Does the World Still Follow the Investment Development Path?
Testing the Validity of the Model

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Abstract

This study investigates the validity of the Investment Development Path model. The analysis of the original theoretical framework, as well as several extensions, is conducted with a use of fixed effects panel dataset. Obtained results lead to the conclusion that the IDP model still correctly predicts the relationship between the Net Outward Investment position of a country and its level of development, however it faces difficulties in capturing the consequences of the Global Financial Crisis. Several interesting deviations of countries from their expected IDPs are presented. The study puts some light on the limitations of the IDP framework and provides insights for a future research in this field.

Keywords: Investment Development Path, Net Outward Investment Position, FDI, GDP, IDP.

Preface

I would like to express my greatest gratitude to Professor Jean-Marie Viaene for his supervision and helpful feedback, without which the whole analysis could not have been carried out.

I would like to say thank you to my Parents, who supported me in whatever I pursued, before and during my year of studies at Erasmus University Rotterdam. Without them, I would not be where I am now.

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Introduction

There are many theoretical approaches to Foreign Direct Investment, but none of them have been considered so path-breaking as the Investment Development Path. Developed in 1981 by John Dunning, quickly gained popularity as the first dynamic approach trying to explain the relationship between FDI and the level of country's development. Numerous studies have been conducted to examine the intuitive, graphical representation of the IDP curve. Still, many scholars assume the validity of this concept and, based on the original version of the model, formulate conclusions on policy recommendations for the examined countries. It is particularly common for the emerging economies of the Central and Eastern Europe, which are in an important moment of their development after years of communist governance.

However, a lot have changed since 1981. The world has observed structural changes in the foreign investment, new types of FDI appeared, the late investor countries joined the international exchange of FDI flows. Moreover, the Global Financial Crisis has challenged the world economy on an unprecedented scale. This is why the questions emerge: is the model of IDP a reliable tool, with an ability to capture all that changes? And does it reflect the same trends in FDI flows in a modern economic reality? Providing answers to these questions is the main motivation of this paper.

The analysis conducted in this work investigates the original model of IDP and its extensions, using the approach introduced by Dunning (1981). A panel dataset for 116 countries in the period 1990-2014 is introduced to empirically answer the main research question. This study contributes to the literature in several ways. Firstly, the most recent database is being used. The sample not only incorporates the time when many post-Soviet countries gained sovereignty, but also includes the years of the Global Financial Crisis. That allows to compare the results with other studies that had been conducted before this event and see, whether the shape of the IDP line was perturbed by the recession of 2007-09. Furthermore, the analysis of the original model is extended by including numerous types of control variables. They allow to interpret a country's investment position not only in relation with its Gross Domestic Product, but also considering other circumstances related to its socio-economic development, institutional profile and technological progress. Lastly, two competing models of IDP are analysed, which supports the intuition provided by the original model.

In general, it is found that the original model of IDP correctly predicts the relationship between Net Outward Investment and GDP of countries in the examined sample. The results provide support for existence of the development line, as suggested by Dunning (1981). The

model extended by additional variables, produces relatively stable output and the signs, as well as the significance of the most important coefficients remain unchanged. This study leads to redefining the income thresholds associated with each of the IDP stages. Also, a surprising distribution of several countries along the development line is discovered, which, however, finds confirmation in reality. Lastly, the estimation of two competing models confirms the assumptions made in the original version of IDP and simplifies the interpretation of changes in the original dependent variable.

This research is structured as follows: first, the genesis of theoretical approaches to FDI which led to developing the concept of IDP is presented. In the second chapter, the model of Investment Development Path with all its elements and five stages of countries' development is described. Further, the review of the empirical literature on IDP is provided, together with its extensions, description of some methodological problems and solutions to them, which have been created as the research deepened. Next, an empirical study on the validity of the IDP model is conducted. The verification of hypotheses, results and their interpretation are also included in the same chapter. The final section of this paper includes conclusions derived from the study, followed by limitations of the method of analysis and insights for the future research.

1. The Evolution of the Theoretical Approaches to Foreign Direct Investment

1.1 The Economic Expansion and Limitations of the Neoclassical Theory

Big private companies have been operating on an international scale long before the industrial revolution, which is traditionally associated with the origins of modern international business activity. Modern Multinational Enterprises (MNEs), in particular, have their roots in the massive international movement of factors that took place in the 19th century (Dunning, 1992). Foreign Direct Investment (FDI) oriented at resource seeking existed in the multinational activity, however most foreign investment in the until the late 1940s was portfolio capital. As a result, international business activity was essentially ignored in economic theory until 1950s. On one hand, the phenomenon was not perceived as having a major economic impact. MNEs were recognised as formations originated in the United States with the aim to uphold the corporate involvements in Latin America and the Caribbean, being their particular *spheres of influence*. Companies from the more developed North used to engage in production in the Third World, mainly estate agriculture and mining, and remained concentrated on primary production for export (Helleiner, 1989). On the other hand, the neoclassical theory, assuming the perfect competition and not granting mobility to the production factors, did not have space for such an international activity of firms.

Following the World War II, a surge in the economic activity took along an astonishing expansion in trade and multinational businesses. Through the improved technology, communication and transport, American companies strengthened their international position. Asian and European MNEs followed, which led to the rapid expansion of FDI in the whole manufacturing sector (Helleiner, 1989). Important changes in the organisation of international business were taking place, for instance the development of horizontal MNEs or the new Japanese vertical MNEs (Dunning, 1992). Those changes emphasised the inadequacy of the neoclassical theory to explain the phenomenon of foreign investing and the need for a whole new approach. Despite its late appearance, international economic and business literature started to flourish with increasing speed.

The theory of determinants and patterns of FDI has evolved through multiple stages described by the mainstream economic and business literature. Inseparably connected with the economic growth of countries, it was investigated to find, what kinds of trends in the multinational activity of nations can be observed and how it relates to their economic performance. The standpoint of the modern literature focusing on a firm and its operations has

little in common with the traditional approach, which did not really distinguish between FDI and the international portfolio investment[1].

What follows next in this chapter, is a description of the evolution of the FDI theory in the economic and business literature. This will place the model of IDP within certain theoretical frames and show - on the background of the scientific achievements in this field hitherto – to which features the model owes its novelty.

1.2 The Capital Theory – 1950s

Until the late 1950s, FDI was explained by the traditional theory of international capital movements. According to the early neoclassical approach, FDI is a response to differences in the rates of return on capital between countries, so-called the international capital arbitrage (Helleiner, 1989). This concept came from the observation of American companies, which – being the major source of foreign investment in that period – benefitted from a higher rate of return from investment in Europe, than in the domestic economy (Mundell, 1960). The analysis of the general equilibrium implemented thus far in the *2x2x2* Heckscher-Ohlin trade theory, was used to analyse the effects of international capital flows on the sending and receiving countries under various assumptions. Unfortunately, the perfectly competitive factor and product markets assumed in that analysis were inconsistent with empirical observations of the circumstances in which it was found. The theory did not manage to defend itself when an inverse relationship between return rates occurred a decade later, with American MNEs maintaining an increasing European based investment (Castro, 2000).

1.3 The Market Imperfections Theory – 1960

The first attempt to point out the weaknesses of the capital theory and give a start to a modern approach to FDI was a doctoral dissertation of Hymer (1960). His major contribution is rather in the field of organisation of production than trade flows and is based on the market imperfections. The Hymer-Kindleberger hypothesis (1969) emphasizes the importance of

[1] International portfolio investment is an operation of purchasing the financial assets (mostly securities) in one country by investors from another country. In this case, the investors do not take active control over the institutions emitting securities, focusing only on the realization of profits, which are generated either by the difference in exchange rates or fluctuations in interest rates. This is why investors interested in securities often base their decisions on the ratings of the country concerned.

domestic firm-specific characteristics, that are a source of advantage in comparison with the indigenous companies in foreign markets. According to this theory, FDI is not about the capital transfers, but the intangible, proprietary assets, such as skills, technology and business strategies that can be transferred due to international markets' failures. These assets efficiently surpass the failures, making FDI a way to reinforce the market power in the oligopolistic industries (Antras and Yeaple, 2014). In Hymer's setting, not financial but real factors determine the location of MNEs activity. Firms that integrate horizontally or vertically result in being more efficient on imperfect markets for intangible assets, intermediaries and information, compared to a number of independent single-plant companies interacting with one another (Helleiner, 1989).

1.4 The Product Cycle Theory – 1966

Parallel to the theory based on the industrial organization, the Product Cycle Model was developed, combining international production with the ground-breaking importance of knowledge spill overs and innovative activities (Vernon, 1966). The main argument of this theory is that the technological progress leads to changes in the products' factors intensity. As a result, changes in countries' comparative advantages occur. The demand in domestic economy motivates firms to innovate, while the international demand stimulates export. Due to the existence of major market and technological barriers of trade, only multinationals can organize their production processes accordingly to international demand. Northern MNEs consequently shift their production to their subsidiaries in the South allowing for cheaper manufacturing. As technology of production and final goods matures, the advantages coming from skilled workforce and research and development (R&D) fade, forcing firms to rely on new products and technologies (Grossman and Helpman, 1995).

Nevertheless, scholars argued that the Product Cycle Theory could not be treated as a complete approach for FDI, since it does little to explain the ownership of production, as well as the existing investment made by developed countries with a long history of FDI. Moreover, it was accused of focusing too much on the infant industries. The model was broadly supported by the empirical evidence in 50's and 60's, yet in 1970's its author admitted that his theory began to be an inadequate tool for describing the activity of multinational firms (Castro, 2000).

1.5 The Internalization Theory – 1976

While the Product Cycle Model ultimately failed to explain the developing activities of MNEs, the Hymer-Kindleberger approach was steadily gaining recognition and many authors, including Caves (1971), Buckley (1976) and Rugman (1981) attempted to extend or redefine the initial model (Antras and Yeaple, 2014). Multiple studies investigated the exceptional firm-specific assets as a source of foreign oligopolistic power. The only question still unanswered was why not simply sell the acquired knowledge and production advantages to the indigenous firms abroad – based on the economics of location - instead of carrying out the foreign production.

Developed by Buckley and Casson (1976), the theory of internalization provides the final answer. It refocuses the analysis of an MNE by referencing to the theory of the firm and assuming the enterprise to be an alternative institution to the markets (Castro, 2000). Buckley and Casson (1976) claim, that multinationals are usually integrated both, horizontally – on a market for the proprietary assets, and vertically – on a market for the intermediate goods. This assumption allows them to build a model, incorporating the market imperfections, as in the Hymer-Kindleberger theorem (1969), firm-specific knowledge and the internalization – thus the FDI - of the markets for the intermediaries (Helleiner, 1989). In this modern approach, FDI is also motivated by an opportunity to increase the control within a firm, reduced uncertainty of licensing in a foreign market and beneficial transfer pricing. According to the internalization theory, FDI not only replaces the independent arm's length transactions by managerial collaboration within the company, but also creates new know-how and contributes to worldwide Pareto efficiency by overcoming the imperfections in the price system (Rugman and Eden, 1985). The scholars, who developed this theory, were the first to point out that internalization is the most efficient measure that allows for exploiting proprietary advantages of the company without simultaneously putting the monopoly they are to a firm at risk.

2. The Model of Investment Development Path

Until the very 1970's, the literature on FDI had attempted to describe the industrial composition or the locational determinants of these flows. It used to put less effort into investigating the country-specific determinants of FDI or the circumstances, which lead to the balance between inflows and outflows of FDI. Dunning's OLI Paradigm, also referred to as the Eclectic Paradigm, arose as a result of his dissatisfaction with the existing literature, which validated various theories of multinational production[2] only partially. While Koopmans (1957) and Markusen (2005) viewed the theory of trade and international activity as a certain portfolio of models, Dunning aimed at combining multiple theorems into one wide-ranging paradigm. Same as his predecessors, he acknowledged the multiplicity of motives for trade and FDI, but tried to incorporate them all into one grand model.

2.1 OLI Foundation

The IDP theory by Dunning is one of the latest tools used for the analysis of FDI. It has its roots in the Ownership, Localization, Internalization paradigm (OLI), which has also been announced by Dunning (1979) and later developed by other researchers. It combines multiple theories of trade and international production into one methodology, henceforth it is not called eclectic without a reason (Fonseca et al, 2007). In addition, it is applicable to all types of FDI and includes three key motivations for firms' foreign activity - exports, direct investing and conventional resource transfers[3] (Dunning, 1979). The OLI model is based upon three traits defining the position of the company and its potential of growth on international markets.

The *Ownership advantages* define certain unique assets, that distinguish a company from indigenous foreign firms. They may appear on a firm level, industry level or country level. In principle, they are intangible resources based on knowledge, such as brand awareness, management experience or strategy for innovation (Viaene, 2016).

Locational advantages assure a firm that it will benefit from its ownership advantages not only within one economy, but also abroad (Fonseca et al., 2007). Transferring them among countries is impossible, as they consist of human and natural resources rare in the home economy. Moreover, they include the costs of transportation, government policies concerning

[2] Such as the Product Cycle Model, the Theory of Market Imperfections and the Internalization Theory.

[3] Such as licensing, methodical assistance or management agreements.

tariffs, taxes, and other institutional aspects, which create an environment that allows for an entrepreneurial activity in a foreign country (Viaene, 2016).

Internalization advantages are connected with the way a company operates on foreign markets, for instance, whether it decides to create an affiliate or manage other kinds of operations such as exports and licensing. A firm directly involving in external production might be fostered by the scale economies, favourable policies concerning contracts enforcement or mergers (Paul, 2014).

The model of Investment Development Path has been derived from the OLI theorem, hence the latter helps to understand, how the changes in three described types of advantages impact the evolution of FDI. Dunning (1981) points out that a systematic distinction between home and host country, industry and firm determinants of the OLI features is indispensable. In fact, firms of different nationalities will have various predisposition to engage in foreign production, dependent on the economic and other characteristics of their nations, countries in which they intend to invest, the offer of the goods they aim to produce and their management strategy (Dunning, 1981).

The IDP has been considered ground-breaking because it gives a full account of the dynamic interaction between the variables in the Eclectic Paradigm. Second important attribute is the fact, that this theory allows for the role of governments in shaping the economic conditions of a country. They change the ownership advantages possessed by domestic companies and, consequently, transform the flows of FDI. This is supposed to happen due to creating public goods, which support competitiveness[4]. Policy recommendations are a crucial part of formulating the conclusions from the evaluation of country's IDP.

2.2 IDP – The Mathematical Representation

The model of Investment Development Path explores the connection between a country's FDI stocks per capita[5] and its level of economic development, represented by Gross Domestic Product per capita (GDP). With the expansion of the economy, the level of FDI is said to evolve through five stages of development (Dunning, 1981). Initially, the existence of

[4] Such as strategic transport, utilities, basic research facilities and business education at schools and universities (Buckley and Casson, 1998).

