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FOREIGN DIRECT INVESTMENT & DEVELOPING COUNTRIES

HOW TO ATTRACT TRANS-NATIONAL CORPORATIONS?

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Abstract

The thesis studied the localisation determinants of foreign direct investment, in order to achieve a better understanding of how developing countries may attract FDI and acquire capital and technology. The examined determinants are based on previous research and economic theories. Founded on localisation advantages, an econometric regression analysis is used as a method to test the relevant location determinants of FDI inflows into host developing countries. The results support the hypothesis relatively well. The general conclusions are that foreign direct investment inflows from previous years, the foreign direct investment stock, gross domestic product, economic growth, infrastructure, and productivity are significant for FDI inflows. Current inflows appear to be path dependent since they are highly dependent on previous inflows and the accumulated stock. Latin America is distinguished from the other developing regions because it seems to attract FDI relatively easier.

KEYWORDS: Foreign direct investment, FDI, location determinants, Investment, Modified Gravity Model.

List of abbreviations

EC	-European Community
FDI	-Foreign direct investment
GDP	-Gross domestic Product
GNI	-Gross national income
GNP	-Gross national product
LA	-Latin America
MDE	-Middle East
MEW	-Manufacturing efficiency wage
NAF	-North Africa
NTB	-Non-tariff barriers
OLI	-Ownership, Leadership and Internalisation advantages: an FDI-theory.
R&D	-Research and development
SAS	-South Asia
SEA	-South East Asia
SSA	-Sub Saharan Africa
TNC	-Transnational Corporations

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1 Introduction

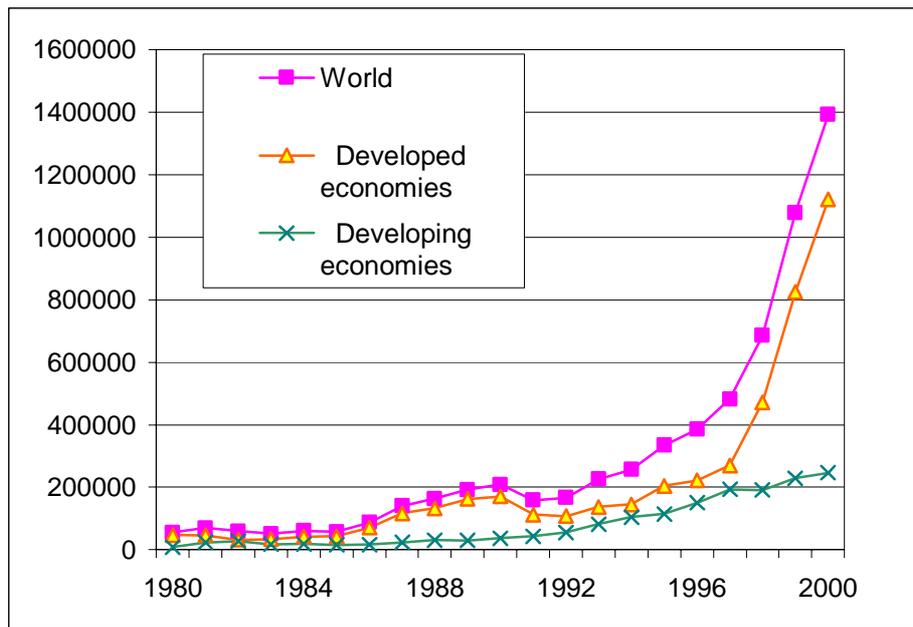
It is deep-rooted in economic *growth theory* that investment in capital is crucial to growth. The *new growth theory* expanded the theory, and put emphasis on knowledge and technology as well. Countries lacking capital accumulation and technological progress are developing much slower than countries with high investment rate and large *research and development* (R&D) expenditures. *Foreign direct investment* (FDI) can provide countries with both capital and new technology.

Transnational corporations (TNCs) are often seen as the primary movers and shapers of the globalisation process. They integrate production processes across national boundaries, transfer capital and technology. They relocate production affiliates companies between countries. Governments react to this phenomenon by dismantling barriers and reforming taxation system, and try to out bid each other by economical incentives. This outbidding led countries to create free trade areas and regional integration agreements.¹ “The success of the EC is not so much a story of institutional innovation, at least with regard to the institutions that govern trade, but rather of the creation of an integrated, trans-national society which expands the set of actors that may effectively interact under the institutional umbrella”²

¹ Kumar, N 1996, Multinational Enterprises, New Technologies and Export-Oriented Industrialisation in Developing Countries: Trends and prospects, *The United Nations University, INTECH, Discussion Paper Series no 9602*, Maastricht.

² Ingram, P & Robinson, J 2003, *The Intergovernmental Network of World Trade: ICO Connectedness, Governance and Embeddedness*, pp. 3.

Figure 1: World total FDI development in millions of US dollars



Source: UNCTAD 2003

Direct investment is defined as total or partial purchase of another firm in order to take control over the production process and to gain the firms' advantages,³ whereas portfolio investment is purely financial. Portfolio investment is designed to get the highest rate of return to capital.⁴ The term *foreign* is used because the investment is emanated from a firm abroad. Investment may also be made in completely new subsidiary, i.e. investment in "greenfield".

A static picture of the world today, may allow us to postulate that developing countries are often less able to generate a large capital stock and conduct R&D. For those countries FDI may offer a great chance of faster development and create an economic wealth.

Becoming a suitable host country for FDI is a difficult task, but not impossible. This thesis attempts therefore to detect what the essential

³ These advantages will be treated in the theory section.

⁴ Gilpin, R & Gilpin, JM 1987, *The political economy of international relations*, Princeton University Press, Princeton, N.J.p. 231

location determinants of FDI are in developing countries. Prior literature contains a range of localisation determinants. Some of the parameters studied hitherto are sometimes relevant, sometimes irrelevant. This may be caused by the fact that prior studies have pooled developing and developed countries into one sample.

1.1 Problem discussion and Purpose

The generally accepted theory of diminishing returns to capital, which implies that capital, should be invested where its ratio to other production factors is low. Yet, slightly more than 70 %, an average of the last 20 years, of world FDI has gone to developed countries, where capital/labour ratio is far much higher than in the developing countries.

“The global stock of FDI continues to grow, albeit at slower rate since 2001. The developed countries remain dominant as regards its ownership and location, although developing countries have made inroads, while least developing countries remain marginal.”⁵

Recent research in international economics leads us to believe that the path for developing countries to grow and “catch up” with the developed countries is not only trade liberalisation. “Countries seek FDI to help them grow and develop. Their national policies are key to attracting FDI and increasing its benefits.”⁶ Then, what determines FDI inflows in developing countries? This is the main question to be answered in this thesis. Moreover, disparities within the developing world in attracting FDI will be examined. The purpose of the thesis is to achieve a better understanding how developing countries may attract FDI and acquire capital and technology.

1.2 Delimitations and disposition

⁵ United Nations Conference on Trade and Development 2003, *FDI policies for development: national and international perspectives*, World investment report, 2003, United Nations, New York. p 26.

