development Indicators ranges from 1971 to 2020. This variable is then logged to represent the growth in human capital.

#### 4.4.6 FDI x Human Capital

As FDI is theorized to have an interaction effect with human capital when looking at the effect that FDI has on economic growth an interaction variable is created.

#### 4.4.7 Domestic investment

In order to measure the domestic investment of a country the gross domestic capital formation measurement of the World Development Indicators from 1971 to 2020 is used. The gross domestic capital formation consists of the addition in fixed assets in the economy and the net changes in the level of inventory. The domestic investment variable is measured in a percentage of the GDP of the country.

#### 4.4.8 Openness to trade

Trade is measured by taking the trade measurement of the World Development Indicators from 1971 to 2020. Trade is measured as the sum of export and imports of goods and services as a percentage of GDP.

#### 4.4.9 Government expenditure

To measure the presence of the government in the economy the government expenditure measurement from the World Development Indicators from 1971-2020 is taken. The government expenditure is measured as the general government final consumption expenditure and includes all government current expenditures for purchases of goods and services as a percentage of the GDP.

#### 4.4.10 Inflation rate

The inflation rate variable is taken from the inflation measurement from the World Development Indicators from 1971 to 2020. The inflation measurement is measured by the annual percentage change in the cost of the average consumer acquiring a basket of goods and services.

#### 4.4.11 Financial sector development

To measure the development of the financial sector the measurement of the World Development Indicators of the amount of domestic credit to the private sector is taken from 1971 to 2020. The domestic credit to private sector is measured as a percentage of the GDP.

#### 4.4.12 Infrastructure

As stated in the theoretical consideration of the variables the infrastructural development of the host country is important in attracting FDI. Authors have used telecommunication as a proxy for the infrastructural development of a country (Shah, 2014). What has mainly been used by authors to measure the telecommunication infrastructure is the number of mainlines. However, since this research spans from 1971 to 2020 another proxy needs to be used. The amount of mainlines shows an increasing trend on average until 2005 to 2010 and afterwards it declines. With the coming of mobile phones the need for telephone mainlines decreased. Because this would influence the results from 2005 onwards the telephone mainlines and mobile subscription measurements of the World Development Indicators are taken as an index. This index is created by taking the growth of telephone mainlines from 1971 to 2005 and taking the growth of mobile subscriptions from 2006 to 2020.

#### 4.4.13 Exchange rate

To measure the exchange rate volatility of a country the exchange rate measurement of the World Development Indicators from 1971 to 2020 is taken. The exchange rate measurement is measured by annual averages of the exchange rate of the domestic currency compared to the US dollar. The exchange rate is then logged to capture the volatility of the exchange rate.

#### 4.4.14 Political rights and civil liberties

To measure the political rights and civil liberties of a country the index from the Freedom House is taken. In this index the Freedom House has given countries a score based on the amount of political rights and civil liberties their citizens have. A higher score in this index means worse political rights and civil liberties. This index also ranges from 1971 to 2020, but is only available annually from 2000 onwards.

#### 4.4.15 Economic freedom

Economic freedom is measured via the economic freedom index from the Fraser Institute. The economic freedom index is measured via size of government, legal structure and security property rights, access to sound money, exchange with foreigners, regulation of capital, labour and business. The Fraser Institute has given countries a rating for their economic freedom which in contrast to the Fraser Institute are the higher the more economic freedom.

## 5 Results

In the tables 2 and 3 the results for the relationship between FDI and economic growth are presented. The findings suggest that economic growth does not have a significant effect on attracting FDI, but that FDI does have a significant effect on economic growth. However, in the case of FDI affecting economic growth a distinction in the significance can be made

between the developmental stages of the countries. In the tables only the significant values for the variables are shown apart from the main independent variables. The results of the Two Way Fixed Effects OLS regression are put in Appendix 3 and 4 as they are not considered valid due to the lack of accounting for endogeneity and simultaneity.