[5] It allows for the comparison between countries without the bias caused by relatively large economies, generating immense amounts of FDI flows. This way of measurement was initially used in the original paper by Dunning (1981).

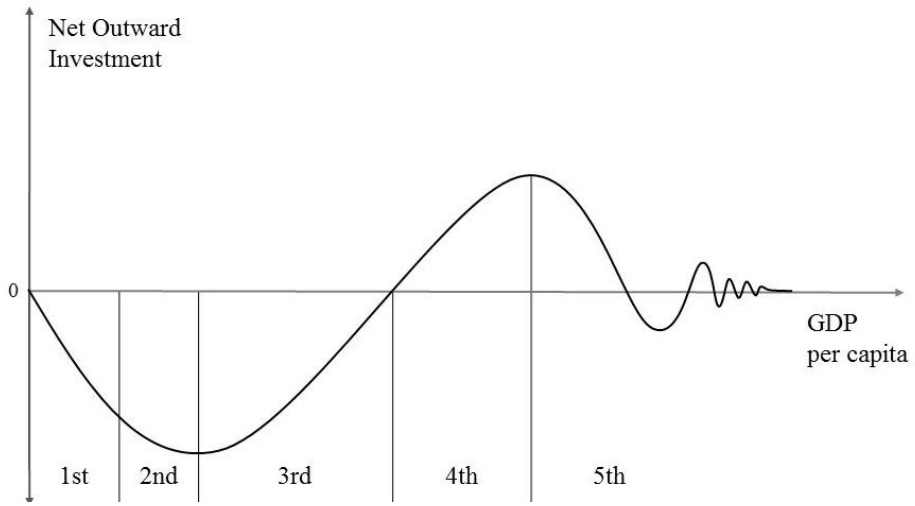
four stages was postulated by Dunning (1981. Narula (1993) added to them one additional stage. It should be taken into consideration, that not all countries must experience all five phases, and the direction of their evolution does not always have to be forward, as it depends on their economic performance. A long-term recession might as well lead to backtracking on their investment paths (Paul, 2014).

Dunning (1981) provides a graphical representation of the IDP in a form of a U- or J-shaped curve with the Net Outward Investment (NOI – a difference between outward and inward FDI) on the vertical axis and GDP per capita on the horizontal one. NOI consists of the three components: equity capital, internal company loans and reinvested earnings.

Equity capital is a purchase of shares of an enterprise by a foreign investor in a country other than its own. Intra-company loans or debt transactions denote short- or long-term borrowing and lending of funds between direct investors (parent enterprises) and their affiliates. Reinvested earnings include the direct investor's share of earnings not distributed by affiliates as dividends, or earnings not remitted to the direct investor. Such profits are reinvested (UNCTAD, 2016).

The full graph indicates the position of countries on the path[6] at a fixed moment in time, but also a track of evolution, on which they can move as the time passes. The standard graphical representation of the IDP, that became the subject of numerous empirical studies, is presented in the Figures 2.1 and 2.2.

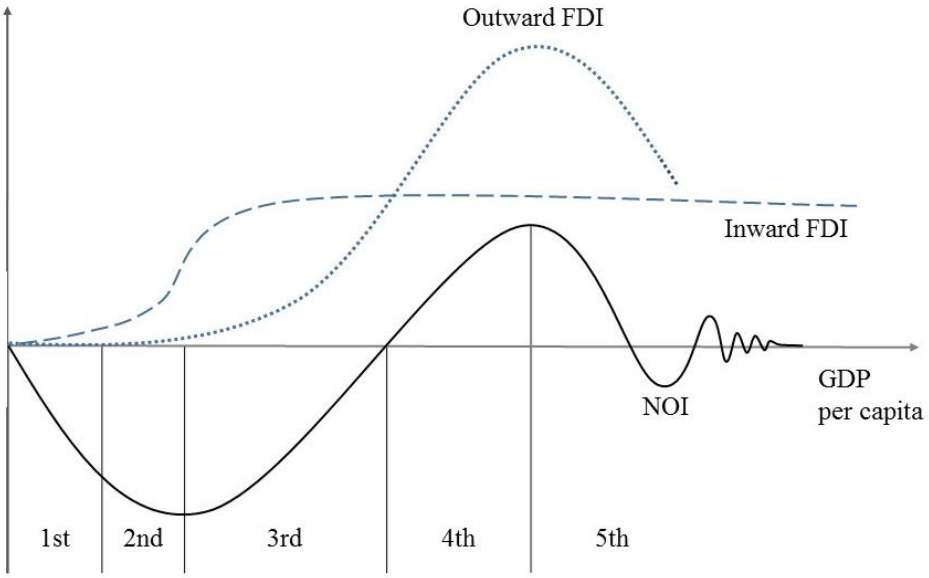
Figure 2.1. The development line and stages of IDP.



Source: Dunning and Narula (1996), recreated for illustrative purposes, not drawn in scale.

[6] With the least developed placed low on the graph, in the 1st and 2nd stage, and the most developed being high, in the 4th and 5th. A full explanation of the countries' location on the graph is provided further.

Figure 2.2. The development line portrayed together with inward and outward FDI.



Source: Narula and Dunning (2010), recreated for illustrative purposes, not drawn in scale.

The equation, that was initially used by numerous scholars[7] to represent the IDP model, is a quadratic function[8] demonstrated:

$$NOI_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 GDP^2_{it} + u_{it,} \quad (2.1)$$

The dependent variable here is the volume of Net Outward Investment and the explanatory variables are the first and second power of GDP. All variables are standardized with respect to country's population. The index *i* denotes a particular country and index *t* – a year. The theory anticipates, that the desired signs of the coefficients at GDP and GDP^2 should be, respectively, negative and positive. That would explain the curve with a turning point in-between the 2nd and 3rd stage with a slope changing from negative to positive in the subsequent phases (Figure 2.1). After adding the 5th stage of development by Narula (1993), the original quadratic equation was extended by inclusion of the third power of GDP per capita:

$$NOI_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 GDP^2_{it} + \beta_3 GDP^3_{it} + u_{it} \quad (2.2)$$

[7] For instance, Dunning (1981, 1996), Tolentino (1993) and Narula (1996).

[8] Because the formula itself has never been fully derived in any of the original literature, it is most probably a quadratic approximation used for the purpose of simplifying the econometric analysis of the relationship between GDP and NOI.

Due to having a third degree polynomial and the negative - as predicted - coefficient at GDP^3, he obtained a third intersection point and a correct shape of the curve[9].

2.3 Five Stages of the IDP

Stage 1 refers to the least developed nations, whose flows of inward and outward FDI are non-existent or vestigial. They are referred to as the FDI receivers, as their Net Outward Investment is equal zero or is negative. Countries classified in stage 1 possess mainly the locational advantages and do not demonstrate any significant ownership advantages (Dunning, 1981). Foreign countries that engage in trade relationships with those economies benefit mainly by a reason of exploitation of their natural resources (Paul, 2014). Home market of such *stage 1* economy is small, the institutional structure is not fully developed yet or, in many cases, politically unstable. A country also lacks a necessary infrastructure that would allow for safe and fast transportation and communication (Buckley, 1998). Government in such a country is responsible for promoting export and usually focuses on improving the quality of human capital, which consists mostly of low skilled labour force (Fonseca et al., 2007). Major share of foreign capital inflows occurs thanks to foreign aid and the efforts of international organizations to improve general functioning of these economies.

Stage 2 is the beginning of increasing advantages of location, which lead to rising inward FDI. GDP also grows, but because the volume of outward FDI (OFDI) is still very low, NOI drops rapidly. This phase steadily emerges from the first one as an effect of recuperating infrastructure and various government programs. Regulatory and legal framework strengthens, encouraging foreign investors that enter local consumer goods market benefitting from cheap labour force (Dunning, 1981). Indigenous companies gradually enter the global value chains. Owing to these partnerships, they acquire production know-how, also investing in better training of their personnel. The progress allows them to upgrade their ownership advantages, however the competitiveness they represent still remains modest (Paul, 2014).

Stage 3 corresponds to the so-called emerging markets. Local firms in such economies are already forming more firm-specific qualities, because resources coming both, from the governments and the companies, aim to deepen and specialize the education of the workforce, R&D, and knowledge spill overs originating from the activity and expertise of foreign multinationals (Dunning, 1981). *Stage 3* economies tend to be net capital receivers, however,

[9] As shown in the Figure 2.1.

the ownership advantages are already so matured that indigenous firms start internationalizing foreign markets. Usually they begin with investments focused on resource-seeking in the developing countries and proceed to strategic, so-called asset-seeking investments in the developed economies (Buckley, 1998). In this stage, NOI is still negative, but starts to increase as a result of outward FDI growing more compared to inward investment. Local firms focus on the innovative activity, deepening their specific advantages, and the government policies are designed to support them in an extensive way. The main reason for a decelerating inward investment is a shrinking comparative advantage in manufacturing based on cheap, low skilled labour. (Paul, 2014) GDP growth is usually positive, since the economy becomes more competitive, industrialized and specialized in production of superior quality goods (Fonseca, 2007).

Stage 4 begins when a country finally achieves a positive value of NOI, hence becoming a net outward investor. At this moment, the ownership advantages tend to emerge from assets based on knowledge as well as highly specialized staff, managerial expertise and technological advancements (Dunning, 1981). Domestic MNEs enter foreign markets in order to seek efficiency, as they begin to face increasing wages and falling productivity levels (Paul, 2014). The activity of foreign and domestic enterprises is aimed at securing strategic assets in other countries. Markets' complexity creates a promising ground for inter-industry trade and production rick in capital. Government policies should be focused on ensuring competition between domestic and foreign companies and alleviating possible market imperfections (Buckley, 1998).

Stage 5 characterizes the most developed nations of the world. Their NOI level is at an unstable equilibrium close to zero, since their stocks of both, inward and outward FDI, are very high (Narula and Dunning, 2010). The sign of NOI's value is usually determined by the current phase of the business cycle and an exchange rate (Dunning, 1981). At this point, the attractiveness and ability to generate international investment depends on the individual expansion strategies and innovation, as the local and foreign multinationals are very similar. The role of governments at this stage remains similar to the previous one (Buckley, 1998).

The next chapter of this paper includes a review of the empirical literature, which has been created to investigate the model of IDP.

3. Review of the Empirical Literature

During the last three decades a number of econometric studies have been conducted to check, whether the theoretical relationship between countries' NOI and GDP can be confirmed empirically. Two alternative approaches were developed. The first way of testing is the cross-sectional analysis on the multinational scale. Second method is analysing the IDP of an individual economy in comparison with the rest of the world or the region which consists of key trade partners for that country (Gorynia et al., 2006). This chapter presents the standpoint associated with the IDP theorem, that has been developed in the literature since the late 1980's.

The empirical studies, which analyse the concept of IDP, start in 1986 with Dunning, who investigates the Net Outward Investment in 25 developing economies. By estimating a set of simple linear regressions[10], he deduces that the ownership advantages of the developed countries are used, when they avoid the transaction costs on the overseas markets they internalize. Third world countries, on the other hand, make use of their unique assets and the pattern of their international investment is explained by factors endowment rather than the market imperfections model.

A descriptive study by Pichl (1989) consists of examining flows of FDI in 18 countries. She concludes that developed small countries have a larger ratio of inward FDI to GDP than big ones. This could indicate the presence of efficiency-type FDI, which is explained by the firm-specific factors rather than the market size.

The original quadratic equation (Dunning, 1981) is used in an econometric study by Tolentino (1993), who tests the link between NOI flows and GDP in 30 countries for the three periods from 1960 till 1984. He obtains negative and significant coefficients of GDP and positive and significant coefficients for its 2nd power, hence confirming the existence of the U-shaped line, only in two periods – 1960-75 and 1960-84. In the period 1976-84 the relationship is inverse, which may be caused by the structural changes that minimize the relationship indicated by the theory. As the main reason for the unexpected results, Tolentino declares the increasing flow of outward FDI from new senders, such as Japan and countries of the Western and Southern Europe in the mid-1970s.

[10] NOI regressed on 4 explanatory variables: GNI per capita, percentage of population with secondary education, percentage of population employed in non-agricultural sectors, trade intensity and urbanisation index (Dunning, 1986).

The same equation as in Tolentino (1993) is used in a cross-sectional study by Dunning and Narula (1996). Their sample covers 88 countries in the years 1980-1992. They confirm the IDP theory with minor exceptions among smaller countries. Also, Narula (1996) analyses FDI of 40 developing economies basing on the same formula. Alarmed by the contradictory results of Tolentino (1993), he decides to examine the sample in the same time period. Contrary to Tolentino's results, his study manages to confirm the IDP theory throughout the whole sample period, which is explained by using data on FDI stocks instead of flows.

Buckley and Castro (1998) replace the original equation with a polynomial formula, using as the explanatory variables the 3rd and 5th power of GDP per capita. They use stocks of FDI, as the historical data on FDI flows for Portugal seem unreliable and do not provide a consistent series after putting together (Taveira, 1984). In their time series analysis for Portugal in the period 1943-96, they suggest that the pattern of Portuguese IDP is reflected better by the updated formula. Due to that, they are able to catch the slow decrease in NOI in the first stage of IDP and a rapid decline after the country entered the 2nd stage of development. They show that the economy of Portugal has been following the IDP very close to that indicated by the theory, but also reveal some limitations of the latter. They conclude that, apart from the GDP levels, institutional and policy-related factors as well as various political events[11] also influenced Portuguese NOI position.

Liu et al. (2005) use the Generalized Method of Moments estimation on Chinese FDI stocks, arguing that economic development, measured by GDP per capita, is still the most influential aspect shaping China's OFDI position. They extend the original set of variables by adding as explanatory factors the level of exports in a country and a measure for human capital, as they are expected to enhance the levels of inward and outward FDI. They obtain results confirming these expectations, as well as being consistent with the original IDP theory.

3.1 Limitations and Revisions of the Original IDP

After the IDP theory gained popularity in the economic literature, scholars have attempted to extend the model and reveal several limitations that the original theory encountered. The concept has been revised, as it started facing some methodological problems

[11] Such as joining the European Union, German reunification of 1989 or Dissolution of the Soviet Union (Buckley and Castro, 1998).

and a number of competing models appeared, aiming to explain the same relationship in a more complex way.

The first concern was about the use of GDP per capita as a measure of a country's development. Dunning and Narula (1996) argue that many countries may have similar GDP per capita, but different structure of the economy, industry and FDI. Therefore, a country's IDP must be interpreted not only based on its income, but also considering other circumstances related to its socio-economic and political structure, institutional profile or external economic relationships. It leads to the conclusion that the link between GDP and NOI still holds and the graphical IDP can be still used for capturing deviations of countries from their expected development paths, nevertheless the relationship is country-specific and may vary among different economies (Narula and Guimon, 2010).

