The Effect of FDI and Other Foreign Capital Inflows on Growth and Investment in Developing Economies

By

Hosein A. T. Elboiashi

A thesis submitted for the degree of Doctor of Philosophy in Economics.

Department of Economics

School of Business

University of Glasgow

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ABSTRACT

This thesis aims to investigate and study a variety of dimensions of the relationship between foreign direct investment (FDI), domestic investment (DI) and economic growth in the host countries. The main purpose of this thesis is to empirically examine the implications of the relationship and complementarity between FDI and DI, and the contribution of the host country's factors in achieving the benefits of FDI inflows.

To achieve the aim and to examine the argument of this thesis, the thesis was structured to include six chapters, containing three empirical chapters. These empirical chapters studied different hypotheses of the relationship between FDI and economic growth. The first empirical chapter attempted to find the answer to these two questions: (a) *does FDI contribute positively to GDP;* and (b) *does FDI really crowd out DI in the host countries*. The second empirical chapter also tried to offer the answer to this question: *does FDI contribute to economic growth in developing countries alone, or does it depend on its initial conditions?* Furthermore, the third empirical chapter studies the direct impact of not only FDI but also other foreign capital inflows on economic growth, and their indirect impact on economic growth, which works via domestic investment channel. This chapter searched for the answer to this question: *how do FDI and other types of foreign capital inflows affect economic growth?*

Chapter one presents the motivation of the thesis and sets its aim and structure. Chapter two presents a background of economic literature on the relationship between FDI, DI and economic growth. This chapter also provides a brief review of theoretical and empirical background on the interrelationship between those variables, in order to reach a better understanding of the contributions of FDI and DI to economic growth in the host countries. Based on this chapter, Chapter three studies empirically the relationship between FDI, DI and economic growth by applying a multivariate VAR system with the error correction model (ECM) and time-series and panel-data techniques of cointegration to investigate the links between FDI, DI and GDP. The empirical evidence reported in this chapter shows that, on the one hand, FDI crowds out DI in the host countries, either in the short-run or in the long-run based on the results of time-series analysis. On the other hand, Panel-data techniques provide strong evidence that FDI has crowding-in effect on DI. Both time-series and panel-data analysis also provide evidence that FDI can positively affect economic growth in host

countries. The results of this chapter also show that GDP have a positive impact on FDI and DI, either in the short-run or in the long-run. The results also show that DI is positively related to GDP and FDI in receiving economies.

Based on the results of Chapter three, Chapter four investigated empirically whether FDI contributes to economic growth alone, or does it depend on the host country's conditions. The empirical evidence stated in this chapter shows that FDI inflows have, in general, a significantly positive impact on growth; however, the magnitude of this effect depends on the host country's absorptive capacity as measured by human capital, technology gap, infrastructure, institution quality, financial market, and trade openness. The results of this chapter show that the host country must reach a threshold of absorptive capacity in order to gain the positive externalities offered by FDI inflows. The results of this chapter also show that domestic investment, human capital, infrastructure development, financial market development, institution quality, and trade openness are positively related to economic growth, while the technology gap is negatively related to economic growth.

Based on the results of chapter three and four, chapter five explored whether the positive impact of FDI and other foreign capital inflows (portfolio investment and loans inflows) in DI on the host economies can be considered as a growth-enhancing role not only for FDI but also for other foreign capital inflows. The results reported in this chapter show that all types of foreign capital inflows have a significant positive influence on economic growth in the host economies. The empirical evidence reported in this chapter also shows that FDI inflows have a more significant effect on economic growth than other type of capital inflows, such as portfolio investment and loans inflows. The results of this chapter also show that all types of foreign capital inflows have a strong crowding-in effect on DI in the host countries; however, FDI inflows have a greater crowding-in effect on DI than portfolio investment, and loans inflows are in between them. The main result presented in chapter five is that the impact of FDI, portfolio investment and loans inflows on economic growth, which works via domestic investment channel, is not a significant one, but also is generally greater and more robust than the direct impact in the host economies.

Generally, the most important contribution of this thesis is that a better understanding of the relationship between FDI, DI and economic growth in developing countries, taking into account the influence of the host country's absorptive capacity, and different types of foreign capital inflows.

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To my heart and beloved wife "Basma

To my beautiful angels, and the greatest gift from God "Kaeim (7), Kais (5) and Raqayim (1.8)

In memory of my father

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During the period of working and writing my thesis, I bear responsibility for this thesis to numerous people who contributed to the final outcome.

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DECLARATION

I declare that, except where explicit reference is made to the contribution of others, that this dissertation is the result of my own work and has not been submitted for any other degree at the University of Glasgow or any other institution.

ABBREVIATIONS

ADF	Augmented Dickey-Fuller Test
AIC	Akaike Information Criterion
DI	Domestic Investment
ECT	Error Correction Term
ERSAP	Economic Reform and Structural Adjustment Programme
FDI	Foreign Direct Investment
FE	Fixed Effect Estimator
FPE	Final Prediction Error Criterion
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Production
GFCF	Gross Fixed Capital Formation
GMM	Generalised Method of Moment Estimator
HQ	Hannan-Quinn Information Criterion
IMF	International Monetary Fund
LDCs	Less Developing Countries
LIML	Limited Information Maximum Likelihood
LR	Sequential Modified Likelihood Ratio Test
M&As	Merger and Acquisitions
MNCs	Multinational Corporations
NAFTA	North American Free Trade Agreement
OECD	Organisation for Economic Co-Operation and Development
OLS	Ordinary Least Square
PP	Phillips-Perron Test
R&D	Research and Development

RE	Random Effect Estimator
SC	Schwarz Information Criterion
TSLS	Two Stage Least Square
3SLS	Three Stage Least Square
UNCTAD	United Nations Conference on Trade and Development
UNCTC	United Nations centre on Transnational Corporations
UNESCO	United Nations Educational, Scientific and Cultural Organization
VARM	Vector Autoregressive Model
VECM	Vector Error Correction Model
WDI	World Development Indicator
WIR	World Investment Report

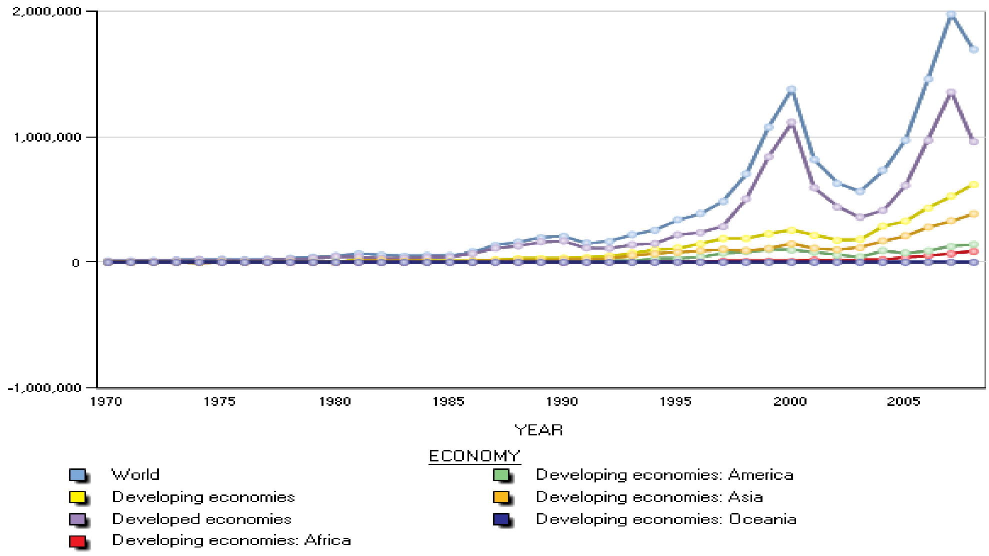
1. Introduction

1.1. Motivation

Recently, foreign capital globalisation, particularly FDI inflow has increased significantly in developing countries, due to the fact that FDI is the most stable and prevalent component of foreign capital inflows (Adams 2009). The importance of FDI has emerged from the role played by MNCs in creating positive externalities in economic growth through providing financial resources, creating jobs, transferring technological know-how, managerial and organisational skills, and enhancing competitiveness (Kobrin 2005; Adams 2009).

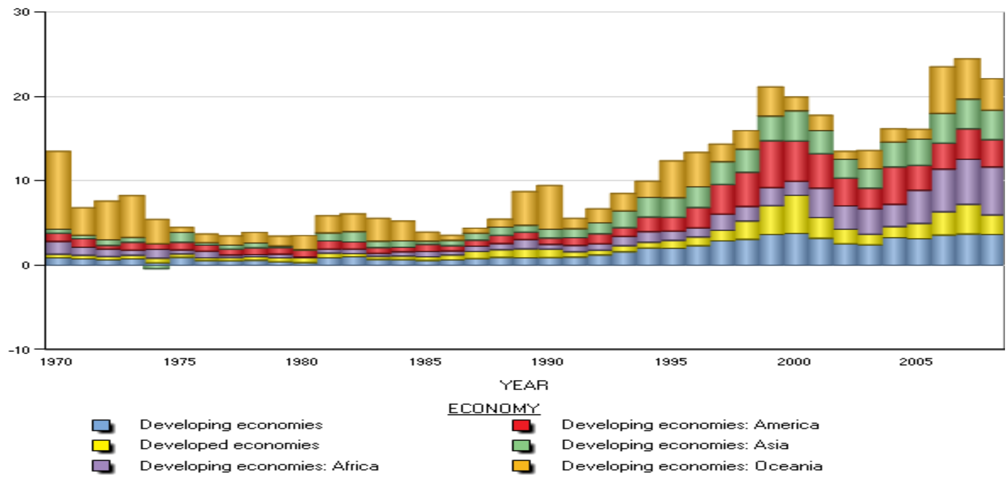
The annual amount of FDI inflows was $ 13.346 billion in 1970, while it was increased to $ 1,697.353 billion by 2008. Moreover, in 1970 the share of FDI inflows equalled only 0.50 percent of world gross domestic product (GDP), while in 2008 the share had increased to close to 2.78 percent. FDI inflows as a percentage of gross fixed capital formation equalled about 2.26 percent in 1970, while it increased to approximately 16.15 percent in 2007 (UNCTAD 2009). Figure 1 shows that developed countries still account for the largest share of FDI inflows, although FDI into developing countries has continuously increased for the period from 1970 to 2008. Figure 1 also shows that most recent inflows into developing countries have been targeted at Asian economies, as well as Latin American countries, followed by African countries. Figure 2 and Figure 3 show that FDI inflows have become increasingly important as a source of economic growth and investment in the world's economies. Thus, the greater the capital investment in an economy, the more favourable its future prospects, so that FDI can be seen as an important source of capital investment and a determinant of the future growth rate of an economy.

By comparing the ratio of FDI as a share of GDP and GFCF in developed and developing economies, the figures show that the significance of FDI has increased markedly in both groups. However, the fact is that the FDI/GDP and FDI/GFCF ratios are slightly higher in developing economies, as compared with the ratios in developed economies. This offers the greatest support for the idea that the importance of FDI to developing countries is greater, in spite of the fact that they received a far smaller share of FDI than the developed economies. The larger increase in the volume of FDI and the share of FDI offers a strong motivation for research on this phenomenon.



Sources: UNCTAD, World Investment Report 2009.

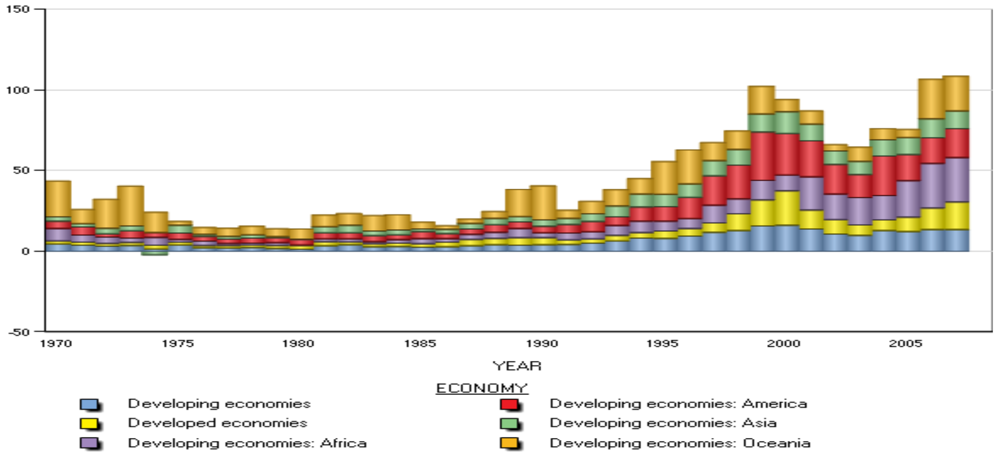
Figure 1: FDI inflows to the world economy (1970 to 2008)[1]



Sources: UNCTAD, World Investment Report 2009.

Figure 2: FDI inflows as a share of GDP (1970 to 2008)

[1] Foreign direct investment (FDI) is defined as an investment involving a long-term relationship and reflecting a lasting interest in and control by a resident entity in one economy of an enterprise resident in a different economy (UNCTAD, WIR 2009).



Sources: UNCTAD, World Investment Report 2009.

Figure 3: FDI inflows as a share of GFCF (1970 to 2007)

The growth in globalisation of capital flows suggests that the world economy is becoming increasingly interconnected as economic activities are extended globally. FDI can play a crucial role in economic growth in developing countries by generating more benefits to the host economies rather than filling the short-term capital deficiency problems. FDI can transfer technologies and its spillovers affect domestic firms, which may make them more competitive and of a higher standard to that necessary to compete with foreign firms and products. FDI can also bring positive externalities to the economy such as training and labour management opportunities from MNCs. These may then be made generally available in the economy, and lead to an increase in the standards of production. The UNCTAD (2008) reports that FDI inflows have the potential to create employment, increase productivity, transfer skills and technology, boost exports and continue the long-term economic growth and development of developing countries. FDI is also seen as the largest source of external financing for developing countries.

FDI is directly linked to the globalisation of capital inflows that provides the opportunities to integrate the domestic economy with the world economy. Growth literatures show that FDI is positively related to economic growth in the recipient countries (Balasubramanyam et al. 1996; De Mello 1997 and 1999; Borensztein et al. 1998). However, there are controversies as some empirical studies argue that the relationship between FDI and growth is non-linear. These findings make the relationship between FDI, DI and growth a complex issue.

MNCs invest in general across the world with the aim of maximising their profits. Thus, economies are offering the most suitable investment environment to MNCs to attract their investment. These offers include policy reforms, political stability, domestic growth related factors, increased domestic entrepreneurial skills, all factors that might cause growth in FDI in host countries. Borensztein et al. (1998), Campos and Kinoshita (2002), Chakraborty and Basu (2002), Elfakhani and Matar (2007), Frimpong and Oteng-Abayie (2006) and Chudnovsky and Lopez (2008) find that FDI alone has an insignificant impact on economic growth and the positive impact of FDI on economic growth is conditional on host country factors.

The relationship between FDI, DI and economic growth is one of the well studied subjects in the field of economic development. With the development of endogenous growth theory that was pioneered by Romer in his 1986's article, this relationship became more essential for long-run economic growth (Romer 1990; Barro and Sala-I-Martin 1995; Balasubramanyam et al. 1996; Borensztein et al. 1998; De Jager 2004). The research interest in this field has increased after the 1990s wave of globalisation, massively increased FDI across the globe and the growth of FDI in receiving countries.

Economic theory provides an explanation of the role played by FDI in accelerating economic growth in developing economies. Modern economic growth theories demonstrate that FDI plays a crucial role in transferring technological progress and in creating new ideas for determining economic growth rate (Grossman and Helpman 1994; Barro and Sala-I-Martin 1995). FDI is also seen as the most important channel in which advanced technologies can be transferred to developing economies (Findlay 1978; Blomstrom 1991). On the other hand, empirical literature on the growth effects of FDI provides mixed evidence. However, FDI literature offers four explanations to justify the controversy of the empirical evidence on the growth effects of FDI. Firstly, the growth effect of FDI depends on the host country absorptive capacity, such as the quality of human capital, the development of the financial sector, the technology gap, the development of infrastructure, etc. Thus, the recipient country needs to reach a minimum threshold of such absorptive capacity, before they can benefit from the growth effects of FDI (Borensztein et al. 1998; Campos and Kinoshita 2002; Chakraborty and Basu 2002; Frimpong and Oteng-Abayie 2006; Elfakhani and Matar 2007; Chudnovsky and Lopez 2008). Secondly, the types of FDI inflows are important in generating positive externalities to host countries. For example, Alfaro (2003) argues that the effect of FDI on economic growth relies on FDI operations. FDI contributes positively to economic growth, if FDI operates in the manufacturing sector, negatively in the primary sector and unclearly in the service sector. Thirdly, Razin (2003) points out that the effects of FDI on economic growth depends on the nature of foreign capital inflows into host country, such as FDI inflows, portfolio investment and loans inflows. Lastly, Agosin and Mayer (2000) argue that FDI in the form of mergers and acquisitions (M&As) leads, in some way, to transfer the existing assets from domestic to foreign investors. FDI, therefore, has not contributed to accumulation of capital formation, and subsequently economic growth of the host economy. Thus, it is interesting to see how FDI has contributed to the economic growth and domestic investment in developing countries. This thesis investigates different aspects of the relationship between FDI, domestic investment and economic growth at the macroeconomic level using aggregated data for FDI. The choice of this topic is to allow for the opportunity of finding results that can offer knowledge about the nature of this relationship, which may help policy makers of the host country make suitable decisions.

1.2. Thesis Aim

The main aim of this thesis is that investigates and studies the effect of FDI and other foreign capital inflows on economic growth and domestic investment in the receiving economies. This thesis also attempts to offer a better understanding of the relationships between FDI, DI and economic growth, taking into account the influence of the host country's absorptive capacity, and different types of foreign capital inflows. The main purpose of this thesis is to empirically examine the implications of the relationship and complementarity between FDI and DI, and the contribution of these factors to economic growth.

1.3. Methodology and Research Questions

The methodology of this thesis is empirical; so that there are different complicated econometric models have been used to evaluate the effect of foreign capital inflows on economic growth in receiving economies, based on the analysis of data collected from international organisations such as the World Bank, the UNCTAD, the IMF, the UNESCO, and the Fraser Institution (EFW).

To achieve the aim of this thesis and to examine it empirically, this thesis attempts to find an answer for one main research question, which is whether and how foreign capital inflows affect economic growth in the host countries, and how this effect is significant in developing countries. This question is broken down into four specific questions related to each empirical chapter as follows:

First empirical chapter (chapter 3) attempts to find an answer to these two questions: (a) does FDI contribute positively to economic growth, and (b) does it really crowd out DI in the host countries. Generally, this chapter aims to investigate empirically the relationships between FDI, DI and economic growth in the short- and long-run. To gain the aim of this chapter and to answer those two questions in context of developing countries, we will build a dynamic model consist of three equations, using three endogenous variables FDI, DI and GDP. To get more robustness results, this chapter will apply two methods, time-series cointegration techniques of Johansen and panel-data cointegration techniques in three top receiving countries selected from three different regions (top-three from Asian, top-three from African and top-three from Latin American countries)[2] for the period from 1970 to 2005. The rational for using modern cointegration techniques is that it can reflect the lagged changes, first differences and the level of variables in the system, which enables the enlightening of the short- and long-run effects, and the feedback that might be existed between endogenous variables, which ignored in existing empirical studies. The rational for selecting the top receiving economies from different regions is to test the hypothesis of this chapter in most successful developing countries in attracting FDI with different development stages and different production functions. Based on the results of this chapter (chapter 3), if FDI inflows have significant positive or insignificant impact on economic growth, then the question raised is that what have host countries to do to get the most benefits form attracting FDI inflows. This will investigate empirically in the next empirical chapter (chapter 4).

Second empirical chapter (chapter 4) attempts to find an answer to this question: does FDI contribute positively to economic growth alone or does it depend on the host country conditions. Following the contributions of Romer (1990), to test the hypothesis of this chapter, the regression model seeks to express the economic growth (real GDP per capita growth rate)

[2] Countries in the sample are that China, Korea, India, Egypt, Morocco, Tunisia, Argentina, Brazil and Mexico.

as a function of external and internal resources. External resource can be the share of foreign direct investment (FDI) to GDP (FDI/GDP), while the internal resources can be broken up into seven components: the domestic investment (DI) (GFCF/GDP), the human capital (the ratio of gross secondary school enrolment; HC), the technology gap between home and host country (TG), infrastructure development (IFR), financial market development (MS) as a share of GDP, trade openness (DOP) as exports plus imports as a share of GDP, and institution equality (EFW). Since the estimate of the effect of FDI on economic growth might be depend on the range of other explanatory variables taken into account, the regression model also includes some policy variables to judge the robustness of the coefficient estimates, such as initial GDP per capita, inflation rate (IFL), government size (GS), and black market premium (BMP). The regression model also includes the multiplication of FDI by the host country conditions (ABS*FDI) to test the hypothesis that the impact of FDI on economic growth is conditional to the host country's absorptive capacity. Therefore, the term "ABS" includes HC, TG, IFR, MS, DOP and EFW variables.

This chapter will apply panel-data techniques in selected sample from developing countries[3] for the period from 1970 to 2005. The Hausman test is conducted to choose between the random effect and fixed effect models. General method of moments (GMM) estimations will be also carrying out in this chapter for its power and efficiency over random effect or fixed effect models. Panel data is the mean of pooling of observations on a cross-section of countries over a number of time periods (Baltagi, 2005). The rational for using panel-data techniques is that it can control for individual heterogeneity, which is not controlled by using time-series or cross section studies that may biased results. Panel-data offers more informative data, more variability, less collinearity among the variables, more degree of freedom and more efficiency than in time-series or cross section studies (Baltagi, 2005). To get more robustness results, the sensitivity of growth regression model is checked by expanding the sample size depending on the availability of data on the most developing countries, changing the time period and removing the observations outlier using Cooks' D.

[3] Countries in the sample are that Angola, Cameroon, Congo Dem. Rep, Egypt, Madagascar, Morocco, South Africa, Tunisia, China, India, Korea, Malaysia, Pakistan, Thailand, Turkey, Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Peru and Venezuela.

Based on the results of first and second empirical chapters, if FDI contributes positively to economic growth, FDI crowds-in DI, and DI contributes positively to economic growth. It can be argue that FDI can contribute to economic growth indirectly via domestic investment channel. Therefore, third empirical chapter (chapter 5) attempts to find an answer to this question: how does foreign capital inflow affect economic growth in the host country via domestic investment channel. This chapter examines the indirect effect not only FDI but also other foreign capital inflows (portfolio investment and loans inflows) on economic growth, which works via domestic investment channel. To empirically test this effect one needs to apply an econometric model that allows for capturing the interrelationships that exist between FDI, other foreign capital inflows, DI, and economic growth. Therefore, this chapter utilises a basic econometric model that consists of a series of two main equations describing the behaviour of these variables. The simultaneous system consists of two equations, one for economic growth equation and another equation for domestic investment. The seemingly unrelated regression (SUR)[4] and three stage least squire (3SLS) are popular methods to estimate simultaneous equation system that because they can offer consistent, efficient and confident results. 3SLS method is preferred because it deals with the endogeneity problem that may exist between endogenous variables such as FDI, other foreign capital inflows, DI and economic growth, and the endogeneity issue in the system when some of the explanatory variables correlated with the disturbance terms of corresponding equation. This chapter will apply cross-country data techniques in selected sample from the majority of developing countries (31 developing economies)[5] depending on the availability of data over the period from 1980 to 2005. The cross-section country techniques are widely used in economic literature that because it can be done relatively quickly as the research data is all gathered at one specific point of time, and it easy to done.

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[4] Borensztein et al. (1998) also used the SUR technique based on panel-data and cross-section regressions for simultaneous system equation consist of two equations (economic growth and domestic investment equations). They tested the hypothesis that the effect of FDI is dependent on the host country condition (human capital development), and FDI is crowding-out domestic investment in the host countries.

[5] Due to a lack of complete data for all developing countries, especially for portfolio investment data, the countries in the sample are that Egypt, Tunisia, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Panama, Uruguay, Venezuela, Turkey, China, Indonesia, Malaysia, Philippines, Thailand, Bangladesh, Pakistan, Benin, Botswana, Cameroon, Cote d'Ivoire, Senegal, Swaziland, Togo and Zimbabwe.

1.4. Thesis Structure

To achieve the aim and to examine the argument of this thesis, it is designed to include six chapters. Chapter one is an introduction, and chapter two presents a background of economic literature on the relationship between FDI, DI and economic growth. Chapter two also provides a brief review of the theoretical and empirical background on the interrelationship between those variables to reach a better understanding of the contributions of FDI and DI to economic growth in the host countries. Chapter three is the first empirical chapter, titled as "*The Relationship between FDI, DI and GDP: Empirical Evidence from Cointegration Time Series Techniques*". This chapter studies empirically the relationship between FDI, economic growth and DI. This chapter contributes to existing literature by applying a multivariate VAR system with the error correction model (ECM) using time series and panel data techniques of cointegration to investigate the links between FDI, DI and GDP in country by country analysis. The chapter also investigates directly the long-run and short-run dynamic interaction between FDI, DI and GDP to address some of the drawbacks of the empirical literature. And thus to gain better understanding of the relevance of interrelationship between those variables in developing countries, offering insight into the extensively doubtful FDI-GDP relationship. The evidence and findings of this chapter will be used to construct the argument of the other empirical chapters. Chapter four is the second empirical chapter, titled as "*The Impact of the Host Country's Absorptive Capacity on the FDI/Growth Relationship*". This chapter investigates empirically whether FDI contributes to economic growth alone or does it depend on the host country conditions. This chapter identifies and fills the gaps in the literature on this topic by analysing the absorptive capacity and the growth impact of FDI in the panel country data. The majority of previous empirical studies focus on the interaction between FDI and one of the host country's characteristics, such as human capital development, institutional quality, financial market development, technology gap, trade openness or infrastructure development. Thus, this chapter examines the impacts of all of these factors simultaneously on the FDI-growth relationship. This examination can help in explaining the failure of previous studies in finding a significant impact of FDI on economic growth in the host economies. Chapter five is the third empirical chapter, titled as "*Foreign Capital, Domestic Investment and Economic Growth: The growth-enhancing role of FDI and other types of foreign capital in developing countries*". This chapter tests whether FDI and other foreign capital inflows affect economic growth through DI, i.e. investigating whether FDI, portfolio investment, and loans inflows have positive contributions to economic growth that works via enhancing DI in the receiving economies. Chapter five will assess the significance of this channel in affecting economic growth indirectly. Chapter six concludes this thesis by highlighting the main results and presenting their academic contributions and policy implications.

2. The literature review on the impact of FDI on economic growth in the host country

2.1. Introduction

Since the 1980s, foreign direct investment inflow (FDI) has grown significantly in most developing countries. This is because many developing countries have made extensive policies aimed at reducing FDI barriers and offering tax incentives and subsidies to attract it. The overall theory is that FDI inflow enhances and sustains economic growth in the host country (Herzer et al. 2008). Therefore, this chapter focuses on how and to what extent FDI affects domestic investment (DI) and economic growth in the host countries. And on how and to what extent these variables affect the host country's FDI inflows attracting ability. However, this chapter will assess the effects of FDI on DI and economic growth. This will be achieved by focusing on recent economic growth theories and related empirical studies. They will provide the explanation for how the channels of FDI inflows affect economic growth in the host countries.

2.2. The Impacts of FDI on Economic Growth in the Host Country

Growth theory provides a theoretical opportunity to observe and interpret economic growth in the global economy. Growth theory is a means of understanding the factors that induce economic growth within a country through providing models, mechanisms, explanations and a predictive framework. Many theoretical and empirical attempts have identified the factors that can enhance economic growth and performance in order to provide suggestions for policymakers to fill the gap between developed and developing countries, and to create sustainable development (De Jager 2004). Therefore, this section is focused on the growth theories, namely the exogenous growth theory and the endogenous growth theory. These closely explore the recent developments in economic growth theories, and investigate the crucial key drivers of economic growth in the short-run and in the long-run, and how they work.

2.2.1. *Exogenous Growth Theory*

The exogenous growth theory, commonly known as the neo-classical growth model or Solow-Swan growth model, was pioneered by Solow (1956). This theory assumes that economic growth is generated through exogenous factors of production functions such as the stock of capital accumulation and labour. Barro and Sala-I-Martin (1995) demonstrate that there is a positive relationship between economic growth and capital accumulation over time.

According to this theory, an increase in the stock of investment accumulation will result in an increase in growth assuming that the amount of labour and the level of technology remain constant (Barro and Sala-I-Martin 1995; De Jager 2004). Therefore, economic growth is affected only in the short-run, determined by the stock of capital accumulation, which is determined by the saving rate and the rate of capital depreciation. On the other hand, economic growth is determined by exogenous factors such as technological progress, which takes the form of labour augmentation, in the long-run (Barro and Sala-I-Martin 1995). So, the growth of the economy depends on the stock of capital accumulation and the augmentation of labour force by technological progress. As a result, if new FDI introduced technology leads to increased labour and capital stock productivity this will lead further to more consistent returns of investment, and labour will grow exogenously (De Jager 2004). In general, this theory argues that FDI enhances the capital stock in the host country. And then promotes economic growth towards a new steady state by this accumulation of capital formation. The argument of exogenous growth theory is that FDI affects economic growth in the short-run through diminishing returns to capital; hence FDI promotes economic growth through raising domestic investment (DI) (Herzer et al. 2008).

The main limitations of this theory are that it considers labour as human capital or knowledge. Economically, labour is a human capital because knowledge accumulates within a firm and is stored within the system of firms. Additionally, this theory does not sufficiently explain production and the diffusion of technology, knowledge and the information that becomes gradually apparent in economic analysis (Ho et al. 2007). Also this theory does not provide the economic explanation about long-run growth and technological progress. It does however include a time trend to reflect technical progress in the long-run rate of economic growth (Barro and Sala-I-Martin 1995; De Jager 2004).

2.2.2. *Endogenous Growth Theory*

In the mid-1980s, the exogenous growth theory became theoretically unsatisfactory in explaining the determinants of long-run growth (Barro and Sala-I-Martin 1995). Therefore, endogenous growth theory was pioneered by Romer in his 1986's article, which concentrated on two factors. Economic growth is derived from the stock of human capital and then from technological changes (De Jager 2004). The mechanism of this theory regarding the stock of human capital is that labour grows as a share of population. This means that growth is promoted exogenously at constant rate. Afterward, this growth is stimulated by a labour augmenting technology multiplier, which means that this growth is promoted endogenously through labour augmenting technological change (De Jager 2004). However, the main feature of this theory is the absence of diminishing returns to capital (Ho et al. 2007). Therefore, technological progress in the form of the generation of new ideas is a crucial factor in passing to diminishing returns to capital in the long-run. The theory argues that technological progress is improved endogenously by taking knowledge from research and development (as an example) (R&D) and that the development of this knowledge can create positive externalities and positive growth spillover effects (Barro and Sala-I-Martin 1995; Ho et al. 2007). As a result, R&D, human capital accumulation and spillovers are considered as determinants of long-run economic growth (Meyer 2003). Spillover effects occur as knowledge generated by R&D in one country creates positive effects in other countries (De Mello 1997).

Endogenous growth theory identifies economic growth as promoted in the long- run by the introduction of new technological production processes in the host country, and that the FDI is assumed to be more productive than DI (De Mello 1999; Herzer et al. 2008). Thus, FDI enhances economic growth through technological spillovers. These offset the diminishing capital return effects by boosting the present stock of knowledge through labour mobility, training and skills, and through managerial skills and organizational arrangements (Romer 1990; Barro and Sala-I-Martin 1995; De Jager 2004). Moreover, FDI is expected to enhance the existing stock of knowledge in the recipient economy, through labour training and skill acquisition and technology diffusion; and also through the introduction of alternative management practices and organisational arrangements. Overall, the existence of various form of externality prevents the unrestrained decline of the marginal productivity of capital. As a result, foreign investors may increase productivity in the host economy and then FDI can be considered as a catalyst of DI and technological progress. Also, the most important mechanism through which FDI promotes growth in the host country is expected to be the FDI's externality effect's great potential (De Mello 1997; Borensztein et al. 1998). Thus, economic growth can increase unlimitedly over time (De Jager 2004). Although, the greatest limitation of this theory is that its invalid predictive ability in growth convergence to allow for the heterogeneity of economies and their different growth patterns (Ho et al. 2007).

Theoretically, FDI can promote economic growth in several ways (Herzer et al. 2008). Some investigators argue that the effects of FDI on economic growth are expected to be twofold (De Mello 1999; Kim and Seo 2003). Firstly, FDI can affect economic growth through capital accumulation by introducing new goods and foreign technology. This view comes from exogenous growth theory view. Secondly, FDI can enhance economic growth through augmenting a stock of knowledge in the host country by knowledge transfer. This view comes from the viewpoint of endogenous growth theory. Therefore, FDI, theoretically, can play a crucial role in economic growth through raising capital accumulation and technological spillovers or progress (Herzer et al. 2008).

Figure **4** may be applicable in simplistically interpreting the relationships between FDI, DI and economic growth and the direct and indirect effects of FDI inflow on economic growth. This figure shows the circular flow of the dynamic relationships between FDI, DI and economic growth. As can be seen, there are three channels for FDI affecting economic growth:

1. FDI can affect economic growth directly through an investment channel (I).
2. FDI can affect economic growth indirectly through influencing DI (III^* + II^*, crowding-in effect).
3. FDI can also affect economic growth indirectly through enhancing technological progress in the host country by generating positive externality (III + IV^*, spillover effect) or by crowding-in DI through the linkage effect (III^* + IV+IV^*).

In fact, the figure also shows the causal relationship between FDI, DI and economic growth. The channel (I + I^*) demonstrates the causal relationship between FDI and economic growth.

In addition, the channel (II^{**}+ II^{*}) illustrates the dynamic relationship between DI and economic growth. The causal relationship between FDI and DI can also appear in the channel (III^{*}+ III^{**}).

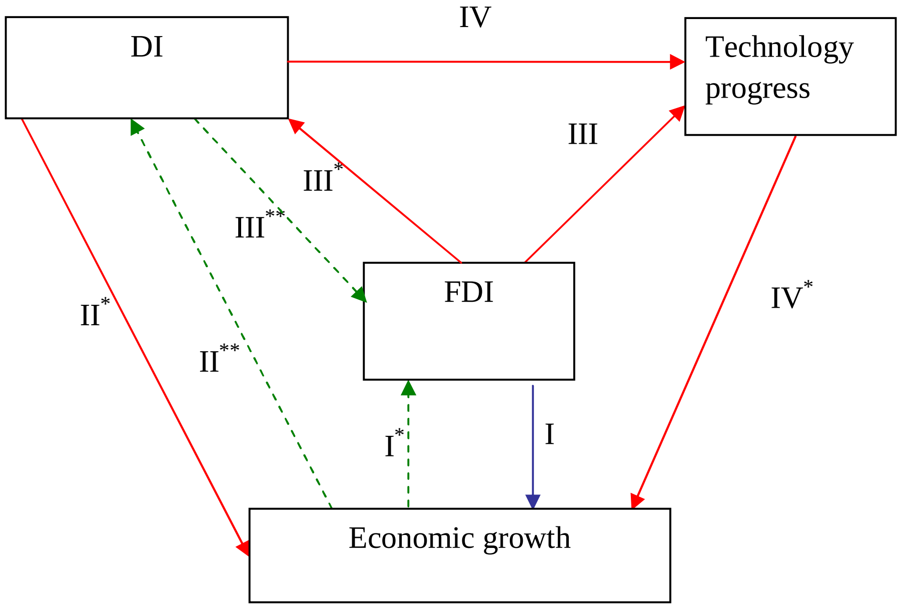

Figure 4: The circular flow of the dynamic relationship between FDI, GDP and DI[6]

This figure also highlights four hypotheses, which will be detailed and considered in the following subsections. These hypotheses are the hypothesis of *FDI-led* growth, the hypothesis of *Crowding-out or in* DI, the hypothesis of *Growth-driven* FDI, and the hypothesis of *causality*.

2.3. The Direct Impact of FDI on Economic Growth

In recent years, FDIs by MNCs are playing an increasingly vital role in capital accumulation and economic growth in developing countries. FDIs are known as a composite bundle of capital stock, know-how and technology (De Mello 1997). FDI inflows might increase

[6] Source: Changyuan, L. (2007), “FDI, domestic capital and economic growth: Evidence from panel data at China’s provincial level”, *World Economic Papers*, 4: 27-43.

economic growth by enhancing domestic saving, then increasing capital accumulation in the host economies. De Mello (1997) adds that FDI enhances growth through capital accumulation by

- Introducing new inputs.
- Using a wider variety of intermediate goods in FDI-related production and technologies.
- Importing high-technology products, adoption of foreign technology and acquisition of human capital (Borensztein et al. 1998), in the production function of the host country.

Therefore, FDI is expected to contribute directly to economic growth by expanding the capital stock of the host economy. Although, the capital accumulation can affect economic growth only in the short-run as exogenous growth theory argued. But long-run growth can be achieved by a permanent increase in the level of technology, taken to be exogenous in this theory (Colen et al. 2008). However, endogenous growth theory considers technology to be endogenous and observes the role of capital investment in the creation of technological advances and advances in know-how. FDI is thought to be the most important channel for access to advanced technology (Borensztein et al. 1998). These shocks can create permanent progress in the level of the technology that leads to long-run growth promotion (Colen et al. 2008).

FDI, in some particular prevailing beliefs, is considered more important than domestic investment and other capital flows for growth. FDI is defined as a whole package of resources such as physical capital, modern technology and production techniques, managerial and market knowledge. These utilities tend to spillover to domestic enterprises in the host country. Thus, FDI would contribute directly and more strongly than domestic investment in accelerating the level of growth in the host economy. This is because FDI has a more advanced level of technology, managerial capacity and know-how that result in higher levels of efficiency and productivity (Colen et al. 2008). Yet, some scholars argue that the hypothesis of foreign firms being more efficient than domestic firms is inaccurate. For example, Mutenyo (2008) investigates the impact of FDI on economic growth in 32 Sub-Saharan African countries by applying cross-section and dynamic panel data for the period from 1990 to 2003. He finds consistent result that FDI has a positive impact on economic growth, yet it is less efficient that domestic investment. Krugman (2000, P. 45-55) quotes that:

> *If domestic firms can borrow with implicit guarantees, they will be willing to pay higher prices than foreign owners despite their lower expected returns. As a result, foreign firms will be crowded out of the domestic market. In terms of the balance of payments ...domestic firms raise capital directly or indirectly by borrowing abroad….when the regime of government guarantees founders, the result will be a transfer of ownership to the more efficient foreign firms….. It will therefore, be in a position to buy the project ……. a transfer of ownership to a foreign firm that is less efficient than the domestic firm, which is an efficient move from the world's point of view.*

This hypothesis can be true when FDI takes the form of M&As[7]. Here, FDI inflow might not constantly be accompanied by improved technologies, managerial capacity and organizational arrangement. This is because foreign firms have a superior cash position and liquidity advantages over domestic firms. Borensztein et al. (1998) address foreign firm’s decisions to invest abroad. They should go beyond the advantages enjoyed by domestic firms, for example, the best knowledge and access to a domestic market, to enjoy lower costs and relatively higher productive efficiency.

Despite the positive benefits of FDI inflows in the host economies in terms of FDI theories, empirical literatures have not predictably concluded a significant activist impact of FDI on economic growth of host economies (Campos and Kinoshita 2002). Herzer et al. (2008) point out that the positive impact of FDI on economic growth is not acknowledged precisely. In spite of the mixed views, Lim (2001), and Hansen and Rand (2006) show that the empirical

[7] M&As are representing a change of ownership of existing assets. Thus, M&As do not contribute to a host country’s capital formation at the moment of entry. This is because of M&As are not investment in new productive assets, they may lead to investment in the future through sequential investment. Moreover, M&As appear to be a dominant component of FDI inflows in developed countries, while, at least until recently, Greenfield projects were the dominant mode of entry of TNCs into developing countries (UNCTAD, 1999).

evidence generally suggests that FDI has a positive effect on economic growth for developing countries.

However, empirical studies can be classified into two broad types. First, studies examining the role of FDI at macro/aggregate level, which are related to real GDP or GDP per capita with FDI inflows or inward FDI stocks along with other relative interactive variables. Second, studies that offers evidence on the role of FDI on productivity growth or spillovers of productivity at industry/sector level or at a firm level.

2.3.1. *Macro-Economic Studies on the Overall FDI-Led Growth Hypothesis*

Macro-economic level studies confirm the effect of FDI on economic growth. These studies used aggregate FDI flows for a *cross-section of countries.* And they establish that FDI inflows contribute positively to economic growth in the host economy (Balasubramanyam et al. 1996), relying on particular conditions, such as the level of income, human capital development, the degree of openness, financial development, infrastructure development, and institution development (Blomstrom et al. 1992; Borensztein et al. 1998; Makki and Somwaru 2004; Chowdhury and Mavrotas 2006; Colen et al. 2008).

For example, the impact of FDI may perhaps be higher in export promoting (EP) countries than in import substituting (IS) countries. Following Bhagwati (1978), Balasubramanyam et al. (1996), investigated the role of FDI inflow in the economic growth process. This was for 46 developing countries and tested the hypothesis that outwardly and inwardly oriented trade policies have significant consequences in attracting FDI inflow and in the impact of FDI on economic growth. They found that the countries that adopt IS are likely to be less attractive to FDI inflow. And the impact of FDI on economic growth is not as great. In contrast the countries that adopted EP are probably highly attractive for FDI and the influences of FDI are larger than the effects of DI on economic growth. They point out that since openness is crucial in determining the effect of FDI on economic growth and efficiency, more honest countries benefit more. According to Alfaro et al. (2004), the impact of FDI on economic growth is favourable for countries that have excellently developed financial markets. Another study by Alfaro (2003) argues that the effect of FDI on economic growth relies on the FDI operations. FDI contributes positively to economic growth, if FDI operates in the manufacturing sector, negatively in the primary sector and unclearly in the service sector. Razin (2003) argues that the effects of FDI on economic growth depend on the nature of foreign capital inflows into the host country, and the degree of development in the host country. Agosin and Mayer (2000) illustrate that FDI in the form of mergers and acquisitions (M&As) leads, in some way, to the transference of the existing assets from domestic to foreign investors. FDI, therefore, has not contributed to the accumulation of capital formation, and subsequently to economic growth of the host economy. Blomstrom et al. (1992), for 78 developing countries, found that FDI has to be beneficial to high-income developing countries rather than low-income developing countries. Thus, the host country should have a certain threshold level of development to absorb the benefits of FDI.

A study by Borensztein et al. (1998), on one hand, tested the effect of FDI on economic growth for 69 developing countries over two periods (1970-1979 and 1980-1989), based on the endogenous growth model. The results show that FDI is economic growth enhancing if the country has a high level of human capital development exceeding a given threshold. They argue that the impact of FDI depends on the level of human capital development in the host country, and that FDI contributes relatively more to growth than DI. On the other hand, Makki and Somwaru (2004) found that FDI and the interaction of FDI with trade openness, made a positive impression on economic growth for 66 developing countries over three periods (1971-1980, 1981-1990, and 1991-2000).

Certainly, cross-country techniques may be making the effects of FDI on economic growth different between studies, because the production functions, such as technological techniques, are absolutely different from one country to another. Statistically, cross-country studies may suffer from serious endogeneity problems and unobserved heterogeneity. Theoretically, rapid economic growth usually produces higher demand and enhanced returns prospects for FDI. The positive impact of FDI is outcome of positive correlation between them and may be accompanied by causality between growth and FDI (Nair-Reichert and Weinhold 2001).

Other types of studies apply *traditional panel techniques*. Panel data techniques are used to escape the problems associated with cross-country studies, such as unobserved country-specific effects. This is done by controlling the endogeneity problem by including lagged explanatory variables in regression equations, and allowing for testing the Granger causality

(Herzer et al. 2008). For instance, Nair-Reichert and Weinhold (2001), for 24 developing countries over the period (1971-1995), found that FDI has had a positive impact on economic growth. Carkovic and Levine (2002), for 68 countries over seven 5-year periods (1960-1995), found that FDI does not exert a positive impact on economic growth.

Changyuan (2007) examined the direct and indirect effects of FDI on economic growth in the 29 mainland provinces in China for the period 1987-2001, based on the neo-classical model. The findings indicate that FDI and private investment have no direct effect on economic growth, but state-owned investment has a direct effect on economic growth. The findings also clarify that FDI significantly increases the total factor productivity (TFP) and both private and state-owned investment have no significant effect on TFP. In particular, FDI has a positive effect on economic growth not through its direct effects but through its indirect effects by affecting technological progress and DI.

The problems associated with traditional panel data studies are that; the regression is subjected to the unrealistic homogeneity conditions on coefficients of the lagged dependent variables; the standard cross-country and panel studies on FDI and growth may restrict the relationship between these variables to those in growth rates or first differences; and using first differences and/or growth rates without allowing for the level of relationship may lead to serious misspecification problems (Hansen and Rand 2006).

According to cointegration panel studies, they used these techniques to avoid the criticisms of traditional panel data estimators. Panel cointegration techniques can allow for country level, time-fixed effects, and country-specific cointegration vectors (Herzer et al. 2008). Basu et al. (2003), for 23 developing countries over the period (1978-1996), found there is a cointegration relationship between FDI and economic growth. Also that there is a bi-directional causality between these two variables in the open economies, and uni-directional causality, mainly the causality runs from GDP to FDI in the closed economies. Their results imply that FDI and GDP are not reinforcing under restrictive trade regimes.

Similarly, Hansen and Rand (2006), for 31 developing countries over the period (1970-2000), found that there is a cointegration relationship between FDI and GDP, and between the ratio of FDI to gross capital formation (DI) and GDP. Their findings indicate that FDI inflows have a positive impact on GDP, whereas GDP has no long-run effect on FDI. Additionally, the ratio of FDI to DI has positive consequences on GDP. Their results imply that FDI enhances economic growth through knowledge transfer and implementation of new technologies.

In spite of the advantages of modern panel cointegration techniques, the heterogeneity problems remain a serious concern. The refusal of the null hypothesis (that there is no panel cointegration) may be driven by a few cointegration relationships between variables. In addition, assuming the whole panel is cointegrated can create high risks if only a small fraction of the relationships in the panel are actually cointegrated (Herzer et al. 2008). Thus, applying cointegration techniques if there is a mix of cointegration and non-cointegration relationships between variables, may lead to serious prejudices in determining causality as well as the short-run and long-run coefficients.

Eventually, in order to avoid the problems associated with using modern panel cointegration techniques, numerous studies applied time series for individual countries. These studies usually apply *time series analysis or time series cointegration techniques* to illustrate the causality between FDI and economic growth for country-by-country studies (Ramirez 2000).

For example, Bouoiyour (2003) examines the determining factors of FDI in Morocco, using annual data by applying an econometric model for the period from 1960 to 2003. He argues that the instability of Moroccan economy growth leads to obstacles in attracting FDI inflows. Adewumi (2006) examines the contribution of FDI to economic growth in Africa using annual series, by applying time series regression analysis for the period from 1970 to 2003. He finds that FDI contributes positively to economic growth in most of the countries but it is not of statistical significance. Adewumi argues that the impact of FDI on economic growth is through its contributions to other factors in the economy; however, its impact cannot be measured directly. In addition, he expected that the negative impact of FDI on the economic growth was due to the methodology used with a low sample size. Additionally, FDI inflow to Africa is relatively small and this may lead to its contributions as being relatively slight. Besides, the impact of FDI on the economic growth may need a considerable time to be achieved. This is especially so if FDI operates in the non-oil sectors where the profits can take a considerable time to be obtained.

Herzer et al. (2008) apply time series techniques over the period (1970-2003) for 28 developing countries (10 countries from Latin America; 9 countries from Asia; 9 countries from Africa). They find weak evidence that FDI enhances either long-run or short-run economic growth (GDP). Also their findings indicate that there is unclear evidence that the impact of FDI on growth (GDP) depends on the level of per capita income, the level of education, the degree of openness and the level of financial market development in the host country.

Despite these results, the majority of time series studies, applying modern cointegration techniques developed by Johansen (1988; 1991; 1995) and Johansen and Juselius (1990), may tend to falsely reject the null hypothesis of no cointegration in the small samples (Tang et al. 2008). Thus, the cointegration and the causality between variables are unsupported by the data. And the validity of the findings of these studies, which do not suffer from small samples, may be biased and this needs to be examined (Borensztein et al. 1998; De Mello 1999).

2.3.2. *Micro-Economic Studies on the Technology Advances in FDI Firms*

These types of studies used micro-economic data in the industry/sector level or at a firm level. These studies tested the hypothesis of FDI firms being technologically more advanced and more productive than domestic firms (Colen et al. 2008).

For example, Aitken and Harrison (1999) applied panel data on Venezuelan plants, finding that foreign equity participation is positively associated with plant productivity; yet, this relationship is only robust for small enterprises. Lall (1978) points out that some crucial factors need to be taken into account regarding findings that indicate that FDI firms are more efficient than domestic firms. For example, firm size, the technology used, and market conditions. Lall (1978) postulated this comment on the study by Vaitsos (1976) who found that FDI firms have higher labour productivity than domestic firms, because FDI firms use more advanced technology, scale economies or better management (Lall 1978).

A study by Smarzynska (2004), based on firm-level panel data from Lithuania, found that the productivity of domestic firms is positively correlated with the degree of potential contacts with multinational customers. But not correlated with the presence of FDI firms in the same industry or the existence of multinational suppliers of intermediate inputs. Haddad and

Harrison (1993), based on firm-level data from the Moroccan manufacturing sector, found that the hypothesis of a foreign presence accelerating productivity growth in domestic firms can be rejected.

Aitken and Harrison (1999), Konings (2001), Gorg and Greenaway (2003), and Herzer et al. (2008) argue that FDI firms can affect domestic firms negatively through competition effect, which lead to reduce the productivity of domestic firms. MNCs have some firm-specific advantages over domestic firms that moves up the cost curve of domestic firms. And this change allows FDI firms to take away the demand from domestic firms forcing them to reduce or cut production.

Konings (2001) applies firm-level panel data from Bulgaria, Romania and Poland. He investigates the effects of FDI on the productivity performance of domestic firms. Konings finds that FDI firms perform better than domestic firms for Poland without foreign partnership, but not for Romania and Bulgaria. He argues that it may take time for ownership effects to affect performance, due to lags in re-establishing. Moreover, Gorg and Greenaway (2003), De Mello (1999) and Kim and Seo (2003) argue that MNCs may also have firm-specific knowledge advantages over domestic firms, and that domestic firms have underdeveloped production technology and low skill employees.

Djankov and Hoekman (2000), based on firm-level panel data from the Czech Republic, find that domestic firms with foreign ownership have higher total factor productivity (TFP) growth and higher labour productivity. This indicates that FDI firms have a positive impact on TFP growth of recipient firms, because FDI firms may tend to invest in firms with above-average productivity. In addition, this reflects the fact that joint ventures have higher TFP growth than firms without foreign partnerships.

According to Blomstrom and Sjoholm (1999), based on firm-level Indonesian data, found that foreign establishments have comparably high levels of labour productivity and the level of labour productivity is unaffected by the degree of foreign ownership. This indicates that FDI firms have a wide range of technologies to choose from when they invest abroad. And that they will match their technology transfer to the competitive situation and other conditions in the host economy.

2.4. The Indirect Impact of FDI on Economic Growth

Various developing economies have been offered special treatment by foreign enterprises. The rational is stemming from the belief that FDI creates externalities in the form of technology transfer (Aitken and Harrison 1999). The countries that invited MNCs may understand the need to access technologies that cannot be produced by domestic firms (Blomstrom and Kokko 1998). Overall, these benefits are confined to spillovers (Blomstrom 1991). Notwithstanding that, the advantages of FDI do not accumulate automatically and evenly across countries, sectors and local communities (OECD 2002).

FDI is particularly foremost because it is seen as a package of tangible (capital accumulation; physical and human, and technology advances) and intangible (technological augmentation, organizational arrangement, and skill acquisition and know-how) assets (De Mello 1999; Ajayi 2006). These assets may not only accelerate productivity and growth from within the newly-entered MNCs, but may additionally spillover to other firms in the host country. And furthermore cause welfare economic growth in these countries through indirect or spillovers effects (Colen et al. 2008).

FDI is considered as the primary channel through which technological transfer occurs. The subsequent effect of FDI on domestic economic growth depends on the diffusion of best practice through the local economy at large (Ajayi 2006). There are different forms of spillover effects that can be produced by MNCs and different channels through which they take place.

The one motivating force behind attracting MNCs and associated FDI on the host economy is the boost of the domestic firm’s productivity. This is correlated to the concept of productivity or technology, which embodies the fact that foreign enterprises own intangible assets, that can be passed on to domestic firms, improving their productivity level. Thus, productivity distribution is an issue of externalities, which are often referred to as productivity spillovers, from established foreign producers to domestic producers (Proenca et al. 2002). Blomstrom and Kokko (1998) argue that when MNCs set up affiliates outside the home country, they are different from the existing firms in the host economy for two reasons. The first reason is that MNCs bring to the host economy some aggregate of their proprietary technology. This technology constitutes their firm-specific advantage and allows them to compete successfully with other existing domestic firms that presumably have superior knowledge of domestic markets, consumer preferences, and business practices. The second reason is that the entry and presence of MNCs affiliates disturbs the existing equilibrium in the market and forces domestic firms to take action to protect their market shares and profits. These reasons may generate different types of spillovers.

One of these types is productivity spillovers. These take place when the entry of MNCs in the host economy leads to productivity or efficiency benefits in the domestic firms and the MNCs are not able to internalise the full value of these advantages. In addition, the productivity spillovers may take place when the entry of MNCs leads to more severe competition in the host economy, which forces domestic firms to use existing technology and resources more efficiently. This kind of spillover may take place if the entry of MNCs raises the competition that forces domestic firms to search for new and more efficient technologies (Blomstrom and Kokko 1998; Colen et al. 2008).

Market access spillovers take place when the entry of MNCs in the host economy leads to improved access to export markets for domestic firms (Colen et al. 2008). MNCs have better organised management that allows them to manage international marketing, distribution, and overall production more effectively than domestic firms, particularly those in developing countries. MNCs can provide both knowledge of international market conditions and access to foreign marketing and distribution networks to domestic firms. MNCs, also, are often larger than domestic firms and may be able to fund the high fixed costs for development of transport, communications, and financial services that are essential in encouraging export activities (Blomstrom and Kokko 1998).

Another type of spillover effects is horizontal spillovers. These take place when MNCs formulate horizontal direct investment to produce overseas the same lines of goods as they produce in the home economy (Caves 1971). The entry of MNCs leads to increased productivity that promotes other firms within the same sector to recover their performance and competitiveness by adapting new technologies or by renting trained workers and managers from FDI firms. Therefore, horizontal spillover effects may occur when domestic firms are unable to catch up with the augmented performance of other firms within the same sector. This action may force domestic firms to reduce their market shares (Stancik 2007). MNCs are not likely to give the source of their competitive advantage away at zero cost. They will hence strive to limit horizontal spillovers (intra-industry) of productivity and market access advantages to compete with domestic firms. Although, technology and knowledge are characterised by imperfect markets or known as public goods, thus, spillover of technology and knowledge or trained labour to domestic competitors cannot be completely prevented (Colen et al. 2008).

Ultimately, vertical spillovers (inter-industry) take place when MNCs formulate vertical direct investment to produce overseas a new good or with other inputs to their production process at host country as they produce at the home economy (Caves 1971). Firms from sectors other than that of FDI firms might be affected by its presence also if they are in direct business contact with it through forward and backward linkages. This includes firms that supply or provide services for FDI firms, and firms that are supplied by FDI firms. In general, MNCs desire higher standards from their suppliers, and the higher standards are provided by FDI firms to domestic firms, which would improve the domestic firms' efficiency and performance (Stancik 2007). MNCs tend to prevent the transfer of technologies to host country competitors; they are likely to optionally increase the efficiency of domestic suppliers or customers through vertical input-output linkages (Colen et al. 2008).

Markusen (1995) argues that horizontal FDI, which means the foreign production of products and services approximately similar to those the firm produces for its home market, is more vital quantitatively than vertical FDI. Vertical FDI means fragmenting the production process geographically, by stages of production. This is because most FDI in production facilities seems to be horizontal in the sense that most of the output of foreign production affiliates is sold in the foreign country. Similarly, Soreide (2001) points out that horizontal FDI is supposed to generate more positive spillovers than vertical FDI, especially when MNCs supply a local market in the host economy. The weaker vertical FDI spillovers are due to the aim of the MNCs to use cheap labour and export the goods. In addition, the outsourced production technology fits in with the existing capabilities of the local workers, instead of upgrading them.

Rodriguez-Clare (1996) illustrates that MNCs would affect the host economy through three important channels, which are the transfer of technology, the training of workers and the generation of linkages. However, empirical literature has suffered from the lack of identification of a formal concept of linkages. He formulates the concept of backward and forward linkages. There is assumed to be a mixture of inputs in the production of final goods, where domestic firms must purchase all of their inputs locally, and that the inputs are produced with increasing returns to scale. Through increasing demand for inputs, final-good firm help to make apparent a greater variety of specialised inputs, thus generating positive spillovers to other final-good producers.

Rodriguez-Clare (1996) postulates three assumptions in the context of generation of industrial linkages. First, a variety of specialised inputs enhances productivity; second, the proximity of supplier and user is necessary for the production of intermediate goods; third, the size of market limits the available variety of specialised inputs. Rodriguez-Clare shows that a positive linkage effect is present in an increase of intermediate goods production, when the MNCs have a higher linkage effect contrasted to domestic firms. In contrast to a negative linkage effect that might be present in a decrease in the productivity of domestic firms and a resulting decrease in wage levels.

UNCTAD (2001) report that the host country that seeks to reap the benefit of FDI in terms of sustainable economic development, would be able to create or improve production linkages between foreign affiliates and domestic firms. These linkages can take several forms, such as backward, forward or horizontal. Backward linkages take place when MNCs get hold of goods or services form domestic firms, and forward linkages when MNCs put to the market goods or services to domestic firms, while horizontal linkages are when MNCs interact with domestic firms engaged in competing activities. The report of UNCTAD (2001) also highlights the importance of backward linkages to domestic firms as well as foreign firms. The backward linkages of FDI are important for domestic firms because they can provide opportunities for production and employment by domestic suppliers. The importance of these linkages appears through the knowledge diffusion and skills that can assist in upgrading domestic suppliers, technological and managerial capabilities and market diversification, with spillover effects on the rest of the economy. However, these benefits depend on the markets in which MNCs operate, the incentives that they have, and on the capabilities of domestic firms. Furthermore, large MNCs can create risks for domestic suppliers in the form of anticompetitive practices, unequal bargaining positions and excessive dependence.

Productivity and market-access spillovers are in general complicated to distinguish empirically as they are set up through comparable externalities channels (Colen et al. 2008). Colen et al. (2008), following Gorg and Greenaway (2003) and Blomstrom and Kokko (1998), identify five channels through which spillover effects from FDI firms to domestic firms can take place. These spillovers can occur throughout imitation, acquisition of human capital, competition, crowding-in and export effects.

Imitation means the broadcast method for new products and processes by the copying of products, technologies and production process by domestic firms, regularly referred to as reverse-engineering (Gorg and Greenaway 2003; Colen et al. 2008). The imitation is dependent on the product or process complication in which FDI firms apply simple manufacturing products and processes. In addition, the managerial and organisational innovations might be easier to imitate. Yet, the advance technology applied by FDI firms might not be imitated if the domestic firms do not have a certain level of technical skills. The imitation can result in horizontal productivity spillovers and growth advances for the economy (Colen et al. 2008). Gorg and Greenaway (2003, P.3) quotes that

> *Any upgrading to local technology deriving from imitation could result in a spillover, with consequent benefits for the productivity of local firms.*

FDI can contribute to ***human capital formation*** through demanding and supplying skills (Colen et al. 2008). MNCs tend to invest in low wages developing countries. They are, however, likely to have a higher demand for relatively skilled labour in the host economy if they do not crowd out local demand for employment. They are also characterized by more skill-incentives than domestic firms (Gorg and Greenaway 2003; Colen et al. 2008).

MNCs may also affect the supply side of skills by investing in training and the development of human capital. MNCs would set up of research and development (R&D) or education centres to develop domestic skills for their high-tech industries or business education (Colen et al.

2008). MNCs, in general, will invest in training and it is unfeasible to secure such resources completely with the lack of bonded labour. This in turn will lead to generate productivity progress through the mobility of labour from FDI firms to domestic firms (Gorg and Greenaway 2003).

Colen et al. (2008) demonstrate that the motives of FDIs are crucial in determining the importance of worker training. For example, Natural resource FDI is usually intensive and requires the training of only a small number of high skilled labours. Efficiency seeking FDI is usually low-skilled, low-wage labour and the need of training is limited. Additionally, strategic-asset seeking FDI is very specific skills to relatively well-educated labour. Another type of motivation is market-seeking FDI, which would involve technological or marketing training of domestic labour to a limited extent.

This type of spillovers from the labour training and education investment would be horizontal or vertical. Horizontal spillovers take place through externalities or labour turnover. Labour that receives training at institutions supported by MNCs, may carry with them knowledge of new technology or new management techniques to domestic firms. However, this type of spillover may appear after a long-time. In contrast, vertical spillover effects through acquiring human capital would be more immediate. MNCs provide training to their domestic suppliers; such training and learning by downstream suppliers and upstream buyers may result in an immediate productivity gain (Colen et al. 2008).

Therefore, training can create spillover directly through complementary workers and indirectly through the workers that carry with them knowledge and skills that is achieved at support training by MNCs (Gorg and Greenaway 2003).

Another channel of spillover is ***competition*** and ***crowding in effects***. Domestic firms may experience ***competition spillovers*** from FDI at the time when MNCs set up their affiliates. Domestic firms that faced new or greater competition from FDI firms may have incentives for faster adoption of new technologies (Balsvik 2003). Domestic firms would be under pressure to use existing technology efficiencies or to invest in human capital, even if they are unable to imitate the MNC’s technology or production processes (Gorg and Greenaway 2003). Following Young (1993), Colen et al. (2008) argue that the innovations embodied in FDI would change and accumulations to old technologies, making domestic investment more productive. Additionally, the competition might increase the speed of adoption of new technology or the speed with which it is imitated (Gorg and Greenaway 2003).

A recent study by Chang and Xu (2008) used annual industrial survey database between 1998 and 2005 from Chinese industrial firms, finding that both spillover and competition effects from various groups of firms, whether foreign or domestic firms, affect firms in other groups in China, and the competition effects are more likely to outweigh spillover effects in regional markets than they are in national markets. In addition, the findings indicate that the competition effects are more likely to outweigh spillover effects among firms of similar resource types than they are among firms with distinct resource profiles.

Besides, greater competition may cause the crowding out of domestic firms and reduce domestic investment, resulting in reduced productivity of domestic firms. For instance, MNCs can reduce the market share of domestic firms by pushing up the average cost curves of domestic firms because MNCs have lower marginal costs due to some firm-specific advantages. This effect can offset the positive productivity spillover effects of increased competition (Aitken and Harrison 1999; Balsvik 2003; Colen et al. 2008).

The ***crowding-in effects*** are commonly known as the hypothesis of *Crowding-out/in effect of FDI on DI.* The crowding in effects of FDI can take place when FDI by foreign firms builds up new investment in downstream or upstream production that would not have taken place in their absence, particularly, when investment is carried out in undeveloped sectors of the economy. Meanwhile, the crowding out effects of FDI take place when FDI firms distorts domestic firms and other foreign affiliates from undertaking investment by driving them out of business (Bende-Nabende and Slater 2003).

The entry of MNCs may create competition that forces domestic firms to crowd out. FDI might stimulate DI and lead to the crowding in of domestic firms (Colen et al. 2008). Similarly, Borensztein et al. (1998) argue that the effects of FDI on domestic investment can be different; competing in product and financial markets MNCs may crowd out domestic firms; FDI may support the expansion of domestic firms by complementarity in production or by increasing productivity through the spillover of advance technology. The policy that offers special tax treatment and other incentivises, such as export free zones and tax exemptions, to stimulate FDI inflows may introduce a distortion affecting domestic investment. This distortion could have a greater negative impact on domestic investment and limit growth spillover effects through crowding in effects of FDI (Borensztein et al. 1998; Colen et al. 2008).

In addition, MNCs may affect domestic investment in host economies in two ways; directly through their own investment activities, and indirectly by affecting investment in the host economy firms (UNCTAD 1999). Herzer et al. (2008) postulate that the positive knowledge spillovers, as endogenous growth theory argued, cannot run from FDI to DI, especially in developing countries. For example, Gorg and Greenaway (2003) report that there is a positive spillover running from FDI to DI only in developed countries, not in developing countries, for several of the firm-level studies as in Aitken and Harrison (1999) for Venezuela.

Gorg and Greenaway (2003), De Mello (1999) and Kim and Seo (2003) argue that MNCs may have also firm-specific knowledge over domestic firms, that domestic firms have underdeveloped production technology and low skill workers. In addition, domestic firms may be unable to absorb the technological spillovers that may be restricted by undeveloped domestic product and financial markets (Apergis et al. 2006).

De Mello (1999) and Apergis et al. (2006) argue that FDI can affect DI through its effect on the profitability of domestic investors, which lead to crowding-out DI. FDI also can have an impact on the adjustment of the ownership structure of total investment in the host country and offers additional financial support for DI. This effect leads to crowding-in additional investment in the receiving countries. Additionally, Van Loo (1977) illustrates that FDI may affect domestic investment in the host economy through forward and backward linkages. For example, FDI firms might buy some product inputs from domestic firms that leads to an increase in the rate of return in this industry, and thus lead to an increase in investment in that industry. In contrast, FDI firms might induce production by providing lower cost inputs. Agosin and Meyer (2000) demonstrate that backward and forward linkages are necessary for crowding in effects but not a sufficient factor. For example, the presence of these linkages cannot prevent crowding out of domestic firms, particularly in the case where FDI firms simply displace existing firms.

Also FDI can affect domestic investment indirectly through expenditure by means of the accelerator theory of investment. For instance, the changes in the relationship of expenditure to capacity generates changes in total investment, thus any changes that FDI causes in the level of expenditure produces changes in domestic investment, which creates indirect effects on domestic investment (Van Loo 1977).

The important assessment of the relationship between FDI and DI derives from several views. For example, a Schumpeterian view of FDI-related innovation as creative destruction through substitution may overlook the scope for complementarity between FDI and DI (De Mello 1997). In addition, the endogenous growth theory view of FDI-led growth that FDI inflows have permanents effects on economic growth under constant returns to DI. This is because the increase in the stock of foreign-owned capital leads to a temporary increase in the output growth rate if diminishing returns prevail in the aggregate (Meyer 2003). Moreover, Dunning’s eclectic paradigm view of OLI (ownership, location and internalisation); creative monopoly power and the competitive advantages of MNCs force domestic firms to exit the industries that FDI replaces DI (De Mello 1997; Hosseini 2005; Tang et al. 2008).

Speaking generally, the positive contribution of FDI to economic growth through DI requires that FDI crowds-in DI. FDI can decrease DI when FDI takes away investment opportunity of DI through licenses, skilled, credit facilities, which reflect the superiority of FDI over DI (Herzer et al. 2008). However, there have been some studies on this relation concluded that there was a strong relationship between FDI inflows and DI over time (Lipsey 2000).

FDI usually increases competition and this reduces market power, especially if the MNCs have established Greenfield projects in a non-tradable goods sector. In a sector of tradable goods, the openness of the trade regime may be sufficient to generate competition. Acquisition entry does not increase competition, but it may affect the pattern of interaction between the competitors. The increased competition by foreign investors seems to push domestic firms toward the best practice limit in industries with low levels of technology, or goods that requires least advanced technologies (Meyer 2003).

Similarly, foreign firms are theoretically expected to increase the efficiency of domestic firms via productivity spillovers (De Mello 1997). However, the effect of entry foreign firms on the domestic firms, in the same industry, depends on the industry structure. The entry of foreign firms in the host country market may increase competition and force inefficient indigenous firms to use existing technology more efficiently, or look for new technology, while the least efficient firms may be driven out of the market. The competition effect of FDI can lead to an increase and an update in the capital stock of DI, especially if the foreign investment operates in an underdeveloped sector or a sector where DI does not exist (De Mello 1999).

In addition, the domestic firms should be aware of adopting advance technology to increase productivity as FDI may be able to increase the cost of production such as wages and the prices of local input supplies (Apergis et al. 2006). In contrast, if domestic firms are weak, foreign entry may improve their efficiency and motivate technological upgrading (Meyer 2003).

Besides, foreign firms may come to dominate the domestic industry, especially if the technological gap between them and the domestic competitors is large. In other words, the imperfect competition can lead to reduced market share of domestic firms, especially if the technological gap is large and the labour force is not sufficiently qualified (Apergis et al. 2006).

In addition, employees may lose their industry-specific investment (negative spillovers effects) notable if domestic firms are crowding out or are forced to cut production (leading to oligopolistic market). Foreign investment, therefore, may lead to reduced plant productivity, especially in the short-run (Aitken and Harrison 1999; Herzer et al. 2008), although FDI entry can create labour income and a new demand for local inputs (Apergis et al. 2006).

Furthermore, DI can affect FDI in several ways. For example, increased investment in the physical and human infrastructure can lead to increased FDI profitability and then further enhancing FDI efficiency (Apergis et al. 2006). In addition, DI can act as a signal about the state of the investment climate, if the information is unavailable or incomplete in the host country (Apergis et al. 2006).

In addition, Driffield and Love (2003) examine the assumption that foreign firms investing in the host country are able to capture spillover effects from domestic firms. They looked at the possibility of spillover effects from domestic firms to foreign firms by applying a panel of UK manufacturing industries. They found that technology generated by the domestic sector drifts out to foreign multinational enterprises, yet that this effect is limited to relatively research and development (R&D) concentrated sectors. There is also evidence that these spillover effects are affected by the spatial concentration of industry, and that learning-by-doing effects are restricted to sectors in which technology sourcing is unlikely to be a motivating influence.

The indirect channel of productivity spillover effects would be passing through ***export effects***. FDI, in general, tends to generate positive spillover to the host economy and then improve the export performance of domestic firms (Nguyen 2008). Also the export spillover effects are dependent on the characteristics of domestic firms, industries and the host economy. These characteristics are known as absorptive capacity such as human capital, financial market development and technology gap (Nguyen 2008).

The presence of FDI firms may promote export activities of domestic firms in the same industry, and then generate positive spillovers to the host economy through horizontal linkages. FDI would also affect export activities of domestic firms in upstream and downstream industries via vertical linkages, which are assumed to be a more important source for export spillover from FDI (Nguyen 2008).

Aitken, Hanson and Harrison (1997) point out that the export spillover effects can take place when MNCs link domestic suppliers and sub-contractors to foreign markets through improved transportation infrastructure or improved access to information about which goods are preferred amongst foreign consumers. Therefore, MNCs can generate export spillovers to the host economy through the fact that FDI firms have a multi-market presence, thus MNCs are a natural channel for transferring information about foreign markets, foreign consumers and foreign technology to domestic firms, and they provide channels through which domestic firms would distribute their products. Aitken et al. (1997) illustrate that the export activities of MNCs often produce externalities from spillovers to domestic firms, enhancing the export prospects of these firms.