⁶ United Nations Conference on Trade and Development 2003, *idem*. p xvi

Focusing on the developing world may help to avoid an “*Inappropriate Pooling of Wealthy and Poor Countries in Empirical FDI Studies*” which was pointed out in a recent study with the same title.⁷

How may a developing country best create incentives for FDI with respect to the structure of its economy? In other words, what should be done in order to attract FDI? The focus is on the impact of the decisions made in a host country, and not on the effects of FDI on the host country.

Tariff and non-tariff barriers (NTBs) will not be taken into account here. These barriers are not judged to be relevant in this context, since the major part of FDI inflows occurs in the heavily industrialized world, where NTBs are used to a high extent. The thesis is composed as follows:

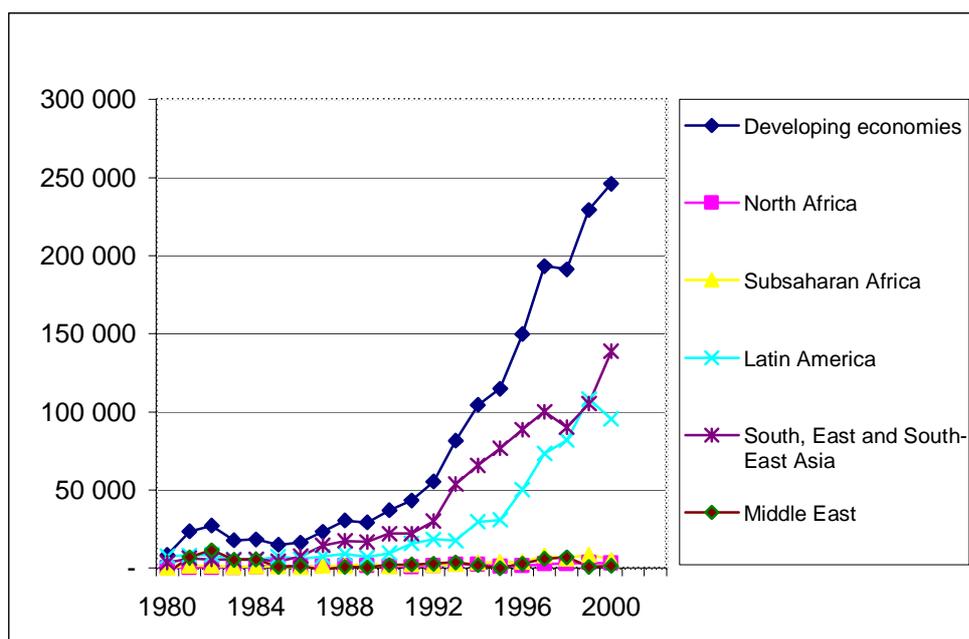
1. First, introduction.
2. The second section, *Major trends in FDI*, will give background information about recent developments in FDI and to stress the importance of FDI in a integrated world economy.
3. The third section, *Theories of Foreign direct investment*, of the thesis will treat general theories and the main types of FDI. It will give a theoretical explanation why firms conduct FDI, and where the firms are attracted.
4. In the fourth section, *The Model and analysis framework* used in this thesis will be presented; it is based on Chunlai’s model in location determinants in developing countries.
5. Section five; *hypotheses* will present the explanatory variables we will use in the regression. The hypothesis of each variable will also be presented.
6. In section 6, *Results and econometric analysis*, as the name indicates a presentation of the results will be given.
7. Finally a *conclusion* will synthesise.

⁷ Blonigen, BA & Wang, M 2004, 'Inappropriate pooling of wealthy and poor countries in empirical FDI studies', *National Bureau of Economic Research. Working Paper Series*, vol. No. 10378, pp. 1-28.

2 Major trends of FDI

The share of world total FDI inflows to developing countries has shown a steady increase from an annual average of 25 % in the 1980s, to an average of 30 % per annum in the 90s.⁸ After the Second World War (WWII), FDI has expanded impressively. FDI growth has surpassed the growth of both world gross domestic product (GDP), and the growth of international trade. In the 70s and the first part of the 80s, the general increase of FDI and exports were approximately identical. However, between 1986 and 1990, FDI did better than exports as well; it grew faster at an annual average rate of 24 %, compared to the growth rate of exports of 15 %. This was a four times faster growth in FDI compared to world GNP (Gross National Product).⁹

Figure 2: Inflows into developing countries in millions \$



Source: UNCTAD 2003.

⁸ Banga, R 2003, 'Impact of government policies and Investment Agreements on FDI inflows to Developing countries: An Empirical Evidence' *Indian Council for Research on International Economic Relations, Working Paper 116*, New Delhi, India

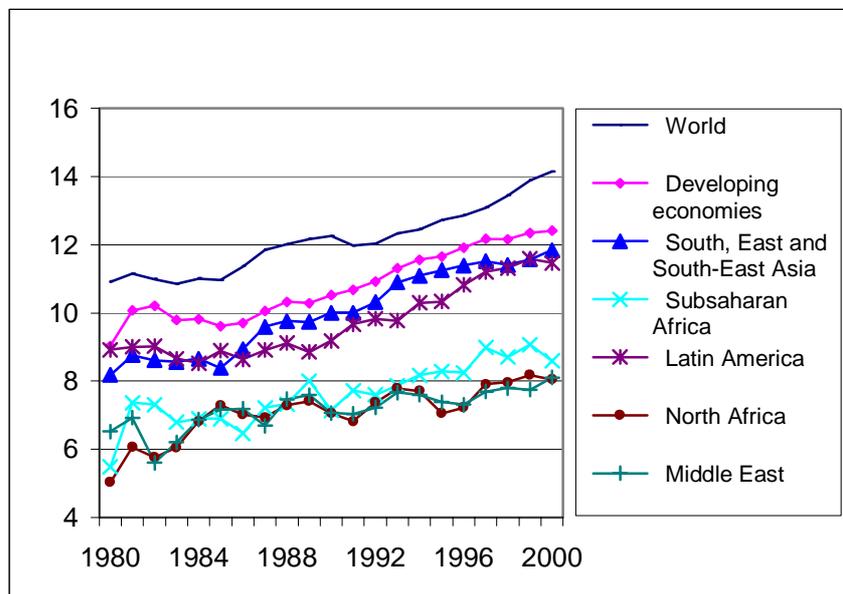
⁹ United Nations Conference on Trade and Development 2003, idem.

In 1980 developing countries received 15,3 % of the world's total FDI inflows (i.e. \$ 8 392 of the world's \$ 54 957 millions), the rest was absorbed by the developed world. The gap narrowed somewhat in 1985, when developing countries' FDI inflows share of the world's total FDI, increased to 26 %. However, in 1990 it decreased to 17,7 %. All of sudden, developing economies shared 40 % of the world total FDI inflows in 1993 and 1997 before it went back again to its level of 1990, in 2000. 17,7 % in 2000 is \$ 246 057 millions, and that is 29,3 times higher than the magnitude of FDI inflows of the years 1980.