Second issue is associated with the use of NOI as a dependent variable. Because it is an aggregation of inward and outward FDI, which are the aggregates of different industries themselves, it is difficult to measure qualitative changes in the structure of country's FDI (Narula and Guimon, 2010). What is also problematic, NOI takes values close to zero in both, 1st and 5th stage of development, however neither inward nor outward FDI in the last stage is equal zero (Duran and Ubeda, 2001). Also because of that, the interpretation of changes in magnitude of NOI needs to be treated with caution and considering the current business cycle, since the increase may be cause either by rising competitiveness of the economy or disinvestment leading to a fall in the inward FDI (Narula, 1996).

The last problem related to the methodology is the use of an original quadratic formula implemented by Dunning (1981). According to Narula (1996), the estimated IDP may have different curvature depending on the sample of countries, mostly when it is not diverse enough. This problem emerged in Tolentino (1993), who obtaines an inverted J-shaped development line, meaning that there is a negative impact of GDP on the Net Outward Investment.

3.2 Competing Models and Extensions of the IDP

As the research regarding the IDP deepened, numerous adjustments to the original theory have been added to mitigate the methodological issues described in the previous section. This part elaborates on the solutions created to address possible problems, which the initial model faced due to its simplicity.

The first extension is related to the lack of variables controlling for the country-specific effects of individual economies. Dunning and Narula (1996) suggest including additional

factors, which reflect not only a country's growth but also its unique characteristics. Therefore, the extended model looks as follows[12]:

$$NOI_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 GDP^2_{it} + \beta_3 GDP^3_{it} + \sum_{n=4}^{M} \beta_n X_{it} + u_{it} \quad (3.1)$$

The authors claim that the full model should incorporate the rates of enrolment to secondary schools and universities as a proxy for the quality of human capital, health care expenditures reflecting the degree of economic and social development, or the level of infrastructure, allowing for engagement in long-term international business relations (Dunning and Narula, 1996). Furthermore, Stoian (2013), Kalotay (2008) and Buckley (2007) put emphasis on the inclusion of institutional factors, in particular, to the examination of FDI flows from post-soviet countries and emerging economies such as Russia or China. The recent surge in outward FDI from these countries would suggest, that local companies have become so competitive, that can successfully expand abroad thanks to their advanced ownership advantages. However, the simple model of IDP alone does not explain, why countries, theoretically belonging to the 2nd stage of their economic development, generate such noteworthy amount of investment flows (Kalotay, 2008). Given the specific, often communist, institutional legacy of these countries, the institutional factors must be *nested within the general theory of the multinational firm* (Buckley at al., 2007). One more advantage resulting from the use of the model including additional structural variables is that they capture the variety of development models employed in numerous countries.

The solution for the second group of statistical problems (arising from too complex explained variable) is suggested by Duran and Ubeda (2001). They implement two competing models, in which NOI is replaced by inward and outward FDI stock respectively and only GDP per capita is used:

$$Inward_{it} = \beta_0 + \beta_1 GDP_{it} + \sum_{n=2}^{M} \beta_n X_{it} + u_{it} \quad (3.2)$$

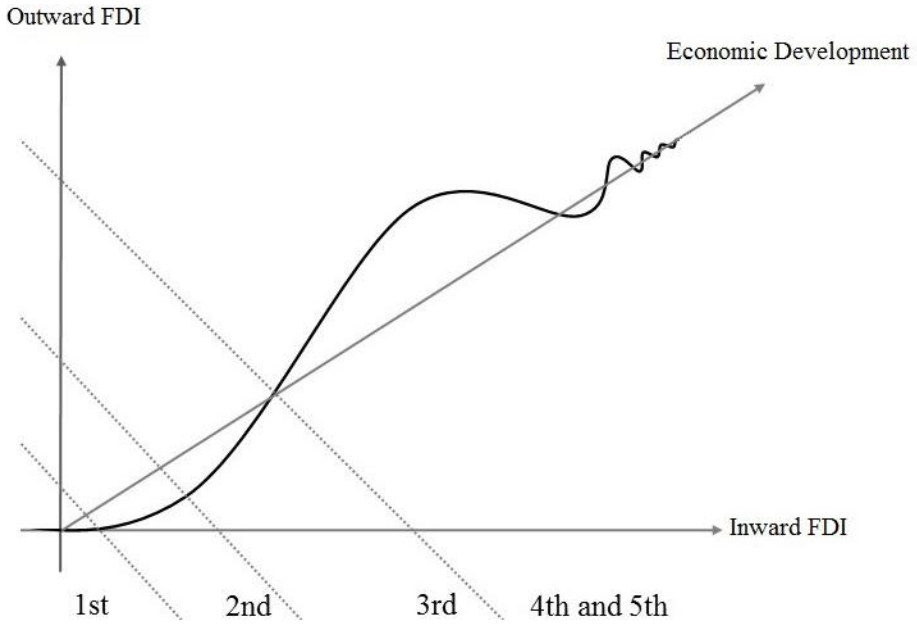
$$Outward_{it} = \beta_0 + \beta_1 GDP_{it} + \sum_{n=2}^{M} \beta_n X_{it} + u_{it} \quad (3.3)$$

[12] *X* denotes a vector of *M* control variables

In this case, with an increasing GDP per capita, one should expect higher levels of inward and outward investment stocks. However, it needs to be taken into consideration that, because of the differences in the size of examined economies, countries, that have been sending and receiving exceptionally large investment flows, will be outshined if the analysis uses the dependent variables measured in absolute terms. In order to avoid this bias, the scholars implement also a relative measurement, which incorporates dependent variables standardized according to a country's population. As this can cause the opposite bias in case of large economies such as United States or China, it is advised to use both types of measurements in the analysis of IDP (Duran and Ubeda, 2001).

This new approach gives rise to an updated graphical representation of the IDP stages, which is shown in the Figure 3.1:

Figure 3.1. The new graphical representation of the IDP.



Source: Duran and Ubeda (2001), recreated for illustrative purposes, not drawn in scale.

Economies below the oblique bisection line (belonging to the 1st, 2nd and 3rd stage of development) have a negative NOI and the ones above the line (in stage 4th and 5th) – a positive NOI. In this new framework, a horizontal movement to the right symbolizes an improvement in the localization advantages and to the left – their deterioration. The vertical ascending movement reflects the increase of a country's competitiveness and the descending one means an opposite result (Duran and Ubeda, 2001).

The same authors also attempt to replace the estimation of the quadratic and polynomial equations (Dunning, 1981; Narula, 1996) with a different set of methodological tools – a

multivariate analysis. This is their answer to the issues raised by the traditional estimations performed on mentioned formulas. They use a factor analysis to establish the relationship between the level of development and stocks of FDI, a non-parametric test to check whether the levels of FDI stocks are in line with the stages indicated by the theory, and a cluster analysis which classified countries belonging to different development stages, based on similarities in the structure of their FDI (Duran and Ubeda, 2001).

Based on the existing literature and a variety of authors presenting somewhat diverse results regarding the validity of the IDP model, in the following chapter an empirical study is conducted. It aims to establish, whether the model invented by Dunning (1981) is still a legitimate tool for assessing the countries' involvement in Foreign Direct Investment. From the literature reviewed above, several research hypotheses are derived and verified by an econometric analysis included in the next chapter of this paper.

4. Empirical Analysis of the IDP Model's Validity in the Time Period 1990-2014

The study presented in this chapter aims to empirically check, if the theory of Investment Development Path remains a legitimate tool for explaining the countries' evolution of FDI. Since majority of the literature highlighting the importance of this theorem have been created over a decade ago, it remains unclear as to whether or not it can be successfully applied to the modern economic circumstances. This study tests, whether the modern FDI in the world displays the same or similar features, as argued by Dunning 35 years ago.

4.1 Research Hypotheses

Building upon the insights provided by the literature mentioned above, several research hypotheses are stated. They are verified in the following study.

The Investment Development Path provides a framework explaining the dynamic relationship between Foreign Direct Investment and the economic development. For decades it has been a tool for analysing the competitiveness of countries from the standpoint of a country's position in the international production network (Castro, 2000). Owing to the IDP, one can identify deviations of individual economies from their expected development paths. Moreover, since the role of governments is strongly emphasized in this theoretical concept, it is possible to tailor for them the economic policies, which would responsibly encourage the outward FDI. The policy considerations are the ultimate motivation for the analysis of countries' IDP, especially in case of countries such as the emerging markets, BRICS[13] or post-communist economies.

However, each theoretical concept needs to be verified and tested, whether it can be still applied to the changing and volatile economic conditions. The latter in the previous years were challenged by unexpected and severe phenomena such as the Global Financial Crisis, fall in the world energy prices or deflation in Europe. In order to test the validity of the IDP theory, Hypothesis 1 is formulated together with the partial Hypotheses 1.1-1.3.

Hypothesis 1: The original model of Investment Development Path correctly predicts the relationship between Net Outward Investment and the level of development for the examined countries.

[13] BRICS is a grouping acronym that refers to the countries of Brazil, Russia, India, China and South Africa, which are all considered to be at a similar stage of newly advanced economic development (O'Neill, 2001).

Hypothesis 1.1: The estimated relationship between NOI and GDP per capita is negative for the 1st and 3rd power of GDP, and positive for the 2nd power of GDP, for the whole sample.

Hypothesis 1.2: The estimated relationship between NOI and GDP per capita is negative for the 1st, 2nd and 5th stage of development[14], and positive for the 3rd and 4th stage.

Hypothesis 1.3: The least developed countries are positioned in the 1st stage of the IDP curve, while the most developed ones are in the 4th and 5th stage.

What is more, this study aims to test, whether the extension of the original model by adding the control variables[15] has any impact on the estimated coefficients of the explanatory variables. This goes beyond the narrow version of IDP. If the model turns out to be relatively stable, it would be an additional argument for it being a valid analytical tool, which takes into account country's peculiarities in the socio-economic development, business environment, institutional framework and technological progress. Thus, Hypothesis 2 is formulated:

Hypothesis 2: The inclusion of structural and institutional control variables does not lead to a change in the signs of the coefficients at GDP per capita.

Following Duran an Ubeda (2001), two competing models, which employ inward and outward FDI stock instead of NOI as the dependent variable, are tested. The intention behind this is only to check, whether they provide a good intuition and support the original IDP model. Because the dependent variables are different, they cannot be directly compared with the original IDP model. However, they can facilitate the interpretation of changes in the magnitude of aggregates constructing NOI, as the latter is the core of this analysis. For that, Hypotheses 3 and 4 are formulated:

Hypothesis 3: There is a positive relationship between GDP per capita and inward FDI stock measured in both: absolute and relative terms.

[14] Measured by the income level.

[15] As suggested by Dunning and Narula (1996), Buckley et al. (2007), Kalotay (2008) and Stoian (2013).

Hypothesis 4: There is a positive relationship between GDP per capita and outward FDI stock measured in both: absolute and relative terms.

It should be noticed that in the 5th stage of IDP no single country is said to have an advantage over any other developed economy. According to Dunning (1996), multinationals are the dominant force in shaping international production and trade, independently of the domestic or host country's location advantages and regardless of the levels of GDP. MNEs start to behave like *mini-markets* as they evolve into Transnational Corporations[16]. The empirical verification of that statement results from formulating Hypothesis 5:

Hypothesis 5: As authenticated by the IDP theory, the NOI position of the most developed countries is no longer dependent on the level of development proxied by GDP per capita.

Finally, a theoretical model can be fully tested after incorporating phenomena, which challenge the modern economies, but which had not been taken into consideration when the model was designed. One of the most severe events, that has affected almost the whole world, was the Global Financial Crisis in the years 2007-09. The propensity of companies to invest was weakened by two major factors. Firstly – by shrinking growth prospects and increasing risks, especially in the developed countries, which were facing the largest recession of the post-war period. Secondly – by reducing access to financial resources, resulting from higher costs of financing and falling corporate profits. Although the crisis spread quickly to majority of countries, it began and most severely affected the inward investment in developed economies, particularly in Western Europe. The FDI inflows are said to have decreased by one-third in the developed countries, because of the prolonging liquidity crisis in the financial markets (UNCTAD, 2016). Therefore, Hypothesis 6 is formulated:

[16] A Transnational Corporation is different from a traditional Multinational Enterprise in a sense that it does not identify itself with one particular nationality. While traditional MNEs are national companies with foreign affiliates, Transnational Corporations spread out their operations in many countries to sustain high levels of local responsiveness. It is achieved for example by employing senior executives in multiple countries, who make decisions from a global perspective rather than from one centralized headquarters. (Kessler, 2009)

Hypothesis 6: In the years of the Global Financial Crisis, there is a positive influence of GDP on NOI in the countries from 4th and 5th stage of IDP.

The following parts of this thesis contain the description of the data and methodology used in the empirical study conducted further.

4.2 Data

Majority of the most recent research carried out to test the IDP was conducted based on FDI stocks data. Therefore, in this study the same technique is being used. The NOI is calculated as a difference between outward and inward investment stocks per capita (NOIs) derived from the UNCTAD FDI database("UNCTADstat", 2016). As the measure of country's development GDP per capita of each economy is used. It is obtained from the World Bank Data ("Data. The World Bank", 2016).

Both, the NOI and GDP are converted into real variables by dividing the nominal values by the GDP deflator with a base year in 2010. It ensures a consistent measurement and enables to make a sensible comparison across time periods, accounting for the price fluctuations. Unadjusted values would distort the measurement of variables such as NOI and GDP, quantified in a particular currency. It serves also as a value added to the research, as such a data adjustment was not used in the previous literature.

The following Table 4.1 contains all the variables constructing the original IDP model used in this study. NOI is measured in US dollars per capita, GDP in thousands of US dollars per capita.

Table 4.1 Summary statistics of the main variables.

Variable	Observations	Mean	Std. Dev.	Min	Max
Dependent Variable					
NOIs	2 652	-4.14	936.76	-5 983.61	46 435.32
Main Explanatory Variables					
GDP	2 652	12.99	17.25	0.15	116.61
GDP^2	2 652	466.26	12 035.50	0.02	13 598.56
GDP^3	2 652	24 722.16	106 009.90	0.01	1 585 768.00

Apart from the original set of variables (Dunning, 1981; Narula, 1996) presented above, this study incorporates four groups of structural control variables and two kinds of dummies: Income Group Dummies and Global Financial Crisis Indicator Dummy. The reasoning behind

such a choice of variables is elaborated on in section 4.3. The statistics of the control variables are shown in Table 4.2:

Table 4.2 Summary statistics of the control variables.