TABLE 2 3SLS FOR ECONOMIC GROWTH ON FDI

Variables	All Countries	Low income	Lower middle income	Upper middle income	High income
<b>Constant</b>	-6.905*** (0.039)	-4.835 (4.620)	-9.733** (3.159)	-2.650 (2.740)	-5.988* (2.588)
<b>Economic Growth Domestic investment</b>	0.039 (0.118)	0.866 (0.898)	-0.920 (0.515)	-0.487 (0.514)	0.434 (0.322)
<b>Population growth</b>				0.860** (0.288)	
<b>Openness to trade</b>	0.94*** (0.096)		1.542*** (0.270)		1.073*** (0.174)
<b>Human capital Infrastructure</b>	-0.055*** (0.01)		-0.109* (0.045)		
<b>Economic Freedom</b>	0.295*** (0.065)	0.327* (0.154)	0.870*** (0.192)	0.574** (0.181)	
<b>Exchange rate</b>	-0.045*** (0.013)		-0.118** (0.038)		-0.151*** (0.035)
<b>Political rights Civil liberties</b>					
<b>No. of observations</b>	830	100	280	210	290

Notes: \*\*\* is a significance of 0.001. \*\* is a significance of 0.01. \* is a significance of 0.05.

### 5.1.1 Results for all countries

For all countries the effect that economic growth has on attracting FDI is not significant. The same goes for population growth, human capital, political rights and civil liberties. These findings are contrary to the hypothesized relationship between economic growth and FDI.

According to hypothesis 3 economic growth was expected to have a positive and significant effect. Therefore, hypothesis 3 needs to be rejected.

Bloom et al. (2010) state that labour force growth also affects FDI as an increase in the labour force makes for a more attractive environment for companies to invest for multiple reasons.

Two of the main reasons given are the possibility for cheap labour and the increase in the internal market. Interestingly, as for the insignificance of population growth, the theory about FDI being attracted by bigger markets does not hold according to the analyses.

Attracting FDI is also not dependent on the skill of the labour force measured through human capital, which is also an interesting results as other authors have found different results. As for political rights and civil liberties they are in none of the situations significant for attracting FDI.

What is interesting to see is the significant and negative effect that infrastructure has on FDI. According to the theory and findings of other authors infrastructure was expected to have a positive effect for attracting FDI. However, this turns out not to be the case. On the contrary the amount of domestic investment as a percentage of the GDP does have a positive and significant effect. This is interesting because the domestic investment variable also captures the investment that the government does in infrastructure.

As expected the openness to trade has a positive and significant effect on the amount of FDI a country receives. The exchange rate has a negative and significant effect on FDI which indicates that when exchange rate is more volatile FDI inflows decrease. Exchange rate volatility was also expected to affect the amount of FDI inflows.

TABLE 3 3SLS FOR FDI ON ECONOMIC GROWTH

Variables	All countries	Low income	Lower middle income	Upper middle income	High income
<b>Constant</b>	5.355*** (1.326)	3.705** (1.323)	6.985*** (1.742)	3.104** (1.10)	5.580*** (1.069)
<b>FDI</b>	1.205*** (0.231)	0.174 (0.118)	0.205 (0.140)	-0.160 (0.165)	0.629*** (0.153)
<b>FDIx Human Capital</b>	-0.000003 (0.000010)		0.000057*** (0.00001)	0.000037*** (0.00001)	
<b>Human Capital</b>	0.341*** (0.098)		-0.258* (0.107)		
<b>Initial GDP per capita</b>	0.436*** (0.053)				0.000016*** (0.000027)
<b>Domestic investment</b>	-0.264* (0.125)				
<b>Financial sector</b>	0.112*** (0.032)		0.180** (0.064)	0.199* (0.082)	0.156* (0.066)
<b>development</b>					
<b>Government expenditure</b>	0.294** (0.096)	-0.299** (0.108)	0.418** (0.126)	0.235* (0.105)	0.290* (0.117)
<b>Inflation</b>			-0.084* (0.036)		
<b>Population growth</b>			-0.100* (0.043)		
<b>Openness to trade</b>	-0.644*** (0.172)		-0.367* (0.168*)		-0.258* (0.128)
<b>Economic Freedom</b>			0.155* (0.071)	0.339*** (0.008)	0.242*** (0.061)
<b>No. of observations</b>	830	100	280	210	290

Notes: \*\*\* is a significance of 0.001. \*\* is a significance of 0.01. \* is a significance of 0.05.

For all countries the effect that FDI has on economic growth is significant and positive as was expected by the theory and literature review. However, the expected interaction effect between human capital and FDI does not give significant results. In contrast as expected by the theory and literature review human capital does affect economic growth positively and

significantly. For economic growth all theorized important control variables turn out to be significant apart from inflation, population growth and economic freedom. For inflation this makes sense as inflation in itself does not have to affect economic growth that much as long as it is stable. This analyses ranges from 1971 to 2020 with 5 year intervals which probably has made the inflation rate stable over the time periods.