Aitken, Hanson and Harrison (1997) applied panel data on 2104 Mexican manufacturing plants for the period 1986-1990. They found that MNCs tend to generate positive export spillover effects to domestic firms but not from general export activity. This suggests that export spillovers are limited to MNCs activity. Using panel firm level data in the UK, Greenaway et al. (2004) found that MNCs exporting has a positive effect on domestic firms' productivity for current exports. Girma et al. (2008) found that there is no evidence on the positive productivity spillovers from MNCs in the same industries (horizontal spillovers), upstream or downstream industries towards either exporting or non-exporting firms by using panel firm-level data from UK manufacturing industries from 1992 to 1999. In addition, the results show evidence for negative vertical spillovers for domestic non-exporters.

2.4.1. *Empirical Studies of the Indirect Impact of FDI on Economic Growth*

2.4.1.1. Horizontal and Vertical Productivity Spillovers

Economic theory can discover a series of possible spillover conduits, but as seen above robust empirical support for positive spillovers is varied. There are huge empirical studies that try to find evidence of the horizontal spillover effects. Gorg and Greenway (2003) provide a comprehensive assessment of experiential confirmation on productivity, wages and export spillovers in developing, industrial and transitional economies from forty studies on horizontal productivity spillovers. They found that nineteen of these studies reported a significantly positive horizontal spillover effects from foreign firms to domestic firms. For example, Caves (1974) examines the hypothesis of horizontal productivity effect of FDI by using a 49 firm from manufacturing sector data from Canada and a 23 firm from manufacturing data from Australia. He found that FDI drives higher technical efficiency in competing domestic firms and speeding up transmit of new technology to them, although he did not explain how spillovers take place (Blomstrom and Kokko 1998).

However, eight of those studies apply cross sectional data, finding positive spillover effects that might lead to biased results. Accordingly, a cross sectional data at the sectoral level may fail to control for time-invariant differences in productivity across sectors, which might be correlated with foreign presence but not caused by it. For example, if FDI is directed towards the more productive sectors, subsequently cross sectional data will present a positive relationship between FDI and productivity (Colen et al. 2008). It is also a positive and statistically significant relationship between the level of FDI and productivity, including spillovers, even though FDI did not cause high levels of productivity but rather was attracted by them (Gorg and Greenaway 2003). Similarly, Smarzynska (2004) addresses some reasons about why cross sectional data may provide a positive relationship between FDI and the average value added per worker in the sector. For example, cross sectional data is problematic in setting up the direction of causality. Also MNCs tend to locate in high-productivity industries. The positive relationship may also be the outcome from the entry of FDI that tends to force out less productive domestic firms or of MNCs increasing their share of the host economy market.

Therefore, Gorg and Greenway (2003) report that panel data uses firm level data as the most appropriate estimating framework. Under those circumstances, panel data techniques allow the examination of the development of the productivity of domestic firms over a longer time period, and it also allows for examining spillovers after controlling for other factors.

By taken it into account, Gorg and Greenway (2003) found that a number of studies that apply panel data find positive horizontal spillovers, and for all of those studies are in developed countries, such as Haskel et al. (2002) for the UK; Castellani and Zanfei (2002) for Italy; Keller and Yeaple (2003) for the US; Ruane and Ugur (2002), Gorg and Strobl (2003) for Ireland; and Damijan et al. (2001) for Romania.

For developing and transition economies, some of other studies found evidence of negative spillover effects from FDI to domestic firms by using panel firm level data from manufacturing industries. For example Haddad and Harrison (1993) for Moroccan manufacturing during the period between 1985 and 1989; they found that horizontal spillover did not take place in all industrial sectors. Also, Aitken and Harrison (1999) for Venezuela; Djankov and Hoekman (2000) for the Czech Republic and Damijan et al. (2003) for seven CEE countries; they pointed out that MNCs shift the demand for intermediate inputs form domestic to foreign producers, reducing the scale of output, and therefore productivity in domestic production. Konings (2001) also found that there is no evidence of positive spillovers to domestic firms on average in Bulgaria, Romania and Poland, and there are no at all spillovers from FDI in Bulgaria and Romania. Meanwhile there are negative spillovers from FDI in Poland.

Colen et al. (2008) suggested some explanations to explain the negative or no horizontal productivity spillover effects from FDI to domestic firms. The negative effects might be reduced through the productivity of domestic firms by competition effects, while in developed economies; domestic firms might be able to achieve something to improving their efficiency (Aitken and Harrison, 1999; Konings, 2001; Gorg and Greenaway, 2003; and Herzer et al. 2008). Similarly, Lipsey (2002, P.34) quotes that

> *Locally- owned firms might increase their efficiency by copying the operations of the foreign- owned firms, or be forced by competition from foreign- owned firms to raise their efficiency to survive. On the negative side, it is conceivable that foreign- owned operations are more efficient only because foreigners have taken over the more efficient local firms, leaving the less efficient in local ownership. Or by taking markets from local firms, foreign- owned firms might force the locally owned firms into less efficient scales of production.*

The difference between foreign firms and domestic firms is that foreign firms might operate on different production function or operate at different points on the same functions (Lipsey, 2002). Another reason suggested by Colen et al. (2008) is that positive spillover effects may take time to capture, or that MNCs may try to prevent their technology drifting to competitors. Balsvik (2003) also postulates that the limited evidence of horizontal productivity spillover effects may be because MNCs can limit these effects to their competitors in several ways. For example, MNCs can invested by protecting their technology, can reduce labour mobility through paying higher wages, or can control the extent of spillovers by their mode of entry.

Blomstrom and Kokko (1998) point out that forward linkage normally carried positive spillover effects. However, backward linkages were shown to be less beneficial because foreign firms have high import propensities. They argue, as in Kokko (1996), that the spillovers from competition are not determined by the presence of FDI, but rather by the interactions between foreign and domestic firms.

However, Reganti and Sica (2005) and Wang (2005) report that the consideration of studies has recently moved from the analysis of horizontal spillovers from FDI (i.e. those benefits to local enterprises at an intra-industrial level) towards the investigation of vertical ones (i.e. the diffusion of positive effects on domestic economies at an inter-industry level). Namely, more recent empirical literature focused on the importance of vertical spillovers, through technology and know-how that drift out from foreign firms to domestic firms (Colen et al. 2008). Therefore, studies on the impact of FDI on domestic firms, and then economic growth through vertical linkages tend to be encouraging in further research. Smarzynska (2004, P.606) quotes that

> *……researchers have been looking for FDI spillovers in the wrong place. Since multinationals have an incentive to prevent information leakage…... spillovers from FDI are more likely to be vertical than horizontal in nature…….spillovers are most likely to take place through backward linkages …….contacts between domestic suppliers of intermediate inputs and their multinational clients……..they would not have been captured by the earlier studies. It is also plausible that spillovers from multinational presence in upstream sectors exist thanks to provision of inputs that either were previously unavailable in the country or are technologically more advanced, less expensive, or accompanied by provision of complementary services.*

Namely, MNCs in general prefer to locate where domestic rivals cannot impact their market share, and thus horizontal (intra-industry) spillovers might be become less probable. MNCs may benefit from technology diffusion in upstream suppliers, where vertical (inter-industry) spillovers to complementary sectors are more likely to take place. Furthermore, the entry of MNCs tends to encourage the demand for local intermediate inputs and services, promoting a productivity increase in upstream and downstream sectors at inter-industry level. MNCs prefer locations characterized by limited domestic competition and many input suppliers, resulting in limited horizontal spillover effects of FDI. This is especially the case when the demand in the host economy is inelastic because of the lack of substitute goods (Reganati and Sica 2005; Kugler 2006).

For example, Smarzynska (2004) found that there are positive productivity spillovers from FDI through backward linkage in the upstream sector using Lithuania’s firm-level study. Similarly, Schoors and Van der Tol (2002) applied cross sectional enterprise-level data from

Hungary. Both of these findings indicate that there are positive vertical spillover effects from FDI to domestic firms, namely that FDI has a positive spillover effect on local suppliers in the consumer sector. In addition, Lileeva (2006) estimated the effects of inward US FDI on the productivity of domestic plants in Canada from 1980 to 1996 for 145 firms in the manufacturing industry, by using double-differencing methodology. The result shows that vertical linkages are positively related to productivity growth of Canadian domestic manufacturing firms.

In contrast, there have been comparative studies on the importance of horizontal and vertical spillover effects for FDI on domestic firms in the host economy. For instance, Reganati and Sica (2005) investigated the presence of horizontal and vertical spillover FDI effects using firm-level domestic and foreign data from 1997 to 2002 in the Italian manufacturing sector. They found an absence of horizontal spillovers and the simultaneous existence of vertical spillovers in the supply industry. This suggests that MNCs act as a driving-force for their domestic producers, encouraging them to scale up technological advances, improve their competencies, and supply more advanced services. Kugler (2006) investigates empirically whether FDI creates positive externalities on local producers in developing countries by using manufacturing panel data from Colombia. He found the existence of limited horizontal (intra-industry) spillovers and clear evidence of vertical (inter-industry) spillovers from FDI. The lack of a positive impact of MNCs on domestic sector competitors is due to the lack of dissemination of sector-specific technologies, thanks principally to linkage effects. Similarly, Blalock and Gertler (2008) test the hypothesis that MNCs operating in emerging markets transfer technology to domestic suppliers to increase their productivity, by using panel firm Indonesian manufacturing data. They found positive vertical spillover effects from FDI to domestic firms in terms of vertical chains as a channel for technology transfer, namely that domestic firms in industries in regions with growing downstream FDI experience greater productivity growth. This suggests that vertical productivity drifts to domestic firms through backward linkages.

Using manufacturing data from the UK and applying a dynamic GMM system, Driffield et al. (2002) found that there are positive spillovers through forward linkages, yet insignificant spillovers through backward linkages. A study by Damijan et al. (2003) tested the impact of

FDI on domestic firm productivity growth by applying a dynamic system GMM approach on more than 8000 firms from ten advanced transition economies. This study distinguishes between intra-industry (horizontal) and inter-industry (vertical) spillovers form FDI to domestic firms. The results indicate that the forward effects of FDI on firms' productivities are larger than the impact of backward linkages, and larger than the impact of horizontal spillovers.

In contrast, Marcin (2007) tested the presence of externalities correlated with FDI in transition economies by applying Polish corporate sector panel firm-level data. The findings indicated that the presence of FDI generates a positive spillover to domestic firms in the same industry (horizontal spillover) and in downstream industries (vertical spillover). The competitive pressure creates backward spillovers, whilst market power facilitates forward spillovers. Stancik (2007) investigated the effects on domestic companies in the Czech Republic service sector by using panel firm-level data from 1995 to 2003. He found that there is a negative horizontal and forward spillover from FDI to domestic firms. This result suggested that foreign firms tend to import their input supplies from abroad instead of using domestic suppliers. Similarly, Kosova and Ayyagari (2008) examined the effect of FDI on domestic firm entry and firm size distributions in 245 industries in the Czech Republic from 1994 to 2000. The result suggests that the existence of positive vertical spillovers in both downstream and upstream industries is via the presence of backward and forward linkages, as well as positive horizontal spillovers from FDI. Yet, the findings also indicate that vertical spillovers are stronger than horizontal spillovers.

A study by Beugelsdijk et al. (2008) examined the growth effects of vertical (efficiency-seeking FDI) and horizontal (market-seeking FDI) US MNC activity into 44 host economies from 1983 to 2003 by using a formal model applying two stage least squares (TSLS) estimations. They found that horizontal and vertical FDI have positive growth effects in developed economies, but the effect of horizontal FDI is relatively stronger. It is also shows that there is no evidence of the effects of horizontal and vertical FDI in developing economies.

2.4.1.2. Crowding-In/Out Effects

The experiential evidence on the impact of FDI on domestic investment (DI) is relatively mixed. Some scholars found that FDI inflows stimulate domestic investment (crowding-in effect of FDI on DI), whilst others found that FDI generates competitive pressure leading to reducing DI (crowding-out effect of FDI on DI) (Colen et al. 2008). Furthermore, Fry (1993) argues that FDI could increase DI by more than its individual direct contribution through its direct effect on economic growth. Fry's paper analysed the macro impacts of FDI on economic growth. The results showed that:

- relative to Latin American studies, that FDI tends to reduce DI
- FDI inflow leads to a direct expansion of productive stock
- rates of domestic savings and investment tend to increase together with an inflow of FDI in Asia, which are called co-finance effects.

Most of the evidence on the crowding-in/out effects of FDI on DI draws from macroeconomic studies. For example, studies applying *cross-section data*, such as Blomstrom et al. (1992) for 78 developing countries and 23 developed countries, and Ndikumana and Verick (2008) for 38 Sub-Saharan African countries, found FDI crowds in DI.

For 69 developing countries, Borensztein et al. (1998) also found a crowding-in effect; that a one-dollar increase in the net inflow of FDI leads to an increase in DI in the host country by more than one-dollar. In addition, the findings suggest that the complementarity between FDI and DI is not sensitive to the productivity of FDI. However, Borensztein et al. (1998) did not examine when crowding in/out effects take place, and the causality links between FDI, DI and economic growth. The study is only focused on the impact of FDI on DI and economic growth, and the interaction between FDI and the stock of human capital in affecting growth rate.

In contrast, Fry (1993) found mixed results. Fry (1993) explored the effects of FDI on DI, saving, growth and current account for 16 developing countries (a group of 5 Pacific Basin countries and a control group of 11 other developing countries), to address the following question; does FDI increase DI, by using the flexible accelerator model based on the neoclassical investment functions? For causality tests, he applies a VAR and DF model for pooled time series analysis to examine the externalities, stock-flow dynamic relationships, and short-run and long-run effects of FDI. The results showed that the crowding-in effect dominated in five Pacific economies, and eleven developing economies presented a crowding-out effect of FDI on DI. For 62 LDCs during 1978 to 1995, Bosworth and Collins (1999) found that FDI inflow crowds in DI relative to both portfolio capital and other loans. In particular, FDI would increase DI more than one-for-one for LDCs, but for emerging markets FDI appears to increase DI by one-for-one. Bosworth and Collins (1999) argued that these results might reflect the cross-country correlation between FDI and DI, which is much greater than the correlation within countries over time. In other words, countries that received more FDI have greater rates of DI. Lipsey (2000) used a lagged of the 5-year period of the FDI ratio to examine the relationship between inward/outward FDI flow and DI in the 22 developed countries from 1970-1995. He found that no evidence that either inflow/outflow of FDI is crucial in determining the level of DI in the host economies.

Studies that used *traditional panel data*; Agosin and Mayer (2000) also found mixed results. They developed a theoretical model of investment based on the neoclassical investment model to test whether FDI crowds in/out DI in three groups of developing countries (Africa, Asia and Latin America) from 1970- 1996. They found strong crowding in effects for DI in Asia and lower in Africa, whilst there is strong crowding out effects in Latin America. Agosin and Mayer (2000) concentrated on the impact of FDI on DI, ignoring the dynamic interaction between FDI, DI and economic growth.

Razin (2003) examined the fundamental interaction between DI, FDI, international loans and international portfolio investment. And the distinction between the effects of FDI and other types of capital flows on economic growth in 64 developing countries from 1976-1997 by applying OLS and TSLS regressions based on the hands-on management standards. The findings indicated that FDI contributes positively to DI and economic growth progression, more so than for any other factor. The findings also clarified that DI and economic growth appear to have a meaningful contribution to FDI.

Changyuan (2007) found that the entry of FDI has enhanced DI through crowding-in effects for 29 mainland provinces in China from 1987-2001. Yet, Changyuan (2007) focused on the impact of FDI on DI and economic growth, ignoring the dynamic interaction between these variables.

Studies that applied *panel cointegration techniques*; De Mello (1999) used the bivariate VAR model and time series concepts of cointegration to a set of time series and panel data for 32 OECD and non-OECD countries. He found that FDI enhancing growth depends on the degree of complementarity and substitution between FDI and DI. De Mello failed to explain the crowding effects clearly and his study is more of a theoretical rather than empirical analysis (Agosin and Mayer 2000).

A study by Apergis et al. (2006), applied a panel cointegration and causality technique to test the impact of FDI on DI and the causality relationship between FDI and DI in a group of 30 countries from 1992-2002. It found that there is a complementarity long-run causal relationship between FDI and DI (crowding in effects) in Asia and Africa, whilst crowding out effects for America and Europe, in line with Agosin and Mayer (2000). Apergis et al. (2006) were also concentrating on the dynamic relationship between FDI and DI and its determinants, passing over the dynamic relationship among FDI, DI and economic growth.

Studies that used *time series analysis*; Van Loo (1977) investigated the effect of FDI on total investment in Canada, by utilising annual data and applying an accelerator investment model. He found that FDI led to increased DI through direct effect and that the total impact is probably smaller due to a negative indirect effect. Similarly, Noorzoy (1979) developed an accelerator-flow of funds model of investment, based on the traditional neoclassical investment model, to estimate the effect of FDI inflow/outflow on DI in Canada from 1957-1971. Noorzoy found that FDI inflow has crowding in effects on DI, while FDI outflow has crowding out effects on DI. Tang et al. (2008) noticed that the models, used by Van Loo and Noorzoy, were a single regression model which failed to consider the strong causal links and feedback between FDI, DI and economic growth.

Studies that applied *time series cointegration techniques*; for example Kim and Seo (2003) investigated the dynamic relationship between FDI, DI and economic growth in Korea using quarterly data from 1985- 1999, and applying a time series techniques (a VAR model and the innovation accounting techniques). Their findings did not support FDI crowding out DI in Korea. Fedderke and Romm (2006), with time series data (1960-2003) in South Africa, found that FDI crowds in DI in the long-run, yet it crowds out DI in the short-run. Tang et al. (2008) found that there is no evidence that FDI crowds out DI, but instead FDI has a complementary effect on DI in China using quarterly time series data from 1988-2003. It also was found that FDI stimulates DI through the technology diffusion channel.

To sum up, theoretically, the role of FDI in economic growth cannot be ignored, but in practice the hypothesis is still controversial. Macro-economic empirical studies show clearly the link between FDI and economic growth in the host economies, but micro-economic empirical studies are more ambiguous. The lack of homogeneity in the host economies makes the relationship between these two variables more ambiguous. In addition, economic theories expect that FDI may generate growth multiplier effects via vertical (inter-industry) and horizontal (intra-industry) productivity spillover effects. The practice evidence illustrates the concentration of horizontal spillover effects, yet provides in general sufficient evidence of the presence and the significance of vertical spillover effects, especially in the manufacturing sector (Colen et al. 2008).

However, the effect of FDI on DI and economic growth seems to be an extensive discussion of the theory and of the practice. Nevertheless the effect of economic growth on FDI and the direction of causation between these variables are still much in need of clarification. Therefore, before turning towards the causal relationship between these variables (*The hypothesis of feedback),* we will look at the effect of economic growth on deriving FDI *(the hypothesis of Growth-driven FDI).*

2.5. The Impact of Economic Growth on Attracting FDI

The hypothesis of Growth-driven FDI is that it occurs when the growth of the host economy attracts FDI. Economic theory provides different reasons regarding MNCs decisions to invest in developed or developing countries. Namely, that MNCs decide to set up a subsidiary in developed countries, and they try to access the large and developed market. Whilst by investing in developing countries, they aim to take advantage of the low-cost production factors, or to get access to real or raw resources. However, MNCs are defined as activities with some specific ownership characteristics, controls and management of production units in different countries (Zhang 2001). Therefore, when MNCs establish a vertical FDI, they try to access the source of cheap raw materials or low labour cost. Thus, vertical FDI is induced by factor price differentials. In contrast to vertical FDI, horizontal FDI is induced by market accesses rather than by factor prices (Moudatsou 2001).

As a result, vertical FDI in the first place improves the production conditions and economic performance in the host country. The better the economic performance of the host country the greater the amount of FDI attracted (and hence incentive); given the improved infrastructure, the qualified human capital and the market size of the host economy (Zhang 2001). By taking those conditions into account, there are greater opportunities for making or raising profits, and this result in more FDI inflows, and so this is the case of growth-driven FDI (Moudatsou 2001).

Zhang (2001) argued that the motivation of FDI is also necessary in explaining the hypothesis of Growth-driven FDI. For instance, market-seeking FDI occurs when MNCs establish enterprises in other countries. This motivation is induced by market access to the host economy for efficient utilisation of resources and exploitation of economies of scale. Another motivation of FDI is export-oriented FDI incentivised by factor-price differentials, such as low wages or cheaper labour, along with human capital and infrastructure conditions.

Therefore, growing market size, and improving conditions in human capital and infrastructures are necessary for attracting FDI, and this results in growth-driven FDI. In other words, the market size of the host economy (as measured by GDP) acts as a factor that encourages MNCs to raise their investment in the host economy (Zhang 2001). The high level of aggregate demand, which is induced by the speed of economic growth, leads to stimulating higher demand for investments and then attracting more FDI.

For capturing the growth enhancing effects of FDI, economies should offer a supportive business environment and must have reached minimum level of economic development. This reflects the hypothesis that higher economic growth causes or induces higher or more FDI inflows (Nunnenkamp and Spatz 2004).

Lean (2008) argues that the speed of GDP growth would influence the ability of the host economy in attracting more FDI inflows. This is also argued by Dowling and Hiemenz (1982). Rapid economic growth will generally generate a shortage of capital in the host economy and thus the host economy will demand more FDI by offering attractive, preferential or advantageous terms to attract foreign investors. It is also the case that rapid economic growth affects the confidence of potential foreign investors who intend to invest in the host economy. In addition, rapid economic growth accompanied by an increase in per capital income will generate high opportunities for FDI investment. These opportunities are not only in the productive industrial sectors, but also in the consumption sectors, such as consumers' durable goods and the infrastructure and utility sectors of the host economy. Moreover, the growth rate and economic development level in the host economy are crucial factors in determining the amount, type and structure of FDI inflows to the host economy (Lean 2008).

The hypothesis of growth-driven FDI has been strongly supported, based on data from developed economies and Asian countries (Baliamoune-Lutz 2004). Empirical studies on growth-driven FDI are limited and inconclusive, and most of them use modern time series or panel cointegration techniques. For example, Moudatsou (2001) for 14 European Union countries over the period from 1970- 1999, found that 4 of them supported the hypothesis of GDP-driven FDI, namely Italy, Finland, Spain and Ireland. The result suggests that the economic growth of those countries and their development level have an important effect on attracting FDI. The result seems reasonable for Italy and Spain, yet the economic growth rate seems to be more attractive for FDI in Ireland and Finland because they are small economies. In contrast, Magnus and Fosu (2008) study the growth-driven FDI hypothesis based on the Toda-Yamamoto (1995) Granger no causality test using annual time series data from 1970 to 2002. They found that that growth-driven FDI is not identified in Ghana. The result suggests that economic growth is a necessary, yet it is not a sufficient condition for attracting more FDI.

For panel cointegration techniques, Nonnemberg and de Mendonca (2004) for 38 developing countries from 1975 to 2000, and Basu et al. (2003) for 23 developing economies from 1978 to 1996, found that the causality runs from GDP to FDI, but not vice versa. Basu et al. (2003) emphasised trade openness as a crucial determinant for the impact of FDI on growth. They found two-way causality in open economies, both in the short and the long run, whereas the long-run causality is unidirectional from growth to FDI in relatively closed economies.

Lean (2008) examined the hypothesis of growth-driven FDI in the Malaysian manufacturing sector from 1980 to 2005, by applying time series cointegration techniques. This research found that the relationship between FDI and GDP is independent, suggesting that Malaysian manufacturing sector needs to improve productivity and competitiveness to stimulate investment, and then attract more FDI.

Baliamoune-Lutz (2004) examined that hypothesis based on the time series data from Morocco from 1973 to 1999, by applying a Granger causality model, finding that the growth-driven FDI is not in evidence. The results suggest that the FDI motivation might ignore GDP growth. This ignoring of GDP growth is because many French MNCs had established enterprises in Morocco during the colonization era and continued to operate and expand independently of short-term economic growth. Furthermore, some MNCs may be encouraged by their home countries to invest in Morocco for political and geo-strategic reasons. Sekmen (2008) tested that hypothesis using time series cointegration techniques in the Turkish tourism sector from 1980 to 2005, finding the growth –driven FDI hypothesis apparent. This suggests that FDI is intended for short-term goals, such as profit maximisation or using short term interest rates.

Chakraborty and Basu (2002) investigated the two-way link between FDI and growth for India by applying cointegration techniques and the VEC model from 1974 to 1996. They found that the causality runs from GDP to FDI. The results suggest that the short-run increase in FDI inflows is labour displacing in nature. And that the liberalisation measures attempted during the 1980s did have an important favourable impact on attracting FDI inflows in India.

2.6. The Causal Relationship between FDI, DI and Economic Growth

FDI remains a key engine in explaining economic growth both in developed and developing countries. Namely, the majority of empirical studies of inter-country differences in growth rates suggest that high growth is correlated with high foreign investment rates. Endogenous growth theory recently also emphasises the link between FDI and growth. It postulates that since FDI includes not only expenditures on capital goods but also expenditures on technology advances and human capital augmentation, diminishing returns to capital will not exist. Countries, hence, that devote a high proportion of productivity to FDI may sustain more rapid growth than countries that invest less in these areas (UNCTAD 1999).

Furthermore, the strong links between FDI and growth would be a result of either the growth-driven FDI or FDI-led growth; this could be probable for two variables that move together through feedback or bi-directional causality (Zhang 2001). In addition, Zhang (2001) reports that economies that experience fast economic growth, not only generate more demand for FDI inflows but they also provide better opportunities for making profits, and hence attracting more FDI inflows. In addition to this, FDI would cause faster economic growth and support economic development of the host economy via direct effects and indirect spillover effects. Thus, FDI and economic growth are maybe positively interdependent and would lead to a two-way causal link between them. Moudatsou (2001, P.2) reports

> "*The feedback hypothesis between two variables is taken place, when the lines of causation frequently are going both from supposed causes to growth and from growth to the supposed causes*".

Thus, the most interesting economic picture suggests a bi-directional causality between FDI and economic growth in the host economy. The studies that focused on the explanations of growth have been pursued in several different ways. Yet, the major problem with interpretation of these studies is the difficulty in determining the direction of causation (Moudatsou 2001).

Shan et al. (1997) pointed out that the causal relationship between FDI and growth depends on several economic, political and cultural factors, such as the economic development level, the productivity of FDI and the policies shaping FDI. In addition, Moudatsou (2001) argued that the FDI and growth links seem to be different for countries of different stage of growth.

Shan (2002) argued that most of the previous studies on the links between FDI and growth suffer from two major problems. First, those studies assumed uni-directional causality between FDI and growth and estimated the impact of FDI on economic growth based on that assumption, without testing the direction of the causality. They also only used a single equation model, which fails to consider the possible two-way causality and cannot deal with the simultaneity issue properly. Second, the majority of those studies that used cross-section data assume a common economic structure and similar production technology across different countries. The significance of conclusions drawn from cross-sectional data based on the development in the panel data analysis regarding a long-run causal relationship is questionable (Shan et al. 1997). For example, Nair-Reichert and Weinhold (2001) apply a traditional panel causality test proposed by Holtz-Eakin et al. (1988) and the mixed fixed and random (MFR) panel causality test in order to avoid the misleading result of cross-section data analysis. And also to provide a sense of whether there is a causal relationship between FDI and growth in panels of 24 developing countries from 1971 to 1995. They found that FDI has a strong positive causal impact on growth, but they did not provide evidence on the direction of causality. Likewise, Choe (2003) used the traditional panel data causality testing method, developed by Holtz-Eakin et al. (1988), for 80 countries from 1971 to 1995, finding that there is a bi-directional causality between FDI and growth, although he finds the causal impact from FDI to growth to be weak.

Furthermore, Shan (2002, P.886) quotes that

> *It is important to understand that the theory relating to causality tests is based upon time-series analysis and hence a causal relationship is best tested in the time-series framework instead of the cross-sectional context. It is not possible to infer anything, in cross-sectional context, more than a contemporaneous correlation between FDI and output growth instead of a long-run relationship. They do not allow for different cross sections to exhibit different patterns of causal relationships…..Apart from the possible feedback between FDI and growth, previous studies have ignored the endogenous nature of a production function that means some inputs within a production function context may affect each other…Therefore, studies that do not consider the endogenous nature of the growth process are subject to a simultaneity bias.*

Shan et al. (1997) commented that studies that tried to overcome the problems associated with cross-section data by applying a simultaneous equations model suffer from the problems of inadequate theoretical foundations and poor econometric methodology.

A number of empirical studies tested the relationship between FDI and economic growth. Most of these studies gave greater attention to the long-run and causality relationships between FDI and growth. Their results were mixed and inconclusive. There seems to be a strong relationship between FDI and growth. Although the relationship is highly heterogeneous across countries, the studies generally agreed that FDI, on average, has an impact on growth in the Granger-causal sense (Lean 2008). For example, Herzer et al. (2008) found that no uni-directional long-run causality runs from FDI to GDP in the vast majority of developing countries.

Zhang (2001), for 11 developing countries in East Asia and Latin America (1970-1995), found that there are long-run and cointegration causalities between FDI and growth (GDP). For the short-run results, the causality runs from GDP to FDI for four countries (Brazil, Korea, Malaysia and Thailand), and no causality between GDP and FDI was found in Argentina. For the long-run results, the causality runs from FDI to GDP for five countries, and the bi-directional causality are found in Indonesia and Mexico. And for Colombia, Hong Kong and Taiwan there is uni-directional causality.

For China, Liu et al. (2002), using quarterly data (1981-1997) in China based on the vector error correction (VEC) model, found cointegration, and bi-directional short and long-run causalities between FDI and growth (GDP). Tang et al. (2008) investigated the causal links between FDI, DI and economic growth in China using quarterly time series data for 1988-2003, by applying an investment error correction model (ECM) and the innovation accounting techniques. The results suggest that there is only a one-way causal effect (single-directional causality) from FDI to economic growth. A study by Shan et al. (1997) using quarterly time series data from 1985:2 to 1996:2, based on Granger no-causality developed by Toda and Yamamoto (1995); found that there is a two-way Granger causality running between FDI and growth in china.

Kim and Seo (2003) investigated the dynamic relationship between FDI, DI and economic growth in Korea using quarterly data covering 1985- 1999, by applying a time series techniques (a VAR model and the innovation accounting techniques). The findings illustrated that economic growth is statistically significant and highly affects FDI rather than the effects of FDI inflows on economic growth.

For Latin American countries (Mexico, Argentina and Brazil), Cuadros et al. (2004) covering quarterly data from 1977 to 2000, found that there are short-run and long-run, and cointegration causalities between FDI and growth (GDP), and causality runs from FDI to GDP in two (Mexico and Argentina) of three Latin American countries. Fedderke and Romm (2006), using time series data (1960-2003) in South Africa, found that there are cointegration and long-run causalities running from FDI to GDP.

Chowdhury and Mavrotas (2006) examined the causal relationship between FDI and economic growth based on the Toda-Yamamoto test for Chile, Malaysia and Thailand over the period from 1969 to 2000. They found that there is a one-way causality from GDP to FDI in Chile, and for Malaysia and Thailand there is strong evidence of a bi-directional causality between FDI and GDP. Hansen and Rand (2006) also examined the causal relationship between FDI and growth in 31 developing countries over the period from 1970 to 2000, based on the panel cointegration techniques. They found that there is a strong causal link from FDI to GDP either in the short-run or long-run.

Qi (2007) suggested that the causal relationship between FDI and growth exists only in a system including DI as well rather than just two variables. Qi (2007) investigated the significance, direction and sign of the long-run and short-run causal relationship between economic growth, DI and FDI in 47 developed and developing countries, using error correction model (ECM) from 1970 to 2003. The findings indicated that without domestic investment, FDI and growth is unlikely to be cointegrated in many countries under analysis because of the different integration order of the two variables. Thus, the long-run relationship between two variables might be neglected unless DI is included in the system. The evidence suggests that the long-run causality between growth, total investment and FDI is apparently less common in developed countries than in developing countries. Namely, the long-run causality is found to be insignificant in 10 out of the 13 developed countries, while it is significant in the 33 developing countries. This suggests the importance of physical capital for economic growth during the process of industrialization, whereas technology, knowledge and human capital are perceived to be vital in enhancing long-run growth in countries where industrialization has been achieved. In addition, developed and developing countries present different features in the direction of both long-run and short-run causal effects. For example, the causality runs from growth to DI, from growth to FDI, or from DI to FDI in developed countries. For developing countries the bi-directional causality between these three variables is revealed in almost of those countries. The results suggest that economic growth, which is driven by some other factor such as innovation, encourages DI and attracts FDI. And that economic growth and DI, in a well-developed market system and stable macroeconomic environment, are not easily affected by FDI inflows in developed countries. For developing countries, DI appears to be quite influential on economic growth. That is countries comparatively short of capital, with under-developed markets, and an unstable macroeconomic environment are sensitive to FDI inflows hence influencing economic growth and DI. Furthermore, policies aiming to attract FDI that are implemented by many developing countries may reinforce in some way the two-way directional causality relationship.

2.7. Absorptive Capacity Factors

The empirical literature on the implications of FDI for economic growth in the host countries is generally mixed and inconclusive on the existence and strength of growth multiplier effects. Recently, empirical studies have recognized that certain factors may condition the FDI-led growth hypothesis, especially in developing countries (Colen et al. 2008). Krogstrup and Matar (2005) suggested that empirical studies on the impact of FDI on economic growth can be divided into two main categories. First, unconditional studies are those looking for an overall linear effect of FDI on growth by including FDI inflows in growth, technology or productivity regressions. Second, conditional studies are those that assume the impact of FDI on growth is non-linear and depends on the absorptive capacity of the host country, such as the technology gap, macroeconomic conditions and the type of FDI. Therefore, we will briefly evaluate those factor conditions in this section.

2.7.1. *The Technology Gap*

Most developing countries believe that the principal benefits of FDI are embodied in increasing their technological and scientific capacities, and in narrowing the technological gaps between them and developed countries. FDI contributes to the technological progress in the developing countries and is an essential factor for the technology inflows that can create and strength overall technological capabilities (UNCTAD 2006). Several studies by various scholars have noted that there are many factors that could be considered important for host developing countries enabling them to absorb the benefit of new technology transfer such as the inherent capacity and potential to make these absorptions.

Barro and Sala-I-Martin (1997) argued that the long-run growth rate depends on the innovation of new products or technologies in a few leading countries. Even though the technological imitation is typically cheaper than invention, many countries have a preference to copy rather than invent. This implies that follower countries, these are developing and less developed countries, will grow relatively faster and catch-up with the leader countries. In that case, the impact of FDI on economic growth is expected to be larger for a larger technological gap between home and host countries. However, in terms of technological development, developing economies are in general lagged behind; FDI would be the important way of spurring economic growth in the least advanced economies (Colen et al. 2008).

Grossman and Helpman (1994) postulated that the growth rate of the technological leader has been increasing over time, which can happen in the exogenous model. And also that the countries appear not to be converging to a common level of per capita income, as they must in the exogenous model if the countries share similar saving behaviour and technologies. In addition, Fagerberg (1994) showed that the technological differences between countries are the outcome of the differences in GDP per capita across countries. Moreover, he added that a large part of the actual differences in growth rates between OECD countries could be explained by the size of the technology gaps.

UNCTAD (2006) reports that the technology gap between developed and developing economies must be bridged, in order to create a sustainable development for developing economies, and to compete successfully in a global economy. The report found that the differences in the stock of knowledge creates approximately 60 per cent of the differences in the income levels between sub-Saharan African and industrialised countries.

Colen et al. (2008) illustrated that the rate of catch-up depends on the level of human capital in the developing countries, and therefore, on the ability to absorb the positive spillovers from FDI. The impact of FDI on economic growth is expected to depend on the technology gap between the home and host countries, a large technology gap might slow down the knowledge and technological spillovers. The World Bank (2008, P.9) reports that

> *"Over the past 15 years, FDI inflows to developing countries have almost doubled as a percentage of GDP. In addition, foreign firms are making important contributions to the technological capacity of host countries, performing more than 40 percent of the total R&D in some countries".*

UNCTAD (2006) defines the technology gap between countries as the differences between countries who have access to technology and employ it effectively and others who do not. Thus, the technology gap exists between countries that can create and innovate to produce new technologies and those who cannot. Castellani and Zanfei (2005) argued that higher technology gaps may in principle increase the possibility that MNCs tend to crowd out domestic suppliers and competitors. Thus, they expected that the positive impact of FDI on the productivity of DI depends on the size of technological gaps between foreign and domestic firms.

Qun-yang et al. (2006) employed industrial data to analyze the technology spillover effect of FDI in Zhejiang province. They argued that the main channels of Zhejiang provincial technical spillover effects are technology gap, competition, industry concentration and industry linkage. Blomstrom et al. (1992) investigated the impact of FDI on economic growth with regards to the technology gap of the host country by splitting their sample of developing countries into two groups; one sub group of low income countries and another of high income countries, They found that FDI has to be growth enhancing in the second group. However, Blomstrom et al. (1992) did not continue to determine the exact threshold level of technology gap.

More specific conclusions to the effect of FDI on economic growth of the host country with respect to the technology gap are reached by Li and Liu (2005), who included the technology gap proxy in their growth regression. For 84 countries, Li and Liu (2005) found a significantly negative coefficient estimate for this proxy, which implies that the lower the level of technological development of the host country, the less is the impact of FDI on growth. Their results imply a threshold value for the technology gap must reach, above which FDI is no longer beneficial for the recipient country.

2.7.2. Culture Differences

Recently, with rapid growth of MNCs researchers in the field of organisational behaviour become increasingly interested in the impact of culture differences across economies on business performance, effective leadership and management (Jiang et al. 2010). Liu et al. (1997), and Kogut and Singh (1988) argue that culture distance is considered to be negatively related to FDI inflows in the host economies. So that, the greater the culture differences between the home and host economies, the more complicated will be the management of FDI-enterprises in the host market, and therefore the smaller will be FDI inflows into the host economies. This argument is supported by the findings of Grosse and Trevino (1996), who found that culture and geographic distance are significantly negatively related to FDI inflows into the host economies.

Jiang et al. (2010) argue that if national culture in the host country did experience considerable change over time, one primary cause of the change should be FDI. Foreign-invested enterprises hire, train and manage local workers, advertise in the local media, and create joint ventures with domestic firms. The FDI inflows are also important in affecting culture change in the host country through intensive interactions between foreigners and residents. Moreover, the effect of FDI on the host country culture may also depend on the cultural characteristics of the home country (e.g. from western or eastern regions). Ali and Guo (2005) argue that culture proximity between home and host country of FDI is a primary facture in encouraging FDI inflows into China. For example, FDI enterprises funded from Taiwan are largely located in Fujian province while Hong Kong investors prefer to locate in Guangdong province. This is because these two pairs are not only geographically closest to each other, but also have the same languages (Ali and Guo 2005). Liu et al. (1997) argue that the success of Guangdong province as a major location of FDI in China is determined by three national culture advantages (i.e. geographic closeness to Hong Kong, historical and ethnic connections with overseas Chinese, and the degree of knowledge in dealing with foreigners). Jiang et al. (2010) found that FDI inflows have considerable impact on some dimensions of Chinese culture through learning effect. FDI inflows offer one of the best opportunities for Chinese people to learn from the advanced economies.

2.7.3. *Other Macroeconomic Conditions*

Theoretically it is widely agreed that the technology gap and the level of economic development between home and host countries as well as other macroeconomic conditions might determine the impact of FDI on the host country economic growth. For example, Li and Liu (2005) and Borensztein et al. (1998) found that FDI has a significantly positive impact on economic growth only when it interacts with school enrolment numbers (as a proxy for human capital development).

Furthermore, Borensztein et al. (1998) found that the positive impact of FDI depends on exceeding the threshold value of average years of secondary schooling of the male population above 25 years in the host country. On contrary, Durham (2004) re-examined the hypothesis of Borensztein et al. (1998) by using a different panel of countries and different years. He does not find any significant interaction term between level of education and FDI.

Another factor that may condition the growth effect of FDI is financial market development of the host country. Some studies argue that the positive impact of FDI on economic growth depends on reaching certain degree of financial market development. For example, Hermes and Lensink (2003), Sadik and Bolbol (2001), Alfaro et al. (2004) and Durham (2004) find that the interaction between FDI and financial sector development has a significantly positive impact on economic growth.

In addition, institutional development may also play a crucial role in determining the positive impact of FDI on economic growth of the host economy. For example, Durham (2004) used a different proxy for measuring the institutional development, finding that most of them have a significantly impact on the growth effect of FDI inflow to the host economy.

Moreover, trade regime policies are also found to be important in determining the growth effect of FDI on the host country. For example, Balasubramanyan et al. (1996) found that export promoting (EP) countries attract a greater volume of FDI and import substituting (IS) countries enjoys greater efficiency of FDI inflows. Further, the beneficial effects of FDI in terms of promoting economic growth are stronger in EP countries than IS ones. Recently, Khamfula (2007) examines the influence of corruption on the growth effect of FDI on EP and

IS host countries. The findings indicate that corruption is more harmful in IS countries than in EP countries.

2.7.4. *The Type of FDI Inflows*

The effect of FDI on economic growth is industry specific, since efficiency-seeking FDI is superior to market-seeking FDI in enhancing greater growth in the host economies (Nunnenkamp 2002). Nunnenkamp (2002) also argued that FDI is expected to have a growth effect in the manufacturing sector, while in the primary sector, natural-resource seeking FDI is expected to have a limited impact on growth. Colen et al. (2008) reports that the impact of FDI on economic growth is greater when FDI directed to high labour-intensive and less technology-intensive industries, where the technology gap between foreign and domestic firms is narrowed.

Some scholars argue that the scope of the operation of FDI is a factor in determining the growth effect of FDI in the host country. For example, Alfaro (2003) and UNCTAD (2001; 2005) reported that the extent for linkages between foreign firms and domestic suppliers is often limited in the primary sector. As a result, the impact of FDI, which operates in the primary sector, tends to have a negative effect on growth. The manufacturing sector tends to have a broad variation of linkages activities; therefore FDI tends to have a positive impact on growth. On the other hand, FDI tends to have ambiguous effect in service sector, where the scope of linkages is limited.

In addition, the entry mode of FDI is also crucial. Since, most developing countries prefer Greenfield FDI because it immediately and directly adds to the existing industrial capacity, whereas M&As only transfers the ownership of domestic assets to foreign investors (Colen et al. 2008). As a result, Greenfield FDI may contribute positively to gross domestic investment, since new production is introduced. Greenfield FDI also has a directly positive impact on employment levels via new jobs creation. By the competition effect, Greenfield FDI may improve the efficiency of domestic firms (Meyer 2003).

On the other hand, M&As are less likely to affect the employment levels in the host countries. However, M&As tend to have a more developed network of domestic and regional suppliers, even though it is simply a take-over of a domestically developed business. Although, M&As

may achieve supplementary capital and employment may increase in the long term (Meyer 2003; Colen et al. 2008).

To sum up, the empirical studies suggest that the growth effect of FDI is not automatically but it depends on some conditional factors. For example, the technology gaps, the level of human capital development, financial market development, the macroeconomic conditions and so on. These factors are expected to explain why the growth effects of FDI are completely different between countries at the same level of development, the same sectors and the same types of firms.

3. The Relationship between FDI, DI and GDP: Empirical Evidence from Cointegration Time Series Techniques[8]

3.1. Introduction

Recently, many researchers have dealt with the complex and controversial issue of the relationship between foreign direct investment (FDI), domestic investment (DI) and economic growth (Agosin and Machado 2005; Agosin and Mayer 2000; Apergis et al. 2006; Borensztein et al. 1998; De Mello 1999; Fry 1993; Kim and Seo 2003; Lipsey 2000; Noorzoy 1979; Razin 2003; Tang et al. 2008; Van Loo 1977).

As we said in Chapter two, economic growth theories provide the explanation of the direct and indirect channels in how foreign direct investment inflows (FDI) affect both domestic investment (DI) and economic growth in the host country. For example, neo-classical growth theory assumes that economic growth is generated through an exogenous factor of production function such as the stock of capital accumulation and labour. Barro and Sala-I-Martin (1995) demonstrate that there is a positive relationship between economic growth and capital accumulation over time. According to this theory, an increase in the stock of investment accumulation will result in an increase in the growth rate (Barro and Sala-I-Martin 1995; De Jager 2004). However, economic growth is affected only in the short-run, determined by the stock of capital accumulation. On the other hand, economic growth is determined by exogenous factors, such as technological progress, which takes the form of labour augmentation, in the long-run (Barro and Sala-I-Martin 1995). Therefore, economic growth would then depend on the stock of capital accumulation and the augmentation of labour force by technological progress. As a result, if new technology brought by FDI leads to improved labour and capital productivity that stabilises returns on investment, and labour will grow exogenously (De Jager 2004).

[8] A paper based on the analysis of this chapter has been accepted on November 2009 for publication in Journal of Advances in Management.

In general, this theory argues that FDI in the host country promotes economic growth towards a new steady state by capital stock accumulation, meaning that FDI promotes economic growth through raising DI in the host economy (Herzer et al. 2008).

Besides, endogenous growth theory identifies that economic growth is promoted in the long-run by introducing new technological processes in production function in the host country, and FDI assumes to be more productive than DI (Borensztein et al. 1998; De Mello 1999; Herzer et al. 2008). Thus, FDI enhances economic growth through technological spillovers that offset the effects of diminishing capital returns by boosting the stock of knowledge through labour mobility, training and skills, and through managerial skills and organisational arrangements (Romer 1990; Barro and Sala-I-Martin 1995; De Jager 2004).

Moreover, FDI is expected to enhance the existing stock of knowledge in the recipient economy through labour training and skill acquisition and diffusion of technology. And knowledge is also enhanced through the introduction of alternative management practices and organisational arrangements. Overall, the existence of various forms of externality prevents the unrestrained decline of the marginal productivity of capital. As a result, foreign investors may increase productivity in the host economy and then FDI can be considered as a catalyst for DI and technological progress. It is also through the great potential of FDI as an externality effect, that it is expected to be the most important mechanisms through which it promotes economic growth in the host country (De Mello 1997; Borensztein et al. 1998). Thus, economic growth can increase unlimitedly (De Jager 2004). In summary, the theoretical growth literature demonstrates the role of FDI inflows, which brings new technology and knowledge along with capital, in enhancing economic growth through raising capital accumulation and technological spillovers (Herzer et al. 2008).

Since the 1980s, FDI inflow has grown significantly in the majority of developing countries, because many developing countries have made extensive policies toward reduced barriers to FDI and offered tax incentives and subsidies to attract foreign investments. The idea is that FDI inflow enhances economic growth and creates a sustainable development in the host country by providing new knowledge and complementing DI (Herzer et al. 2008). Borensztein et al. (1998) demonstrate that FDI flows are considered to be the main dynamic in economic growth. Further, De Mello (1999) points out that the growth effect of FDI depends on the great strength of the relationship between FDI and DI or on the crowding-in effects of FDI. On the other hand, Carkovic and Levine (2005) find that FDI inflow does not have an independent impact on economic growth. Similarly, Aitken and Harrison (1999) and Aitken et al. (1997) are unsuccessful in finding support for the hypothesis that FDI inflows accelerate overall economic growth. Besides, De Mello (1997) demonstrates that FDI inflows have a positive impact on output growth and a complementary effect on DI in technological leaders and followers. However, FDI inflows had a negative effect on DI after the integration of countries in the panel of technological leaders, while FDI remains complementary DI in the panel of technological followers. Taking these facts into account, it is natural to find such interest in investigating the relationship between FDI, DI and economic growth in developing countries. Since then, there have been a large number of macro and micro studies examining the relationship between FDI and economic growth. However the results of both country level studies and cross-sectional studies fail to clarify the relationship between FDI and economic growth.

This chapter contributes to the existing literature by applying a multivariate VAR system with the error correction model (ECM), using time series and panel data techniques of cointegration to investigate the links between FDI, DI and GDP in country by country analysis. The aim of this chapter is to investigate the long-run and short-run dynamic interrelationship between FDI, DI and GDP and to address some of the drawbacks of the empirical literature. The chapter, particularly, surveys the recent empirical studies and identifies areas that need further investigation, and addresses them in a way that helps to reduce the empirical evidence debates, and to reach a better understanding of the relationship between FDI inflows, DI and economic growth. Therefore, this chapter attempts to directly identify or examine the relationship between FDI, DI and GDP in developing countries, offering insight into the extensively doubtful FDI-GDP relationship, by investigating the following issues:

Firstly, does FDI contribute positively to GDP; and

Secondly, does FDI really crowd out DI?

The rest of the chapter is organised as follows: section 3.2 critically reviews the empirical literature, highlighting issues that need further examination. Section 3.3 presents econometric methodology that applies to examine the relationship between those variables discussed in this chapter. Section 3.4 shows the variables and the data sources. Section 3.5 presents the empirical results. Section 3.6 presents the conclusion of the chapter.

3.2. FDI Inflows, DI and GDP: Pre-View of Existing Evidence

In recent years, the need for FDI inflows has increased as MNCs have assumed significant importance as a source of economic growth and development. Since FDI may help developing or lower income countries by providing new knowledge and complementing DI, it is important to analyse the relationship between FDI, DI and economic growth, particularly in developing countries. The FDI-Growth nexus has been mainly investigated theoretically and empirically. The growth effect of FDI inflows is one of the most controversial issues in development economics. According to the modernisation hypothesis, FDI generally carries with it advanced technology, and superior management and organisation. Thus, FDI promotes economic growth by offering externalities and, through growth, spreads its benefits throughout the economy (Tsai 1994). This theory predicts that FDI inflows can have permanent positive effects on economic growth (Kim and Seo 2003). In contrast, the dependency hypothesis admits a possible short-run positive effect of FDI inflow on economic growth, although it states that there is a deleterious long-run effect of FDI inflow on economic growth as reflected in the negative correlation between the stock of FDI and growth rate (Tsai 1994). This hypothesis argues that any increase in FDI inflow enables higher investment and consumption and thus directly and immediately creates economic growth in the short-run, while in the long-run as FDI builds up and foreign schemes take hold, there will be adverse results on the rest of the economy that decrease economic growth due to recapitalisation and disarticulation, and the lack of linkages (Tsai 1994). De Mello (1999) demonstrates that “if FDI is expected to have a positive effect on economic growth in the host country, it may appear to have some degree of complementary with DI”. FDI, theoretically, would actually displace DI if the two were perfect substitutes. In this case, the total output in the host country is likely to remain unchanged. In contrast, if FDI and DI were complementary there would be a growth in both total investment and output in the host country. Thus, FDI tends to stimulate competition and promote DI. A traditional view of FDI believes that FDI has a positive effect on economic growth through generating an amount of positive externalities and spillovers (Apergis et al. 2006; Borensztein et al. 1998; Fry 1993; Razin 2003). For instance, FDI has a fundamental role to play in economic growth and long-run growth, as indicated by the neoclassical and endogenous growth theory. Therefore, economic growth may be achieved through attracting FDI inflows because as the stock of FDI increases over time, then the marginal product of capital can be prevented from decreasing in the future (Tang et al. 2008).

Table 1 provides an overview of the different studies in terms of type; of data; country samples, time periods and variables used, and summarize the main findings. The literature appears to offer a better understanding of the dynamic interrelationships between FDI inflows, DI and economic growth. Empirical studies that examine the role played by FDI inflows in economic growth can be divided into four methodological categories: *cross-sectional studies*, *traditional-panel studies*, *cointegration-panel studies*, *and time series* and *cointegration-time series studies*.

3.2.1. Cross-Sectional Studies

This type of studies in general established that FDI inflows contribute positively to economic growth in the host economy (Balasubramanyam et al. 1996). This positive contribution is dependent on particular conditions, such as the level of income, human capital development, the degree of openness, financial development, infrastructure development, and institution development (Blomstrom et al. 1992; Borensztein et al. 1998; Makki and Somwaru 2004; Chowdhury and Mavrotas 2006; Colen et al. 2008). For example, Razin (2003) points out that the effects of FDI on economic growth depend on the nature of FDI flows to the host country, and the degree of development in the host country. Razin (2003) examined the fundamental interaction between DI, FDI, international loans and international portfolio investment, and the distinction between the effects of FDI and other types of capital flows on the economic growth in 64 developing countries for the period 1976-1997 by applying OLS and TSLS regressions, based on hands-on management standards. He finds that FDI contributes positively to DI and economic growth, which was more than any other types of capital flows. Moreover, Blomstrom et al. (1992), for 78 developing countries and 23 developed countries, found that FDI has to be beneficial to high-income developing countries rather than low-income developing countries. Thus, the host country needs to have a certain threshold level of development to absorb the benefits of FDI. Blomstrom et al. (1992) also found that FDI has a crowding-in effect on DI, namely a capital accumulation FDI growth effect. For 38 Sub-

Saharan African countries similar results were also obtained by Ndikumana and Verick (2008). Trade policy regimes also become important in FDI's growth effect. Following Bhagwati (1978), Balasubramanyam et al. (1996) tested the hypothesis that outwardly and inwardly oriented trade policy has significant consequences in attracting FDI inflow and the impact of FDI on economic growth for 46 developing countries. They found that countries that adopted an export promotion strategy are probably highly attractive for FDI, and the influences of FDI are larger than the effects of DI on economic growth. Similarly, Makki and Somwaru (2004) found that FDI and its interaction with trade openness have a positive impact on economic growth for 66 developing countries over three periods (1971-1980, 1981-1990, and 1991-2000). According to Alfaro et al. (2004), FDI's impact on economic growth is favourable in countries that have well-developed financial markets.

The type of FDI flows also appears to affect the impact of FDI on growth. Agosin and Mayer (2000) illustrate that FDI in the form of mergers and acquisitions (M&As) leads, in some way, to transfer the existing assets from domestic to foreign investors. FDIs, therefore, have not contributed to accumulation capital formation, and subsequent economic growth of the host economy. Human capital development also appears important to the host country to benefit from FDI inflow. For 69 developing countries, Borensztein et al. (1998) found that FDI inflows alone have insignificant impact on economic growth. However, when it interacts with human capital, the joint impact of it on economic growth is positive. They argued that the impact of FDI depends on the level of human capital development in the host country, and FDI contributes relatively more to growth than DI. Kim and Seo (2003) point out that the results of Borensztein et al. (1998) cannot be convincingly understood as a straightforward causal relationship between FDI and economic growth through an indirect channel. Some scholars also argue that the hypothesis of FDI being more efficient than DI is inaccurate. For example, Mutenyo (2008) investigated the impact of FDI on economic growth in 32 Sub-Saharan African countries by applying cross-section and dynamic panel data from 1990 to 2003. He found that consistently FDI has a positive impact on economic growth, yet it is less efficient that DI. Borensztein et al. (1998) also found a crowding-in effect, that a one-dollar increase in FDI net inflow leads to increased total investment in the host country by more than one-dollar. These results indicate that most of FDI's growth effect may derive from an efficiency gain rather than an overall higher induced level of investment, contrary to De

Mello's (1999) assumption. However, Borensztein et al. (1998) did not examine when crowding in/out effects take place and their study is only focused on the impact of FDI on DI and economic growth, and the interaction between FDI and the stock of human capital. Fry (1993) explored FDI's effect on DI, savings, growth and current account for 16 developing countries (a group of 5 Pacific Basin countries and a control group of 11 other developing countries). The results show that crowding-in effect dominated in five Pacific economies and eleven developing economies also present a crowding-out effect of FDI on DI. Bosworth and Collins (1999) researched 62 LDCs during 1978 to 1995. They found that FDI inflow crowds in DI, than either portfolio capital and other loans in which FDI would increase DI more than one-for-one for LDCs. However, for emerging markets FDI appears to increase DI by one-for-one. Lipsey (2000) used a lagged of the 5-year period of FDI ratio to examine the relationship between inward/outward FDI flow and DI in the 22 developed countries from 1970-1995. He found no evidence that either inflow/outflow of FDI is crucial in determining the level of DI in the host economies. Certainly, using cross-country techniques may make cause the effects of FDI on economic growth to be different between studies. This difference is because of the various production functions, such as technological, institutional and political production, that are absolutely different from one country to another. Statistically, cross-country studies may suffer from serious endogeneity problems and unobserved heterogeneity. This means that the significant coefficient of FDI in the growth equation is not necessarily the consequence of the effect of FDI on economic growth. Theoretical, rapid economic growth usually produces higher demand and enhanced returns prospects for FDI. Also a positive correlation may be accompanied with causality running from growth to FDI (Nair-Reichert and Weinhold 2001).

3.2.2. Traditional-Panel Techniques Studies

Panel data techniques are used to escape the problems associated with cross-country studies, such as; unobserved country-specific effects, controlling endogeneity issues by including lagged behind explanatory variables to regression equations, and allowing for testing the Granger causality (Herzer et al. 2008). These studies provide mixed evidence on the impact of FDI on economic growth. For instance, Nair-Reichert and Weinhold (2001), for 24 developing countries over the period (1971-1995), found that FDI has a positive impact on economic growth, while Carkovic and Levine (2003) found that FDI does not exert a positive impact on economic growth for 68 countries over seven 5-year periods (1960-1995). In contrast, Changyuan (2007) examined the direct and indirect effects of FDI on economic growth in the 29 mainland provinces in China from 1987-2001, based on the neo-classical model. He found that FDI is positively correlated with economic growth not through its direct effects but through its indirect effects by affecting the technology progress and DI. However, Changyuan (2007) focused on the impact of FDI on DI and economic growth, ignoring the dynamic interaction between these variables. Agosin and Mayer (2000) also had mixed results. They developed a theoretical model of investment based on the neoclassical investment model to test whether FDI crowds in/out DI in three groups of developing countries (Africa, Asia and Latin America) from 1970- 1996. They found that there is a strong crowding in effect for DI in Asia and neutral effect in Africa, while there is strong crowding out effect in Latin America. Agosin and Mayer (2000) concentrated on the impact of FDI on DI, ignored the dynamic interaction between FDI, DI and economic growth. The major problems associated with traditional panel data studies are that the regression is subject to the unrealistic homogeneity conditions on coefficients of the lagged dependent variables. In addition, the standard cross-country and panel studies on FDI and growth may restrict the relationship between these variables in growth rates or first differences. As a consequence, using first differences and/or growth rates without allowing for level relationship may lead to serious misspecification problems (Hansen and Rand 2006).

3.2.3. Cointegration-Panel Studies

These studies used panel cointegration techniques to avoid the criticisms of traditional panel data estimators. Panel cointegration techniques can allow for country level, time-fixed effects, and country-specific cointegration vectors (Herzer et al. 2008), although little work has been done to date. Recently, Basu, Chakraborty, and Reagle (2003), for 23 developing countries from (1978-1996), found a cointegration relationship between FDI and GDP. Basu et al. also found that there is a bi-directional causality between these two variables in open economies, and uni-directional causality, mainly the causality runs from GDP to FDI, in closed economies. Their results imply that FDI and GDP are not mutually under restrictive trade regimes. Moreover, Hansen and Rand (2006), for 31 developing countries from 1970-2000, found that there is a cointegration relationship between FDI and GDP. Their findings indicated that FDI inflows are positively correlated with GDP, whereas GDP has no long-run effect on FDI. De Mello (1999) used the bivariate VAR model and time series concepts of cointegration to a set of time series and panel data for 32 OECD and non-OECD countries. He found that the ability of FDI to enhance economic growth depends on the degree of complementarity and substitution between FDI and DI. However, De Mello failed to explain the crowding effects clearly and his study is hence more theoretical rather than an empirical analysis (Agosin and Mayer 2000). In addition, his study is subject to a small sample bias, (22 annual observations), and the methodology used has hardly ever been employed to investigate the dynamic relationship between FDI, DI and economic growth (Kim and Seo 2003). Another study focused on the impact of FDI on DI using panel cointegration, by Apergis et al. (2006). This study tested the impact of FDI on DI and the causality relationship between FDI and DI in a group of 30 countries from 1992-2002. It found that there is a complementarity long-run causal relationship between FDI and DI, crowding in effects, in Asia and Africa, while crowding out effects for America and Europe, in line with Agosin and Mayer (2000). In spite of the advantages of modern panel cointegration techniques, the heterogeneity problems remain a serious concern. The refusal of the null hypothesis, i.e. that there is no panel cointegration may be driven by a few cointegration relationships between variables. In addition, assuming the whole panel is cointegrated can create high risks if only a small fraction of the relationships in the panel is actually cointegrated (Herzer et al. 2008). Thus, applying cointegration techniques if there is a mixture of cointegration and non-cointegration relationships between variables may lead to serious prejudices in determining causality as well as the short-run and long-run coefficients (Banerjee et al. 2004).

3.2.4. Time Series Studies and Cointegration-Time Series Studies

Recently, a number of empirical studies applied time series for individual countries, however, little work has been found to date. The studies usually apply *time series analysis or time series cointegration techniques* to illustrate the causality between FDI, DI and economic growth for country-by-country studies (Ramirez 2000). Bouoiyour (2003) examined the determining factors of FDI in Morocco, using annual data by applying an econometric model from 1960 to 2003. He argued that the instability of the Moroccan economy growth leads to obstacles in attracting FDI inflows. On the other hand, Adewumi (2006) examined the contribution of FDI to economic growth in Africa using annual series, by applying time series regression analysis from 1970 to 2003. He found that FDI contributes positively to economic growth in most of the countries but it is not statistically significant. Recently, Herzer et al. (2008) applied time series techniques from 1970-2003 for 28 developing countries, 10 countries from Latin America; 9 countries from Asia; 9 countries from Africa. They found weak evidence that FDI enhances either a long-run or short-run GDP. Their findings also indicate that there is unclear evidence that the impact of FDI on economic growth depends on the level of per capita income, the level of education, the degree of openness and the level of financial market development in the host country.

For testing the crowding effect of FDI, Van Loo (1977) and Noorzoy (1979) investigated the effect of FDI on total investments in Canada, by utilizing annual data and applying an accelerator investment model. They found that FDI leads to increased DI through direct effects, and that the total impact is probably smaller due to a negative indirect effect. Moreover, Noorzoy (1979) found that FDI inflow has crowding in effects on DI, while FDI outflow has crowding out effects on DI. However, Van Loo and Noorzoy used a single regression model, which failed to consider the strong causal links and feedback between FDI, DI and economic growth (Tang et al. 2008). Kim and Seo (2003) investigated the dynamic relationship between FDI, DI and economic growth in Korea using quarterly data from 1985-1999, by applying a time series techniques (a VAR model and the innovation accounting techniques). Their findings did not support that FDI crowds out DI in Korea. Similarly, Tang et al. (2008) found that there is no evidence that FDI crowds out DI, but instead FDI has a complementary effect on DI in China using quarterly time series data from 1988-2003. They also found FDI stimulates DI through the channel of technology diffusion. Fedderke and Romm (2006), for time series data from 1960-2003 in South Africa, found that FDI crowds in DI in the long-run, yet it crowds out DI in the short-run.

To sum up, theoretically, the role of FDI in economic growth cannot be ignored, but in practice this hypothesis is still controversial. The lack of homogeneity in the host economies makes the relationship between these variables more ambiguous. The results of existing empirical studies may cast a doubt about the relevance of the dynamic relationship between

FDI, DI and growth, suggesting that this field of literature may need more investigation, particularly in developing countries.

Table 1: Summary of recent studies of the dynamic relationship between FDI, DI and Growth

Author(s)	Type of data	Sample	Variable(s)	Main results
Van Loo (1997)	Time series	Canada; 1948-1966	FDI inflow; GFCF (DI)	Crowding –in effect
Noorzoy (1979)	Quarterly data	Canada; 1957.I-1971.IV	FDI inflow; GCF (DI)	Crowding –in effect
Borensztein et al.(1998)	Gross section	69 developing countries; 1970-1989	FDI/GDP; growth rate of per capita real GDP; Total fixed investment (DI)	FDI has a positive effect on growth but magnitude depends on availability of host country human capital. FDI has crowding in effect on DI.
De Mello (1999)	Panel data and time series	32 developed and developing countries; 1970-1990	FDI inflow, TFP growth, capital accumulation (DI)	The positive impact of FDI on economic growth depends on crowding in effect of FDI.
Agosin and Mayer (2000)	Panel data	Group of 32 countries (12 in Africa, 8 in Asia and 12 in Latin America); 1970-1996	FDI/GDP, growth rate of GDP, GFCF (DI)/GDP	Strong crowding-in effect in Asia, neutral effect in Africa and strong crowding-out effect in Latin America
Kim and Seo (2003)	Time series cointegration	Korea; 1985-1999	FDI inflow, GFCF (DI) and growth rate of GDP	Strong positive effect from growth rate of GDP to FDI rather than the effect of FDI on economic growth. FDI inflows crowd-in DI.
Apergis et al. (2006)	Panel cointegration data	Group of 30 countries from Asia, Africa, America and Europe; 1992-2002	FDI inflows, GFCF (DI)	Crowding in effect of FDI for Asia and Africa. Crowding-out effect for America and Europe.
Tang et al. (2008)	Time series cointegration	China; 1988-2003	FDI inflows, GCF (DI), GDP	Bi-directional causality between DI and GDP. Uni-directional causality from FDI to GDP and DI. FDI crowds-in DI.
Herzer et al. (2008)	Cointegration time series	Group of 28 countries (10 in Latin American, 9 in Asia and 9 in Africa)	FDI inflow/GDP, GDP	Only weak evidence for FDI effects on GDP. Weak evidence for the growth effects of FDI depend on host country conditions.
Ndikumana (2008)	Gross section	Group of 38 sub-Saharan African countries	FDI/GDP, growth rate of GDP, Private investment/GDP	Economic growth has a positive impact on FDI. Bi-directional causality between FDI and DI, and FDI crowds-in DI. Also, FDI enhances economic growth through capital accumulation.
Choe (2003)	Panel data	Group of 80 developed and developing countries; 1971-1995	Growth rate of per capita GDP, FDI/GDP, GFCF (DI)/GDP	FDI Granger causes economic growth and vice versa but this effect is more apparent from growth to FDI. Uni-directional causality runs from growth to DI.
Chowdhury and Mavrotas (2006)	Time series cointegration	Chile, Malaysia and Thailand; 1969-2000	FDI inflow, GDP	GDP causes FDI in Chile, and there are a bi-directional causality between GDP and FDI in the case of both Malaysia and Thailand
Adams (2009)	Pooled time-series cross-section	Group of 42 Sub-Saharan African countries; 1990-2003	Growth rate of real GDP per capita, FDI inflows/GDP, GFCF (DI)/GDP	DI has a positive impact on economic growth but FDI is positive and significant only in the OLS estimation. FDI has an initial negative impact on DI.
Baharumshah and Thanoon	Dynamic panel data	Group of 8 East Asian countries; 1982-2001	GDP, long-term debt/GDP, short-term debt/GDP,	Domestic saving has a positive impact on the long-term economic growth. FDI influence on growth is much

(2006)			FDI/GDP, domestic savings/GDP	higher than domestic savings. Short-term capital inflow has adverse effect on the economic growth.
Chakraborty and Basu (2002)	Time series cointegration	India; 1974-1996	Real GDP, FDI inflows	The causality runs more from GDP to FDI and not vice versa. FDI has negative insignificant impact on economic growth in the short-run.
Elfakhani and Matar (2007)	Panel data	Group of 19 MENA countries; 1990-2000	FDI/GDP, growth rate of real GDP, GFCF (DI)	FDI crows-in DI. Economic growth has a negative correlation with FDI inflows.
Frimpong and Oteng-Abayie (2006)	Time series data	Ghana; 1970-2002	FDI inflows, growth rate of GDP	There is no causality between FDI and GDP growth but FDI caused GDP growth during the post-SAP (1984-2002) period.
Hansen and Rand (2006)	Panel cointegration	31 developing countries; 1970-2000	FDI/GDP, real GDP, FDI/GCF	Strong causal link from FDI ratio to GDP, also the changes in the FDI ratio cause changes in the level of GDP in the long-run. GDP Granger causes FDI, but no impact on the long-run level of the FDI ratio. Also, FDI/GCF Granger causes GDP.
Johnson (2006)	Cross-section and panel data	Group of 90 developed and developing countries; 1980-2002	Inward stock of FDI per capita, growth rate of real GDP per capita	FDI inflows enhance economic growth in developing countries but not in developed countries.
Fedderke and Romm (2006)	Time series	South Africa; 1956-2003	Real GDP, private sector fixed capital stock (DI), real FDI	FDI inflow crowds-in DI in the long-run but it crowds-out DI in the short-run. Most FDI inflow into South Africa is horizontal rather than vertical.

3.3. Econometric Methodology

Following UNCTAD (WIR, 1999), Agosin and Mayer (2000), Kim and Seo (2003), Tang et al. (2008) and Herzer et al. (2008), based on the theoretical argument and empirical studies, this study will use a modern time series technique to address those questions, that arose above. Therefore, this study will apply a vector error-correction model (VECM) to test the dynamic relationships between FDI, GDP and DI variables. The vector error correction model (VECM) can be used to reflect the lagged changes, first differences and the level of these variables in the system, which enables the enlightening of the short-run and long-run effects between those three variables. Since, the previous empirical studies used either cross-sectional or panel data, which might suffer from problems of data comparability and heterogeneity (Tang et al. 2008), this chapter uses pure time-series data to overcome these problems. In addition, the usual approach in empirical studies used the cross-sectional or panel data framework; regressing growth on FDI inflows or vice versa and setting-up other variables that are considered to affect the relationships. The major problem of these empirical approaches, however, is that estimates are interpreted to imply some strong relationship between those variables, ignoring the feedback, and hence highly restricting the dynamics (Kim and Seo 2003). The VAR model with the error correction model (ECM) integrates a long-run and short-run dynamic which the others do not have. Testing for the hypotheses relative to these issues takes these forms:

$$\Delta LGDP_t = \lambda_0 + \sum_{k=1}^{m} \lambda_{1k}\, \Delta LGDP_{t-k} + \sum_{k=1}^{m} \lambda_{2k}\, \Delta LFDI_{t-k} + \sum_{k=1}^{m} \lambda_{3k}\, \Delta LDI_{t-k} + \lambda_4\, \nu_{t-1} + \eta_{1,t} \qquad (1)$$

Similarly, both the VECM of FDI and DI equations can be rewritten as following

$$\Delta LFDI_t = \sigma_0 + \sum_{k=1}^{m} \sigma_{1k}\, \Delta LGDP_{t-k} + \sum_{k=1}^{m} \sigma_{2k}\, \Delta LFDI_{t-k} + \sum_{k=1}^{m} \sigma_{3k}\, \Delta LDI_{t-k} + \sigma_4 \nu_{t-1} + \eta_{2,t} \qquad (2)$$

$$\Delta LDI_t = \tau_0 + \sum_{k=1}^{m} \tau_{1k}\, \Delta LGDP_{t-k} + \sum_{k=1}^{m} \tau_{2k}\, \Delta LFDI_{t-k} + \sum_{k=1}^{m} \tau_{3k}\, \Delta LDI_{t-k} + \tau_4 \nu_{t-1} + \eta_{3,t} \qquad (3)$$

where

ν_{t-1} indicates the error-correction term. For example, $\nu_{t-1} = GDP_{t-1} - \lambda_2 FDI_{t-1} - \lambda_3 DI_{t-1}$, is the residual of the cointegration equation and λ_4 is the adjustment coefficients. In this model there are two sources of causation for GDP, either through the lagged terms of the variables or through the lagged cointegrating vectors (Asteriou and Hall 2007).

$\eta_{i,t}$ indicates the white-noise disturbance terms.

Δ indicates the difference operator of the log variable (for example, $\Delta LGDP_t = LGDP_t - LGDP_{t-1}$, which indicates the growth rates of GDP).

L indicates the natural logarithm form.