Variable	Observations	Mean	Std. Dev.	Min	Max
Business Environment					
TAX	1 548	3.15	0.34	2.20	4.01
CREDIT	2 551	3.93	0.89	1.01	5.94
WAGE	713	8.28	1.51	2.89	12.86
Socio-Economic Development					
ENROLSEC	2 030	4,33	0.48	1.64	5.09
HEALTH	2 176	1.79	0.39	0.63	2.84
ELCONS	2 491	7.66	1.37	2.60	10.91
Institutions and Openness					
LAW	1 783	0.01	0.93	-2.83	1.67
TRADE	2 668	4.31	0.53	2.62	6.12
Technological Development and Infrastructure					
ENROLTERT	1 939	3,30	0.96	0.98	4.70
AIR	2 513	10.59	1.72	4.29	16.13
RAIL	1 645	8.38	1.38	5.53	12.34
ROADS	967	3.74	1.34	0.20	7.30
Income Group Dummies					
LOW	2 704	0.19	0.39	0	1
LOWERM	2 704	0,27	0.44	0	1
UPPERM1	2 704	0,17	0.37	0	1
UPPERM2	2 704	0,04	0.19	0	1
HIGH	2 704	0.33	0.47	0	1
Global Financial Crisis Dummy					
CRISIS	2 704	0.13	0.33	0	1

What follows next, is a description and scientific justification of all used control variables associated with each of estimated models.

4.2.1 Business Environment Variables

This set of variables indicates the quality of the interactions between the companies and the state, as well as incentives to start a business in a particular country.

Variable TAX denotes the local corporate tax rate. Low rates may encourage investors to start an overseas activity in a certain location, thus increasing FDI. The data is derived from the EY's Worldwide Corporate Tax Guide 2014 (EY, 2014).

Variable CREDIT is a domestic credit provided by monetary authorities and deposit money banks to various sectors on a gross basis, as a % of GDP. The reasoning behind the use of this variable is that the bigger and more accessible financing is in a particular country, the larger amount of FDI will flow into this economy. The data on this and all following variables is obtained from the World Bank ("Data. The World Bank", 2016).

Variable WAGE denotes the average annual wage per worker. In the common perception of the efficiency-seeking investment it represents the input costs of production, one of the most decisive factors for FDI – both, horizontal and vertical (Villaverde at al., 2012). However, in the context of the knowledge-intensive FDI flows, which usually characterize countries from the 4th and 5th stage of IDP, wage can also serve as a demonstration of the purchasing power in a country, expressing the market demand (Coughlin et al., 1991). This variable, similarly to NOI and GDP is deflated by dividing by the GDP deflator.

4.2.2 Socio-Economic Development Variables

The following variables signalize the overall development, which is associated with the quality of life in a particular country. Apart from being another – after GDP – proxy for the development, they indicate certain peculiarities of the sample countries. These indicators allow for further investigation of the variation in the inflow of FDI into the economies (Dunning and Narula, 1996).

Variable ENROLSEC denotes the ratio of total secondary education enrolment to the population of the age group which corresponds to this level of education. It provides basic education that began at the primary level, and lays foundations for long-term learning and human development ("Gross enrolment ratio, secondary, both sexes (%) Data", 2016). It has been shown that achieving a certain minimum stage of education[17] is a prerequisite for an economy to attract and maintain FDI. It also allows for maximizing the indirect effects caused by the presence of companies with foreign capital (Dorozynski et al., 2014).

Variable HEALTH refers to the sum of public and private health expenditures as a share of GDP. It covers the provision of health services, nutrition activities, family planning activities and emergency aid ("Health expenditure, total (% of GDP) Data", 2016).

Variable ELCONS measures the production of combined heat and power plants in kWh per capita. It indicates the market size, which is one of the most basic determinants of FDI, as

[17] Said minimum differs among various sectors of the economy.

well as the level of urbanization and industrialization of economies ("Electric power consumption (kWh per capita) | Data", 2016).

4.2.3 Institutions and Openness Variables

The quality of institutions is considered an important factor determining FDI. Poor institutions increase the costs of doing business[18], which deteriorate the investment activities. Inefficient legal protection can lead to dispossession of company's assets, decreasing the chance of investment. Finally, low quality of institutions results in a poor infrastructure and public gods supply, which lowers the expected profitability and consequently – the FDI (Blonigen, 2005). Variable LAW Reflects the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence in a particular country. The score varies from -2.5 (weak) to 2.5 (strong governance performance).

FDI is particularly beneficial in the locations with a liberal trade regime and involved in the supra-national trade agreements. The latter enhance the market potential of the host country, making a foreign investment more beneficial. If FDI aims to support exports into the host economy, or it is vertical, the openness will facilitate the trade of intermediaries and final goods.

Therefore, in this study the variable TRADE is used. It denotes the sum of exports and imports of goods and services measured as a share of GDP ("Trade (% of GDP) | Data", 2016)

4.2.4 Technological Development and Infrastructure Variables

Among the determinants of FDI there are also country's infrastructure and technological development. The latter is particularly important in the most developed economies, involved in the intra-industry trade and knowledge-intensive investment activities.

A factor that encourages the technologically advanced FDI in the first place is the high quality human capital, as numerous companies consider the access to qualified and creative labourforce an important factor of competitiveness (Dorozynski et al., 2014). A proxy of that is variable ENROLTERT, which denotes the ratio of total tertiary education enrolment to the population of the age group that officially corresponds to this level of education ("Gross enrolment ratio, tertiary, both sexes (%) | Data", 2016).

[18] Through malfunctioning markets or corruption.

Variable AIR serves on one hand as a measure of the transport infrastructure, and on the other – as an indicator of the market accessibility. The most common approach to the latter is summarized by the gravity models theory, which states that the bilateral trade flows diminish with the increasing distance between countries due to rising transport costs. As a result, it is more attractive to set up a production plant abroad, giving a start to FDI, instead of relying on the trade flows (Krugman, 1991). Variable AIR denotes the registered carrier departures worldwide, that is domestic and foreign take-offs of air carriers registered in a country ("Air transport, passengers carried | Data", 2016).

The quality of a country's infrastructure is one of the preconditions for any kind of investment either domestic or foreign (Neuhaus, 2006). Two variables control for that effect.

Variable RAIL represents the length of the railway route available for train service, irrespective of the number of parallel tracks in a country ("Rail lines (total route-km) | Data", 2016).

Variable ROADS denotes the ratio of the length of a country's total road network to a country's land area. The road network includes all roads in a country: motorways, highways, main or national roads, secondary or regional roads, and other urban and rural roads ("Road density Data | The World Bank", 2016).

4.2.5 Additional Dummy Variables

Variables LOW, LOWERM, UPPERM1, UPPERM2 and HIGH are dummies denoting five income groups. They are related to the level of countries' development and indicate the thresholds for each stage of IDP. The division was based on Amann and Virmani (2015) and is not consistent with the World Bank Country and Lending Groups classification ("World Bank Country and Lending Groups", 2016). The income groups are arranged as follows:

Table 4.3 The classification of the income groups and stages of IDP according to country's GDP per capita.

Variable name	Income group	GDP per capita	Stage of IDP
LOW	Low	<$2500	1
LOWERM	Lower middle	$2500-$10,000	2
UPPERM1	Upper middle 1	$10,000-$25,000	3
UPPERM2	Upper middle 2	$25,000-$36,000	4
HIGH	High	$36,000<	5

Source: Amann and Virmani (2015).

The last variable used is the dummy indicating the presence of the global financial crisis, which officially took place in the years 2007-2009 (Eigner and Umlauft, 2015).

All control variables with exception of dummies and variable LAW[19] are used in the form of a natural logarithm, which helps to obtain their normal distribution. Description of the used variables, their sources and expected signs can be found in Table A.2 in the Appendix.

4.3 Empirical Methodology

This study aims to empirically test, whether the IDP model applied to a modern sample of countries correctly predicts the relationship between the Net Outward Investment and the level of development, according to the theoretical approach proposed by Dunning (1981). The fundamental condition for a reliable estimation of the IDP is a diverse database. The sample shall contain countries representing all possible stages of development in order to capture the desired distribution of countries along the IDP curve, if such exists. To allow for the dynamics in the model, a long time series is used to show changes in the NOI position over time. Therefore, a panel data combining all above features is employed for conducting the study in this paper. The sample consists of 116 countries over the period 1990-2014, which results in the overall number of 2652 observations in the base model. The database can be, in fact, considered diverse, as the NOI values vary from -5983.60 to 46435.32 US dollars per capita. Detailed statistics on each country are presented in Table A.1 in the Appendix.

To test, whether the original model of Investment Development Path correctly predicts the relationship between Net Outward Investment and the level of development, thus Hypotheses 1 and 1.1, the following regressions are estimated: first,

$$NOI_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 GDP^2_{it} + \beta_3 GDP^3_{it} + u_{it} \quad (4.1)$$

which corresponds to the original formula used by Dunning and Narula (1996) and Tolentino (1993), and second,

$$NOI_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 GDP^2_{it} + \beta_3 GDP^3_{it} + \beta_{4\text{-}120}\boldsymbol{dCOUNTRY}_{it} + \beta_{121\text{-}146}\boldsymbol{dYEAR}_{it} + u_{it} \quad (4.2)$$

[19] Variable LAW has negative values; therefore, a log transformation would lead to loosing these observations.

which additionally includes the country fixed effects, represented by variable *dCOUNTRY*, and year fixed effect, represented by variable *dYEAR*. The reasoning behind the inclusion of the fixed effects is that in this model countries are not drawn from a larger sample in a random manner. Also, the effects of individual countries are not random as well, since they result from the country-specific characteristics (Paul, 2014).

To check if this intuition is correct, a Likelihood Ratio test is performed with an assumption, that the model from Regression 1 is nested in the model from Regression 2. P-value equals zero, this it implies rejecting the null model in favour of the model with fixed effects included. Additionally, a Wald test on the fixed-effects dummies is run. Again, based on p-value equal zero the null hypothesis of their joint insignificance is rejected and the dummy variables are kept, as they turn out to have a significant effect on the dependent variable. The detailed results of both tests can be found in Tables A.3 and A.4 in the Appendix. The specification of Model 1 with fixed effects is used for performing all following estimations.

Using Model 1, five regressions are estimated, including each of the income group dummies (variable *dINCOME*) respectively:

$$NOI_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 GDP^2_{it} + \beta_3 GDP^3_{it} + \beta_{4\text{-}120} dCOUNTRY_{it} + \beta_{121\text{-}146} dYEAR_{it} + \\ + \gamma_j \boldsymbol{dINCOME}_{it} + u_{it,} \qquad (4.3)$$

where j=1,…,5.

This tests, whether the impact of GDP per capita on NOI is positive or negative, dependent on the income group referring to the particular stage of IDP. It leads to confirming or rejecting Hypothesis 1.2. It is to some extent a novel thing to do, as it has not yet been analysed in this manner. The summary of obtained coefficients signs can be found in Table 4.5.

Going beyond the narrow model of IDP, apart from the Model 1 five other models are implemented, which allow to verify Hypothesis 2. As stated in section 4.2, this study incorporates four sets of structural control variables and the Models 2-6 are divided according to the choice of these variables. Each of the models includes factors related to a different topic, respectively: Business Environment Quality (Model 2):

$$NOI_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 GDP^2_{it} + \beta_3 GDP^3_{it} + \beta_4 \boldsymbol{TAX}_{it} + \beta_5 \boldsymbol{CREDIT}_{it} + \beta_6 \boldsymbol{WAGE}_{it} + \\ + \beta_{7\text{-}123} dCOUNTRY_{it} + \beta_{124\text{-}149} dYEAR_{it} + u_{it,} \qquad (4.4)$$

Socio-Economic Development (Model 3):

$$NOI_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 GDP^2_{it} + \beta_3 GDP^3_{it} + \beta_4 \boldsymbol{ENROLSEC}_{it} + \beta_5 \boldsymbol{HEALTH}_{it} + \beta_6 \boldsymbol{ELCONS}_{it} + \\ + \beta_{7\text{-}123} dCOUNTRY_{it} + \beta_{124\text{-}149} dYEAR_{it} + u_{it,} \quad (4.5)$$

Institutions and Openness (Model 4):

$$NOI_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 GDP^2_{it} + \beta_3 GDP^3_{it} + \beta_4 \boldsymbol{LAW}_{it} + \beta_5 \boldsymbol{TRADE}_{it} + \beta_{6\text{-}122} dCOUNTRY_{it} + \quad (4.6) \\ + \beta_{123\text{-}148} dYEAR_{it} + u_{it,}$$

Technological Development and Infrastructure (Model 5):

$$NOI_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 GDP^2_{it} + \beta_3 GDP^3_{it} + \beta_4 \boldsymbol{ENROLTERT}_{it} + \beta_5 \boldsymbol{AIR}_{it} + \beta_6 \boldsymbol{RAIL}_{it} + \quad (4.7) \\ + \beta_7 \boldsymbol{ROADS}_{it} + \beta_{8\text{-}124} dCOUNTRY_{it} + \beta_{125\text{-}150} dYEAR_{it} + uit.$$

The last model (Model 6) incorporates all the variables together:

$$NOI_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 GDP^2_{it} + \beta_3 GDP^3_{it} + \beta_4 \boldsymbol{TAX}_{it} + \beta_5 \boldsymbol{CREDIT}_{it} + \beta_6 \boldsymbol{WAGE}_{it} + \quad (4.8) \\ + \beta_7 \boldsymbol{ENROLSEC}_{it} + \beta_8 \boldsymbol{HEALTH}_{it} + \beta_9 \boldsymbol{ELCONS}_{it} \beta_{10} \boldsymbol{TRADE}_{it} + \beta_{11} \boldsymbol{ENROLTERT}_{it} + \\ + \beta_{12} \boldsymbol{AIR}_{it} + \beta_{13} \boldsymbol{RAIL}_{it} + \beta_{14} \boldsymbol{ROADS}_{it} + \beta_{14\text{-}130} dCOUNTRY_{it} + \beta_{130\text{-}155} dYEAR_{it} + uit.$$

This categorization builds upon the recommendations from Dunning and Narula (1996), Buckley et al. (2007), Kalotay (2008) and Stoian (2013) described in section 3.2. It is a holistic approach, which addresses multiple fields of country's development and has not yet been present in such form in any of the previous research. The reasoning behind such classification of the variables is that it allows to check whether the signs, magnitude and significance of the GDP per capita coefficients change, depending on which indicators of country's development are applied in a particular model. Put differently, it can capture how volatile and unstable is the broad IDP model's behaviour dependent on the choice of additional variables. The output of estimating Models 2-6 can be found in Table 4.4 in section Results.

Knowing that numerous macroeconomic control variables used in this study are likely to exhibit the problem of non-stationarity, a Fisher-type unit root test is performed on each variable and residuals obtained from regressing Models 1-6. As expected, numerous tests indicate the presence of the unit root, which may result in spurious regressions producing

significant but untrue estimates and incorrect goodness-of-fit measurements. Therefore, the problematic variables are replaced with the differentiated ones in all further regressions, ensuring their stationarity (Table A.5 in the Appendix).