Population growth could have two different effects according to the literature, first of all it could have a positive effect as population growth can effect GDP growth. However, because this research has taken GDP per capita as the dependent variable it could also have meant a negative effect because the total amount of GDP needs to be divided by more people.

Economic Freedom was expected to have a positive and significant effect on economic growth. However, it turns out to not have a direct effect on economic growth. Because it does affect FDI, and because FDI affects economic growth, economic freedom can still be considered a factor in economic growth as it affects it indirectly through FDI.

Interestingly, domestic investment has a negative and significant effect on economic growth even though it does increase the amount of FDI inflows. As expected the initial GDP per capita growth is a strong, significant and positive predictor on the GDP per capita growth. Furthermore, a more developed financial sector also positively and significantly affects economic growth as expected. General government expenditure affects economic growth positively and significantly as Wagner's Law predicted (Wu et al., 2010). What is highly surprising is the negative, significant and strong effect openness to trade has on economic growth, whereas it has a positive effect on FDI. According to the theory countries that trade more should experience more economic growth. The results indicate that countries that are less reliant on trade as a percentage of their GDP experience more economic growth.

### 5.1.2 Results for grouped countries

For all the groups of countries the effect that economic growth has on attracting FDI is insignificant. Only for upper middle income countries domestic investment has an effect on attracting FDI. The effect even doubles from 0.358 to 0.860 compared to the all country analysis. This indicates that only for countries that are developing, but are of an certain level of development experience a benefit from domestic investment to attract FDI. Openness to trade only has a significant and positive effect for lower middle income countries and high income countries. If only developing or developed countries would have experienced a significant or positive effect than that would indicate that openness to trade would only affect

FDI for one of those two categories. However, upper middle income countries do not experience a significant effect of openness to trade on FDI, thus the conclusion that it only has a significant effect on developing countries or high income countries cannot be drawn.

Infrastructure only maintains its negative and significant effect on FDI inflows when looking at lower middle income countries. The effect also doubles in size when comparing lower middle income countries indicating that lower middle income countries should decrease the growth of the telecommunications network in order to attract more FDI. However, it does not make sense theoretically that limiting the growth of a telecommunications network would increase FDI.

Economic freedom growth has a positive and significant effect for low, lower middle and upper middle income as expected. It does however not have a significant effect for high income countries. This makes sense when considering that most high income countries already have had high economic freedom ratings. This means that they do not increase that much and thus also not significantly affect FDI inflows.

Exchange rate volatility remains negative and significant for lower middle income and high income countries which indicates that an instable exchange rate negatively affects the amount of FDI inflows for lower middle income and high income countries. What is interesting that the effect is insignificant for upper middle income countries. For low income countries most of the effects have no significance, which can be explained by the fact that there are only ten countries in the group of low income. This is a rather small panel to examine the effect for.

When looking at the effect that FDI has on economic growth it is only significant for high income countries, which is an interesting finding when looking at the debate within the literature about the effects of FDI on economic growth in developed and developing countries. Looking at the results of this analysis the statement can be made that for FDI to have a significant and positive effect on economic growth a certain level of development needs to be reached.

The amount of economic growth that is increased by FDI through human capital is significant and positive for lower middle income and upper middle income countries. However, the effect is small compared to the effects of other variables. This would indicate that when considering lower and upper middle income countries as developing countries that only for developing countries FDI affects economic growth through human capital.

An interesting finding is the shift of the effect that human capital has on economic growth. In lower middle income countries the effect of human capital on economic growth is negative and significant. This would mean that as people get better education in lower middle income

countries the economic growth decreases. This is a rather peculiar conclusion, but could possibly be true if giving people education in lower middle income countries would mean that they experience a brain drain. However, it is unlikely that the brain drain is so big that it decreases economic growth in the lower middle income countries.

The initial GDP per capita growth only maintains its significance in high income countries. The effect becomes a lot smaller for high income countries than for all countries, which would mean that it only affects GDP per capita growth by a little bit in high income countries.

Domestic investment is only significant when considering all countries, which can be explained by the fact that a larger sample size increases the significance of variables.

The development of the financial sector maintains its positive and significant value for lower middle, upper middle and high income countries. This would indicate that by developing the financial sector both developing and developed countries can increase their economic growth.