GDP_t: real GDP in constant US dollars as proxy of market size of the host country (Herzer et al. 2008; Li and Liu 2005; Ramirez 2000; Tang et al. 2008; Agosin and Mayer 2000; Kim and Seo 2003).

FDI_t: the ratio of FDI inflow to GDP. Using the FDI-to-GDP ratio rather than (log) FDI, since the latter, via the national income accounting identity, is itself a component of GDP and thus partly endogenous within the GDP equation, which may bias the results in favour of a correlation between these two variables (Herzer et al. 2008). Also, the ratio of FDI to GDP can take into account the effect of host country market size. FDI inflow will be using as proxy for measuring investment by TNCs (or foreign firms) in host country (UNCTAD 1999). The expected sign is positive.

DI_t: the ratio of gross capital formation (GFCF) to GDP. GFCF will be using as proxy of total investment (domestic investment; DI) in the host country (UNCTAD 1999). The expected sign is positive.

In addition, the expected sign of the explanatory variables in the FDI equation can be summarised as following: the log of GDP is used to capture the influence of market size of the host country. FDI literature documents that a market size measure is expected to have a positive impact on FDI, as a large market means a greater demand for goods and services which attracts market-seeking FDI. The log of DI is used to capture the influence of domestic investment of the host country. DI literature demonstrates that domestic investment is expected to have a positive sign, because DI can act as a signal of the investment opportunities, and provide more information about investment environments in the host economy. Further, the lagged of FDI inflow captures the impact of existing foreign investment on new FDI inflows.

Moreover, the expected sign of the explanatory variables in the DI equation can be summarised as following: the log of GDP is used to capture the influence of market size of the host country. Economic literature documents that a market size measure is expected to have a positive impact on DI, as a large market means a greater demand for goods and services which attracts not only more FDI but also enhances more DI. The log of FDI is used to capture the influence of FDI on the domestic investment of the host country. FDI literature demonstrates that FDI is expected to have both signs, depending on the crowding-in or out effects of FDI on DI. Further, the lagged of DI captures the impact of existing domestic investment on the future DI.

A crucial equation in this extent is how much is the magnitude of crowding effect of FDI on DI. Since DI includes foreign investment, the magnitude of crowding effect of FDI needs some explanations. Following Agosin and Mayer (2000) and Razin (2003), this chapter suggests two formulas to distinguish between the crowding effect of FDI in the long-run and in the short-run.

In the long-run, the magnitude of crowding effect will take this formula:

From total *DI* equation in the long-run: $DI= f(\alpha FDI\ldots.)$

As we know the *DI includes both foreign and domestic investment, therefore,*

$$FDI+ DI=\alpha FDI$$

$$DI= \alpha FDI-FDI$$

$$DI= (\alpha-1)\ FDI, \textit{ and then}$$

The magnitude of Crowding effect (CE) = α*-1, and therefore,* there are three possibilities for crowding effect:

If $\alpha=1$*, then there is no effect from FDI to DI (neutral effect)*

If $\alpha>1$*, then there is a positive effect from FDI to DI (crowding-in effect)*

If $\alpha<1$*, then there is a negative effect from FDI to DI (crowding-out effect)*

Where: α is the volume of the coefficient of *FDI* in the long-run.

In the short-run, the magnitude of crowding effect (*CE*) is calculated as following:

From total DI equation in the short-run: $DI= f\,(\sum\tau_{2k}\,FDI, \sum\tau_{3k}\,DI\ldots)$

$$DI=\sum \tau_{2k}\,FDI +\sum \tau_{3k}\,DI$$

$$DI-\sum \tau_{3k}\,DI =\sum \tau_{2k}\,FDI$$

$$(1- \sum \tau_{3k})DI = \sum \tau_{2k}\,FDI$$

$$\text{The magnitude of Crowding effect (CE)} =\sum \tau_{2k} / (1-\sum \tau_{3k})$$

where: τ_{2k} is the volume of *FDI* coefficient, and τ_{3k} is the volume of *DI* coefficient.

Therefore, there are three possibilities for crowding effect:

1. If the magnitude of crowding effect (CE) equals one unit. This means that an increase in FDI of one dollar (or, more precisely, of one percentage point of GDP) becomes one dollar of additional total investment (or investment amounting to one percentage point of GDP). This is called the neutral effects of FDI on total DI, and there are no macroeconomic externalities generating from FDI inflows.

2. If the magnitude of crowding effect (CE) is more than one unit. This means that one additional dollar of FDI becomes more than one additional dollar of total investment. This is evidence on the crowding in effects of FDI on DI, and there are positive macroeconomic externalities generating from FDI inflows.

3. If the magnitude of crowding effect (CE) is less than one unit. This means that one additional dollar of FDI leads to less than a one-dollar increase in total investment. In

other words, there is displacement of DI by FDI. This is evidence on the crowding out effects of FDI on DI, and there are negative macroeconomic externalities generating from FDI inflows.

3.4. Data and Variables

The empirical analysis is based on annual data of 3 groups selected from the top recipients of FDI in Africa, Latin America and Asia regions, so that the sample incorporates nine developing countries. However, choosing different countries from different regions with different development episodes can make the investigation of the relationships between FDI, DI and GDP more interesting.

Appendix A summarises the main economic policy reforms in the sample countries. The summary of economic policy reform indicates that the majority of these countries cannot achieve their economic development goals, despite moving from closed door to open door. This change increases their ability to attract more foreign investment and liberalises their economy. In addition, the impacts of foreign investment on economic growth and domestic investment are still unclear, although these countries followed different policies and they achieved different development stages.

The selected sample includes Egypt (1970-2006), Morocco (1970-2006), Tunisia (1970-2006), China (1979-2006), India (1970-2006), Korea (1976-2006), Argentina (1977-2006), Brazil (1970-2006) and Mexico (1970-2006) on FDI inflows, gross domestic production (GDP) and gross fixed capital formation (DI). The data are obtained from the World Bank (World Development Indicators, 2008). GDP is supposed to be used as a proxy for measuring the market size and economic growth. GDP is expressed in real terms at a constant 2000 US dollar value. The ratio of FDI inflows to GDP is supposed to be used as a proxy for measuring knowledge transfers and adoption of new technology brought along by FDI inflows. Net FDI inflows are defined as net inflows of investment for acquiring a lasting management interest (10% or more of voting stock) in an enterprise operating in an economy other than that of the investor. It includes equity capital, reinvestment of earnings and other long term and short-term capital as shown in the balance of payments (Herzer et al. 2008). The ratio of gross fixed capital formation to GDP is supposed to be used as a proxy for measuring the DI. All variables are expressed in natural logarithms to facilitate the calculation of elasticity of variables. This chapter used annual time series data because of stationarity characteristics. This implies that the mean and standard deviation do not systematically differ over the time period. In addition, annual data is normally very useful in establishing long-term econometric relationships between variables.

3.4.1. *Trends of Net FDI Inflow, DI and GDP Analysis*

The figures from Figure 5 to Figure 13 show the trends of the variables used in this study over the country sample within the sample period. Since the 1980s, the graphs of FDI[9] show increasing trends, except in India, and that the FDI trends have been continuously increasing since the 1990s. These figures also show that there are increasing trends of the DI and GDP variables over the sample period in each country.

The FDI graph shows that FDI inflows, in Egypt, increased slowly during the period from 1980 to 2003, and then increased significantly afterwards, due to its openness policy and the adoption of the Economic Reform and Structural Adjustment Programme (ERSAP). There was also an increase of about 64.1 % per annum in FDI flows into this country from 1980 to 2006. The FDI graph also shows that FDI inflows, in Morocco, increased slightly during the 1980s, and then increased significantly between 1990 and 1994, due to the Structural Adjustment Programme (SAP) and the privatisation programme. This was followed by decreased FDI flows from 1995 to 1999, due to fewer privatisation sales and inadequate economic policy reforms (UNCTAD 2007) and then a recovery. However, FDI inflows increased by about 94.3% per annum from 1980 to 2006 in Morocco. The FDI graph also shows that FDI inflows, in Tunisia, increased slowly during the 1980s, and then increased considerably during the 1990s. This was followed by significantly increased FDI flows from 2000 to 2006, due to a 1980s export promotion strategy, investment incentives legalised in 1994 and a privatisation programme in 1995. However, FDI inflow increased by about 47.9% per annum from 1980 to 2006 in Tunisia.

[9] Net FDI inflows are measured at current U.S dollar.

Turning to Latin American countries, Argentina started enjoying FDI flows since the late 1980s, as a result of stagnating macroeconomic conditions, such as the second oil shock, the third world debt crisis, hyperinflation and a broad currency crisis and a reduction of TNCs. The FDI graph shows that FDI inflows, in Argentina, increased significantly during the 1990s, as a result of the Economic Emergency Act. However, FDI inflows were falling between 1999 and 2001, due to the economic crisis years of 1995-1996 and the Asian financial crisis between 1997 and 1998, and then recovered afterwards. However, FDI inflow increased by about 26.5% per annum from 1980 to 2006 in Argentina.

Since the 1970s, FDI inflows have played a significant role in economic development in the Brazilian economy, which is the outcome from the FDI regime liberalisation (Veiga 2004). However, the FDI graph shows that FDI inflows, in Brazil, increased slowly between 1980 and 1993, as a result of the Brazilian exchange crisis and the rule number 171 under the Constitution of 1988, and then increased considerably from 1994 to 2000, as a consequence of economic liberalisation, Mercosur protocol and the adjustments to the Constitution of 1988. This was followed by significantly decreasing FDI flows from 2000 to 2003, as a result of regulation risks of new government, and then recovered afterwards. However, FDI inflow increased at about 32.7% per annum between 1980 and 2006 in Brazil. With regard to Mexico, it announced that foreign investment has become the crucial factor for economic growth, due to the worst Mexican financial crisis in 1982. In 1986, Mexico entered into GATT and was classified as second grade, and in 1994, Mexico signed the North American Free Trade Agreement (NAFTA). In the 1990s, Mexico was one of the most successful countries in Latin America in attracting FDI. The FDI graph shows that FDI inflows increased significantly between 1980 and 2006, reaching a peak in 2002. However, FDI inflow increased to about 30.7 % per annum 1980 to 2006 in Mexico.

Turning to Asian countries, by the early 1970s and compared with its Asian neighbours, China was suffering from weakness and the failure of its technological modernisation. These challenges led to increase focusing on readjustment and reforms, which took place in 1976 (Li 1998). In the 1990s, China overtook other countries, except the USA in attracting FDI. This made China the first recipient of FDI among developing countries and the second largest recipient in the world (Coughlin and Segey 1999). The FDI graph shows that FDI inflows increased slowly during the 1980s, as a result of the lack of clarity of China's policies and the lack of adequate information. Since the beginning of 1990s, FDI inflows to China have been increased significantly, as a consequence of improvement in the investment climate, the granting of exemptions and incentives for FDI, reducing the control of local loans and opening the domestic market for FDI. However, FDI inflow was increased to about 125.9% per annum from 1990 to 2006.

With regard to India, it started liberalising its economy to the rest of the world in the mid-1980s (Chakraborty and Basu 2002). In the 1990s, as a result of the Gulf war and the deteriorating balance of payment, India entered into the most difficult financial crisis. In 1991 the government adopted a program of macroeconomic stabilisation and structural adjustment supported by the International Monetary Fund (IMF) and the World Bank. In the same year, India announced the New Industrial Policy (NIP) (Kumar 1995). In spite of the liberalization policies pursued by the country for FDI, it started enjoying FDI inflows only from 1995. The FDI graph shows that FDI flows slowly during the 1980s and from 1995 and afterwards, FDI flows significantly to India. However, FDI inflow increased to about 499.5% per annum from 1990 to 2006.

Finally, Korea has shifted to a more proactive FDI regime but FDI still played a marginal role in the industrialisation process (Ahn 2008). Korea began to stand ahead of ASEAN countries but behind China, although its performance seems to be unsatisfactory in terms of its economic size. Korea is classified as a poor country in providing investment incentives for FDI (Hong and Gray 2003). The reasons behind the decrease in FDI performance to below the potential level are the government policy, a tradition of law reliance on FDI, political and social factors, and weak international competitiveness (Francis 2003). Korea restricted FDI inflows into the country by adopting a serious burden of laws and regulations to protect domestic industries. These restrictions led to the closure of many sectors to FDI until the early 1990s. Moreover, until the mid-1980s Korea followed independent FDI policies, which controlled and depressed FDI inflows into the country based on government’s desire to take control of the available capital resources (Kim 1999). However, in the 1980s, Korea accumulated a high amount of foreign exchange reserves, due to increased export revenues and thus it thought that it did not need to donate more incentives to attract FDI (Hong and Gray 2003). As a result, FDI flowed slowly during the 1980s. In the late 1990s, Korea faced slowing economic growth, emergency borrowing from the IMF in 1997 and an acute shortage of foreign exchange reserves in the wake of the Asian financial crisis of 1997-1998. Korea began a new wave of attracting FDI to support its balance of payment and to reduce the levels of unemployment (Hong and Gray 2003). As a result, FDI inflows shot up to reach a peak in 1999 and 2000. This was followed by declining FDI flows reaching a bottom in 2002, as a result of the slowdown of world economic growth. This was followed by recovering in FDI flows, due to the changes in the structure of the Korean economy (Kwon 2004). However, FDI inflow was increased to about 20.9% per annum from 1990 to 2006.

These graphs also show that total DI[10], for the whole period, increased considerably by averaging growth rates over 20%, 11.1%, 10.5%, 1.3%, 5.02%, 8.51%, 61.39%, 27.75%, 30.17% per annum in the case of Egypt, Morocco, Tunisia, Argentina, Brazil, Mexico, China, India and Korea, respectively. The graphs of total DI suggest that there is a strong increasing trend in this variable over the sample period in the case of Asian countries, steadily growing in the case of African countries and limited growth in the case of Latin American countries. In addition, GDP, for the whole period, increased dramatically by averaging growth rate over 14.3%, 8.7%, 13.5%, 2.5%, 8.07%, 7.24%, 40.89%, 13.59% and 19.10% per annum in the case of Egypt, Morocco, Tunisia, Argentina, Brazil, Mexico, China, India and Korea, respectively. The GDP graphs suggest that there is a strong growing trend of this variable over the sample period in the case of Asian countries, particularly China, steadily growing in the case of African countries and slight growth in the case of Latin American countries.

[10] Total DI includes both domestic investment and foreign investment.

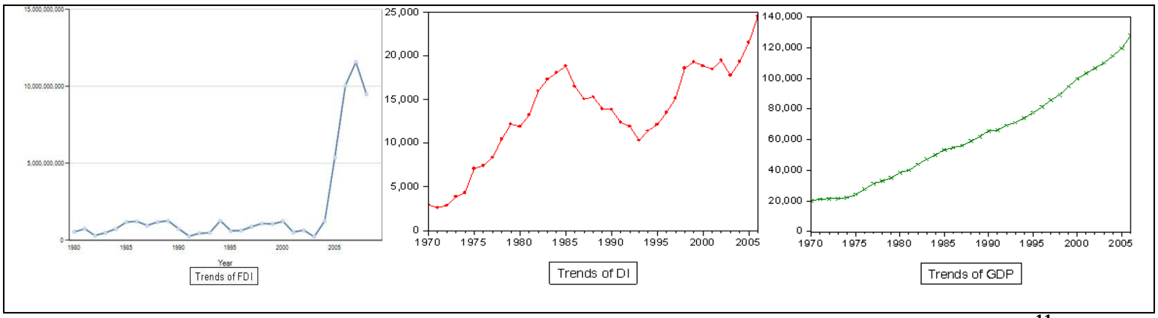

Figure 5: Trends of net FDI inflows, real DI and real GDP in the case of Egypt[11]

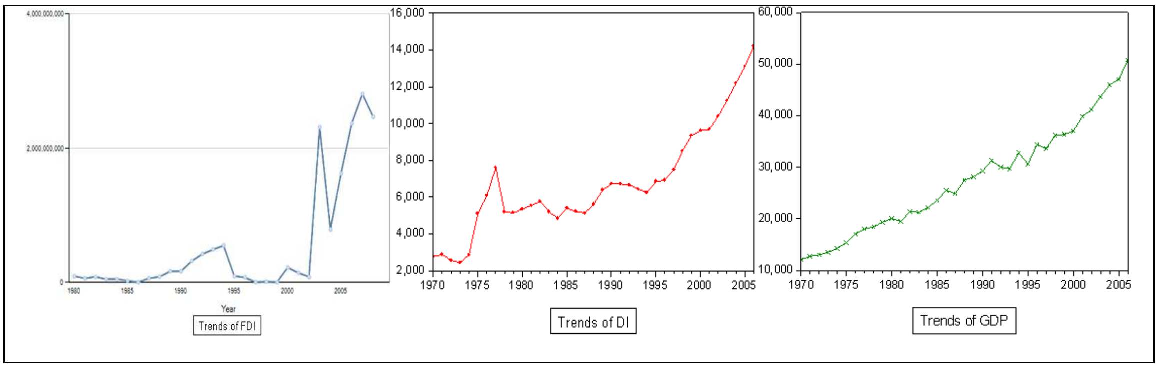

Figure 6: Trends of net FDI inflows, real DI and real GDP in the case of Morocco

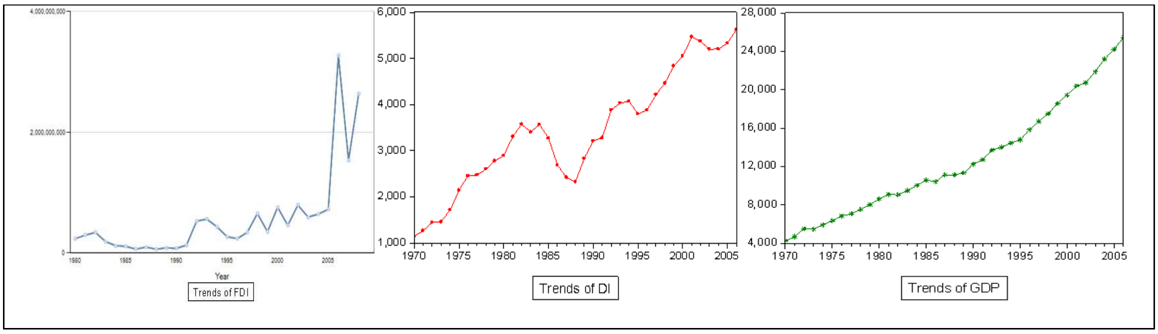

Figure 7: Trends of net FDI inflows, real DI and real GDP in the case of Tunisia

[11] All figures are conducted by author using Eviews software based on the data analysis.

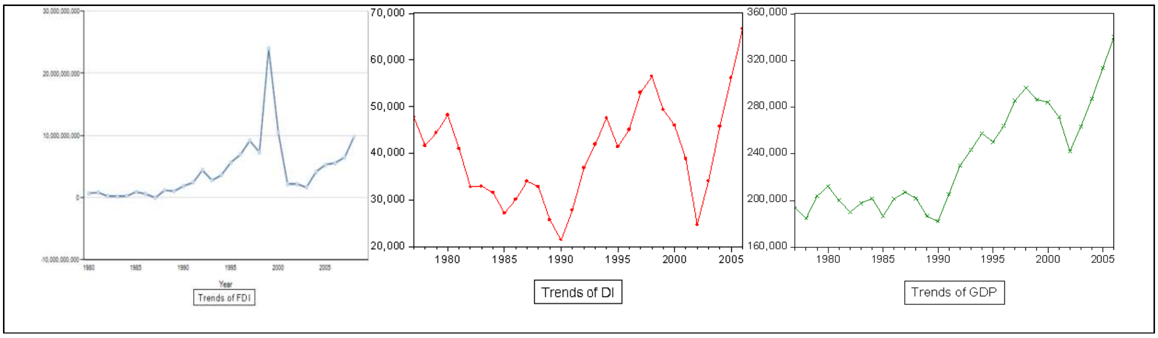

Figure 8: Trends of net FDI inflows, real DI and real GDP in the case of Argentina

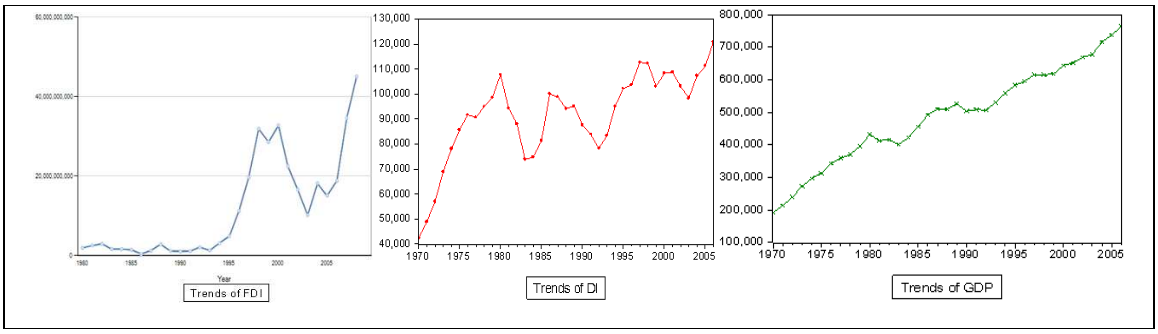

Figure 9: Trends of net FDI inflows, real DI and real GDP in the case of Brazil

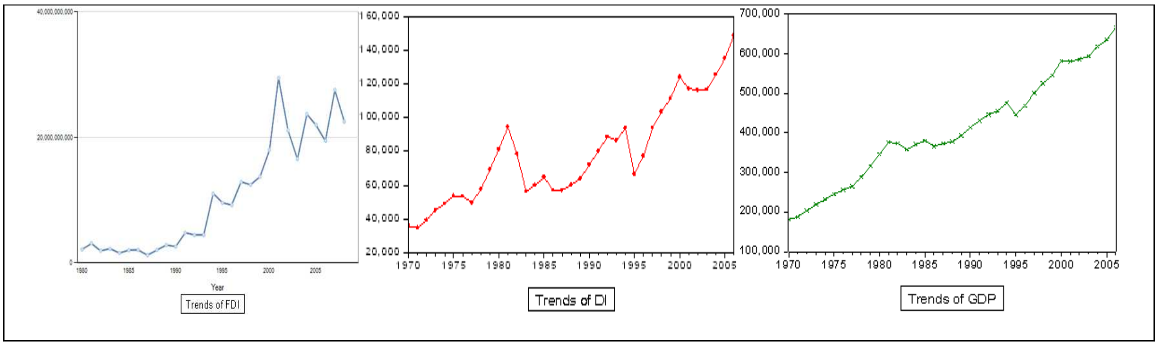

Figure 10: Trends of net FDI inflows, real DI and real GDP in the case of Mexico

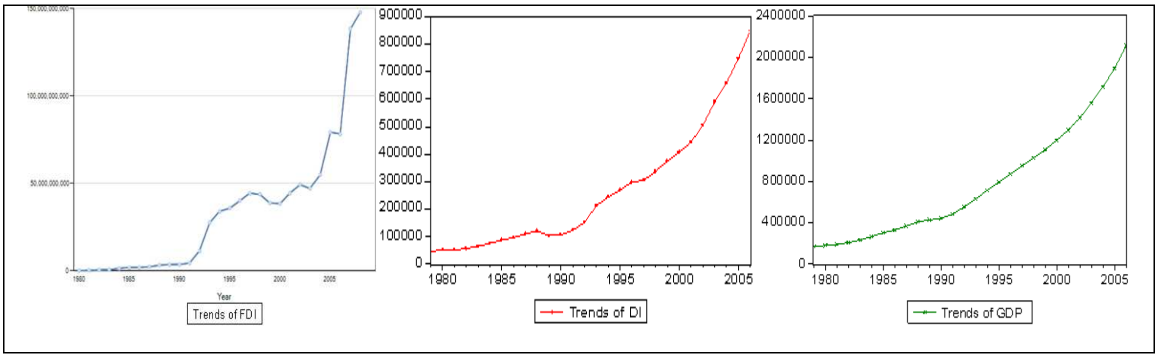

Figure 11: Trends of net FDI inflows, real DI and real GDP in the case of China

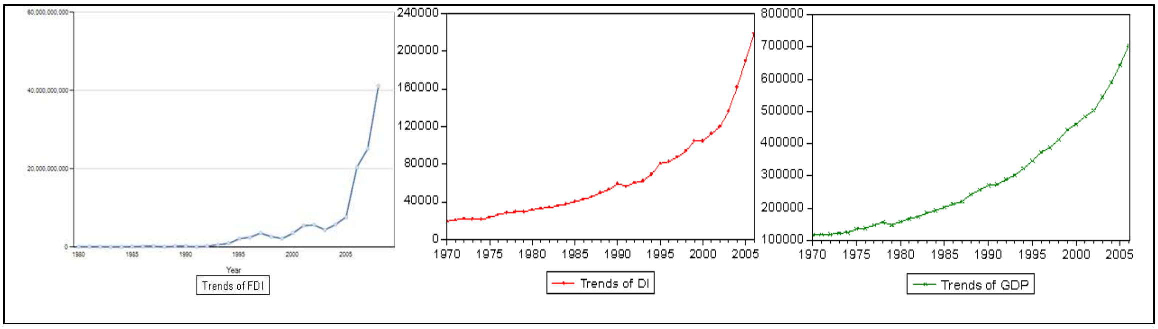

Figure 12 : Trends of net FDI inflows, real DI and real GDP in the case of India

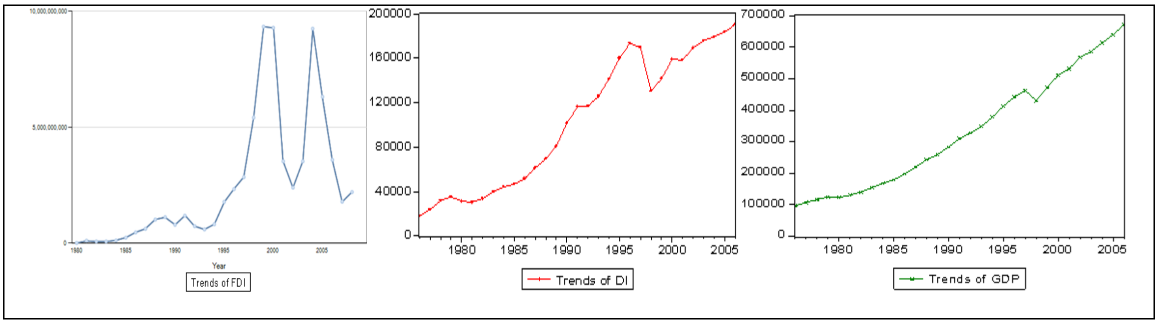

Figure 13: Trends of net FDI inflows, real DI and real GDP in the case of Korea

3.4.2. *The Contributions of FDI to GDP and DI, and the Contributions of DI to GDP*

It can be seen from Figure 14 that there was little fluctuation in the ratios of FDI to GDP in the case of Egypt. Although FDI appears to have a slightly increasing contribution to GDP, this contribution exceeded 1.27%, as an average from 1970 to 2006. There was also a little fluctuation in the ratios of FDI to total DI. Nevertheless, these ratios even exceeded 5.69%, as an average for the whole period. Also, the contributions of total DI to GDP even exceeded 22.9 %, as an average of the whole period. In the case of Morocco, it can be seen that the ratios of FDI to GDP were quite low and did not exceed 0.73%, as an average of the period from 1970 to 2006. Furthermore, the ratio of FDI to total DI has a number of fluctuations over the sample period. This ratio though exceeded 2.95% as an average of the period from 1970 to 2006. In addition, there was a significant contribution of total DI to GDP, although the contribution of total DI to GDP exceeded 24.6% as an average of the sample period. In this case of Tunisia, it can be seen that there was an increase in the ratios of FDI to GDP over the sample period, at an average of more than 2.14%. There was also a significant contribution of FDI to total DI in this case. The ratios of FDI to total DI exceeded 7.98% an average over the sample period. Additionally, there was a slight decrease in the contribution of total DI to GDP in this case; however, the ratios of total DI to GDP recorded 28.37% as an average of the sample period.

In the case of Argentina, there was a little fluctuation in the ratios of FDI to GDP, although the contribution of FDI to GDP still exceeded 1.31%, as an average of the period from 1977 to 2006. Furthermore, there was a little fluctuation in the ratios of FDI to total DI. These contributions exceeded 7.95%, as an average of the whole period. In addition, there was a steady decline in the ratios of total DI to GDP over the sample period. However, the contributions of total DI to GDP exceeded 17.0%, as an average of the whole period. In the case of Brazil, the ratios of FDI to GDP were quite low and less than 1% from 1970 to 1995. Furthermore, the contribution was quite low and exceeded 1.21%, as an average from 1970 to 2006. The ratios of FDI to total DI also increased over the sample period, although they exceeded 6.97% as an average from 1970 to 2006. In addition, there was a significant contribution of total DI to GDP, although these ratios of total DI to GDP exceeded 19.67% as an average of the sample period. In the case of Mexico, the ratios of FDI to GDP were quite low and exceeded 1.3%, as an average of the period from 1970 to 2006. Furthermore, the ratios of FDI to total DI were growing over the sample period. However, these ratios exceeded 6.8% as an average of the period from 1970 to 2006. In addition, there was a small fluctuation in the ratios of total DI to GDP over the sample period, although these ratios exceeded 19.3% as an average of the sample period.

In the case of China, the ratios of FDI to GDP mostly fluctuated over the sample period. However, the contribution exceeded 2.3%, as an average of the period from 1980 to 2006. Furthermore, there was a considerable contribution of FDI to total DI over the sample period, although the contribution exceeded 6.9% as an average of the period from 1980 to 2006. In addition, there was a significant contribution of total DI to GDP, although the ratios of total DI to GDP exceeded 31.6% as an average of the sample period. In the case of India, the ratios of FDI to GDP were quite low and less than 1%, as an average of the period from 1970 to 2006. Furthermore, the ratios of FDI to total DI had been growing over the sample period, although the contribution nevertheless exceeded 1.42% as an average from 1970 to 2006. There was also a small fluctuation in the ratios of total DI to GDP during the sample period. However, the ratios of total DI to GDP exceeded 21.2% as an average of the sample period. In the case of Korea, the ratios of FDI to GDP were quite low and less than 1%, as an average of the period from 1976 to 2006. Furthermore, the ratios of FDI to total DI have a slow fluctuation over the sample period. Although, the contribution still exceeded 15.4%, as an average from 1976 to 2006. In addition, there was a small fluctuation in the ratios of total DI to GDP over the sample period. However, the ratios exceeded 29.9% as an average of the sample period.

To sum up, the volume of FDI inflows to these countries has increased significantly since 1980s. The graphs of FDI, DI and GDP suggest that there are growing trends of these variables in each country. Therefore, the attractiveness of FDI remains a desirable objective in these countries. However, the challenges are how to increase the advanced effect of FDI inflows in the economic development and domestic investment in these countries. The useful lesson is that the contributions of FDI to GDP and DI in these countries are still quite low, suggesting that host country factors may not be responding enough to the improvements in the economic conditions over past decades.

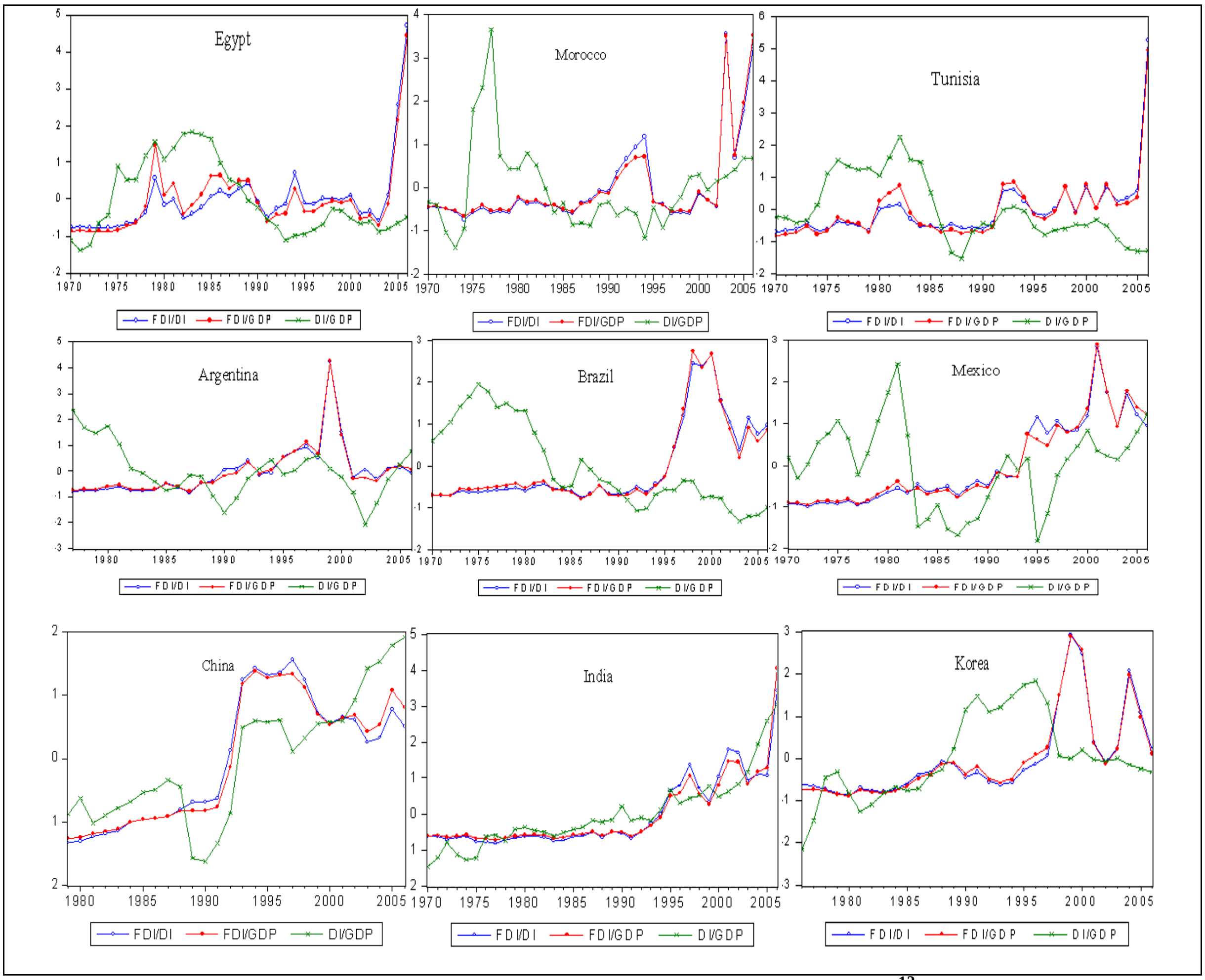

Figure 14: The ratios of FDI/GDP, FDI/DI and DI/GDP[12]

3.5. Estimation Method

Since, significant development has been introduced to cointegration techniques to examine long-run relationship as well as short-run. Not only ADF and PP tests to decide the integration order of each variable and to examine the unit root but also the Johansen multivariate test is

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[12] All figures are conducted by author using Eviews software based on the data analysis.

used for examining the cointegration relationships between variables, since this chapter used more than two variables. Following Johansen (1988) and Johansen and Juselius (1990) estimator procedures, this chapter used vector error correction model (VECM). In fact, cointegration relationship means that the two or more variables would be regarded as defining a long-run equilibrium relationship, if they drift nearly together in the long-run, which is referred to as a cointegration vector (Johansen 1988; 1991; 1995). For example, suppose there is vector X_t, the components of this vector have to be cointegrated of order *r,d*, denoted $X_t \sim CI(r,d)$, if all components of X_t are $I(r)$, and there exists a cointegration vector, $\alpha \neq 0$, thus that $Z_t = \alpha X_t \sim CI(r,d)$. Haug (1996, P.89) quotes that

> *The cointegration hypothesis is that among variables that are individually integrated of order one [I(1)] at least one linear combination of the variables exists that is stationary or integrated of order zero [I(0)]. Cointegration is a concept that allows studying long-run and short-run economic relations.*

Johansen (1988) and Johansen and Juselius (1990) develop the system-based cointegration approach that overcome the problems associated with the single–equation Engle and Granger two-step procedure. The single-equation conditional error correction model (ECM) test initially proposed by Phillips (1954) and further developed by Sargan (1964), while the system-based cointegration approach of Johansen provides maximum likelihood estimation and two likelihood ratio tests for multiple cointegrating vectors in a given number of variables. Since, this research used a set of variables in the model, and then there is an opportunity of having more than one cointegrating vector. In this concept, the system-based cointegration approach of Johansen provides a combined framework for examining and estimating of cointegration relationship between variables in the concept of vector autoregressive (VAR) models, which can resolve the serious problems of analysis such as spurious regressions (Ghali 1999).

Assuming that there are more than two variables in the system, which can be endogenous. The system-based cointegration approach of Johansen developed two tests to determine the number of cointegrating vectors in the dimensional vector M_t. In order to implement the cointegration relationships; it will be started by considering the unrestricted vector autoregression (VAR) model in the following form:

$$M_t = \prod_1 M_{t-1} + \prod_2 M_{t-2} + \ldots \ldots + \prod_k M_{t-k} + \mu + \varepsilon_t \qquad (4)$$

where:

M_t is a vector of a given (m) variables

$\prod_i$ is a matrices of parameters ($m \times m$), $i = 1,2,\ldots, k$, and k is a number of lagged time

μ is the vector of constants ($m \times 1$)

ε_t is a white noise represent a vector of *i.i.d.* normal error..

Assuming that these variables are $I(0)$ and after utilize that may exist co-movements of these variables and opportunities that they will trend together towards a long-run equilibrium state. Since the economic time series is often non-stationary, the VAR model can be converted to first-difference form. Therefore, it can be reformulated E.q 4 in the form of VEC models as following:

$$\Delta M_t = \Gamma_1 \Delta M_{t-1} + \Gamma_{k-1} \Delta M_{t-k+1} + \ldots \ldots + \prod M_{t-k} + \mu + \varepsilon_t \qquad (5)$$

where:

$\Gamma_i = -(I - \prod_1 - \ldots - \prod_i)$, $i = 1, 2, \ldots, k-1$

$\prod = -(I - \prod_1 - \ldots - \prod_k)$

In addition, ΔM_t is the vector of the growth rates of these variables. Γ_s are estimable parameters that contain the contemporaneous short-run adjustment parameters. Δ is a difference operator. μ is an intercept term as a trend-stationary variable in order to take into account exogenous growth; i.e. technological progress, (Haug 1996). This due to the fact that VECM should include it associated with the cointegrating vectors, if the data does not contain a time trend (Johansen and Juselius 1990). ε_t is a vector of impulses, which represent the unanticipated movements in M_t, with $\varepsilon_t \sim niid(0,\sum)$. $\prod$ is the long-run parameter matrix with r rank. $\prod$can decomposed as $\prod=\alpha\beta^{`}$, where α is the adjustment coefficient matrices, which measures the strength of the cointegrating vectors in the VECM. $\beta^{`}$ is the long-run matrices of coefficients, which measures the cointegrating relationships. Therefore, the $\beta^{`}M_{t-1}$ term represents an error-correction term. In order to examine the relationship between variables, assuming that there is two lagged, *k*= 2, the VEC model can be rewritten as:

$$\Delta M_t = \Gamma_1 \Delta M_{t-1} + \prod M_{t-2} + \mu + \varepsilon_t \qquad (6)$$

where:

$\Gamma_i = -(I - \prod_1)$, and $\prod = -(I - \prod_1 - \prod_2)$

The matrix $\prod$ gives information about a possible cointegrating vector among the variables in M_t. If the rank of $\prod = m$, then $\prod$ has full rank and M_t is stationary. If rank of $\prod$ =0, then the model is the traditional first-differenced vector autoregression. Yet, if the rank of $\prod > 0$, then$\prod=\alpha\beta^{`}$, where so that $\beta^{`}M_t$ is stationary even though M_t itself is non-stationary (Baharumshah and Almasaied 2009).

Johansen and Juselius (1990) present two likelihood ratio tests for determining the number of cointegration vectors, *r*. The first test is based on the likelihood ratio test statistic, λ_{trace} *statistic*, for the hypothesis that there are at most, *r*, cointegrating vectors against the alternative that there are, *r*, or more cointegrating vectors, is given by

$$\lambda_{trace} = -T\sum_{i=r+1}^{p} ln\,(1-\hat{h}_i) \qquad (7)$$

where:

p is characteristic roots denoted by $\lambda_1 > \lambda_2 > ... > \lambda_p$, and $\hat{h}_i$ solves the eigenvalue problem.

The second test is based on the maximum eigenvalue statistic, λ_{max} statistic, for the hypothesis that there is at most, *r*, cointegrating vectors against the alternative of, *r+1*, cointegrating vectors, is given by

$$\lambda_{max}\,(r,r+1) = -\,T\,ln\,(1-\hat{\mathrm{h}}_{r+1}) \qquad (8)$$

The critical values for both statistics are provided by Johansen and Juselius (1990), although these critical values are directly provided from Eviews package after conducting a test for cointegration using the Johansen approach, since this research uses Eviews package.

After evaluated the system-based cointegration techniques of Johansen, we will assessing the examination of the interrelationship between variables. The most aim for constructing the VAR model is to examine empirically the dynamic interrelation between the variables chosen for the system. In that case, after testing for the unit roots and the existence of cointegration relationship between variables under analysis, it is important to check the interrelationship between those variables in the short-run and the long-run by carrying out the VAR and VEC models of Johansen for multiple equations.

Since the study establishes using the VEC model when all variables are treated as the dependent or endogenous variable, it augments the more general multivariate *pth* order VEC model. Assume that we have one lagged; our series data can be described by this model:

$$(1-L)\begin{bmatrix} lnGDP_t \\ lnFDI_t \\ lnDI_t \end{bmatrix} = \begin{bmatrix} \alpha_1 \\ \alpha_2 \\ \alpha_3 \end{bmatrix} + \sum_{i=1}^{p}(1-L)\begin{bmatrix} \beta_{11i} & \beta_{12i} & \beta_{13i} \\ \beta_{21i} & \beta_{22i} & \beta_{23i} \\ \beta_{31i} & \beta_{32i} & \beta_{33i} \end{bmatrix}\begin{bmatrix} lnGDP_{t-i} \\ lnFDI_{t-i} \\ lnDI_t - i \end{bmatrix} + \begin{bmatrix} \emptyset_1 \\ \emptyset_2 \\ \emptyset_3 \end{bmatrix}[ECT_{t-1}] + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{bmatrix} \qquad (9)$$

where:

lnGDP is the natural logarithm of gross domestic production.

lnFDI is the natural logarithm of foreign direct investment.

lnDI is the natural logarithm of domestic investment.

α_i is the constant drifts, and *(1-L)* is the difference operator.

ECT_{t-1} is the lagged error-correction term, which is derived from the cointegrating vector. This also can represent the statistical significance of the long-run cointegration relationship between variables.

ε_{it} is serially independent random error with mean zero and finite covariance matrix, and p is the optimal lag length.

In a VEC model, a dependent variable in one equation can be an explanatory variable in other equations in the model. For example, in equation (2), FDI is the dependent variable, which is determined by GDP and DI variables, but at the same time FDI enters the GDP equation and the DI equation, equations (1) and (2), respectively, as an explanatory variable. As a result, the explanatory variables in VEC are endogenous and, therefore, are correlated with the disturbance terms in all the structural equations of the model. As a result, using Ordinary Least Square, OLS, to estimate the structural equations will result in inconsistent estimates for the system parameters. A reliable estimation for the model parameters required using an estimation technique that can deal with the endogeneity problem.

As a rule, there are two main approaches that can consistently estimate the structural equations. Firstly, the single equation approach that estimates each equation separately, i.e. this approach examines the equations of the structural system equation by equation, and without reference to the information contained in the other equations in the system. Secondly, the VEC approach that estimates the equations of the structural system simultaneously, and takes into account all information contained in other equations in the system. In particular, VECM takes into account the correlation between the disturbances of different structural equations, and uses all the available information about each equation to estimate the whole system.

The two approaches provide consistent estimates for the parameters of the structural equations. However, the VECM are asymptotically more efficient than single equation approach. This is due to the fact that single equation approach ignores the information that simultaneous correlation exists between the disturbance terms of the complete system, while

VECM takes these information into account. Therefore, VECM are asymptotically better than single equation approach.

3.6. Estimation Results

The results of cointegration tests and VEC models present in this chapter to investigate the short and long-run relationship between variables. To gain robustness results panel data cointegration techniques also applied to avoid small sample problems and to increase the power of unit root tests.

3.7. Time Series Cointegration Tests

3.7.1. *Unit Root Tests and Integration Order*

These tests are used to investigate the null hypothesis that all the variables have a unit roots, against that they do not, in the level of variables as well as in their first differences. The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP)[13] are carried out for testing unit roots. All variables are in the logarithmic transformation of the non-linear equation. Augmented Dickey-Fuller (ADF) and Phillips-Perron results for testing foreign direct investment (FDI), gross domestic production (GDP) and domestic investment (DI) are reported in Table 2 for each country. The ADF statistics for levels series of FDI, DI, and GDP do not exceed their critical values at 5% level of significance and this implies that these

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[13] The ADF test has three possible type of models, based on the following regression forms:

- With constant
$$\Delta y_t = \alpha + p y_{t-1} + \sum_{i=1}^{m} \delta_i \Delta y_{t-i} + \epsilon_t \qquad (1)$$
- With constant and trend
$$\Delta y_t = \alpha + p y_{t-1} + \beta T + \sum_{i=1}^{m} \delta_i \Delta y_{t-i} + \epsilon_t \qquad (2)$$
- Without constant and trend
$$\Delta y_t = p y_{t-1} + \sum_{i=1}^{m} \delta_i \Delta y_{t-i} + \epsilon_t \qquad (3)$$

Where y_t is the relevant time series variables. ϵ_t *is* $NID(0, \sigma 2)$ random variables. α is a constant. T is a time trend. The differences between those forms are to determine the presence of deterministic elements α and βT.
While, The *PP* test takes the *AR(1)* regression form as following:
$$\Delta y_t = \alpha + \theta y_{t-1} + \epsilon_t \qquad (4)$$
The *PP* statistic is just modifications of the ADF statistic, which takes into account the less restrictive nature of the error process. Therefore, the ADF test corrects the serial correlation by including lagged differenced terms, while the PP test corrects the t-statistic of the coefficient θ from the *AR(1)* model to account for the serial correlation in error terms.

variables are not stationary in levels in each case, except in the case of Brazil when constant and constant & trend are included in DI equations. On the other hand, The PP statistics for levels series of FDI, DI and GDP do not exceed their critical values at 5% level of significance and this indicates that these variables are not stationary in the levels, except in the case of Morocco, Tunisia, China, India, Argentina when constant and constant & trend are included in FDI equation. In addition, the PP statistics for level series of GDP does exceed their critical values at 5% level of significance and this indicates that this variable is stationary in the levels only when GDP equation includes constant and constant &trend for Brazil.

However, the ADF and PP tests generally do not pass their corresponding critical values at 5% or 1% levels of significance when all variables testing in their levels. Therefore, testing the variables in their first differences is performed. The ADF and PP tests statistics exceed their corresponding critical values at 5% and 1% levels of significance when all variables at first differences, except GDP in the case of Egypt, China and India when constant and trend do not included in the ADF and PP models. The ADF and PP tests also show that DI in first difference does not exceed their corresponding critical values at 5% and 1% levels of significance in the case of China and India when constant and trend do not included in the ADF and PP models. However, The ADF and PP tests statistics exceed their corresponding critical values at 5% and 1% levels of significance when all variables at first differences when constant and constant & trend included in the ADF and PP models. As a consequence, the null hypothesis of the existing of a unit root in the first differences of FDI, DI and GDP is rejected and this implies that those variables are stationary in first differences. This means that the variables are integrated processes of order one ($1 \sim I(1)$) and they are moved together in the long-run. Therefore, the first differences are performed sequentially to the variables to be stationary and to have same order, which is also shown in Table 2 for all regression forms. Like ADF and PP tests, figures (B-1:9), which presented in Appendix B, show the plots of the first difference series of FDI, DI and GDP in each case. These figures indicate also that all variables are demonstrated the random fluctuations around a constant values and they are likely to be close to zero. Thus, the graphs show the series have a constant mean and constant variance, which implies that the first difference series of all variables achieve stationary.

Consequently, the results are consisted with the null hypothesis that each variable is stationary and integrated of the same order, and then the cointegration tests are performed to determine whether these variables are cointegrated or to identify the number of cointegration relationships among endogenous variables if they are cointegrated.

Table 2: ADF and PP tests for unit root tests for all variables

ADF and PP tests for unit root tests in **Egypt**

Test results for unit root on the level of series						
Variables	constant		constant & trend		None	
	ADF test	PP test	ADF test	PP test	ADF test	PP test
LFDI	-1.46(1)	-1.78(4)	-1.59(1)	-2.10(1)	1.20(1)	1.05(3)
LDI	-2.42(0)	-2.24(3)	-3.08(3)	-1.88(3)	1.35(2)	1.85(4)
LGDP	-1.47(0)	-1.28(1)	-0.84(0)	-1.07(1)	3.00(3)	7.75(3)
Test results for unit root on the first differenced series						
LFDI	-3.77(1)***	-8.09(1)***	-4.03(1)**	-8.18(0)***	-3.28(1)***	-7.72(2)***
LDI	-4.37(0)***	-4.34(1)***	-4.77(0)***	-4.75(1)***	-3.68(0)***	-3.60(1)***
LGDP	-3.18(1)**	-3.35(0)**	-4.11(2)**	-3.47(0)*	-0.96(1)	-1.17(1)

ADF and PP tests for unit root tests in Morocco

Test results for unit root on the level of series						
Variables	constant		constant & trend		None	
	ADF test	PP test	ADF test	PP test	ADF test	PP test
LFDI	-2.25(2)	-4.58(2)***	-3.44(3)	-5.66(2)***	0.23(3)	-0.12(2)
LDI	-1.16(1)	-0.98(1)	-2.93(1)	-2.37(1)	1.45(1)	1.78(1)
LGDP	-0.97(1)	-0.82(2)	-2.04(1)	-2.91(3)	6.75(1)	7.68(2)
Test results for unit root on the first differenced series						
LFDI	-6.59(1)***	-9.44(0)***	-6.52(1)***	-9.32(0)***	-6.67(1)***	-9.57(0)***
LDI	-3.93(1)***	-4.66(1)***	-3.88(1)***	-4.59(1)***	-3.44(1)***	-4.35(1)***
LGDP	-4.77(1)***	-10.05(1)***	-4.80(1)***	-10.02(1)***	-4.85(0)***	-4.80(1)***

ADF and PP tests for unit root tests in **Tunisia**

Test results for unit root on the level of series						
Variables	constant		constant & trend		None	
	ADF test	PP test	ADF test	PP test	ADF test	PP test
LFDI	-2.25(2)	-4.58(2)***	-3.44(3)	-5.66(2)***	0.23(3)	-0.12(2)
LDI	-1.16(1)	-0.98(1)	-2.93(1)	-2.37(1)	1.45(1)	1.78(1)
LGDP	-0.97(1)	-0.82(2)	-2.04(1)	-2.91(3)	6.75(1)	7.68(2)
Test results for unit root on the first differenced series						
LFDI	-6.59(1)***	-9.44(0)***	-6.52(1)***	-9.32(0)***	-6.67(1)***	-9.57(0)***
LDI	-3.93(1)***	-4.66(1)***	-3.88(1)***	-4.59(1)***	-3.44(1)***	-4.35(1)***
LGDP	-4.77(1)***	-10.05(1)***	-4.80(1)***	-10.02(1)***	-4.85(0)***	-4.80(1)***

ADF and PP tests for unit root tests in **China**

Test results for unit root on the level of series						
Variables	constant		constant & trend		None	
	ADF test	PP test	ADF test	PP test	ADF test	PP test
LFDI	-1.99(1)	-8.24(1)***	-1.58(1)	-13.16(1)***	2.24(1)	1.05(1)
LDI	0.14(1)	0.23(1)	-3.78(1)**	-2.42(1)	2.74(1)	5.98(1)
LGDP	-0.21(1)	0.02(1)	-4.42(1)***	-2.30(1)	2.67(1)	14.99(1)
Test results for unit root on the first differenced series						
LFDI	-3.29(1)**	-18.94(1)***	-3.59(1)**	-18.05(1)***	-2.90(1)***	-17.12(1)***
LDI	-3.57(1)**	-3.47(1)**	-3.46(1)**	-3.46(1)**	-1.35(1)	-1.80(1)
LGDP	-4.43(1)***	-2.91(1)**	-4.41(1)***	-2.86(1)	-0.37(1)	-0.46(1)

ADF and PP tests for unit root tests in **India**

Test results for unit root on the level of series						
Variables	constant		constant & trend		None	
	ADF test	PP test	ADF test	PP test	ADF test	PP test
LFDI	-2.78(1)	-4.45(2)***	-4.11(1)**	-5.63(2)***	-0.16(1)	-0.18(2)
LDI	2.28(1)	2.76(2)	-0.28(1)	0.27(2)	3.57(1)	6.96(2)
LGDP	2.97(1)	3.35(1)	-1.43(1)	-1.55(1)	5.11(1)	10.15(1)
Test results for unit root on the first differenced series						
LFDI	-6.20(1)***	-10.07(1)***	-6.14(1)***	-9.95(1)***	-6.29(1)***	-10.21(1)***
LDI	-3.03(1)**	-4.16(2)***	-4.09(1)**	-4.95(2)***	-1.13(1)	-1.76(2)
LGDP	-3.65(1)***	-5.50(1)***	-4.86(1)***	-7.02(1)***	-0.55(1)	-1.43(1)

ADF and PP tests for unit root tests in **Korea**

Test results for unit root on the level of series						
Variables	constant		constant & trend		None	
	ADF test	PP test	ADF test	PP test	ADF test	PP test
LFDI	-1.37(1)	-1.52(1)	-3.33(1)	-3.18(1)	0.32(1)	0.29(0.76)
LDI	-1.37(1)	-2.25(1)	-1.58(1)	-1.53(1)	1.78(1)	3.29(1)
LGDP	-1.31(1)	-1.66(1)	-0.84(1)	-0.80(1)	3.73(1)	8.80(1)
Test results for unit root on the first differenced series						
LFDI	-4.54(1)***	-5.79(1)***	-4.43(1)***	-5.68(1)***	-4.55(1)***	-5.86(1)***
LDI	-4.98(1)***	-3.70(1)***	-5.16(1)***	-3.79(1)**	-3.70(1)***	-3.10(1)***
LGDP	-3.64(1)**	-4.50(1)***	-3.86(1)**	-4.70(1)***	-1.96(1)**	-1.97(0)**

ADF and PP tests for unit root tests in **Argentina**

Test results for unit root on the level of series						
Variables	constant		constant & trend		None	
	ADF test	PP test	ADF test	PP test	ADF test	PP test
LFDI	-2.39(1)	-3.24(1)**	-2.44(1)	3.83(1)**	-1.14(1)	-1.14(1)
LDI	-2.31(1)	-1.82(1)	-2.61(1)	-2.10(1)	0.41(1)	0.27(1)
LGDP	-0.62(1)	-0.22(1)	-2.47(1)	-2.13(1)	1.39(1)	1.44(1)
Test results for unit root on the first differenced series						
LFDI	-5.84(1)***	-9.39(1)***	-5.91(1)***	-9.39(1)***	-5.82(1)***	-9.44(1)***
LDI	-3.90(1)***	-3.87(1)***	-4.13(1)**	-3.94(1)**	-3.97(1)***	-3.92(1)***
LGDP	-3.99(1)***	-4.10(1)***	-4.15(1)**	-4.09(1)**	-3.72(1)***	-3.81(1)***

ADF and PP tests for unit root tests in **Brazil**

Test results for unit root on the level of series						
Variables	constant		constant & trend		None	
	ADF test	PP test	ADF test	PP test	ADF test	PP test
LFDI	-0.88(1)	-0.37(1)	-1.75(1)	-1.26(1)	-1.74(1)	-2.91(1)***
LDI	-3.18(1)**	-3.57(1)**	3.94(1)**	-3.50(1)	0.96(1)	1.62(1)
LGDP	-2.52(1)	-3.99(1)***	-4.10(1)**	-4.34(1)***	2.26(1)	4.53(1)
Test results for unit root on the first differenced series						
LFDI	-6.53(1)***	-9.54(1)***	-6.42(1)***	-9.39(1)***	-6.63(1)***	-9.66(1)***
LDI	-3.26(1)**	-3.68(1)***	-3.64(0)**	-3.62(1)**	-3.16(1)***	-3.53(1)***
LGDP	-2.97(1)**	-3.64(1)***	-4.00(0)**	-3.94(1)**	-2.34(1)**	-2.64(1)***

ADF and PP tests for unit root tests in **Mexico**

Test results for unit root on the level of series						
Variables	constant		constant & trend		None	
	ADF test	PP test	ADF test	PP test	ADF test	PP test
LFDI	-0.99(1)	-0.98(1)	-1.46(1)	-1.55(1)	-1.56(1)	-1.62(1)
LDI	-1.44(1)	-1.12(1)	-3.24(1)	-2.60(1)	1.59(1)	1.75(1)
LGDP	-1.90(1)	-2.07(1)	-2.91(1)	-2.30(1)	2.93(1)	5.22(1)
Test results for unit root on the first differenced series						
LFDI	-4.0591)***	-5.98(1)***	-3.98(1)**	-5.91(1)***	-3.84(1)***	-5.70(1)***
LDI	-4.52(1)***	-5.04(1)***	-4.44(1)***	-4.97(1)***	-4.07(1)***	-4.67(1)***
LGDP	-3.44(1)**	-4.15(1)***	-3.55(1)**	-4.39(1)***	-2.13(1)**	-2.48(1)**

Notes: (1) ** and *** denote significance at the 5% and 1% levels, respectively.
(2) The figures in the parentheses are the number of lags used.
(3) The lag length is chosen by Schwarz Information criterion for ADF test.
(4) The lag length is chosen by Newey-West Bandwidth for PP test.

3.7.2. *Cointegration Test*

For testing cointegration, it is important firstly to determine the optimal lag length in the VAR models to have Gaussian error terms that do not suffer from non-normality, autocorrelation and heteroskedasticity. However, the issue of the dynamic model formulation is whether constant and/or time trend should include in the VEC models either in the short-run and /or in the long-run models. For that reason, we determine secondly the suitable VAR models by applying Pantula principle test to decide which models can be carried out to test for cointegration or to determine the appropriate restriction on the intercept and trend in the short-run and long-run models. This test is used to determine the number of cointegration relationships between variables if they are cointegrated.

3.7.2.1. Selecting the Suitable Lag Length (K) of the VAR Model and the Suitable VAR Model for Testing Cointegration

The Johansen process is sensitive to lag length selection. In order to determine an optimal lag length of vector autoregressive model (VARM), different criteria can be used. This study applies the Sequential modified likelihood ratio test statistic (LR), Final prediction error (FPE), Akaike information criterion (AIC), Schwarz information criterion (SC) and Hannan-Quinn information criterion (HQ) for selecting the suitable lag length. This study uses different criteria so that there are opportunities to choose from more suitable lag length and because of the sensitivity of the VAR model.

Table (C-1) in Appendix C reports the results of those criteria. The maximum number of lags in the testing procedure is specified in the first column, and other columns indicate the lag order chosen by each lag length selection criteria. It can be seen that each criterion is sensitive to the choice of the maximum number of lags, which may be due to the use of annual data in the regression analysis. In addition, this Table presents the value displayed by the criterion. Most of the criterion suggests different lag orders of VAR models, except LR and SC which are more stable. According to these contradictory results given by the selection criterion and to the fact that the VAR model is very sensitive to lag order selected by each criterion, we usually rely on the SC. This is because it allows for losing a less of a number of observations.

In this study, we choose a VAR of order 1 for each case, except for India, whereas the VAR of order 2 is preferred, as presented in Table (C-1) in Appendix C.

Now, the investigation of the suitable VAR model for testing cointegration is performed after determining the optimal lag length in the VAR model. The aspect of the dynamic models, however, are whether an intercept and/or trend should be included in the short-run (VAR) or in the long-run (cointegrating equation, CE) models, or both models. Accordingly, trace statistic and maximal eigenvalue statistic are addressed to choose the appropriate model regarding the deterministic components in the vector error-correction models (VECMs) and in determining the number of long-run cointegration relationship in the system. In this case, we have tested three models[14]; namely model-2, model-3 and model-4 as suggested by the Johansen method, which is also presented by Eviews packages. Model-2 means that the model includes only an intercept in the cointegration equation (CE) and there is no intercept or trend in the VAR model. Namely, the intercept is restricted to the long-run model. Model-3 includes an intercept in CE and VAR models, and there is no trend in CE and VAR models. This means that there is no linear trend in the level of the data but it allows both specifications to drift around an intercept. Model-4 includes an intercept in CE and VAR models and linear trend only in CE. The trend in this model indicates exogenous growth such as technology progress. For example, the Pantula principle test of Johansen indicates that the suitable model for testing cointegration is model-2 for each case, as shown in Appendix C from Table (C-2). Furthermore, Table (C-2) also shows the results of the Pantula principle test based on the Johansen procedure for determining the number of cointegrating vectors. The Table reports the trace test (λ_{trace}) of the null hypothesis that there are at most r cointegrating vectors against the alternative of r+1 cointegrating vectors. The Tables also report the maximal eigenvalue test (λ_{max}) of the null hypothesis that there is at most r cointegrating vectors against the alternative of r > 0 cointegrating vectors. The results indicate that there is a unique cointegrating vector in the case of Tunisia, Argentina and Brazil, while there are two cointegrating vectors in other cases. Now, we move to estimate VECMs for the GDP equation, FDI equation and DI

[14] For more details see Asteriou and Hall (2007, P. 323)

equation, after determining the optimal number of lags, the suitable mode for testing VAR models and the number of cointegrating vectors VECMs should have.

The last part of the Table 3, Table 5 and Table 6 show the diagnostic tests of GDP, FDI and DI equations, respectively. These Tables show that the residuals follow the normal distribution, there is no serial correlation and there is no autoregressive conditional heteroskedasticity. Thus, the diagnostic tests suggest that the residuals are Gaussian as the Johansen method presupposes.

3.7.3. The Results from GDP Equation

Table 3 reports the estimated results of the GDP equation. The long-run results[15] are reported in the first part of this Table, while the short-run results are presented in the second part. Table 3 shows that error correction terms (ect) coefficients are statistically significant, suggesting that $LGDP$ variable is not weakly exogenous to the models and the series cannot drift too far apart and convergence may be achieved in the long-run as its magnitude is between 0 and -1 for all cases. In addition, the significance of the error correction terms confirmed the existence of a long-run relation between the variables in the system as indicated by the Pantula principle test for cointegration. Baharumshah and Almasaied (2006) and Kremers et al. (2005) demonstrate that the highly statistically significance of the error correction term coefficient in the ECM strongly supports the establishment of the long-run cointegration relationship between variables.

Form Table 3, it is possible to see that the long-run coefficients of FDI are statistically significant and positive in the case of China, India, Brazil, Mexico. For example, a 1% increase in foreign direct investment (FDI) inflows raises GDP in the long-run by an estimated 0.02%, 0.03%, 0.36% and 0.09% in China, India, Brazil and Mexico, respectively. This Table also shows that FDI has a negative impact on GDP in the case of Egypt, Morocco, Tunisia, Korea and Argentina in the long-run. For instance, a 1% increase in foreign direct investment (FDI) inflows reduces GDP in the long-run by an estimated 2.22%, 0.04%, 0.57%, 0.27% and

[15] Long-run results are provided by cointegration equation (CI equation) estimation, while the short-run results are provided by VAR model estimation.

0.09% in Egypt, Morocco, Tunisia, Korea and Argentina, respectively. Table 3 also shows that the short-run effect of FDI on growth rate of GDP ($\Delta LGDP_t$) is positive and statistically significant in the case of Egypt, Morocco, Korea, Argentina and Brazil. On the other hand, it is a negative in the case of Tunisia, China, India and Mexico. These results seem to be contrary to economic growth theories. One explanation of these results is the statistical procedure as the time-series techniques suffer from small sample bias (nine countries with only 35-year period), which reduce the power of unit root tests and cointegration test[16].

The estimated results provide mixed evidence on the impact of FDI on GDP and on the growth rate of GDP. Some of these results support previous empirical studies, which study the impact of FDI on economic growth, stating that FDI inflows have a positive impact on growth (as endogenous growth theories often assume). On the other hand, the estimated results also find that FDI has a negative impact on economic growth. This result seems to be contrary to many empirical studies on the growth effect of FDI. Nevertheless, a study by Khan and Leng (1997), examines the relationship between FDI and growth using annual data for Singapore, Taiwan and Korea, and does not find any evidence that FDI causes economic growth in Korea (Kim and Seo 2003). In addition, a study by Kim and Hwang (1998) applies a random effects model using annual data from Korea, finds that FDI has a positive impact on growth but is statistically insignificant. Moreover, a study by Kim and Seo (2003) finds weak evidence that FDI inflows have a positive impact on GDP in Korea, as well as in a study by Herzer et al. (2008) that found the same result for a group of developing countries. For a set of developing countries, Borensztein et al. (1998), Campos and Kinoshita (2002), Chakraborty and Basu (2002), Elfakhani and Matar (2007), Frimpong and Oteng-Abayie (2006) and Chudnovsky and Lopez (2008) find that FDI alone has a negative impact on economic growth. Therefore, these results are not uncommon empirically.

Table 3 also shows that the initial level of GDP ($LGDP_{-1}$) is account for the convergence hypothesis[17]. As expected, all coefficients on $LGDP_{-1}$ are negative and statistically significant.

[16] This limitation is avoided by applying panel-data techniques to test the hypothesis of this chapter.

[17] The idea is that poor economies should grow faster than rich economies (Ford et al. 2008).

This finding is consistent with the conditional convergence hypothesis, suggesting that poor economies tend to grow faster than rich economies in GDP terms.

Table 4 summarizes the results regarding the net impact of DI[18] on GDP in the long-run and in the short-run. To obtain the net impact of DI on GDP[19], any influence of FDI on DI has to be stripped out. Columns 1 and 3 show the direct impact of DI on GDP and FDI. Columns 2 and 5 show the direct impact of FDI on GDP and DI. Columns 4 and 6 show the indirect impact of DI on GDP, and the net impact of DI on GDP, respectively. As reported in the Table, column 6 shows that the net impact of DI is positive in all of these cases, except Egypt and Tunisia in the long-run. This column shows that an increase in net DI by one % leads to an increase in GDP in the long-run by about 0.77%, 0.58%, 0.74%, 0.57%, 0.73%, 2.45% and 0.65% in the case of Morocco, China, India, Korea, Argentina, Brazil and Mexico, respectively.

Column 6 also shows that the net impact of DI is positively correlated with growth rate of GDP in all of these cases in the short-run, except India, where an increase in net DI by one % leads to an increase in the growth rate of GDP by about 0.13%, 0.10%, 0.06%, 0.28%, 0.32%, 0.39%, 0.20% and 0.29% in Egypt, Morocco, Tunisia, China, Korea, Argentina, Brazil and Mexico, respectively. Table 4 also shows that the magnitude of the net DI coefficient is more than the numerical coefficient of FDI whether in the long-run or in the short-run. This result confirms many empirical studies, such as a study by Choe (2003) and King and Levine (1993),

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[18] Since the data of DI include FDI, and there is no published data on domestic investment without including foreign capital. Thus, to get the net DI, this needs some mathematical solutions.

[19] Equation 1 shows that a change in *FDI* by one unit causes *GDP* to change by λ_2, and a change in total *DI* by one unit causes *GDP* to change by an amount equal to λ_3. Since total *DI* included *FDI*, Equation 3 shows that a change in *FDI* by one unit can also induce a change in total DI by an amount equal to τ_2. This means that the effect of changes in *LDI* by one unit is not limited to its impact on growth rate of *GDP* but also includes the impact of changes in *LFDI*. Thus, the net impact of domestic investment on *GDP* equal to the total impact of *DI* on *GDP* minus the impact of *FDI* on total *DI*.

This effect can be calculated by finding the derivative of *GDP* Equation with respect to *DI*, the derivative of *FDI* equation with respect to *DI*, and the derivative of *DI* equation with respect to *FDI*, which is equal to:

$\partial(\Delta LGDP_t)/\partial(\Delta LDI_t) = \lambda_{2k}\partial(\Delta LFDI_t)/\partial(\Delta LDI_t) + \lambda_{3k}$.

Equation 2 shows that the derivative of *FDI* with respect to *DI* is equal to: $\partial(\Delta LFDI_t)/\partial(\Delta LDI_t) = \sigma_{2k}$. Therefore, the total impact of *DI* on *GDP* is equal to $(\lambda_{2k}*\sigma_{2k}) + \lambda_{3k}$

Equation 3 shows that the derivative of *DI* with respect to *FDI* is equal to: $\partial(\Delta LDI_t)/\partial(\Delta LFDI_t) = \tau_{2k}$

Thus, the net impact of domestic investment on *GDP* is equal to the total impact of *DI* on *GDP* minus the impact of *FDI* on total *DI*, which is equal: $[(\lambda_{2k}*\sigma_{2k}) + \lambda_{3k}] - \tau_2$

who found that DI exerts a greater effect on economic growth than FDI, and higher levels of DI are positively related to economic growth.