Keeping in mind that macro panels with time series longer than 20 years might suffer from serial correlation, a Lagrange-Multiplier test with a null hypothesis of no serial correlation is performed. P-values lower than 0,05 for Models 5 and 6 indicate that there may be a problem while analysing on a 10% and 5% significance level, however on 1%, the null of no serial correlation still cannot be rejected (Table A.6 in the Appendix). Tables of correlation for each Model are presented in the Appendix (Tables A.8-A.13).

Further, an alternative approach to estimating the IDP is being tested. It is done by redefining the dependent variable of NOI. This time, FDI flows are used instead of stocks, keeping in mind that Tolentino (1993) obtains an inverted J-shaped development curve while using this method. This not only complements the analysis of an original and extended model, but also serves as a robustness check from the econometric point of view. Models 1 to 6 are estimated without any additional changes. The output is presented in Table 4.5 in section Results.

The analysis of IDP is extended by following Duran and Ubeda (2001) and estimating two competing models, which test the relationship between country's development and inward and outward FDI stocks separately. However, it is hard to compare the output of these models to the original model of IDP, as well as run any statistical tests, because the dependent variables in all the models are different. Therefore, this part of an analysis is implemented only as a support for the hypothesis from the IDP theory, that the overall levels of inward and outward investment increase when a country becomes richer. Firstly, two sets of regressions are estimated, which employ inward and outward FDI stock per capita as dependent variable.

$$INWARDpc_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_{2\text{-}118} dCOUNTRY_{it} + \beta_{118\text{-}143} dYEAR_{it} + \beta X_{it} + u_{it,} \quad (4.9)$$

$$OUTWARDpc_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_{2\text{-}118} dCOUNTRY_{it} + \beta_{118\text{-}143} dYEAR_{it} + \beta X_{it} + u_{it.} \quad (4.10)$$

The explanatory variable in each of the regressions is the first power of GDP per capita. The control variables remain the same as in the Models 1-6 above and are denoted by the factor βX_{it}. Next, two sets of regressions are estimated, which use inward and outward FDI stock measured in absolute terms:

$$INWARD_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_{2\text{-}118} dCOUNTRY_{it} + \beta_{118\text{-}143} dYEAR_{it} + \beta X_{it} + u_{it,} \quad (4.11)$$

$$OUTWARD_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_{2\text{-}118} dCOUNTRY_{it} + \beta_{118\text{-}143} dYEAR_{it} + \beta X_{it} + u_{it.} \quad (4.12)$$

The explanatory variables and control variables remain unchanged.

To test, whether or not the NOI position of the most developed countries is still dependent on the level of development proxied by GDP per capita, therefore confirming or rejecting Hypothesis 5, Model 1 from equation 4.2 is estimated again. This time, only for the high income countries from the 5th stage of development. The joint significance Wald test on three first powers of GDP per capita is performed. The result can be found in Table A.14 in the Appendix.

Finally, to test whether the model correctly captures the impact of the Global Financial Crisis, the regressions from equations 4.2 and 4.4-4.8 are estimated again, with the inclusion of the CRISIS dummy. The estimations are performed only for the countries from 4th and 5th stage of IDP (βX_{it} refers to the vector of control variables):

$$NOI_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 GDP^2_{it} + \beta_3 GDP^3_{it} + \beta_4 \boldsymbol{CRISIS}_{it} + \beta_{5\text{-}121} dCOUNTRY_{it} + \beta_{122\text{-}147} dYEAR_{it} + \\ + \beta X_{it} + u_{it} \quad (4.13)$$

In the end, using the lowess procedure, a nonparametric adjustment is performed to create six scatterplots, which enrich this analysis with the graphical representation of obtained results. The graphs are presented in the Figures 4.1-4.6 in the next section.

4.4 Results

4.4.1 Evaluating the Original Model of IDP and Its Validity

The aim of this study is to examine, whether the original model of IDP correctly predicts the relationship between NOI and GDP per capita in the contemporary sample of countries. The output of the estimation of Model 1 is presented in Table 4.4 below[20]. Despite the simplicity of the model, one can easily notice that GDP, GDP^2 and GDP^3 per capita all have a significant

[20] Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

impact on the Net Outward Investment[21]. What is more, the signs of their coefficients are in line with the theory described in the empirical literature: both, in the initial study (Dunning, 1981, 1986) as well as the more recent ones (Narula, 1996; Castro, 2000; Narula and Guimon, 2010; Paul, 2014. Indeed, the relationship between GDP and NOI is negative for the 1st and 3rd power of GDP per capita, and positive for its square, what implies the existence of a U- or J-shaped development curve in the examined sample of countries.

Table 4.4 Results of estimating Models 1-6.

Variable	Model					
	(1)	(2)	(3)	(4)	(5)	(6)
GDP	-1.656***	-2.697***	-2.706***	-1.934**	-776.5***	-1.788***
	(13.94)	(914.2)	(80.24)	(907.5)	(230.1)	(613.3)
GDP²	3.431***	40.64***	114.1**	41.81**	14.00*	27.13**
	(66.85)	(13.12)	(54.11)	(18.29)	(7.078)	(12.12)
GDP³	-1.902***	-0.169**	-0.756*	-0.230*	-0.0358	-0.0936
	(55.06)	(0.0639)	(0.428)	(0.129)	(0.0531)	(0.0818)
TAX		-247.0				812.5
		(5.719)				(6.516)
CREDIT		823.6				808.1
		(1.243)				(973.4)
WAGE		-30.660				-48.594
		(32.988)				(48.365)
ENROLSEC			325.2			-1.248
			(230.1)			(36.84)
HEALTH			85.79			-86.56*
			(401.5)			(46.51)
ELCONS			289.8			-53.29
			(252.6)			(87.95)
LAW				149.5		
				(104.3)		
TRADE				-57.58		-148.0
				(55.31)		(7.750)
ENROLTERT					8.076	12.169
					(24.45)	(11.787)
AIR					4.154	1.119**
					(2.812)	(433.0)
RAIL					35.20*	3.195
					(19.40)	(2.215)
ROADS					-6.154	4.467
					(10.98)	(21.282)
Constant	382.213	34.519**	-3.097	504.4	14.36***	-192.7
	(794.382)	(16.594)	(3.041)	(315.7)	(4.806)	(281.2)
Observations	2.694	376	1.541	1.546	446	214
Adj. R-squared	0.924	0.292	0.274	0.346	0.845	0.862
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES

[21] On a 1% level of significance.

To put some light on the IDP line emerging from this analysis and visualise the relationship between NOI and GDP, three scatterplots are presented below. The dots in each of them are pairs of NOI and GDP per capita values. The line is a smooth curve fitted between two variables by a non-parametric adjustment. Figure 4.1 includes all the countries in the period 1990-2014, while Figures 4.2 and 4.3 are cross-sections for years 1990 and 2014, respectively.

Figure 4.1. Scatterplot with estimated line showing the relationship between NOI and GDP per capita: 1990-2014.

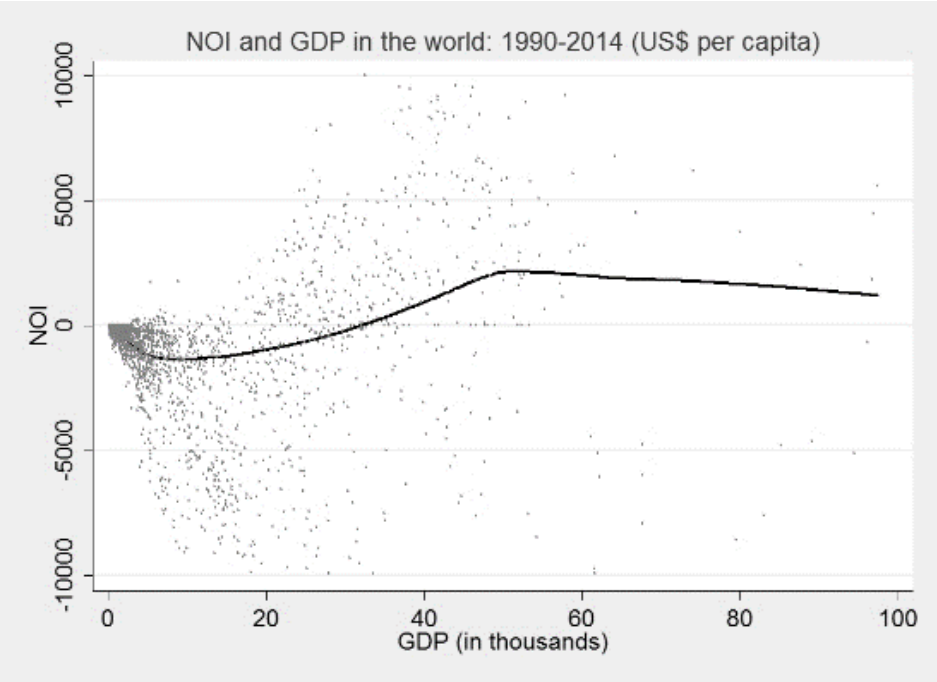


Figure 4.2. Scatterplot with estimated line showing the relationship between NOI and GDP per capita: 1990.

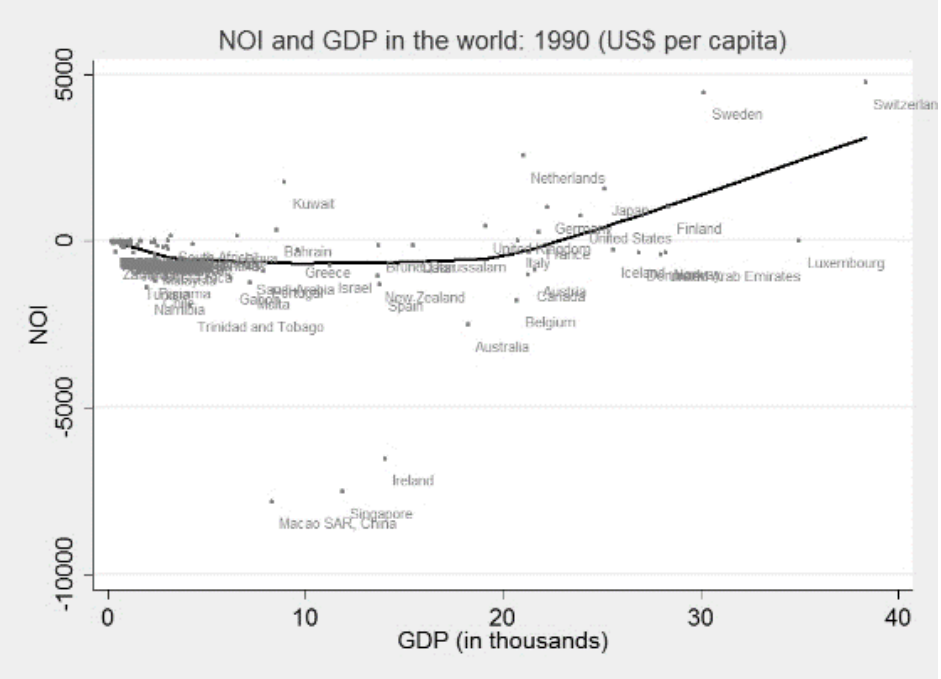
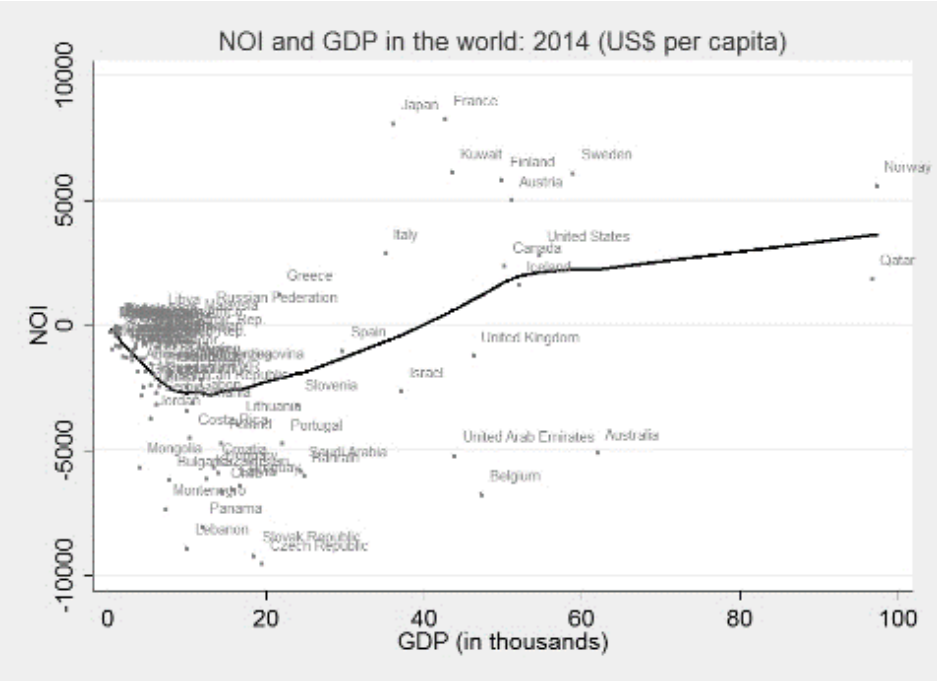


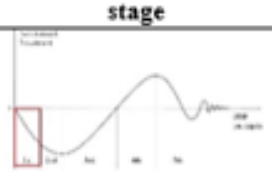
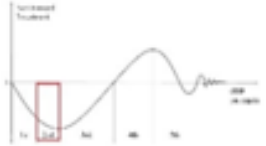
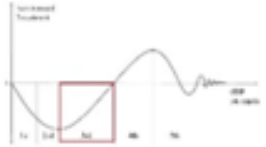
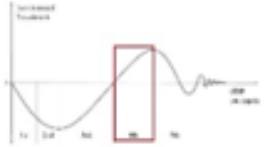
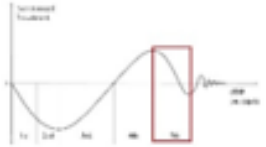
Figure 4.3. Scatterplot with estimated line showing the relationship between NOI and GDP per capita: 2014.



The main conclusion that can be derived from these scatterplots is that the relationship between NOI and GDP per capita is, in fact, as predicted by the original theory of IDP. The resemblance of the figures above to the original development line, as seen in the Figure 2.1, is even larger in the sample from 2014 than it used to be in the 1990s. Overall, these findings lead to the confirmation of Hypothesis 1.1 and partially contribute to the positive evaluation of the main Hypothesis 1.

Next, it is tested, what is the sign of the GDP per capita coefficient while estimating regressions with the income group dummies included. Table 4.5 reveals that in each regression, focusing on different intervals of the IDP curve, the signs at GDP coefficients are consistent with the theory and result in correct slopes of the curves.

Table 4.5 Results of the estimations of Model 1 with included income group dummies.