The government expenditure shows an interesting effect when looking at the value for low income countries. In contrast to countries of different developmental stages it has a negative effect on economic growth. This indicates that for low income countries more government expenditure as a percentage of their GDP decreases economic growth. For the lower middle, upper middle and high income countries the effect remains positive and significant as expected.

Inflation only has a negative and significant effect in lower middle income countries, which indicates that lower middle income countries experience decreased economic growth when the inflation rate increases. The same happens for population growth, just as with inflation the population growth is only significant and negative for lower middle income countries. This indicates that for lower middle income countries an increase in population growth will result in an decrease of GDP per capita growth.

Openness to trade maintains its negative and significant effect for lower middle and high income countries. This indicates that for lower middle and high income countries having a higher trade as percentage of GDP their growth of GDP per capita decreases.

Economic freedom interestingly does not have a significant effect when considering all countries, but does have a significant and positive effect for lower middle, upper middle and high income countries. This indicates that economic freedom does have a positive effect on lower middle, upper middle and high income countries as was expected from the literature.

### 5.1.3 Summary of the results

The expectation from the first hypothesis was that as a country receives more FDI its economic growth increases as well. The results show that this is true when taking all countries into account and when only looking at high income countries. For the non-developed countries the effect was not significant which goes against the expectation from hypothesis four that states that the effect of FDI on economic growth would be larger for developing countries than developed countries. The interaction effect of FDI and human capital on economic growth is only significant for lower middle and upper middle income countries but the effect is very small. This means that for hypothesis two that states that FDI has an effect on economic growth there is an effect for lower to upper middle income countries but it is so small compared to the effects of other variables that it is negligible. The expectation from hypothesis three was that an increase in economic growth attracts more FDI. However, no significant effect has been found for either of the sample sizes.

## 6 Discussion and Conclusion

This research has looked at the relationship between FDI and economic growth using data ranging from 1971 to 2020 for 83 countries using a 3SLS model. The paper has further analysed the relationship between FDI and economic growth for groups of countries of different levels of development. The intent of the research was to fill the gap in the literature about the relationship between FDI and economic growth by accounting for endogeneity and simultaneity by using the 3SLS model and addressing the potential differences of the effects for groups of countries of different developmental stages. The results indicate that FDI increases economic growth when considering all countries and high income countries. The expected bidirectionality of the relationship between FDI and economic growth was not found as economic growth did not have a significant effect on FDI in all sample sizes. The results indicate that in order for countries to attract FDI to boost economic growth they can increase their orientation towards trade, increase their domestic investment, increase their economic freedom and keep a stable exchange rate. For countries to increase their economic growth they can invest in increasing the educational attainment of their population, increase the development of the financial sector and participate actively in the economy through increasing government spending as a percentage of the GDP.

For future research the relationship between FDI and economic growth can be further analysed using a model that accounts for both the endogeneity and simultaneity of the relationship and takes the developmental stages into account. This research has done this but due to the lack of data on low income countries most coefficients were not significant for this category. When more data for low income countries becomes available a study can be done that can fully take into account all developmental stages. What's more is that in this study the amount of countries in the different categories differ, which could mean that the results are influenced more by the groups of countries that contain the most countries. For future research a more balanced division can be made.

## 7 Appendix

### APPENDIX 1 DESCRIPTION AND SOURCE OF THE VARIABLES

<b>Variable</b>	<b>Description</b>	<b>Source</b>
<b>Economic growth</b>	Growth of GDP per capita	World Development Indicators
<b>FDI</b>	FDI inflows as percentage of host country GDP	World Development Indicators
<b>Initial GDP per capita</b>	Lagged GDP per capita	World Development Indicators
<b>Population growth</b>	Growth of the population of host country	World Development Indicators
<b>Human capital</b>	Index of increase in the amount of people that have had primary, secondary and tertiary schooling	World Development Indicators
<b>FDI x human capital</b>	The interaction effect between the FDI inflows as percentage of host country GDP and the human capital index	World Development Indicators
<b>Domestic investment</b>	Gross domestic investments as a percentage of GDP	World Development Indicators
<b>Openness to trade</b>	Sum of exports and imports of goods and services as a percentage of GDP	World Development Indicators
<b>Government expenditure</b>	General government final consumption expenditure on goods and services as a percentage of GDP	World Development Indicators
<b>Inflation rate</b>	The rate of inflation based on the consumer price index	World Development Indicators