Table 3: Cointegration Equation & Vector Error Correction Model (VECM) for GDP Equation

	Egypt	Morocco	Tunisia	China	India	Korea	Argentina	Brazil	Mexico
Cointegration Equation: $LGDP_t$ as dependent variable									
LFDI	-2.22 (0.008)* [0.805]	-0.04(0.005)* [0.016]	-0.57(0.041)** [0.274]	0.02(0.000)* [0.003]	0.03 (0.000)* [0.008]	-0.27 (0.000)* [0.036]	-0.09 (0.000)* [0.007]	0.36 (0.042)** [0.174]	0.09 (0.000) [0.029]
LDI	9.29 (0.001)* [2.728]	0.89 (0.001)* [0.264]	2.98 (0.000)* [0.579]	0.79(0.000)* [0.088]	0.77 (0.000)* [0.033]	1.08 (0.000)* [0.097]	0.89 (0.000)* [0.156]	-0.29 (0.007)* [0.103]	0.84 (0.000)* [0.118]
C	-5.35(0.024)** [2.028]	5.42 (0.328) [5.457]	-3.64(0.019)** [1.481]	6.51(0.000)* [0.741]	6.70 (0.000)* [0.721]	6.88 (0.048)** [3.378]	4.63 (0.226) [3.763]	0.77 (0.005)* [0.262]	4.51 (0.182) [3.333]
Vector Error Correction Model **(**VECM): OLS Regressions; $\Delta LGDP_t$ as dependent variable									
ect(-1)	-0.01(0.001)* [0.004]	-0.006(0.003)* [0.002]	-0.03(0.000)* [0.001]	-0.01(0.002)* [0.004]	-0.32(0.000)* [0.048]	-0.003(0.000)* [0.0004]	-0.09(0.000)* [0.016]	-0.0007(0.000)* [0.00006]	-0.11(0.006)* [0.038]
ΔLFDI(-1)	0.002(0.010)** [0.0005]	0.003(0.036)** [0.001]	-0.01(0.003)* [0.003]	-0.004(0.061)*** [0.002]	-0.006(0.000)* [0.0009]	0.007(0.003)* [0.003]	0.0007(0.054)*** [0.0003]	0.008(0.000)* [0.001]	-0.001(0.859) [0.003]
ΔLFDI(-2)					-0.0005(0.602) [0.001]				
ΔLDI(-1)	0.08(0.0000)* [0.010]	0.03(0.194) [0.027]	0.06(0.275) [0.061]	0.25(0.0000)* [0.027]	-0.04(0.600) [0.078]	0.36(0.0000)* [0.039]	0.38(0.000)* [0.050]	0.19(0.0005)* [0.049]	0.28(0.000)* [0.015]
ΔLDI(-2)					-0.17(0.029)** [0.075]				
ΔLGDP(-1)	-0.25(0.032)** [0.115]	-0.59(0.0000)* [0.104]	-0.19(0.055)** [0.099]	-0.09(0.263) [0.084]	-0.08(0.517) [0.132]	-0.02(0.681) [0.058]	-0.17(0.045)** [0.082]	-0.21(0.019)** [0.085]	-0.09(0.265) [0.081]
ΔLGDP(-2)					0.25(0.053)*** [0.126]				
R^2	0.43	0.43	0.08	0.50	0.57	0.88	0.91	0.41	0.94
Adj R^2	0.36	0.35	-0.01	0.40	0.46	0.86	0.89	0.36	0.93
S. E. of Regression	0.022	0.035	0.031	0.019	0.021	0.013	0.021	0.032	0.009
DW	2.38	2.29	2.04	2.97	2.22	2.08	2.94	2.97	2.63
Diagnostic tests									

$\chi^2_{Norm}(2)$	0.79(0.671)	2.93(0.229)	4.00(0.460)	0.66(0.717)	3.26(0.681)	2.80(0.648)	2.29(0.751)	3.16(0.233)	2.31(0.582)
$\chi^2_{S.C.}(2)$	4.30(0.116)	3.49(0.174)	3.72(0.155)	1.82(0.403)	3.19(0.202)	0.82(0.662)	1.34(0.511)	0.004(0.997)	1.52(0.468)
$\chi^2_{Arch}(1)$	3.54(0.170)	1.05(0.305)	0.65(0.721)	0.38(0.536)	0.56(0.451)	1.05(0.305)	1.33(0.248)	0.001(0.974)	1.33(0.248)

P- Values are in ( ) & Standard errors are in [ ]. *, ** and *** signify 1%, 5% and 10% significance levels respectively. L indicates to the natural logarithm. Δ indicates to the first differences of the log variable(for example, $\Delta\ LGDP_t = LGDP_t - LGDP_{t-1}$, which indicates to the growth rates of GDP). χ^2_{Norm} tests for the hypothesis that the residual follow the normal distribution; $\chi^2_{S.C}$ tests for the hypothesis that there is no serial correlation; χ^2_{Arch} tests for the hypothesis that there is no autoregressive conditional heteroskedasticity.

Table 4: The net impact of domestic investment on GDP

	1	2	3	4=2*3	5	6= 1+4-5
	The direct impact of DI on GDP (λ_{3k})	The direct impact of FDI on GDP (λ_{2k})	The direct impact of DI on FDI (σ_{2k})	The indirect impact of DI on GDP (λ_{2k}*σ_{2k})	The impact of FDI on DI (τ_2)	The net impact of DI on GDP [(λ_{2k}*σ_{2k}) +λ_{3k}]- τ_2
	The long-run impact of domestic investment on GDP					
Egypt	9.29*	-2.22*	4.18*	-9.28	0.23*	-0.22
Morocco	0.89*	-0.04*	1.80***	-0.07	0.05**	0.77
Tunisia	2.98*	-0.57**	5.15**	-2.94	0.19***	-0.15
China	0.79*	0.02*	0.25**	0.005	0.22*	0.58
India	0.77*	0.03*	0.17**	0.005	0.04*	0.74
Korea	1.08*	-0.27*	0.95*	-0.26	0.25*	0.57
Argentina	0.89*	-0.09*	0.91*	-0.08	0.01*	0.73
Brazil	-0.29*	0.36**	7.98***	2.87	0.13*	2.45
Mexico	0.84*	0.09*	-0.93**	-0.08	-0.11**	0.65
	The short-run impact of domestic investment on GDP					
Egypt	0.08*	0.002*	1.27**	0.0025	-0.05*	0.13
Morocco	0.03	0.003**	0.19	0.0006	-0.07	0.10
Tunisia	0.06	-0.01*	0.14**	-0.0014	0.002	0.06
China	0.25*	-0.004***	0.11**	0.00044	-0.03*	0.28
India	-0.21**	-0.0065*	-0.76***	0.0049	0.0038*	-0.21
Korea	0.36*	0.007*	-0.22*	-0.0015	0.04**	0.32
Argentina	0.38*	0.0007***	0.87*	0.0006	-0.008*	0.39
Brazil	0.19*	0.008*	0.64*	0.0051	-0.003**	0.20
Mexico	0.28*	-0.001	0.63*	0.00063	-0.01**	0.29

Note: *, **, and *** denote significance at 1%, 5%, and 10%, respectively.

3.7.4. The Results from Foreign Direct Investment (FDI) Equation

In this sub-section the estimated results of FDI equation are presented. The result of testing the hypothesis of market size and its expansion, and DI as a crucial factor for attracting FDI inflow into these countries, is presented in Table 5.

Table 5 shows that the long-run coefficients of GDP have positively impacted on FDI in China, India, Brazil and Mexico, while the short-run coefficients of GDP are positive in Morocco, China, India and Brazil. The results also clearly show that the elasticity of FDI with respect to GDP indicates that a 1% increase in GDP raises FDI inflow in the long-run by an estimated 0.54%, 2.05%, 2.74% and 1.10% in China, India, Brazil and Mexico, respectively. On the other hand, a 1% increase in GDP reduces FDI inflow in the long-run by an estimated 0.44%, 2.24%, 1.72%, 0.64% and 1.95% in Egypt, Morocco, Tunisia, Korea and Argentina, respectively.

The estimated results suggest that there is conflicting evidence on the impact of GDP on FDI flows. Some of these results support previous empirical studies, which study FDI determinants, indicating that market size and its expansion are crucial factors for driving FDI inflows into developing economies (Scaperlanda and Mauer 1969; Root and Ahmed 1979; Jackson and Markowski 1995; Balasubramanyam et al. 1996; Basu et al. 2003; Nguyen 2006). On the other hand, the estimated results also find that GDP and the growth rate of GDP have a negative impact on FDI flows. This result seems to be contrary to many empirical studies on FDI determinants, although Singh and Jun (1995) reported that a survey by the United Nations Centre on Transnational Corporations (UNCTC, 1992) found that economic growth and market size are insignificant. Lunn (1980) also finds that the lagged of growth rate is significant, nevertheless it had a negative sign, so this is not uncommon for results in the empirical literature of FDI determinants.

To accommodate the influence of DI in FDI, the coefficient of total DI approximately equals one for Korea and Argentina in the long-run, and for the short-run only in Argentina, Brazil and Mexico. This result suggests that DI cannot explain the variation in FDI inflows in these countries in line with a study by Harrison and Revenga (1995). Table 5 also shows that the coefficient of total DI is more than one in the case of Egypt, Morocco, Tunisia and Brazil in the long-run, while in the short-run only in Egypt. This implies that DI does positively affect the variation of FDI in these countries in line with many empirical studies. Contrary to a number of empirical studies, Table 5 shows that DI is less than one in China, India and Mexico in the long-run, whilst negative in the short-run for Morocco, Tunisia, China, India and Korea. These results provide contradictory evidence on the role played by DI in determining FDI inflows into these countries.

Table 5: Cointegration Equation & Vector Error Correction Model (VECM) for FDI Equation

	Egypt	Morocco	Tunisia	China	India	Korea	Argentina	Brazil	Mexico
Cointegration Equation: $LFDI_t$ as dependent variable									
LGDP	-0.44 (0.001)* [0.119]	-2.24 (0.012)** [0.855]	-1.72(0.062)*** [0.895]	0..54 (0.049)** [0.268]	2.05(0.056)*** [1.044]	-0.64(0.014)** [0.247]	-1.95(0.004)* [0.637]	2.74(0.274) [2.473]	1.10(0.022)** [0.465]
LDI	4.18 (0.006)*	1.80 (0.06)*** [0.967]	5.15 (0.024)** [2.189]	0.25(0.015)** [0.099]	0.17(0.015)** [0.070]	0.95(0.001)* [0.259]	0.91(0.005)* [0.308]	7.98(0.051)*** [3.967]	-0.93(0.023)** [0.393]
C	-4.39 (0.002)* [1.317]	0.59 (0.000)* [0.065]	-1.47(0.073)*** [0.804]	-2.76(0.001)* [0.785]	-1.77(0.009)* [0.648]	2.51(0.001)* [0.665]	8.68(0.086)*** [4.907]	-2.12(0.002)* [0.661]	-5.0(0.226) [4.069]
Vector Error Correction Model **(**VECM): OLS Regressions; Δ $LFDI_t$ as dependent variable									
ect(-1)	-0.23(0.088)*** [0.133]	-1.14(0.000)* [0.065]	-0.08(0.043)** [0.038]	-0.07(0.000)* [0.017]	-0.83(0.000)* [0.177]	-0.03(0.000)* [0.002]	-0.13(0.000)* [0.023]	-0.55(0.033)** [0.244]	-0.05(0.000)* [0.009]
Δ LFDI(-1)	-0.55(0.005)* [0.182]	0.06(0.062)*** [0.031]	-0.25(0.031)** [0.110]	0.16(0.000)* [0.021]	0.81(0.010)** [0.293]	-0.09(0.053)*** [0.045]	-0.45(0.001)* [0.126]	0.32(0.000)* [0.029]	-0.17(0.097)*** [0.100]
Δ LFDI(-2)					0.16(0.249) [0.139]				
Δ LDI(-1)	1.27(0.044)** [0.604]	0.19(0.625) [0.387]	0.14(0.026)** [0.061]	0.11(0.036)** [0.051]	-0.82(0.080)*** [0.455]	-0.22(0.004)* [0.071]	0.87(0.000)* [0.146]	0.64(0.004)* [0.208]	0.63(0.000)* [0.165]
Δ LDI(-2)					0.06(0.893) [0.453]				
Δ LGDP(-1)	-4.73(0.024)** [2.001]	-0.13(0.000)* [0.017]	-0.63(0.007)* [0.217]	-0.31(0.005)* [0.098]	-1.21(0.138) [0.790]	-0.24(0.073)*** [0.127]	-0.35(0.095)*** [0.198]	-1.39(0.000)* [0.177]	-0.26(0.001)* [0.078]
Δ LGDP(-2)					-1.51(0.048)** [0.728]				
R^2	0.44	0.56	0.21	0.66	0.68	0.18	0.29	0.28	0.31
Adj R^2	0.36	0.50	0.13	0.61	0.59	0.08	0.16	0.16	0.24
S. E. of Regression	1.11	2.43	0.577	0.228	2.338	0.777	0.316	0.245	0.440
DW	2.43	2.19	2.17	2.69	2.54	2.66	2.27	2.26	2.94
Diagnostic tests									

$\chi^2_{Norm}(2)$	2.88(0.649)	1.171(0.992)	1.38(0.501)	3.80(0.149)	5.55(0.135)	4.26(0.199)	3.76(0.415)	2.07(0.530)	3.94(0.469)
$\chi^2_{S.C.}(2)$	4.55(0.102)	1.18(0.553)	2.39(0.302)	4.11(0.127)	0.43(0.803)	1.51(0.470)	2.36(0.306)	4.14(0.246)	0.26(0.877)
$\chi^2_{Arch}(1)$	0.03(0.873)	0.01(0.904)	0.39(0.527)	4.53(0.209)	0.17(0.675)	3.74(0.442)	0.42(0.515)	1.78(0.181)	0.004(0.945)

P- Values are in ( ) & Standard errors are in [ ]. *, ** and *** signify 1%, 5% and 10% significance levels respectively. L indicates to the natural logarithm. Δ indicates to the first differences of the log variable. χ^2_{Norm} tests for the hypothesis that the residual follow the normal distribution; $\chi^2_{\text{s.c}}$ tests for the hypothesis that there is no serial correlation; χ^2_{Arch} tests for the hypothesis that there is no autoregressive conditional heteroskedasticity.

3.7.5. The Results from Domestic Investment (DI) Equation

Table 6 presents the result of testing the hypothesis of the crowding effect of FDI in these countries. As reported in this Table, the coefficients of FDI range between -0.11 and 0.25 in the long-run, and they also range between -0.008 and 0.04 in the short-run, suggesting that FDI may crowd out DI whether in the short-run or long-run, since total DI included FDI. This means that one additional dollar of FDI leads to less than a one-dollar increase in total investment. Table 7 shows the calculator of the crowding-out effect of FDI in these countries in the long-run as well as in the short-run. It is possible to see that the magnitude of net crowding-out effects of FDI ranges from -1.11 to -0.75 in the long-run. Table 7 also shows that the magnitude of net crowding-out effects of FDI ranges from -0.006 to 0.14 in the short-run, although the net crowding effect in Tunisia and Korea is positive, but still less than one unit. These findings are contrary to many empirical studies, such as a study by Kim and Seo (2003) for Korea, Ramirez (2000) for Mexico, Tang et al. (2008) for China, Van Loo (1977) and Noorzoy (1979) for Canada, Fedderke and Romm (2006) for South Africa and Elfakhani and Matar (2007) for a group of 19 MENA countries. However, our results are not uncommon amongst the empirical literature. For example, Fry (1992) and Lipsey (2000) for a set of countries, Agosin and Mayer (2000) for Latin American countries, De Mello (1999) for a group of developed countries, Apergis et al. (2006) for America and Europe, Adams (2009) for a group of Sub-Saharan African countries, and Mahboub (1997) for Egypt, found that FDI inflows tend to crowd-out DI. Moreover, a panel data study by Braunstein and Epstein (2002) found that FDI crowds out DI in China.

Apergis et al. (2006) explain the crowding-out effect of FDI on DI as the result of the entry of FDI in sectors where there is plenty of domestic firms that cannot prosper in increased competition and further exploit possible opportunities from the mergers and acquisitions activity (M&As), supported this by Aitken and Harrison (1999), Konings (2001), Gorg and Greenaway (2003), and Herzer et al. (2008). MNCs have some firm-specific advantages over domestic firms that take up the cost curve of domestic firms. This allows FDI firms to take away the demand from domestic firms forcing them to reduce or cut their production. Similarly, Gorg and Greenaway (2003), De Mello (1999) and Kim and Seo (2003) postulate that MNCs may have also firm-specific knowledge over domestic firms, i.e. domestic firms have underdeveloped production technology and low skilled employees. Moreover, Woerz (2003) argues that if the technology gap between foreign and domestic firms is too large, domestic firms will not be able to produce at their efficient level and go bankrupt, therefore more productive foreign firms will crowd out domestic firms, but if the gap is limited, the increase in competition will induce higher productivity in the catching-up domestic firms. Castellani and Zanfei (2005) argue that higher technology gaps may in principle increase the possibility that TNCs tend to crowd out domestic suppliers and competitors.

Return to Table 6, which shows that the long-run impact of GDP on total DI is significantly positive in all countries conducted in this study except Brazil, while the effect of changes in GDP is negative and significantly correlated with the changes in DI in the short-run. This suggests that in the long-run a larger market size can provide more and better opportunities for domestic firms to exploit their ownership advantages.

Table 6: Cointegration Equation & Vector Error Correction Model (VECM) for DI Equation

	Egypt	Morocco	Tunisia	China	India	Korea	Argentina	Brazil	Mexico
Cointegration Equation: LDI_t as dependent variable									
LFDI	0.23(0.000)* [0.060]	0.05(0.029)** [0.022]	0.19(0.054)*** [0.097]	0.22(0.000)* [0.044]	0.04(0.000)* [0.010]	0.25 (0.000)* [0.038]	0.01(0.000)* [0.0008]	0.13 (0.000)* [0.010]	-0.11(0.011)** [0.040]
LGDP	0.10(0.000)* [0.016]	1.12(0.001)* [0.306]	0.33(0.028)** [0.147]	0.26(0.002)* [0.079]	1.29 (0.000)* [0.051]	0.92(0.008)* [0.329]	1.11(0.000)* [0.269]	-0.34(0.000)* [0.038]	1.19 (0.000)* [0.194]
C	1.78(0.081)*** [0.994]	-6.08(0.038)** [2.824]	1.93(0.000)* [0.180]	-8.18(0.000)* [1.411]	-8.66 (0.000)* [1.225]	-6.35(0.042)** [2.992]	-5.14 (0.476) [7.101]	2.65(0.015)** [1.046]	-5.41(0.440) [5.791]
Vector Error Correction Model (VECM): OLS Regressions; Δ LDI_t as dependent variable									
ect(-1)	-0.02(0.020)** [0.009]	-0.05(0.000)* [0.006]	-0.01(0.009)* [0.006]	-0.02(0.037)** [0.010]	-0.16(0.009)* [0.058]	-0.006(0.036)** [0.002]	-0.01(0.002)* [0.003]	-0.02(0.092)*** [0.011]	-0.006(0.011)** [0.002]
Δ LFDI(-1)	-0.05(0.001)* [0.014]	-0.07(0.360) [0.070]	0.002(0.918) [0.021]	-0.03(0.006)* [0.009]	-0.004(0.000)* [0.0004]	0.04(0.030)** [0.018]	-0.008(0.000)* [00.001]	-0.003(0.034)** [0.001]	-0.01(0.095)*** [0.007]
Δ LFDI(-2)					0.0002(0.872) [0.0009]				
Δ LDI(-1)	0.57(0.001)* [0.160]	0.01(0.001)* [0.004]	0.51(0.002)* [0.155]	0.54(0.010)** [0.193]	-0.03(0.673) [0.075]	0.72(0.032)** [0.316]	0.50(0.000)* [0.107]	0.46(0.000)* [0.056]	0.47(0.000)* [0.032]
Δ LDI(-2)					0.62(0.0000)* [0.121]				
Δ LGDP(-1)	-0.69(0.383) [0.786]	-0.32(0.094)*** [0.189]	-0.81(0.080]*** [0.448]	-0.32(0.640) [0.685]	-0.29(0.014)** [0.111]	-1.03(0.300) [0.974]	-0.19(0.070)*** [0.102]	-0.14(0.001)* [0.038]	-0.14(0.000)* [0.034]
Δ LGDP(-2)					0.58(0.004)* [0.186]				
R^2	0.40	0.47	0.32	0.17	0.25	0.24	0.44	0.26	0.22
Adj R^2	0.32	0.39	0.25	0.06	0.05	0.14	0.34	0.13	0.15
S. E. of Regression	0.105	0.107	0.076	0.079	0.051	0.095	0.154	0.375	0.521
DW	2.19	2.27	2.81	2.91	2.59	2.78	2.91	2.40	2.41
Diagnostic tests									

$\chi^2_{Norm}(2)$	4.15(0.107)	3.59(0.309)	2.92(0.971)	0.41(0.814)	3.54(0.350)	1.26(0.938)	1.02(0.998)	2.43(0.295)	2.37(0.737)
$\chi^2_{S.C.}(2)$	0.35(0.838)	2.50(0.286)	1.73(0.420)	0.36(0.832)	2.55(0.635)	2.67(0.262)	0.91(0.633)	2.06(0.357)	0.56(0.904)
$\chi^2_{Arch}(1)$	0.41(0.521)	2.20(0.137)	0.38(0.536)	0.05(0.822)	0.0004(0.983)	0.19(0.657)	1.04(0.790)	1.35(0.245)	0.21(0.645)

P- Values are in ( ) & Standard errors are in [ ]. *, ** and *** signify 1%, 5% and 10% significance levels respectively. L indicates to the natural logarithm. Δ indicates to the first differences of the log variable. χ^2_{Norm} tests for the hypothesis that the residual follow the normal distribution; $\chi^2_{\text{s.c}}$ tests for the hypothesis that there is no serial correlation; χ^2_{Arch} tests for the hypothesis that there is no autoregressive conditional heteroskedasticity.

Table 7: The long-run and short-run results of the magnitude of Crowding out effects[20]

	Egypt	Morocco	Tunisia	China	India	Korea	Argentina	Brazil	Mexico
	Long-run								
CE	-0.77	-0.95	-0.81	-0.78	-0.96	-0.75	-0.99	-0.87	-1.11
	Short-run								
CE	-0.11	-0.07	0.005	-0.07	-0.009	0.14	-0.016	-0.006	-0.02

[20] This Table is based on Table 5. In the long-run, we calculated the magnitude of crowding effect (*CE*) as following:

The magnitude of CE= α*-1*

While in the short-run, the magnitude of crowding effect (*CE*) is calculated as following:

The magnitude of Crowding effect (CE) =$\sum \tau_{2k} / (1-\sum \tau_{3k})$

3.8. Panel Data Cointegration Tests

The empirical results presented above are based on time-series cointegration techniques with small number of observations. Thus, it is difficult to gain significant statistical parameters from regressions. This problem is common with using annual data estimations, as the above section used. To avoid this problem, pooling of the data into panel of time series from different cross-sectional units is an efficient solution can be used (Asteriou and Hall 2007).

Panel data estimation can offer some major advantages. For example, panel data can allow for heterogeneity in countries that cannot achieved when using time series data (Harris and Sollis 2003). Panel data can allow for increasing the sample size, which offers much better estimates by providing more degree of freedom and more efficiency (Asteriou and Hall 2007; Harris and Sollis 2003). Panel data also provide more variability that leads to less collinearity among variables (Harris and Sollis 2003). Although, disadvantage of panel data estimation is that the heterogeneous panel when the parameters are different across the individuals, which related to the design and collection of the data (Asteriou and Hall 2007; Harris and Sollis 2003). To gain more robustness results, panel data cointegration test is applied.

3.8.1. Estimation Procedure and Results

In order to study the possibility of panel cointegration, first step is necessary to determine the existence of unit roots in the three panel series (FDI, DI and GDP). Econometric literature has proposed a number of methods for testing the existence of a unit root under panel data setting. The ADF-Fisher Chi-square test (ADF-Fisher)and PP-Fisher Chi-square test (PP-Fisher) (Maddala and Wu 1999), Im, Pesaran and Shin (2003) W-test (IPS) and Levin and Lin (1992) (LL), have been chosen to perform the panel data unit root test and compare their results, since different panel unit root tests may provide different testing outcomes.

Table 8 presents the results of the tests at level and first difference for ADF-Fisher, PP-Fisher, IPS and LL tests in constant and constant plus time trend. The results clearly show that the null hypothesis of a panel unit root in the level of the series with constant and constant plus time trend cannot be rejected. Therefore, the results indicate that FDI, DI and GDP variables are non-stationary with and without time trend at levels by applying the ADF-Fisher, PP-Fisher, IPS and LL tests. The last part of Table 8 presents the results of the tests at the first difference for ADF-Fisher, PP-Fisher, IPS and LL tests with constant and constant plus time trend. It can be seen that for all series the null hypothesis of unit root test is rejected at 1% significance level. Namely, the ADF-Fisher, PP-Fisher, IPS and LL tests provide a strong evidence that all the series are in fact integrated of order one (*I(1)*) in all variables across countries.

Table 8: Panel unit root tests

Panel unit root in the level of series								
Variables	constant				constant & trend			
	ADF test	PP test	IPS test	LL test	ADF test	PP test	IPS test	LL test
LFDI	-4.64	-2.88	-1.63	0.23	-5.31	-1.92	-1.03	-0.15
LDI	-0.89	0.38	-0.99	0.19	-0.72	1.19	-1.10	-1.12
LGDP	-0.95	-0.31	0.19	-0.06	-0.60	-1.49	-1.06	-0.95
Panel unit root in the first differenced series								
LFDI	-13.15*	-12.00*	-9.57*	-11.24*	-13.28*	-20.26*	-8.10*	-17.89
LDI	-8.81*	-9.93*	-7.05*	-11.08*	-8.21*	-8.95*	-5.97*	-11.43*
LGDP	-11.07*	-11.06*	-8.52*	-15.03*	-10.68*	-11.52*	-7.72*	-13.37*

Notes: (1) ADF, PP, IPS and LL are the Fisher-ADF, Fisher-PP, Im, Pesaran and Shin and Levin, Lin and Chu tests for a unit root in the model, respectively.
(2) * denotes rejection of the null hypothesis that is a panel series has a unit root at the 1% level of significance.
(3) The maximum lag length selection based on automatic Akaike Information criterion (AIC).

The next step is to investigate whether the variables are cointegrated using Pedroni (1999, 2001 and 2004), since the variables are found to be integrated in the same order (*I(1)*).

The summary of the results of Pedroni panel analysis with constant and constant plus time trend are presented in Table 9. In constant level, there is a strong evidence for existence of cointegration among FDI, DI and GDP variables as all statistics rejected the null hypothesis of no cointegration among interested variables. In constant and time trend, four out of seven statistics reject the null hypothesis of no cointegration at 1% level of significance. Harris and Sollis (2003, P.205) note that “it is not uncommon for different tests to gave mixed results when some of the series are cointegrated and some are not. However, since all statistics conclude in favour of cointegration combined with the fact that the panel are more reliable in constant, it can be concluded that there is a long-run cointegration among variables in selected sample from developing countries.

Table 9: Pedroni Panel cointegration Test

	Individual Intercept		Individual Intercept and Individual Trend	
	Statistic	Prob.	Statistic	Prob.
	Within-dimension			
Panel v-Stat.	4.00*	0.0001	0.501	0.692
Panel rho-Stat.	-4.118*	0.0000	-3.819*	0.0001
Panel PP-Stat.	-5.528*	0.0000	-7.326*	0.0000
Panel ADF-Stat.	-1.987**	0.0234	-2.341*	0.0096
	Between-dimension			
Group rho-Stat.	-2.948*	0.0016	-1.531	0.0628
Group PP-Stat.	-5.367*	0.0000	-5.449*	0.0000
Group ADF-Stat.	-2.329*	0.0099	-1.311	0.0949

Note: All statistics are from Pedroni's procedure (1999). The Pedroni (2004) statistics are one-sided tests with a critical value of -1.64 (statistic < -1.64 implies rejection of the null), except the v-statistic that has a critical value of 1.64 (statistic > 1.64 suggests rejection of the null). *, ** indicates rejection of the null hypothesis of no-co-integration at 1% and 5% levels of significance.

Table 10 shows testing for existing cointegration among the variables for each country, which is carried out by using the Johansen approach for the three variables in our selected sample. From the results of individual cointegration test, the trace statistic rejects the null hypothesis of no cointegration and accepts that there is one cointegration vector for all cases. The test also rejects the null of only one cointegration vector in favour of two cointegration vectors[21] for all cases apart from two (India and Morocco suggest only one cointegration). Generally, the trace statistic suggests that there are two cointegrating vectors based on the statistical value of this test.

[21] Harris and Sollis (2003) point out that if the number of variables in the system exceeds two, then potentially more than one cointegration vector may exist as in our case.

Table 10: Johansen Panel cointegration test for individual cross-section results

	r=o		r=1		r=2	
	λ_{trace}	Prob.	λ_{trace}	Prob.	λ_{trace}	Prob.
Argentina	35.20**	0.040	17.87**	0.010	5.75	0.21
Brazil	57.64*	0.000	22.43**	0.021	7.36	0.10
Mexico	39.29**	0.010	17.88**	0.019	5.42	0.23
China	48.65*	0.001	22.13**	0.042	6.77	0.13
India	33.12*	0.018	13.41	0.331	4.11	0.39
Korea	33.77**	0.027	17.91**	0.025	5.62	0.22
Egypt	58.27*	0.000	25.45*	0.008	8.84	0.55
Tunisia	37.31**	0.020	14.58**	0.045	3.03	0.57
Morocco	34.38**	0.036	11.33	0.510	3.80	0.44

(r) denotes the number of cointegration vectors. * and ** indicate rejection of the null hypothesis of no-cointegration at 1% and 5% level of significance, respectively. P-value calculated from Mackinnon-Haug-Michelis (1999).

Since the number of cross-section units greater than the number of coefficients (nine cross-section countries and three variables), VECM can be estimated. The estimated results of Panel VECM with lag order =1[22] and two cointegrating vectors are presented in Table 11. This Table shows that error correction term coefficients in the GDP, DI and FDI equations are statistically significant and their magnitude is between -0.05 and -0.02, suggesting that the series of GDP, DI and FDI cannot drift too far apart and convergence can be achieved in the long-run, confirming existing of the long-run cointegration relationships between interested variables. The diagnostic tests of GDP, DI and FDI equations show that the residuals follow the normal distribution, there is no serial correlation and there is no autoregressive conditional heteroskedasticity.

The results of cointegration equation (long-run results) presented in the first part of Table 11. From the results of GDP equation, it can be seen that the long-run coefficients of FDI and DI are statistically significant and positively related to GDP. These results clearly show that the elasticities of GDP with respect to FDI and DI indicate that a 1% increases in FDI and DI raise

[22] It can be estimated ECM with lag order equal one or two. If using lag order equal two, then potentially too much information will lose as the data only over 35-year period.

GDP in the long-run by an estimated 0.48% and 0.88%, respectively. These results seem to be stronger than what have been found in previous section when applied a time series cointegration techniques, confirming the power of panel data cointegration techniques. From the results of DI equation, it can be seen that the long-run coefficients of GDP and FDI are statistically significant and positively related to DI. These results clearly show that the elasticity of DI with respect to GDP indicates that a 1% increases in GDP raise DI in the long-run by an estimated 0.89%. The long-run coefficient of FDI is more than one, suggesting that one additional dollar of FDI leads to increase DI in the host countries by more than one-dollar (net crowding-in effect: 3.28-1=2.28). The first part of Table 11 shows that the long-run coefficients of GDP and DI are statistically significant and positively related to FDI. These results clearly show that the elasticities of FDI with respect to GDP and DI indicate that a 1% increases in GDP and DI raise FDI in the long-run by an estimated 1.37% and 0.30%, respectively.

The results of VAR model (short-run results) presented in the second part of Table 11. From the results of GDP equation, it can be seen that the short-run coefficients of FDI and DI are statistically significant and positively related to GDP. These results clearly show that the elasticities of GDP with respect to FDI and DI indicate that a 1% increases in FDI and DI raise GDP in the short-run by an estimated 0.18% and 0.29%, respectively. From the results of DI equation, it can be seen that the short-run coefficients of GDP and FDI are statistically significant and positively related to DI. These results clearly show that the elasticity of DI with respect to GDP indicates that a 1% increases in GDP raise DI in the short-run by an estimated 0.49%. The short-run coefficient of FDI is approximately one, suggesting that one-to-one relationship between FDI and DI exist. The net effect of FDI on DI (net crowding effect: 0.91/ (1-0.15) =1.07) suggest that there is a neutral effect of FDI on DI in the short-run. The last column of Table 11 shows that the short-run coefficients of GDP and DI are statistically significant and positively related to FDI. These results clearly show that the elasticities of FDI with respect to GDP and DI indicate that a 1% increases in GDP and DI raise FDI in the short-run by an estimated 0.19% and 0.23%, respectively.

Table 11: the results of the VECMs and diagnostic tests

	CI Equation (Long-run results)		
Variables	LGDP	LDI	LFDI
LFDI	0.48(0.010)**	3.28(0.006)*	---
LDI	0.88(0.015)**	---	0.30(0.001)*
LGDP	---	0.89(0.037)**	1.37(0.023)**
constant	-5.01(0.022)**	-2.62(0.046)**	-2.50(0.041)**
	VAR model (Short-run results)		
ect(1)	-0.04(0.009)*	-0.03(0.000)*	-0.02(0.001)*
ect(2)	-0.05(0.008)*	-0.03(0.000)*	-0.02(0.000)*
ΔLFDI(-1)	0.18(0.046)**	0.91(0.000)*	0.21(0.012)**
ΔLDI(-1)	0.29(0.024)**	0.15(0.006)*	0.23(0.001)*
ΔLGDP(-1)	0.28(0.000)*	0.49(0.000)*	0.19(0.000)*
R^2	0.28	0.44	0.32
S. E. of Regression	0.11	0.05	0.30
$\chi^2_{Norm}(2,2,2)$	2.91(0.53)	3.17(0.79)	3.15(0.64)
$\chi^2_{S.C}(2,2,2)$	8.17(0.516)	6.76(0.661)	3.38(0.947)
$\chi^2_{Arch}(1,1,1)$	2.19(0.988)	3.25(0.953)	2.86(0.969)

ρ - Values are in the parentheses. *, **and *** indicate significance at the 1%, 5% and 10% levels, respectively. L and Δ indicate to the natural logarithm and the first difference of the variables, respectively. χ^2_{Norm} test for the hypothesis that the residual follows the normal distribution; $\chi^2_{S.C}$ test for the hypothesis that there is no serial correlation; χ^2_{Arch} test for the hypothesis that there is no autoregressive conditional heteroskedasticity.

The results of panel data suggest that changing the techniques are much more robust than in the size of the one observed in the standard low-power unit root test and cointegration tests applied for small samples. Panel data models also provide better properties of panel unit-roots, cointegration test and VECM, compared with low-power unit-root tests, cointegration tests and VECM for time series cointegration techniques. The results of panel data cointegration techniques can be interpreted as evidence the FDI inflows have significant contribution to economic growth in the host countries and can complementary DI whether in the short-run or in the long-run. This confirms modern economic growth theories and several empirical studies, stating that FDI contributes positively to economic growth and has crowding-in effect on DI in the receiving economies.

3.9. Conclusion

The main purpose of this chapter is to examine the dynamic interaction between FDI, DI and GDP in context of developing countries for the period from 1970 to 2006. This study applies cointegration time-series and panel-data techniques; vector error correction (VEC) model to address the following arguments.

1- Does FDI contribute positively to GDP; and

2- Does FDI really crowd out DI?

Firstly, the results of time-series analysis show that that FDI affects positively GDP in the long-run only in four of nine countries. In contrast, the short-run growth effect of FDI is positive only in five of nine countries. These results provide conflicting evidence on the impact of FDI on economic growth. In addition, the results indicate that FDI crowds-out DI whether in the long-run or short-run. The findings also indicate that DI does not affect FDI in two countries in the long-run, while in the short-run only in Latin American countries in line with Harrison and Revenga (1995). In addition, DI has a positive impact on FDI in the long-run in African countries, while in the short-run only in one country, supporting Apergis et al. (2006) hypothesis. On the other hand, DI has a negative effect on FDI in three of nine countries in the long-run, while in the short-run in five of nine countries. However, these findings cannot confirm that DI is, in general, positively correlated with FDI. The estimated results also suggest that there is conflicting evidence on the impact of GDP on FDI flows. Some of these results support previous empirical studies, which study FDI determinants, indicating that market size and its expansion are crucial factors for driving FDI inflows into developing economies (Scaperlanda and Mauer 1969; Root and Ahmed 1979; Jackson and Markowski 1995; Balasubramanyam et al. 1996; Basu et al. 2003; Nguyen 2006). On the other hand, the estimated results also find that GDP and the growth rate of GDP are negatively related to FDI flows. The result of this chapter also shows that the long-run impact of GDP on total DI is significantly positive, while the effect of changes in GDP is negatively related to the changes in DI in the short-run.

Secondly, the results of panel-data analysis provided more strong results than what have been provided by time-series investigation. This may due to the low sample with only over 35 observations. The results of panel-data show that FDI is positively related to GDP whether in the long- or short-run. FDI also has a strong crowding-in effect on DI in the long-run, while in the short-run FDI seems to be have a neutral effect on DI. The panel-data results also show that GDP is positively related to FDI and DI, and DI is also positively related to GDP and FDI whether in the long- and short-run.

This investigation suggests that the relationships between the three variables used in this study might be explained by other factors. Recent empirical studies found that the positive impact of FDI on economic growth is conditional on the host country's absorptive capacity. For example, Borensztein et al. (1998), Xu (2000), Wang and Wong (2008) and Fortanier (2007) point out that FDI promotes economic growth only when host country has an adequate level of human capital. On the other hand, Alfaro et al. (2004) argue that countries with well-developed financial markets gained significantly from FDI, suggesting that countries with better financial systems can exploit FDI more efficiently. Kinishita and Lu (2006) argue that good infrastructure is not only the driver of FDI inflows but also a pre-requisite for positive spillovers from FDI on the host economy. Kokko (1994), Li and Liu (2005) and Colen et al. (2008) argue that the positive impact of FDI on economic growth is expected to depend on the technology gap between the home and host countries, so that a large technology gap might slow down the knowledge and technological spillovers. If the technology gap is too wide to bridge, the spillovers may not easily spread to domestic economy. Therefore, further empirical studies and researches are required to re-examine the relationship between FDI and economic growth using different analytical methods to avoid sampling and measurement problems; and also to determine whether the share of FDI inflow in the period under analysis is the reason for the failure to find any impacts of FDI inflows on growth and investment. Moreover, further studies and researches are required to include variables, such as the technology gaps, the human capital developments, the financial market development, infrastructure development and other economic conditions to catch-up the impact of the host country's absorptive capacity factors on the relationships between those variables. However, this claim requires further analysis to empirically test whether such a conditional of impact really exists, and if so, how significant it is. Chapter four will address this area of analysis.

4. The Impact of the Host Country's Absorptive Capacity on the FDI/Growth Relationship

4.1. Introduction

During the last decades, FDI inflow has increased significantly in developing countries, due to the fact that FDI is the most stable and prevalent component of foreign capital inflows (Adams 2009). The importance of FDI has emerged from the fact that FDI can generate positive externalities to economic development in the host countries through providing financial resources, creating jobs, transferring technological know-how, managerial skills and organisational arrangements, and enhancing competitiveness (Adams 2009; Kobrin 2005). The majority of countries have liberalised their policies, removed restrictions and eased controls on foreign direct investment (FDI) and provided tax incentives and subsidies to attract foreign capital flows (Aitken and Harrison 1999; Carkovic and Levine 2003).

In spite of a large increase in FDI inflows to developing countries as reported by UNCTAD (2009), the effect of FDI flows on economic growth remains ambiguous. However, whether foreign direct investment (FDI) helps to improve economic growth has been one of the fundamental debates in development and international economics. Recently, this question has received a lot of consideration in the economic literature. So far, it seems that this debate has not been conclusive. The recent contribution of modern economic growth theories in general predicts that FDI can have a positive impact on economic growth in the receiving countries (Romer 1990; Barro and Sala-I-Martin 1995; De Jager 2004). Empirical studies, however, produce ambiguous results, and suggest that the growth effects of FDI are conditional on the host country characteristics (Borensztein et al. 1998; Blomstrom et al. 1992; Kokko 1994; Li and Liu 2005; Alfaro et al. 2004; Sadik and Bolbol 2001; Balasubramanyam et al. 1996; Kinishita and Lu 2006; Bernstein 2000). Besides, De Mello (1999) finds that the growth effects of FDI depend on the degree of complementary with DI in the receiving countries. In contrast, Carkovic and Levine (2002) investigate whether the growth effect of FDI depends on the host country's absorptive capacity for a panel of 72 developed and developing countries from 1960 to 1995. They find that FDI does not exert a positive impact on economic growth in the host country and that it is not conditional on its absorptive capacity.

Taking these matters into account, it is natural to find such interest in investigating the growth effects of FDI in developing countries. The main purpose of this chapter is to examine the growth effect of FDI in a selected sample from Asian, African and Latin American countries. The sample is selected form the top ten recipients of FDI inflows in each region for the period from 1970 to 2005. This chapter focuses mainly on the role played by the host country's absorptive capacity in the growth effect of FDI. The chapter examines the following specific research question: *Does FDI contribute to economic growth in developing countries alone or does it depend on its initial conditions?*

The chapter contributes to the existing literature by identifying and filling the gap in the literature on this topic by analysing the absorptive capacity and the growth impact of FDI in developing countries. Recent empirical studies suggest that the ability of host countries to exploit FDI efficiently depends on a set of absorptive capacities within these countries, which may help in explaining the ambiguity in the previous empirical studies. This chapter contributes to this debate by presenting a deeper insight into the host country conditions that might affect the FDI-growth nexus. This deeper insight is needed because the majority of previous empirical studies focus on the interaction between FDI and one of the host country characters (e.g. human capital development, financial market development, technology gap, infrastructure development, trade openness, etc). This chapter investigates the impact of a set of these factors simultaneously on the FDI-growth relationship. This chapter also contributes to the existing literature by determining the threshold value of absorptive capacity in the host country that positively correlates FDI with growth. This chapter also contributes to the existing literature by applying panel data analysis, which is a very valuable resource for establishing empirical solutions to policy implications with macroeconomic data. In order to obtain consistent parameter estimates from growth equations, this chapter applies a number of econometric panel techniques.

The rest of this chapter is structured as follows: Section two presents an overview of existing empirical studies. Section three is the empirical specification. Section four describes the data and variables set used for empirical tests. Section five is the empirical results. Section six is the sensitivity analysis. Section seven is the summary of this chapter.

4.2. An Overview of Existing Empirical Studies

The majority of empirical studies on the impact of FDI on economic growth present controversial evidence. The impact of FDI on host country economic growth comes from the fact that FDI inflow is the most important channel for technology diffusion. The diffusion of technology is considered as the main source of conditional convergence between countries (Elmawazini et al. 2008). Table 12 provides an overview of the different studies in terms of type, data, country samples, time period, variables used, and summarize the main findings. The literature appears to offer a thoughtful assessment of the impact of the host country's absorptive capacity on the dynamic relationship between FDI inflows and economic growth. Many of these studies argue that the degree of technology transfer or externality generating from FDI inflows to the host economy depends on the host country's absorptive capacity. The term "absorptive capacity" takes account of factors such as the level of human capital development, the level of technology gap, the level of financial development, the degree of trade openness, the level of institution quality, etc. The majority of empirical studies show that host countries do indeed need to pass a certain level of absorptive capacity, known as a development threshold, to be able to efficiently exploit FDI.

Recent growth theories argue that the availability of human capital quality plays an essential role in economic growth. The quality of human capital is also crucial for a host country in absorbing the FDI externalities. These externalities are the transfer of skills from MNCs to domestic firms through labour mobility or learning-by-doing. Borensztein et al. (1998) investigate the effect of FDI inflows on economic growth in 69 developing countries using cross-country and cross-section regressions. They apply panel data for two decades (1970-79 and 1980-89), and the regressions are estimated using the seemingly unrelated regressions technique (SUR) and cross-section regressions. Both regressions show that host countries must pass a threshold value of human capital development to benefit from FDI inflows. Similar results are also obtained by Xu (2000) for 40 countries (20 DCs and 20 LDCs) from 1966 to 1994. He examines the effect of the presence of MNCs affiliates on the productivity growth of the host country. By applying the panel data two stages least square (2SLS) method, he finds that developing countries (DCs) benefit positively from technology transfer provided by US MNCs but not in less developing countries (LDCs). He concludes that LDCs do not reach the minimum human capital threshold required. In contrast, Blomstrom et al. (1992) investigate the impact of FDI on economic growth for 101 countries over the period from 1960 to 1985. They find that education level is not essential to achieve an FDI growth effect (Carkovic and Levine 2002). In addition, Blomstrom et al. (1996) find that the host country must pass a certain threshold of economic development to benefit from FDI.

In turn, Colen et al. (2008) argue that the impact of FDI on economic growth is expected to depend on the technology gap between the home and host countries. A large technology gap might slow down the knowledge and technological spillovers. If the technology gap is too wide to bridge, the spillovers may not easily spread to the domestic economy. Castellani and Zanfei (2005) also argue that a higher technology gap may in principle increase the possibility that MNCs tend to crowd out domestic suppliers and competitors.

Absorptive capacity of the recipient economy measured by the technology gap is used in many empirical studies. Kokko (1994) uses the technology gap between foreign and domestic firms as a proxy for absorptive capacity in 216 Mexican manufacturing industries. He finds that domestic firms can benefit from the technology diffusion from foreign firms if the technology gap between them is small. A more specific conclusion on the role played by the technology gap in the host economy to obtain the FDI growth effect is reached by Li and Liu (2005). They examine the effect of FDI on economic growth based on panel data for 84 countries from 1970-1999 by applying both random effect and simultaneous system. Li and Liu (2005) find that for the host country to benefit from attracting FDI, it must have a certain level of technological development. They conclude that the lower the level of technological development of the host country, the less the impact of FDI on growth. Li and Liu (2005) argue that for a country above a certain level of technology gap, FDI inflows will no longer benefit the host economy.

Despite the numerous empirical studies on the growth effect of FDI, the literature on the FDI-growth nexus seems to have ignored the importance of the role not only of the financial development but also of other factors, such as infrastructure development, trade openness and institutional development. The level of financial development is crucial because a lack of financial market development might be preventing the foreign and domestic investors from accessing the financial resources required (Massoud 2008). Hermes and Lensink (2003) and Alfaro et al. (2004) argue that countries with a better financial system can exploit FDI more efficiently. They point out that a more developed financial system positively contributes to the process of technological diffusion associated with FDI inflows. Hermes and Lensink (2003) provide some explanations on the role of financial system development in exploiting FDI inflows efficiently to promote economic growth in the host country. They argue that financial institutions can help to reduce the risks of investment related to upgrading or adopting new technologies. Hence this domestic upgrading and adopting of new technology affects the speed of technological innovation. Financial systems also determine partly the ability of domestic firms to finance their investment plans in case external finance is needed. The domestic financial system partly determines the ability of foreign firms to borrow to extend their innovation activities in the host country, thus increasing the scope for technological spillovers to domestic firms. Therefore, the quality of financial system may influence the impact of FDI on the diffusion of technology in the host country. The diffusion of technology may be more efficient in host countries with a better financial system. Using cross-country data for two samples (49 and 71 countries) from 1975 to 1995, Alfaro et al. (2004) find that FDI played an important part in contributing to economic growth, and those countries with well-developed financial markets gained significantly from FDI. Using panel data for Arab countries from 1975-2000, Sadik and Bolbol (2003) also find that a certain threshold of financial market development must be reached to benefit from FDI inflows.

Many studies of economic growth define infrastructure as an essential factor behind economic growth (Barro and Sala-I-Martin 1995; Munnell 1992; Sanchez-Robles 1998). Munnell (1992) points out that good infrastructure can increase the productive capacity of the economy, by increasing resources and encouraging the productivity of existing resources. Besides, infrastructure investment allows both foreign and domestic firms to produce their products at a lower total cost. Therefore, the idea is that host economy may benefit from FDI only if it has appropriate infrastructure development. Kinishita and Lu (2006) and Yamin and Sinkovics (2009) also argue that good infrastructure is not the only FDI inflows driver but also a pre-requisite for positive spillovers from FDI to the host economy. Kinishita and Lu (2006) investigate the effects of FDI on economic growth when a host country has a sufficient level of infrastructure development for 42 non-OECD countries. Their estimations are based on panel data set with data averaged over each of the six 5-year periods from 1970 to 2000 using OLS regressions and random effects GLS estimates. They find that technology spillovers via FDI take place only when the host country has a certain level of infrastructure development. They point out that the host country gains less from attracting FDI if infrastructure falls behind the critical level.

Economic literature also recognises the importance of trade openness as one factor in host country's absorptive capacity. Frankel and Romer (1999) argue that trade openness can help to facilitate more efficient production of goods and services through shifting production to economies that have comparative advantages. Grossman and Helpman (1990) also argue that an open trade regime is significantly related with good investment climates, technological externalities and learning effects. They argue that trade contributes to the diffusion of knowledge largely through the process of imitation of the knowledge capital embedded in the product. Therefore, FDI and trade motivate advancing economies to be more innovative and allow developing ones to draw upon the stock of knowledge of more advanced countries. Adhikary (2011) also cites that FDI can increase the technological spillover benefits to the host country through widening the scope of international competition and strengthening the supply side capabilities for producing and selling goods and services. These effects lead to a fostering of economic growth as pointed out by Pugel (2007). Adhikary (2011) argues that a more open trade policy framework promotes the allocative efficiency of investment by reorienting production factors to sectors that have comparative advantages in trade, thereby augmenting economic growth. Edwards (1998) also argues that a country with a greater degree of openness can absorb the new technology brought by FDI at a faster rate than a country with a lower degree of openness. Empirically, Balasubramanyam et al. (1996) and Makki and Somwaru (2004) find that the effect of FDI inflows on economic growth is dependent on the degree of openness. Makki and Somwaru (2004) investigate the effect of FDI inflow on economic growth through trade openness by interacting FDI with trade openness in 63 developing countries from 1970-2000. They find that both FDI and trade openness are crucial for enhancing economic growth. They also find that FDI and trade openness reinforce each other in advancing economic growth in the host economies.

Although a number of studies investigate the impact of FDI on economic growth, they do not consider the role played by institution quality in determining investment efficiency and economic growth, including, for example, Borensztein et al. (1998), Balasubramanyam et al. (1996), Alfaro et al. (2004) and Carkovic and Levine (2002), Li and Liu (2005).

Olofsdotter (1998) argues that the ability to absorb the new technology provided by FDI inflows can be emphasised in countries with better institution quality. Empirically, Olofsdotter finds that the strong positive impact of FDI on economic growth is reached in countries that have high institution quality. Similarly, Durham (2004) examines the role played by institution quality in determining the effects of FDI on economic growth for 80 countries from 1979 to 1998. He finds that FDI inflows are more beneficial in countries with higher levels of institutional (as measured by business regulation index and property rights index) or financial development (as measured by the stock market liberalisation to GDP). Durham also finds that the host country that passes a minimum threshold of institution quality enjoys a positive impact of FDI on economic growth. Durham argues that the magnitude of financial and institutional development in enhancing productivity is that it potentially mediates the flow of imported capital to productive enterprises. In line with the same argument, Ayal and Karras (1998) examine the effect of institution quality measured by economic freedom index components on economic growth in 58 countries from 1975 to 1990. Their findings indicate that economic freedom index has a positive impact on economic growth. Ayal and Karras (1998) point out that reports on economic freedom suggest that economic growth increased with reduced direct involvement of government in economic activities. The reports usually connect such alleged on relationship to policies of privatisation, and changes in laws that make the relevant countries more accommodating to foreign and domestic business.

The above review suggests that the growth effect of FDI remains extremely controversial. This may be due to the use of different samples and data by different authors, and partly because of various methodological problems. For example, the results of single country studies are country specific and cannot be generalised. A number of studies do not take into account the role of different factors of host country absorptive capacity on the growth effect of FDI, and the certain level of absorptive capacity required to benefit from FDI. Adams (2009) also argues that FDI inflow can have a positive, no significance or negative impact on growth. This effect is dependent on the variables that are entered on the right-hand side of the growth equation, such as the initial per capita GDP, DI, political instability, etc. Overall, in spite of numerous empirical studies that present sufficient evidence that the impact of FDI on economic growth is not automatic, a number of recent researchers do not provide evidence supporting the hypothesis that the impact of FDI brought by MNCs on host country economic growth depends on its initial conditions. The above discussion also shows that previous empirical studies are sensitive to the measure of absorptive capacity used. To overcome these limitations, this chapter investigates a set of factors, as measures of host country absorptive capacity in selected sample from developing countries. This may help to explain the ambiguities in the literature of the contribution of FDI or in exploiting FDI more efficiently to promote economic growth.

Table 12: Summary of recent studies on the impact of host country' absorptive capacity on the dynamic relationship between FDI and growth

Author(s)	Type of data	Sample	Variable(s)	Main results
Balasubramanyam et al. (1996)	Cross section	46 developing countries; 1970-1985	Stock of foreign capital (FDI inflow); real GDP	FDI has a positive effect but only for export promoting countries
Olofsdotter (1998)	Cross section	50 developed and developing countries; 1970-1990	Growth rate of GDP per capita; Capital investment to total output (DI); growth rate of FDI (FDI inflows)	Increase in the stock of FDI inflows has a positive effect on economic growth. There are no positive growth effects from the stock of FDI in combination with the degree of openness or the level of human capital.
Borensztein et al. (1998)	Gross section	69 developing countries; 1970-1989	FDI/GDP; growth rate of per capita real GDP; Total fixed investment (DI)	FDI has a positive effect on growth but magnitude depends on availability of host country human capital. The host country should pass the (0.52 years) threshold of education to benefit from FDI inflow. FDI has crowding in effect on DI.
De Mello (1999)	Panel data and time series	32 developed and developing countries; 1970-1990	FDI inflow, TFP growth, capital accumulation (DI)	The positive impact on FDI on economic growth depends on crowding in effect of FDI.
Zhang (2001)	Time series	Group of 11 countries (Latin American and East Asia); 1957-1997	Real stock of FDI (FDI); real GDP	Growth effect of FDI depends on the host country conditions
Carkovic and Levine (2002)	Cross section and Panel data	Group of 72 developed and developing countries; 1960-1995	Growth rate of real GDP per capita; gross private capital inflows (FDI inflows)	FDI inflow does not exert a robust independent effect on economic growth
Bengoa and Sanchez-Robles (2003)	Panel data	Group of 18 Latin American countries; 1970-1999	Growth rate of GDP; FDI to GDP (FDI inflows)	FDI inflows have a positive impact on economic growth but the magnitude depends on the host country conditions.
Xu (2000)		Group of 40 developed and developing countries; 1966-1994	Growth rate of TFP; YM= value added of foreign affiliates to host country GDP; TR= royalties and license fees paid by foreign affiliates to valued added of affiliates; YM*TR= measure of the technology diffusion effect of MNEs	FDI has a positive effect on growth but magnitude depends on availability of host country human capital. The host country should pass the (1.4 years) threshold of education to benefit from FDI inflow. The technology transfer provided by US MNEs contributes to the productivity growth in DCs but not in LDCs

Herzer et al. (2008)	Cointegration time series	Group of 28 countries (10 in Latin American, 9 in Asia and 9 in Africa); 1970-2003	FDI inflow/GDP, GDP	Only weak evidence for FDI effects on GDP. Weak evidence for the growth effects of FDI depend on host country conditions.
Li and Liu (2005)	Panel data	Group of 84 developed and developing countries; 1970-1999	Growth rate of real GDP per capita; FDI to GDP; gross DI to GDP	FDI not only directly promotes economic growth by itself but also indirectly does so via its interaction terms. The interaction of FDI with human capital exerts a strong positive effect on economic growth in developing countries, while that of FDI with the technology gap has a significant negative impact. The host country above the (12.6) threshold of technology will no longer benefit from FDI inflow.
Sadik and Bolbol (2001)	Panel data	6 Arab countries; 1978-1989	FDI stock; GDP (TFP); DI	FDI inflow has a negative effect on technology and productivity.
Sadik and Bolbol (2003)	Panel data	Arab countries;1975-2000	FDI stock to GDP; GDP (TFP); domestic credit to the private sector to GDP	The growth effect of FDI depends on host country conditions. The host country should pass the (0.13 of GDP) threshold of financial development to benefit from FDI inflow.
Adams (2009)	Pooled time-series cross-section	Group of 42 Sub-Saharan African countries; 1990-2003	Growth rate of real GDP per capita, FDI inflows/GDP, GFCF (DI)/GDP	DI has a positive impact on economic growth but FDI is positive and significant only in the OLS estimation. FDI has an initial negative impact on DI.
Kinishita and Lu (2006)	Panel data	Group of 42 emerging and developing countries; 1970-2000	FDI inflow; growth rate of per capita GDP	FDI alone fails to affect economic growth, but it is realised in the country with a sufficient infrastructure. FDI and infrastructure are complements in affecting per capita GDP growth.
Bernstein (2000)	Time series data (3SLS)	Canadian manufacturing; 1966-1991	R&D stocks of Canadian communication equipment and U.S. manufacturing; growth rate of TFP of Canadian manufacturing	The infrastructure spillovers from U.S. manufacturing generate productivity gains to Canadian manufacturing through communication, and then Canadian manufacturing becomes the main source of R&D spillovers.
Kokko (1994)	Cross section	216 Mexican manufacturing industry; 1970	Average labour productivity in domestic firms; domestic firms' capital-labour ratio; Labour quality; foreign presence;	The advanced MNC technologies or large technology gaps alone do not constitute insurmountable obstacles to spillovers, but spillovers are less likely in industries with 'enclave' characteristics, i.e. where large technology gaps and high foreign shares coincide.
Elmawazini et al. (2008)	Panel data	Group of 38 developed and developing	Growth rate of TFP; The technology gap measured by TFP relative to US TFP in	The results do not support the hypothesis that the technology diffusion from MNCs has a positive impact

		countries; 1977-2000	the initial year; The human capital is the average years of male secondary school attainment in the population over age 25; the US MNCs in the manufacturing sector	on the productivity growth in developing countries. The total factor productivity gap is more appropriate than average years of schooling to measure host country absorptive capacity
Blomstrom et al. (1992)	Cross section	Group of 78 higher and lower income countries; 1960-1985	Growth rate of real GDP per capita; FDI inflow to GDP	FDI has a positive impact on economic growth in higher income developing countries, but not for lower income ones.
Johnson (2006)	Cross-section and panel data	Group of 90 developed and developing countries; 1980-2002	Inward stock of FDI per capita, growth rate of real GDP per capita	FDI inflows enhance economic growth in developing countries but not in developed countries.
Alfaro et al. (2004)	Cross section	Group of 71 OECD and non-OECD countries;1975-1995	Net FDI inflow; liquid liabilities to GDP; the ratio of commercial bank assets divided by commercial bank plus central bank assets; the value of credits by financial intermediaries to the private sector divided by GDP; the credit by deposit money banks to the private sector as a share of GDP; growth of real per capita GDP	FDI alone plays an ambiguous role in contributing to economic growth. However, countries with well-developed financial markets gain significantly from FDI

4.3. Empirical Specification

This section examines the significance of the absorptive capacity of the host country as measured by human capital development, technology gap, financial market development, infrastructure development, and trade openness and institution quality on the FDI-growth relationship. To investigate it empirically, this chapter tests a Growth equation, and uses the growth rate of real GDP per capita of the host economy as a dependent variable.

Furthermore, since the data available in DI already included the flows of FDI, so DI will not be controlled in the growth equation as in Carkovic and Levine (2003), Li and Liu (2005), Bengoa and Sanchez-Robles (2005) and Kinishita and Lu (2006). Bengoa and Sanchez-Robles (2005) do not control DI in their growth equation to avoid the collinearity of DI with FDI. Alfaro et al. (2004) also found that the introduction of DI led FDI to be insignificant in the growth equation. They explained this by the fact that both forms of investment were highly correlated, and FDI seemed to be a significant determinant of DI. By expanding their sample, they find that FDI can have a positive impact on growth even when controlling for DI. Conversely, one could argue that FDI can have a positive impact on growth because DI is not controlled in the growth equation. Therefore, for further robustness, DI will be added to the list of independent variables in the growth equation in the sensitivity analysis section.

For enlarging the sample size, the choice of countries and the time period is determined by the availability of the data on the top ten recipients of FDI inflows in Asian, African and Latin American countries. All data were sampled at five year intervals for 36 years from 1971 to 2005, that is, 1971-1975, 1976-1980, 1981-1985, 1986-1990, 1991-1995, 1996-2000, and 2001-2005. Thus data permitting, there are seven observations per country. Transforming data from annual observations to five-year averages has several advantages. For example, it may assist in limiting the influence of business cycles on the estimated coefficient such as FDI. Net FDI inflows vary widely from year to year, resulting in large fluctuations that may make the effect of persistent factors ambiguous (Bengoa and Sanchez-Robles 2005).

This chapter follows the contributions of Romer (1990), and extends the hypothesis of Borensztein et al. (1998), who are the first authors to examine the absorptive capacity of the host country. The chapter includes in the Growth equation not only human capital as a proxy of host country's absorptive capacity but also the technology gap, financial market development, infrastructure development, institution quality and trade openness. This chapter also follows the hypothesis of Xu (2000), Li and Liu (2005), Alfaro et al. (2004) and Kinishita and Lu (2006). Therefore, this chapter considers most of the explanatory variables in the Growth equation that have been used in previous studies, such as *FDI* inflows, initial *GDP per capita*, human capital development (*HC*), the technology gap between host and home country (*TG*), the financial market development (*MS*), infrastructure development (*IFR*), institution quality (*EFW)* and trade openness (*DOP*). The theory predicts that these variables are positively related to Growth, except initial *GDP per capita* and *TG* that are ambiguous. In addition to these explanatory variables, the empirical model includes a set of control variables that are likely to affect economic growth in developing countries. These variables are also included for testing the hypothesis of this chapter and for the robustness of the results.

Among this set of variables, the empirical model includes macroeconomic stability (*IFL*), government size (*GS*), black market premium (*BMP*) and two dummy variables, one for African countries (*Africa*) and another one for Latin American countries (*Latin*). These variables also include the interaction term of FDI inflows with both of these variables, the human capital, the technology gap, the financial market development, infrastructure development, and trade openness and institution quality. The theory predicts that inflation rate, government size, black market premium variables are negatively related to economic growth.

By considering all of these explanatory variables in the Growth equation, the model used in this chapter has the following formula:

$$\begin{aligned} LGrowth_{i,t} = {} & \alpha_0 + \alpha_1\, Linitial\ GDPpc_{i,t} + \alpha_2\, LFDI_{i,t} + \alpha_3\, LHC_{i,t} + \alpha_4\, LTG_{i,t} + \alpha_5\, LIFR_{i,t} \\ & + \alpha_6\, LMS_{i,t} + \alpha_7\, LDOP_{i,t} + \alpha_8\, L(1+IFL)_{i,t} + \alpha_9\, LGS_{i,t} + \alpha_{10}\, L(1+BMP)_{i,t} \\ & + \alpha_{11}\, LEFW_{i,t} + \alpha_{12}\, Africa_{i,t} + \alpha_{13}\, Latin_{i,t} + \alpha_{14}\, (LFDI*ABS)_{i,t} + \eta_i + \varepsilon_{i,t} \qquad (1) \end{aligned}$$

where:

LGrowth: the natural logarithm of the average of real gross domestic production (GDP) per capita growth rate.

Linitial GDPpc: the natural logarithm of real GDP per capita at the start of each period, so that it equals the initial year of the five-year intervals as researched by Carkovic and Levine (2002). This variable is used to measure the convergence or catching-up process between host countries and developed ones. This variable tests the hypothesis that growth is rapid at first and then slows down as the economy becomes more developed (Baharumshah and Almasaied 2009).

LFDI: the natural logarithm of the average of net foreign direct investment inflows as a ratio of GDP. The FDI-to-GDP ratio is used to take into account the effect of the country size. FDI inflow will be used as proxy for MNCs investment (or foreign firms) in host country (UNCTAD 1999).

LHC: the natural logarithm of the average of gross secondary school enrolment ratio. A higher level of human capital in a host country is expected to make FDI more effective in stimulating economic growth (Aleksynska et al. 2003). The gross ratio of secondary school enrolment is used as proxy of human capital development in the host country.

LTG: the natural logarithm of the average of the technology gap between home and host country. This variable is used to measure the technology gap that most developing countries face for entering the global market. Sjoholm (1999) argues that the wider the technology between the leader and follower country, the larger is the potential for technological imitation, which will spur economic growth.

Since, it is not simple to measure the technology gap between leading country and following one, a measure of the productivity gap can be used, as in Lim and McAleer (2002), Li and Liu (2005), Li (2005) and Krogstrup and Matar (2005). The technology gap is measured as the ratio of the gap between US GDP per capita as the world's technological leader country and host country GDP per capita, relative to host country GDP per capita at constant US dollars. Therefore,

$$TG_{i,t} = (Ymax_t - Y_{i,t})/ Y_{i,t}$$

where $Ymax_t$ is the GDP per capita of United States, and $Y_{i,t}$ is the GDP per capita of the host economy.

LIFR: the natural logarithm of the average of the number of mobile and fixed-line telephone per 1000 people. The mobile and fixed-line telephone subscribers (per 1000 people) that connect customers to a public network (Lumbila 2005) are used as a proxy of infrastructure.

LMS: the natural logarithm of the average of the ratio of M_2 as a percentage of GDP. The ratio of M_2 to *GDP* is used to measure the size of financial intermediaries relative to the size of the economy, or in general measure the financial system’s development (Lumbila 2005). Most empirical studies have demonstrated that well financial market development has a significant positive impact on economic growth (Alfaro et al. 2006; Alfaro et al. 2004; Barro 1991; Mankiw et al. 1992; Romer 1993).

LDOP: the natural logarithm of the average of trade openness, which equals exports plus imports relative to GDP. The degree of openness is an indicator which reflects the ease of entering the market. A higher degree of openness is often associated with greater market discipline and additional outlet for goods and services produced by domestic firms. The ratio of trade to GDP has been computed, as many empirical studies did, as total exports of goods and services plus total imports of goods and services divided by GDP. Balasubramanyam et al. (1996), Yanikkaya (2003) and Makki and Somwaru (2004) find that there is a positive correlation between trade openness and growth.

L(1+IFL): the natural logarithm of one plus the average of inflation rate as measured by the annual growth rate of GDP deflator. The inflation rate reflects the macroeconomic stability (Mercereau, 2005). Theoretically, an increasing inflation rate could further increase economic distortions and increase input costs, implying a negative effect on expected output growth.

LGS: the natural logarithm of the average of government size as measured by government spending as a share of GDP. This variable is used to capture the impact of government size on economic growth of the host country as suggested by cross-country studies. Barro (1991) demonstrates that government spending is negatively related to economic growth as indicated by his results in Barro (1989; 1990). Barro argues that government spending may not directly affect private productivity, but it can lower saving and growth through the distorting effects from taxation or government-expenditure programs.

L(1+BMP): the natural logarithm of one plus the average of black market premium, which capture the effect of exchange rate distortion on economic growth, as measured by the index of the difference between the official exchange rate and the black market rate. Dollar (1992) and, Levine and Zervos (1996) find that this variable tends to have a negative impact on economic growth. They argue that international price distortions may lower economic growth through the distortion effect.

LEFW: the natural logarithm of the average of economic freedom world index, which captures the effect of institution quality on economic growth. The literature indicates that an improved institutional quality leads to an improvement in economic performance (Bengoa and Sanchez-Robles, 2003, 2005). Bengoa and Sanchez-Robles (2003, 2005) and Ayal and Karras (1998) use the Fraser Institute's indicator for economic freedom as an institutional variable and find a significantly positive impact on growth.

The study includes twenty-four economies[23] from different regions with different economic growth performance and income level per capita. Asian countries show faster economic growth over the period under consideration and tend to have a higher share of foreign investment in GDP than African and Latin American countries. Therefore, two dummy variables, called *Africa* and *Latin*, for African and Latin American countries, respectively, are included to test whether the growth rate in African and Latin American countries is lower than in Asian countries, with respect to other determinants of economic growth. The two dummy

[23] Countries in the sample: African countries include Angola, Cameroon, Congo Dem. Rep, Egypt, Madagascar, Morocco, South Africa and Tunisia. Asian countries include China, India, Korea, Malaysia, Pakistan, Thailand and Turkey. Latin American countries include Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Peru and Venezuela.

variables are expected to be negatively correlated with the growth rate, if these countries grow more slowly than Asian countries.

Latin: A dummy variable for Latin American countries.

Africa: A dummy variable for African countries.

η: unobserved country-specific effect.

ε: The disturbance term.

i and t: Country and time period, respectively.

*(LFDI*ABS):* The multiplication of FDI by the host country' absorptive capacity variables, which capture the interaction terms of FDI with host country's absorptive capacity factors. This variable allows for testing the hypothesis that the impact of FDI on economic growth is determined by the host country's absorptive capacity. The term "*ABS*" includes *LHC, LTG, LIFR, LMS, LDOP* and *LEFW variables*.

From the model specification, there are three possible results that can assess the role played by the host country's absorptive capacity factors in determining the contribution of FDI in economic growth.

1- If α_2 and α_{14} both have a positive (negative) sign in the growth equation, then FDI inflows have an unambiguously positive (negative) effect on economic growth.
2- If α_2 is positive, but α_{14} is negative, then FDI inflows have a positive effect on growth, and this effect diminishes with the improvements in the host country's absorptive factors.
3- If α_2 is negative and α_{14} is positive, then this means that the host country has to achieve a certain threshold level (in terms of absorptive capacity developments) for FDI inflows to have a positive impact on economic growth.

The threshold of the host country's absorptive capacity is calculated by finding the partial impact of *FDI* on *Growth* as follows:

$(\partial Lgrowth/\partial LFDI)= \alpha_2 + \alpha_{14}\, ABS=0$, *then the threshold of host country's absorptive capacity* $(ABS) = - \alpha_2/ \alpha_{14}$

The sensitivity of the growth model specified is tested by controlling for other determinants of economic growth, by including a set of host country' absorptive capacity variables and by applying panel random effect and GMM estimations. To gain some robustness, the list of countries is expanded, changing the time period and removing the observations outlier also carried out in the next section.

4.4. Data and Variables

The empirical test is based on 24 developing country recipients of FDI inflows selected from three regions; Asia, Africa and Latin America over the period from 1971 to 2005. The choice of countries and the time period is determined by the availability of data. This chapter identifies countries with high-FDI flows over the entire thirty-six year sample period. The motivation for employing the size of FDI flows is to examine the hypothesis of this chapter within successful developing countries. A list of the economies integrated in the sample, the variables used in the empirical test and the data sources themselves are presented in Appendix II. Table 13 provides a summary statistic of the variables integrated in the empirical model. Table 14 presents the correlation matrix for all the explanatory variables and growth as dependent variable. The correlation matrix provides a first crude expectation of the relationship between these variables. Table 14 shows that *Growth* (GDP per capita growth rate) has a strong positive correlation with *FDI*, *MS, DOP* and *EFW*, as theoretically predicted. The Table also shows that Growth is positively related to *HC* and *IFR* at 5% and 10% significance levels, respectively. In addition, the Table indicates that *Growth* is strongly and negatively correlated with *IFL* and *initial GDP per capita*, as theoretically predicted. The Table also shows that the correlation between G*rowth* and both of *TG*, *GS*, and *BMP*, is negative and significant at 5% significance levels.

Table 13: Descriptive statistics of the variables used in specification model

	LGROWTH	LFDI	LHC	LTG	LIFR	LMS	LDOP	L(1+IFL)	LGS	L(1+BMP)	LinitialGDPpc	LEFW
Mean	0.97	0.93	3.75	6.61	3.12	3.28	3.70	2.76	2.52	1.99	5.63	1.66
Max	1.38	2.38	4.66	6.82	6.55	5.34	5.31	8.85	3.69	2.39	6.22	2.01
Min	-0.02	0.17	2.39	6.36	-0.64	1.02	2.07	0.02	1.42	0.00	4.62	1.04
Std. Dev.	0.30	0.50	0.53	0.18	1.68	0.73	0.55	1.44	0.32	0.74	0.32	0.21
Obs.	167	168	168	168	168	168	168	162	168	168	168	161

Table 14: Correlation matrix of the variables included in specification model

	LGROWTH	LFDI	LHC	LTG	LIFR	LMS	LDOP	L(1+IFL)	LGS	L(1+BMP)	LinitialGDPpc	LEFW
LGROWTH	1.00											
LFDI	0.21*	1.00										
LHC	0.17**	29*	1.00									
LTG	-0.26**	-0.50*	-0.33*	1.00								
LIFR	0.08***	0.44*	0.67*	-0.53*	1.00							
LMS	0.20*	0.16**	0.49*	-0.27*	0.41*	1.00						
LDOP	0.11*	0.46*	0.24*	-0.20*	0.38*	0.21*	1.00					
L(1+IFL)	-0.23*	-0.26*	-0.13	0.21*	-0.25*	-0.24*	-0.41*	1.00				
LGS	-0.03**	-0.21*	-0.10**	-0.03	-0.14***	0.21*	-0.22*	-0.05	1.00			
L(1+BMP)	-0.03**	0.07**	0.12	-0.23*	0.24*	-0.12	0.04	-0.15*	0.11	1.00		
LinitialGDPpc	-0.08*	0.08	-0.09**	-0.08	-0.02	-0.05	0.0001	-0.13**	-0.01	0.05	1.00	
LEFW	0.17*	0.32*	0.35*	-0.54*	0.46*	0.41*	0.22*	-0.32*	0.03	0.23*	0.03	1.00

4.5. Empirical Results

To empirically assess the role played by host country absorptive capacity in the FDI-Growth relationship, the model will be estimated by applying panel data techniques, which allow for studying variations over time. For testing the robustness of the results, two different panel estimation techniques will be presented, RE estimator as well as system GMM estimator.