The growth of FDI inflows into developing countries is mostly attributable to South East Asia, South Asia, and Latin America.

What are then the trends of FDI inflows into developing countries in details? A logarithmic graph puts the regional trends in evidence in the studied period.

Figure 3: Logarithmic graph including the world's total FDI inflows



Source: UNCTAD 2003.

The logarithmic curves reveal a positive trend in all regions studied, namely South East Asia, South Asia, Middle East, North Africa, Sub-Saharan Africa, and Latin America.

3 Theories of Foreign Direct investment

FDI as a phenomenon is not homogenous, there are different types of FDI. It is appropriate to give a short presentation of its main types, before explaining its theories.

3.1 FDI: a typology

FDI is to its nature very diversified, different firms have different reasons for conducting FDI, however the common goal is the drive for profit maximising. FDI has in most literature been divided into two large groups: market-oriented and export-oriented. The classification between the two groups is not always clear, and there is a considerable overlapping of FDI as an initially market-oriented plant may export, as well as export-oriented may produce for the host market.

3.1.1 Market-oriented FDI

Market-oriented FDI, as the name indicates, is conducted in order to access a market. The main reason for market-oriented FDI is transaction costs including transport costs, tariffs, barriers to trade and uncertainty about exchange rates etc. It is conducted to secure or increase market shares by “tariff jumping”. The main motive referred to by firms for market-oriented FDI, is to overcome trade protection in order to supply goods and services to the local market. The host country variable, which matters most for this category of FDI, is the market size. Market size is a function of the population size and GDP level, i.e. the total demand. These domestic demand-size driven FDI industries are characterised by high product differentiation, high absolute capital costs, high economies of scale, conglomeration externalities and high managerial requirements.

Apart from market size, prospects for future economic growth and degree of economic development of host countries are of importance for attracting this

type of FDI. Market-oriented FDI is also called “horizontal” FDI.¹⁰ It is called horizontal FDI because it may imply duplication of the entire production process in several countries, except for some common R&D and management departments.

3.1.2 Export-oriented FDI

Export-oriented FDI is conducted in order to minimize the production costs and export from the host country endowed with the needed production factor. However, some of the products are sold in the host market as well. The host-country’s market is not of importance as firms in this category of FDI. Instead, it is the price and efficiency of production factors which plays the crucial role where to, and if, FDI will be conducted. When a firm decides to conduct export-oriented FDI, there is no need for a complete copy of the firm’s structure; only a part of the firm’s organisation is implanted in the foreign market. Therefore export-oriented FDI is also called vertical FDI.¹¹

3.2 The theories

There are several theories attempting to explain why firms engage in Transnational production, which is an effect of FDI. However, no theory is generally accepted. The motive for the theories is that more and more firms are obliged to produce overseas in order to avoid losses of market shares abroad. When FDI used to be treated as a part of international trade, it was not possible to illuminate the phenomenon as such. Stephen Hymer was the first to draw up lines to make the new phenomenon intelligible. The most

¹⁰ Blonigen, BA & Wang, M 2004, idem p. 4, and Chunlai, C 1997, The Location Determinants of Foreign Direct Investment in Developing Countries, *CIES Discussion Paper Series 97-12*. p. 20

¹¹ Blonigen, BA & Wang, M 2004, idem p. 4, Chunlai 1997, idem p. 20

influential theories today will be briefly discussed. These main theories are grounded by Hymer, Vernon and Dunning.

3.2.1 Management theory

Hymer's groundbreaking viewpoint, presented in the 60s, focuses on industrial organisation mechanisms incentives for FDI instead of studying FDI within *international capital theory*.¹² Hymer's theory builds on the idea, that domestic firms have an advantage over foreign firms, they have better knowledge of the home market, legislation, attitudes etc. If a firm wants to locate its production in a foreign market, it has to possess a firm specific advantage in order to succeed in the new market;¹³ it could be a patent or a strong brand.

He considers three factors underlying the motivations for the firm to become a transnational. *First*, Risk and uncertainty about transaction costs, such as the extent to which volatility of exchange rates and costs of attaining information, etc. *Second*, FDI means transfers of technology and organisational efficiency. This enables the firm to earn economic rent on all its assets. *Third*, FDI means a transfer of rights and control to the firm.¹⁴

3.2.2 Product cycle theory

Raymond Vernon developed a spatial product cycle in order to explain the phenomenon FDI¹⁵. Vernon's product cycle has three stages and in the different stages different locations are suitable for production. Vernon admitted that his theory was a generalization:

¹² Hymer, SH 1976, *The international operations of national firms : a study of direct foreign investment*, M.I.T. monographs in economics ; 14, MIT Press, Cambridge, Mass.

¹³ Dicken, P 2003, *Global shift : reshaping the global economic map in the 21st century*, 4th edn, Sage Publications, London ; Thousand Oaks.

¹⁴ Chunlai 1997, idem. pp. 14

¹⁵ Vernon, R. 1966 "International Investment and International Trade in the Product Cycle", *Quarterly Journal of Economics*, Vol 80, pp. 190-207

“In an area as complex and “imperfect as international trade and investment, however, one might ought not to anticipate that any hypothesis will have more than a limited explanatory power.”¹⁶

Instead of focusing on comparative advantages, to explain the production of a country, the main element is the timing of innovation. Vernon abandoned the assumption that knowledge is a free good and argued that most advanced countries are similar, with one exception the USA.

In the first stage, as the US economy is especially suited for new labour saving products. This since the US economy has higher incomes and higher labour costs. This gives higher incentives for entrepreneurs in USA to invent new products, which are labour saving, in order to achieve extra profits from being first with the product, i.e. the economy has a higher innovative capability. The US has not comparative advantage in labour intensive production, but new products are associated with external economies and communication costs. The new product is not standardised, the processing, inputs and specifications is still changing. The producer has to have intensive contacts with customers (mostly the US market), suppliers etc. in order to develop the product, the producer competes with product differentiation rather than price.

In the second stage, the product is maturing and becomes more standardised. The need for flexibility declines and production cost awareness is increasing, due to a rising price competition. As soon as a new product is invented there will be demand for it in other advanced countries as well. As the demand in other advanced countries grows, it will soon be more profitable for the firms to move the production to the countries where the firms new markets are, due to lower labour costs. If the differences in labour costs are higher than the transport costs, the new facilities will also produce

¹⁶ United Nations Conference on Trade and Development 2003, *idem.* p. 198

for the US market. FDI occurs when the firms in USA start to build facilities in other countries.

In the last stage, the production is fully standardised and firms competes with prices and not product differentiation. In this stage developing countries may receive FDI, and be the most competitive location for production. But it depends on the transaction costs, the inputs for the production, and external economies of scale. Most developing countries have not many other industries that create the external economies and have a relatively poor infrastructure. If the costs of those disadvantages are marginal compared to the gain from much lower labour costs developing countries will be the optimal location for production and export to the other markets.