Income group	Sign of the GDP per capita coefficient	Sign of the GDP^2 per capita coefficient	Sign of the GDP^3 per capita coefficient	Part of the IDP curve referring to the analysed development stage	Signs consistent with the theory
LOW	-	+	-		YES
LOWER MIDDLE	-	+	-		YES
UPPER MIDDLE 1	+	-	+		YES
UPPERM MIDDLE 2	+	-	+		YES
HIGH	-	+	-		YES

Worth noting is the fact, that all above estimations lead to defining the new thresholds for each of the IDP stages, measured in the US dollars per capita. While classification by Amann and Virmani (2015) results in correct estimates, the thresholds obtained in the analysis of the sample for the year 2014 are slightly different from the ones presented in Table 4.3. The authors themselves inform in their study, that values they indicated as marginal are notional in a sense that they are based on a theoretical prediction. The values of thresholds obtained in this analysis are presented in Table A.7 in the Appendix, together with the list of countries, which belong to each of the development stages. In general, the estimated relationship between NOI and GDP per capita is negative for the 1st, 2nd and 5th stage of development, and positive for the 3rd and 4th stage, thus leading to the confirmation of Hypothesis 1.2. The least developed countries are positioned in the first IDP stage, while the most advanced ones belong to the 4^{th} and 5^{th} stage of development, what positively verifies Hypothesis 1.3.

All evidence gathered so far indicate, that the main Hypothesis 1 together with the supporting Hypotheses 1.1, 1.2 and 1.3 can be confirmed. The original model of Investment Development Path correctly predicts the relationship between Net Outward Investment and the

level of development for the examined countries, which is visible in the estimation output, as well as in the graphs provided above.

4.4.2 Verification of the Broader Version of the Model

This study goes beyond the narrow IDP model by extending it with numerous control variables. The results of estimating Models 2-6 can be found in Table 4.4 above. Regardless of the choice of control variables, each of the estimations results in the same, expected signs of the coefficients of GDP, GDP^2 and GDP^3 per capita, as in the original Model 1. The control variables themselves are not the subject of this analysis, therefore their interpretation is left out. Despite losing some significance of the 3rd power of GDP, particularly in case of Models 5 and 6, GDP per capita still has a negative and highly significant[22] influence on NOI. The same goes for the square of GDP per capita[23]. Both together provide the evidence for existence of the J-shaped IDP line. The volatility in magnitudes of the coefficients among different models is noticeable, but not very large, especially in case of the first power of GDP per capita. Overall, this part of the study confirms Hypothesis 2.

4.4.3 Results of the Alternative Approach to Modelling the IDP

To address all possible variations of the IDP model suggested by the literature, six regressions, which employ Net Outward Investment flow as a dependent variable, are performed. The results are shown in Table 4.6 below. The first noticeable fact is that the signs of coefficients at GDP, GDP^2 and GDP^3 remain unchanged as compared to the models with Net Outward Investment stock as dependent variable. On the contrary to Tolentino (1993), who obtains an inverted J-shaped IDP curve while using FDI flows, this results are consistent with the original theory. Nevertheless, a use of flows leads to lowered significance of obtained coefficients and makes their values more volatile among the models including control variables.

[22] On 1% significance level. Only in case of Model 4 the level of significance equals 5%.

[23] Coefficient significant on a 1% significance level in case of Model 2, 5% level in Models 3, 4 and 6, 10% in Model 5.

Table 4.6 Results of the alternative method of estimating the IDP.

Variable	Model					
	(1)	(2)	(3)	(4)	(5)	(6)
GDP	-275.6***	-26.09	-325.3***	-131.1**	-83.96*	-244.9*
	(8.311)	(144.3)	(9.597)	(60.13)	(45.42)	(127.8)
GDP^2	1,163***	2.230	12.84**	1.698	2.685*	4.677*
	(39.86)	(1.601)	(6.447)	(2.007)	(1.485)	(2.596)
GDP^3	-905.7***	-0.0256***	-0.0681	-0.00675	-0.0165	-0.0251
	(32.82)	(0.00674)	(0.0541)	(0.0208)	(0.0127)	(0.0181)
TAX		4,675				5,881
		(3,366)				(4,871)
CREDIT		1,175				33.85
		(925.5)				(237.5)
WAGE		21,985				-6,537
		(20,520)				(3,980)
ENROLSEC			44.96			-755.5
			(28.18)			(1,675)
HEALTH			5.517			6,571
			(47.58)			(4,775)
ELCONS			36.00			1,319
			(31.73)			(7,944)
LAW				-0.118		
				(2.439)		
TRADE				14.18*		-4,893
				(8.208)		(4,530)
ENROLTERT					-2,079	-8,183
					(1,306)	(5,590)
AIR					-101.2	-223.3
					(74.63)	(215.3)
RAIL					652.9	1,206
					(730.4)	(1,342)
ROADS					272.9	-1,353
					(504.2)	(10,875)
Constant	837,617	-7,651	-398.5	65.98**	204.8*	20,096
	(618,818)	(4,882)	(359.5)	(29.33)	(111.8)	(17,300)
Observations	2,694	376	1,541	1,546	448	214
Adj. R-squared	0.850	0.070	0.012	0.024	0.204	0.220
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES

What is more, the magnitudes of goodness-of-fit indicators are much lower than in case of FDI stocks. Table 4.7 presents the adjusted R^2 statistics for both sets of models: with dependent variable measured in stocks and in flows of FDI. While for the simple IDP model the difference is not substantial, for the other five, particularly the full Model 6, the goodness of fit is much higher in the model employing NOI stocks.

Table 4.7. Adjusted R-squared for the two sets of IDP models.

Model	1	2	3	4	5	6
Adj. R^2 stocks	0.924	0.292	0.274	0.346	0.845	0.862
Adj. R^2 flows	0.850	0.070	0.012	0.024	0.204	0.220

All above leads to a conclusion that while the simple model of IDP generates robust results regardless of whether FDI stocks or flows are used, the models extended by control variables produce much more stable and favourable outputs when FDI stocks are used. This is consistent with the literature, which mostly supports the use of FDI stocks in modelling the IDP.

4.4.4 Results of Estimating the Competing Models of IDP

Moving on to the extensions of the IDP, four sets of models are estimated. They replace NOI as the dependent variable by the inward FDI stock per capita, inward FDI stock in absolute terms, outward FDI stock per capita and outward FDI stock in absolute terms, respectively. The results of the first two groups of estimations can be found in Tables 4.8 and 4.9.

Table 4.8 Results of estimating the relationship between GDP per capita and inward FDI stock per capita[24].

Variable	(1)	(2)	(3)	(4)	(5)	(6)
GDP	1,527**	2,823*	1,543*	1,433**	1,005***	1,390***
	(665.6)	(1,459)	(857.6)	(705.4)	(373.8)	(377.3)
Constant	-548.6	-72,047	-1,576	-54,772	-1,416***	-159,814**
	(1,805)	(49,073)	(2,030)	(33,476)	(405.4)	(73,119)
Observations	2,746	376	1,373	1,792	448	214
Adj. R-squared	0.582	0.876	0.540	0.675	0.829	0.815
Control variables	NO	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES

[24] Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

Table 4.9 Results of estimating the relationship between GDP per capita and inward FDI stock in thousands of US dollars[25].

Variable	(1)	(2)	(3)	(4)	(5)	(6)
GDP	6.101**	6.369***	5.022***	5.411***	10.84***	10.35***
	(2.437)	(2.373)	(1.750)	(1.908)	(3.277)	(3.168)
Constant	-58.09***	-31.96	-84.18***	-232.8	-8.971	186.5
	(16.86)	(31.39)	(27.62)	(146.3)	(10.58)	(378.5)
Observations	2,746	1,363	1,373	1,792	448	394
Adj. R-squared	0.760	0.915	0.896	0.878	0.949	0.954
Control variables	NO	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES

In each of estimated models, regardless of the measurement of the dependent variable, the relationship between GDP and inward FDI stock is positive, as suggested by the literature (Duran and Ubeda, 2001). The models seem to be more stable when the explained variable is measured in the relative terms, but the results are more significant when the absolute terms of FDI stocks are used. It does not apply to the Models 5 and 6, which in both tables produce the GDP coefficient significant on a 1% significance level. Despite adding the control variables, the sign of the coefficient in the baseline model does not change. All this means that the inward FDI stock in a country rises together with the economic development and therefore, confirms Hypothesis 3.

The results of the second two groups of estimations can be found in Tables 4.10 and 4.11.

Table 4.10 Results of estimating the relationship between GDP per capita and outward FDI stock per capita[26].

Variable	(1)	(2)	(3)	(4)	(5)	(6)
GDP	1,546**	3,288*	1,759*	1,530*	1,366***	1,959***
	(698.3)	(1,625)	(915.1)	(782.5)	(463.7)	(548.7)
Constant	-232.4	-93,110	-437.6	-68,398*	-1,756***	-246,025**
	(1,746)	(54,924)	(2,067)	(37,417)	(514.6)	(106,699)
Observations	2,746	376	1,373	1,792	448	214
Adj. R-squared	0.593	0.809	0.624	0.699	0.849	0.852
Control variables	NO	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES

[25] As before.

[26] As before.

Table 4.11 Results of estimating the relationship between GDP per capita and outward FDI stock in thousands of US dollars[27].

Variable	(1)	(2)	(3)	(4)	(5)	(6)
GDP	7.876**	7.688***	6.940***	7.017***	15.10***	14.97***
	(3.117)	(2.853)	(2.472)	(2.483)	(3.912)	(3.788)
Constant	-60.61***	-51.94	-89.72***	-398.5*	-15.52*	23.36
	(20.49)	(42.75)	(33.57)	(203.2)	(9.018)	(598.9)
Observations	2,746	1,363	1,373	1,792	448	394
Adj. R-squared	0.753	0.909	0.872	0.864	0.915	0.917
Control variables	NO	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES

Exactly the same conclusions as from Tables 4.8-4.9 can be drawn from the results presented in Tables 4.10-4.11. Based on this analysis, the outward FDI stock increases, when the economic development, measured by GDP per capita volumes, improves. This is true for the outward FDI stock per capita as well as for FDI measured in thousands of US dollars. It leads to the conclusion that these two competing models of IDP correctly predict the impact of GDP on inward and outward FDI stocks, as suggested by Duran and Ubeda (2001). Therefore, Hypothesis 4 can also be confirmed.

4.4.5 The Impact of GDP on NOI Among the Most Developed Countries

To examine, whether the original theory correctly predicts the impact of economic development on NOI among the countries from the 5th stage of IDP, a Wald test s performed after running the regression of Model 1. The results are presented in Table A.14 in the Appendix. The null hypothesis of this test is that the GDP, GDP^2 and GDP^3 are jointly insignificant while explaining the Net Outward Investment of the most developed economies. The p-value equal 0.0888 implies that the null cannot be rejected[28], hence the NOI position of the countries in the 5th stage of IDP is no longer dependent on the level of development proxied by GDP. This leads to the empirical confirmation of Hypothesis 5.

[27] As before.

[28] On 1% and 5% level of significance.

4.4.6 Evaluating Accuracy of the Original IDP Model in Reflecting the Consequences of the Global Financial Crisis

Results of testing the accuracy of the original IDP model in capturing the effects of the Global Financial Crisis, are presented in Table 4.12.

Table 4.12 Results of estimating the impact of the Global Financial Crisis on NOI [29].

Variable	(1)	(2)	(3)	(4)	(5)	(6)
GDP	2,888***	-659.0	1,962	3,450***	6,854***	4,696***
	(902.1)	(5,637)	(1,377)	(485.3)	(1,109)	(1,189)
GDP^2	-44.88***	3.506	-36.39*	-53.72***	-107.8***	-63.30**
	(14.70)	(85.64)	(19.86)	(8.847)	(19.04)	(27.50)
GDP^3	0.234***	0.0171	0.193*	0.290***	0.559***	0.300
	(0.0691)	(0.415)	(0.0980)	(0.0446)	(0.126)	(0.193)
CRISIS	154.8	-192.7	540.7**	120.6	306.3***	163.2
	(146.9)	(446.9)	(232.6)	(172.3)	(48.15)	(94.22)
Constant	-821.6**	16.78	8,054	-1,903***	-1,783***	-2,336***
	(301.3)	(1,046)	(5,822)	(649.1)	(302.5)	(641.4)
Observations	189	132	150	161	159	159
Adj. R-squared	0.571	0.621	0.439	0.568	0.932	0.957
Control variables	NO	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES

The inclusion of the dummy CRISIS, and estimating for the 4th and 5th stage only, radically change the behaviour of the models, compared to the results from Table 4.4. Firstly, in five out of six Models the sign of the GDP coefficient changes from negative to positive, and in four out of five regressions this coefficient is significant on a 1% significance level, also in the model including all the control variables. This would mean that with the increase in GDP per capita, the NOI rises as well, which, in this context, could be caused by diminishing inward FDI stock. The impact of the dummy CRISIS itself is significant in case of Models 3 and 5, and in both of them is positive. This implies that the presence of the Global Financial Crisis causes NOI to rise in the countries belonging to the 4th and 5th stage of IDP. In sum, this provides evidence for confirming Hypothesis 6. However, because of the high volatility in magnitudes and signs of the estimated coefficients, and problematic interpretation of the changes in NOI, these results need to be treated with caution and most definitely, do not provide a detailed explanation of the impact of the Global Financial Crisis on the FDI flows in the world.

[29] Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

5. Conclusions

The main objective of this study was to test, whether the model of Investment Development Path remains a legitimate tool for explaining the countries' evolution of FDI. The main research question was: does the IDP model correctly predict the relationship between the Net Outward Investment and the level of development, while applied to the modern sample of countries. In general, this study finds support for a positive answer to that question.

Firstly, estimating the primary model of Investment Development Path provides evidence that the distribution of modern FDI flows in the world displays features as argued by Dunning in his original study (1981). Table 5.1 indicates that the obtained signs of the variables' coefficients are generally in line with the theory.

Table 5.1 Comparison of expected and realized signs of the used variables.

Variable Name	Expected Sign	Ultimately Obtained Sign
Models 1-6 with NOI as Dependent Variable		
GDP	-	-
GDP^2	+	+
GDP^3	-	-
TAX	+	+
CREDIT	-	+
WAGE	+/– depending on the type of FDI	-
ENROLSEC		-
HEALTH	- in developing countries, + in	-
ELCONS	developed countries	-
LAW		+
TRADE	+ or – depending on the kind of FDI	-
ENROLTERT	+	+
AIR	+	+
RAIL	- in developing countries, + in	+
ROADS	developed countries	+
Competing Models with Inward and Outward FDI Stock as Dependent Variables		
GDP	+	+
Models 1-6 with NOI as Dependent Variable Used to Test the Effects of the Global Financial Crisis		
GDP	+	+
GDP^2	-	-
GDP^3	+	+
CRISIS	+	+

The J-shaped development curve exists in a similar form, as it was proven in the empirical literature. The least developed countries are, in fact, positioned in the 1st stage of the development line, while the most developed economies are far on the right hand side of the curve. Nonetheless, the model of IDP can actually indicate possible deviations of countries

from their expected development paths. The obtained distribution of countries along the line, indeed, captures two interesting facts.