This chapter uses random effect (RE) estimator instead of fixed effect (FE) estimator for the following reasons:

1- The panel data used has a large number of observations, thus RE will be more efficient than FE, so that it has more degree of freedom and uses information from the between estimator, and it allows to have explanatory variables that do not change over time for a unit (Asteriou and Hall 2007). Although, Wooldridge (2006) shows that in a large sample setting, fixed effect and random effect present similar estimates.

2- RE estimator allows for controlling of a certain amount of heterogeneity by including time-dummy variables for each group (Wooldridge 2006).

3- RE estimator is more appropriate for testing unbalanced panel data, where there are limitations or missing observations in the panel data set (Asteriou and Hall 2007).

4- The main differences between fixed effect and random effect models are that fixed effect assumes that each country differs in its constant term, whereas latter assumes that each country differs in its error terms. Random effect model treats the intercepts for each section not as fixed but as random parameters (Asteriou and Hall 2007).

However, the choice between RE or FE is dependent on whether unobserved component and other control variables are correlated. It is important to have a test for examining this assumption (Wooldridge 2006). Hausman (1978) developed a test to choose between RE and FE estimators. Table 15 shows that the Hausman (1978) test confirms the choice of using RE rather than FE, as its p-value is larger than 0.05.

Column 1 of Table 15 reports the results of the Growth equation. As expected all the explanatory variables have a right sign and are statistically significant. This column shows that countries with low level of initial GDP per capita grow faster as shown by the negative sign of the initial GDP per capita[24]. Column 1 also shows that FDI inflows are significantly and positively related to economic growth, which is consistent with the empirical literature and economic growth theory, stating that FDI inflows in general have a positive impact on economic growth. The coefficient of FDI suggests that for a one-percentage point increase in FDI, this increases the growth rate by 0.02 percentage points. The coefficient on *LHC*, the measure of human capital development, is also positively and significantly related to growth as reported in column 1. This result highlights the importance of education in the growth process of these economies[25]. In addition, the government size proxy has a negative and significant impact on economic growth, suggesting that a higher government spending to GDP ratio leads to lower economic growth. The black market premium is also negatively and significantly related to economic growth, where higher international price distortions lead to lower economic growth. The two dummy variables are also significantly and negatively related to economic growth. These results suggest that African and Latin American countries tend, *ceteris paribus*, to grow more slowly than Asian countries by 10% and 2%, respectively. This finding is not surprising given the fact that Africa and Latin America countries suffer the most from slower economic growth, compared to Asia economies.

[24] The idea is that poor economies should grow faster than rich economies (Ford et al. 2008).
[25] The same results are obtained by Borensztein et al. (1998) for developing countries, Li and Liu (2005) for developed and developing countries, and Ford et al. (2008) for the US.

Table 15: Absorptive capacity and the impact of FDI on economic growth; 1970-2005 (RE estimator, Dependent variable: real GDP per capita growth)

	1	**2**	**3**	**4**	**5**	**6**	**7**
Linitial GDP pc	-0.04** (0.015)	-0.03* (0.000)	-0.03** (0.033)	-0.02*** (0.056)	-0.05** (0.015)	-0.06*** (0.092)	-0.02** (0.042)
LFDI	0.056*** (0.061)	-0.58 (0.024)	0.91 (0.778)	-0.88 (0.561)	-1.19 (0.131)	-1.22 (0.139)	-0.28 (0.676)
LHC	0.08* (0.000)	0.34** (0.047)	0.19* (0.000)	0.16* (0.000)	0.49*** (0.052)	0.33* (0.000)	0.28** (0.040)
LGS	-0.05** (0.020)	-0.04** (0.033)	-0.03** (0.037)	-0.04** (0.039)	-0.05** (0.026)	-0.17** (0.039)	-0.04** (0.036)
L(1+BMP)	-0.005** (0.036)	-0.004 (0.828)	-0.001*** (0.094)	-0.001*** (0.096)	-0.01** (0.019)	-0.03** (0.017)	-0.002** (0.011)
Africa	-0.10** (0.012)	-0.12*** (0.081)	-0.12*** (0.080)	-0.011*** (0.062)	-0.11** (0.016)	-0.01** (0.015)	-0.03*** (0.071)
Latin	-0.02*** (0.068)	-0.003*** (0.060)	-0.001*** (0.099)	-0.002*** (0.077)	-0.002*** (0.097)	-0.09** (0.022)	-0.05** (0.046)
LFDI*LHC		0.17** (0.035)					
LTG			-0.05** (0.046)				
LFDI*LTG			-0.12** (0.048)				
LIFR				0.05** (0.030)			
LFDI*LIFR				0.41** (0.044)			
LMS					0.16*** (0.070)		
LFDI*LMS					0.40** (0.012)		
LDOP						0.14* (0.005)	
LFDI*LDOP						0.32** (0.045)	

LEFW							0.27** (0.049)
LFDI*LEFW							0.17** (0.032)
L(1+IFL)	-0.02 (0.620)						
constant	-3.72* (0.000)	-4.28* (0.000)	-4.34* (0.000)	-4.04* (0.000)	-4.11* (0.000)	-4.52* (0.000)	-3.90 (0.000)
R^2ad.	0.71	0.71	0.89	0.81	0.70	0.69	0.68
Threshold Value		3.41	7.58	2.15	2.98	3.81	1.64
No. obs.	168	168	168	168	168	168	144
P-Normality test	0.215	0.121	0.098	0.106	0.096	0.128	0.122
P-Hausman test	0.087	0.096	0.582	0.539	0.118	0.630	0.596

P-values reported in parentheses. The RE estimator includes a time dummy variable for each five-year period to account for period-specific effects. *, **, *** denote significance at 1%, 5%, and 10%, respectively. Macro instability is seen as a major determinant of black market premium. To avoid the possibility of there being a strong negative correlation between macroeconomic stability, as measured by inflation rate, and the black market premium, other columns except column 1 will not include *IFL* variables. This will be applied for all regression forms. As HC, TG, IFR, MS, DOP and FEW used as proxies for absorptive capacity of the host countries, to avoid the possibility of there being correlated, the variables and their interaction effects enter the regression equation one-by-one. This will be applied for all next estimations.

Column 1 also shows that the inflation rate has a right sign, but statistically insignificant, confirming the findings of Borensztein et al. (1989)[26].

Column 2 presents the estimated results for testing the growth effect of FDI through a well-educated workforce by including the interaction term of FDI with the human capital development proxy (*LFDI*LHC*)[27] in the growth equation. Column 2 shows that FDI has a negative impact on economic growth, while the interaction term of FDI with human capital is significantly and positively related to economic growth[28]. These facts suggest that a minimum level of human capital is required for FDI to contribute positively to growth, confirming the results of Borensztein et al. (1989). From column 2, the education threshold[29] required equals 30.26. This suggests that all economies with gross ratio of secondary school enrolment above 30.26 will benefit positively from FDI inflows. In this case, by taking the average value of gross ratio of secondary school enrolment in each country for the period from 1971 to 2005, 19 out of 24 countries satisfy this threshold in the period. Figure 15 shows the implications of the results[30]. The horizontal line (at 30.26) illustrates the estimated range of the minimum educational thresholds needed for FDI to be beneficial to growth. Note that there are five countries below the minimum estimated threshold including Angola, Cameroon, Congo, Madagascar and Pakistan. There are 19 additional countries that passed the estimated threshold, thus providing the requirement to absorb the benefits of FDI in average over the period 1971-2005. The finding suggests that only countries that provide a relatively well-educated labour force have the capacity to take advantage of foreign technology.

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[26] Borensztein et al. (1989) find that inflation rate is insignificant and negatively related to growth. They argue that the reason for this result is that the sample countries used do not include developed countries.

[27] *LFDI *LHC* is an interaction term meant to capture the effect of a well-educated workforce is likely to have on the absorptive capability of the flow of foreign assets (technology, knowledge, etc.).

[28] Borensztein et al. (1998), Xu (2000) and Ford et al. (2008) argue that FDI will no longer benefit the host countries, if they do not meet the threshold requirement for absorbing technology.

[29] By taking the derivative of the growth equation with respect to *LFDI*, setting them equal to zero. By solving it for the level of human capital (*LHC*) required, the total effect of FDI on growth is positive. This is yielding the education threshold, equal to 3.41. By taking the exponential of this value, the certain level of education will equal 30.26. This calculation will be applied for all threshold levels of other host country absorptive capacity variables.

[30] The level of education for each country on average over the period 1971-2005 is plotted on the vertical-axis and the average FDI over the period 1971–2005 is plotted on the horizontal-axis.

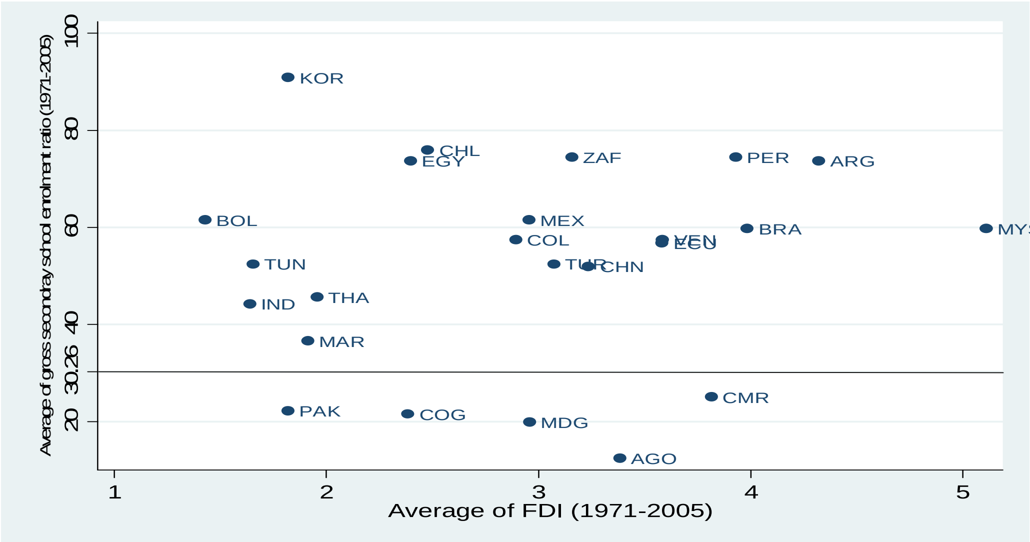

Figure 15: Human capital threshold (1971-2005; using RE)

Column 3 presents the estimated results for testing the growth effect of FDI through the effect of the technological gap between developing countries and developed ones by including the technology gap variable along with the interaction term of FDI with the technology gap proxy (LFDI*LTG)[31] in the growth equation. This column shows that the technology gap (*LTG*) variable appears to have a significant negative impact on economic growth. This implies that a wide technology gap between home and host country tends to slow down economic growth of the host country, as suggested by a number of empirical studies, such as those by Lim and McAleer (2002), Li and Liu (2005), Li (2005) and Krogstrup and Matar (2005).

Column 3 also shows that the coefficient of FDI is positive and the coefficient of the interaction term of FDI with technology gap is significantly and negatively related to economic growth. This suggests that a certain level of technological development is required for FDI to contribute positively to growth[32], confirming Li and Liu (2005) findings. Column 3

[31] *FDI *Technology* is an interaction term meant to capture the effect a size of the technology gap is likely to have on the absorptive capability of the FDI inflows.

[32] Kokko (1994) hypothesizes that spillovers are negatively related to the size of the technology gap between foreign and domestic firms. Therefore, a certain technology gap is necessary for those spillovers that occur as local firms copy MNC technology or benefit from the MNC's training of local employees. Kokko (1994) finds that the coefficient of FDI becomes positive and statistically significant when interacting FDI with technology

shows that not all economies will benefit positively from attracting FDI when the technology gap level is above 1958.62[33]. The sample suggests that 11 out of 24 countries can no longer exploit the positive impact of FDI on growth[34] as shown in Figure 16.

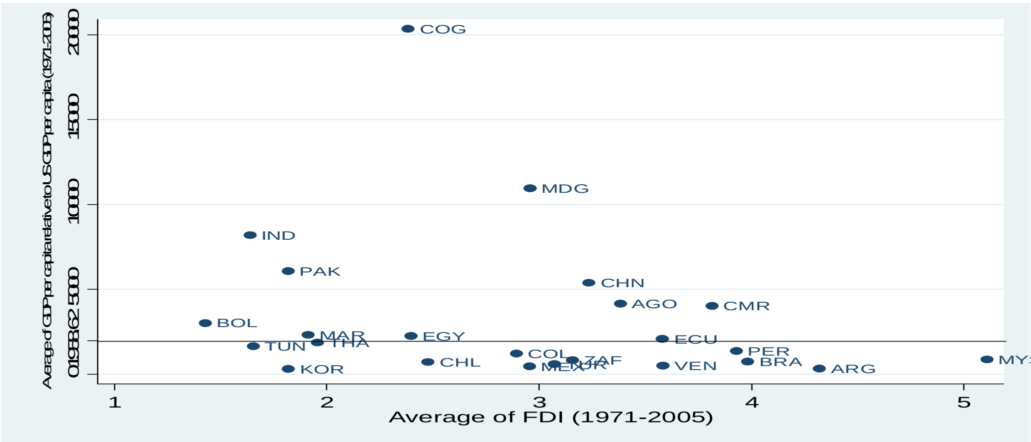

Figure 16: Technology gap threshold (1971-2005; using RE)

Column 4 tests the hypothesis that the contribution of FDI to economic growth is conditional on the levels of infrastructure development. Column 4 also shows that the infrastructure variable is significantly and positively related to economic growth in these countries, confirming previous findings of empirical studies, such as Kinishita and Lu (2006), Bernstein (2000), Sanchez-Robles (1998), Munnell (1992) and Lumbila (2005).

gap variable included in the regression, suggesting that spillovers of FDI are more important where foreign and domestic firms are in direct competition with each other. Thus, the competitive pressure exerted by the foreign firms may force domestic firms to operate more efficiently and introduce new technologies. Kokko (1994) also points out that the highly significant of the negative interaction term of foreign investment with the technology gap indicates that a large technology gaps may impede spillovers of FDI inflows into the host economy. Li and Liu (2005) demonstrate that FDI will no longer benefit for the receiving economies above threshold value of technology gap.

[33] By taking the exponential of the value (7.58), the certain level of the technology gap equals 1958.62.

[34] The eleven countries above the maximum estimated threshold including Angola, Cameroon, China, Congo, Bolivia, India, Madagascar, Morocco, Egypt, Ecuador and Pakistan, while 13 additional countries below the estimated threshold, which provided the requirement to absorb the benefits of FDI in the average of the period 1971-2005.

This column confirms the hypothesis that the relation between FDI and growth is contingent on the level of infrastructure development, suggesting that host country must reach a certain level of infrastructure development to benefit positively from FDI. From column 4, the certain level of pre-infrastructure required equals 8.58 (exponential of 2.15). In this case, 22 out of 24 countries can satisfy a requested pre-telephone network requirement to exploit the positive impact of FDI on growth over the average of the period as shown in Figure 17[35].

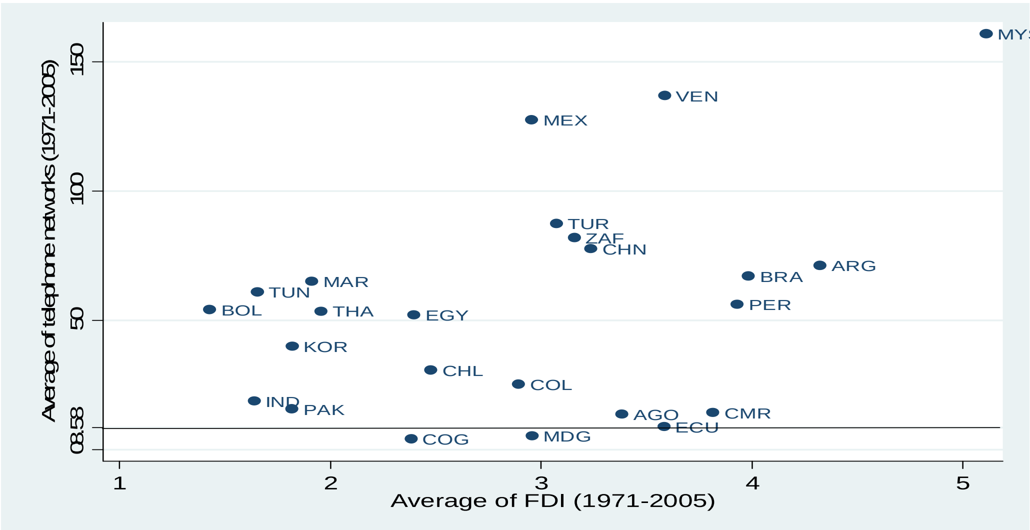

Figure 17: Infrastructure threshold (1971-2005; using RE)

Column 5 shows that the financial market development has a significant positive impact on economic growth in line with Barro (1991), Mankiw et al. (1992), Romer (1993), King and Levine (1993) and Alfaro et al. (2004).

Column 5 also tests the hypothesis that the impact of FDI on economic growth is contingent on the financial system. The column shows that the certain level of financial development is required to benefit positively from FDI equals 19.68 (exponential of 2.98), confirming the findings of Alfaro et al. (2004) and Durham (2004). Generally, there are 6 out of 24 countries that cannot satisfy a requested M_2 as a share of *GDP* requirement to exploit the positive

[35] Figure 3 shows that there are only two countries below the minimum estimated threshold including Congo and Madagascar, while 22 additional countries passed the estimated threshold

impact of FDI on growth are the average of the period under consideration as shown in Figure 18[36].

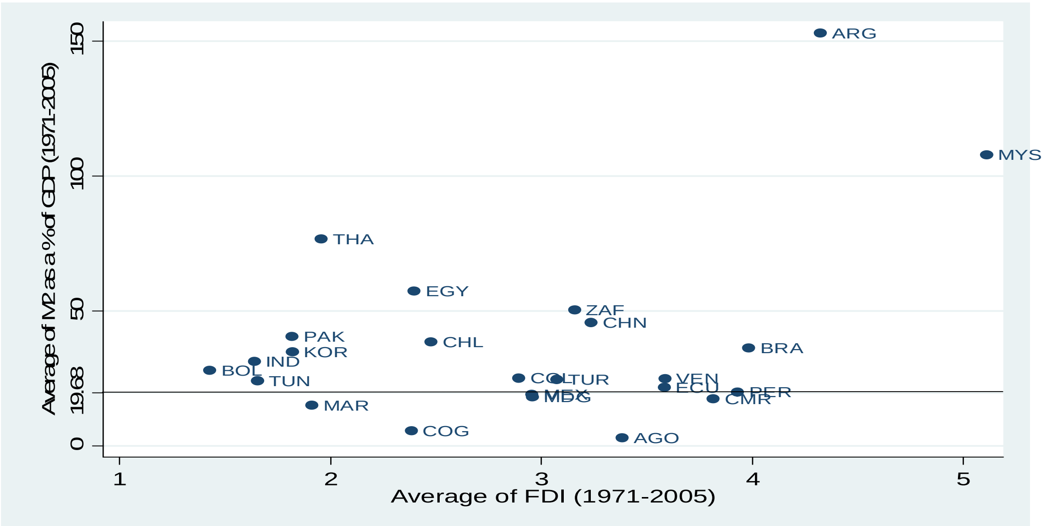

Figure 18: Financial market threshold (1971-2005; using RE)

Column 6 also shows that trade openness is significantly and positively related to economic growth, confirming empirical studies studying the impact of trade openness on economic growth, such as Balasubramanyam et al. (1996), Yanikkaya (2003) and Makki and Somwaru (2004). The degree of openness is an indicator that reflects the opening level of the local market, so that a higher degree of openness is often associated with greater market discipline and additional outlets for goods and services produced by domestic firms. Column 6 also confirms the results from Balasubramanyam et al. (1996), who argue that the relation between FDI and growth is contingent on trade. This column shows that a threshold of degree of openness equals to 45.15 (exponential of 3.81). Thus there are 13 out of a selected sample that can satisfy a requested degree of trade openness requirement to reap the positive impact of FDI on growth over the average of the period as shown in Figure 19.

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[36] Figure 18 shows that six countries below the minimum estimated threshold including Angola, Cameroon, Congo, Madagascar, Mexico and Morocco, while 18 additional countries passed the estimated threshold.

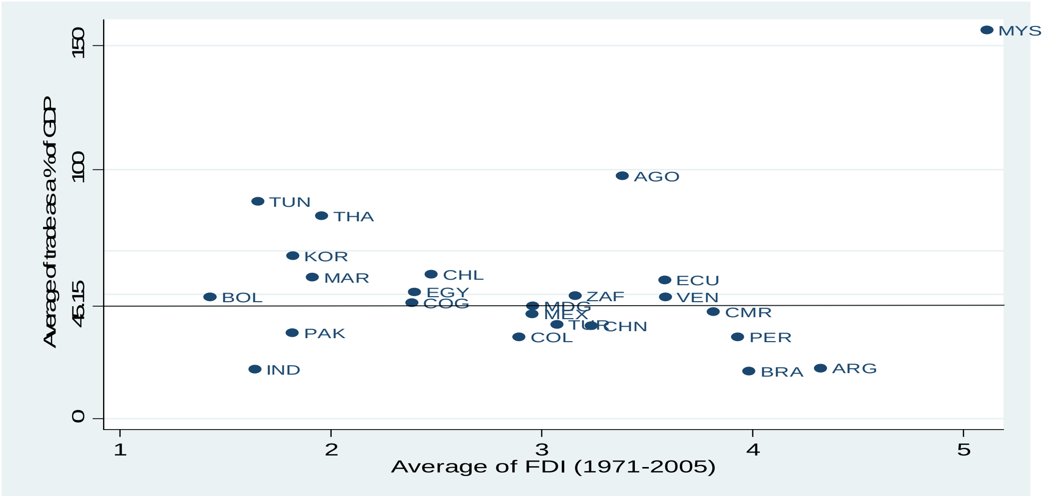

Figure 19: Trade openness threshold (1971-2005; using RE)

Recent empirical growth studies find that institution quality is an important prerequisite for and complement to economic growth. Column 7 examines whether economies with better institutional quality can exploit FDI more efficiently. In line with the literature, as can be seen in Column 7, the index of economic freedom has a positive and significant coefficient. This result confirms that a higher quality of institution positively affects economic growth in these economies.

Column 7 tests empirically whether the quality of institutions increases the potential benefits from FDI on growth through an interaction term of the EFW index with FDI. The calculated threshold for the economic freedom index is 5.15 (exponential 1.64), thus practically any improvement in the EFW index above this threshold would yield a positive growth effect of FDI. Figure 20 shows that 9 out of 23 economies[37] do not pass this threshold.

[37] These countries are Brazil, Madagascar, Congo, Pakistan, Turkey, Ecuador, Peru, China and Argentina.

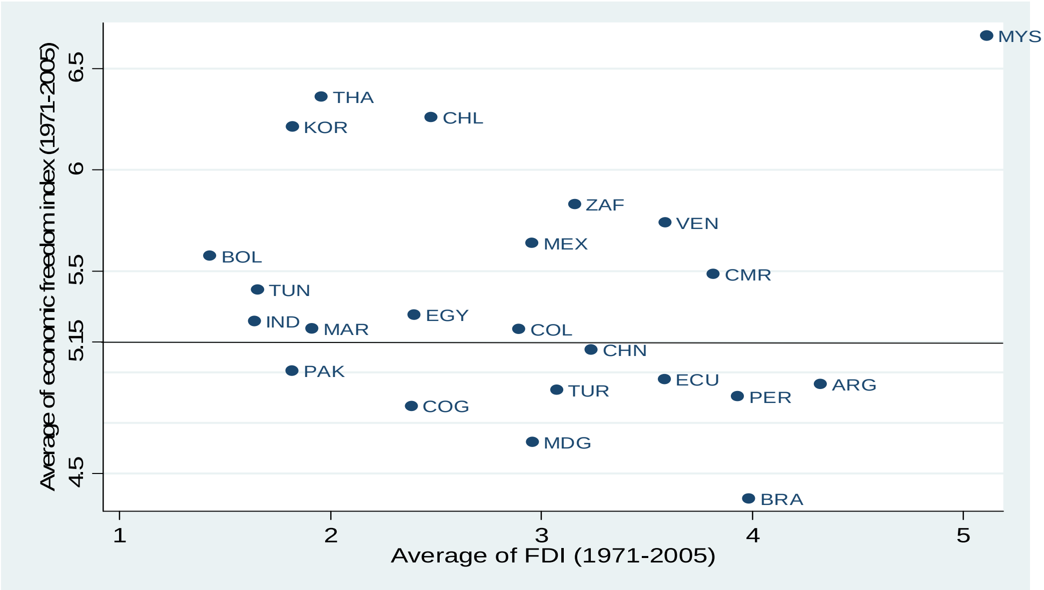

Figure 20: Institution quality threshold (1971-2005; using RE)

To gain some robustness, we apply a panel GMM estimation technique in spite of it assumes fixed effects. This technique also can help to overcome the limitation of using the Random effect estimator. One limitation of using the Random effect estimator is that it does not deal with the endogeneity problem of some regressors, especially FDI, which leads to inconsistent estimations. So far, endogeneity has been dealt with by using lagged period of endogenous variables as effective instruments in panel dynamic techniques (Arellano and Bond 1991). Bond (2002) and Roodman (2006) states that there are two methods to eliminate this endogeneity, by taking first-difference or transforming the data to remove unobserved individual-specific effects.

The most convenient and widely used approach is the Generalised Method of Moments (GMM) estimator by first-differencing the model to eliminate the fixed effects. The model then addresses the correlation between the differenced lagged dependent variable and the induced error term, which produce a consistent estimator and efficient parameter estimates (Arelleno and Bond 1991; Bond 2002; Johnson et al. 2004). Therefore, the lagged dependent variable (*Growth (-1)*) is included as an additional explanatory variable, and for eliminating the country-specific error term the first-difference of the model is applied. Therefore, this is often called the difference GMM estimator.

To specify these facts properly, equation 1 can be rewritten as follows:

$$Y_{i,t} = \alpha\, Y_{i,t-1} + \beta\, X_{i,t} + \eta_i + \varepsilon_{i,t} \qquad (2)$$

where: Y is the logarithm of the dependent variable (growth rate of real GDP per capita) and Y_{t-1} represents the lagged dependent variable. X is the set of explanatory variables, including FDI and other determinants variables in the growth equation. η represents an unobserved country-specific effect. ε is the error term, and i and t are the country and time period, respectively.

Taking the first differences of equation 2 to deal with the country-specific effect:

$$y_{i,t} = \alpha\, y_{i,t-1} + \beta\, x_{i,t} + \omega_{i,t} \qquad (3)$$

where: y is the first differences of dependent variable and y_{t-1} represents the first differences of lagged dependent variable. x is the first differences of the set of explanatory variables and ω is the first differences of the error term. It is assumed that the error term is not serially correlated with the lagged dependent variable as regressors. In addition, the explanatory variables are assumed to be uncorrelated with future realizations of the error term. The GMM dynamic model applies the following moment conditions:

$$E\,|Y_{i,t-c} \cdot \omega_{i,t}| = 0 \qquad \text{for } c \geq 2;\ t= 3, \ldots, T \qquad (4)$$

$$E\,|X_{i,t-c} \cdot \omega_{i,t}\,| = 0 \qquad \text{for } c \geq 2;\ t= 3, \ldots, T \qquad (5)$$

where: c and t represent the five-year period under consideration. The GMM estimator based on these conditions is known as the difference GMM estimator.

One limitation of this technique is that using the lagged level as an instrument for the first-difference GMM equation is weak, which may bias the parameters (Blundell and Bond 1998;

Baum 2006). Following Blundell and Bond (1998) to deal with this limitation, the model will include both first-differenced and levels equations. This type of model is known as a system GMM estimator.

The validity of the initial conditions process will results in the use of lagged levels of the variables as instruments for equations in first differences combined with lagged difference of the variables as instruments for equation in levels. This implies that there are two instruments; one for the regression in differences and anther one for the regression in levels. Formula 6 clarifies this properly:

$$E\,[Y_{i,t+p} \cdot \eta_i\,] = E\,[Y_{i,t+q} \cdot \eta_i\,] and\ E\,[X_{i,t+p} \cdot \eta_i\,] = E\,[X_{i,t+q} \cdot \eta_i\,] \qquad \text{for all } p \text{ and } q \qquad (6)$$

where: p, q *and* t represent the time periods.

To eliminate the possibility of the presence of the correlation between the levels of the right-hand variables and the country-specific effect, additional moment conditions are included for the regression in levels.

$$E\,[(Y_{i,t-c} - Y_{i,t-c-1}) \cdot (\eta_i + \varepsilon_{i,t})\,] = 0 \qquad for\ c= 1 \qquad (7)$$

$$E\,[(X_{i,t-c} - X_{i,t-c-1}) \cdot (\eta_i + \varepsilon_{i,t})\,] = 0 \qquad for\ c= 1 \qquad (8)$$

This is because there is a large body of literature showing that the causality between FDI and growth can run in both directions. Thus, for controlling the problem of endogeneity, all endogenous variables are lagged by two periods. The lagged differences and levels of the endogenous variables are also used as instruments in system GMM. Arellano and Bond (1991) demonstrate that lagged differences of endogenous variables can be used as effective instruments in a dynamic panel model. To control for the endogeneity of FDI, the lagged FDI is used. The first differenced lagged dependent variable (GDP per capita growth) is also instrumented with its past levels to reduce autocorrelation bias. Other explanatory variables in growth equation also included as instruments in system GMM estimation. This makes the endogenous variables pre-determined and thus, not correlated with the error term. The variables in levels in the level equation are also instrumented with their own first differences to increase efficiency. Using only the second lag of the endogenous variables as instruments, because a large number of instruments causes the Sargan test to be weak. It is also the second lag is necessary, because it is not correlated with the current error term, and to avoid reducing the sample size. The Hansen and Sargan tests are used to approve the validity of the overall appropriateness of the instruments used. The Arellano-Bond test is also used for testing second-order serial correlation in residuals.

The results of system GMM estimator are presented in Table 16[38]. This table confirms the results obtained by the RE estimator that all explanatory variables have an expected sign and are statistically significant.

Column 1 shows that LFDI and LHC are significantly and positively related to economic growth, while LGS, L(1+BMP) and L(1+IFL) have an expected negative impact on economic growth. This column also confirms the fact that African and Latin American countries tend, *ceteris paribus*, to grow more slowly than Asian countries.

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[38] The reported *P-value* of Arellano-Bond test shows that the second-order serial correlation is not significant. In addition, Hansen and Sargan tests are tests of over-identification. The reported *p-value* of Hansen and Sargan tests indicate that the set of moment conditions is not rejected.

Table 16: Absorptive capacity and the impact of FDI on economic growth; 1970-2005 (two-step system GMM, Dependent variable: real GDP per capita growth)

	1	2	3	4	5	6	7
Lagged Growth	-0.25** (0.029)	-0.34** (0.023)	-0.42*** (0.095)	-0.36** (0.012)	-0.29** (0.030)	-0.36* (0.003)	-0.54* (0.008)
LFDI	0.01*** (0.059)	-2.38 (0.501)	3.58 (0.940)	-1.26 (0.741)	-2.08 (0.233)	-1.85 (0.868)	-9.21 (0.860)
LHC	0.57** (0.017)	0.45** (0.018)	0.76** (0.020)	0.14** (0.045)	0.64** (0.043)	0.34** (0.030)	0.08*** (0.089)
LGS	-0.17** (0.040)	-0.08** (0.049)	-0.36*** (0.057)	-0.61*** (0.075)	-0.99*** (0.055)	-0.22*** (0.056)	-0.48** (0.036)
L(1+BMP)	-0.03** (0.041)	-0.16** (0.026)	-0.12** (0.047)	-0.05 (0.823)	-0.05** (0.040)	-0.16** (0.022)	-0.14 (0.764)
Africa	-0.04** (0.048)	-0.41** (0.043)	-0.21*** (0.052)	-0.47** (0.040)	-0.31** (0.021)	-0.21 (0.706)	-0.37** (0.048)
Latin	-0.02** (0.012)	-0.09** (0.040)	-0.45** (0.031)	-0.31 (0.516)	-0.15** (0.018)	-0.22 (0.711)	-0.34** (0.019)
LFDI*LHC		0.74** (0.013)					
LTG			-0.99*** (0.075)				
LFDI*LTG			-0.42** (0.010)				
LIFR				0.37** (0.026)			
LFDI*LIFR				0.39** (0.026)			
LMS					0.28** (0.039)		
LFDI*LMS					0.67** (0.030)		
LDOP						0.14** (0.031)	
LFDI*LDOP						0.48** (0.040)	

LEFW							0.49** (0.014)
LFDI*LEFW							5.53** (0.019)
L(1+IFL)	-0.26*** (0.071)						
constant	3.52** (0.047)	4.17* (0.000)	-1.14** (0.010)	3.54** (0.018)	1.59** (0.046)	2.63** (0.034)	1.26*** (0.063)
Threshold Value		3.21	8.52	3.23	3.10	3.85	1.66
No. Observations	126	130	130	130	130	130	124
No. Instrument variables	19	19	19	19	19	19	19
P-Arellano-Bond test for AR(2) in first diff.	0.245	0.462	0.137	0.481	0.304	0.537	0.135
P-Hansen test of over id. restrictions	0.159	0.076	0.187	0.145	0.157	0.101	0.279
P-Sargan test of over id. restrictions	0.193	0.241	0.235	0.173	0.221	0.138	0.363

P-values reported in parentheses. The system includes a time dummy variable for each five-year period to account for period-specific effects. *, **, *** denote significance at 1%, 5%, and 10%, respectively.

Column 2 also confirms the hypothesis that the impact of FDI on growth depends on a level of educated workforce. As the result suggests, a certain level of human capital development must be reached for FDI to contribute positively to economic growth. Figure 21 shows the implications of the human capital threshold[39]. This figure shows that there are four countries below the minimum estimated threshold including Pakistan, Angola, Congo and Madagascar, while 20 additional countries passed the estimated threshold during the average of the period 1971-2005.

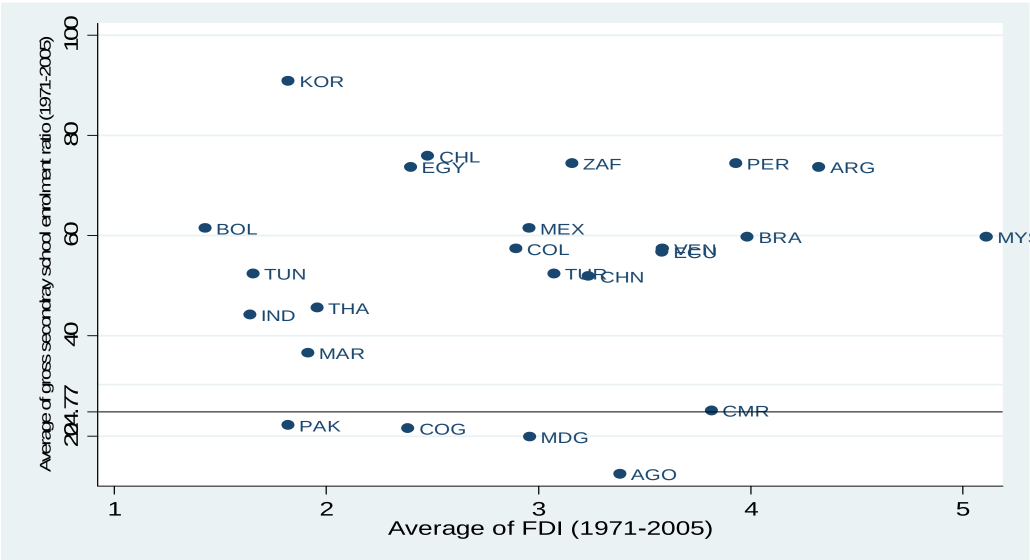

Figure 21: Human capital threshold (1971-2005; using GMM)

Column 3 also confirms that the host country must have a certain level of technological development for the impact of FDI on economic growth to be positive. Figure 22 shows the implication of an estimated range of the maximum technological gap thresholds needed for FDI to be beneficial to growth, which is equal to 5014.05 (exponential 8.52).

[39] The horizontal line (at 24.77; exponential 3.21) shows the estimated range of the minimum human capital thresholds needed for FDI to have a positive impact on growth.

This figure shows that there 5 out of 24 countries that do not have the technological capacity to exploit the advantages of foreign technology[40].

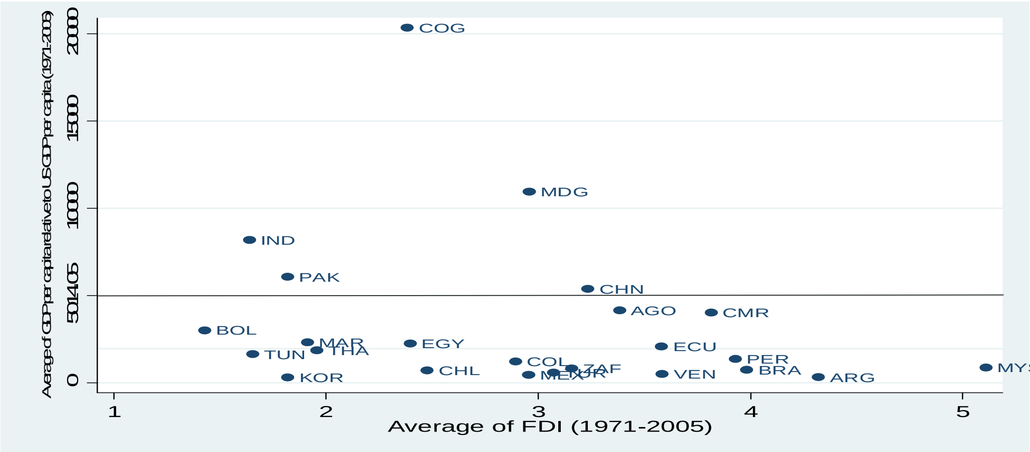

Figure 22: Technology gap threshold (1971-2005; using GMM)

Column 4 shows that the host country must pass a minimum threshold of infrastructure development to gain the most from attracting FDI, which confirms the results of random effect estimation. Figure 23 shows that there are seven countries below the minimum estimated threshold of infrastructure development (at 25.27) including Angola, Cameroon, Congo, Ecuador, Pakistan, India and Madagascar, while 17 additional countries passed the estimated threshold over the average of the period 1971-2005.

[40] Figure 22 shows that there are five countries above the maximum estimated threshold including Congo, India, Pakistan, China and Madagascar. There are 19 additional countries below the estimated threshold, which provided the requirement to absorb the externalities of FDI in the average of the period 1971-2005.

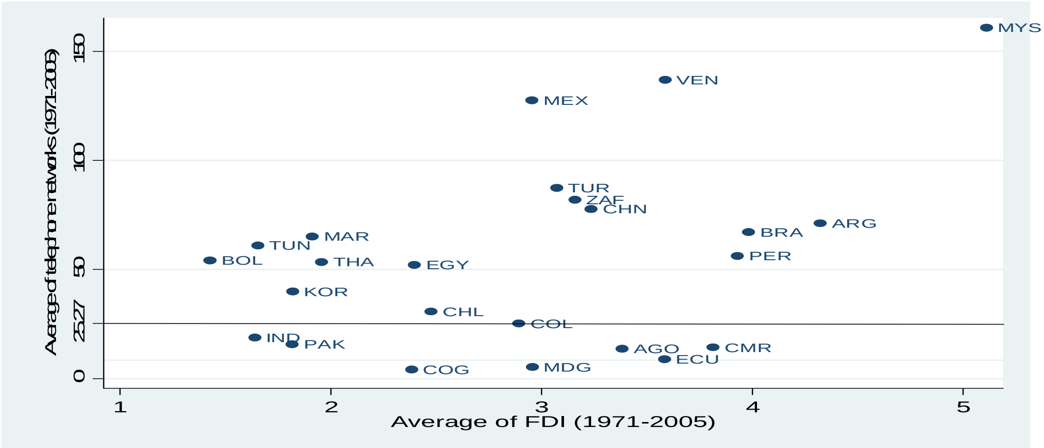

Figure 23: Infrastructure threshold (1971-2005; using GMM)

Column 5 also confirms the hypothesis that the host country must reach a threshold level of financial system development for FDI to be beneficial to economic growth. From Figure 24, there are eight countries[41] below the minimum estimated threshold (at 22.19), while 16 additional countries passed the estimated threshold over the average of the period 1971-2005.

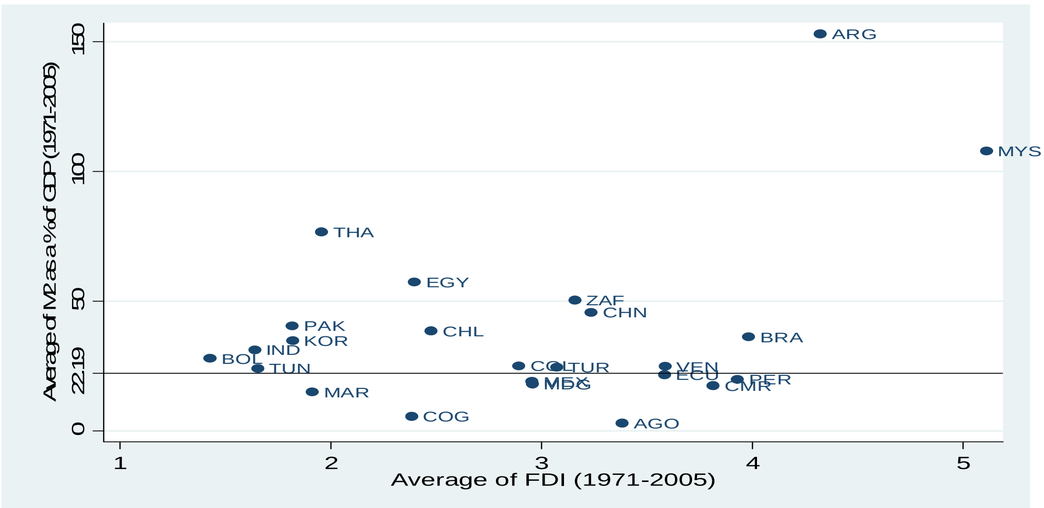

Figure 24: Financial market threshold (1971-2005; using GMM)

[41] These countries are Angola, Congo, Morocco, Madagascar, Mexico, Ecuador, Peru and Cameroon.

The hypothesis that the relation between FDI inflows and economic growth is contingent on trade is also confirmed as shown in column 6. The implication of the threshold of the degree of openness, equal to 46.99, is presented in Figure 25. This figure shows that 12 economies passed the minimum estimated threshold of trade openness over the average of the period 1971-2005.

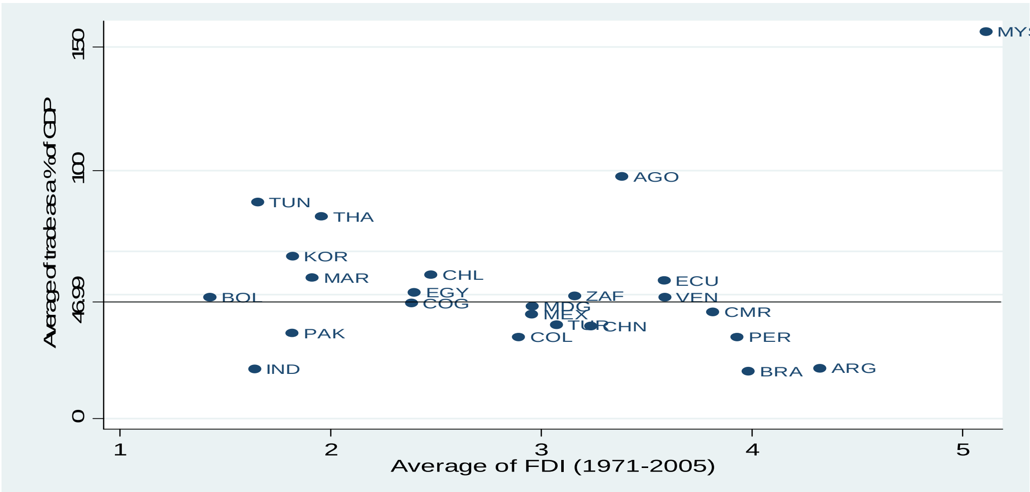

Figure 25: Trade openness threshold (1971-2005; using GMM)

Column 7 also confirms the results of RE estimation that tests the hypothesis on whether the quality of institutions increases the potential benefits from FDI on growth. The calculated threshold for the economic freedom index is 5.25 (exponential 1.66). Figure 26 shows the implication of this result, indicating that 11 out of 23 economies[42] could not exploit FDI efficiently.

[42] These countries are Brazil, Madagascar, Congo, Pakistan, Turkey, Morocco, Colombia, Ecuador, Peru, Argentina and China.

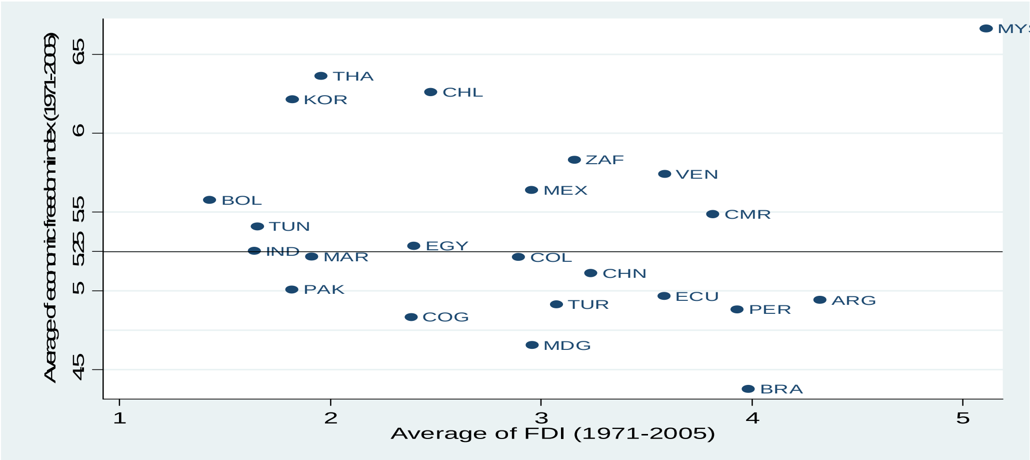

Figure 26: Institution quality threshold (1971-2005; using GMM)

These results can be interpreted as evidence that the impact of FDI on economic growth is heavily influenced by changes in the techniques applied. The results also can be interpreted as offering base-line support to the hypothesis that FDI has a positive impact on economic growth, and countries that offer pre-absorptive capacity enjoy the most benefits from FDI externalities.

4.6. Sensitivity Analysis

The empirical results presented above are based on a small sample of 24 top developing countries that are successful in attracting FDI inflows in three regions; Asian, African and Latin American regions. The reason for using that sample is to test the hypothesis of this chapter within successful countries. As a result, the findings might be sensitive to the sample choice. Thus, the robustness of the results is tested by using a larger country sample. To enlarge the sample size, the choice of countries and the time period is determined by the availability of the data on most developing countries. Since the majority of developing countries have started attracting FDI inflows from the early 1980s, the time period of this section covers 1981 to 2005. All data were sampled at five year intervals for 25 years from 1981 to 2005, that is, 1981-1985, 1986-1990, 1991-1995, 1996-2000, and 2001-2005, thus data permitting there are five observations per country. These changes increase the sample size from 24 to 76 countries and the number of observations from 168 to 380. A list of the economies integrated in the sample and used in the empirical investigation is presented in Appendix II.

Economic growth literature shows that the rate of physical capital formation positively affects economic growth, as concluded, for example, by Kormendi and Meguire (1985), Barro (1991) and Levine and Renalt (1992). Thus, the robustness of the results is also tested by including domestic investment (DI)[43] in the growth equation and by reducing omitted variables biases. This section also examines the outliers observed to gain some robustness. A common statistical test is Cook's distance measure, which provides an overall measure of the influence of an observation on the estimated regression coefficient. The higher the value of the Cook's D the more frequent outliers are the observations, and lowest value of the Cook's D, zero or near-to-zero is the assumed. The potential critical value is 4/number of observations. Appendix II includes a table that shows the outliers result of Cook's D test, which is obtained from regression all explanatory variables in the growth equation by applying OLS estimation. The multicollinearity check among explanatory variables is also reported in Appendix II. The test shows that the problem of multicollinearity does not exist and estimated coefficients are stable.

Table 17 provides a summary statistics of the variables integrated in the growth equation. Table 18 presents the correlation matrix for all the explanatory variables and growth as the dependent variable. Table 18 shows that Growth rate has a strong positive correlation with *FDI*, *HC*, *IFR* and *EFW*, as theoretically predicted. The Table also shows that Growth has a significantly positive correlation with *MS*, *DOP and DI*. The Table also indicates that Growth is significantly and negatively related to *TG*, *IFL*, *GS*, *BMP* and *initial GDP per capita*, as suggested by growth theory.

[43] Definition of this variable and the source of the data are listed in Appendix II.

Table 17: Descriptive statistics of the variables used in specification models

	LGROWTH	LFDI	LHC	LTG	LIFR	LMS	LDOP	L(1+IFL)	LGS	L(1+BMP)	LinitialGDPpc	LEFW	LDI
Mean	2.07	2.46	3.61	7.90	1.64	3.41	4.07	2.47	2.58	1.98	6.37	1.68	3.02
Max	3.00	3.57	4.66	10.64	6.55	5.35	5.48	8.86	3.69	2.39	9.79	2.01	24.85
Min	-0.047	1.79	1.19	4.09	-3.73	1.73	2.59	-1.56	1.42	0.00	4.62	0.54	0.19
Std. Dev.	0.39	0.19	0.75	1.39	2.20	0.59	0.56	1.27	0.38	0.79	1.21	0.23	1.24
Obs.	380	380	380	380	380	380	380	371	380	380	380	355	355

Table 18: Correlation matrix of the variables included in specification models

	LGROWTH	LFDI	LHC	LTG	LIFR	LMS	LDOP	L(1+IFL)	LGS	L(1+)BMP	LinitialGDPpc	LEFW	LDI
LGROWTH	1.00												
LFDI	0.38*	1.00											
LHC	0.27*	0.29*	1.00										
LTG	-0.15*	-0.12**	-0.51*	1.00									
LIFR	0.35*	0.49*	0.74*	-0.47*	1.00								
LMS	0.06**	0.12**	0.57*	-0.38*	0.46*	1.00							
LDOP	0.02***	0.25*	0.32*	-0.24*	0.19*	0.39*	1.00						
L(1+IFL)	-0.11**	-0.12**	-0.03	0.07	-0.05	-0.32*	-0.35*	1.00					
LGS	-0.18*	0.0002	0.06	-0.26*	0.04	0.31*	0.27*	-0.08	1.00				
L(1+BMP)	-0.24*	-0.26*	0.05	-0.02	0.19*	-0.01	0.30*	-0.19*	-0.07	1.00			
LinitialGDPpc	-0.06**	-0.01	0.46*	-0.71*	0.22*	0.39*	0.54*	-0.21*	0.26*	0.05	1.00		
LEFW	0.36*	0.35*	0.41*	-0.31*	0.45*	0.30*	0.31*	-0.39*	-0.005	0.49*	0.29*	1.00	
LDI	0.08**	0.10***	0.15*	-0.07	0.17*	0.05	0.06	0.02	-0.02	0.02	0.01	0.06	1.00

4.6.1. Empirical Results

Table 19 presents the results of the growth equation obtained by applying the RE estimator. As can be seen from column 1 of Table 19, FDI still has a positive and significant impact on growth, confirming previous findings of this chapter. Column 1 also shows that the impacts of HC, IFL, GS and BMP on economic growth are confirmed. Column 1 also shows that two dummy variables have a right sign and are statistically significant. Columns (2, 3, 4, 5, 6 and 7) show that the hypothesis that the relation between FDI inflows and economic growth is contingent on the host country's absorptive capacity is confirmed.

Additionally, the results of system GMM estimator are reported in Table 20. The results indicate that *FDI* inflows contribute positively to economic growth, only if the host countries have reached a certain level of human capital development, technological gap, infrastructure development, financial system development, degree of trade openness and institutional development.

These results suggest that changing the sample size and omitted variables do not affect the main findings of this chapter. Namely, FDI contributes positively to economic growth of the host countries, but the magnitude of this effect depends on the host country absorptive capacity.

Table 19: Absorptive capacity and the impact of FDI on economic growth; 1980-2005 (RE estimator, Dependent variable: real GDP per capita growth)

	1	2	3	4	5	6	7
Linitial GDP pc	-0.06** (0.010)	-0.05** (0.033)	-0.10* (0.000)	-0.05** (0.036)	-0.05** (0.039)	-0.02** (0.064)	-0.06* (0.009)
LDI	0.64** (0.010)	0.57** (0.047)	0.44** (0.034)	0.36** (0.033)	0.60** (0.011)	0.87** (0.014)	0.55** (0.045)
LFDI	0.40* (0.000)	-0.67 (0.910)	0.98 (0.797)	-1.02 (0.134)	-0.57 (0.739)	-0.56 (0.652)	-1.01 (0.745)
LHC	0.16* (0.000)	0.25** (0.018)	0.11** (0.011)	0.48* (0.000)	0.14* (0.002)	0.16* (0.000)	0.28** (0.021)
LGS	-0.24* (0.001)	-0.20* (0.002)	-0.23* (0.000)	-0.22* (0.001)	-0.19* (0.008)	-0.17** (0.011)	-0.19* (0.004)
L(1+BMP)	-0.09* (0.006)	-0.10* (0.002)	-0.10* (0.001)	-0.09* (0.005)	-0.10* (0.002)	-0.13* (0.000)	-0.03** (0.031)
Africa	-0.06*** (0.055)	-0.08** (0.027)	-0.03*** (0.058)	-0.10** (0.019)	-0.11*** (0.098)	-0.11*** (0.093)	-0.08** (0.020)
Latin	-0.05** (0.045)	-0.09** (0.014)	-0.08** (0.019)	-0.08** (0.025)	-0.10** (0.019)	-0.05** (0.049)	-0.07** (0.030)
LFDI*LHC		0.16** (0.027)					
LTG			-0.12** (0.021)				
LFDI*LTG			-0.12** (0.029)				
LIFR				0.12*** (0.098)			
LFDI*LIFR				0.22** (0.015)			
LMS					0.58** (0.035)		
LFDI*LMS					0.16** (0.031)		
LDOP						0.47** (0.017)	

LFDI*LDOP						0.17** (0.019)	
LEFW							1.17** (0.035)
LFDI*LEFW							0.61** (0.020)
L(1+IFL)	-0.03*** (0.066)						
constant	1.54* (0.000)	0.88** (0.023)	2.86* (0.002)	1.44* (0.000)	1.05** (0.014)	2.78** (0.010)	-0.23*** (0.081)
R^2ad.	0.26	0.25	0.28	0.25	0.25	0.27	0.28
Threshold Value		4.18	8.16	4.63	3.56	3.29	1.65
No. obs.	346	355	355	355	355	355	355
P-Normality test	0.154	0.132	0.122	0.134	0.139	0.133	0.123
P-Hausman test	0.371	0.376	0.377	0.378	0.377	0.375	0.372

P-values reported in parentheses. The RE estimator includes a time dummy variable for each five-year period to account for period-specific effects. *, **, *** denote significance at 1%, 5%, and 10%, respectively.

Table 20: Absorptive capacity and the impact of FDI on economic growth; 1980-2005 (two-step system GMM, Dependent variable: real GDP per capita growth)

	1	2	3	4	5	6	7
Lagged Growth	-0.41* (0.000)	-0.40* (0.000)	-0.25** (0.015)	-0.31* (0.001)	-0.15** (0.015)	-0.36* (0.001)	-0.31** (0.024)
LDI	0.65** (0.024)	0.18** (0.017)	0.55* (0.009)	0.63** (0.032)	0.55*** (0.065)	0.49** (0.048)	0.85** (0.028)
LFDI	0.32** (0.029)	-0.64 (0.842)	2.25 (0.316)	-1.13 (0.795)	-0.73 (0.883)	-0.85 (0.922)	-2.81 (0.294)
LHC	0.11** (0.030)	0.91*** (0.066)	0.39** (0.022)	0.13*** (0.059)	1.08** (0.016)	0.69** (0.022)	0.55** (0.047)
LGS	-0.37** (0.036)	-1.33** (0.022)	-1.53** (0.013)	-0.62** (0.017)	-0.58 (0.592)	-1.19** (0.028)	-0.80** (0.032)
L(1+BMP)	-0.53** (0.011)	-0.55** (0.019)	-0.47** (0.022)	-0.82*** (0.064)	-0.79** (0.013)	-0.76* (0.003)	-0.15*** (0.055)
Africa	-0.08*** (0.086)	-0.42** (0.037)	-0.58** (0.046)	-0.60*** (0.067)	-0.72*** (0.066)	-0.34 (0.576)	-0.29** (0.031)
Latin	-0.04** (0.036)	-0.04** (0.033)	-0.45** (0.014)	-0.53** (0.017)	-0.29 (0.544)	-0.60 (0.129)	-0.25*** (0.054)
LFDI*LHC		0.18** (0.022)					
LTG			-0.50** (0.018)				
LFDI*LTG			-0.29** (0.028)				
LIFR				0.18** (0.048)			
LFDI*LIFR				0.23** (0.023)			
LMS					0.91** (0.014)		
LFDI*LMS					0.21** (0.040)		
LDOP						1.36** (0.014)	

LFDI*LDOP						0.23** (0.015)	
LEFW							5.21** (0.014)
LFDI*LEFW							1.63** (0.032)
L(1+IFL)	-0.12** (0.029)						
constant	4.88** (0.039)	3.84** (0.023)	8.00** (0.030)	0.02*** (0.099)	0.59*** (0.060)	4.96** (0.034)	-7.06** (0.034)
Threshold Value		3.55	7.75	4.91	3.47	3.69	1.72
No. Observations	277	284	284	284	284	284	284
No. Instrument variables	23	23	23	23	23	23	23
P-Arellano-Bond test for AR(2) in first diff.	0.348	0.296	0.265	0.292	0.207	0.274	0.114
P-Hansen test of over id. restrictions	0.378	0.405	0.062	0.265	0.522	0.084	0.069
P-Sargan test of over id. restrictions	0.110	0.660	0.476	0.816	0.893	0.673	0.982

P-values reported in parentheses. The system includes a time dummy variable for each five-year period to account for period-specific effects. *, **, *** denote significance at 1%, 5%, and 10%, respectively.

Figures below show the implication of these findings[44]. Figure 27 shows the implications of the human capital threshold[45]. The calculated threshold for the human capital indicates that 59 out of 76 economies do not pass this threshold in the average from 1981-2005 as suggested by RE estimates. Also, human capital threshold estimated by system GMM estimator shows that there are 27 out of 76 countries below the minimum estimated threshold for the average of the same period.

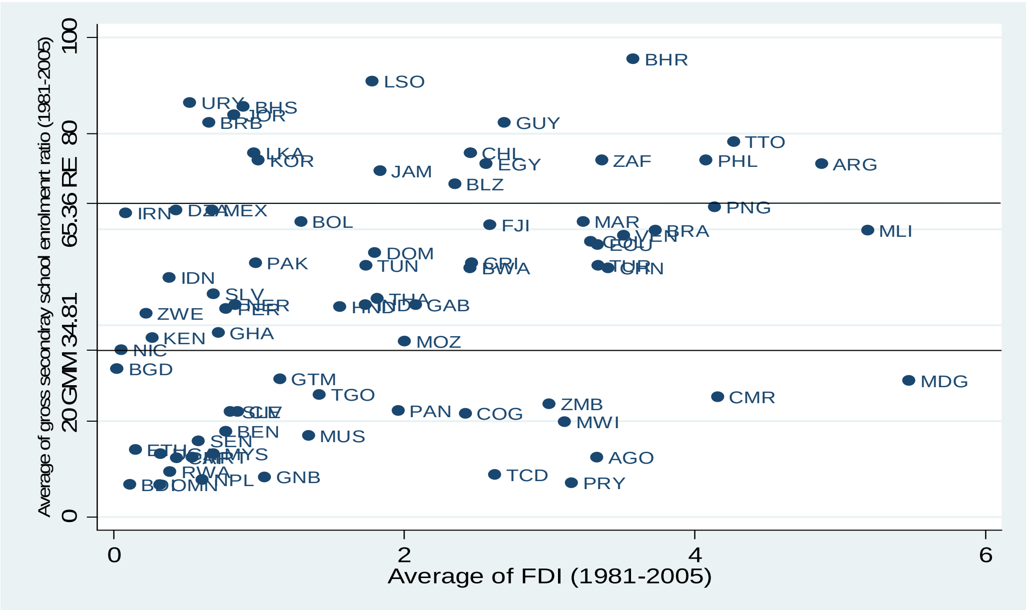

Figure 27: human capital threshold (1981-2005)

The implication of the technology gap threshold is shown in Figure 28. The estimated threshold for the technology gap indicates that 35 out of 76 economies above this threshold (at 3498.18) on average over the period 1981-2005 as suggested by RE estimates. Also, Technology gap threshold estimated (at 2321.57) by system GMM estimator shows that there

[44] Note that all thresholds calculated are transferred to non-logarithmic forms by taking the exponential value of threshold estimated.

[45] The two horizontal lines (at 65.36 for RE estimates and 34.81 for system GMM estimates) show the estimated range of the minimum human capital thresholds needed for FDI to have a positive impact on growth.

are 39 out of 76 countries above the maximum estimated threshold on average of the same period.

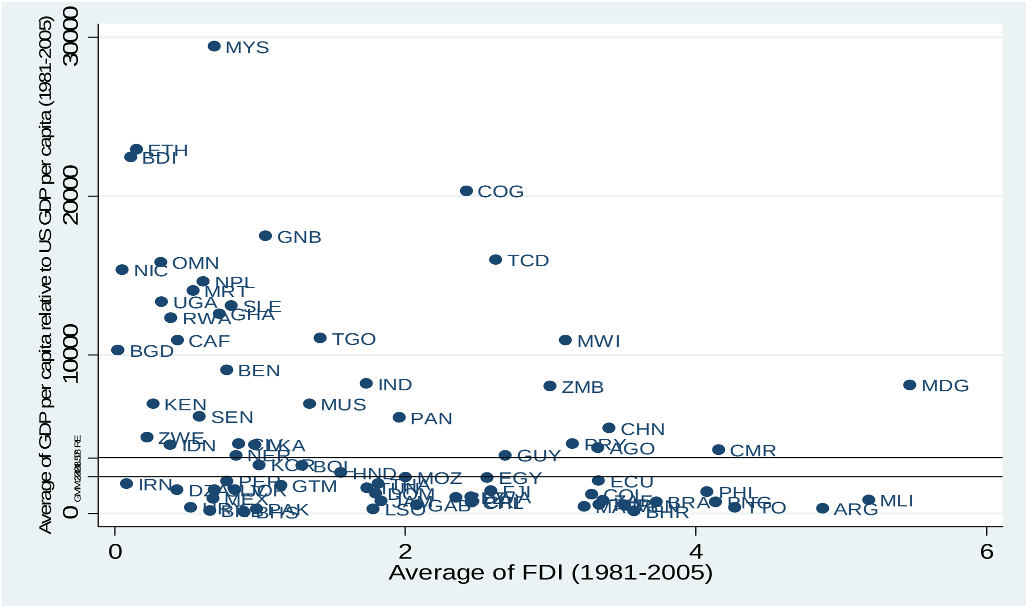

Figure 28: Technology gap threshold (1981-2005)

Figure 29 shows the implications of the infrastructure threshold estimated, equal to 102.51 and 135.63 as estimated by RE and GMM estimators, respectively. This threshold for the infrastructure indicates that 26 out of 76 economies passed the estimated threshold on average for the period 1981-2005 as suggested by RE estimates. Infrastructure threshold estimated by system GMM shows that there are only 15 out of 76 countries above the minimum estimated threshold for the average over the same period.

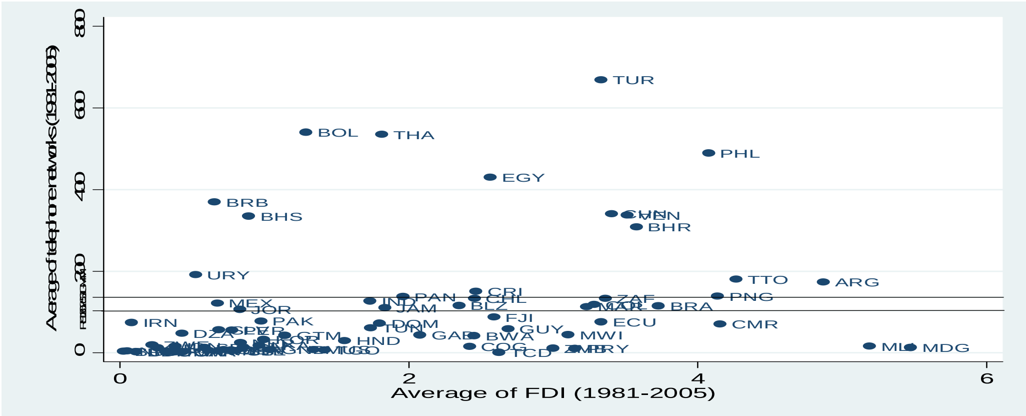

Figure 29: Infrastructure threshold (1981-2005)

The calculated of minimum threshold of the financial system[46] is presented in Figure 30, while Figure 31 shows the implication of the estimated minimum threshold of trade openness[47] over average for the period 1981-2005.

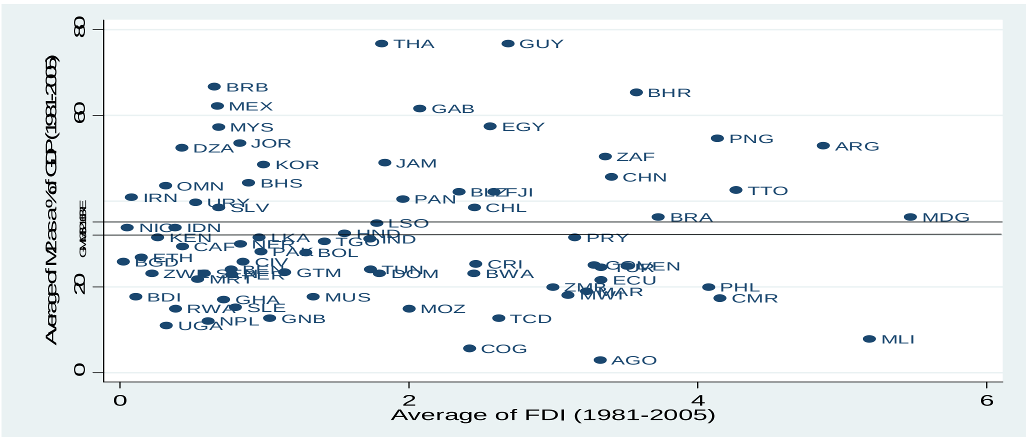

Figure 30: Financial market threshold (1981-2005)

[46] The threshold values of financial system equal to 35.16 and 32.13as estimated by RE and GMM estimators, respectively.

[47] The threshold values of trade openness equal to 26.84 and 40.04 as estimated by RE and GMM estimators, respectively.

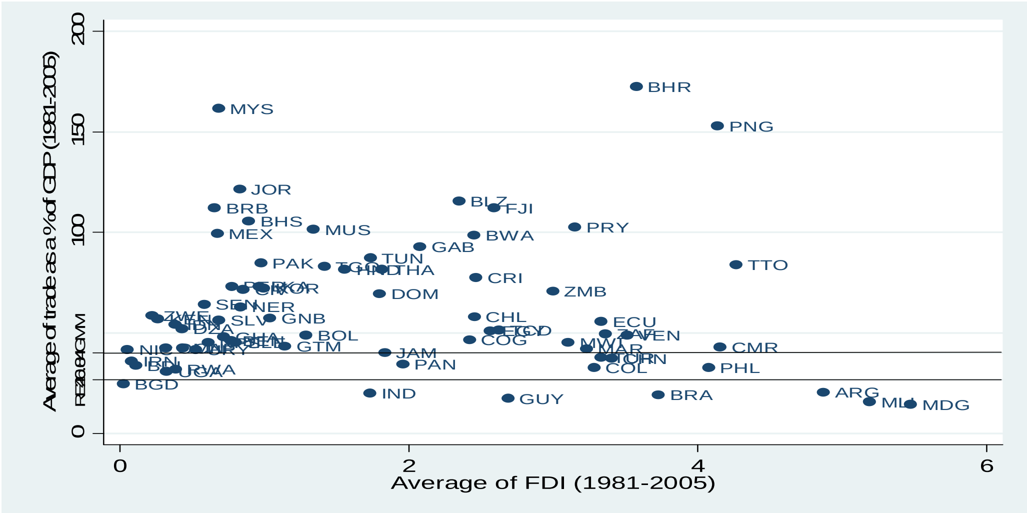

Figure 31: Trade openness threshold (1981-2005)

Figure 32 shows the implication results of the minimum threshold of the institution quality[48] in the host countries during the average over the period 1981-2005.

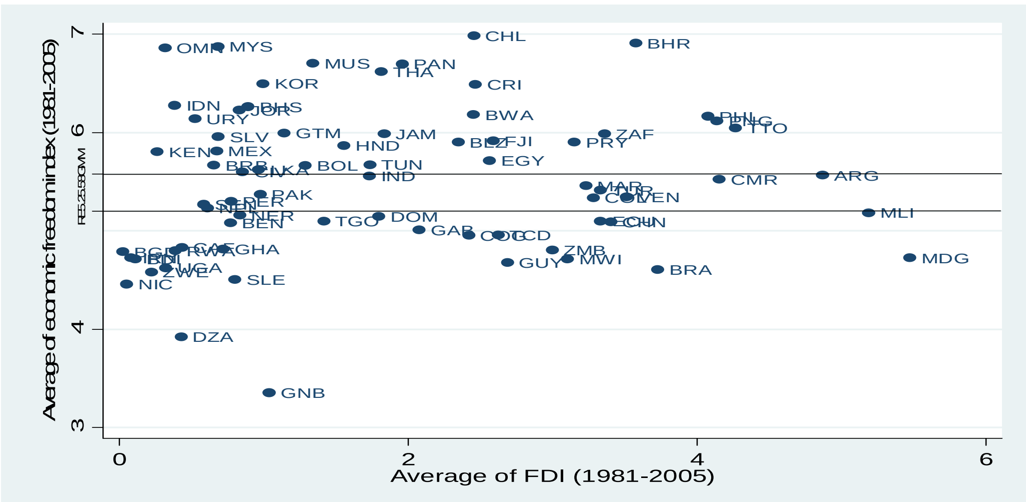

Figure 32: Institution quality threshold (1981-2005)

48 The threshold values of institutional quality equal to 5.20 and 5.58 as estimated by RE and GMM estimators, respectively.

To gain some robustness, we re-estimated the growth equation after excluding outliers in observations. The results of both random effect (RE) and general method of moment (GMM) estimators are presented in Appendix II. The results of both RE and GMM estimators indicate that there is a threshold level of host country's absorptive capacity development, and the countries gain the most from FDI spillovers, if they reach this threshold.