<b>Financial sector development</b>	Domestic credit to the private sector as a percentage of GDP	World Development Indicators
<b>Infrastructure</b>	Index of the increase of the amount of people using mainlines and mobile phones.	World Development Indicators
<b>Exchange rate</b>	The change of the exchange rate based on domestic currency compared to the US dollar	World Development Indicators
<b>Political rights</b>	Index of political rights	Freedom House
<b>Civil liberties</b>	Index of civil liberties	Freedom House
<b>Economic freedom</b>	Economic freedom index	The Fraser Institute

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## APPENDIX 2 GROUPING OF COUNTRIES

<b>Low income</b>	<b>Lower middle income</b>	<b>Upper middle income</b>	<b>High income</b>
Burundi	Algeria	Argentina	Australia
Central African Republic	Bangladesh	Belize	Belgium
Malawi	Benin	Botswana	Canada
Mali	Bolivia	Brazil	Denmark
Niger	China	Fiji	Finland
Rwanda	India	Colombia	Chile
Sierra Leone	Cameroon	Costa Rica	France
Togo	Indonesia	Dominican Republic	Germany
Uganda	Congo Republic	Malaysia	Japan
Zambia	Egypt	Ecuador	Greece
	Nepal	Guatemala	Korea Republic
	Ghana	Jordan	Cyprus
	El Salvador	Guyana	Iceland
	Iran	Jamaica	Ireland
	Pakistan	Thailand	Italy
	Papua New Guinea	Mexico	New Zealand
	Philippines	Mauritius	Netherlands
	Kenya	Paraguay	Israel
	Haiti	Peru	Norway
	Lesotho	Namibia	Portugal
	Honduras	South Africa	Spain
	Sri Lanka		Singapore
	Vietnam		Sweden
	Morocco		Switzerland
	Venezuela		United Kingdom
	Senegal		United States
	Tanzania		Panama
	Tunisia		Trinidad and Tobago
			Uruguay

## APPENDIX 3 TWO WAY FIXED EFFECT OLS FOR FDI ON ECONOMIC GROWTH

<b>Variables</b>	<b>General</b>	<b>Specific</b>
<b>FDI</b>	0.009 (0,011)	0.004 (0.011)
<b>Initial GDP per capita</b>	0.139*** (0.016)	0.00002 (0.016)
<b>FDI x Human capital</b>	0.00002*** (0.000003)	0.00002*** (0.000003)
<b>Population growth</b>	-0.378*** (0.088)	-0.609*** (0.089)
<b>Human capital</b>	-0.026 (0.037)	
<b>Domestic investment</b>	0.027 (0.038)	
<b>Financial sector development</b>	0.070*** (0.018)	0.083*** (0.019)
<b>Openness to trade</b>	-0.216*** (0.039)	-0.250*** (0.040)
<b>Government expenditure</b>	0.073 (0.046)	
<b>Inflation rate</b>	-0.006 (0.013)	
<b>Economic Freedom</b>	0.065** (0.02)	0.078*** (0.02)
<b>No. of observations</b>	830	830
<b>No. of country</b>	83	83
<b>Adj. R-squared</b>	0.2681	0.17642

Notes: \*\*\* is a significance of 0. \*\* is a significance of 0.001. \* is a significance of 0.5.

## APPENDIX 4 TWO WAY FIXED EFFECTS OLS FOR ECONOMIC GROWTH ON FDI

<b>Variables</b>	<b>General</b>	<b>Specific</b>
<b>Economic growth</b>	0.065 (0.11)	0.078 (0.11)
<b>Population growth</b>	-0.838** (0.305)	-0.616* (0.270)
<b>Human Capital</b>	0.087 (0.070)	
<b>Domestic investment</b>	0.555*** (0.128)	0.595*** (0.123)
<b>Infrastructure</b>	0.027 (0.033)	
<b>Exchange rate</b>	0.009 (0.017)	
<b>Openness to trade</b>	0.651*** (0.13)	0.660*** (0.127)
<b>Political rights</b>	-0.048 (0.055)	
<b>Civil liberties</b>	-0.017 (0.075)	
<b>Economic Freedom</b>	0.220** (0.071)	0.253*** (0.065)
<b>No. of observations</b>	830	830
<b>No. of country</b>	83	83
<b>Adj R-squared</b>	0.0036	0.0024

Notes: \*\*\* is a significance of 0.001. \*\* is a significance of 0.01. \* is a significance of 0.05.

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