3.2.3 Theory of international production

Dunning has made an integration of theory of trade, organisation theory, location theory and theory of the firm. This is the eclectic theory of international production,¹⁷ also known as the “OLI” framework. “OLI” stands for Ownership advantages, Location advantages and Internalisation advantages, which are conditions of an eventual Trans-nationalisation of firms.

Ownership advantage refers to advantages a firm has due to possession of a production process. It could be a firm specific advantage, such as a patent or management skills. The advantage makes a firm’s competition in foreign markets noticeable and saves market shares.

Location advantage is the advantages emanating from the fact that production takes place in another market than the firm’s traditional one,

¹⁷ Dunning, JH 1993, *The globalization of business : the challenge of the 1990s*, Routledge, London.

lower costs of production factors, input costs, social and institutional factor advantages are examples.

Internalisation advantages are those that have to do with forward and backward linkages, such as suppliers or distributors to the firm. Market failures in transactions make it more profitable for the firm to internalise those activities than to have them outsourced.

3.3 Critics towards the three theories

Although these approaches have clarified insights on FDI, they are still not fully perfect. Hymer's theory explains the preceding of FDI, but does not depict its subsequent development. This is not surprising since he is a forerunner of all industrial organisation based theories of FDI.

In Vernon's initial overseas investment, explanations are mostly based on US firms. The similar countries are referred to Europe and the less similar are the countries in the rest of the world. TNCs and the world economic structure is today far much more complex and therefore it is unrealistic to assume the simple outwards direction from the US economy, as it is in Vernon's theory. This theory condemns the rest of the world from being innovative.

Dunning's theory is criticised for listing factors that may explain modern TNCs, instead of explaining the phenomenon of TNCs and FDI. However, there are scholars defending Dunning, and argue it should be seen as a framework, within which specific cases can be examined. It has widely contributed to international production studies.

3.4 Prior Studies of location determinants of FDI

The literature on location determinants of FDI is extensive, and there have been several studies with the focus solely on developing countries. The procedure in many of the studies is similar. First the variables, which are assumed to influence FDI inflows, are presented. Then a regression analysis is conducted in order to explain which of the assumed explanatory variables that influences FDI. Some of the studies and their conclusions will be presented below.

Chen Chunlai's study¹⁸ is based on a survey of thirty-three developing countries over 8 years between 1987 and 1994. He used a modified gravity model to explain FDI inflows. He found the following variables significant for explaining the level of FDI inflows; market size measured by GDP and GNI (gross national income) per capita, GDP growth measured by annual per cent change, manufacturing efficiency wage (MEW)¹⁹, remoteness measured by the relative distance to 'the world economic centre', foreign direct investment stock and openness. All variables except remoteness and MEW influences FDI inflows positively according to Chunlai' study.

Rashmi Banga²⁰ conducted a similar regression as Chunlai in order to get background information, to investigate how investment agreements and government policies influence FDI inflows. His sample included 10 developing countries over 11 years. His findings were that market size, labour cost,²¹ secondary enrolment ratio, external debt and electricity

¹⁸ Chunlai, C 1997, idem

¹⁹ Used as a proxy for the productivity in the country.

$MEW = \frac{Y_m}{V_m}$, Y_m is manufacturing labour earnings and V_m is manufacturing value-added.

²⁰ Banga, R 2003 idem

²¹ Calculated from labour costs divided by labour productivity

consumption are significant for the level of FDI inflows. He also found bilateral investment treaties with developed countries are positive and significant and that different regional treaties have different impacts on FDI inflows.

Also Elisabeth Asiedu²² made a regression analysis in order to explain the location determinants of FDI. Her paper aimed to examine whether or not sub-Saharan Africa (SSA) is different from other developing regions. Asiedu used a sample of 71 developing countries, 32 located in SSA, and calculated annual averages for 6 time period between 1970 and 1999 to use cross sectional data. In her study, openness, infrastructure (phones per 1000 population), and rate of return to capital (measured by the inverse of the real GDP per capita), were significant variables. A dummy for SSA was introduced and was significant and negative, proving that SSA was different in her sample.

Nunnenkamp²³ had a sample of 28 countries between the years 1987 and 2000. He divided the sample into three time periods in order to investigate whether there were differences over time. The main conclusion in his study is that the determinants of FDI have changed surprisingly little over time. Education and openness have become more important. But, it is still the market related determinants (GDP, GDP per capita, population and GDP growth in real terms), which are most important.

²² Asiedu, E 2002, 'On the determinants of foreign direct investment to developing countries: is Africa different?' *World Development*, vol. 30, no. 1, pp. 107-19.

²³ Nunnenkamp, P 2002, *Determinants of FDI in developing countries: has globalization changed the rules of the game?*, Kieler Arbeitspapiere, Kiel working papers ; no. 1122, Kiel Institute for World Economics, Kiel.

4 The model and Analysis framework

Chunlai²⁴ used a basic gravity model as groundwork and modified it, in order to apply it on the size of FDI inflows into developing host countries. Our choice of Chunlai's model is based on its exclusive focus on developing countries. Moreover, it holds source countries' variables constant, and thus offers an appropriate model for the location determinants of FDI, which are the core question of this thesis. The variables are carefully and well thought out in his model, which is judged to be plausible. However, in this thesis the model has been adjusted. Some variables has been added and others modified.

4.1 A basic gravity model: a short presentation

A gravity model predicts that bilateral trade between two countries will increase with the size of these economies, measured by GDP level and GDP per capita, and will decrease with the distance between the two economies as the distance is inversely correlated to the bilateral trade.

“In its unmodified form, the gravity concept postulates that an attracting force of interaction between two areas is created by the population masses of the two areas while a friction or resistance to interaction is caused by the intervening space over which the interaction must take place.”²⁵

In addition to the core variables (market-size and distance) of the model, most gravity models, include several other explanatory variables that influence trade flows, such as common border, similar language and culture

²⁴ Chunlai 1997, idem

²⁵ Chunlai, idem pp 23.

and membership in a trading block.²⁶ Recent literature has deduced that the gravity model goes well together with neo-classical models in explaining international and regional trade-flows, and that it is not the absolute distance between two countries that matters, but the economies' geographical position relative to all countries in the world²⁷. More recently economists started to use the same sort of gravity model for explaining FDI- flows.

4.2 Chunlai's modified gravity model²⁸

Dunning's ownership, localisation, and internalisation advantages, the OLI-theory of FDI,²⁹ are the keystone for the modified gravity model. Connecting the OLI-theory with the basic framework of a gravity model generates a model for the localisation determinants of FDI in developing countries. Each of the OLI-parts will be treated and fitted into one of gravity model's variables.

- Ownership advantages are specific to the source country factors
- Location advantages belong to the host country, both specific advantages to the host market environment and its linkages to the world economy.
- Internalisation advantages are specific to the source country.

FDI determinants can be classified into supply-side, and demand-side factors. OLI can be divided into these two groups: Ownership advantages

²⁶ Hufbauer, G & Oegg, B 2003, "The Impact of economic sanctions on US trade: Andrew Rose's Gravity Model", *International Economics Policy Briefs, Number PB03-4*.