4.7. Conclusion

There are a large number of empirical studies that examine the growth effects of FDI in developing countries. However, the results of these studies fail to confirm whether FDI helps to improve economic growth in the host countries. Thus, the main purpose of this chapter is to examine the growth effect of FDI on the host countries in selected samples from Asian, African and Latin American countries from 1971 to 2005. The chapter investigates firstly this hypothesis among the most successful countries, and then in most of Asian, African and Latin American countries 1981 to 2005. Particularly, the chapter examines the following specific research question: *Does FDI contribute to economic growth in developing countries alone or does it depend on its initial conditions?*

The results of this chapter confirm the numerous empirical studies and economic growth theories studying the growth effect of FDI, stating that FDI has in general a positive impact on economic growth. The results of this chapter clearly show that domestic investment, human capital, infrastructure development, financial market development, trade openness, and institution quality are positively related to economic growth. In contrast, the technology gap, initial GDP per capita, government size, black market premium and the inflation rate are negatively related to economic growth. The result of this chapter also shows that African and Latin American countries are, assuming other factors remaining fixed, more likely to grow less than Asian countries.

The main finding of this chapter is that FDI can have a positive impact on economic growth, but its magnitude depends on the host country conditions, as suggested by the significant impact of the interaction terms of FDI with a set of host county characteristics. These findings suggest that a certain level of absorptive capacity is required for FDI to be beneficial to the host economy. These findings are in line with many empirical studies on this topic, although it is contrary to the findings of Carkovic and Levine (2002) for panel data, Blomstrom et al. (1992) for cross-section data, and Herzer et al. (2008) for time series data. Furthermore, the results of this chapter are influenced by change in applied techniques, omitted variable, sample countries used or observations outlier.

Overall, the findings of this chapter support the fact that policies considered to attract more FDI are not satisfactory in generating spillovers for economic growth. Improving the investment environment through developing the host country's absorptive capacity factors should be a priority for policymakers in these countries to exploit FDI efficiently.

This investigation suggests that further empirical studies and researches are required to re-examine which type of foreign capital flows foster economic growth, and how foreign capital inflows affect economic growth in the host countries. However, this claim requires further analysis to empirically test whether such a specific capital flow form exist, and if so, how significant it is. This investigation has considerable policy implications to policymakers in these countries. Chapter five will address this area of analysis.

5. Foreign Capital, Domestic Investment and Economic Growth: The growth-enhancing role of FDI and other types of foreign capital in developing countries

5.1. Introduction

The surge increase in the flow of foreign capital in the world economy has motivated a large empirical literature focusing on the consequences of foreign capital flows in the host countries. The main study area of this literature focuses on the growth effect of foreign capital flow, with especial focuses on the factors that enable host countries to absorb the benefits of foreign capital flow, as described in chapter four and stated by a number of studies, such as Borensztein et al. (1998), Alfaro et al. (2004), Balasubramanyam et al. (1996), Kokko (1994), and Durham (2003; 2004). Another research area that has received less, but steady growing consideration in the recent literature, is the effect of foreign capital flow on domestic investment in the host countries. A number of studies in this area of research provide evidence that foreign capital flow has a positive impact on domestic investment (Bosworth and Collins 1999; Bosworth et al. 1999; De Mello 1999; Razin 2003; Mody and Murshid 2005; Mileva 2008), as also described in chapter three.

These two areas of research are still separate in spite of the fact that if foreign capital flow can have a positive impact on domestic investment, then it indirectly affects economic growth in the host countries. The aim of this chapter is to bring together these two areas of research into a single research study. This can help explore the indirect impact of foreign capital flow on growth, and testing whether foreign capital flow has a growth-impact works via domestic investment.

Given that the recent economic growth literature demonstrates that domestic investment is one of the most robust determinants of economic growth, as also supported by Levine and Renelt (1992) and Mishra et al. (2001); the empirical literature also states that foreign capital inflow positively affects domestic investment in the host countries rather than crowding it out (Reisen and Soto 2001). Exploring whether foreign capital flows have an indirect impact on growth turns out to be an area important for study. Such study can be empirically carried out by developing a simultaneous equation model. This model includes domestic investment and growth as endogenous variables, and foreign capital inflows included as a determinant of domestic investment and growth. This model allows specifying the channel of influence from foreign capital flow to economic growth via domestic investment. In such a model, foreign capital flows will disaggregate into three types of foreign capital flows, which include foreign direct investment (FDI), portfolio investment (PF) and loans flows (LN). This allows answering the question of how each type of foreign capital flow affects growth directly and indirectly via capital accumulation. The answer of this question is crucial for understanding the contribution of each type of foreign capital inflow to economic growth.

The important implication of this question is that if the impact of each type of foreign capital flows on growth via domestic investment is significant, a failure to take it into account will result in under-evaluating the development role of each type of foreign capital flows. Furthermore, if each type of capital flow is proved to have an indirect impact on growth through capital accumulation channel, then the scope of the literature on growth effects of FDI will extend to include the impact of other types of capital inflow into account. Another implication of this question is that if FDI appears to have a greater impact on growth than other types, then developing countries should strengthen their ability to attract FDI instead of other types, and promotions of FDI will be justified.

The rest of the chapter is organised as follows: section 5.2 briefly reviews the existing studies on the impact of foreign capital inflows on economic growth. Section 5.3 describes the methodology used, and section 5.4 presents the overview of the data. Section 5.5 presents the estimation method, section 5.6 presents the estimation results, and section 5.7 concludes the chapter.

5.2. An Overview of Existing Studies

Recently, policy makers and economists have become more concerned with the issue of foreign capital inflows in developing countries and its impact on economic growth. FDI and other types of capital inflow can contribute to economic growth by expanding the capital accumulation in the host countries. This capital accumulation can affect growth only in the short-run as suggested by traditional neo-classical growth theory (Solow 1956). In neo-classical growth theory, the long-run growth is only possible through a permanent increase in the level of technology and is taken to be exogenous. Endogenous growth theory, however, considers technology to be endogenous and considers the role of capital in the creation of technological advances (Colen et al. 2008). Foreign capital provides resources for investment in the development of new idea and skills, so that raises the level of technology not only within the firm, but in the entire economy. Thus, according to endogenous growth theory, foreign capital, including FDI, can have permanent affect on economic growth through increased investment in technology and know-how, increasing the overall level of knowledge and technology in the economy (Colen et al. 2008).

Economic literature emphasises various type of foreign capital inflows to the host countries, such as FDI inflows, portfolio investment, bank lending investment, and official investment[49]. Durham (2003) points out that FDI is preferable to other types of foreign capital inflows. The most important advantage of FDI inflows, over other types of foreign capital inflows such as portfolio investment and bank lending, through its externalities is the adoption of new technology, which can occur via licensing agreements, commencement, and competition for resources, employee training, knowledge, and export spillovers. These benefits, together with the direct capital financing, affect major macroeconomic variables such as domestic investment, technology, employment generation and skilled labour, and export competitiveness in developing countries (Shahbaz and Rahman 2010). FDI has also a larger impact on growth due to its limited volatility compared with other types of capital inflows (Bosworth and Collins 1999; Lipsey 2001; Durham 2003; Shahbaz and Rahman 2010). This is due to the fact that FDI inflows cannot easily be withdrawn while profits, losses and risks are shared among the foreign and the host entity. So that FDI is attracted by the long term

[49] *FDI* occurs when an investor achieves some control or acquires more than 10% of the asset shares over the functioning of an enterprise in another country. *Portfolio investment* occurs when investors purchase non-controlling interests in foreign companies, or buy foreign corporate or government bonds, short-term securities, or notes. *Bank lending investment* takes the form of bank loans, including deposit holdings by foreigners and loans to foreign individuals, businesses and governments. *Official investment* takes generally the forms of development assistance, such as aid flows and accumulation of international reserves, which developed countries give to developing ones (Prasad et al. 2007).

prospects of the country and its policies, and therefore more stable than other foreign capital investment (Colin et al. 2008).

Other types of foreign capital inflows can be seen as supporting the depth and breadth of domestic capital markets, such as portfolio investment and foreign loans (Bosworth and Collins 1999). Thus, the growth effects of these types of flows in the long-run might be significant, depending on the potential growth impact of each type of foreign capital flows.

The empirical literature has been mainly focused on the impact of FDI inflows on economic growth. The findings of this literature indicate that FDI may have a positive, negative or no impact on economic growth, contingent on the host country’s absorptive capacity. To our knowledge, little work has been found to date examining the effects of other types of foreign capital inflows on economic growth in the host countries. These studies can be divided into two categories; the first one only focuses on the effect of these types on economic growth, while the second one examines the effect of each category of foreign capital inflows on DI.

5.2.1. Empirical evidence on the impact of specific types of foreign capital inflows on economic growth

Growth literature suggests that the contribution of FDI to economic growth is seen to be robustly associated with its contribution to capital accumulation, as other types of foreign capital inflows, and its role as a vehicle for transferring knowledge and advanced technology and other managerial skills. All of these factors are expected to enhance productivity level and technological progress, which lead to higher economic growth.

Foreign portfolio investment can be beneficial to the host country in different ways. Foreign portfolio investment increases the liquidity of domestic markets. As market becomes more liquid, deeper and broader, many ranges of enterprises can be financed. For example, new enterprises have a greater chance of receiving start-up financing. Portfolio investment can also bring discipline and know-how into domestic capital markets. In such markets, investors can have greater incentives to expend resources in researching new or emerging investment opportunities. Portfolio investment can also help domestic market by introducing more advanced instruments and technology for managing portfolio investment risks (Evans 2002). Reisen and Soto (2001) also point out that portfolio equity flows encourage the liquidity of domestic stock markets, easing allocation from low to high growth industries, and lowering the capital cost for firms. Summers (2000) suggests that such a reallocation of capital flow will enhance investment in the host country. Bekaert and Harvey (1998) find, empirically, that portfolio equity flows have a positive direct effect on macroeconomic performance in emerging markets.

Mallick and Moore (2005) argue that bank lending can also help promote economic growth in receiving countries. Bank lending can help boost infrastructural investment in both social and physical capital. Bank participation in investment projects may also raise the expected level of both social and private investment returns, thereby crowding-in additional private sector investment. The bank lending can also carry with it a package of structural policy reforms, which a country accepts as a condition for receiving the loans. Thus the bank lending can have a direct impact on economic growth, which reflects the impact of loans on investment, and indirect impact through the associated reforms on economic efficiency and growth (Mallick and Moore 2005).

Gruben and McLeod (1998), in a panel of 18 Asian and Latin American countries, find a supported evidence of the above theoretical view. They find that FDI inflows, portfolio flows, and bank lending have a significant positive impact on growth. Reisen and Soto (2001) argue that FDI, portfolio investment and bank lending can bring addition financial resources to domestic investment, and then stimulate growth in the host countries through improving resource allocation, deepening domestic financial markets or reducing capital costs for local entrepreneurs.

Shen, Lee, and Lee (2010) examine the impact of FDI and foreign portfolio investment on economic growth, for a sample of 80 countries, covering the period from 1976 to 2007. They find that FDI has a significant positive impact on growth, while foreign portfolio investment does not have any significant effect. Reisen and Soto (2001) examine the growth effect of FDI, portfolio equity flows and bank lending, which includes short-term and long-term lending, for 44 emerging countries, covering the period from 1986 to 1997. They find that FDI and portfolio equity flows exert a significant positive impact on growth, while bank lending has a significant negative impact on growth. Durham (2003) points out that the negative impact of bank lending on growth can be explained by the volatility comprises a substantial part of its negative gross effect on economic growth.

Other scholars argue that the impact of each type of foreign capital inflows on growth depends on the host country absorptive capacity (Mishra et al. 2001; Durham 2003; Durham 2004; De Vita and Kyaw 2009; Kyaw and Macdonald 2009). On the one hand, Durham (2003) examines the impact of FDI, equity portfolio investment, bond foreign portfolio investment, and bank lending on growth for a sample of 88 countries, over the period from 1977 to 2000. His results indicate that the positive impact of FDI and equity portfolio investment does not depend on host country absorptive capacity. The results also show that the bound portfolio investment and bank lending have insignificant impact on growth, although its positive impact is contingent on the level of financial and legal development in the host country. Contrary to that, Durham, in his article of 2004, finds that FDI and equity foreign portfolio investment do not have any direct impact on growth, although their positive impact depends on financial and institutional development, in a sample of 62 non-OECD and 21 high-income countries over the period of 1979-1998.

De Vita and Kyaw (2009), and Kyaw and Macdonald (2009) also examine the impact of FDI and portfolio investment flows on economic growth in a sample of 126 developing countries, over the period of 1985-2002. They find that the effects of FDI and portfolio investment are conditional on the host country's absorptive capacity, and the host country should have a certain level of economic development in order to capture the growth-enhancing effect of both types.

On the other hand, Edison et al. (2002) examine the role of the host country's absorptive capacity on the growth effect of FDI and foreign portfolio investment in 57 countries, over the period of 1980-2000. Their results indicate that FDI and foreign portfolio investment are positively associated with growth. Their results show that the host country's absorptive capacity, particularly the level of economic, financial and institutional development, government corruption, and macroeconomic policies, does not influence the effects of FDI or foreign portfolio investment on economic growth.

Despite the ambiguity in empirical studies, most of these studies show that all type of foreign capital flows can have a positive impact on economic growth, whether it depends on host country absorptive capacity or not.

5.2.2. Empirical evidence on the impact of specific types of foreign capital inflows on domestic investment

The empirical evidence on the impact of FDI and other types of foreign inflows on domestic investment is quite mixed. Generally, foreign capital flow is found to stimulate domestic investment, with the relationship being strongest for FDI and bank lending and weaker for portfolio investments (Bosworth and Collins 1999).

Growth literature suggests that foreign capital inflows, particular FDI inflows, can contribute to economic growth directly by expanding capital accumulation, like all other types of capital inflows, in the host countries, and indirectly through spillover effects. As FDI is a composite bundle of capital stocks, know-how, and technology (Colen et al. 2008). FDI inflows are found in the most empirical studies to stimulate domestic investment, which explained by linkages in local production and by positive technology spillovers (Borensztein et al. 1998; Reisen and Soto 2001). De Mello (1999) also finds the positive impact on FDI on growth is largely due to its effect on domestic investment in non-OECD countries.

FDI, portfolio investment and bank lending can affect domestic investment by reducing the interest rates or increasing the credit available to finance new domestic investment. Foreign capital can also have indirect impact on domestic investment through “collateral benefits” as a consequence of macroeconomic policies, develop institutions and improve governance to attract foreign investors. Bank lending can affect domestic investment indirectly when it used to raise or smooth consumption, thus increasing economic growth during periods of sluggish demand (Mileva 2008).

Bosworth and Collins (1999), who provided the first empirical study concerning the effect of capital inflows on DI, by distinguishing between three types of capital inflows, FDI inflows, portfolio investment, and bank loans. They find that FDI has a large, positive effect on DI, while portfolio investments have the smallest and least significant impact, with bank lending in between them in 62 developing countries during the period of 1978-1995.

Razin (2003) also provides evidence relating to the effect of FDI inflow, portfolio investment, and bank loans on DI in 64 developing countries for the period 1976-1997. Razin finds that FDI contributes positively to DI and economic growth, which is more than any other type. OLS regression indicates that FDI and bank loans have a significant positive impact on DI, while portfolio investment is not significant. In contrast, 2SLS regression shows that all types of foreign capital inflows have a positive and significant impact on DI. 2SLS regression also shows that the long-run effect of FDI on DI exceeds the corresponding effect of portfolio investment, which in turn exceeds the effect of bank loans.

Mileva (2008) also examines the effect of FDI, portfolio investment, and long-term bank loans on DI by comparing between two groups, taking into account the financial market and institution development in a sample of 22 transition economies during the period of 1995 to 2005. She finds that total foreign capital inflows generally have a significant positive impact on DI. The findings also show that FDI tends to increase DI by more than one additional dollar, while bank loans produce insignificant impact on DI in transition countries with less developed financial markets and weaker institutions. For countries with stronger governance indicators, long-term bank loans affect DI positively, while FDI generates less than one additional dollar increase in DI, meaning that FDI may crowd-out DI. She concludes that the countries with better-developed financial markets and better-institution quality attract more foreign capital in the form of bank loans, and use a large portion of it directly for investment. To the contrary, portfolio investment has an insignificant effect on DI in either group. She argues that the reason for this is that the relatively underdeveloped equity and bond markets in the transition countries.

Mody and Murshid (2005) examine the relationship between foreign capital flows and DI, taking into accounts the liberalisation capital account restrictions in the 1990s, in a sample of 60 developing countries from 1979 to 1999. Their results show that FDI has the strongest impact on DI; that is, each additional dollar of FDI inflow raised DI by an amount of between 72 and 86 cents. Bank loans have a sizeable impact, with each additional dollar of foreign loans raising DI by a little over half the amount of the loans received. To the contrary, portfolio investment seems to have a positive impact on DI, but its impact is lower than other type of foreign capital flows. The findings also show that, on the one hand, in the 1980s, both FDI and bank loans had a large impact on DI, while portfolio investment had no effect on DI. On the other hand, the period of the 1990s shows that the impact of portfolio investment on DI was strengthened, while the impact of FDI and bank loans fell. They conclude that this result reflects a shift in the composition of FDI away from the traditional Greenfield variety toward more mergers and acquisitions. The decline in bank loans may reflect the shift from public to private sector borrowing. Prior to the debt crisis, the public sector was responsible for large scale investment projects, which financed from bank loans. As the consequences of the crisis, loans fell in importance. Lending which continued went largely to the private sector, which possibly used foreign loans as a substitute for more expensive domestic borrowing.

One of the important papers that investigate the indirect impact of foreign financial inflows on growth via domestic investment was conducted by Mallick and Moore (2006). They argue that foreign capital inflows can provide the opportunities to accelerate economic growth by potentially raising the rate of capital formation in the host countries. By estimating a panel data model of 60 developing countries from different income groups over the period of 1970-2003, they find that FDI inflows exert beneficial complementarity effects on domestic investment across all income-group countries. Official financial inflows contribute to increasing domestic investment in the middle income countries, but not in the low-income economies due to misallocation of official inflows into financing government consumption needs rather than investment projects. Their findings indicate that the indirect impact of both FDI and official financial inflows on economic growth via domestic investment could be weaker in the low-income economies due to its lower absorptive capacity.

Overall, the above literature indicates that the empirical results support the idea that all types of foreign capital flow can complement DI in the host countries. Taken altogether, Mishra et al. (2001) suggest that capital flow emphasises a positive growth, and tends to be go more to countries with strong investment climates. A large body of theoretical literature shows that foreign capital inflows increase growth through a number of channels. These channels include competition, employee training, knowledge, export spillovers, capital accumulation, and improved financial system in the host country (Butkiewicz and Yanikkaya 2008; Shahbaz and Rahman 2010). This chapter focuses on the impact of foreign capital on economic growth, and via capital accumulation channel. Studying the impact of FDI and other type of foreign inflows on economic growth, and via domestic investment channel, is crucial for understanding the contribution of each type of foreign capital flow to economic growth.

5.3. Empirical Model

This chapter examines the indirect impact of FDI and other types of foreign capital inflows on economic growth via domestic investment channel. To empirically investigate this effect, one needs to apply a model that allows for capturing the interrelationships that exist among FDI and other types of foreign capital, domestic investment, and growth. Particularly, one needs a model that allows for endogenising economic growth and DI, with FDI and other types of foreign capital inflows included as a determinant of DI. Therefore, this chapter utilises a basic econometric model that consists of a series of two main equations describing the behaviour of these variables. This model consists of a cross-country growth equation, and another equation for domestic investment.

5.3.1. Growth Equation

To empirically investigate the effect of foreign capital inflows on economic growth, the chapter uses three key capital control terms, namely, FDI inflows, portfolio investment inflows, and loans inflows. Following Gruben and McLeod (1998) and Razin (2003), the chapter uses real GDP per capita growth rates as dependent variables, to test which of these forms foster economic growth. Considering FDI inflows, portfolio investment inflows, and loans inflows, all of these variables are theoretically expected to have a different effect on economic growth as mentioned above.

To capture standard growth determinants, a set of other conditional variables have been incorporated. The list of variables is reasonably comprehensive relative to the growth literature. For example, Blomstrom et al. (1996), Borensztein et al. (1998) and Xu (2000) tend to limit the set of conditional variables, and focus on human capital; Balasubramanyam et al. (1996) and Edwards (2000) tend to focus on trade openness; while De Greogori (1992), Nair-Reichert and Weinhold (2001) and Carkovic and Levine (2002) extend the set of explanatory variables by including government consumption to control the public sector effect on growth, and inflation to capture the effect of macroeconomic instability on growth.

Therefore, this chapter includes in the growth equation a number of explanatory variables, namely, domestic investment, human capital, infrastructure, trade openness, financial market development, government consumption, and inflation rate. The theory predicted that these variables are positively related to economic growth, except government consumption, and inflation rate, while initial GDP per capita is expected to be negative if the neoclassical conditional convergence hypothesis exists.

5.3.2. Domestic Investment Equation

To empirically investigate the effect of foreign capital inflow composition on DI, the chapter follows Bosworth and Collins (1999), Razin (2003), Mody and Murshid (2005) and Mileva (2008), by using gross fixed capital formation as proxy of domestic investment (DI) as dependent variables. The chapter also uses three forms of foreign capital terms, namely, FDI inflows, portfolio investment inflows and loans inflows. These variables are theoretically expected to have a positive impact on DI, as all types of foreign capital may provide a financial resource for financing capital accumulation in the host economies, and also with different magnitudes, as FDI caries with it a bundle of know-how, knowledge and technology. As a result, these effects can lead to increase the productivity of domestic firms through building up new investment projects or as spillovers run from MNCs to domestic firms. In contrast, the productivity of domestic firms can be reduced by the entry of FDI, which is known as market stealing effect of FDI, as consequences of superior technology of MNCs (Driffield and Love 2007).

A number of empirical studies find that output growth, as measured by growth rate of GDP per capita, GDP per capita as proxy of market size, trade openness, M_2/GDP, as proxy for the liquidity available to finance investment, infrastructure development, human capital development, and government consumption have a strong positive impact on domestic investment, while the inflation variable tends to be ambiguous. This overview can help to formulate the domestic investment equation as a function of FDI and other types of foreign capital inflows with a set of explanatory variables.

5.3.3. The Complete Model

The complete model used in this chapter for testing the impact of FDI and other types of foreign capital inflows on economic growth has the following formula:

$$\begin{aligned} Growth = \alpha_0 + \alpha_1\, DI + \alpha_2\, GDP80 + \alpha_3\, HC + \alpha_4\, IFR + \alpha_5\, DOP + \alpha_6\, M2 \\ + \alpha_7\, FDI + \alpha_8\, LN + \alpha_9\, PF + \alpha_{10}\, IFL + \alpha_{11}\, GS + \varepsilon \qquad (1) \end{aligned}$$

$$\begin{aligned} DI = \beta_0 + \beta_1\, Growth + \beta_2\, GDPpc + \beta_3\, HC + \beta_4\, IFR + \beta_5\, DOP + \beta_6\, M2 \\ + \beta_7\, FDI + \beta_8\, LN + \beta_9\, PF + \beta_{10}\, IFL + \beta_{11}\, GS + v \qquad (2) \end{aligned}$$

These equations suggest that this model contains two endogenous variables:
Growth: the average of real GDP per capita growth rate over the period of 1980-2005.

DI: the average of gross fixed capital formation (GFCF) as a ratio of GDP over the period of 1980-2005.

However, it is extremely complicated to argue that some of these variables are absolutely exogenous, but the exogeneity here means that they do not appear on the left-hand side of any of the structural equations, and that they are understood to be determined outside the model. The following is a list of the exogenous variables included in our model.

GDP80: the GDP per capita in 1980.

FDI: the average of net FDI inflows as a share of GDP over the period of 1980-2005.

LN: the average of bank loans inflows over the period of 1980-2005. Loans are the bank and trade-related lending covers commercial bank lending and other private credits in current U.S. dollars. It is divided by GDP to get the loans flows as a share of GDP.

PF: the average of portfolio inflows over the period of 1980-2005. Portfolio inflows, excluding liabilities constituting foreign authorities reserves, covers transactions in equity securities and debt securities in current U.S. dollars. It is divided by GDP to get the portfolio investment inflows as a share of GDP.

HC: the average of gross secondary school enrolment ratio over the period of 1980-2005.

IFR: the average of the number of mobiles and fixed-line telephones per 1000 people over the period of 1980-2005.

M2: the average of the ratio of M_2 as a percentage of GDP over the period of 1980-2005.

DOP: the average of trade openness over the period of 1980-2005, which equals exports plus imports relative to GDP.

GS: the average of general government consumption as a share of GDP over the period of 1980-2005. It includes all current spending for purchases of goods and services (including wages and salaries). It also includes expenditures on national defence and security, but excludes government military expenditure that is a part of government capital formation.

GDPpc: the average of GDP per capita over the period of 1980-2005.

IFL: the average of inflation rate over the period of 1980-2005, as measured by the annual growth rate of GDP deflator.

ε *and* v: disturbance terms in growth equation and DI equation, respectively.

5.3.4. How do FDI and other types of foreign capital flow affect economic growth?

One of the importance of this chapter centres on how capital flows affect economic growth directly and indirectly via domestic investment. Equation (1) shows that a change in FDI, LN and PF by one unit causes economic growth to change by an amount equal to α_7, α_8 and α_9, respectively. Equation (1) also shows that a change in domestic investment by one unit causes economic growth to change by an amount equal to α_1. Nevertheless, equation (2) shows that a change in FDI, LN and PF by one unit can also induce a change in domestic investment by an amount equal to β_7, β_8 and β_9, respectively. This means that the effect of capital flows is not limited to its direct impact on growth, but also includes the indirect impact via domestic investment channel. Therefore, the total impact of each type of capital flow on growth equals the sum of the direct and indirect impact.

The effect of foreign capital flow can be calculated by finding the derivative of growth and domestic investment with respect to each type of capital flow (FDI, LN and PF), which is equal to

$$\partial \text{Growth}/\partial \text{FDI} = \alpha_1 (\partial \text{DI}/\partial \text{FDI}) + \alpha_7$$

$$\partial \text{Growth}/\partial \text{LN} = \alpha_1 (\partial \text{DI}/\partial \text{LN}) + \alpha_8$$

$$\partial \text{Growth}/\partial \text{PF} = \alpha_1 (\partial \text{DI}/\partial \text{PF}) + \alpha_9$$

It clear that the impact of foreign capital flow on growth is twofold: the direct impact, which is equal to α_7, α_8 and α_9, respectively. And also the indirect impact, which is equal to α_1 multiplied by the derivative of domestic investment with respect to each type of capital flow.

Equation (2) shows that the derivative of domestic investment with respect to each type of capital flow is

$$\partial \text{DI}/\partial \text{FDI} = \beta_7$$

$$\partial \text{DI}/\partial \text{LN} = \beta_8$$

$$\partial \text{DI}/\partial \text{PF} = \beta_9$$

In this case there are three cases as mentioned in chapter three:

- If the estimated coefficients of β_7, β_8 and β_9 are more than one, this means that there is a strong crowding-in effect, and FDI and other types of foreign capital inflows lead to increase the investment demand in the host country.
- If the estimated coefficients of β_7, β_8 and β_9 are less than one but positive, this means that there is a crowding-in effect, and FDI and other types of foreign capital inflows lead to finance capital accumulation but they do not increase the investment demand in the host country.
- If the estimated coefficients of β_7, β_8 and β_9 are less than zero or negative, this means that there is a crowding-out effect, and FDI and other types of foreign capital inflows lead to substitute domestic investment in the host country.

Thus the total impact of each type of capital flow on economic growth is

The total impact of FDI inflow on economic growth equals $(\alpha_1 \times \beta_7) + \alpha_7$

The total impact of LN inflow on economic growth equals $(\alpha_1 \times \beta_8) + \alpha_8$

The total impact of PF inflow on economic growth equals $(\alpha_1 \times \beta_9) + \alpha_9$

Estimating the above complete system of equations and finding α_1, α_7, α_8, α_9, β_7, β_8 and β_9 allows testing how FDI and other types of foreign capital inflows affect economic growth.

5.4. Overview of the Data

To enlarge the sample size, the choice of countries and the time period is determined by the availability of the data on most of the developing countries. Due to some data, particularly foreign portfolio investment and bank loans, covering a limited number of countries, the empirical test is restricted in terms of the number of countries, and in terms of time coverage. Therefore, the data refers to a diverse cross section of 31 developing countries, and the time period under analysis is between 1980 and 2005. The specific list of countries is given in Appendix III, and it covers nearly all of the developing countries within available data, covering the period of 1980 to 2005.

The variables used in empirical specifications, the expected sign in each equation, and the data sources are reported in Appendix III.

Table 21 provides a summary statistics of the variables integrated in the empirical model, and Table 22 presents the correlation matrix for all the explanatory variables and G*rowth* as a dependent variable. The correlation matrix provides a first basic expectation of the relationship among these variables. Table 22 shows that all the variables have a right sign as theoretically expected. The Table shows that *Growth* has a strong positive correlation with *DI* and *IFR*, as theoretically predicted. The Table also shows that the correlations between Gr*owth* and all of these variables, *FDI*, *LN*, *PF*, *HC*, *DOP* and *M2*, are positive, and statistically significant at 5% significance level. The Table also shows that *Growth* has a significant negative correlation with government consumption (*GS*) and initial GDP per capita (*GDP80*), but insignificantly correlated with inflation rate (*IFL*).

Table 21: Descriptive statistics of variables used in empirical model

	Growth	DI	FDI	PF	LN	HC	DOP	M2	IFR	GS	IFL	GDPpc	GDP80
Mean	2.35	20.09	2.67	2.30	4.86	48.72	66.99	37.80	68.04	12.94	16.91	1917.93	1628.84
Std. Dev.	1.44	0.83	1.01	0.77	0.81	19.28	36.66	21.03	58.54	3.72	21.71	1667.35	1580.24
Min	0.46	12.08	4.18	0.32	3.31	15.17	19.12	17.33	3.28	4.58	2.41	124.17	118.32
Max	7.40	32.53	7.98	4.66	7.89	86.13	157.25	107.39	191.29	24.58	113.62	5981.64	5884.71
Obs.	31	31	31	31	31	31	31	31	31	31	31	31	31

Table 22: Correlation matrix of the variables included in empirical model

	Growth	DI	FDI	LN	PF	HC	IFR	DOP	M2	IFL	GS	GDP80	GDPpc
Growth	1.00												
DI	0.56*	1.00											
FDI	0.28**	0.82**	1.00										
LN	0.19**	0.29**	0.11**	1.00									
PF	0.33**	0.42**	0.13	0.55*	1.00								
HC	0.21**	0.49*	0.34**	0.31**	0.28*	1.00							
IFR	0.10*	0.15**	0.27**	0.35**	0.30**	0.70*	1.00						
DOP	0.13**	0.29*	0.47*	0.30**	0.22**	0.09	0.13**	1.00					
M2	0.43**	0.67*	0.38**	0.01**	0.20***	0.31**	0.19***	0.35**	1.00				
IFL	-0.15	-0.19**	-0.11***	0.71*	-0.65*	-0.37**	0.37**	-0.40**	-0.23**	1.00			
GS	-0.12***	0.21**	0.30***	0.08	-0.13	0.15	0.05	0.47*	0.03	0.08	1.00		
GDP80	-0.49*	-0.12**	0.09***	0.37**	0.49*	0.63*	0.83*	-0.01	-0.05	0.43**	0.001	1.00	
GDPpc	0.46*	0.82**	0.19**	0.385**	0.47*	0.66*	0.87*	0.04	0.01	0.41**	0.05	0.98*	1.00

5.5. Estimation Method[50]

In the previous section, we developed a simultaneous equation model where a dependent variable in one equation can be an explanatory variable in other equation in the system. For example, in equation (1), growth (real GDP per capita growth rate) is the dependent variable, which determined by DI and other growth determinants. In equation (2), DI is the dependent variable, which determined by growth and other variables. At the same time, FDI and other types of foreign capital inflows (LN and PF) enter the growth equation and DI equation as explanatory variables. In such simultaneous equation model, some of the explanatory variables are endogenous, and then are correlated with the disturbance terms in all the structural equations in the system. As a result, using OLS to estimate the parameters of the system equations will result in inconsistent estimates when some of the explanatory variables are endogenous. OLS also ignores any correlation among errors across these two equations.

The identification of the model is required to approve that the parameters of the system are estimable, before choosing appropriate method of the estimation. Considering the reduce form of the system described above in the matrix term to make it easier to identified. Therefore, the model can be written as follows:

$$\Upsilon b + \Gamma x = \acute{E}$$

Where Y is the matrix of the parameters of the endogenous variables, and *b* is the vector of the endogenous variables. Γ is the matrix of the parameters of the exogenous variables, and *x* is the vector of the exogenous variables. Έ is the vector of the disturbance terms. The reduced form of the model can be obtained by solving the structural form for the values of the endogenous variables. The reduced form can be expressed as follows:

$$b = \Pi x + \epsilon$$

Where $\Pi = -\ \Upsilon^{-1}\,\Gamma$; $\epsilon = \Upsilon^{-1}\,\acute{E}$

[50] This subsection is based on Greene (2003) and Wooldridge (2001).

This reduced form expresses the endogenous variables as functions of the exogenous variables and thus, endogeneity issue is resolved. OLS can be used to estimate the parameters of matrix Π, but the identification issue means that it can be drive estimates for Υ and Γ from Π. There are three possible situations:

1- Under-identification, whereas it is not possible to get estimates for Υ and Γ from Π.
2- Exact identification, whereas it is possible to get estimates for Υ and Γ from Π in a one way.
3- Over-identification, whereas it is possible to get estimates for Υ and Γ from Π in more than one way.

To indentify the structural equation, there are two conditions. Order condition that means the number of the exogenous variables that are excluded from the equation considered have to be greater than or equal to the number of the endogenous variables included in the equation minus one. Another condition is the rank condition, which is a necessary and sufficient one. This condition required that the rank of the matrix in the equation under consideration must have a rank equal to the number of the endogenous variables included in the equation minus one. Supposing that G is the number of endogenous variables in the system and M is the number of variables that are excluding from the equation under consideration. On the one hand, the order condition states that if $M \geq G$-1, then the equation is over-identification. On the other hand, the rank condition required that at least G-1 equal to the number of rows and columns that are not all zero after delete the row of the equation that under consideration. Applying these conditions to the models described in equations (1) and (2) presented above show that the two structural equations satisfy the order and the rank conditions.

Therefore, one needs an estimation method that account for the disturbance correlation across the corresponding equations and account for the simultaneity issue in the system. Among system methods, on the one hand, the Seemingly Unrelated Regression (SUR) method is preferred for these reasons. The SUR model is often applied when there are several equations, which appear to be unrelated, but they may be related by the fact that:

- Some coefficients are the same or assumed to be zero.
- Different error variances in each equation
- The disturbances are correlated across equations.
- A subset of right-hand side variables is the same.

One of the most limitations of a SUR method is that it does not deal with the endogeneity issue in the system when some of the explanatory variables are correlated with the disturbance terms of corresponding equation. Thus, one needs a method that can deal with the endogeneity issue. Among other system methods, Three-Stage Least Squire (3SLS) method with instrumental variables (IV) is preferred due to its ability to deal with the endogeneity problem, and it takes into account the correlation between disturbances across equations in the system.

In such approach, the equations of the structural system are estimated simultaneously and taken into account prior restrictions and all information contained in other equations in the system. This makes 3SLS method a popular method to estimate simultaneous equation system.

Therefore, 3SLS method is preferred to employ in this chapter that because this method is easier to compute, and to gain a robustness result.

But before considering the estimation results, the simultaneity bias in the system equation has to be checked to see whether the endogeneity relationship between dependent variables in the system equation is existed, and does OLS is not consistent for estimating system equation model. Another test is required for checking the validity of instrumental variables when estimating the system of structural equations by 3SLS method.

5.5.1. The endogeneity test between Growth and DI

The equation system stated above includes two equations, one for economic growth and another one for domestic investment. Therefore, to achieve the hypothesis of this chapter, the endogeneity between the economic growth and domestic investment needs to be examined. Since the current GDP per capita growth may be influenced by DI as in equation (1), or GDP per capita growth may impact on investment rates as in equation (2). It is also argued that growth may be an important determinant of domestic investment, for example, a more rapidly growing economy provides greater profit opportunities than a slowly growing economy. The endogeneity test between the two equations is conducted based on the Durbin-Wu-Hausman test. The DWH test is suggested by Davidson and MacKinnon (1993), which can be easily conducted by including the residuals of each endogenous right-hand-side variable as a function of all exogenous variables in a regression of the original model.

The Growth equation is estimated with additional regressors of all explanatory variables in the investment equation. The investment equation is, then, estimated with the residuals of the Growth equation as an additional regressor. If the coefficient of the residuals is significantly different from zero, then there exists an endogenous relationship between the two dependent variables[51]. The results of DWH are presented in Appendix III. The DWH shows that the estimated coefficient of the Growth equation residual in DI equation is statistically significant at 1% of significance levels. This means that the endogeneity relationship between Growth and DI existed. The residual test also indicates that OLS is not consistent for estimating system equation model.

5.5.2. Testing the validity of instrumental variables

Before estimating the structural system equations by 3SLS method, the validity of instrumental variables has to be checked to see whether the instruments are not correlated with the disturbance terms of the corresponding equation. Choe (2003) and Chowdhury and Mavrotas (2006) argue that controlling the endogeneity bias is particularly important in the context of the relationship between *growth*, *DI* and foreign capital inflows, since they may be simultaneously determined, and the causality is likely to run both ways. To reduce the problem of endogeneity, the instrumental variables used to avoid the possibility of reverse causation among foreign capital inflows variables, *DI* and economic growth.

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[51] For example, suppose that we have the following two single equations:
$Z= a_0 - a_1Y- a_2 X_1 - \varepsilon_1$; $Y = b_0 - b_1 z- b_2 X_2 - \varepsilon_2$
Before estimating these two equations as a simultaneous system, simultaneity must be found. The reduced form is established as follows:
$Z= c_0 - c_1 X_1- c_2 X_2- \varepsilon_3$
To get the residual μ, then estimate an augmented regression:
$Y= d_0 - d_1 z- d_2 X_2- d_3 \mu - \varepsilon_4$
If d_3 is significantly different from 0, then there exists a significant endogenous relationship between the two dependent variables.

Hahn and Hausman (2002) argue that instrumental variables estimation of the simultaneous equation model may lead to problem of inference in the situation of weak instruments. In such case, if the instruments do not have a high degree of explanatory power for the jointly endogenous variables or the number of instruments becomes large, this problem will be raised. This problem has studied extensively in a single equation, but in a system of equation, it still under consideration.

Hahn and Hausman (2002) and Hendry (2011) have recommended possible diagnostic tests for the presence of this problem. They suggest to examine the reduced form regression for the including endogenous variables. In such economic model, the instrument variables will appear in the reduced form equations for all endogenous variables, which called the algebraic solution to the simultaneous system. To get consistent estimates of a system of structural equations with instrumental variables, the validity of instrumental variables must be found. In such reduced form model, the structural parameters are directly related to the reduced form parameters, and testing the relevance of instruments in the IV context can be found.

The *Growth* equation is estimated with additional regressors of all explanatory variables in the investment equation[52]. The choice of instruments was motivated by a number of studies, such as Borensztein et al. (1998), Gruben and McLeod (1998), Bosworth and Collins (1999), Reisen and Soto (2001), Mody and Murshid (2002), Mileva (2008) and Shen et al. (2010). Therefore, the instrumental variables used are the one-year-lagged values of foreign direct

[52]The reduced form of structural equation system is estimated by using *ivreg2* command, which available in Stata packages. This command allows producing a Sargan test of over-identification test, and Kleibergen-Paap test of under-identification test of all instruments. In such reduced from, the *growth* variable is the dependent variable while other variables are used as explanatory variables. Therefore, all structural parameters are directly related to the reduced form parameters. The validity of instrumental variables can be tested by applying IV regression with instrumental variables. The estimation results of reduced form can be summarized as follows:

$$\underset{}{Growth} = \underset{(0.027)}{2.31} + \underset{(0.022)}{0.31\,DI} - \underset{(0.010)}{0.03\,GDP80} + \underset{(0.044)}{0.18\,HC} + \underset{(0.067)}{0.37\,IFR} + \underset{(0.060)}{0.65\,DOP} + \underset{(0.036)}{0.12\,M2}$$

$$+ \underset{(0.031)}{0.49\,FDI} + \underset{(0.027)}{0.57\,LN} + \underset{(0.017)}{0.45\,PF} - \underset{(0.195)}{0.02\,IFL} - \underset{(0.024)}{0.12\,GS} + \underset{(0.015)}{0.24\,GDPpc}$$

$$\underset{(0.0003)}{F\,(12, 7) = 6.54} \qquad \underset{(0.207)}{\text{Kleibergen-Paap test } X^2\,(7)} \qquad \underset{(0.653)}{\text{Hansen J statistic } X^2\,(6)}$$

Note that *P-values* are in parentheses

investment, portfolio investment, and loans; the one-year-lagged values of GDP per capita growth, the one-year-lagged values of DI and other explanatory variables. The Sargan test is a test of the validity of instrumental variables. The hypothesis being tested with this test is that the instrumental variables are uncorrelated to some set of residuals, and therefore they are acceptable instruments. Therefore, if Sargan test is significantly different from zero, then the null hypothesis that the instruments are uncorrelated with the error term will be rejected. The Sargan test and Kleibergen-Paap test confirm that the instruments are appropriately uncorrelated with the disturbance process, and they are valid by these criteria.

5.6. Estimation Results

Table 23 presents the estimation results of the simultaneous equation model using the SUR and 3SLS methods for across sectional data over the average of period 1980-2005. The first column reports the estimation results of the growth and *DI* equations using the SUR method. The overall significance of the set of the explanatory variables included in the *Growth* equation and DI equation is confirmed by F statistics, which shows that the probability that the set of the explanatory variables does not explain any variation on economic growth and *DI*, is equal to zero

From the growth equation as reported in column 1, all the explanatory variables have the expected sign, and are statistically significant, except inflation rate variable. Particularly, the growth equation shows that countries with low levels of initial *GDP* per capita grow faster, as indicated by the negative sign of *GDP* per capita in 1980. A higher level of education, developed infrastructure, a more open economy, and a developed financial market are associated with a faster economic growth rate. Government spending have a negative and significant impact on economic growth, indicating that higher government spending to *GDP* ratio leads to lower economic growth, confirming Grier and Tullock (1989), Barro and Lee (1994) and Chapter four findings. The results of Growth equation estimated by a SUR model also show that inflation rate has a right sign but statistically insignificant. Borensztein et al. (1998) and Dicks-Mireaux et al. (2000) also fail to obtain significant effects of inflation in their growth model.

As regards the impact of *DI*, *FDI*, *LN* and *PF* on economic growth, the *Growth* equation shows that all of these variables are positively and statistically significant related to economic growth. These findings are in line with Gruben and McLeod (1998) in a number of 18 Asian and Latin American countries, who find that *FDI*, *LN* and *PF* are positively related to economic growth.

Table 23: Structural system equations estimation (1980-2005)

	1		*2*	
	SUR		*3SLS*	
	Growth	*DI*	*Growth*	*DI*
Growth	-----	2.63* (0.000)	-----	0.47** (0.025)
DI	0.47* (0.000)	-----	0.11** (0.049)	-----
GDP80	-0.03** (0.012)	-----	-0.05** (0.014)	-----
GDPpc	-----	0.18** (0.020)	-----	0.07** (0.027)
HC	0.20** (0.013)	0.54** (0.020)	0.21** (0.033)	0.61** (0.036)
IFR	0.35** (0.022)	0.24** (0.024)	0.14** (0.019)	0.37** (0.045)
DOP	0.25*** (0.088)	0.21** (0.035)	0.27** (0.016)	0.19** (0.046)
M2	0.24** (0.038)	0.34* (0.002)	0.27*** (0.070)	0.12* (0.001)
FDI	1.39* (0.000)	3.88* (0.002)	0.51** (0.047)	4.94** (0.019)
LN	0.73** (0.027)	1.84*** (0.089)	0.32*** (0.074)	3.07** (0.042)
PF	0.43** (0.039)	1.29** (0.048)	0.13*** (0.069)	2.55** (0.037)
IFL	-0.20 (0.164)	-0.06 (0.177)	-0.09 (0.602)	-0.07 (0.578)
GS	-0.11** (0.047)	0.36*** (0.060)	-0.09** (0.047)	0.21*** (0.066)
Constant	-0.31** (0.036)	2.81*** (0.056)	-0.60*** (0.055)	-0.63** (0.045)
R^2	0.62	0.66	0.44	0.67
F (p-value)	0.000	0.000	0.002	0.007
No. of obs.	31	31	30	30

The system has two equations, where the dependent variables are the per capita growth rate and domestic investment. The SUR and 3SLS models are done on the cross-section of countries for the average of the period 1980-2005. P-values reported in parentheses. *, **, *** denote significance at 1%, 5%, and 10%, respectively. The 3SLS with instrumental variable used the following instruments: the one-year-lagged values of foreign direct investment, portfolio investment, and loans, the one-year-lagged values of GDP per capita growth, one-year-lagged values of DI and other explanatory variables in the system. In the 3SLS, Hansen-Sargan test of over-identification: X^2 *(8) = 9.574, Prob>* X^2*= 0.296.*

The estimated coefficient on *DI* shows that increasing *DI* by one standard deviation will increase the economic growth by 0.390% points; The estimated coefficient on *FDI* shows that increasing *FDI* inflows by one standard deviation will increase the economic growth rate by 1.404% points; the estimated coefficient on *LN* shows that increasing *LN* inflows by one standard deviation will increase the economic growth rate by 0.591% points; the estimated coefficient on *PF* shows that increasing *PF* inflows by one standard deviation will increase the economic growth rate by 0.331% points[53].

The results of the *DI* equation estimated by SUR method are presented in the second part of column 1. The results show that growth and market size variables have a significantly positive impact on *DI*, indicating that economic growth and related variables are important in determining *DI* in these countries. In addition, a higher level of education, developed infrastructure, a more open economy and a developed financial market are associated with a stimulating *DI*. Macroeconomic stability, as measured by *IFL*, has a right sign but statistically insignificant, confirming Borensztein et al. (1998) and Dicks-Mireaux et al. (2000).

Government spending, as measured by *GS*, has a positive impact on *DI*, indicating that a higher government spending to *GDP* ratio leads to an increase *DI*. This supports the view that a permanent raise in government spending encourages domestic investment, as stated by Aiyagari and Christiano (1992) and Ramey and Shapiro (1998).

More related to the main argument of this chapter is that the impact of FDI and other types of foreign capital inflows are positively related to *DI*. The estimated coefficients on *FDI*, *LN* and *PF* show that these variables are statistically significant, except *LN* that is statistically significant at 10% confidence level, and all estimated coefficients are more than one, suggesting that a one-for-one relationship between *DI* and *FDI*, *PF* and *LN* exists.

The estimated result of *DI* equation shows that FDI has the strongest positive impact on domestic investment than *PF*, while *LN* is in between them, confirming the fact that FDI is the most important type of capital inflows in developing countries. The estimated results show that each dollar of FDI inflows results in 3.88 cents of domestic capital formation; each dollar

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[53] The impact of *DI*, *FDI*, *LN* and *PF* on Growth is computed as follows: for FDI, Δ(Growth) = α_7 Δ(FDI). Table 23 shows that α_7 = 1.39; Table 21 shows that the S.D of FDI = 1.01. Thus, Δ(Growth) = 1.39*1.01=1.404; the same has been done for *DI*, *LN* and *PF*.

of LN inflows results in 1.84 cents of domestic capital formation[54]; each dollar of PF inflows results in 1.29 cents of domestic capital formation.

These results, on the one hand, are not quite different from those of Borensztein et al. (1998), Bosworth and Collins (1999), and Agosin and Mayer (2000). For example, Borensztein et al. (1998) reported 2.82 for *FDI* coefficient; Bosworth and Collins (1999) reported 2.34, 1.36 and 1.31 for *FDI*, *LN* and *PF*, respectively; Agosin and Mayer (2000) reported 5.56 for *FDI* in Asian countries. On the other hand, it seems quite different from those of Mody and Murshid (2005) and Mileva (2008). Mody and Murshid (2005) reported 0.72, 0.61 and 0.46 for *FDI*, *LN* and *PF*, respectively, while they reported 3.19 for FDI in the log-run; Mileva (2008) reported 0.74 and 0.46 for FDI and LN, respectively, while they reported 0.70 and 0.50 for FDI and LN, respectively, in the log-run. Mileva (2008) argue that the lower estimated coefficient of FDI in her sample may be due to shorter time series or to the higher volatility of investment rates in the transition economies due to the numerous structural reforms and bouts of economic instability that occurred in the 1990s.

The estimated coefficient on *FDI* also shows that increasing *FDI* inflows by one standard deviation will increase *DI* by 3.919% points; the estimated coefficient on *LN* shows that increasing *LN* inflows by one standard deviation will increase *DI* by 1.490% points; the estimated coefficient on *PF* shows that increasing *PF* inflows by one standard deviation will increase *DI* by 0.993% points. These findings confirm Bosworth and Collins (1999), Razin (2003), and Mody and Murshid (2005), stating that FDI inflows have a larger crowding-in effect on *DI* in the receiving economies, more than other types of flow. As FDI is not only included a bundle of capital stocks but also a bundle of know-how, and technology.

As mentioned above, using SUR to estimate the parameters of the structural equation may result in inconsistent estimates when some of the explanatory variables are endogenous, particular among Growth, DI, and foreign capital inflows variables.

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[54] Mileva (2008) argues that developing countries can be able to attract foreign loans and use them to raise domestic capital formation.

To gain more robustness results, column 2 reported the results of *Growth* equation and *DI* equation estimated by 3SLS with instrumental variables to control for endogeneity problem if exist between Growth, DI and capital flows. The 3SLS estimation results show that the p-values of the Sargan test of over-identification does not reject the null hypothesis that the instruments are exogenous in any specification, confirming the validity of instrumental variables test in previous section. Column 2 shows that *F* statistics confirm the overall significance of the set of the explanatory variables included in the *Growth* equation and *DI* equation.

The 3SLS estimation shows that changing the estimation of system method is robust to alternative specifications. For example, the Growth equation results show that the estimated coefficients of *DI*, *FDI*, *PF* and *LN* are positively related to economic growth. Only exception is that the estimated coefficients of *LN* and *PF* are statistically significant at 10% confidence level.

The second part of column 2 shows that the estimated coefficients of *FDI*, *PF* and *LN* are more than one unit, indicating that all types of foreign capital inflows can have a complementary effect on additional investment, confirming the results of SUR method. The estimates from the DI equation are similar to that obtained by SUR method, and the effect of FDI on capital accumulation is still the largest among the three types of capital inflows.

Overall, it can conclude that the results of 3SLS do not essentially affect the main findings of this chapter, as all types of capital inflows still exert a positive and statistically significant influence on economic growth and domestic investment; the coefficient of DI in growth equation is also positive and significant. Thus, the results can confirm that foreign capital inflows exert a positive impact on growth by increasing gross fixed capital formation in the host countries.

5.6.1. The impact of FDI and other types of foreign capital on economic growth

Based on Table 21 and Table 23, Table 24 summarises the results regarding the total impact of each type of capital flows on economic growth. Based on the results of SUR method, Column

1 shows the direct impact of *FDI*, *LN* and *PF* on economic growth. This column shows that an increase in *FDI*, *LN* and *PF* by one standard deviation increases economic growth by 1.404%, 0.591% and 0.331%, respectively. Column 2 shows the impact of each type of capital inflows on *DI*. The estimated coefficients on *FDI*, *LN* and *PF* in *DI* equation show that an increase in *FDI*, *LN* and *PF* by one standard deviation increases the *DI* by 3.919%, 1.490% and 0.993%, respectively. Column 3 shows the indirect impact of each type of capital inflow on economic growth. This effect is computed by compound coefficient of *DI* in the *Growth* equation (α_1) and the coefficient of *FDI*, *LN* and *PF* in the *DI* equation. Column 3 shows that an increase in *FDI*, *LN* and *PF* by one standard deviation indirectly increases economic growth by 1.842%, 0.700% and 0.467%, respectively. The amount of indirect impact of *FDI*, *LN* and *PF* on economic growth seems to be significantly higher than the direct impact. Column 4 computes the total impact of *FDI*, *LN* and *PF* on economic growth. This column shows that an increase in *FDI*, *LN* and *PF* by one standard deviation increases economic growth rate by 3.246%, 1.291% and 0.798%, respectively.

Changing the estimation method of the system equation leads to support the evidence presented in this chapter as confirmed by the second part of Table 24 based on the results of 3SLS method.

Generally, the results presented in Table 24 make it very clear that FDI and other types of capital inflows have a significant impact on economic growth beyond its indirect impact; an impact that works via increasing capital accumulation in the host countries. The Table also shows that the indirect impact of FDI and other types of capital inflows has considerable and comparable volume to the direct impact. More significantly, the total impacts of *FDI*, *LN* and *PF* on economic growth are extremely greater, or more, than the double that of the direct impact of *FDI*, *LN* and *PF* on growth considered by foreign capital inflows literature so far.

Table 24: The impact of FDI and other types of capital flow on economic growth

	Based on the results of SUR model											
	1			2			3			4		
	The direct impact on growth			The impact on DI			The indirect impact on growth			The total impact on growth		
	FDI	LN	PF	FDI	LN	PF	FDI	LN	PF	FDI	LN	PF
The coefficient	α_7	α_8	α_9	β_7	β_8	β_9	$(\alpha_1 \times \beta_7)$	$(\alpha_1 \times \beta_8)$	$(\alpha_1 \times \beta_9)$	$(\alpha_1 \times \beta_7)+\alpha_7$	$(\alpha_1 \times \beta_8)+\alpha_8$	$(\alpha_1 \times \beta_9)+\alpha_9$
The estimated coefficient	1.39	0.73	0.43	3.88	1.84	1.29	1.823	0.865	0.606	3.213	1.595	1.036
The impact of one S.D	1.404	0.591	0.331	3.919	1.490	0.993	1.842	0.700	0.467	3.246	1.291	0.798
	Based on the results of 3SLS model											
	1			2			3			4		
	The direct impact on growth			The impact on DI			The indirect impact on growth			The total impact on growth		
	FDI	LN	PF	FDI	LN	PF	FDI	LN	PF	FDI	LN	PF
The coefficient	α_7	α_8	α_9	β_7	β_8	β_9	$(\alpha_1 \times \beta_7)$	$(\alpha_1 \times \beta_8)$	$(\alpha_1 \times \beta_9)$	$(\alpha_1 \times \beta_7)+\alpha_7$	$(\alpha_1 \times \beta_8)+\alpha_8$	$(\alpha_1 \times \beta_9)+\alpha_9$
The estimated coefficient	0.51	0.32	0.13	4.94	3.07	2.55	0.543	0.338	0.281	1.053	0.658	0.411
The impact of one S.D	0.515	0.259	0.100	4.989	2.487	1.964	0.549	0.274	0.216	1.064	0.533	0.316

One S.D of FDI =1.01; One S.D of LN= 0.81; One S.D of PF= 0.77; One S.D of DI= 0.83.

5.7. Conclusion

The main purpose of this chapter is to examine the growth effect of FDI and other types of foreign capital inflows in a selected sample from 31 developing countries for the period from 1980 to 2005; with a special focus on the impact of FDI, portfolio and loans inflows on economic growth and via domestic investment.

The findings of this chapter found that there is a strong complementarity connection between FDI, bank lending and portfolio investment, and economic growth through the conduit of gross fixed capital formation, suggesting that foreign capital inflows do positively contribute to economic growth. This supports the argument of this chapter that opening up of the investment opportunities via foreign capital brings about high economic growth.

The results of this chapter suggest that FDI and other types of foreign capital inflows provide substantial real benefits by crowding-in additional investments in the host countries. It suggests that a large proportion of investments financed by foreign capital inflows. The results also show that there are significant differences among types of capital flows that are FDI, as expected, does have a much larger and more statistically significant relationship with domestic investment either portfolio investment or bank loans.

Finally, the chapter explores the links between FDI and other types of foreign capital inflows and economic growth. This enables to study the channel through which foreign capital inflows influence growth performance. Essentially, the empirical work finds significant evidence that FDI, portfolio and loans inflows raise economic growth rate in the host countries, working through their effects on capital accumulation.

The important implications can be drawn from this chapter are that all types of foreign capital flows are to be further encouraged for economic growth in developing countries, as all types produce a direct and indirect impact on economic growth, which worked via domestic investment channel. FDI is to be further encouraged for economic growth in developing countries as it produces the strongest impact on economic growth and via domestic investment. The crowding-in effect suggests that host country can explore the benefits of foreign capital inflows, whether domestic investment is low or high. In the case of strong domestic investment, investment by MNCs may obtain positive investment responses in the domestic economy through backward or forward linkages. In the second case, MNCs may invest in sectors that domestic investors are unable to enter, because of technological or capital requirements that domestic firms cannot meet. Finally, Better policies undertaken by the host country not only bring in more foreign capital inflows, especially for FDI, portfolio and loans flow, they tend to strengthen the foreign capital-domestic investment relationship.

6. Conclusion

Foreign capital inflows, particularly FDI inflows, have been viewed as a main engine for economic development in the world economy. The consequence of FDI inflows is being increasingly accepted as the majority of economies ease up the entry of foreign capital inflows and set up an advanced system to increase their prospective of attracting FDI inflows.

However, FDI inflows are one of the most important questions currently concerning both developed or developing countries. Recently, economic growth literature has shown a greater interest in exploring the effect of foreign capital inflows on economic growth. A growing number of models and studies concern the effect of foreign capital on economic growth and DI. These models and studies conclude that foreign capital inflows is among the most important determinants of economic growth, leading to thought that FDI inflows are the critical engine to obtain sustained economic growth and complementary DI in the host economies.

In spite of the growing studies investigating the role played by FDI inflows in economic growth, the interrelationship between FDI inflows, economic growth, and DI, and their implications to economic development, has received little attention in economic literature. This thesis has attempted to fill this gap in the literature by applying different aspects of the relationship between FDI inflows, economic growth, and DI, and their implications for economic growth. A major purpose of this thesis was to empirically investigate the implications of the relationship and complementarities between FDI and DI to the contribution of these factors on economic growth. The main argument of this thesis was that a better understanding of the relationship between FDI, economic growth, and DI, and the contribution of FDI to economic growth. This can be achieved if the interrelationship between these factors, the complementarities between FDI and DI, the host country's absorptive capacity, and other types of foreign capital inflows are taken into account.

The methodology of this thesis was empirical; so that there are different complicated econometric models have been used to evaluate the effect of foreign capital inflows on economic growth in receiving economies, based on the analysis of data collected from international organisations such as the World Bank, the UNCTAD, the IMF, the UNESCO, and the Fraser Institution (EFW). This thesis attempts to find an answer for one main research question, which is whether and how foreign capital inflows affect economic growth in the host countries, and how this effect is significant in developing countries. This question is broken down into four specific questions related to each empirical chapter as follows: First empirical chapter (chapter 3) searched to find an answer to these two questions: (a) does FDI contribute positively to economic growth, and (b) does it really crowd out DI in the host countries. To achieved the aim of this chapter and to answer those two questions in context of developing countries, this chapter will apply two methods, time-series cointegration techniques of Johansen and panel-data cointegration techniques in three top receiving countries selected from three different regions (top-three from Asian, top-three from African and top-three from Latin American countries)[55] for the period from 1970 to 2005. The rational for using modern cointegration techniques is that it can enable the enlightening of the short- and long-run effects, and the feedback that might be existed between endogenous variables, which ignored in existing empirical studies. Based on the results of this chapter (chapter 3), if FDI inflows have significant positive or insignificant impact on economic growth, then the question raised is that what have host countries to do to get the most benefits form attracting FDI inflows. This investigated empirically in the next empirical chapter (chapter 4). Chapter 4 attempted to find an answer to this question: does FDI contribute positively to economic growth alone or does it depend on the host country conditions. This chapter applied panel-data techniques in selected sample from developing countries[56] for the period from 1970 to 2005. The Hausman test was conducted to choose between the random effect and fixed effect models. General method of moments (GMM) estimations also carried out in this chapter for its power and efficiency over random effect or fixed effect models. Chapter 5 examined the indirect effect

[55] Countries in the sample are that China, Korea, India, Egypt, Morocco, Tunisia, Argentina, Brazil and Mexico.

[56] Countries in the sample are that Angola, Cameroon, Congo Dem. Rep, Egypt, Madagascar, Morocco, South Africa, Tunisia, China, India, Korea, Malaysia, Pakistan, Thailand, Turkey, Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Peru and Venezuela.

not only FDI but also other foreign capital inflows (portfolio investment and loans inflows) on economic growth, which works via domestic investment channel, since the findings of chapter 3 and 4 indicated that FDI is positively related to economic growth, and crowing-in DI in the host countries. Moreover, DI has a significant positive impact on economic growth in an economy. Therefore, this chapter investigated the implication of the effect of FDI and other foreign capital inflows on economic growth in developing economies. This chapter applied cross-country data techniques using 3SLS regression in selected sample from the majority of developing countries (31 developing economies)[57] over the period from 1980 to 2005.

To obtain the purpose and to investigate the argument of this thesis, this thesis was designed to include three empirical chapters as mentioned above, as well as three other chapters: the introduction, the literature review and the conclusion. The first empirical chapter studied the relationship between FDI, economic growth, and DI. The second empirical chapter investigated whether FDI contributes to economic growth alone, or if it depends on the host country's conditions. Chapter Five investigated whether FDI, portfolio investment and loans inflows affect economic growth through DI channel.

6.1. Summary of the Findings

The important findings of this thesis can be summarised in the following:

1- The results of Chapter Three, based on time-series analysis provide evidence that FDI can positively affect economic growth. Half of the sample countries showed that FDI positively affects GDP in the long-run, while it positively affects GDP for more than half of the sample countries in the short-run.

The results of this chapter also show that FDI crowds-out DI, whether in the long-run or in the short-run. Moreover, the results of this chapter cannot bring to close that DI is, in general,

[57] Due to a lack of complete data for all developing countries, especially for portfolio investment data, the countries in the sample are that Egypt, Tunisia, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Panama, Uruguay, Venezuela, Turkey, China, Indonesia, Malaysia, Philippines, Thailand, Bangladesh, Pakistan, Benin, Botswana, Cameroon, Cote d'Ivoire, Senegal, Swaziland, Togo and Zimbabwe.

positively related to FDI. The findings indicate that DI does not affect FDI in two of nine countries in the long-run, while in the short-run only in Latin American countries. In addition, DI has a positive impact on FDI in the long-run in African countries, while in the short-run only in one of nine countries. On the other hand, DI has a negative effect on FDI in three of nine countries in the long-run, while in the short-run in more than half of sample countries.

The estimated results also suggest that there is conflicting evidence of the impact of GDP on FDI flows. Some of these results support previous empirical studies, which study FDI determinants, indicating that market size and its expansion are crucial factors for driving FDI inflows into developing economies. On the other hand, the estimated results also find that GDP, and the growth rate of GDP, are negatively related to FDI flows. The result of this chapter also shows that the long-run impact of GDP on total DI is significantly positive, while the effect of changes in GDP is negatively related to the changes in DI in the short-run.

The results of Chapter three, based on panel-data techniques[58], provided strong evidence that FDI has a crowding-in effect on DI in the long-run, while in the short-run it seems that it has a neutral effect. The panel-data analysis showed that FDI and DI are positively related to GDP whether in the long-run or short-run. The panel-data results also showed that GDP and DI are positively related to FDI in the selected sample.

2- The results of Chapter Four suggest that FDI inflows have, in general, a significantly positive impact on growth; however, this effect depends on the host country's absorptive capacity. This finding seems to be contrary to the findings of Carkovic and Levine (2002) and Herzer et al. (2008). The results of the economic growth equation also show that domestic investment (DI), human capital, infrastructure development, financial market development, institution quality, and trade openness are positively related to economic growth. The technology gap has a negative and significant impact on economic growth, as well as initial GDP per capita and macroeconomic stability. The results of this equation also suggest that a

[58] Panel-data techniques are used to overcome the limitation of using time-series techniques such as small sample problem, and a lack of power of unit root and cointegration tests (nine countries with only 35-year period).

certain level of the host country's absorptive capacity is required for FDI to be beneficial to the host economy.

3- The findings of Chapter Five are in line with a number of empirical studies, which investigate the effect of different types of capital flows on growth and DI. These studies state that FDI inflows have a greater significant effect on economic growth and DI, more than portfolio investment, and loans inflows are in between them.

The main finding of Chapter Five is that FDI, portfolio investment and loans inflows have an indirect positive impact on economic growth, which works via enhancing DI in the host economies. The evidence presented in this chapter also shows that the indirect impact is generally greater and more robust than the direct impacts of FDI, portfolio investment and loans inflows on economic growth in the host economies.

6.2. Academic Contributions

The findings of this thesis can be seen as important contributions to the debate about FDI, economic growth, and DI. The major contributions of the thesis can be summarised in the following aspects:

1- Chapter Three showed that the role of FDI in economic growth cannot be theoretically ignored, but in practice this hypothesis is still controversial. The lack of homogeneity in the host economies makes the relationship between these variables more ambiguous. The results of existing empirical studies may cast a doubt about the relevance of the dynamic relationship between FDI, DI, and Growth, suggesting that this field of literature may need more investigation, particularly in developing countries. Chapter Three contributes to existing literature by applying a multivariate VAR system with the error correction model (ECM) using time-series and panel-data techniques of cointegration to investigate the links between FDI, DI, and GDP in a country by country analysis. The chapter also investigated directly the long-run and short-run dynamic interaction between FDI, DI, and GDP to address some of the drawbacks of the empirical literature. And, thus, to gain better understanding of the relevance of the interrelationship between those variables in developing countries, offering insight into the extensively doubtful FDI-GDP relationship. This investigation can help to reduce the debates of the empirical evidence, and to reach a better understanding of the relationship between FDI, DI, and economic growth. The main finding of this chapter was that FDI inflows are positively contributed to economic growth and complementary DI in the host economies. The findings of this chapter suggest that the relationship between FDI, DI, and growth can be explained by other variables, such as the host country's characteristics, which was investigated in Chapter Four.

2- Chapter Four contributes to existing economic literature by helping to reduce the inconclusiveness of the empirical evidence regarding the role of the host country's absorptive capacity in determining the relationship between FDI and economic growth. This chapter was to identify and fill the gap in the literature on this topic by analysing the absorptive capacity and the growth impact of FDI in the panel country data. The majority of previous empirical studies focus on the interaction between FDI and one of the host country's characters, such as human capital development, financial market development, the technology gap, institution quality, trade openness, or infrastructure development. This chapter investigated the impacts of all of these factors simultaneously on the FDI-growth relationship. The main results of this chapter were that FDI inflows have a positive impact on economic growth, and the magnitude of this effect exerts a robust dependent effect. This suggests that the host country must reach a certain level of absorptive capacity to absorb the spillovers of FDI inflows. The findings of this chapter suggested that further empirical studies and researches are required to re-examine which type of capital flows foster economic growth and complement DI in the host country. This investigation may help in determining whether the share of FDI inflows, or other types of capital flows, in the period under analysis, is the reason for the existence of or the failure to find any impacts of capital flows on economic growth and DI. This claim was investigated in Chapter Five.

3- Chapter Five contributes to existing economic literature by testing whether foreign capital inflows have a positive impact on economic growth that works via DI channel, based on the growth-enhancing role of each type of capital inflows. Empirical studies on foreign capital flows and the growth relationship exist mainly for the FDI-growth nexus in developing countries, so that the growth effect of different types of foreign capital inflows remains unexplored to a large extent. Testing this hypothesis may have both academic and practical significance. First, exploring the impact of foreign capital inflows on the host country may advance our understanding of the contribution of foreign capital inflows to DI and economic growth in the host country.

Second, it provides a new empirical verification for explaining the differences in the contribution of foreign capital inflows on economic growth, which is one of the most important aspects of attracting foreign capital inflows.

Thirdly, it searches to find evidence for which type of foreign capital inflows can be more beneficial to the host countries for achieving higher rates of capital accumulation and efficiency improvements, which translate into higher rates of economic growth. If so, this effect may offer the countries a reason to impose or remove capital controls to offset the investment reduction by greater saving. The main finding of this chapter was that FDI inflows have a significant effect on economic growth and DI, rather than other types of capital inflows, such as portfolio investment and loans inflows.

Finally, the main contribution of Chapter Five is that it provided empirical evidence confirming that the contributions of FDI, portfolio investment and loans inflows to economic growth are of larger scope than what have been expected in economic literature so far. More specifically, the results of Chapter five expanded the ways in which not only FDI but also other types of foreign capital inflows can affect economic growth, including their impacts on DI. Additionally, the empirical evidence presented in chapter five made it clear that the impacts of FDI, portfolio investment and loans inflows on economic growth that works via DI are not only a significant one but also greater and more robust than the direct impacts recognised by economic literature so far. This evidence has gone some way towards enhancing our understanding of the contributions not only FDI but also portfolio investment and bank lending to economic growth in receiving economies.

Generally, the most important contribution of this thesis was providing a better understanding of the relationship between FDI, DI, and economic growth, taking into account the influence of the host country's absorptive capacity and different types of foreign capital inflows.

6.3. Policy Implications

As well as the academic contributions of the thesis, there are a number of policy implications that can be drawn from the results of this thesis.

1- The results of Chapter Three suggest some policy implications for attracting and affecting FDI, either on economic growth or DI. The findings of this chapter showed that the positive effect of FDI on economic growth is not assured, either in the long-run or in the short-run. The findings also showed that FDI complements DI. This result suggests that FDI needs to be encouraged, and, thereby, enhance its potential to contribute positively to economic growth. The crowding-out effect of FDI on DI may reflect the weakness of DI, or show that MNCs invest in sectors where domestic investors are unable to enter, due to the technological or capital requirements, or to increase competitions and further exploit possible opportunities. This suggests that DI needs to be encouraged by promoting and enhancing domestic saving, or by offering regulations, environmental protections, exemptions, and tax incentives and subsidiaries, etc. These should be encouraged in order to achieve a complementary relationship between FDI and DI, and then economic growth. In addition, FDI should be encouraged to invest in high risk areas or in sectors where DI is limited. The main implication of attracting FDI is the assumption in developing countries that FDI is always good for growth and development. Thus, these countries have liberalised their policy toward MNCs. Therefore, the results suggest that the liberalisation policy may still be insufficient to ensure the positive impact of FDI on the whole economy.

2- The results of Chapter Four suggest a major change in the policy recommendations given by previous studies, i.e. a shift from recommending that FDI can contribute positively to economic growth whilst not being dependent on other growth determinants (Carkovic and Levine 2002), to recommending that FDI alone may contribute positively to economic growth, but the magnitude of its effect depends on the host country's conditions, confirming the Borensztein et al. (1998), Xu (2000), Alfaro et al (2004), Li and Liu (2005) and Kinishita and Lu (2006) findings. The results of this chapter also suggest that the host country's absorptive capacity factors are crucial for determining economic growth. This suggests that a further trade liberalisation policy, improving domestic investment, high quality of human capital, pre-infrastructure development, financial market development, high quality of institutions, and bridging the technology gap should be encouraged to increase the capability of the economy.