First of them is that several CEE countries, namely Hungary, Latvia and Poland, despite being well-established emerging economies, are still positioned in the 2nd stage of development. One of the major reasons for such situation may be a persistent difficulty of their companies in generating innovations and absorbing new technologies. This leaves a room for the governments to support the innovative movements of domestic companies, what could contribute to pushing them forward successful and sustainable international activity. Such distribution of countries reveals also one of the drawbacks of the IDP model. Because the range of income groups is very wide, it leads to locating countries with very different income levels, political, geographical and institutional background in the same IDP stages. This may be misleading in a sense that there are substantial differences between African, South American and Central European countries, which are all assigned by the empirical model to the same stage of development.

Second surprise is the positioning of the oil-rich economies in the 4th (Kuwait and United Arab Emirates) and 5th (Qatar) stage of IDP. Despite having vast amounts of natural resources, the overall level of development in countries from West Asia would not put them so far on the IDP line. The very high NOI position is consequence of two factors. One of them is the boost in the outward FDI from the Gulf Cooperation Council member states caused by high levels of foreign exchange reserves derived from their accumulation of surpluses from export earnings. On the other hand, inward FDI to West Asia decreases, as persistent tensions in the region put the investors off in the last couple of years.

The original model of IDP can be considered robust, as the signs and significance of GDP coefficients remain unchanged when the dependent variable is measured in FDI flows instead of stocks. Also, the "stocks" model, extended by country's peculiarities in the socio-economic development, business environment, institutional framework and technological progress, still correctly predicts the relationship between NOI and GDP and produces stable outputs. Moreover, the results obtained from the two competing models support the main assumption suggested by the IDP theory, that is, the stocks of inward and outward FDI increase together with a rise in a country's per capita income.

The IDP framework can be successfully used in a broad sense, as it is foremost a valid tool to analyse the interaction between FDI and development. However, said model is not the best instrument for capturing the consequences of disruptions such as the Global Financial Crisis. Despite generating coefficients with preferred signs, the output becomes more volatile

and some of the significance is lost. Because of the dependent variable being an aggregate it is difficult to interpret the results provided by the model.

In the end, it is essential to mention some limitation of this analysis with the use of IDP model as they may serve as indications for further research in this field. Firstly, the hypotheses in this study were formulated to test the validity of the model on the sample of world countries as a whole. However, any analysis of a particular region needs to consider the specific political and historical context. It is because of the idiosyncrasy of IDP, and the previous policy orientations, affecting the conditions in which the current economic activity is organised. Secondly, IDP, being strictly quantitative approach, does not take into account the quality of FDI. The latter is related to the way investment matches a country's development model and aspirations, and how it contributes to improving the location-specific assets and local technological advantage. Therefore, the analysis of a country's IDP needs to be enhanced by examination of the structural and industrial trends in inward and outward FDI, as well as way companies deal with reinvestment of earnings from their international activity.

References

Air transport, passengers carried | Data. (2016). *Data.worldbank.org*. Retrieved 19 July 2016, from http://data.worldbank.org/indicator/IS.AIR.PSGR

Amann, E., S. Virmani. (2015). "Is the Evolution of India's Outward FDI Consistent with Dunning's Investment Development Path Sequence*?" Lancaster University Economics Working Paper Series*, 2015(019).

Antras, P., S. Yeaple. (2014). Multinational Firms and the Structure of International Trade. In G. Gopinath, E. Helpman and K. Rogoff, *Handbook of International Economics* (4th ed., pp. 55-58). Elsevier B.V.

Blonigen, B. (2005). A Review of the Empirical Literature on FDI Determinants. Atlantic Economic Journal, 33(4), 383-403.

Buckley, P., F. Castro. (1998). The Investment Development Path: The case of Portugal. *Transnational Corporations*, 7(1), 1-15.

Buckley, P., M. Casson. (1976). *The Future of the Multinational Enterprise*. New York: Holmes and Meier Publishers.

---. (1998). Models of the Multinational Enterprise. *Journal of International Business Studies*, *29*(1), 21-44.

Buckley, P., L. Clegg, A. Cross, X. Liu, H. Voss and P. Zheng. (2007). The Determinants of Chinese Outward Foreign Direct Investment. *Journal of International Business Studies*, *38*(4), 499-518.

Case Study: The Relationship Between the Structure/Strategy of Multinational Corporations and Patterns of Knowledge Sharing Within Them, 2009, in E. Kessler, ed. E*ncyclopedia of management theory*. Thousand Oaks: SAGE.

Castro, F. (2000). *Foreign Direct Investment in the European Periphery - The Competitiveness of Portugal* (Ph.D.). Leeds University Business School.

Caves, R. (1971). International Corporations: The Industrial Economics of Foreign Investment. *Economica*, *38*(149), 1.

Chaudhuri, S. and U. Mukhopadhyay (2014). *Foreign Direct Investment in Developing Countries. A Theoretical Evaluation.* New Delhi, Springer India.

Coughlin, C., J. Terza and V. Arromdee. (1991). State Characteristics and the Location of Foreign Direct Investment Within the United States. *The Review of Economics and Statistics*, 73(4), 675.

Data. The World Bank. (2016). *Data.worldbank.org*. Retrieved 19 July 2016, from http://data.worldbank.org

Dorozynski, T., A. Dorozynska and W. Urbaniak. (2014). The Role of Local Government Units in Attracting FDI. The Case of the Lodz Region. *BEH*, *10*(4), 281-304.

Dunning, J. (1981). Explaining The International Direct Investment Position of Countries: Towards a Dynamic or Developmental Approach. *Weltwirtschaftliches Archiv*, 117(1), 30-64.

---. (1986). The Investment Development Cycle Revisited. *Weltwirtschaftliches Archiv*, 122(4), 667-676.

---. (1992). *Multinational Enterprises and the Global Economy*. Wokingham, England: Addison-Wesley.

Dunning, J., R. Narula. (1996). *Foreign Direct Investment and Governments*. London: Routledge.

Dunning, J.H., C. Kim, J. Lin. (2001). Incorporating Trade into the Investment Development Path: A Case Study of Korea and Taiwan, *Oxford Development Studies*, Vol. 29(2): 145–154.

Duran, J. and F. Ubeda. (2001). The Investment Development Path: A New Empirical Approach and Some Theoretical Issues. *Transnational Corporations*, *10*(2), 5-25.

Electric power consumption (kWh per capita) | Data. (2016). *Data.worldbank.org*. Retrieved 19 July 2016, from http://data.worldbank.org/indicator/EG.USE.ELEC.KH.PC

Eigner, P. and T. Umlauft. (2015). The Great Depression(s) of 1929-1933 and 2007-2009? Parallels, Differences and Policy Lessons. *SSRN Electronic Journal*.

EY. (2014). Worldwide Corporate Tax Guide. EYGM Limited. Retrieved from http://www.ey.com/Publication/vwLUAssets/Worldwide_corporate_tax_guide_2014/$FILE/Worldwide%20Corporate%20Tax%20Guide%202014.pdf

Fonseca, M., A. Mendonça, J. Passos. (2007). "The Investment Development Path Hypothesis: Evidence from the Portuguese Case – A Panel Data Analysis". Technical University of Lisbon Working Papers, (0874-4548), 1-29.

Gorynia, M., J. Nowak, R. Wolniak. (2006). The Investment Development Path of Poland Revisited: A Geographic Analysis. In *32nd Annual Conference of the European International Business Academy (EIBA)* (pp. 7-9). Fribourg, Switzerland.

---. (2010). Foreign Direct Investment in Central and Eastern Europe: The IDP Trajectories of Selected Countries. *Poznań University of Economics Review* 10(1): pp. 5-26.

Gross enrolment ratio, secondary, both sexes (%) | Data. (2016). *Data.worldbank.org*. Retrieved 19 July 2016, from http://data.worldbank.org/indicator/SE.SEC.ENRR

Gross enrolment ratio, tertiary, both sexes (%) | Data. (2016). *Data.worldbank.org*. Retrieved 19 July 2016, from http://data.worldbank.org/indicator/SE.TER.ENRR

Grossman, G., E. Helpman. (1995). Technology and Trade. In G. Grossman and K. Rogoff, *Handbook of international Economics* (3rd ed., p. 1334). Elsevier Science B.V.

Health expenditure, total (% of GDP) | Data. (2016). *Data.worldbank.org*. Retrieved 19 July 2016, from http://data.worldbank.org/indicator/SH.XPD.TOTL.ZS

Helleiner, G. (1989). Transnational Corporations and Direct Foreign Investment. In H. Chenery and T. Srinivasan, *Handbook of Development Economics* (2nd ed., pp. 2-14). Elsevier Science Publishers B.V.

Hymer, S. (1960). *The International Operations of National Firms; A Study of Direct Foreign Investment*. [Place of publication not identified].

Kalotay, K. (2008). Russian Transnationals and International Investment Paradigms. *Research in International Business And Finance*, *22*(2), 85-107.

Kindleberger, C. (1969). *American Business Abroad*. New Haven: Yale University Press.

Koopmans, T. (1957). *Three Essays on the State of Economic Science*. New York: McGraw-Hill.

Krugman, P. (1991). Increasing Returns and Economic Geography. *Journal of Political Economy*, *99*(3), 483-499.

Liu, X., T. Buck, C. Shu. (2005). Chinese Economic Development: Outward FDI. International Business Review, Vol. 14: 97-115.

Markusen, J. (2005). Modelling the Offshoring of White-Collar Services: From Comparative Advantage to the New Theories of Trade and Foreign Direct Investment. *Brookings Trade Forum,2005*(1), 1-23.

Mundell, R. (1960). The Public Debt, Corporate Income Taxes, and the Rate of Interest. *Journal of Political Economy*, *68*(6), 622-626.

Narula, R. (1993). *An Examination of the Evolution and Interdependence of Foreign Direct Investment and Economic Structure: The Case of Industrialized Countries* (Ph.D.). Newark, Ruthers University.

---. (1996). *Multinational Investment and Economic Structure*. London: Routledge.

Narula, R., J. Dunning. (2010). Multinational Enterprises, Development and Globalization: Some Clarifications and a Research Agenda. *Oxford Development Studies*, *38*(3), 263-287.

Narula, R., J. Guimon. (2010). The Investment Development Path in a Globalised World. *Eastern Journal of European Studies*, 1(2).

Neuhaus, M. (2006). The Impact of FDI on Economic Growth. Heidelberg: Physica-Verlag.

O'Neill, J. (2001). Building Better Global Economic BRICs. *Goldman Sachs Global Economic Papers*, *66*.

Paul, T. (2014). "Analysis of The Investment Development Path in The Central and Eastern European Countries: Can They Move Further?". Charles University in Prague.

Pichl, C. (1989). Internationale Investitionen, Entwicklungsniveau und Landesgrosse. *WIFO Monatsberichte*, 4, 259-266.

Rail lines (total route-km) | Data. (2016). *Data.worldbank.org*. Retrieved 19 July 2016, from http://data.worldbank.org/indicator/IS.RRS.TOTL.KM

Road density Data | The World Bank. (2016). *Data.worldbank.org*. Retrieved 19 July 2016, from http://data.worldbank.org/indicator/IS.ROD.DNST.K2

Rugman, A. (1981). *Inside the Multinationals*. New York: Columbia University Press.

Rugman, A., L. Eden. (1985). *Multinationals and Transfer Pricing*. New York: St. Martin's Press.

Stoian, C. (2013). Extending Dunning's Investment Development Path: The Role of Home Country Institutional Determinants in Explaining Outward Foreign Direct Investment. *International Business Review*, 22(3), 615-637.

Taveira, E. (1984). “Foreign Direct Investment in Portugal” (Ph.D.). University of Reading.

Tolentino, P. (1993). *Technological Innovation and Third World Multinationals*. London: Routledge.

Trade (% of GDP) | Data. (2016). *Data.worldbank.org*. Retrieved 19 July 2016, from http://data.worldbank.org/indicator/NE.TRD.GNFS.ZS

United Nations Conference on Trade And Development. (2014). World Investment Report 2014. Retrieved 4 August 2016, from http://Unctad.Org/En/Publicationslibrary/Wir2014_En.Pdf

UNCTADstat. (2016). *Unctadstat.unctad.org*. Retrieved 19 July 2016, from http://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=96740

World Bank Country and Lending Groups. (2016). *Datahelpdesk.worldbank.org*. Retrieved 19 July 2016, from https://datahelpdesk.worldbank.org/knowledgebase/articles/906519

Vernon, R. (1966). International Investment and International Trade in The Product Cycle. *The Int. Exec.*, *8*(4), 16-16.

Viaene, J. (2016). The OLI Approach. Lecture, Erasmus University Rotterdam, Department of Economics.

Villaverde, J., A. Maza, and M. Hierro. (2011). Regional International Migration Distribution in Spain: Which Factors Are Behind? European Regional Science Association.

Appendix

Table A.1. Country statistics (1990-2014). All values expressed in US dollars per capita.