²⁷ Deardorff, AV 1995, 'Determinants of bilateral trade: does gravity work in a neoclassical world', *National Bureau of Economic Research. Working Paper Series*, vol. No. 5377, pp. 1-28.

²⁸ To the best of our knowledge, Chunlai first modified this version of gravity model.

²⁹ Dunning, JH 1993, *The globalization of business : the challenge of the 1990s*, Routledge, London.

and Internalisation advantages belong to supply-side factors, and localisation advantages constitute the demand-side factors.

As the thesis concerns developing host countries, source countries' factors will be held constant in the model. Source countries' factors characterize the ability to conduct FDI outflows to all potential host countries equally; therefore they are not of interest in this model. This simplification allows for a model in which only the localisation advantages and linkage factors influence FDI inflows. Both of these factors are the host economies' attraction on FDI. The linkage factors are derived from the distance factor in a gravity model and are among others, distance, openness and accumulated FDI stock in the country.

The FDI is a function of, source country variables; host country variables; and linkage variables. The technical form of the model is as following:

$$\begin{aligned}
 FDI_{ij} &= f(X_i, X_j, R_{ij}) \\
 i &= 1, 2, 3, \dots, I \\
 j &= 1, 2, 3, \dots, J \\
 i &\neq j
 \end{aligned}
 \tag{1}$$

Where: FDI_{ij} = total FDI inflows from source country i, into host country j.
 X_i = source country composite variables
 X_j = host country composite variables
 R_{ij} = linkage composite variables between i and j

The linear regression form of the equation above is:

$$FDI_{ij} = \alpha_0 + \alpha_1 X_i + \alpha_2 X_j + \alpha_3 R_{ij}
 \tag{2}$$

Where: α_0 = a constant
 $\alpha_{1, 2, n}$ = elasticities of FDI to the variables.

The aggregate FDI inflows into a host country will be denoted as FDI_{*j} and equals to the sum of its FDI inflows from all source countries, as denoted in the linear regression (2) above:

$$FDI_{*j} = \sum_{i=1}^I FDI_{ij} \quad (3)$$

Substitute 2 into 3.

$$\begin{aligned} FDI_{*j} &= \sum_{i=1}^I (\alpha_0 + \alpha_1 X_i + \alpha_2 X_j + \alpha_3 R_{ij}) \\ &= I\alpha_0 + \alpha_1 \sum_{i=1}^I X_i + I\alpha_2 X_j + \alpha_3 \sum_{i=1}^I R_{ij} \\ &= I\alpha_0 + \alpha_1 X_* + I\alpha_2 X_j + \alpha_3 R_{*j} \end{aligned} \quad (4)$$

The source country i 's variables (X_*) indicate the source country's technological and economic development levels. They are independent and irrespective of destinations. They are included in the intercept term (β_0) and treated as constants in this model below.

$$FDI_{*j} = \beta_0 + \beta_2 X_j + \beta_3 R_{*j} \quad (5)$$

$$\beta_0 = I\alpha_0 + \alpha_1 X_*$$

$$\text{Where: } \beta_2 = I\alpha_2$$

$$\beta_3 = \alpha_3$$

Equation (5) states that FDI_{*j} , given the source countries' variables (supply-side factors included in the intercept β_0), the host country variables (demand-side factors X_j) and linkage variables (e.g. geographic position, openness etc. R_{*j}) are the only variables which matters to determine the attraction of FDI. The equation is the *modified gravity model* used to explain the magnitude of FDI inflows from all source countries into a developing host country j . The modification in the model consists of an improved

linkage factor, remoteness instead of absolute physical distance.³⁰ Shortly, it can be said that remoteness is a weighted distance between a host country and all other source countries together. This weighted distance is used as an index determining a host country's relative geographic position in the world economy as compared with other host countries.

³⁰ See discussion in the section 5.1.10 "variables", where remoteness is presented profoundly.

5 Hypothesis

As the core question in this paper is the host country's overall attraction of FDI, the demand-side factors are exclusively the aim of the thesis; this paper is concerned only with L, the localisation advantages of Dunning's OLI-theory. Since resource endowments, economic and social factors are uneven among countries; the host countries' attraction on FDI is different, given constant supply-side factors.

From the theoretical framework of a gravity model, host countries abilities and linkages will affect the result of this model. The source countries will be neglected as they are assumed to affect all the host countries equally.

5.1 Variables

The variables are based on Chen Chunlai's modified gravity model.³¹ Focusing on location advantages, Chunlai, studied the quantity of total FDI inflows to developing host countries, from different source countries. However, the model is extended with 5 variables; education, infrastructure, previous FDI inflows and domestic investment are added to the model. The factor cost proxy is changed to per capita gross domestic product. A compressed presentation of these variables will follow in table 1 with sources of the data.

5.1.1 Market size

The basic argument for the market size is economies of scale. A larger market offers more possibilities to realise economies of scale. However, in an open economy a firm can realise economies of scale through trade with foreign markets. It is in this context the market size, as a location factor in determining FDI inflows, should be analysed.

³¹ Chunlai 1997, idem.

Why is the market size an important factor in an open economy? There are FDI in non-tradable goods and service sectors, and one purpose of market-oriented FDI, as explained above, is to create or secure a market for the firms' products, i.e. firms invest in a market to avoid tariffs on export.

For export-oriented FDI, a larger market-size increases the probability of positive external economies and spillover effects. And finally, there will characteristically be more activities in big markets than in smaller ones. This leads to more opportunities for more diverse FDI, and thus its magnitude. All these explanations are measured by gross domestic product. The market size denotation in the regression will be GDP. The hypothesis here is a positive correlation between GDP and the amount of FDI inflows.

5.1.2 Economic growth

Economic development potential is usually indicated by high economic growth. The hypothesis is a positive relation between economic growth and FDI inflows. The variable will be represented by GGDP, which stands for the growth rate of GDP.

5.1.3 Productivity

Whereas market size affect mainly market-oriented FDI, the production factor costs mainly affect export-oriented FDI. The major part of the production factor costs is attributed to labour. This is why labour costs are a determinant variable for FDI. In lack of data, we are compelled to use GDP per capita as a proxy for productivity. Therefore we excluded GNP per capita from the regression, which has been used as the development level in Chunlai's study.³² GDP per capita is a too similar measure to GNP per

³² Chunlai 1997, idem.

capita and simultaneously explains the development degree of the economy. There is a risk for multicollinearity

The productivity variable will be denoted as PROD, and is expected to influence FDI inflows positively.

5.1.4 Education

Education is important for FDI inflows, since it reflects the labour skill. This means the productivity of labour may be high and may rise in the future. An educated population has a higher ability to perform more complicated tasks and assimilate new tasks with ease. As a result it measures the country's ability to absorb new technology. One more reason for taking education into account is the structural change of FDI, from labour intensive to more technology intensive production in TNCs.³³ Education is measured by primary school enrolment in per cent.

In the regression, education is EDU, and is expected to influence FDI inflows positively.