3- An important implication of Chapter Five is that all types of foreign capital inflows - FDI, portfolio flows, and bank loans - can facilitate economic growth and complementary DI in developing countries. This result highlights the importance of solid foundation to support and justify various sorts of incentives given to foreign investors. Considering the growth-enhancing role of FDI, portfolio investment and loans inflows that works via DI. This helps to shift policy recommendation from questioning the merits of the incentives given to foreign investors (Blomstrom 2002; Carkovic and Levine 2002) to emphasising the importance of such incentives as FDI, portfolio investment and loans inflows have positive and robust indirect impacts on economic growth.

Appendices

Appendix I

Appendix A

Summary of economic policy reforms toward attracting FDI inflows and making it more beneficial

Country	Economic Policy Reforms
Egypt	- In 1971 adopts an import substitution strategy and open door in 1974. - In the 1980s, fall economic growth rate, increase inflation rate and current account deficits due to oil prices crisis in 1986. - In the 1990s, FDI flows at steadily increasing due to the adoption of Economic Reform and Structural Adjustment Programme (ERSAP). - ERSAP established to reduce the dominants of public sector and do more liberalisation of economy. Also, to induce the government to invest in the enterprises that leads to crowding-in domestic investment. - The economy remained weak and sensitive to the external shocks such as Asian and Latin American financial crises in 1997 and 1998 and the September 11th attack on the USA in 2001. - The aim of attracting FDI is to achieve economic growth and development. - Egypt ranked the second largest recipients of FDI in African region, and 20th among developing countries. - FDI flows to Egypt are mostly concentrated in the manufacturing sectors such as chemical industry, food industry and textile industry that attracted 47.6% of total FDI stock , followed by tourism, services and financial sectors that attracted together 30.0% of total FDI stock until the end of 1996, while in 2001 the total of FDI stock in the manufacturing sector represented 33%, and tourism, services and financial sectors represented 38% of total FDI stock in 2001 - The petroleum sector attracted for almost up to 50% of total FDI inflows to Egypt.
Morocco	- UNCTAD (2007) reports that the economic reforms programmes that government adopted in order to achieving sustainable and positive economic growth effect of FDI inflow will not be sufficient. - In 1973, Morocco adopts the Moroccanisation Decree, which restricted foreign ownership of certain industrial, commercial and services activities to no more that 49%. - In 1983, it adopts the Structural adjustment Program (SAP), which included a new policies regarding to trade and foreign investment that allowed full foreign ownership of Moroccan companies. Afterwards this code further liberalized in 1988, but the 1983 code was replaced by the investment chapter in 1995 for development and promotion of investments through the improvement of the investment conditions. This followed by financial law in 1996. It is also the privatization programme was adopted in 1989 and accelerated from 1993. Bouoiyour (2003) argues that the instability of Moroccan economy growth can be

	obstacle FDI inflows. - UNCTAD (2007) reports that Morocco ranked the second recipients of FDI inflows in African region between 2001 and 2003. Yet, Morocco ranked the fourth in 2005, indicating to the existence of investment obstacles and the ability of economy to attract FDI inflows due to fewer privatisation sales and inadequate economic policy reforms. - Between 2000 and 2005, FDI mostly concentrated in the services sector such as telecommunications that reached 44% of FDI inflows, followed by manufacturing sector, 27% (UNCTAD 2007).
Tunisia	- Tunisia adopts export promoting strategy since early of 1980s as a part of economic reform and they thought that this strategy can be serving as instrument to attracting FDI inflows and create spillovers for DI, which may facilitates transferring technology and knowledge and externality spillovers to the country. - In 1994, Tunisia government established an investment incentives code, covering the majority of activities in order to improve and codified incentives for both domestic and foreign investors. In 1995, the government introduced a privatisation programme in order to attracting FDI, stimulating DI, and increasing the share of FDI in the manufacturing sector. - FDI inflows to Tunisia were directed to the petroleum and gas sector, which shared almost up to 80% against 8% for the manufacturing sector by the first half of the 1990's. By 1998, the share of total FDI inflow in the Petroleum and gas sector compared to the manufacturing sector was observed about 58% and 35%, respectively.
Argentina	- Between the late-1960s and the mid-1970s, Argentina was governed by different governments aimed to restricting and controlling TNCs' activities as a part of pro-market reforms. - In 1973 Argentina passed a new foreign investment law that required specific congressional approval if foreign capital exceeded 50% of the total in a company, a limited profit remittances and capital repatriation. - In 1976 the government passed a new foreign investment law (Foreign Investment Act) that moved the policy focus from FDI control to FDI promotion. - In the 1980s, Argentina did not attract much new FDI as results of stagnating macroeconomic conditions such as the second oil shock, the third world debt crisis, hyperinflation and currency broad crisis, and reduction of TNCs enterprises. - In 1989 the Economic Emergency Act introduced due to create more flexibility to the FDI regime, and provided additional information on the economic environment. This law aimed to eliminate all restrictions on the movement of capital in and out of Argentina by adopting a single foreign exchange market. - The 1980s period characterised by depressing and high inflation, with sharply reduced in domestic investments, and FDI flows became less significant and more changeable. - In 1991, Argentina signed the Argentinean-US Bilateral Investment Treaty (BIT), providing incentives and national treatments to investments. - Argentine passed the law of 1994 due to create one free trade zone (FTZ) in each province and four others in border areas. FTZs were offering tax-free and duty-free importing and exporting - In 1994, Argentina has been signed the Mercosur protocols for promotion and protection investment. - Argentina economy was affected by the Asian financial crisis between 1997 and 1998; as a result the annual foreign direct

	investment (FDI) inflow fell from $9 billion to $6.85 billion from 1997 to 1998, respectively. - Between 2001 and 2002, Argentina was knowledge its worst political and economic crisis since 1983, which characterized by extreme policy changes, government turmoil, and social disturbances. - Chudnovsky and Lpoez (2008) demonstrate that in the case of Argentina, as FDI was mainly through mergers and acquisitions, it probably did not contribute to the domestic economy as much as if it had taken the form of green-field investment. - The crisis years of 1995-1996 have a negative impact on the contribution of FDI inflow to domestic investment, and on the reduction of the FDI inflows to the country (Gao and Eshaghoff 2004; Chudnovsky and Lopez 2008).
Brazil	- Brazilian investment regime is described by its stability and being regulated despite the considerable political changes and the effect of import substitution (IS) strategy for the period from early 1960s to the 1980s. Since 1970s FDI inflows have been played a significant role in economic development in Brazilian economy, which outcome from the FDI regime liberalisation (Veiga 2004). - Brazil is the one of largest recipient of foreign investment in Latin America region. - In 1988 the government has issued the rule number 171 under the Constitution of 1988. This law led to restrictions on the activity of the foreign companies that invest in Brazilian economy (Veiga 2004). - In the 1980s, Brazilian exchange crisis had led to reduction net FDI flows to the country from $ 2.3 billion on average for the period 1971 to 1981 to a mere $ 357 million for the period 1982 to 1991 that because foreign firms adopted so called a waiting position to avoid this crisis (Viega 2004). - In 1990s, Brazilian economy was characterized by liberalisation, the partial removal of many barriers to foreign direct investment and the introduction of significant adjustments to the Constitution of 1988. - In the mid-1990s, the government adopted promotion investment system and technology transfer for supporting domestic investment and providing informations relevant to FDI. In the late-1990s, Brazilian central bank provided many facilities required for FDI inflows such as registration process and reduction of the entry cost. These procedures were taken place to prevent economy from the Mexican crisis and increasing trade deficits in 1995. This period characterised by the macroeconomic stability, which creates a strong growth in domestic demand, and trade liberalisations that led foreign companies to increase their investment to face the competition and less protected environments - A Mercosur protocol was signed in 1994 by Brazilian government for promoting and protecting investment (Viega 2004). - From 1996 to 2000, the majority of FDI received by country directed to the services sector, which reached about 90.3% of total flows due to privatization programme, reforms of financial sector and market liberalisation. The outcome of this period was an increase in the number of foreign firms from 6,322 in 1995 to a total of 11,404 enterprises in 2000 (Rothmuller 2003). - Between 2001 and 2002, the total FDI flows to service sector reduced to more than one half of its value due to the exhaustion of the privatization programme, the effect of the Argentinean crisis, the main trading partner, and the presidential election in 2002(Rothmuller 2003). - In 2003, all the measures taken for the liberalization of FDI regime in the 1990s were poised relevant to the political situations of the new government. This in turn has weakened the domestic investment and foreign alike to avoid the regulation risks. In

	spite of an increased MNCs and FDI flows received by the country as well as the benefits of FDI flows to economic development, the growing gap and capabilities between foreign firms and domestic firms remain a serious concerned on the contribution of FDI to economic development and domestic investment (Veiga 2004). - Rothmuller (2003) points out that most FDI flows to the country was horizontal; therefore, many scholars found that there is no impact of FDI on domestic investment, economic growth and unemployment in this country as well as Argentina. Similarly, Gallagher and Lopez (2008) demonstrate that foreign firms pay higher wages to workers that may generate negative spillovers to domestic firms. FDI is not a substitute for policies oriented to improve the productive and environmental performance of domestic firms. Furthermore, Hiratuka (2008) addresses that FDI flows did not contribute positively to the development of new productive capacity due to that the large share of FDI attributable to mergers and acquisitions. However, despite the high levels of FDI inflows, DI did not response enough to the increase in FDI flows because DI stagnated in Brazilian economy as a whole.
Mexico	- In the 1990s, Mexico was one most successful country in Latin America in attracting foreign direct investment. - In 1973, Mexico passed the first investment law considered to regulate foreign investment. It was designed to avoid sell Mexican companies already owned to foreign investors. The aim of this law is to encourage investment in Mexico, to regulate foreign investment, and stimulate the achievement of adjust and balanced economic development, and to promote economic independence (Del Toro 1996). This law defined the proportion of foreign investment in the projects could not exceed a certain percentage of less than 49% of the maximum. As a result of this law, Mexico did not achieve the goal of development. - After the worst financial crisis in 1982, Mexico announced that foreign investment become the crucial factor for economic growth in Mexico. In the 1986, Mexico entered into GATT and classified as second grade. In this year, several economic activities were opened to foreign investors, although these reforms did not make confidence environment and security to foreign investors (Del Toro 1996). - In 1989, the government passed a new law of foreign investment for promoting investment and regulating foreign investment, and eliminating all prior restriction over foreign investment. - In 1994, Mexico signed the North American Free Trade Agreement (NAFTA). The agreement aimed to remove barriers to investment among these countries. - The Mexican government has adopted some measures to encourage FDI. It has signed several free trade agreements and agreements for the promotion and protection of foreign investment. For example, the free trade agreement with Uruguay, which signed in 2004, and entered into an economic association with Japan in 2005. In addition, Mexico accessed the Organization for Economic Cooperation and Development (OECD) in 1994 and entered into force of NAFTA in 1994. The country also has undertaken some competition on sectoral programs and has entered into the International Agreement for the information technology (ITA-Plus) to attract FDI (Peters 2008). - The manufacturing sector accounted for 49% of FDI flows between 1994 and 2005, constituting the most important sector. The financial services sector, which ranks second, increased its share of FDI substantially as a result of the sale of national banks between 2000 and 2002, although this tendency is likely to diminish. The third-ranked sector, accounting for 10.8% of FDI between 1994 and 2005, is commerce, with an average annual growth rate of 6.7% for this period (Peters 2008).

	- Peters (2008) demonstrates that FDI has been much more important than domestic investment especially in manufacturing sector particularly in industry sector. He also found that FDI inflows have an insignificant impact on research and development (R&D) expenditures in the country. - The Mexican government accepted the idea that the country needed to attract capital in order to supplement domestic savings and finance higher rates of capital accumulation. The problem was that the government centred it within flows from multilateral institutional and foreign commercial banks and did not give private flows a significant role (Del Toro 1996).
China	- By early 1970s and compared with its Asian neighbours, China was suffering from weakness and the failure of the technological modernisation. These challenges lead to increasing focus on the readjustment and reforms, which takes place in 1976 (Li 1998). - In the 1990s, China passed other countries, except USA in attracting FDI. This made China the first recipient of FDI among developing countries and the second largest recipient in the world (Coughlin and Segey 1999). - FDI inflows to China are largely consisted of Greenfield investment (Graham and Wada 2001). - In 1977 China moved from closed door policy to opening-up policy. - In 1979, China passed the law of joint ventures using Chinese and foreign investment, offering a treatment to joint ventures by establishing four special economic zones and limited foreign currency market (Coughlin and Segev 1999). - Since 1979, FDI development in China has undergone four stages, as clarified by Wang (2001); the first stage is the stage of experiment for the period from 1979 to 1983. This period was characterized by slower FDI inflows due to the lack of clarity of China's policies and the lack of adequate information, leading to a lack of knowledge of the investment climate in China. The second stage is the stage of initial development for the period from 1984 to 1986. This stage was characterized by increasing economic openness to the outside world, the expansion of foreign trade and reforms in the Chinese legislation for improving the investment climate and further encourages FDI inflows into the country. The third stage is the stage of steady development for the period from 1987 to 1989. After a decline in FDI inflows in 1986, China has taken several measures to reverse the trends of foreign investment from the previous period, improve the investment climate and the granting of exemptions and incentives for FDI. This stage was characterized by passing the "Article 22" to encourage FDI inflows and facilitate exports and the granting of management autonomy to the provinces. The fourth stage is the stage of large-scale development for the period from 1992 to present. In order to the deterioration in the economic and political climate that led to prevent the flows of FDI in the years 1989 and 1990, after the boom that has occurred in the period from 1987 to 1988. As a result of decreased growth rates in foreign investment that led to a negative reaction of foreign investors on investment environment in China. This stage was characterized by abandoning the policy of austerity in the early 1991, which adopted in late 1988, and replaced by a policy to encourage foreign investment by reducing the control of local loans and opening the domestic market for FDI.
India	- India started liberalising its economy to the rest of the world at the mid-1980s (Chakraborty and Basu 2002). - India has taken into account to achieving $10 billion in actual FDI inflow per year. - The characteristics of Indian economy over their counterparts of the Asian countries are that it has a large area, availability of human resources, English language speaking population and low levels of wages and skilled labour. Despite the widespread illiteracy, skills, experience and advantages of India could lead it to become the point destination of both market-seeking and

	efficiency-seeking FDI, if its liberalization process continues (Athukorala 2008). - India attitude towards FDI has passed four important periods. First period was characterised by a gradual liberalization for the period from independence in 1947 to the late 1960s. In this stage India attracted a little FDI concentrated in extractive resources that the country was marked by low levels of development and underdevelopment infrastructure. Second period was marked by a more selective stance for the period from the late 1960s up to the 1970s. In this stage India attempted to develop domestic market and protect domestic industry. Third period was characterised by certain liberalisation policy for the period 1980s. In this stage domestic projects are strengthened and they could have technological capability to produce standardised goods. Also, FDI flows directed to more technology intensive manufacturing and towards efficiency seeking or export base production. Fourth period is the period of 1990s to present. This period was marked by a more liberalisation policy to increase the international competitiveness of Indian projects. This stage of FDI development was marked by factor driven, investment driven, innovation driven and wealth driven (Kumar 1995). - Investment regime in India is still suffering from a number of restrictions. For example, foreign ownership is ranging from 50% to 100% of equity, which need a long procedure of government for approval. More openness requires further reductions and the cancellation of the tariff rates, especially tariff rates on import of capital goods used for export, and on import inputs for export production (Bajpai and Sachs 2000). - Despite the growth of GDP has slow down, India has been avoided the worst of Asian financial crisis of 1997. - In the 1990s, as a result of the Gulf war and the balance of payment deteriorated, India entered in the most difficult financial crisis. In 1991 the government adopted a program of macroeconomic stabilisation and structural adjustment supported by the International Monetary Fund (IMF) and the World Bank. In the same year, India announced the New Industrial Policy (NIP) (Kumar 1995). - In spite of the liberalization policies pursued by the country for FDI, the political instability after 1995 is still had a negative impact on FDI inflows into the country (Athreye and Kapur 2002). - One of the most important goals of the policy of reform during the 1990s is to remove obstacles for export-oriented manufacturing in general and the identification of locations to attract efficiency-seeking FDI in the country. - FDI is considered to be local market-seeking in the first situation, its world market-orientation has evidently boosted in the post-reform (Chakraborty and Nunnenkamp 2006). - Chakraborty and Nunnenkamp (2006) explain the increase of the volume of FDI inflows received by the country not only due to improvement of investment climate but also to the higher GDP growth. - Notwithstanding its importance, FDI inflows received by the country are remained very low to make a hug effect on economic growth in India. The hypothesis of FDI-led growth in India is not reasonably to be considered FDI as an engine of economic growth that because the contribution of FDI to domestic investment has remained low. Balasubramanyam and Mahambare (2003), Fischer (2002) and Arabi (2005) illustrate that FDI inflows to India are still domestic market seeking, as a consequence FDI may create a little growth effect. Due to that FDI may crowd out domestic investment (DI), if FDI inflows into the country just to produce for domestic markets. - In spite of the evidence that FDI inflows have been a significant effect on growth in India, Emde (1999) drew attention to the

	existence of two limitations associated with FDI received by the country. Firstly, the limited effectiveness of FDI is that MNCs in India are less export-orientated than in other countries. Due to the vast and growing domestic market in India has been the focus of MNCs. Thus, MNCs have achieved monopolistic profit, and they have no incentive to compete on the world markets. Secondly, the limited of growth of FDI is that the amount of FDI inflows into India is relatively small compared to other countries such as China.
Korea	- Korea has been shifted to a more proactive FDI regime but FDI still played a marginal role in the industrialisation process (Ahn 2008). Korea began to standing ahead of ASEAN countries but behind China, although its performance seems to be unsatisfactory in terms of its economy size. Korea classified as a poorest country in providing investment incentives for FDI (Hong and Gray 2003). - Francis (1998) attributes the decrease of FDI performance to below the potential level in Korea to the government policy, a tradition of law reliance on FDI, political and social factors, and weak international competitiveness. - Korea, before the Asian financial crisis of 1997, was considered as the most terrible place to invest among Asian countries. Korea restricted FDI inflows into the country by adopting a serious burden of laws and regulations to protect domestic industries. These restrictions led to the closure of many sectors to foreign direct investments (FDI) until the early 1990s. The labour market lacked flexibility, which led to rising labour cost to one of the highest among Asian countries (Kwon 2004). - According to Kwon (2004), the ratio of inward FDI stock to gross fixed capital formation (DI) was less than one percent over the 1990-1997, while this ratio for the world and East Asian countries were 4.7 % and 7.4 % respectively. The ratio of inward FDI stock to current GDP in 1995 was 2.0 % in Korea, compared to the 10.0 % and 18.9 % for the world and East Asian countries respectively. - Between 1970 and 1974 Korea established two Free Export Zones at Masan and Iri for welcoming FDI into the light manufacturing export sector. This was a result of shifting its basic development strategy from import substitution (IS) to export promotion (EP) to emphasise an FDI-based development strategy (Ahn 2008). - In 1973 the government moved from a policy of general encouraging exports and incentives to the targeting of strategic of the heavy and chemical industries (HCIs). HCIs created massive economic problems such as monetary expansion and increased budget deficit, and investments became not sufficient to have a positive impact on general economy and these investments focused on the strategic industries. This in turn led the companies to focus on their market share rather than their profitability and shareholder value (Harvie and Pahlavani 2007). - The period from 1976 to 1978 saw many of the developments that led to economic decline. For example, the rapid increase in the wage rates and construction boom of 1976 in the Middle East. These have led to the worst inflation that was resulted a weakness of competitiveness of exports and slowdown in exports and economic growth (Harvie and Pahlavani 2007). - Until the mid-1980s Korea followed independent FDI policies, which are controlled and depressed FDI inflows into the country that based on the Korean government's desire to take control of the available capital resources (Kim 1999). - In the 1980s Korea has accumulated a high amount of foreign exchange reserves, due to increase the revenue of exports and thus the country though that it did not need to donate more incentives to attract FDI (Hong and Gray 2003). - Korea attitude towards FDI was passive and restrictive. As a result, a many sectors, including most service sectors, agricultural sector and heavy and chemical industries, were closed to FDI by law until the 1997 (Kwon 2004). - In the late 1990s, Korea faced a slowing economic growth, emergency borrowing from the IMF in 1997 and an acute shortage of foreign exchange reserves in the wake of Asian financial crisis of 1997-1998. Korea began a new wave of attracting FDI to support its balance

	of payment and to reduce the levels of unemployment (Hong and Gray 2003). - Korea does not achieve its goal of attracting FDI, although FDI has increased significantly in the last years. The ratio of the FDI stock to total fixed capital formation was accounted for about 1.3% in 1996, compared with 7.4% of the average of Southeast Asian countries and 14.6% of the world average. In addition, the ratio of the FDI stock to GDP was accounted for about 2.6% in 1996, compared with 5.64% of the average of Southeast Asian countries and 10.6% of the world average (Kim 1999). - In 1998 Korea replaced the Foreign Capital Inducement Act of 1966 by a new Foreign Investment Promotion Act. The purpose of this act is to provide extensive tax reductions especially in high-technology industries, a broad one-stop investment service, foreign investment zones and lower long-term rents of land. As a consequence, FDI environment is substantially improved, and the Korean market labour has remarkably improved its flexibility. Korean employers change their preferences to foreign firms that have increased, leading foreign firms to accommodate local workers (Kwon 2004). The total of FDI inflows into the country has substantially increased for about twofold, form $5.2 billion in 1998 to $10.2 billion in 2000 (Hong and Gray 2003). - For eliminating most the restrictions on foreign exchange transactions and domestic transactions in foreign currencies, Korea replaced the Foreign exchange Transaction Act by the Foreign Exchange Management Act in 1999 (Kim 1999). Yet, the role of FDI in Korean economy has not been considered as an engine of economic development that because it played only a slight role in raising the level of value added and employment. - FDI inflows into the country increased significantly after the financial crisis of 1997, which attributed to the introduction of new policy measures to induce FDI and restructure the financial and corporate sectors. Nevertheless, FDI inflows into the country decreased sharply especially in 2001, due to the slowdown of the world economic growth, which accounted for about 1.3% compared with 4.0% in 2000 (Kim 2003). - For the period from 2001to 2003, the service sector was accounted for about 70% of FDI, while the share of manufacturing sector was declined to 27% of FDI. These changes in FDI flows into the country reflect clearly the changes in the structure of Korean economy and the opening of the service sector after the 1997 crisis and the loss of international competitiveness (Kwon 2004). - One of the most motivation of FDI into the country until the mid-1980s is low-cost labour, which is the major advantage of investing in Korea through that period. After the mid-1980s the motivation of FDI is market-oriented that due to increase wages. Recently, market-oriented FDI is became the dominants that MNCs aim to attracting regional and global markets (Kwon 2004; Kim 1999). - Foreign investor received a much higher incentives than domestic investor. Domestic investor wishes to receive the same benefits, such as one-stop service, simplified procedures and other investment incentives. This discourages domestic investor and creates economic distortions (Kim 1999).

Appendix B

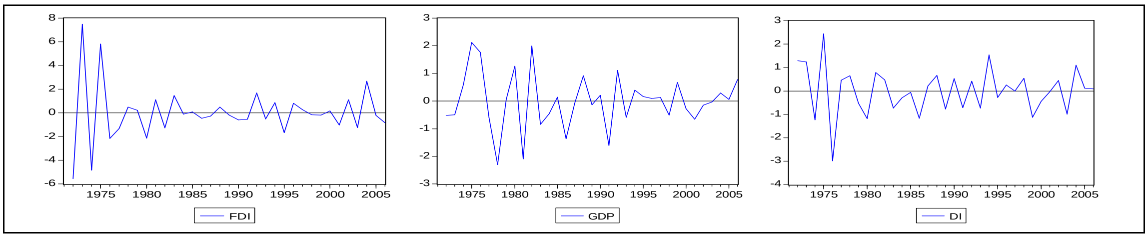

Figure (B-1) the plots of the first difference series of (log) variables for Egypt

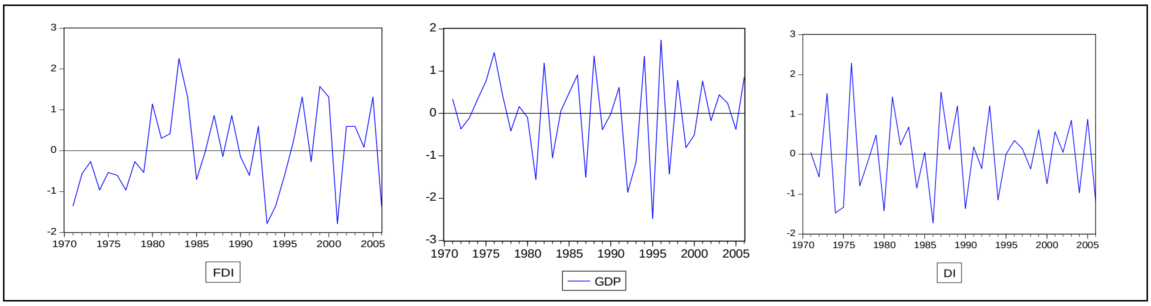

Figure (B-2) the plots of the first difference series of (log) variables for Morocco

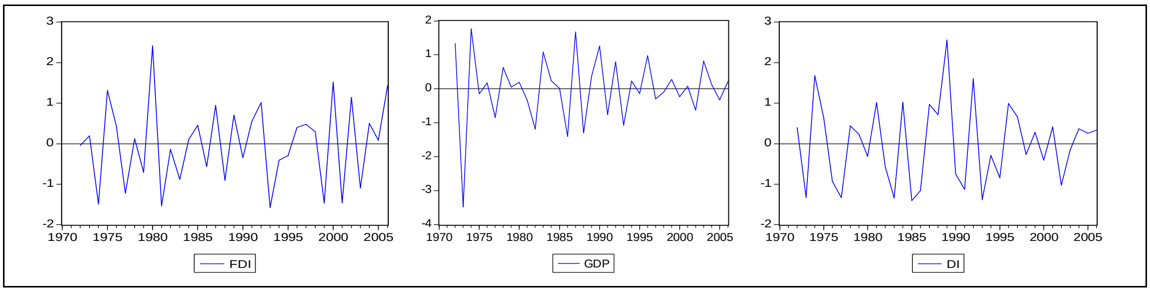

Figure (B-3) the plots of the first difference series of (log) variables for Tunisia

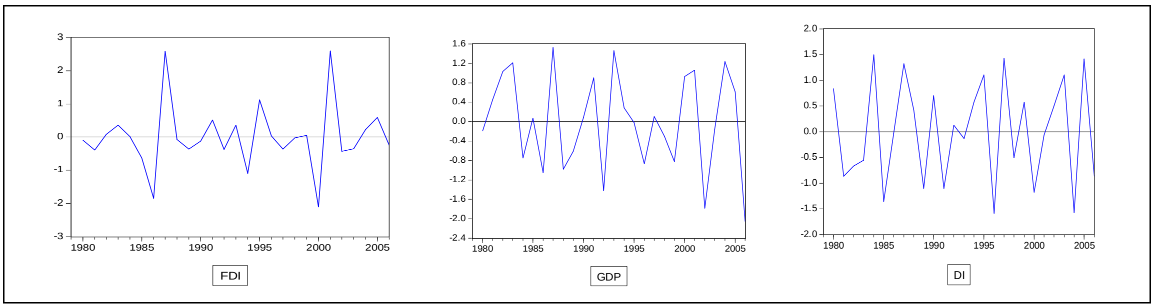

Figure (B-4) the plots of the first difference series of (log) variables for China

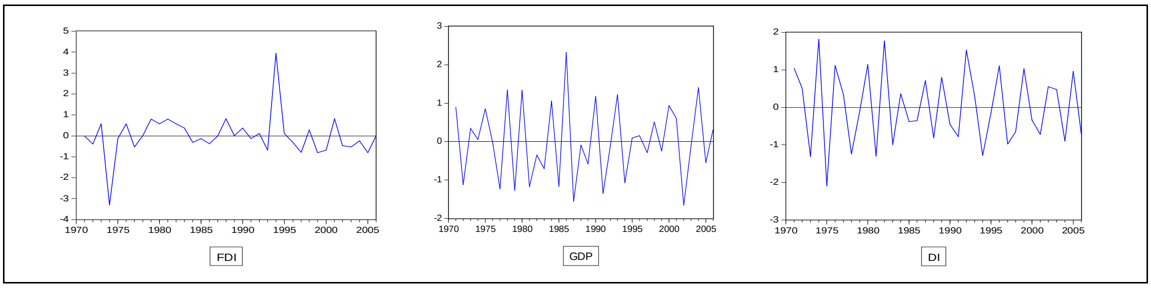

Figure (B-5) the plots of the first difference series of (log) variables for India

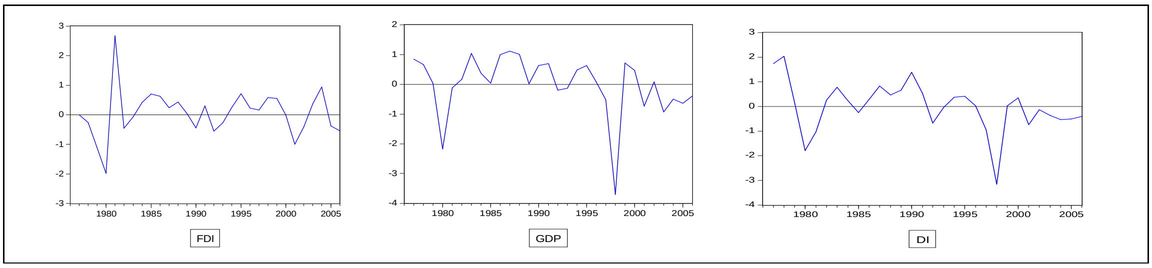

Figure (B-6) the plots of the first difference series of (log) variables for Korea

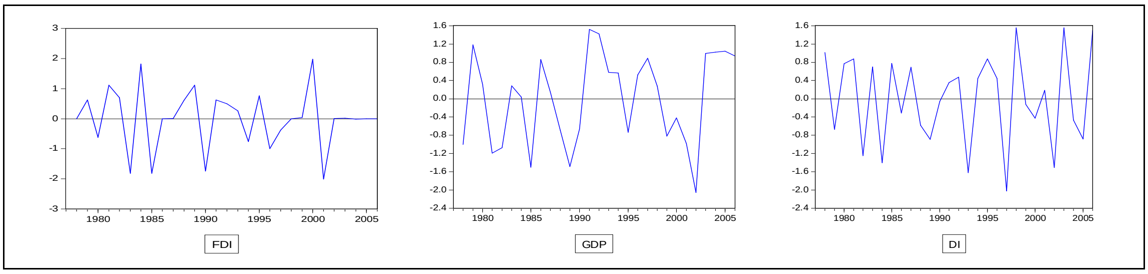

Figure (B-7) the plots of the first difference series of (log) variables for Argentina

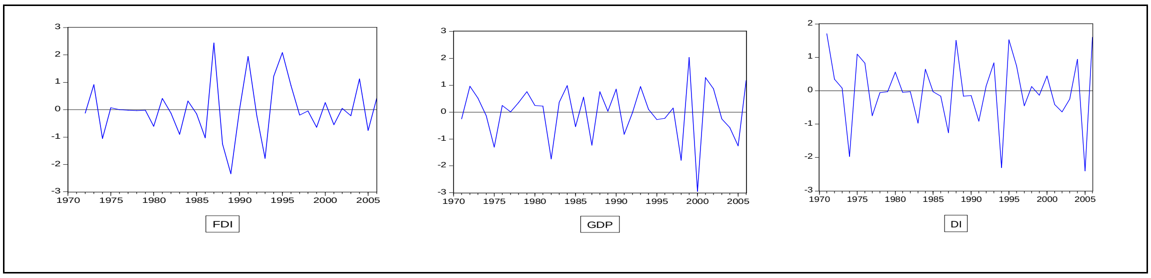

Figure (B-8) the plots of the first difference series of (log) variables for Brazil

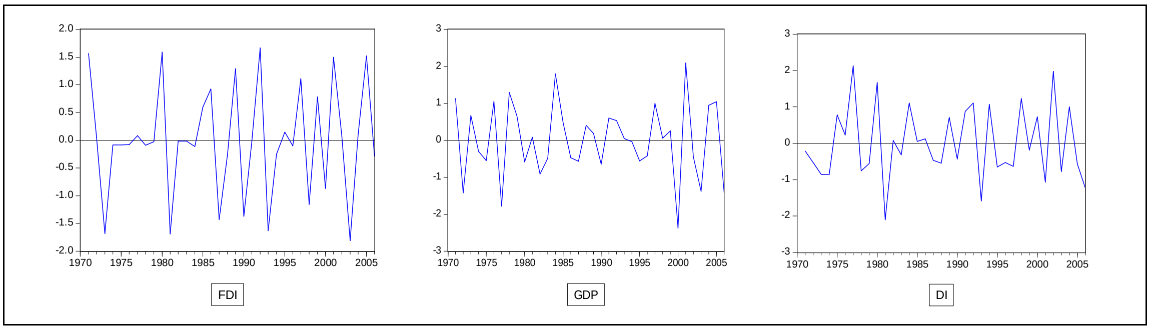

Figure (B-9) the plots of the first difference series of (log) variables for Mexico

Appendix C

Table (C-1) VAR lag length selection criteria for FDI, DI and GDP model

Egypt	FDI, DI and GDP Model				
Lag specification (max. lags) (L)	LR	FPE	AIC	SC	HQ
0	NA	0.013283	4.192274	4.328320	4.238050
1	243.5434	5.18e-06	-3.660318	-3.116134*	-3.477217
2	17.76417	4.59e-06	-3.798101	-2.845778	-3.477673
3	22.94489*	3.04e-06*	-4.250250*	-2.889789	-3.792496*
4	8.485809	3.70e-06	-4.129086	-2.360486	-3.534006

Morocco	FDI, DI and GDP Model				
Lag specification (max. lags) (L)	LR	FPE	AIC	SC	HQ
0	NA	0.017400	4.462301	4.598347	4.508076
1	154.4967	0.000146	-0.319719	0.224466*	-0.136617
2	20.18008*	0.000118	-0.550421	0.401902	-0.229993*
3	14.17810	0.000114	-0.621405	0.739056	-0.163652
4	14.50901	0.000103*	-0.801401*	0.967199	-0.206321

Tunisia	FDI, DI and GDP Model				
Lag specification (max. lags) (L)	LR	FPE	AIC	SC	HQ
0	NA	0.000748	1.314931	1.450977	1.360706
1	204.8277	1.11e-06	-5.202638	-4.658454*	-5.019537
2	17.14015*	1.01e-06	-5.316420	-4.364097	-4.995993
3	16.82102	8.68e-07*	-5.502314*	-4.141853	-5.044561*
4	8.725356	1.04e-06	-5.393128	-3.624528	-4.798048

China	FDI, DI and GDP Model				
Lag specification (max. lags) (L)	LR	FPE	AIC	SC	HQ
0	NA	0.000460	0.829387	0.976644	0.868454
1	203.4115*	3.76e-08	-8.591186	-8.002159*	-8.434917
2	16.07956	3.23e-08	-8.787043	-7.756246	-8.513572
3	9.553171	3.86e-08	-8.719412	-7.246845	-8.328740
4	15.20550	2.57e-08*	-9.351731*	-7.437393	-8.843856*

India	FDI, DI and GDP Model				
Lag specification (max. lags) (L)	LR	FPE	AIC	SC	HQ
0	NA	0.004627	3.137748	3.273794	3.183523
1	192.7472	1.04e-05	-2.963251	-2.419067	-2.780150
2	32.18950	5.29e-06	-3.655854	-2.703531*	-3.335427
3	17.21740*	4.49e-06*	-3.858982*	-2.498521	-3.401229*
4	2.807439	7.27e-06	-3.453900	-1.685300	-2.858820

Korea	FDI, DI and GDP Model				
Lag specification (max. lags) (L)	LR	FPE	AIC	SC	HQ
0	NA	0.002627	2.571732	2.715714	2.614545
1	190.7839*	1.29e-06*	-5.056552*	-4.480625*	-4.885299*
2	7.271601	1.79e-06	-4.753466	-3.745593	-4.453772
3	10.91112	1.98e-06	-4.728629	-3.288811	-4.300496
4	9.771664	2.23e-06	-4.759939	-2.888174	-4.203365

Argentina	FDI, DI and GDP Model				
Lag specification (max. lags) (L)	LR	FPE	AIC	SC	HQ
0	NA	0.024571	4.807324	4.952489	4.849126
1	97.37843*	0.000591*	1.073339	1.653999*	1.240548*
2	12.53231	0.000632	1.106051	2.122206	1.398667
3	12.92842	0.000612	0.990333	2.441983	1.408355
4	9.457968	0.000701	0.955105*	2.842249	1.498534

Brazil	FDI, DI and GDP Model				
Lag specification (max. lags) (L)	LR	FPE	AIC	SC	HQ
0	NA	0.009572	3.864664	4.000710	3.910440
1	265.2722	1.77e-06	-4.737197	-4.193012*	-4.554095*
2	17.14973*	1.60e-06*	-4.851348*	-3.899025	-4.530920
3	10.09487	1.85e-06	-4.744800	-3.384339	-4.287046
4	5.428136	2.63e-06	-4.470753	-2.702153	-3.875672

Mexico	FDI, DI and GDP Model				
Lag specification (max. lags) (L)	LR	FPE	AIC	SC	HQ
0	NA	0.001053	1.657420	1.793466	1.703195
1	254.3405*	2.83e-07	-6.567488	-6.023303*	-6.384386*
2	14.70061	2.82e-07*	-6.587441*	-5.635118	-6.267013
3	11.63239	3.05e-07	-6.547743	-5.187281	-6.089989
4	6.479931	4.11e-07	-6.326285	-4.557685	-5.731205

Notes: * indicates to the optimal lag order chosen by the criteria.
LR: sequential modified LR test statistic.
FPE: Final prediction error.
AIC: Akaike information criterion.
SC: Schwarz information criterion.
HQ: Hannan-Quinn information criterion.

Table (C-2) Pantula principle test for FDI, DI and GDP model

Egypt		FDI, DI and GDP Model; k= 1					
r	n-r	Model 2		Model 3		Model 4	
		λ_{trace}	λ_{max}	λ_{trace}	λ_{max}	λ_{trace}	λ_{max}
0	3	49.27	23.95	31.59	19.28	50.49	25.55
1	2	25.32	18.72	12.31*	10.05	24.93*	15.79
2	1	6.59*	6.59*	2.25	2.25	9.14	9.14

Morocco		FDI, DI and GDP Model; k-1					
r	n-r	Model 2		Model 3		Model 4	
		λ_{trace}	λ_{max}	λ_{trace}	λ_{max}	λ_{trace}	λ_{max}
0	3	74.26	37.32	40.46	28.60	47.42	29.65
1	2	36.93	28.60	11.86*	10.25*	17.77*	11.52*
2	1	8.33*	8.33*	1.60	1.60	6.24	6.24

Tunisia		FDI, DI and GDP Model; k=1					
r	n-r	Model 2		Model 3		Model 4	
		λ_{trace}	λ_{max}	λ_{trace}	λ_{max}	λ_{trace}	λ_{max}
0	3	52.14	32.54	27.05	16.14	65.11	41.36
1	2	16.60*	11.92*	10.91	8.91	23.74*	15.93*
2	1	7.67	7.67	2.00	2.00	7.81	7.81

China		FDI, DI and GDP Model; k=1					
r	n-r	Model 2		Model 3		Model 4	
		λ_{trace}	λ_{max}	λ_{trace}	λ_{max}	λ_{trace}	λ_{max}
0	3	54.77	30.64	34.95	21.71	52.45	24.78
1	2	24.13	18.95	13.24*	13.00*	27.67	16.78
2	1	5.17*	5.17*	0.23	0.23	10.88*	10.88

India		FDI, DI and GDP Model; k=2					
r	n-r	Model 2		Model 3		Model 4	
		λ_{trace}	λ_{max}	λ_{trace}	λ_{max}	λ_{trace}	λ_{max}
0	3	56.17	30.48	40.96	26.21	52.61	31.75
1	2	25.69	23.02	14.75*	12.28*	20.85*	17.50*
2	1	2.67*	2.67*	2.47	2.47	3.35	3.35

Korea		FDI, DI and GDP Model; k=1					
r	n-r	Model 2		Model 3		Model 4	
		λ_{trace}	λ_{max}	λ_{trace}	λ_{max}	λ_{trace}	λ_{max}
0	3	36.17	21.16	16.14	11.67	47.12	33.68
1	2	15.01*	11.33	4.46	3.69	13.44*	11.60*
2	1	3.67	3.67	0.76	0.76	1.83	1.83

Argentina		FDI, DI and GDP Model; k=1					
r	n-r	Model 2		Model 3		Model 4	
		λ_{trace}	λ_{max}	λ_{trace}	λ_{max}	λ_{trace}	λ_{max}
0	3	37.99	21.76	25.60	16.40	43.77	20.95
1	2	16.22*	12.85	9.20	9.09	22.81*	16.39
2	1	3.36	3.36	0.10	0.10	6.41	6.41

Brazil		FDI, DI and GDP Model; k=1					
r	n-r	Model 2		Model 3		Model 4	
		λ_{trace}	λ_{max}	λ_{trace}	λ_{max}	λ_{trace}	λ_{max}
0	3	48.86	30.30	35.87	20.68	43.91	23.82
1	2	18.56*	14.40*	15.18*	11.04	20.08*	13.51
2	1	4.16	4.16	4.14	4.14	6.56	6.56

Mexico		FDI, DI and GDP Model; k=1					
r	n-r	Model 2		Model 3		Model 4	
		λ_{trace}	λ_{max}	λ_{trace}	λ_{max}	λ_{trace}	λ_{max}
0	3	55.16	32.36	43.55	24.67	53.24	27.66
1	2	22.80	16.56	18.88	13.96*	25.57*	16.41*
2	1	6.24*	6.24*	4.91	4.91	9.16	9.16

* denotes the first time when the null hypothesis is not rejected at the 0.05% level.
K denotes the optimal number of lags in the VAR model.

Appendix II

Definition of variables, theoretical expected sign and the data sources

Variables	Proxy	Data sources
Real GDP per capita growth rate	*Growth*	World Bank, WDI
FDI net inflows as % of GDP	*FDI*	World Bank, WDI
Gross ratio of secondary school enrolment	*HC*	World Bank, WDI; UNESCO, statistical year-book, differed issues; ADB 2008
Host country GDP per capita	*TG*	World Bank, WDI
U.S. GDP per capita		
M_2 as % of GDP	*MS*	World Bank, WDI
Mobile and fixed-line telephone (per 1000 people)	*IFR*	World Bank, WDI
Export of goods and services + import of goods and services as % of GDP	*DOP*	World Bank, WDI
GDP deflator (annual %)	*IFL*	World Bank, WDI
Interaction terms of FDI with education	*FDI*HC*	
Interaction terms of FDI with technology	*FDI*TG*	
Interaction terms of FDI with financial	*FDI*MS*	
Interaction terms of FDI with infrastructure	*FDI*IFR*	
Interaction terms of FDI with trade openness	*FDI*DOP*	
Real GDP per capita at the start of each period	*Initial GDP pc*	World Bank, WDI
Government consumption as a % of GDP	*GS*	World Bank, WDI
Index of difference between official exchange rate and black market rate, 0-10 scale	*BMP*	EFW, 2009 annual report. Fraser Institute, the
Index of economic freedom world	*EFW*	Fraser Institute, the
Gross of fixed capital formation as % of GDP	*DI*	World Bank, WDI
Dummy variable takes 1 if the country from African region and 0 otherwise	*Africa*	
Dummy variable takes 1 if the country from Latin American region and 0 otherwise	*Latin*	

List of countries included in the empirical analysis (the small sample)

Africa	Asia	Latin America
Angola	China	Argentina
Cameroon	India	Bolivia
Congo Dem. Rep	Korea	Brazil
Egypt	Malaysia	Chile
Madagascar	Pakistan	Colombia
Morocco	Thailand	Ecuador
South Africa	Turkey	Mexico
Tunisia		Peru
		Venezuela

List of countries included in the empirical analysis (the large sample)

Middle East and North Africa	Latin America and Caribbean		East Asia and Pacific	South Asia	Sub-Saharan Africa	
Algeria	Argentina	Guatemala	China	Bangladesh	Angola	Lesotho
Bahrain	Bahamas	Guyana	Fiji	India	Benin	Malawi
Egypt	Barbados	Honduras	Indonesia	Nepal	Botswana	Mali
Iran	Belize	Jamaica	Korea	Pakistan	Burundi	Mauritania
Jordan	Bolivia	Mexico	Malaysia	Sri Lanka	Cameroon	Mauritius
Morocco	Brazil	Nicaragua	Papua New Guinea	Turkey	Central Africa	Mozambique
Oman	Chile	Panama	Philippines		Chad	Niger
Tunisia	Colombia	Paraguay	Thailand		Congo, Rep	Rwanda
	Costa Rica	Peru			Côte d'Ivoire	Senegal
	Dominican Rep.	Trinidad and Tobago			Ethiopia	Sierra Leone
	Ecuador	Uruguay			Gabon	South Africa
	El Salvador	Venezuela			Ghana	Togo
					Guinea Bissau	Uganda
					Kenya	Zambia
					Madagascar	Zimbabwe

List of UNDP (United Nations Development Programme) country codes

Country	code	Country	Code	Country	Code
Algeria	**DZA**	**Ethiopia**	**ETH**	**Niger**	**NER**
Angola	AGO	Fiji	FJI	Oman	OMN
Argentina	**ARG**	**Gabon**	**GAB**	**Pakistan**	**PAK**
Bahamas	BHS	Ghana	GHA	Panama	PAN
Bahrain	**BHR**	**Guatemala**	**GTM**	**Papua New Guinea**	**PNG**
Bangladesh	BGD	Guinea-Bissau	GNB	Paraguay	PRY
Barbados	**BRB**	**Guyana**	**GUY**	**Peru**	**PER**
Belize	BLZ	Honduras	HND	Philippines	PHL
Benin	**BEN**	**India**	**IND**	**Korea**	**KOR**
Bolivia	BOL	Indonesia	IDN	Rwanda	RWA
Botswana	**BWA**	**Iran**	**IRN**	**Senegal**	**SEN**
Brazil	BRA	Jamaica	JAM	Sierra Leone	SLE
Burundi	**BDI**	**Jordan**	**JOR**	**South Africa**	**ZAF**
Cameroon	CMR	Kenya	KEN	Sri Lanka	LKA
Central African	**CAF**	**Lesotho**	**LSO**	**Thailand**	**THA**
Chad	TCD	Madagascar	MDG	Togo	TGO
Chile	**CHL**	**Malawi**	**MWI**	**Trinidad and Tobago**	**TTO**
China	CHN	Malaysia	MYS	Tunisia	TUN
Colombia	**COL**	**Mali**	**MLI**	**Turkey**	**TUR**
Congo	COG	Mauritania	MRT	Uganda	UGA
Costa Rica	**CRI**	**Mauritius**	**MUS**	**Uruguay**	**URY**
Côte d'Ivoire	CIV	Mexico	MEX	Venezuela	VEN
Dominican Rep.	**DOM**	**Morocco**	**MAR**	**Zambia**	**ZMB**
Ecuador	ECU	Mozambique	MOZ	Zimbabwe	ZWE
Egypt	**EGY**	**Nepal**	**NPL**		
El Salvador	SLV	Nicaragua	NIC		

The results of multicollinearity test among explanatory variables

```
. collin  lnfdi  lndi  lnhc lnifr lnms lndop lnefw lnifl lngs lnbmp africa latin, corr
(obs=346)

  Collinearity Diagnostics

                        SQRT                   R-
  Variable      VIF     VIF    Tolerance    Squared
----------------------------------------------------
     lnfdi      1.56    1.25    0.6410      0.3590
      lndi      1.04    1.02    0.9616      0.0384
      lnhc      3.48    1.87    0.2875      0.7125
     lnifr      3.10    1.76    0.3222      0.6778
      lnms      2.39    1.55    0.4186      0.5814
     lndop      1.69    1.30    0.5901      0.4099
     lnefw      2.02    1.42    0.4940      0.5060
     lnifl      1.59    1.26    0.6272      0.3728
      lngs      1.29    1.14    0.7723      0.2277
     lnbmp      1.62    1.27    0.6179      0.3821
    africa      2.24    1.50    0.4469      0.5531
     latin      1.62    1.27    0.6189      0.3811
----------------------------------------------------
  Mean VIF      1.97

                           Cond
         Eigenval          Index
---------------------------------
    1     3.5890          1.0000
    2     1.9239          1.3658
    3     1.4595          1.5681
    4     0.9922          1.9019
    5     0.9123          1.9834
    6     0.7259          2.2235
    7     0.6643          2.3244
    8     0.5798          2.4880
    9     0.3965          3.0087
    10     0.3290          3.3030
    11     0.2637          3.6893
    12     0.1639          4.6791
---------------------------------
 Condition Number          4.6791
 Eigenvalues & Cond Index computed from deviation sscp (no intercept)
 Det(correlation matrix)    0.0144
```

The results of Cook's D outliers test of predictor variables used in specification model

```
. list  lngrowth lnfdi lnhc lntg lnifr lnms lndop lnifl lngs  lnbmp lndi lnefw  country cooksd if  cooksd>4/346
```

	lngrowth	lnfdi	lnhc	lntg	lnifr	lnms	lndop	lnifl	lngs	lnbmp	lndi	lnefw	country	cooksd
12.	2.146269	1.775417	4.271526	6.509952	2.256774	4.897882	2.77642	7.043939	3.473393	0	2.754686	1.647951	BOL	.012765
13.	2.277378	1.777325	4.237989	6.610278	2.568816	4.71778	2.804005	3.43025	3.647017	0	2.861501	1.863675	BOL	.0202763
14.	2.226896	1.781521	4.412086	6.677427	3.337698	5.34617	3.107386	-.9267914	3.691242	0	2.925673	1.902697	BOL	.0230163
41.	2.007053	1.844748	4.058971	7.72742	1.101226	3.152795	3.881727	.	2.110292	2.282382	2.978168	1.382151	ECU	.
42.	2.127597	1.980378	4.043048	7.747235	1.379652	2.947985	4.07879	.	2.346363	1.94591	3.054734	1.567946	ECU	.
44.	2.07986	2.241623	4.026472	7.708443	2.356565	3.171807	4.011751	.	1.962524	.8754687	2.979053	1.72361	ECU	.
72.	2.007053	1.952312	3.987193	8.711648	4.034047	2.704163	3.575094	4.345473	2.149352	2.261763	24.85201	1.732243	MEX	.0111533
126.	.3037188	1.855876	4.511155	4.984739	2.691171	3.956434	5.34565	1.846952	2.92278	2.397895	3.616258	1.873414	BHR	.0198528
127.	1.954526	1.699944	4.568977	5.26089	2.918729	4.262142	5.23916	.	3.216719	2.397895	3.159901	1.917999	BHR	.
139.	2.299155	1.670939	3.395172	5.507755	3.908203	4.255807	4.712712	1.373926	3.06581	2.379546	2.926995	1.728289	BRB	.0139754
146.	2.52259	2.203348	3.337593	7.297335	-.1631582	3.120811	4.79747	2.410062	3.216476	1.88707	3.396775	1.629648	BWA	.0153239
147.	2.674733	2.063183	3.684921	7.071073	.3695394	3.161254	4.72861	2.700033	3.190922	2.261763	3.39211	1.691012	BWA	.0239904
149.	2.492007	1.789849	4.333547	6.839688	2.310804	3.073511	4.512344	2.384339	3.263164	2.397895	3.238683	1.973032	BWA	.0145843
152.	2.562392	2.112738	4.193964	7.082825	1.937479	3.657557	4.816606	1.698689	2.810175	1.791759	3.193992	1.738175	BLZ	.0119987
166.	2.523749	1.767051	1.79896	9.582004	-3.725124	2.582191	3.600504	2.109991	2.118769	2.379546	1.431206	1.565522	TCD	.020256
170.	2.950674	3.369521	2.760458	9.689847	.0658393	2.309611	4.565725	1.878303	1.880484	2.397895	3.633929	1.709853	TCD	.1268168
177.	1.251261	1.644505	3.011112	8.243542	-.5689103	3.402555	4.130342	.	2.816358	2.322388	2.466262	1.694926	CIV	.
201.	.9191666	1.574047	3.657742	9.369031	-1.174276	2.488235	2.653281	4.051946	2.022614	0	1.899056	.9119891	GHA	.0299811
206.	.9066706	1.686701	2.951388	7.294282	.3507752	3.181368	3.432686	2.261565	2.024579	0	2.608145	1.551119	GTM	.0135708
211.	2.345478	1.783376	2.305937	9.584374	-.8410346	3.306524	3.975749	3.320578	3.150511	1.648659	3.430703	.5481214	GMB	.0890397
218.	2.551975	3.126817	4.274839	8.271148	1.554583	4.022943	5.484894	3.652408	2.754176	2.322388	3.691952	1.554919	GUY	.0198307
257.	2.063643	1.53555	1.99463	9.589211	-2.217304	3.107779	3.925664	.	2.640684	2.322388	3.113046	1.559268	MLI	.
262.	2.53118	1.751463	3.968332	6.983137	1.566032	3.983128	4.862191	2.450877	2.493567	2.24071	3.262597	1.803064	MUS	.0164587
272.	-.3372982	1.548278	3.593642	8.163301	.1408788	3.421353	4.108937	8.482541	3.537873	2.197225	3.077404	.8891913	NIC	.0276187
276.	-.065086	1.557928	1.641877	9.282331	-2.17241	2.646582	3.983664	2.100473	2.389214	2.379546	2.728406	1.665277	NER	.0115886
277.	1.729101	1.674611	1.818802	9.522039	-2.139091	2.920877	3.715654	.	2.621121	2.322388	2.502988	1.556224	NER	.
281.	2.743682	1.848062	3.149204	5.703903	.5556915	3.066525	4.545553	.	3.265213	2.397895	3.256331	1.853365	OMN	.
283.	2.135126	1.694027	4.187414	5.662385	1.990299	3.30043	4.373384	.	3.218187	2.397895	2.828869	1.950975	OMN	.
293.	2.487586	2.095863	2.453401	8.27419	-.1468305	3.438599	4.555147	1.959516	3.070515	2.261763	3.104661	1.872617	PNG	.0282123
301.	.8040846	1.569544	4.198657	7.797671	-.0722206	3.238092	3.879098	3.096437	2.099194	2.261763	3.255557	1.560686	PHL	.0157028
317.	1.558794	.0599016	2.866346	9.270143	-1.07968	2.751369	3.751857	4.489875	2.014024	0	2.256798	1.338498	SLE	.0574561
319.	.400439	1.779137	3.277588	9.895267	-.7064087	2.543269	3.763735	3.038378	2.41412	1.791759	1.952124	1.62453	SLE	.0116769
320.	2.754066	2.043988	3.543038	9.723485	.7043536	2.841711	4.03892	2.144667	2.729104	2.397895	2.534933	1.739116	SLE	.0205927
331.	.8247345	1.869113	4.3484	5.587232	1.832746	3.660923	4.269223	1.986057	2.994988	1.163151	3.229269	1.48569	TTO	.0125983
341.	.5616298	1.543998	4.275465	5.925812	2.133168	3.82673	3.742219	3.848464	2.677157	2.397895	2.79023	1.682377	URY	.0138623
348.	.6791787	2.057514	3.200197	9.022897	-.1234932	2.663146	4.327567	4.625562	2.931818	2.341806	2.52034	1.481105	ZMB	.0133928
355.	-.4340681	1.668148	3.713295	8.848614	1.744716	3.429532	4.232212	5.482152	3.022561	0	2.76195	1.084439	ZWE	.0194508

The empirical results excluding outliers

Absorptive capacity and the impact of FDI on economic growth; 1980-2005 (RE estimator, Dependent variable: real GDP per capita growth)

	1	**2**	**3**	**4**	**5**	**6**	**7**
Linitial GDP pc	-0.04* (0.005)	-0.04** (0.036)	-0.07* (0.002)	-0.05** (0.017)	-0.04*** (0.053)	-0.02** (0.024)	-0.04** (0.031)
LDI	0.76** (0.027)	0.70** (0.018)	0.61** (0.012)	0.69*** (0.04)	0.79** (0.049)	0.88** (0.027)	0.75* (0.005)
LFDI	0.35* (0.000)	-0.81 (0.810)	0.59 (0.845)	-0.35 (0.585)	-0.31 (0.842)	-0.69 (0.127)	-1.45 (0.590)
LHC	0.11* (0.001)	0.33** (0.022)	0.10* (0.005)	0.12** (0.010)	0.13* (0.000)	0.14* (0.000)	0.09** (0.012)
LGS	-0.20* (0.000)	-0.20* (0.000)	-0.21* (0.000)	-0.20* (0.000)	-0.17* (0.003)	-0.18* (0.001)	-0.21* (0.000)
L(1+BMP)	-0.09* (0.000)	-0.10* (0.000)	-0.10* (0.000)	-0.09* (0.000)	-0.09* (0.000)	-0.11* (0.001)	-0.06* (0.009)
Africa	-0.05** (0.023)	-0.04** (0.030)	-0.04** (0.046)	-0.05* (0.000)	0.07** (0.024)	-0.04** (0.0474)	-0.04** (0.045)
Latin	-0.03** (0.039)	-0.03* (0.007)	-0.007** (0.040)	-0.03** (0.046)	-0.07** (0.022)	-0.002 (0.969)	-0.03*** (0.0590)
LFDI*LHC		0.25** (0.012)					
LTG			-0.15** (0.048)				
LFDI*LTG			-0.07** (0.018)				
LIFR				0.14* (0.008)			
LFDI*LIFR				0.08* (0.004)			
LMS					0.57** (0.038)		
LFDI*LMS					0.08** (0.041)		
LDOP						0.51* (0.007)	
LFDI*LDOP						0.21** (0.026)	
LEFW							1.43*

							(0.004)
LFDI*LEFW							0.88** (0.011)
L(1+IFL)	-0.005 (0.313)						
constant	1.27* (0.000)	0.46** (0.026)	2.84* (0.000)	1.08* (0.000)	1.01*** (0.064)	3.10* (0.000)	-0.89** (0.029)
R^2ad.	0.29	0.30	0.32	0.31	0.30	0.34	0.32
Threshold Value		3.24	8.42	4.37	3.87	3.28	1.64
No. obs.	319	319	319	319	319	319	319
P-Normality test	0.162	0.157	0.151	0.162	0.161	0.148	0.159
P-Hausman test	0.222	0.221	0.319	0.352	0.219	0.312	0.345

P-values reported in parentheses. The RE estimator includes a time dummy variable for each five-year period to account for period-specific effects. *, **, *** denote significance at 1%, 5%, and 10%, respectively.

Absorptive capacity and the impact of FDI on economic growth; 1980-2005 (two-step system GMM, Dependent variable: real GDP per capita growth)

	1	2	3	4	5	6	7
Lagged Growth	-0.30* (0.000)	-0.20*** (0.087)	-0.28* (0.004)	-0.28** (0.014)	-0.20** (0.021)	-0.31* (0.000)	-0.23* (0.009)
LDI	0.34** (0.034)	0.78** (0.042)	0.32** (0.026)	0.25** (0.042)	0.19*** (0.079)	0.95* (0.001)	0.55** (0.044)
LFDI	0.83** (0.023)	-5.04 (0.324)	3.36 (0.509)	-1.01 (0.393)	-2.58 (0.327)	-0.78 (0.895)	-8.31 (0.944)
LHC	0.09** (0.037)	1.99** (0.039)	0.09** (0.018)	0.50** (0.035)	0.34* (0.005)	0.22** (0.027)	0.48* (0.007)
LGS	-1.05** (0.018)	-0.26** (0.032)	-0.18* (0.002)	-1.30** (0.045)	-0.60*** (0.068)	-0.72** (0.048)	-1.41** (0.033)
L(1+BMP)	-0.51** (0.043)	-0.36*** (0.068)	-0.06** (0.046)	-0.07** (0.042)	-0.08*** (0.089)	-0.29** (0.048)	-0.59** (0.047)
Africa	-0.16** (0.048)	-0.15** (0.031)	-0.05*** (0.078)	-0.31* (0.007)	-0.49** (0.027)	-0.10*** (0.062)	-0.20** (0.028)
Latin	-0.04** (0.018)	-0.008*** (0.089)	-0.004*** (0.093)	-0.14** (0.014)	-0.22** (0.038)	-0.01*** (0.098)	-0.16** (0.026)
LFDI*LHC		1.21** (0.043)					
LTG			-1.14** (0.032)				
LFDI*LTG			-0.45** (0.013)				
LIFR				0.61* (0.008)			
LFDI*LIFR				0.26*** (0.055)			
LMS					0.54*** (0.078)		
LFDI*LMS					0.76* (0.001)		
LDOP						1.03** (0.023)	
LFDI*LDOP						0.22** (0.018)	
LEFW							9.60** (0.015)

LFDI*LEFW							4.65** (0.020)
L(1+IFL)	-0.01 (0.154)						
constant	5.49*** (0.056)	-4.21** (0.010)	10.74** (0.014)	6.81** (0.022)	-2.17** (0.049)	6.42** (0.045)	-1.61** (0.040)
Threshold Value		4.16	7.46	3.88	3.39	3.54	1.78
No. Observations	260	260	260	260	260	260	260
No. Instrument variables	23	23	23	23	23	23	23
P-Arellano-Bond test for AR(2) in first diff.	0.481	0.869	0.966	0.723	0.679	0.993	0.752
P-Hansen test of over id. restrictions	0.690	0.888	0.657	0.747	0.788	0.392	0.913
P-Sargan test of over id. restrictions	0.589	0.545	0.732	0.835	0.811	0.291	0.199

P-values reported in parentheses. The system includes a time dummy variable for each five-year period to account for period-specific effects. *, **, *** denote significance at 1%, 5%, and 10%, respectively.

Appendix III

List of countries included in the empirical analysis; 1980-2005

Middle East and North Africa	Latin America and Caribbean		Europe and Central Asia	East Asia and Pacific	South Asia	Sub-Saharan Africa	
Egypt	Belize	El Salvador	Turkey	China	Bangladesh	Benin	Togo
Tunisia	Bolivia	Guatemala		Indonesia	Pakistan	Botswana	Zimbabwe
	Brazil	Honduras		Malaysia		Cameroon	
	Chile	Mexico		Philippines		Côte d'Ivoire	
	Colombia	Panama		Thailand		Senegal	
	Costa Rica	Uruguay				Swaziland	
		Venezuela					

Definition of variables, theoretical expected sign and the data sources

Variables	Proxy	Expected sign		Data sources
		Growth Eq.	*DI Eq.*	
Real GDP per capita growth rate	*Growth*		+	World Bank, WDI
GDP per capita in 1980	*GDP80*	-		World Bank, WDI
GDP per capita	*GDPpc*		+	World Bank, WDI
Gross fixed capital formation (GFCF) as % of GDP	*DI*	+		World Bank, WDI
FDI net inflows as % of GDP	*FDI*	+	+	World Bank, WDI
Loans inflows as % of GDP	*LN*	+	+	World Bank, WDI
Portfolio investment inflows as % of GDP	*PF*	+	+	World Bank, WDI
Gross ratio of secondary school enrolment	*HC*	+	+	World Bank, WDI; UNESCO, statistical year-book, differed issues; ADB 2008
M_2 as % of GDP	*MS*	+	+	World Bank, WDI
Mobile and fixed-line telephone (per 1000 people)	*IFR*	+	+	World Bank, WDI
Export of goods and services + import of goods and services as % of GDP	*DOP*	+	+	World Bank, WDI
GDP deflator (annual %)	*IFL*	-	-	World Bank, WDI
General government consumption	*GS*	-	+	World Bank, WDI

Endogeneity test between *Growth* and *DI*

```
. regress  growth dom  gdp80 hc ifr dop m2 fdi ln pf  ifl gs gdppc
```

Source	SS	df	MS
Model	48.1899114	12	4.01582595
Residual	14.4482307	18	.802679484
Total	62.6381421	30	2.08793807

Number of obs =	31
F(12, 18) =	5.00
Prob > F =	0.0012
R-squared =	0.7693
Adj R-squared =	0.6156
Root MSE =	.89592

growth	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dom	.0902198	.058616	1.54	0.141	-.0329279	.2133674
gdp80	-.0026876	.0008353	-3.22	0.005	-.0044426	-.0009326
hc	.0218097	.0141789	1.54	0.141	-.0079791	.0515984
ifr	.0045777	.00765	0.60	0.557	-.0206497	.0114942
dop	.0086234	.0078415	1.10	0.286	-.007851	.0250978
m2	.0019014	.0133984	0.14	0.889	-.0300504	.0262475
fdi	.5630419	.2323496	2.42	0.026	1.05119	.0748936
ln	.8192707	.3455497	2.37	0.029	.0932978	1.545244
pf	1.541102	.3735261	4.13	0.001	2.325851	.756353
ifl	-.0250847	.0156976	-1.60	0.127	-.0078948	.0580642
gs	-.1294661	.0679962	-1.90	0.073	-.2723207	.0133885
gdppc	.0025654	.0008821	2.91	0.009	.0007121	.0044186
_cons	2.740071	1.878704	1.46	0.162	-1.20694	6.687082

```
. predict growth_res, res

. regress  dom growth gdppc hc ifr dop m2 fdi ln pf ifl gs growth_res
```

Source	SS	df	MS
Model	565.009606	12	47.0841338
Residual	135.516351	18	7.52868619
Total	700.525957	30	23.3508652

Number of obs =	31
F(12, 18) =	6.25
Prob > F =	0.0003
R-squared =	0.8066
Adj R-squared =	0.6776
Root MSE =	2.7438

dom	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
growth	3.062957	.6203721	4.94	0.000	1.759604	4.366311
gdppc	.0006996	.0007512	0.93	0.364	-.0008785	.0022778
hc	.058035	.0440173	1.32	0.204	.1505119	.0344419
ifr	.0187719	.0219285	0.86	0.403	-.064842	.0272982
dop	.0227392	.0234868	0.97	0.346	-.0720832	.0266047
m2	.0957144	.0346808	2.76	0.013	.0228527	.168576
fdi	1.365541	.6660068	2.05	0.055	-.0336874	2.764769
ln	2.159608	1.158218	1.86	0.079	4.592934	.2737184
pf	4.572566	1.357312	3.37	0.003	1.720959	7.424174
ifl	-.0716541	.0476989	-1.50	0.150	-.1718657	.0285576
gs	.3879296	.1969582	1.97	0.064	-.0258641	.8017234
growth_res	-3.062957	.9518097	-3.22	0.005	-5.062635	-1.063279
_cons	2.003952	5.11742	0.39	0.700	-8.747348	12.75525

```
. test  growth_res

 ( 1)  growth_res = 0

       F(  1,    18) =   10.36
            Prob > F =    0.0048
```

The small F statistics of residual test indicates that OLS is not consistent.

References

Abdel-Malek, T (1969). "Import Substitution vs. Export Orientation." *Columbia Journal of World Business* September-October: 29-38.

Accolly, D. (2003). *The Determinants and Impacts of Foreign Direct Investment*. MSc Economics Dissertation. London Metropolitan University. London, UK.

Adams, S. (2009). "Foreign Direct investment, domestic investment, and economic growth in Sub-Saharan Africa." *Journal of Policy Modeling* 31: 939-949.

Addison, T., Guha-Khasnobis, B. and Mavrotas, G. (2006). "Introduction and Overview." *The World Economy* 29(1): 1-8.

Adewumi, S. (2006). *The Impact of FDI on Growth in Developing Countries: An African Experience*. MSc Economics Dissertation. Jonkoping International Business School, Jonkoping University. Sweden.

Adhikary, B. (2011). "FDI, Trade Openness, Capital Formation, and Economic Growth in Bangladesh: A Linkage Analysis." *International Journal of Business and Management* 6(16-28).

Agarwal, J. P. (1997). "European Integration and German FDI: Implications for Domestic Investment and Central European Economies." *National Institute Economic Review* 160: 100-111.

Agbenyegah, B. (2007). *An Econometric Approach to Measuring Productivity: Australia as a Case Study*. PhD thesis. Curtin University of Technology, School of Economics and Finance. Australia.

Aghion, P. and Howitt, P. (1992). "A Model of Growth Through Creative Destruction." *Econometrica* 60(2): 323-351.

Agosin, M. and Machado, R. (2007). "Openness and the International allocation of foreign direct investment." *Journal of Development Studies* 43(7): 1234-1247.

Agosin, M. R. (2008). Is Foreign Investment Always Good for Development? *Working Group Discussion Paper DP09*.

Agosin, M. R. and Machado, R. (2005). "Foreign investment in developing countries: does it crowd in domestic investment?" *Oxford Development Studies* 33(2): 149-162.

Agosin, M. R. and Mayer, R. (2000). "Foreign investment in developing countries: does it crowd in domestic investment?" *United Nations Conference on Trade and Development. Discussion Papers* No. 146: 1-16.

Ahmed, A. and Suardi, S. (2007). "Sources of Economic Growth and Technology Transfer in Sub-Saharan Africa." *South African Journal of Economics* 75(2): 159-178.

Ahn, C. (2008). New Direction of Korea's Foreign Direct Investment Policy in the Multi-Track FTA Erạ: Inducement and after care Services. *Paper Presented at the OECD Global Forum VII on International Investment. March 27-28, 2008*. OECD Investment Division.

Aitken, B., Hanson, G. and Harrison, A. (1997). "Spillovers, foreign investment, and export behaviour." *Journal of International Economics* 43: 103- 132.

Aitken, B. J. and Harrison, A. E. (1999). "Do Domestic Firms Benefit from Direct Foreign Investment? Evidence from Venezuela." *The American Economic Review* 89: 605-618.

Aiyagari, S. and Christiano, L. (1992). "The output, employment, and interest rate effects of government consumption." *Journal of Monetary Economics* 30: 73-86.

Ajayi, S. I. (2006). FDI and Economic Development in Africa. *University of Ibadan, Ibadan, Nigeria*.

Akinlo, A. E. (2004). "Foreign direct investment and growth in Nigeria: An empirical investigation." *Journal of Policy Modeling* 26: 627-639.

Al-Iriani, M. and Al-Shamsi, F. (2007). Foreign Direct Investment and Economic Growth in the GCC Countries: A Causality Investigation Using Heterogeneous Panel Analysis.

Topics in Middle Eastern and North African Economies. *Paper Presented at the 27th annual meeting of MEEA. January 4-7, 2007*. Chicago.

Aleksynska, M., Gaisford, J. and Kerr, W. (2003). Foreign Direct Investment and Growth in Transition Economies. *MPRA Paper* No. 7668.

Alesina, A., Grilli, V. and Milesi-Ferretti, G. (1993). "The Political Economy of Capital controls." *NBER Working Paper Series* Working Paper No. 4353.

Alessandrini, S. (2000). FDI in the MENA Region. *Paper prepared at the third Mediterranean Development Forum. March 5-8, 2000*. Cairo.

Alfaro, L. (2003). Foreign Direct Investment and Growth: Does the Sector Matter? *Harvard Business School Working Papers*.

Alfaro, L., Chanda, A., Kalemli-Ozcan, S. and Sadik, A. (2006). How Does Foreign Direct Investment Promote Economic Growth? Exploring the Effects of Financial Markets on Linkages. *Harvard Business School Working Papers,* No.07-013.

Alfaro, L., Chanda, A., Kalemli-Ozcan, S. and Sayek, S. (2004). "FDI and economic growth: the role of local financial markets." *Journal of International Economics* 64 89–112.

Ali, F. (2010). *Essays on Foreign Direct Investment, Institutions, and Economic Growth.* PhD thesis**:** 209. University of Glasgow, Glasgow, UK.