	Country	NOI stock		GDP			Country	NOI stock		GDP	
		Mean	Std. Dev.	Mean	Std. Dev.			Mean	Std. Dev.	Mean	Std. Dev.
1	Albania	-432	490	2 182	1 596	24	Colombia	-675	604	3 673	2 231
2	Algeria	-233	199	2 910	1 524	25	Costa Rica	-1 453	1 301	5 160	2 532
3	Argentina	-938	523	8 061	3 160	26	Cote d'Ivoire	-223	123	970	265
4	Armenia	-618	675	1 712	1 377	27	Croatia	-3 206	2 920	9 649	4 082
5	Australia	-2 760	1 425	33 155	17 343	28	Cyprus	-7 590	6 223	23 327	7 339
6	Austria	452	2 249	35 028	10 950	29	Czech Republic	-5 410	4 191	12 318	6 645
7	Azerbaijan	-400	318	2 726	2 840	30	Denmark	4 411	6 258	42 871	13 398
8	Bahrain	-4 393	1 868	15 415	5 639	31	Dominican Republic	-1 262	976	4 155	1 564
9	Bangladesh	-22	17	511	227	32	Ecuador	-541	230	3 051	1 535
10	Belarus	-480	598	3 379	2 396	33	Egypt, Arab Rep.	-457	281	1 599	853
11	Belgium	-2 565	5 298	33 056	10 195	34	El Salvador	-529	473	2 483	979
12	Bolivia	-506	260	1 353	719	35	Estonia	-5 278	3 635	10 467	6 297
13	Bosnia and Herzegovina	-807	786	2 749	1 693	36	Finland	4 672	3 092	34 485	11 552
14	Brazil	-748	873	6 040	3 472	37	France	4 097	2 853	31 423	8 654
15	Brunei Darussalam	-6 238	4 874	23 692	10 328	38	Gabon	-1 020	898	7 316	2 624
16	Bulgaria	-2 353	2 814	3 700	2 664	39	Georgia	-754	863	1 780	1 380
17	Cambodia	-221	223	527	277	40	Germany	5 109	3 064	33 221	8 597
18	Cameroon	-128	67	920	255	41	Ghana	-200	247	733	507
19	Canada	896	1 050	32 148	12 541	42	Greece	-394	1 000	18 198	7 047
20	Cayman Islands	-182 567	184 717	47 148	23 981	43	Guatemala	-335	142	2 011	807
21	Chad	-176	134	498	330	44	Honduras	-440	400	1 334	644
22	Chile	-3 090	1 805	7 577	4 270	45	Hong Kong SAR, China	-13 394	10 893	26 862	6 610
23	China	-131	70	2 250	2 257	46	Hungary	-3 903	2 657	8 574	4 365

	Country	NOI stock		GDP			Country	NOI stock		GDP	
		Mean	Std. Dev.	Mean	Std. Dev.			Mean	Std. Dev.	Mean	Std. Dev.
47	**Iceland**	3 720	7 654	38 389	12 464	70	**Malta**	-64 269	108 599	13 416	5 289
48	**India**	-34	33	737	439	71	**Mauritius**	-778	840	5 249	2 362
49	**Indonesia**	-582	259	2 830	853	72	**Mexico**	-1 154	667	6 865	2 267
50	**Iran, Islamic Rep.**	-212	168	3 811	2 169	73	**Mongolia**	-919	1 718	1 455	1 342
51	**Iraq**	-236	186	4 294	1 978	74	**Montenegro**	-4 726	3 644	7 025	352
52	**Ireland**	-5 557	19 467	35 965	16 779	75	**Morocco**	-655	515	1 915	762
53	**Israel**	-729	894	22 090	7 635	76	**Mozambique**	-170	247	334	142
54	**Italy**	1 076	961	27 807	7 449	77	**Namibia**	-1 335	527	3 210	1 366
55	**Japan**	3 071	1 952	36 090	5 067	78	**Netherlands**	9 275	7 367	36 490	12 421
56	**Jordan**	-1 619	1 395	2 612	1 375	79	**New Zealand**	-6 946	3 428	23 395	10 304
57	**Kazakhstan**	-2 267	2 358	5 112	4 709	80	**Nicaragua**	-423	366	1 106	463
58	**Kenya**	-35	18	622	339	81	**Nigeria**	-212	112	968	976
59	**Kuwait**	2 780	2 199	29 458	15 032	82	**Norway**	1 635	2 454	57 796	28 081
60	**Latvia**	-2 872	2 401	8 272	5 224	83	**Pakistan**	-66	42	720	322
61	**Lebanon**	-4 209	3 590	5 660	2 558	84	**Panama**	-3 106	2 059	5 223	2 860
62	**Libya**	130	149	7 634	2 741	85	**Paraguay**	-297	200	2 281	1 075
63	**Lithuania**	-2 239	1 659	8 294	5 203	86	**Peru**	-715	698	3 086	1 719
64	**Luxembourg**	-1 060	53 538	71 271	29 207	87	**Philippines**	-142	61	1 412	669
65	**Macao SAR, China**	-13 709	10 868	31 135	25 854	88	**Poland**	-1 950	1 841	7 219	4 441
66	**Macedonia, FYR**	-1 001	932	3 045	1 422	89	**Portugal**	-2 773	1 574	15 866	5 521
67	**Madagascar**	-75	99	317	88	90	**Qatar**	-3 801	3 460	44 484	29 995
68	**Malaysia**	-815	491	5 771	2 849	91	**Romania**	-1 271	1 427	4 374	3 460
69	**Mali**	-74	62	413	164	92	**Russian Federation**	-218	325	6 090	4 609

	Country	NOI stock		GDP			Country	NOI stock		GDP	
		Mean	Std. Dev.	Mean	Std. Dev.			Mean	Std. Dev.	Mean	Std. Dev.
93	**Saudi Arabia**	-2 088	2 105	12 675	6 367	105	**Thailand**	-822	632	3 230	1 498
94	**Senegal**	-60	47	763	220	106	**Trinidad and Tobago**	-7 063	3 972	10 240	6 335
95	**Serbia**	-2 657	520	6 075	461	107	**Tunisia**	-1 800	790	2 909	1 028
96	**Singapore**	-19 826	16 687	30 779	13 550	108	**Turkey**	-792	737	5 943	3 237
97	**Slovak Republic**	-4 565	3 887	10 656	5 804	109	**Ukraine**	-467	533	1 905	1 196
98	**Slovenia**	-1 554	669	17 556	6 266	110	**United Arab Emirates**	-1 744	1 744	34 290	6 481
99	**South Africa**	-516	653	4 705	1 683	111	**United Kingdom**	4 753	3 834	31 731	9 965
100	**Spain**	-1 133	932	21 962	7 735	112	**United States**	1 874	1 723	38 840	9 865
101	**Sri Lanka**	-146	113	1 455	1 053	113	**Uruguay**	-1 586	1 926	7 676	4 151
102	**Sweden**	3 725	985	39 786	12 321	114	**Yemen, Rep.**	-100	54	739	394
103	**Switzerland**	28 048	18 404	54 612	17 602	115	**Zambia**	-448	125	781	532
104	**Syrian Arab Republic**	-64	51	1 180	350	116	**Zimbabwe**	-83	52	613	166
							Total	**-1 595**	**15 157**	**12 813**	**17 179**

Table A.2 Description of the used variables, their sources and expected signs.

Variable Name	Description	Source	Expected Sign
Models 1-6 with NOI as Dependent Variable			
GDP	Gross Domestic Product per capita	World Bank	-
GDP^2	2nd power of GDP		+
GDP^3	3rd power of GDP		-
TAX	Local corporate tax rate	EY's Worldwide Corporate Tax Guide 2014	+
CREDIT	Domestic credit provided to various sectors on a gross basis, as a % of GDP	World Bank	-
WAGE	Average annual wage per worker		+/– depending on the type of FDI
ENROLSEC	Ratio of total secondary education enrolment to the population of the age group that officially corresponds to this level of education		- in developing countries + in developed countries
HEALTH	Sum of public and private health expenditures as a % of GDP		
ELCONS	Production of combined heat and power plants in kwh per capita		
LAW	Quality of contract enforcement, property rights, the police, and the courts, the likelihood of crime and violence		
TRADE	The sum of exports and imports of goods and services as a % of GDP		+/– depending on the kind of FDI
ENROLTERT	Ratio of total tertiary education enrolment to the population of the age group that officially corresponds to this level of education		+
AIR	Registered carrier departures worldwide - domestic and foreign take-offs of air carriers registered in the country		+
RAIL	Length of the railway route available for train service, irrespective of the number of parallel tracks in the country		- in developing countries + in developed countries
ROADS	Ratio of the length of the country's total road network to the country's land area		
Competing Models with Inward and Outward FDI Stock as Dependent Variables			
GDP	As before	World Bank	+
Models 1-6 with NOI as Dependent Variable Used to Test the Effects of the Global Financial Crisis			
GDP	As before	World Bank	+
GDP^2			-
GDP^3			+
CRISIS	Indicator of the Global Financial Crisis	Eigner and Umlauft, 2015	+

Table A.3. The Likelihood-Ratio test for choosing between model with and without country and year fixed effects.

Likelihood-Ratio test			**LR chi2(25) = 152.13**			
(Assumption: base1 nested in base3)			**Prob > chi2 = 0.0000**			
Model	**Obs**	**ll(null)**	**ll(model)**	**Df**	**AIC**	**BIC**
base1	2694	-69733.58	-51963.5	2	103931	103942.8
base3	2694	-69733.58	-51887.44	27	103828.9	103988.1

Table A.4. The Wald test for the joint significance of the fixed-effects dummies.

H0: Country 1-116 = 0, Year 1-25 = 0
F(27,13) 2.0e+12
Prob > F = 0.0000

Table A.5. The Fisher-type unit root test on residuals (H0: All panels contain unit root).

Model	**Variables displaying non-stationarity**	**P-value before taking first differences**	**P-value after taking first differences**
1	-	0.0000	0.0000
2	TAX, WAGE	0.1084	0.0000
3	ENROLSEC, HEALTH, ELCONS	0.0281	0.0000
4	-	0.0000	0.0000
5	ENROLTERT, AIR, RAIL, ROADS	0.8771	0.0000
6	All stated above	0.0950	0.0000

Table A.6. The Wooldridge test for autocorrelation in panel data (H0: No problem of serial correlation).

Model	**P-value before taking first differences**	**P-value after taking first differences**	**Possible serial correlation on >5% significance level**
1	0.5900	0.5900	NO
2	0.6454	0.4848	NO
3	0.4598	0.1811	NO
4	0.9220	0.9220	NO
5	0.0208	0.0265	YES
6	0.0277	0.0349	YES

Table A.7. Classification of countries according to the updated stages of IDP.

Stage of IDP	1st stage	2nd stage	3rd stage	4th stage	5th stage
GDP per capita in US dollars	> 3,000	3,000 - 16,000	16,000 - 42,000	42,000 – 53,000	53,000 <
Countries belonging to this stage of IDP	Bangladesh Cambodia Cameroon Chad Congo Cote d'Ivoire Ghana Honduras India Kenya Madagascar Mali Mozambique Nicaragua Pakistan Philippines Senegal Zambia Zimbabwe	Albania Algeria Argentina Armenia Azerbaijan Belarus Bolivia Bosnia and Herzegovina Brazil Bulgaria Chile China Colombia Costa Croatia Dominican Republic Ecuador Egypt, El Salvador Gabon Georgia Guatemala Hungary Indonesia Iran Iraq Jordan Kazakhstan Latvia Lebanon Libya Macedonia Malaysia Mauritius Mexico Mongolia Montenegro Morocco Namibia Nigeria Panama Paraguay Peru Poland Romania Russian Federation Serbia South Sri Lanka Thailand Tunisia Turkey Ukraine	Bahrain Brunei Darussalam Cyprus Czech Republic Estonia Greece Hong Kong Israel Italy Japan Lithuania Portugal Saudi Arabia Slovak Republic Slovenia Spain Trinidad and Tobago Uruguay	Austria Belgium Canada Finland France Germany Iceland Kuwait Netherlands New Zealand United Arab Emirates United Kingdom	Australia Denmark Ireland Luxembourg Macao SAR Norway Qatar Singapore Sweden Switzerland United States

Table A.8. Correlation table for Model 1.

	Variable	1	2	3	4
1	NOIs	1.00			
2	GDP	0.23	1.00		
3	GDP^2	0.46	0.97	1.00	
4	GDP^3	0.57	0.67	0.77	1.00

Table A.9. Correlation table for Model 2.

	Variable	1	2	3	4	5	6	7
1	NOIs	1.00						
2	GDP	0.25	1.00					
3	GDP^2	0.24	0.92	1.00				
4	GDP^3	0.19	0.79	0.96	1.00			
5	TAX	-0.03	0.04	-0.05	-0.08	1.00		
6	CREDIT	0.19	0.57	0.42	0.29	0.08	1.00	
7	WAGE	0.06	0.23	0.16	0.10	-0.11	0.28	1.00

Table A.10. Correlation table for Model 3.

	Variable	1	2	3	4	5	6	7
1	NOIs	1.00						
2	GDP	0.08	1.00					
3	GDP^2	0.15	0.59	1.00				
4	GDP^3	0.14	0.46	0.94	1.00			
5	ENROLSEC	0.00	0.33	0.31	0.19	1.00		
6	HEALTH	0.02	0.28	0.34	0.22	0.45	1.00	
7	ELCONS	0.01	0.49	0.51	0.34	0.80	0.51	1.00

Table A.11. Correlation table for Model 4.

	Variable	1	2	3	4	5	6
1	NOIs	1.00					
2	GDP	0.08	1.00				
3	GDP^2	0.14	0.77	1.00			
4	GDP^3	0.14	0.63	0.95	1.00		
5	LAW	-0.05	0.53	0.46	0.33	1.00	
6	TRADE	-0.17	0.18	0.22	0.21	0.35	1.00

Table A.12. Correlation table for Model 5.

	Variable	1	2	3	4	5	6	7	8
1	NOIs	1.00							
2	GDP	0.34	1.00						
3	GDP^2	0.41	0.95	1.00					
4	GDP^3	0.42	0.87	0.97	1.00				
5	ENROLTERT	0.02	0.51	0.38	0.31	1.00			
6	AIR	0.28	0.53	0.49	0.42	0.05	1.00		
7	RAIL	0.19	0.12	0.12	0.09	-0.05	0.71	1.00	
8	ROADS	0.08	0.49	0.40	0.32	0.31	0.12	-0.06	1.00

Table A.13. Correlation table for Model 6.

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	**NOI$_S$**	1.00															
2	**GDP**	0.58	1.00														
3	**GDP^2**	0.65	0.95	1.00													
4	**GDP^3**	0.67	0.85	0.96	1.00												
5	**TAX**	-0.01	-0.01	0.01	0.03	1.00											
6	**CREDIT**	0.33	0.61	0.51	0.40	-0.02	1.00										
7	**WAGE**	-0.37	-0.40	-0.33	-0.26	0.00	-0.57	1.00									
8	**ENROLSEC**	-0.03	-0.08	-0.04	-0.01	-0.06	0.01	0.04	1.00								
9	**HEALTH**	-0.04	0.06	0.04	0.03	-0.07	0.02	-0.01	0.11	1.00							
10	**ELCONS**	-0.14	-0.26	-0.25	-0.22	-0.06	-0.24	0.26	-0.02	-0.41	1.00						
11	**LAW**	0.13	0.26	0.27	0.26	-0.07	0.05	0.03	-0.06	0.02	0.05	1.00					
12	**TRADE**	-0.10	-0.11	-0.02	0.05	0.01	-0.42	0.37	0.00	-0.07	0.09	0.33	1.00				
13	**ENROLTERT**	-0.07	-0.16	-0.11	-0.06	-0.07	-0.26	0.25	0.06	0.02	0.10	0.10	0.11	1.00			
14	**AIR**	-0.02	-0.04	-0.01	0.02	0.07	-0.07	0.11	-0.02	0.18	-0.05	-0.04	-0.01	0.09	1.00		
15	**RAIL**	0.06	-0.07	-0.10	-0.11	-0.09	0.00	-0.05	0.04	0.00	0.04	-0.05	0.04	-0.01	-0.02	1.00	
16	**ROADS**	-0.07	-0.17	-0.15	-0.13	0.01	-0.01	0.05	-0.06	-0.18	0.11	-0.05	-0.05	0.03	0.02	0.08	1.00

Table A.14. The Wald test for the joint significance of the three first powers of GDP per capita in explaining the NOI of the countries from the 5th stage of IDP.

H0: GDP=0, GDP^2=0, GDP^3=0 if HIGH=1
F(3,16) = 2.20
Prob > F = 0.0888