5.1.5 Domestic Investment

It is not unreasonable to assume that host countries' investment rate affects the FDI inflows to the country. The domestic investment rate reflects the population's propensity to carry out business and their belief in the future of the economy. It also provides information on the investment climate in the country. Therefore domestic investment is used as an independent variable to explain the variation in the level of FDI inflows. Hence, it is expected that the level of FDI inflows will be higher as domestic investment are high. It will be denoted as INVEST in the regression.

³³ Gavin Kitching, *Seeking Global Justice Through Globalization, Escaping a Nationalist Perspective*, Pennsylvania State University, 2001. See also Dicken, P 2003.

5.1.6 Infrastructure and communications

The infrastructure of a country is of essential importance for the economic milieu of the country. A good infrastructure enables the economy to operate without major distortions, and to grow at a faster pace. Infrastructure is usually not only physical infrastructure as roads, ports etc. but also how well the institutions of the country function.³⁴ Infrastructure should be measured by both availability and reliability. A large energy production is worthless, if there are often power delivery failures.

Due to lack of availability of data, a reasonable proxy for infrastructure will be phones per 1000 inhabitants. This measure is not perfect; it does not capture the institutional performance in the country or the reliability of the telephone connections. A country may have a large intensity of phones, but the telephone network may be malfunctioning.³⁵ Although the proxy's imperfections, it gives important information on the possibility to transactions and availability of infrastructure.

The hypothesis is a positive correlation between infrastructure and the extent of FDI inflows. Infrastructure will be represented by INFRA in the regression.

5.1.7 Previous FDI inflows

When investors start to invest in a country, it seems that they get more used to the economy, and consequently continue to invest in the country. Previous FDI inflows will have a positive effect on current FDI inflows, and will be denoted as FDII1 or FDII2, where the numbers represent the year of the lag. FDII is the initials of foreign direct investment inflows.

³⁴ Jones, CI 2002, *Introduction to economic growth*, 2nd ed edn, W.W. Norton, New York.

³⁵ Asiedu, E 2002, *idem*

5.1.8 FDI stock in the host country

The investment environment is reflected by the already accumulated FDI stock. Potential investors will be positively affected by already made investment. The hypothesis will hence be that a larger accumulated FDI stock attracts more FDI. In the regression, FDIS represents FDI stock.

5.1.9 Openness

Openness has two opposite impacts. One promoting export-oriented, and one discouraging market-oriented FDI. A low degree of openness will attract market-oriented FDI – as firms want to avoid tariffs and transport costs, whereas dismantling trade barriers allows TNCs (in this case, export-oriented FDI) to pursue integrated international strategies and structures, driving them to acquire a range of location assets in bad times as well as good. As this category of FDI desires to reach other markets from the low cost production location, openness attracts it, without necessarily excluding market-oriented FDI. A high degree of openness implies more economic linkages with other countries and international intra-firm (or intra-industrial) trade. As familiar, openness is measured as a ratio of the sum of the two-way trade (export and import) to GDP. Thus the hypothesis is consequently such as: the higher openness is, the more FDI inflows. Openness will be denoted as OPEN.

5.1.10 Remoteness from the ‘world economic centre’

One specific character of the *basic gravity model* is, among other things, the study of the effect of distance on bilateral trade flows. In this *modified gravity model*, however, the distance term will be adjusted, since physical distance is not an adequate measurement to verify localisation advantages of FDI in development countries.

A country's remoteness variable is a weighted average distance value. It equals the sum of the product of the fraction of source countries'³⁶ GDP to world GDP, and the physical distance between these major source countries and the host country. The physical distance is the distance between the source countries' capitals and the capital of the host country. The function for the remoteness variable will be as following:

$$\text{Remoteness}_j = \sum_{i=1}^I w_i D_{ij}$$

Where: $w_i = \frac{Y_i}{Y_w}$

Y_i = country i's GDP.

Y_w = world GDP.

D_{ij} = direct distance between country i to country j.

The remoteness variable will have two effects on FDI, one positive and one negative. If remoteness is high, FDI is expected to be high for market-oriented FDI in order to avoid transport costs, and low for export-oriented FDI for the same reason. The higher the remoteness is, the higher the transaction costs. We expect the remoteness variable to influence FDI inflows negatively. In the regression, REM will represent remoteness, and has hypothetically a negative relation to FDI inflows.

³⁶ Chunlai's choice of these countries is based on their total outward FDI stock, which constituted 99.63% of the world total outward FDI stock in 1994. The countries were Australia, Austria, Belgium, Brazil, Canada, Chile, China, Denmark, France, Finland, Germany, Hong Kong, Israel, Italy, Japan, Korea, Kuwait, Malaysia, Mexico, Netherlands, New Zealand, Norway, Panama, Portugal, Saudi Arabia, Singapore, South Africa, Spain, Sweden, Switzerland, Taiwan, Thailand, United Kingdom, United States, Venezuela. All together 35 countries. These are also used in this study.

6 Results and econometric analysis

6.1 Method

The goal of this thesis is to answer the question: which parameters in developing countries affect inflows of FDI? The method was to gather a sample of as many individual countries as possible for the chosen explanatory variables described above. The sample is unfortunately restricted by lack of data to 62 host developing countries:

Algeria, Argentina, Bangladesh, Barbados, Benin, Bolivia, Brazil, Burkina Faso, Burundi, Cameroon, Chile, China, Colombia, Congo, Costa Rica, Cote d'ivoire, Dominican Rep., Ecuador, Egypt, El Salvador, Ethiopia, the Gambia, Ghana, Guatemala, Honduras, Hong Kong, India, Indonesia, Iran, Jamaica, Jordan, Kenya, Madagascar, Malaysia, Mali, Mauritius, Mexico, Morocco, Mozambique, Nepal, Niger, Pakistan, Panama, Paraguay, Peru, the Philippines, Rwanda, Senegal, South Africa, South Korea, Sri Lanka, Syria, Tanzania, Thailand, Togo, Trinidad & Tobago, Tunisia, Turkey, Uruguay, Venezuela, Zambia, and Zimbabwe.³⁷

The period of time studied is between 1982-2000. The choice of the time period is decided by the availability of data. The ambition was to include as long period as possible. This is also a restriction to the sample size, since many countries do not have data for the whole period of time. The data contains an almost balanced panel, except for school enrolment data for some years and countries. An average of the year before and after is used to balance the panel.

A multiple linear regression is generated on basis of the modified gravity model, equation (5). Pooled data is used for a more comprehensive analysis. Introducing five dummies for different regions in the regression made the

³⁷ The underlined countries are some of the countries included in Chunlai's study.

following geographical division of the countries into six different regions: Africa South of Sahara (SSA), North Africa (NAF), Middle East (MDE), Latin America (LA), South Asia (SAS), and South East Asia (SEA). The major regional sample is Latin America, including South and Central America, which is used as the reference region. Variable elasticities without interaction with regional dummies represent Latin American coefficients in table 2 in section 6.3.

Table 1 Presentation of the Variables

Variable	Specification of Variables	Source
FDII (dependent)	Logarithmic total inflows of FDI into the developing host country	World Investment Report 2003
GDP	Logarithmic aggregate GDP	Penn World Tables
GGDP	Annual growth of GDP in per cent	Penn World Tables
PROD	Productivity, logarithmic income/capita	Penn World Tables
EDU	Education, primary school enrolment	World Dev. Indicators
INVEST	Domestic investment rate (%)	Penn World Tables
INFRA	Infrastructure in the developing host country, measured by logarithmic number of phones / 1000 inhabitants	World Development Indicators
FDII1, FDII2	Logarithmic total inflows of foreign direct investment with one, resp. two years of time lag.	World Investment Report 2003
FDIS	Logarithmic foreign Direct Investment stock already accumulated in the host country	World Development Indicators (W.D.I.)
OPEN	Openness of host country, measured by trade to GDP ratio, in %	Penn World Tables
REM	Remoteness of the developing host country, a logarithmic index of weighted average distance to the rest of the world	www.indo.com/distance capital-to-capital real distance. Weights: WorldDevelopmentRep.

6.2 Technical analysis

The regression equation is:

$$\begin{aligned} FDI_{j,t} = & \beta_0 + \beta_1 GDP_{j,t} + \beta_2 GGDP_{j,t} + \beta_3 PROD_{j,t} + \beta_4 EDU_{j,t} \\ & + \beta_5 INVEST_{j,t} + \beta_6 INFRA_{j,t} + \beta_7 FDII1_{j,t-1} + \beta_8 FDII2_{j,t-2} \\ & + \beta_9 FDIS_{j,t} + \beta_{10} OPEN_{j,t} + \beta_{11} REM_{j,t} + \varepsilon_t \end{aligned}$$

Where ε is the stochastic error term, and the different β are the parameters' elasticities to be estimated. The effect of independent variables on the dependent one appears only at time t .

The regression is based on OLS, ordinary least squares, and computed in the statistical program *Eviews*. Space and time dimensions of the pooled data are disregarded. Consequently, all coefficients are assumed to be constant across time and countries.³⁸ Regional dummies capture the disparities in space. The total sample size is 1178 (i.e. 62 countries times 19 years), for the model.

Introducing a time lag of one or several years is a common method to explain how the independent variables influence the dependent one. The underpinning argument in this method is that it takes time to adjust to the changes. However, in the contemporary world with advanced information and communication technology, the space and time are strongly reduced; therefore it is not necessary to lag the independent variables.

³⁸ Gujarati, DN 2003, *Basic econometrics*, 4th edn, McGraw Hill, Boston. p. 641

6.3 The regression findings

The outcome from the regression is presented in the two following tables.

Table 2: Total sample coefficients

Independent variables	total sample coefficients	
Constant	-0,09924383	
	(-0,813059)	
GDP	0,169966**	
	(2,544487)	
GGDP	4,313479***	
	(5,386212)	
PROD	-0,379436***	
	(-3,570684)	
EDU		
INVEST		
INFRA	0,001013*	
	(1,909254)	
FDII1	0,432112***	
	(15,10544)	
FDII2	0,151534***	
	(0,028789)	
FDIS	0,339413***	
	(6,830715)	
OPEN	0,004540**	
	(2,268838)	
REM		
SSA	-0,557242***	
	(-3,494001)	
SEA	-0,616730***	
	(-2,903178)	
SAS	-0,573706**	
	(-2,487729)	
NAF	-0,648444***	
	(-2,857558)	
MDE	-0,647195***	
	(-3,403379)	
Adjusted R ²	0,738866	
DF	1160	
Durbin-Watson Stat.	1,989855	
Breusch-Godfrey Serial Correlation	0,082068	P=0,774566

Note: t-statistics is in parentheses

* Statistically significant at 0,1 level (two tails test)

** Statistically significant at 0,05 level (two tails test)

*** Statistically significant at 0,001 level (two tails test)

Table 2 contains the result from a regression, with 11 independent explanatory variables for FDI inflows, and 5 regional dummies. In this regression, the dummies only explain differences in the intercept between the regions. Observe the intercept (constant), is not significant. For the presented hypotheses, the regression has generated has rather good results. A majority of the variables are significant and affect FDI inflows as expected. The variation of foreign direct investment inflows over the time is rather well determined by the model, as indicated by the adjusted R^2 value, 73 %. Out of sixteen variables, only 3 are insignificant (see the empty cases in table 2).

The insignificant variables are education, domestic investment and remoteness. In the case of education, as explained the pupil of today is a potential efficient worker tomorrow. FDI is not affected by education, since there may be a too large time lag. Domestic investment may not be significant because the variable FDIS represents the investment climate for foreign firms. Domestic investment represents investment climate for domestic firms and may not be the same as for FDI. In the case of remoteness, the physical distance becomes less important over time. Transaction costs are shrinking and new communication technology has improved firms' ability to conduct operations over large distances. This improvement has maybe made the variable remoteness less important and thus insignificant in the regression.

Perhaps the most surprising result in the regression is the productivity proxy. It is significant but discourages FDI inflows, despite the opposite expectation.

However, this result is common in prior studies of developing countries³⁹ and as such it did not come as a surprise. The intention was – as Chunlai did

³⁹ Elizabeth Asiedu, idem, p.110, table 3 (where a collection of results from studies are gathered).

– to measure productivity by a proxy of manufacturing efficiency wage (MEW).⁴⁰ However, we were unable to find data to calculate the MEW. We thought and still believe that productivity is an essential determinant for FDI inflows. The proxy we used for MEW is GDP per capita. This measure is probably inadequate, and thus explains the results in the regressions. Also, the fact that GDP per capita is positively correlated with GDP may contribute to this, since near co-linearity between the variables may be a problem.

The variable GGDP is highly significant with a high positive coefficient, of 4,3. This means TNCs are highly sensitive to growth. GDP is significant at a level of 5 % and has a positive coefficient. This means the market size in developing countries determines FDI but to a lesser extent than GGDP. Since the variable GDP is used at the same time as GDP per capita, and constitute similar measures, they may cancel each other. The difference between the variables is the population. GDP per capita is aggregate GDP divided by the population. Thus the relationship between the population and FDI inflows seems to be positive. This is in line with our hypothesis about market size.

Infrastructure has a minor impact, shown by its marginal coefficient on FDI inflows, and its significance is at a 10 % risk level.

Openness is positively correlated with the FDI inflows with a quite low coefficient. This may express that the more open an economy is, the more it is linked with the rest of the world, and the more disposed are foreign investors to engage.

⁴⁰ $MEW = \frac{Y_m}{V_m}$, Y_m is manufacturing labour earnings and V_m is manufacturing value-added.

The accumulated stock of FDI in a certain host developing country informs about the rate of return to capital, and how secure it is to invest in the economy. Former FDI inflows, in recent years, confirm and fortify the belief of foreign investors in the country's return to capital and stability. FDII1, FDII2 and FDIS are all relevant determinants for new potential investors.

All the dummies are significant and negative. This means that Latin America is the region, which receives relatively more FDI compared to the other regions.⁴¹ When a country in LA improves its determinants with one per cent, FDI inflows increase more for that country than it would have done for a country in any other region. As this is of major interest, two new regressions with interaction between the variables and the dummies are made. This is done in order to see the different impacts of the variables between the regions and LA. In the first column in table 3, a regression with all variables included. In the second column, FDII2 is subtracted from the regression in order to clearly see whether the previous FDI inflows influence with a short lag or with a longer one. The two new regressions gave the following result:

The regressions with and without time lag 2 for FDI inflows generated quite similar results. Hence, the time lag one is enough for the study, but we will see some few differences yet.

⁴¹ Regressions have been made with all regions as the reference region. It is only LA, which is significantly different.

Table 3: Regional comparisons with, and without time lag 2 of FDI inflows

Independent variables	all included	FDII2 is subtract
C		
EDU		
FDII1	0,304714*** (4,875468)	0,340423*** (5,762277)
FDIS	0,568634*** (4,672781)	0,629638*** (5,408462)
GDP	0,308693** (2,466964)	0,328212*** (2,649585)
GGDP	4,428859*** (2,740793)	4,182281** (2,573662)
INFRA	0,003046** (2,413884)	0,003361*** (2,688596)
OPEN		0,005727* (1,670937)
PROD	-0,736215*** (-3,409779)	-0,791679*** (-3,723686)
OPEN*SSA		0,008105* (1,750996)
FDII1*SEA	0,282697** (2,350449)	0,345249*** (3,224586)
FDIS*SEA	-0,697599*** (-3,817150)	-0,673792*** (-3,865480)
GGDP*SEA	8,870240** (2,402706)	8,138923** (2,240375)
INFRA*SEA		-0,002529* (-1,739353)
FDII1*SAS	0,341665* (1,749588)	0,322870* (1,947632)
FDII1*NAF	0,318962** (2,555903)	
FDII2*NAF	-0,386986*** (-3,140294)	
FDIS*NAF	1,412838** (2,176101)	1,363653** (2,285186)
GDP*NAF		-1,724711** (-2,079771)
INVEST*NAF	0,207388* (1,799208)	
OPEN*NAF	-0,101337** (-2,440269)	-0,110051*** (-2,733875)
INVEST*MDE		-0,112575*** (-2,764951)
Adjusted R ²	0,752751	0,747818
DF	1116	1121
Durbin-Watson Stat.	2,019121	2,045911
Breusch-Godfrey Serial Corr.	0,830339 (P=0,362372)	2,286044 (0,130824)

Note: t-statistics is in parentheses

* Statistically significant at 0,1 level (two tails test)

** Statistically significant at 0,05 level (two tails test)

*** Statistically significant at 0,001 level (two tails test)

SSA deviates significantly from LA only in the variable OPEN, in the regression without time lag 2 of FDI inflows. MDE seems to get less FDI for higher domestic investment than in LA in the regression with only one time lag, column 2 in table 3.

Between SAS and LA, there is a significant difference in how former FDI inflows are important. In SAS higher FDI inflow last year will generate a relatively higher FDI inflow.

The differences between SEA and LA are significant in several variables. FDI inflows from the last years are more important in SEA than in LA to attract FDI inflows, whereas FDI stock in SEA is less relevant. Infrastructure shows a difference only in regression without time lag 2 (FDII2, second column). It has less impact in SEA than in LA. The growth of the economy, GGDP proves to be far much more important in SEA than in LA. This is statistically significant at 5 % level.

FDIS impact on FDII is significantly lower in SEA than in LA. This may be explained as if its impact on FDI inflows is zero at first, when FDIS is non-existent. As soon as a country begins to attract and accumulate FDI, FDI stock begins to increase. Its impact on FDI inflows increases sharply at the beginning, and then it flattens out. Consequently, we may say that when FDIS is high enough relative to the other regions, its net impact on FDII decreases, due to diminishing returns to scale.

NAF also shows many significant differences. FDII1, FDIS, and INVEST attract more current FDI than they do in LA, whereas the coefficients of FDII2, GDP, and OPEN are negative, i.e. attract significantly less FDI inflows in NAF than in LA. Since there is a strong correlation between the variables FDIS, FDII1 and FDII2, it is wise not to conclude that there are differences between the two regions with respect to the named variables.

7 Conclusion

The thesis studied the localisation determinants of foreign direct investment, in order to achieve a better understanding how developing countries may attract FDI and acquire capital and technology. The examined determinants are based on previous research and economic theories. Based on localisation advantages, an econometric regression analysis is conducted as a method to test the relevant location determinants of FDI inflows into host developing countries; and whether or not there is an inappropriate pooling of all countries within the developing world.

The general conclusions of the thesis are that foreign direct investment inflows from previous years, foreign direct investment stock, gross domestic product, economic growth, infrastructure, and productivity influences FDI inflows.

Previous FDI inflows and FDI stock are essential for attracting new inflows. This leads us to believe that FDI may be path dependent. Nonetheless, to exert attraction on TNCs, a country ought to focus its economic policy on growth. According to our investigation, economic growth together with the market size – gross domestic product – are the most essential determinants of foreign direct investment, which a host country can affect without foreign involvement. This study cannot answer the question whether FDI inflows promote economic growth or if it is economic growth, which attracts FDI inflows. The regression findings say nothing about the causality between them, only that they are related.

FDI inflows seem to be path dependent, because it depends on the inflows in previous years and on the FDI stock. According to the study, the earlier a country receives FDI, the more FDI it will receive relatively to other countries. Therefore FDI stock may reveal a hidden determinant, namely distance costs. In the past, economic transactions in the remote distance were costly and influenced FDI inflows in favour of countries sited geographically near. From this, the following deduction may be made: some

countries have had the opportunity to get an advantage compared to other countries thanks to either closeness or early inflows. However, today the distance variable, remoteness is found to be insignificant.

Treating the developing world as a group is not accurate. One more finding in the study is that among developing countries the Latin American countries as a region, stands out and attracts FDI easier than the other regions.

For countries with high FDI stock relative to other countries, the FDI stock impact on FDI inflows is less important. This is probably due to higher competition and may be explained partly by diminishing returns to scale, and increasing wage rate.

Some suggestions for future research would be: (a) to examine which of the specific characters of Latin America that allows it to attract FDI relatively easier compared to other regions of developing countries; (b) to consider how the location determinants in developing countries have changed over time. This has been done earlier, but not with an exclusive focus on developing countries; (c) to accurately study the causality of FDI versus economic growth: will countries grow thanks to FDI or ought they grow first and by this means attract FDI as the finding is here? It is indeed worthwhile to consider the idea of Gene M. Grossman and Elhanan Helpman on openness and international economic 'integration and growth'. They postulated "while many economists *firmly* believe that open trade must always promote rapid expansion, ...closing off trade might actually increase a country's long-run growth rate."⁴²

⁴² Grossman, G M & Helpman, E 1994 'Endogenous Innovation in the Theory of Growth' in *Journal of Economic Perspectives* – Volume 8, Number 1, p. 40. *Italic style: our emphasis.*

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