Ali, S. and Guo, W. (2005). "Determinants of FDI in China." *Journal of Global Business and Technology* 1 (2): 21-31.

Apergis, N., Katrakilidis, C. P., and Tabakis, N. M. (2006). "Dynamic Linkages Between FDI Inflows and Domestic Investment: A Panel Cointegration Approach." *Atlantic Economic Journal* 34(4): 385-394.

Arabi, U. (2005). Foreign Direct Investment flows and Sustained Growth: A Case Study of India and China. *Paper Presented at the DEGIT conference in Mexico-City*. Mimeo.

Archibugi, D. and Coco, A. (2005). "Measuring technological capabilities at the country level: A survey and a menu for choice." *Research Policy* 34: 175-194.

Arellano, M. and Bond, S. (1991). "Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations." *The Review of Economic Studies* 58(2): 277-97.

Asiedu, E. (2002). "On the Determinants of Foreign Direct Investment to Developing Countries: Is Africa Different?" *World Development* 30(1): 107-119.

Asiedu, E. (2006). "Foreign Direct Investment in Africa: The Role of Natural Resources, Market Size, Government Policy, Institutions and Political Instability." *World Economy* 29(1): 63-77.

Asteriou, D. and Hall, S. G. (2007). *Applied Econometrics: A Modern Approach using Eviews and Microfit*. Hampshire, UK and New York, USA: Palgrave Macmillan.

Atancik, J. (2007). Horizontal and Vertical FDI Spillovers: Recent Evidence from the Czech Republic. *CERGE-EI. Working Paper* Series 340.

Athreye, S. and Kapur, S. (2002). "Private Foreign Investment in India: Pain or Panacea?" *The World Economy* 24(3): 399-424.

Athukorala, P. (2003). The Impact of Foreign Direct Investment for Economic Growth: A Case Study in Sri Lanka. *Paper Presented at 9th International Conference on Sri Lanka Studies*. *Full Paper Number 092*. Matra, Sri Lanka..

Athukorala, P. (2008). Trends and Patterns of Foreign Direct Investments in Asia: An Interpretative Survey. *Paper Presented at the Future of Economic Integration in Asia. November 20-21, 2008*. Bangkok.

Ayal, E. and Karras, G. (1998). "Components of Economic Freedom and Growth: An Empirical Study." *Journal of developing Areas* 32(3): 327-338.

Ayanwale, A. (2007). FDI and Economic Growth: Evidence from Nigeria, Research Papers RP_165, African Economic Research Consortium.

Azubike, A. (2006). Accessibility of Government Information as a Determinant of Inward Foreign Direct Investment in Africa. *United Nations Economics commission for Africa*. Seoul, Korea, World Library and Information Congress: 72ND IFLA General Conference and Council.

Backer, K. and Sleuwaegen, L. (2003). "Does Foreign Direct Investment Crowd Out Domestic Entrepreneurship?" *Review of Industrial Organization* 22: 67-84.

Baharumshah, A. and Almasaied, S. (2009). "Foreign Direct Investment and Economic Growth in Malaysia: Interactions with Human Capital and Financial Deepening." *Emerging Markets Finance and Trade* 45(1): 90-102.

Baharumshah, A. and Thanoon, M. (2006). "Foreign capital flows and economic growth in East Asian countries." *China Economic Review* 17: 70-83.

Bajpai, N. and Sachs, J. (2000). Foreign Direct Investment in India: Issues and Problems. *Development Discussion Papers No. 759*, Harvard Institute for International Development.

Balasubramanyam, V. and Mahambare, V. (2003). "FDI in India." *Transnational Corporations* 12(2): 45-72.

Balasubramanyam, V., Salisu, M. and Sapsford, D. (1996). "Foreign Direct Investment and Growth in EP and IS Countries." *The Economic Journal* 106(434): 92-105.

Balasubramanyam, V., Sapsford, D. and Griffiths, D. (2002). "Regional Integration Agreements and Foreign Direct Investment: Theory and Preliminary Evidence." *The Manchester School* 70(3): 460-482.

Baldwin, R., Braconier, H. and Forslid, R. (2005). "Multinationals, Endogenous Growth, and Technological Spillovers: Theory and Evidence." *Review of International Economics* 13(5): 945-963.

Baliamoune-Lutz, M. N. (2004). "Does FDI contribute to economic growth? Knowledge about the effects of FDI improves negotiating positions and reduces risk for firms investing in developing countries." *Business Economics* 39(2): 49-63.

Balsvik, R. (2003). FDI and mode of entry with vertical spillovers through backward linkages, *Paper Presented at the Norwegian School of Economics and Business Administration*. 2003. Norway.

Baltagi, B. (2005). *Econometric Analysis of Panel Data*, John Wiley & Sons, Chichester, UK.

Baltagi, B., Egger, P. and Pfaffermayr, M. (2007). "Estimating models of complex FDI: Are there third-country effects?" *Journal of Econometrics* 140: 260-281.

Bandyopadhyay, D. (2006). "How Financial Development Caused Economic Growth in APEC Countries: Financial Integration with FDI or Privatization without FDI." *Asia-Pacific Development Journal* 13(1): 75-100.

Banerjee, A., Marcellino, M. and Osbat, C. (2004). "Some cautions on the use of panel methods for integrated series of macroeconomic data." *The Econometrics Journal* 7(2): 322-340.

Banga, R. (2005). "Foreign Direct Investment in services: Implications for Developing Countries." *Asia-Pacific Trade and Investment Review* 1(2): 55-72.

Barro, R. (1991). "Economic Growth in a Cross Section of Countries." *The Quarterly Journal of Economics* 106(2): 407-443.

Barro, R. and Lee, J. (1994). "Sources of economic growth." *Carnegie-Rochester Conference Series on Public Policy* 40: 1.

Barro, R. and Lee, J. (1996). "International Measures of Schooling Years and Schooling Quality." *The American Economic Review* 86(2): 218-223.

Barro, R. and Sala-I-Martin, X. (1991). "Convergence across states and regions." *Brookings Papers on Economic Activity* 1991(1): 107-182.

Barro, R. and Sala-I-Martin, X. (1995). *Economic Growth*. Cambridge, MA: McGraw-Kill.

Barro, R. and Sala-I-Martin, X. (1997). "Technological Diffusion, Convergence, and Growth." *Journal of Economic Growth* 2(1): 1-27.

Bashier, A. and Bataineh, T. (2007). "The Causal Relationship between Foreign Direct Investment and Savings in Jordan: an Error Correction Model." *International Management Review* 3(4): 12-18.

Bashir, A. (1998). Foreign Direct Investment and Economic Growth in Some MENA Countries: Theory and Evidence. *Paper Presented at the ERF Third Conference. August 31st-September 2, 1998*. Tunisia.

Basu, A. and Srinivasan, K. (2002). Foreign Direct Investment in Africa: Some Case Studies. *IMF Working Paper*. WP/02/61.

Basu, P., Chakraborty, C. and Reagle, D. (2003). "Liberalization, FDI, and Growth in Developing Countries: A Panel Cointegration Approach." *Economic Inquiry* 41(3): 510-516.

Baum, F. (2006). *An introduction to modern econometrics using Stata*. Texas: Stata Press.

Bekaert, G. and Harvey, C. (1998). Capital Flows and the Behaviour of Emerging Market Equity Returns. *National Bureau of Economic Research* 6669. Cambridge.

Bell, M. and Pavitt, K. (1993). "Accumulating Technological Capability in Developing Countries." *The World Bank Economic Review*: 257-282.

Bellak, C. (2004). "How Domestic and Foreign Firms Differ and Why Does It Matter?" *Journal of Economic Surveys* 18(4): 483-514.

Bellak, C. and Cantwell, J. (1996). "Foreign direct investment: how much is it worth? Comment on S. J. Gray and A. M. Rugman." *Transnational Corporations* 5(1): 85-97.

Bende-Nabende, A. (2002). "Foreign direct investment determinants in Sub-Sahara Africa: A co-integration analysis." *Economics Bulletin* 6(4): 1-19.

Bende-Nabende, A. and Slater, J. (2003). "Private capital formation: Short- and long-run crowding-in (out) effects in ASEAN, 1971-99." *Economics Bulletin* 3(27): 1-16.

Bende-Nabende, A., Ford, J., Santoso, B. and Sen, S. (2003). "The interaction between FDI, output and the spillover variables: co-integration and VAR analyses for APEC, 1965-1999." *Applied Economics Letters* 10(3): 165-172.

Bengoa, M and Sanchez-Robles, B. (2003). Does foreign direct investment promote economic growth? Recent Evidence from Latin America. *Paper presented at the Universidad de Cantabria,* 2003.

Bengoa, M. and Sanchez-Robles, B. (2005). "Policy shocks as a source of endogenous growth." *Journal of Policy Modeling* 27: 249-261.

Benhabib, J. and Jovanovic, B. (1991). "Externalities and Growth Accounting." *The American Economic Review* 81(1): 82-113.

Benhabib, J. and Spiegel, M. (2002). "The roles of human capital in economic development: evidence from aggregate cross-country data." *Journal of Monetary Economics* 34(2): 143-173.

Bernstein, J. (2000). "Manufacturing, U.S. R&D Spillovers, and Communication Infrastructure." *The Review of Economics and Statistics* 82(4): 608-615.

Berthelemy, J. and Demurger, S. (2000). "Foreign Direct Investment and Economic Growth: Theory and Application to China." *Review of Development Economics* 4(2): 140-155.

Beugelsdijk, S., Smeets, R. and Zwinkels, R. (2008). "The impact of horizontal and vertical FDI on host's country economic growth." *International Business Review* 17: 452-472.

Bhaskara, R. B. (2006). "Time Series Econometrics and Applied Economics: A Methodological Perspective." *Indian Journal of Economics and Business* 5(2): 153-169.

Blalock, G. and Gertler, P. (2008). "Welfare gain from Foreign Direct Investment through technology transfer to local suppliers." *Journal of International Economics* 74: 402-421.

Bleaney, M. F. (1996). "Macroeconomic stability, investment and growth in developing countries." *Journal of Development Economics* 48(2): 461-477.

Blomstrom, M. (1991). Host country Benefits of Foreign Investment. *NBER Working Papers* Series. No. 3615.

Blomstrom, M. (2002). "The Economics of International Investment Incentives." *OECD*: 165-183.

Blomstrom, M. and Kokko, A. (1998). "Multinational Corporations and Spillovers." *Journal of Economic Surveys* 12(2): 1-31.

Blomstrom, M. and Kokko, A. (2001). *FDI and Human Capital: A Research Agenda*. FDI, Human Capital and Education in Developing Countries: Technical Meeting, 13-14 December 2001, Paris, OECD.

Blomstrom, M., Lipsey, R. E. and Zejan, M. (1992). "What Explains Developing Country Growth?" *National Bureau of Economic Research,* NBER Working Paper No. 4132.

Blomstrom, M., Lipsey, R. E. and Zejan, M. (1996). "Is Fixed Investment the Key to Economic Growth?" *The quarterly Journal of Economics* 111(1): 269-276.

Blomstrom, M. and Sjoholm, F. (1999). "Technology transfer and spillovers: Does local participation with multinationals matter?" *European Economic Review* 43: 915- 923.

Blomstrom, M. and Wang, J. (1992). Foreign investment and technology transfer: A simple model. *NBER Working Paper* No. 2958.

Bloodgood, L. (2007). "Inbound and Outbound U.S. Direct Investment with Leading Partner Countries." *Journal of International commerce and Economics*: 1-44.

Blundell, R. and Bond, S. (1998). "Initial conditions and moment restrictions in dynamic panel data models." *Journal of Econometrics* 87(1): 115-43.

Bolton, G. and Katok, E. (1998). "An experimental test of the crowding out hypothesis: The nature of beneficent behaviour." *Journal of Economic Behaviour & Organization* 37: 315-331.

Bond, S. (2002). "Dynamic panel data models: a guide to micro data methods and practice." *Portuguese Economic Journal* 1: 141-162.

Borensztein, E., De Gregorio, J. and Lee, J-W. (1998). "How does foreign direct investment affect economic growth?" *Journal of International Economics* 45: 115-135.

Bornschier, V. (1984). "The Role of MNCs in Economic Growth: Reply to Szymanski." *The Journal of Conflict Resolution* 28(1): 157-164.

Borregaard, N. and Dufey, A (2002). Environmental Effects of Foreign Investment versus Domestic Investment in the Mining Sector in Latin-America. *OECD Global Forum on International Investment, Conference on Foreign Direct Investment and the Environment*.

Borregaard, N., Dufey, A. and Winchester, L. (2008). Effects of Foreign Investment versus Domestic Investment on the Forestry Sector in Latin America (Chile and Brazil) - Demystifying FDI effects related to the Environment. *Working Group Discussion Paper* DP15.

Bosworth, B. and Collins, S. (1999). Capital Inflows, Investment, and Growth. *Tokyo Club Papers*, 12.

Bosworth, B., Collins, S. and Reinhart, C. (1999). "Capital Flows to Developing Economies: Implications for Saving and Investment." *Brookings Papers on Economic Activity* 1999(1): 143-180.

Botman, D. and Diks, C. (2005). The Role of Domestic and Foreign Investors in a Simple Model of Speculative Attacks. *IMF Working Paper*. WP/05/205.

Bouoiyour, J. (2003). The Determining Factors of Foreign Direct Investment in Morocco. France, University de Pau et des Pays de I'Adour.

Bouoiyour, J. and Rey, S. (2005). "Exchange Rate Regime, Real Exchange Rate, Trade Flows and Foreign Direct Investments: The Case of Morocco." *African Development Review* 17(2): 302-334.

Bourgain, A. and Pieretti, P. (2007). "Measuring Technological Spillovers in a Financial Center by using “Feder” Model." *Economics Bulletin* 18(8): 1-9.

Boussemart, J., Briec, W., Cadoret, I. and Tavera, C. (2006). "A re-examination of the technological catching-up hypothesis across OECD industries." *Economic Modelling* 23: 967-977.

Braunerhjelm, P., Oxelheim, L. and Thulin, P. (2005). "The relationship between domestic and outward foreign direct investment: The role of industry-specific effects." *International Business Review* 14: 677-694.

Braunstein, E. and Epstein, G. (2002). Bargaining Power and Foreign Direct Investment in China: Can 1.3 Billion Consumers Tame the Multinationals?, *PERI. Working Paper* No.45.

Brewer, T. (1993). "Government Policies, Market Imperfections, and Foreign Direct Investment." *Journal of International Business Studies* 24(1): 101-120.

Broadman, H. and Sun, X. (1997). The Distribution of Foreign Direct Investment in China. *The World Bank Policy Research Working Paper* No. 1720.

Brooks, C. (2002). *Introductory econometrics for finance*. Cambridge: Cambridge University Press.

Bruggemann, R. and Lukepohl, H. (2004). Practical Problems with Reduced Rank ML Estimators for Cointegration Parameters and a Simple Alternative. European University Institute, Florence and Humboldt University, Berlin.

Butkiewicz, J. and Yanikkaya, H. (2005). "The Effects of IMF and World Bank Lending on Long-run Economic Growth: An Empirical Analysis." *World Development* 33(3): 371-391.

Butkiewicz, J. and Yanikkaya, H. (2008). "Capital Account Openness, International Trade, and Economic Growth: A Cross-Country Empirical Investigation." *Emerging Markets Finance and Trade* 44(2): 15-38.

Campos, N. and Kinoshita, Y. (2002). Foreign Direct Investment as Technology Transferred: Some Panel Evidence from the Transition Economies. *William Davidson Institute*. Working Paper 438.

Caniels, M. and Verspagen, B. (1999). *Spatial distance in a technology gap model*. Maastricht : MERIT, Maastricht Economic Research Institute on Innovation and Technology, 021.

Cantwell, J. and Bellak, C. (1998). "How Important Is Foreign Direct Investment?" *Oxford Bulletin of Economics and Statistics* 60(1): 99-106.

Carkovic, M. and Levine, R. (2002). Does Foreign direct Investment Accelerate Economic Growth?, University of Minnesota, Working Paper.

Castejon, C. and Worz, J. (2006). Good or bad? - The influence of FDI on output growth: An industry-level analysis, *The Vienna Institute for International Economic Studies*, Working Paper No. 38.

Castellacci, F. (2001). A “technology-gap approach to cumulative growth toward an integrated model: Empirical evidence for Spain, 1960-1997. *Paper Presented at Druid Academy Winter Conference. January 18-2, 2001*. Copenhagen.

Castellacci, F. (2002). Technology-gap and cumulative growth: models, results and performances. *Paper Presented at the DRUID Winter Conference. January 17-19, 2002*. Aalborg.

Castellani, D. and Zanfei, A. (2005). "Technology Gaps, Absorptive Capacity and the Impact of Inward Investments on Productivity of European firms." *Economics of Innovation and New Technology* 12(6): 1-24.

Castellani, D. and Zanfei, A. (2007). "Multinational companies and productivity spillovers: is there a specification error?" *Applied Economics Letters* 14 (14): 1047- 1051.

Caves, R. (1971). "International Corporations: The Industrial Economics of Foreign Investment." *Economica* 38(149): 1-27.

Caves, R. (1974). "Multinational Firms, Competition, and Productivity in Host-Country Markets." *Economica* 41(162): 176- 193.

Chakraborty, C. and Basu, P. (2002). "Foreign direct investment and growth in India: a cointegration approach." *Applied Economics* 34: 1061-1073.

Chakraborty, C. and Nunnenkamp, P. (2006). Economic Reforms, Foreign Direct Investment and its Economic Effects in India. *The Kiel Institute for the World Economy*. Kiel working Paper No. 1272

Chanda, A. (2005). "The influence of capital controls on long run growth: Where and how much?" *Journal of Development Economics* 77: 441-466.

Chang, S. J. and Xu, D. (2008). "Spillovers and Competition among Foreign and Local Firms in China." *Strategic Management Journal* 29: 495-518.

Changyuan, L. (2007). "FDI, domestic capital and economic growth: Evidence from panel data at China’s provincial level." *Frontiers of Economics in China* 2(1): 92-113.

Chari, V. (2004). "Discussion of Growth and Foreign Direct Investment: Does Policy Play a Role?" *American Journal of Agricultural Economics* 86(3): 802-804.

Checchi, D., De Simone, G. and Faini, R. (2007). Skilled Migration, FDI and Human Capital Investment. *The Institute for the Study of Labour (IZA) Discussion Paper* No.2795.

Chen, Z. and Song, S. (2008). "Efficiency and technology gap in China's agriculture: A regional meta-frontier analysis " *China Economic Review* 19(2): 287-296.

Cheng, L. K., Qiu, L. D. and Tan, G. (1999). Technology Transfer, Foreign Direct Investment and International Trade. *Econometric Society World Congress 2000 Contributed Papers*, 1777.

Chinn, M. and Ito, H. (2005). "What matters for Financial Development? Capital Controls, Institutions, and Interactions." *National Bureau of Economic Research* (Working Paper 11370).

Choe, J. (2003). "Do Foreign Direct Investment and Gross Domestic Investment Promote Economic Growth?" *Review of Development Economics* 7(1): 44-57.

Chowdhury, A. and Mavrotas, G. (2006). "FDI and Growth: What Causes What? ." *The World Economy* 29(1): 9-19.

Christiansen, H., Oman, C. and Charlton, A. (2003). Incentives-based Competition for Foreign Direct Investment: The Case of Brazil. *Organisation for Economic Co-operation and Development (OECD)*. Working Papers on International Investment.

Chuang, Y. and Hsu, P. (2004). "FDI, trade, and spillover efficiency: evidence from China's manufacturing sector." *Applied Economics* 36(10): 1103-1115.

Chudnovsky, D. and Lopez, A. (2008). Foreign Investment and Sustainable Development in Argentina. *Working Group Discussion Paper DP12*.

Chung, W. (2001). "Identifying Technology Transfer in Foreign Direct Investment: Influence of Industry Conditions and Investing Firm Motives." *Journal of International Business Studies* 32(2): 211-229.

Clemes, M., Arifa, A. and Gani, A. (2003). "An Empirical Investigation of the Spillover Effects of Services and Manufacturing Sectors in ASEAN Countries." *Asia-Pacific Development Journal* 10(2): 29-40.

Coe, D.T., Helpman, E. and Hoffmaister, A. W. (1997). "North-South R&D Spillovers." *The Economic Journal* 107(440): 134-149.

Coelho, B. and Gallagher, K. P. (2010). "Capital Controls and 21st Century Financial Crises: Evidence from Colombia and Thailand " *PERI Working Paper No.213*.

Colen, L., Maertens, M. and Swinnen, J. (2008). Foreign Direct Investment as an Engine for Economic Growth and Human Development: A Review of the Arguments and Empirical Evidence. *IAP P6/06*. Working Paper No.16.

Cornwall, J. (1976). "Diffusion, Convergence and Kaldor's Laws." *The Economic Journal* 86(342): 307-314.

Coughlin, C. and Segev, E. (1999). Foreign Direct Investment in China: A Spatial Econometric Study. *Federal Reserve Bank of St. Louis, Working Paper* 1999-001A.

Cuadros, A., Orts, V. and Alguacil, M. (2004). "Openness and Growth: Re-Examining Foreign Direct Investment, Trade and Output Linkages in Latin America " *Journal of Development Studies* 40(4): 167-192.

Damijan, J., Knell, M., Majcen, B. and Rojec, M. (2003). Technology Transfer through FDI in Top-10 Transition Countries: How Important are Direct Effects, Horizontal and Vertical Spillovers? *William Davidson Working Paper* Number 549.

Davidson, R. and Mackinnon, J. (1993). *Estimation and Inference in Econometrics*. New York, Oxford: Oxford University Press.

De Gregorio, J. (1992). "Economic growth in Latin America." *Journal of Development Economics* 39: 59-84.

De Jager, J. (2004). Exogenous and Endogenous Growth, University of Pretoria ETD.

De long, J. and Summers, L. (1991). "Equipment Investment and Economic Growth." *The Quarterly Journal of Economics* 106(2): 445-502.

De Mello, J. (1995). "Vintage Capital Accumulation: Endogenous Growth Conditions." *Journal of Macroeconomics* 17(4): 703-716.

De Mello, J. (1997). "Foreign direct investment in developing countries and growth: A selective survey." *Journal of Development Studies* 34(1): 1-34.

De Mello, J. (1999). "Foreign direct investment- led growth: evidence from time series and panel data." *Oxford Economic Papers* 51(1): 133-151.

De Vita, G. and Kyaw, K. (2009). "Growth effect of FDI and portfolio investment flows to developing countries: a disaggregated analysis by income levels." *Applied Economics Letters* 16(3): 277-283.

Del Toro, G. E. (1996). *Foreign Direct Investment in Mexico and the 1994 Crisis: a Legal Perspective*. MSc Economics Dissertation. Institute of Comparative Law. Montreal, Quebec, McGill University.

Deme, M. and Graddy, D. (2006). "Trade, foreign direct investment, and endogenous growth: an empirical investigation." *Indian Journal of Economics and Business* 5(2): 289-300.

Desai, M. A., Foley, C. F. and Hines, J. Jr. (2005). "Foreign direct investment and domestic economic activity." *National Bureau of Economic Research. Working Paper Series* No. 11717: 1-[41].

Desai, M. A., Foley, C. F. and Hines, J. Jr. (2005). "Foreign direct investment and the domestic capital stock." *American Economic Review, Papers and Proceedings* 95(2): 33-38.

Desai, M. A., Foley, C. F. and Hines Jr, J. R (2006). "Capital Controls, Liberalizations, and Foreign direct Investment." *The Review of Financial Studies* 19(4): 1434-1464.

Dhakal, D., Rahman, S. and Upadhyaya, K. (2007). “Foreign Direct Investment and Economic Growth in Asia” *Indian Journal of Economics and Business* 6(1): 15-26.

Dickey, D. and Fuller, W. (1979). "Distribution of the Estimators for Autoregressive Time Series With a Unit Root." *Journal of the American Statistical Association* 74(366): 427-431.

Dickey, D. and Fuller, W. (1981). "Likelihood Ratio Statistics for Autoregressive Time Series with a Unit root." *Econometrica* 49(4): 1057-1072.

Dicks-Mireaux, L., Mecagni, M. and Schadler, S. (2000). "Evaluating the effect of IMF lending to low-income countries." *Journal of Development Economics* 61: 495-526.

Djankov, S. and Hoekman, B. (2000). "Foreign Investment and Productivity Growth in Czech Enterprises." *The World Bank Economic Review* 14(1): 49- 64.

Dollar, D. (1992). "Outward-Oriented Developing Economies Really Do Grow More Rapidly: Evidence from 95 LDCs, 1976-1985." *Economic Development and Culture change* 40(3): 523-544.

Dooley, M. (1995). A Survey of Academic Literature on Controls over International Capital Transactions. *National Bureau of Economic Research*. NBER working Papers, No.5352.

Dosi, G. (1982). "Technological paradigms and technological trajectories." *Research Policy* 11: 147-162.

Dowling, M. and Hiemenz, U. (1982). Aid, Savings and Growth in the Asian Region. *Asian Development Bank*. 3, Economic Office Report Series.

Driffield, N. and Hughes, D. (2003). "Foreign and Domestic Investment: Regional Development or Crowding Out?" *Regional Studies* 37(3): 277-288.

Driffield, N. and Love, J. (2007). "Linking FDI motivation and host economy productivity effects: conceptual and empirical analysis." *Journal of International Business Studies* 38: 460-473.

Driffield, N. and Love, J. H. (2003). "Foreign Direct Investment, Technology Sourcing and Reverse Spillovers." *The Manchester School* 71(6): 659-872.

Driffield, N., Munday, M. and Roberts, A. (2002). "Foreign Direct Investment, Transactions Linkages, and the Performance of the Domestic Sector." *Int. J. of the Economics of Business* 9(3): 335-351.

Dunning, J. (1980). "Toward an Eclectic Theory of International Production: Some Empirical Tests." *Journal of International Business Studies* 11(1): 9-31.

Dunning, J. (1988). "The Eclectic Paradigm of International Production: A Restatement and Some Possible Extensions." *Journal of International Business Studies* 19(1): 1-31.

Dunning, J. and Rugman, A. (1985). "The Influence of Hymer's Dissertation on the Theory of Foreign Direct Investment." *The American Economic Review* 75(2): 228-232.

Dupasquier, C. and Osakwe, N. (2005). "Foreign direct Investment in Africa: Performance, Challenges and Responsibilities." *African Trade Policy Centre, Work in Progress No.21*.

Durham, J. (2003). Foreign Portfolio Investment, Foreign Bank Lending, and Economic Growth, Board of Governors of the Federal Reserve System. *International Finance Discussion Papers* 757.

Durham, J. (2004). "Absorptive capacity and the effects of foreign direct investment and equity foreign portfolio investment on economic growth." *European Economic Review* 48: 285-306.

Easterly, W. (1993). "How much do distortions affect growth?" *Journal of Monetary Economics* 32: 187-212.

Economic Commission for Africa, ECA (2006). Capital Flows and Development Financing in Africa, ECA Publications and Conference Management Division (PCMS).

Edison, H., Levine, R., Ricci, L. and Slok, T. (2002). International Financial Integration and Economic Growth. *International Monetary Fund. IMF* Working Paper 02/145.

Edwards, S. (1998). "Openness, Productivity and Growth: What do we Really Know?" *The Economic Journal* 108(447): 383-398.

Edwards, S. (2000). *Capital Flows and Economic Performance: Are Emerging Economies different?*, University of California, Los Angeles.

El-Mikawy, N. (2003). Institutional Reform in Egypt. *Institutional Reform and Economic Development in Egypt*. El-Makawy, N. and Handoussa, H. Cairo, American University Press.

El Mahdy, A., Louis, M. and Handoussa, H. (2003). Survey of Foreign Investment Firms in Egypt. London Business School, *DRC* Working Papers No. 3.

Elfakhani, S. and Matar, L. (2007). "Foreign direct investment in the Middle East and North Africa region." *J. Global Business Advancement* 1(1): 49-70.

Elkins, Z., Guzman, A. and Simmons, A. (2006). "Competing for Capital: The Diffusion of Bilateral Investment Treaties, 1960–2000." *International Organization* 60: 811-846.

Elmawazini, K., Manga, P. and Saadi, S. (2008). "Multinational Enterprises, Technology Diffusion, and Host Country Absorptive Capacity: A Note." *Global Economic Review* 37(3): 379-386.

Elmawazini, K. and Saadi, S. (2006). Technology Gap, Human Capital and Multinational Enterprises: Evidence from Country-Level Panel Data. *Paper Presented at the 6th Global Conference on Business & Economics. October 15-17, 2006.* Gutman Conference Centre, USA.

Emde, M. (1999). "An analysis of the effects of MNCs on India since liberalization." *Saskatchewan Economic Journal*: 2nd edition.

Enders, W. (1995). *Applied Econometric Time series*. New York: John Wiley & sons.

Engelbrecht, H. (2003). "Human Capital and Economic Growth: Cross-Section Evidence for OECD Countries." *The Economic Record* 79(Special Issue, June): S40-S51.

Engle, R. and Granger, C. (1987). "Co-Integration and Error Correction: Representation, Estimation, and Testing." *Econometrica* 55(2): 251-276.

Engle, R., Hendry, D. and Richard, J. (1983). "Exogeneity." *Econometrica* 51(2): 277-304.

Ericsson, N. and MacKinnon, J. (2002). "Distributions of error correction tests for cointegration." *Econometrics Journal* 5: 285-318.

Esaka, T. (2010). "Exchange rate regimes, capital controls, and currency crises: Does the bipolar view hold?" *Journal of International Financial Markets, Institutions & Money* 20: 91-108.

Escot, L. and Galindo, M. (2000). "International Capital Flows and Convergence in the Neoclassical Growth Model." *IAER* 6(3): 451-460.

Evans, K. (2002). Foreign Portfolio and Direct Investment: Complementarity, Differences, and Integration. *Paper Presented at the Global Forum on International Investment: Attracting Foreign Direct Investment for Development, 5-6 December 2002*. Shanghai, OECD.

Faber, B. (2006). Economic Growth of Developing Countries: Is Foreign Direct Investment Really Necessary?, Law of Nation building, Working Paper December 2006.

Fagerberg, J. (1987). "A technology gap approach to why growth rates differ." *Research Policy* 16(2-4): 87-99.

Fagerberg, J. (1994). "Technology and International Differences in Growth Rates." *Journal of Economic Literature* 32(3): 1147-1175.

Fagerberg, J. and Verspagen, B. (2001). Technology-Gaps, Innovation-Diffusion And Transformation: An Evolutionary Interpretation. Centre for Technology, Innovation and Culture, University of Oslo. Working Papers 11.

Fan, E. (2002). Technological Spillovers from Foreign Direct Investment- A Survey. Asian Development Bank (ADB). *ERD* Working Paper Series No. 33.

Fedderke, J. and Romm, A. (2006). "Growth impact and determinants of foreign direct investment into South Africa, 1956–2003." *Economic Modelling* 23(5): 738-760.

Feldstein, M. and Horioka, C. (1980). "Domestic Saving and International Capital Flows." *The Economic Journal* 90(358): 314-329.

Findlay, R. (1978). "Relative Backwardness, Direct Foreign Investment, and the Transfer of Technology: A Simple Dynamic Model." *The Quarterly Journal of Economics* 92(1): 1-16.

Fine, B. (2000). "Endogenous growth theory: a critical assessment." *Cambridge Journal of Economics* 24: 245-265.

Fink, P. (2006). "FDI-led growth and rising polarisations in Hungary: Quantity at the expense of quality." *New Political Economy* 11(1): 47-72.

Fischer, S. (2002). "Breaking Out of the Third World: India's Economic Imperative." Obtained through the Internet: *http://www.imf.org/external/np/speeches/2002/012202.htm*, [accessed 09/12/2009].

Ford, T. C., Rork, J. C. and Elmslie, B. T (2008). "Foreign Direct Investment, Economic Growth, and the Human Capital Threshold: Evidence from US States." *Review of International Economics* 16(1): 96-113.

Fortanier, F. (2007). "Foreign direct investment and host country economic growth: Does the investor's country of origin play a role?" *Transnational Corporations* 16(2): 41-76.

Fosu, Oteng-Abayie, E. and Magnus, F. J. (2006). "Bounds Testing Approach to Cointegration: An Examination of Foreign Direct Investment Trade and Growth Relationships." *American Journal of Applied Sciences* 3(11): 2079-2085.

Francis, M. (2003). UNCTAD *World Investment Report 2002*: Transnational Corporations and Export Competitiveness. Obtained through the Internet: http://www.ideaswebsite.org/doc/jan2003/UNCTAD.pdf., [accessed 15/11/2009].

Frankel, J. and Romer, D. (1999). "Does Trade Cause Growth?" *The American Economic Review* 89(3): 379-399.

Frimpong, J. and Oteng-Abayie, E. (2006). Bivariate causality analysis between FDI inflows and economic growth in Ghana, *MPRA* Paper No. 351.

Fry, M. (1993). Foreign Direct Investment in a Macroeconomic Framework: Finance, Efficiency, Incentives, and Distortions. International Economics Department, The World Bank. *WPS* 1141.

Fuat, S. (2007). "Cointegration and Causality among Foreign Direct Investment in Tourism Sector, GDP, and Exchange Rate Volatility in Turkey." *The Empirical Economics Letters* 6(1): 53-58.

Fukao, K. (2007). The Performance of Foreign Firms and the Macroeconomic Impact of FDI. *Center for Economic Institutions*. Working Paper Series, No.2007-4.

Gallagher, K. P. and Lopez, A. (2008). Foreign Investment and Sustainable Development: lessons from the Americas: Executive Summary. *Working Group on Development and the Environment in the Americas* 5-7.

Gallagher, K. P. and Zarsky, L. (2004). Sustainable Industrial Development? The Performance of Mexico's FDI-led Integration Strategy, The Global Development and Environment Institute (G-DAE) at Tufts University.

Gao, T. and Eshaghoff, T. (2004). "MNCs' Preferred Responses to the Argentine Financial Crisis: A Classification and Empirical Investigation." *Latin American Business Review* 5(1): 23-44.

Gattai, V. (2005). From the Theory of the Firm to FDI and Internalisation: A Survey. Fondazione Eni Enrico Mattei. Nota Dilavoro 51.2005.

Ghali, K. (1999). "Government size and economic growth: Evidence from a multivariate cointegration analysis." *Applied Economics* 31(8): 975-987.

Ghali, S. and Rezgui, S. (2006). FDI Contribution to Technical Efficiency in the Tunisian Manufacturing Sector. Tunisia, Faculté des Sciences Economiques et de Gestion de Tunis, Université de Tunis.

Gholami, R., Lee, S. T. and Heshmati, A. (2006). "The Causal Relationship between Information and Communication Technology and Foreign direct Investment." *World Economy* 29(1): 43-62.

Ghose, A. K. (2004). Capital inflows and investment in developing countries, Employment Analysis Unit. *Paper Presented at the Employment Strategy Department 2004/11*.

Girma, S. (2005). "Absorptive Capacity and Productivity Spillovers from FDI: A Threshold Regression Analysis." *Oxford Bulletin of Economics & Statistics* 67(3): 281-306.

Girma, S., Gorg, H. and Pisu, M. (2008). "Exporting Linkages and Productivity Spillovers From Foreign Direct Investment." *Canadian Journal of Economics* 41(1): 320-340.

Glass, A. and Saggi, K. (1999). FDI Selection: Crowding Out and Distributional Effects, *OSU* Working Paper No. 99-03.

Globerman, S. and Shapiro, D. (1999). "The Impact of Government Policies on Foreign Direct Investment: The Canadian Experience." *Journal of International Business Studies* 30(3): 513-532.

Goldberg, L. and Klein, M. (1997). Foreign Direct Investment, Trade and Real Exchange Rate Linkages in Southeast Asia and Latin America. *NBER* Working Paper Series. Working Paper 6344.

Gopinath, M. and Echeverria, R. (2004). "Does Economic Development Impact The Foreign Direct Investment-Trade Relationship? A Gravity-Model Approach." *American Journal of Agricultural Economics* 86(3): 782-787.

Gorg, H. and Greenaway, D. (2003). Much Ado About Nothing? Do Domestic Firms Really Benefit from Foreign Direct Investment?, *IZA.* Discussion Paper No. 944.

Gourinchas, P. and Jeanne, O. (2007). "Capital Flows to Developing Countries: The Allocation Puzzle." *National Bureau of Economic Research* Working Paper No. 13602.

Graham, E. and Wada, E. (2001). Foreign Direct Investment in China: Effects on Growth and Economic Performance. *Institute for International Economics Working Paper No. 01-03*.

Granger, C. (1969). "Investigating Causal Relations by Econometric Models and Cross-spectral Methods." *Econometrica* 37(3): 424-438.

Granger, C. (1997). "On Modelling the Long Run in Applied Economics." *The Economic Journal* 107: 169-177.

Greenaway, D., Sousa, N. and Wakelin, K. (2004). "Do domestic firms learn to export from multinationals?" *European Journal of Political Economy* 20: 1027-1043.

Greene, W. (2003). *Econometric Analysis,* New Jersey Upper Saddke River.

Greunz, L. (2001). European regional growth, technology gap and R&D efforts. *Paper Presented at the European Regional Science Association conference, 29 August -1 September 2001*. Zagreb.

Grier, B. and Tullock, G. (1989). "An empirical analysis of cross- national economic growth, 1951-1980." *Journal of Monetary Economics* 24(2): 259-276.

Grilli, V. and Milesi-Ferretti, G. (1995). "Economic Effects and Structural Determinants of Capital Controls." *IMF Staff Papers* 42(3): 517-551.

Grosse, R. and Trevino, L. (1996)."Foreign Direct Investment in the United States: An Analysis by Country of Origin." *Journal of International Business Studies* 27 (1): 139-155.

Grossman, G. and Helpman, E. (1989a). Comparative Advantage and Long-run Growth, *NHER* Working Paper Series No. 2809.

Grossman, G. and Helpman, E. (1989b). Endogenous Product Cycles, *NEER* Working Paper Series No.2913.

Grossman, G. and Helpman, E. (1990). Product Development and International Trade. *NBER*, Working Paper Series. w2540.

Grossman, G. and Helpman, E. (1994). "Endogenous Innovation in the Theory of Growth " *Journal of Economic Perspectives, American Economic Association* 8(1): 23-44.

Gruben, W. and Mcleod, D. (1998). "Capital Flows, Savings, and Growth in the 1990s." *The Quarterly Review of Economics and Finance* 38(3): 287-301.

Gujarati, D. (2004). *Basic Econometrics*, the McGraw-Hill.

Haaparanta, P. (1996). "Competition for foreign direct investment." *Journal of Public economics* 63(1): 141-153.

Habib, M. and Zurawicki, L. (2002). "Corruption and Foreign Direct Investment." *Journal of International Business Studies* 33(2): 291-307.

Haddad, M. and Harrison, A. (1993). "Are there positive spillovers from direct foreign investment? Evidence from panel data for Morocco." *Journal of Development Economics* 42: 51-47.

Hagen, J. and Zhou, J. (2008). "The interaction between capital controls and exchange rate regimes: evidence from developing countries." *International Economic Journal* 22(2): 163-185.

Hahn, J. and Hausman, J. (2002). "A New Specification Test for the Validity of Instrumental Variables." *Econometrica* 70(1): 163-189.

Hakro, A. and Ghumro, A. (2007). Foreign Direct Investment, Determinants and Policy Analysis: Case Study of Pakistan, Department of Economics, University of Glasgow. Working Papers 2007-04.

Hamilton, J. and Monteagudo, J. (1998). "The augmented Solow model and the productivity slowdown." *Journal of Monetary Economics* 42: 495-509.

Hansen, H. and Rand, J. (2006). "On the Causal Links between FDI and Growth in Developing Countries." *The World Economy* 29(1): 21-41.

Harris, R. and Sollis, R. (2003). *Applied Time Series Modeling and Forecasting*, John Wiley & Sons, Chichester, UK.

Harrison, A. and Revenga, A. (1995). The effects of Trade Policy Reform: What Do We Really Know? *National Bureau of Economic research*, NBER Working Paper no. 5225, , Cambridge, Massachusetts.

Harvie, C. and Pahlavani, M. (2007). "Sources of Economic Growth in South Korea: An Application of the ARDL Analysis in the Presence of Structural Breaks - 1980-2005 " *The Journal of the Korean Economy* 8(2): 205-235.

Haskel, J., Pereira, S. and Slaughter, M. (2007). "Does Inward FDI boost the Productivity of Domestic Firms?" *The Review of Economics and Statistics* 89(3): 482-496.

Haug, A. (1996). "Tests for cointegration: A Monte Carlo comparison." *Journal of Econometrics* 71: 89-115.

Hausman, J. (1978). "Specification Tests in Econometrics." *Econometrics* 46(6): 1251-1271.

Head, K. and Ries, J. (2004). "Exporting and FDI as Alternative Strategies." *Oxford Review of Economic Policy* 20(3): 409-423.

Hecht, Y., Razin, A. and Shinar, N. (2002). Interactions between Capital Inflows and Domestic Investment: International Panel Data, Economics Department, Tel-Aviv University.

Hecht, Y., Razin, A. and Shinar, N. (2004). "Interactions between Capital Inflows and Domestic Investment: Israel and Developing Economies." *Israel Economic Review* 2(2): 1-14.

Hejazi, W. and Pauly, P. (2003). "Motivations for FDI and Domestic Capital Formation." *Journal of International Business Studies* 34(3): 282-289.

Hejazi, W. and Safarian, A. (1999). "Trade, Foreign Direct Investment, and R&D Spillovers." *Journal of International Business Studies* 30(3): 491-511.

Helpman, E. (1988). Growth, Technological Progress, and Trade. *National Bureau of Economic Research*, NBER Working Paper Series, No.2592.

Hendry, D. (2011). "On adding over-identifying instrumental variables to simultaneous equations." *Economics Letters* 111: 68-70.

Hermes, N. and Lensink, R. (2003). "Foreign direct investment, financial development and economic growth." *Journal of Development Studies* 40(1): 142-163.

Herzer, D., Klasen, S. and Nowak-Lehmann D, F. (2008). "In search of FDI-led growth in developing countries: The way forward." *Economic Modelling* 25(5): 793-810.

Hiratuka, C. (2008). Foreign Direct Investment and Transnational Corporations in Brazil: Recent Trends and Impacts on Economic Development. *Working Group Discussion Paper DP10*.

Ho, S., Kauffman, R. and Liang, T. (2007). "A growth theory perspective on B2C e-commerce growth in Europe: An Exploratory study." *Electronic Commerce Research and Applications* 6: 237-259.

Holmes, K., Feulner, E. and O'Grady, M. (2008). Index of Economic Freedom, The Heritage Foundation and The Wall Street Journal.

Holmstrom, B. and Tirole, J. (2002). "Domestic and International Supply of Liquidity." *AER Papers and Proceedings* 92(2): 42-45.

Holtz-Eakin, D., Newey, W. and Rosen, H. (1988). "Estimating Vector Autoregression with Panel Data." *Econometrica* 56(6): 1371-1395.

Hong, S. and Gray, S. (2003). "Attracting FDI to the Republic of Korea: foreign affiliates satisfaction with government policies." *Transnational Corporations* 12(1): 107-128.

Hosseini, H. (2005). "An economic theory of FDI: A behavioural economics and historical approach." *The Journal of Socio-Economics* 34: 528-541.

Huang, H. and Xu, C. (1999). "Institutions, Innovations, and Growth." *The American Economic Review* 89(2): 438-444.

Hubler, M. (2009). Avoiding the Trap: The Dynamic Interaction of North-South Capital Mobility and Technology Diffusion. *Kiel Institute for the World Economy*, Kiel Working Paper No. 1477. Germany.

Hymer, S. (1970). "The Efficiency (Contradictions) of Multinational Corporations." *The American Economic Review* 60(2): 441-448.

Ihrig, J. (2005). "The Influence of Technology on Foreign Direct Investment." *American Economic Review* 95(2): 309-313.

Im, K. S., Pesaran, M. H. and Shin, Y. (2003)."Testing for Unit Roots in Heterogeneous Panel." Journal of Economics 115 (1): 53-74.

Inada, K. (1966). "Investment in Fixed Capital and the Stability of Growth Equilibrium." *The Review of Economic Studies* 33(1): 19-30.

Islam, N. (1995). "Growth Empirics: A Panel Data Approach." *The Quarterly Journal of Economics* 110(4): 1127-1170.

Iyer, K., Rambaldi, A. and Tang, K (2006). Technology Gap, catching-up and Outward Orientation. *Paper Presented at the Australasian Econometric Society Alic Springs Convention between 5th and 7th July, 2006*. Australia.

Jackson, S and Markowski, S. (1995). "The attractiveness of countries to foreign direct investment " *Journal of World Trade* 29: 159-180.

Jacobson, C. and Lindberg, S. (2005). An Evaluation of the Offshore Regime in Tunisia. *MFS, Ekonomi Hogskolan*, Lunds Universitet.

Jiang, L., Chen, Q. and Liu, Y. (2010)."FDI and the change of the Chinese culture." *International Journal of Social Economics* 37 (2): 101–118.

Johansen, S. (1988). "Statistical Analysis of Cointegration Vectors." *Journal of Economic Dynamics and Control* 12: 231-254.

Johansen, S. (1991). "Estimation and Hypothesis Testing of cointegration Vectors in Gaussian Vector Autoregressive Models." *Econometrica* 59(6): 1551-1580.

Johansen, S. (1995). *Likelihood-based inference in cointegrated vector autoregressive models*, Oxford: Oxford University Press.

Johansen, S. and Juselius, K (1990). "Maximum Likelihood Estimation and Inference on Cointegration-With Applications to the Demand for Money." *Oxford Bulletin of Economics & Statistics* 52(2): 170-210.

Johnson, A. (2006). The Effects of FDI Inflows on Host Country Economic Growth. *Royal Institute of Technology, CESIS - Centre of Excellence for Science and Innovation Studies*, Working Paper Series in Economics and Institutions of Innovation 58.

Johnson, P., Durlauf, S. and Temple, J. (2004). *Growth Econometrics*, Vassar College Department of Economics Working Paper Series 61.

Johnston, B. and Tamirisa, N. (1998). "Why Do Countries Use Capital Controls?" *IMF Working Paper No. w/98/181*.

Jonathan, O., Ghosh, A. and Habermeier, K. (2010). "Capital Inflows: The Role of controls." *IMF Working Papers: SPN/10/04*.

Jones, C. (1995). "Time Series Tests of Endogenous Growth Models." *The Quarterly Journal of Economics* 110(2): 495-525.

Jones, C. (1997). Population and Ideas: A Theory of Endogenous Growth. *National Bureau of Economic Research, Inc*, NBER Working Papers 6285.

Jordaan, J. (2005). "Determinants of FDI-induced externalities: New empirical evidence for Mexican manufacturing industries." *World Development* 33(12): 2103-2118.

Joyce, J. and Noy, I. (2005). "The IMF and the Liberalization of Capital Flows." *East-West Center Working Papers* No.84.

Kaminsky, G. (2005). International Capital Flows, Financial Stability and Growth. *DESA Wotrking Paper No. 10*.

Keller, W. (2004). "International Technology Diffusion." *Journal of Economic Literature* XLII: 752-782.

Keshava, S. (2008). "The effect of FDI on India and Chinese economy: A comparative analysis." *Proceedings of the second Singapore international conference on finance*.

Khamfula, Y. (2007). "Foreign Direct Investment and Economic Growth in EP and IS Countries: The Role of Corruption." *The World Economy* 30(12): 1843-1854.

Khan, K. and Leng, K. (1997). "Foreign Direct Investment, Exports and Economic growth in the three little dragons: evidence from cointegration and causality tests." *Singapore Economic Review* 42(2): 40-60.

Kiiza, O. (2007). *The Causal Relationship between Foreign Direct Investment and Economic Growth: Case Study of Uganda*. MSc Thesis. School of Management, Cranfield University.

Kim, D. D. and Seo, J. (2003). "Does FDI inflow crowd out domestic investment in Korea?" *Journal of Economic Studies* 30: 605-622.

Kim, J. (1999). Inward foreign direct Investment Regime and some evidences of Spillover effects in Korea. *Korea Institute for International Economic Policy (KIEP)*. Working Paper 99-09.

Kim, J. (2003). Inward Foreign Direct Investment into Korea: Recent Performance and Future Agenda. *Korea Institute for International Economic Policy (KIEP)*. Discussion Paper 03-01.

Kim, J. and Hwang, S. (1998). The role of foreign direct investment in Korea's economic development: productivity effects and implications for the currency crisis. *KIEP Working Paper* 98-04.

Kim, S. (1999). Attracting Foreign Direct Investment: Prospects and Policy Implications. *Korean Development Institute (KDI),* Korea.

Kim, S. and Yang, D. (2008). The Impact of Capital Inflows on Emerging East Asian Economies: Is Too Much Money Chasing Too Little Good? *Asian Development Bank. Working Paper Series on Regional Economic Integration*, No. 15.

King, R. and Levine, R. (1993). "Finance and Growth: Schumpeter Might Be Right." *The Quarterly Journal of Economics* 108(3): 717-737.

Kinishita, Y. and Lu, C. (2006). On the Role of Absorptive Capacity: FDI Matters to Growth. *IEAS Working Paper*, No. 06-A006.

Kitamura, Y. (1998). "Likelihood-Based Inference in Cointegrated Vector Autoregressive Models." *Econometric Theory* 14(4): 517-524.

Kobrin, S. (2005). "The determinants of liberalization of FDI policy in developing countries: a cross-sectional analysis, 1992-2001." *Transnational Corporations* 14(1): 67-103.

Kogut, B. and Singh, H. (1988)."The Effect of National Culture on the Choice of Entry Mode." *Journal of International Business Studies* 19 (3): 411-432.

Kohpaiboon, A. (2006). "Foreign Direct Investment and Technology Spillover: A Cross-Industry Analysis of Thai Manufacturing." *World Development* 34(3): 541-556.

Kokko, A. (1994). "Technology, market characteristics, and spillovers." *Journal of Development Economics* 43: 279-293.

Kokko, A. (1996). "Productivity Spillovers from Competition between Local Firms and Foreign Affiliates." *Journal of International Development* 8(4): 517-530.

Kolstad, I. and Villanger, E. (2004). How does social development affect FDI and domestic investment?, Chr. Michelsen Institute. Development Studies and Human Rights.

Konings, J. (2001). "The effects of foreign direct investment on domestic firms: Evidence from firm-level panel data in emerging economies." *Economics of Transition* 9(3): 619-633.

Kormendi, R. and Meguire, P. (1985). "Macroeconomic determinants of growth: Cross-country evidence." *Journal of Monetary Economics* 16(2): 141-163.

Kose, M., Meredith, G. and Towe, C. (2004). How Has NAFTA Affected the Mexican Economy? Review and Evidence. *IMF Working Paper*, WP/04/59.

Kosova, R. and Ayyagari, M. (2008) Does FDI facilitate Domestic Entry? Evidence from the Czech Republic. Obtained through the Internet: *http://ssrn.com/abstract=891781*, [accessed 23/08/2010].

Kottaridi, C. (2005). "The 'core-periphery' pattern of FDI-led growth and production structure in the EU." *Applied Economics* 37(1): 99-113.

Kozhan, R. (2009). *Financial Econometrics- with Eviews*, APS: Ventus Publishing.

Kremers, M., Ericsson, N. and Dolado, J. (1992). "The Power of Cointegration Tests." *Oxford Bulletin of Economics & Statistics* 54(3): 325-348.

Krogstrup, S. and Matar, L. (2005). "Foreign Direct Investment, Absorptive Capacity and Growth in the Arab World." *Economics* HEI Working Paper no.02.

Krugman, P. (2000). Fire-Sale FDI. *Capital Flows and the Emerging Economies: Theory, Evidence, and Controversies*. Sebastian Edwards, editor. University of Chicago Press**:** 43- 60.

Kugler, M. (2006). "Spillovers from foreign direct investment: Within or between industries?" *Journal of Development Economics* 80: 444-477.

Kumar, N. (1995). Industrialization, Liberalization and Two Way Flows of Foreign Direct Investments: The Case of India. *Discussion Paper series No. 9504*, The United Nations University, INTECH.

Kumar, N. and Pradhan, J. P. (2002). Foreign Direct Investment, Externalities and Economic Growth in Developing Countries: Some Empirical Explorations and Implications for WTO Negotiations on Investment. *Research and Information System for the Non-Aligned and Other Developing Countries*, RIS DISCUSSION PAPERS 27.

Kumar, R. (2003). "Changing Role of the Public Sector in the Promotion of Foreign Direct Investment." *Asia-Pacific Development Journal* 10(2): 1-27.

Kwon, O. (2004). "Causes for Sluggish Foreign Direct Investment in Korea: A Foreign Perspective." *The Journal of the Korean Economy* 5(1): 69-96.

Kyaw, S. (2003). Foreign Direct Investment to Developing Countries in the Globalised World. *Paper Presented at the DSA Conference 2003*. University of Strathclyde and Glasgow, 10-12 September, 2003.

Kyaw, S. and Macdonald, R. (2009). "Capital Flows and Growth in Developing Countries: A Dynamic Panel Data Analysis." *Oxford Development Studies* 37(2): 101-122.

Lall, S. (1978). "Transnationals, Domestic Enterprises, and Industrial Structure in Host LDCs: A Survey." *Oxford Economic Papers* 30(2): 217-248.

Lean, H. (2008). "The Impact of Foreign Direct Investment on the Growth of the Manufacturing Sector in Malaysia." *International Applied Economics and Management Letters* 1(1): 41-45.

Lensik, R., Oliver, M. and Osei, R. (1999). The Impact of Uncertain Capital Flows on Economic Growth in Developing Countries: An Empirical Analysis for the 1999's. *Paper Presented at the University of Groningen, Netherlands*.

Leon-Ledesma, M. (1999). "Accumulation, Innovation and Catching-up: an Extended Cumulative Growth Model." *Cambridge Journal of Economics* forthcoming: 1-28.

Levin, A. and Lin, C. (1992). *Unit Root Test in Panel Data: Asymptotic and finite Sample Properties*, Discussion Paper 92-93, University of California at San Diego.

Levine, R. and Renelt, D. (1992). "A Sensitivity Analysis of Cross-Country Growth Regressions." *The American Economic Review* 82(4): 942-963.

Levine, R. and Zervos, S. (1996). Stock Market Development and Long-Run Growth. *The World Bank Policy Research*, Working Paper 1582.

Li, J. (2008). "Asymmetric Interactions between Foreign and Domestic Banks: Effects on Market Entry." *Strategic Management Journal* 29: 873-893.

Li, W. (1998). *The Development of Foreign Direct Investment in a Rapidly Growing Economy: The Case of China as of 1979*. MSc Economics Dissertation: 125. International Development Studies, Saint Mary's University, Nova Scotia, Canada.

Li, X. (2005). *Foreign Direct Investment and Economic Development: An Interactive relationship*. PhD thesis. Aston University, UK.

Li, X. and Liu, X. (2005). "Foreign Direct Investment and Economic Growth: An Increasingly Endogenous Relationship." *World Development* 33(3): 393-407.

Lileeva, A. (2006). The Benefits to Domestically-Controlled Plants from Inward direct Investment- the Role of Vertical Linkages. *Statistics Canada* - Catalogue no. 11-622-MIE, no. 010.

Lim, E. (2001). Determinants of, and the Relation Between, Foreign Direct Investment and Growth: A Summary of the Recent Literature. *International Monetary Fund Policy Working Paper*. WP/01/75.

Lim, L. and McAleer, M. (2002). "Economic growth and technological catching up by Singapore to the USA." *Mathematics and Computers in Simulation* 59(1-3): 133-141.

Lin, H. and Chuang, W. (2007). "FDI and Domestic Investment in Taiwan: An Endogenous Switching Model." *The Developing Economies* XLV-4: 465-490.

Lindbeck, A. (1983). "The Recent Slowdown of Productivity Growth." *The Economic Journal* 93(369): 13-34.

Lipsey, R. E. (2002). Home and Host Country Effects of FDI. *National Bureau of Economic Research*. Working Paper No. 9293.

Lipsey, R. E. (2000). Interpreting Developed Countries' Foreign Direct Investment. *National Bureau of Economic Research.* Working Paper No.7810.

Lipsey, R. E. (2001). "Foreign Direct Investment and the Operations of Multinational Firms: Concepts, History, and Data." *National Bureau of Economic Research* Working Paper No.8665.

Liu, X., Burridge, P. and Sinclair, P. (2002). "Relationships between economic growth, foreign direct investment and trade: evidence from China." *Applied Economics* 34(11): 1433-1440.

Liu, X., Song, H., Wei, Y. And Romilly, P. (1997)."Country Characteristics and Foreign Direct Investment in China: A Panel Data Analysis." *Weltwirtschaftliches Archiv* 133 (2): 313-329.

Loof, H. (2007). Technology Spillovers and Innovation: The Importance of Domestic and Foreign Sources CESIS. *Electronic Working Papers*, No.83.

Louis, M., Mahdy, A. and Handoussa, H. (2004). Foreign Direct Investment in Egypt. *Investment Strategies in Emerging Markets*. Meyer, Saul E. and Klaus E. Northampton, UK, MA: Edward Elgar.

Low, L. (2004). "The Political Economy of Trade Liberalization." *Asia-Pacific Development Journal* 11(1): 1-23.

Lumbila, K. N. (2005). "What Makes FDI Work? A Panel Analysis of the Growth Effect of FDI in Africa." *African Trade Policy Centre, Work in Progress No.21* Africa Region Working Paper Series 80.

Lunn, L. (1980). "Determinants of US Direct Investment in the EEC." *European Economic Review* 13: 93-101.

Lutkepohl, H. (1982). "Non-Causality Due to Omitted Variables." *Journal of Econometrics* 19: 367-378.

Maddala, G. S. and Wu, S. (1999)."Comparative Study of Unit Root Tests with Panel Data and a New Simple Test." *Oxford Bulletin of Economics and Statistics, Special Issue*, 61: 631-652.

Magnus, F. and Fosu, O. (2008). "Bivariate Causality Analysis between FDI Inflows and Economic Growth in Ghana." *International Research Journal of Finance and Economics* ISSN 1450-2887(15): 104-112.

Mahboub, A. (1997). Foreign Direct Investment in Egypt: How to encourage and maximize the benefits. Department of Economics, Zagazig University.

Makki, S. and Somwaru, A. (2004). "Impact of Foreign Direct Investment and Trade on Economic Growth: Evidence from Developing Countries." *American Journal of Agricultural Economics* 86(3): 795-801.

Mallick, S. and Moore, T. (2005). "Impact of World Bank lending in an adjustment-led growth model." *Economic System* 29: 366-383.

Mallick, S. and Moore, T. (2006). Foreign Capital in a Growth Model. *Paper Presented at 5th Annual Meeting of the European Economics and Finance Society (EEFS*), 18-21 May 2006. Crete, Greece.

Mankiw, N., Romer, D. and Weil, D. (1992). "A Contribution to the Empirics of Economic Growth." *The Quarterly Journal of Economics* 107(2): 407-437.

Marcin, K. (2007). How does FDI inflow affect productivity of domestic firms? The role of horizontal and vertical spillovers, absorptive capacity and competition. *Munich Personal RePEc Archive (MPRA)*, National Bank of Poland.

Markusen, J. (1995). "The Boundaries of Multinational Enterprises and the Theory of International Trade." *The Journal of Economic Perspectives* 9(2): 169-189.

Masanjala, W. and Papageorgiou, C. (2004). "The Solow Model with CES Technology: Nonlinearities and Parameter Heterogeneity." *Journal of Applied Econometrics* 19: 171-201.

Masih, R. and Masih, A. M. (1996). "Macroeconomic activity dynamics and Granger causality: New evidence from a small developing economy based on a vector error-correction modelling analysis." *Economic Modelling* 13(3): 407-426.

Masih, R. and Masih, A. M. (1996). "Stock-Watson dynamic OLS (DOLS) and error-correction modelling approaches to estimating long- and short-run elasticises in a demand function: new evidence and methodological implications from an application to the demand for coal in mainland China." *Energy Economics* 18: 315-334.

Massoud, N. (2008). Assessing the Employment Effect on FDI Inflow to Egypt: Does the Mode of Entry Matter? *Paper Presented at the International Conference on the Unemployment Crisis in the Arab Countries, 17-18 March 2008*, Cairo-Egypt.

McCallum, B. (1996). "Neoclassical vs. Endogenous Growth Analysis: An Overview." *Federal Reserve Bank of Richmond Economic Quarterly* 82(4): 41-71.

McGrattan, E. and Prescott, E. (2007). Openness, Technology Capital, and Development. *National Bureau of Economic Research*. NBER Working Paper, No.13515.

Mekki, R. (2005). *The impact of Foreign Direct Investment on Trade: Evidence from Tunisia*. In Capital Flows and Foreign Direct Investments in Emerging Markets (ED. S. Motamen-Samadian). Palgrave: Macmillan.

Mercereau, B. (2005). "FDI Flows to Asia: Did the Dragon Crowd Out the Tigers?" *IMF working Paper* WP/05/189.

Meyer, K. (2003). FDI Spillovers in Emerging Markets: A Literature Review and New Perspectives. *London Business School DRC*, Working Papers No.15.

Mileva, E. (2008). The Impact of Capital Flows on Domestic Investment in Transition Economies. *European Central Bank*, Working Paper. No. 871.

Mishra, D., Mody, A. and Murshid, A. (2001). "Private Capital Flows and Growth." *IMF Financial & Development* 38(2).

Mitchell, J. (2000). The importance of long run structure for impulse response analysis in VAR models. *NIESR Discussion Papers 172*, National Institute of Economic and Social Research. .

Mody, A. and Murshid, A. (2005). "Growing up with capital flows." *Journal of International Economics* 65: 249-266.

Mody, A. and Murshid, A. (2002). Growing Up with Capital Flows. *International Monetary Fund*, Working Paper No.02/75.

Montiel, P. and Reinhart, C. (1999). "Do capital controls and macroeconomic policies influence the volume and composition of capital flows? Evidence from the 1990s "Journal *of International Money and Finance* 18: 619-635.

Morgan, R. and Katsikeas, C. (1997). "Theories of international trade, foreign direct investment and firm internationalization: a critique." *Management Decision* 53(1): 68-78.

Most, S. J. and Berg, H. V. (1996). "Growth in Africa: does the source of investment financing matter?" *Applied Economics* 28: 1427-1433.

Motta Veiga, P. (2004). "Foreign Direct Investment in Brazil: regulation, flows and contribution to development " *International Institute for Sustainable Development.* Obtained through the Internet: http://www.iisd.org/pdf/2004/investment_country_report_brazil.pdf, [accessed 26/05/2010].

Mottaleb, K. (2007). Determinants of Foreign Direct Investment and Its Impact on Economic Growth in Developing Countries. *Civil Service College, Dhaka, 63 New Eskaton, BIAM Dhaka-1000*. Munich Personal RePEc Archive (MPRA).

Moudatsou, A. (2001) FOREIGN DIRECT INVESTMENT AND ECONOMIC GROWTH EVIDENCE FROM 14 EUROPEAN UNION COUNTRIES. TEI of Crete. Obtained through the Internet: http://www.iefs.org.uk/Papers/Moudatsou.pdf, [accessed 13/12/2009].

Munnell (1992). “Infrastructure Investment and Economic Growth” *The Journal of Economic Perspectives* 6(4): 189-198.

Musila, J. W. and Sigue, S. P. (2006). "Accelerating foreign direct investment flow to Africa: from policy statements to successful strategies." *Managerial Finance* 32(7): 577-593.

Mutenyo, J. (2008). Does Foreign Direct Investment Stimulate Economic Growth in Sub-Sahara Africa? *Paper Presented at the ESRC Development Economics Conference 17th – 18th September*. University of Sussex, London, UK.

Naguib, R. (2009). The effects of privatisation and FDI on economic growth in Egypt. *Paper Presented at the 6th Augustin cournot Doctoral Days 1-3 April 2009*. Egypt.

Nair-Reichert, U. and Weinhold, D. (2001). "Causality Tests for Cross-Country Panels: A New Look at FDI and Economic Growth in Developing Countries." *Oxford Bulletin of Economics and Statistics* 63(2): 153-171.

Narayan, P. and Smyth, R. (2005). "Temporal causality and the dynamics of democracy, emigration and real income in Fiji " *International Review of Applied Economics* 19(2): 245-261.

Narula, R. and Marin, A. (2003). FDI spillovers, absorptive capacities and human capital development: evidence from Argentina. *Research Memoranda 018, Maastricht: MERIT*, Maastricht Economic Research Institute on Innovation and Technology.

Ndikumana, L. and Verick, S. (2008). "The Linkages Between FDI and Domestic Investment: Unravelling the Developmental Impact of Foreign Investment in Sub-Saharan Africa " *Development Policy Review* 26(6): 713-726.

Nelson, R. (2007). Economic Development from the Perspective of Evolutionary Economic Theory. *FDI*, Technology and Competitiveness. Geneva: UNCTAD.

Nguyen, L. (2006). Foreign Direct Investment and Its Linkage to Economic Growth in Vietnam: A Provincial Level Analysis. Centre for Regulation and Market Analysis, University of South Australia. Obtained through the Internet: http://editorialexpress.com/cgi-bin/conference/download.cgi?db_name=ESAM07&paper_id=24. [accessed 27/05/2010].

Nguyen, L. (2008). Foreign Direct Investment and Export Spillovers: Evidence form Vietnam. National Economic University. Obtained through the Internet: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1263685. [accessed 11/08/2010]

Nicolaides, P. (1992). "Foreign Direct Investment: Its Causes, Its Contribution and Some of Its Consequences." *Business Strategy Review* 3(2): 1-15.

Nocke, V. and Yeaple, S. (2008). "An Assignment Theory of Foreign Direct Investment." *Review of Economic Studies* 75: 529-557.

Nonnemberg, M. and DE Mendonca, M. (2004). The Determinants Of Foreign Direct Investment In Developing Countries. *Proceedings of the 32nd Brazilian Economics Meeting, 061, ANPEC*, Brazilian Association of Graduate Programs in Economics.

Noorbakhsh, F., Paloni, A. and Youssef, A (1999). Low wages or skilled labour? Prospects for foreign direct investment in developing countries. *Glasgow, Department of Economics. University of Glasgow*. Working Papers 1999-19.

Noorbakhsh, F., Paloni, A. and Youssef, A. (2001). "Human Capital and FDI Inflows to Developing countries: New Empirical evidence." *World Development* 29(9): 1593-1610.

Noorzoy, M. (1979). "Flows of Direct Investment and their effects on Investment in Canada." *Economics Letters* 2(3): 257-261.

Noy, I. and Vu, T. (2007). Capital Account Liberalization and Foreign Direct Investment. *Working Paper No. 07-8*.

Nunnenkamp, P. (2002). Determinants of FDI in Developing Countries: Has Globalization Changed the Rules of the Game?, *Kiel Institute for World Economics*. Kiel Working Paper No. 1122.

Nunnenkamp, P. and Spatz, J. (2004). "FDI and economic growth in developing economies: how relevant are host-economy and industry characteristics." *Transnational Corporations* 13(3): 54-86.

OECD (2002). Foreign Direct Investment for Development: Maximising Benefits, Minimising Costs : An Overview. Paris, France, Organisation for Economic Co-Operation and Development.

OECD (2006). *MENA-OECD Investment Programme*. Jordan, Dead Sea: OECD.

Oetzel, J. and Doh, J. (2009). "MNEs and development: a review and reconceptualization." *Journal of World Business* 44 (2): 108-120.

Olofsdotter, K. (1998). "Foreign direct investment, country capabilities and economic growth." *Review of World Economics* 134(3): 534-547.

Osterloh, M. and Frey, B. S. (2000). "Motivation, Knowledge Transfer, and Organizational Forms." *Organization Science* 11(5): 538-550.

Oxley, L. and Greasley, D. (1995). "A Time-Series Perspective on Convergence: Australia, UK and USA since 1870." *The Economic Record* 71(214): 259-270.

Ozler, S. and Rodrik, D. (1992). "External shocks, politics and private investment: Some theory and empirical evidence." *Journal of Development Economics* 39: 141-162.

Pack, H. (1993). "Technology Gaps between Industrial and Developing Countries: Are There Dividends for Latecomers?" *The World Bank Economic Review*: 283-302.

Parente, S. (2008). Narrowing the Economic Gap in the 21st Century. *2008 Index of Economic Freedom*. Holmes, K., Feulner, E. and O'Grady, M. Washington and New York, The Heritage Foundation and Dow Jones & Company, Inc.**:** 23-33.

Paugel, A. (2007). *International Economics*, New York, USA: McGraw-Hill Irwin.

Pearce, R., Islam, A. and Sauvant, K. (1992). "The Determinants of Foreign Direct Investment: A Survey of Empirical Evidence." *United Nations Centre on Transnational Corporations*: United Nation, New York.

Pedroni, P. (1999)."Critical Values for Cointegration Tests in Heterogeneous Panels with Multiple Regressors." *Oxford Bull. Econ. Stat*istics, *Special Issue* 61:653-678.

Pedroni, P. (2001)."Purchasing Power Parity Tests in Cointegrated Panels." *The Rev. Econ. Statistics*, 83(4):727-731.

Pedroni, P. (2004)."Panel Cointegration: Asymptotic and finite samples properties of pooled time series Tests with an application to the PPP hypothesis." *Econ. Theory* 20 (3): 597-625.

Pesaran, M., Shin, Y. and Smith, R. (2000). "Structural analysis of vector error correction models with exogenous *I(1)* variables." *Journal of Econometrics* 97: 293-343.

Peters, E. (2008). The Impact of Foreign Direct Investment in Mexico. *Working Group Discussion Paper DP11*, the Working Group on Development and Environment in the Americas

Phillips, A. (1954). "Stabilisation Policy in a Closed Economy." *The Economic Journal* 64(254): 290-323.

Phillips, P. (1995). Impulse Response and Forecast Error Variance Asymptotics in Nonstationary VAR's. *Cowles Foundation Discussion Papers 1102*, Cowles Foundation, Yale University.

Phillips, P. and Perron, P. (1988). "Testing for a unit root in time series regression." *Biometrika* 75(2): 335-346.

Powers, W. (2004). Forward and Backward Linkages and the Location of International Production. *Paper Presented at Department of Economics*, University of Michigan.

Prasad, E., Rajan, R. and Subramanian, A. (2007). Foreign Capital and Economic Growth. *National Bureau of Economic Research*. NBER Working Paper N0.13619.

Proenca, I., Fontoura, M. and Crespo, N. (2002). Productivity Spillovers from Multinational Corporations in the Portuguese Case: Evidence from a Short Time Period Panel Data. *Department of Economics at the School of Economics and Management (ISEG), Technical University of Lisbon*, Working Papers. No.6.

Prufer, P. and Tondl, G. (2008). The FDI-Growth nexus in Latin American: The role of source countries and local conditions. *Tilburg University*, Discussion Paper No. 2008-61.

Qi, L. (2007). "The Relationship between Growth, Total Investment and Inward FDI: Evidence from Time Series Data." *International Review of Applied Economics* 21(1): 119-133.

Qin, D., Cagas, M., Quising, P. and He, X. (2006). "How much does investment drive economic growth in China?" *Journal of Policy Modeling* 28: 751-774.

Quinn, D. (1997). "The correlates of change in International financial Regulation." *The American Political Science Review* 91(3): 531-551.

Qun-yang, D., Qin, Z. and Yan, W. (2006). FDI Technology Spillover Effect for Zhejiang Province: An Empirical Analysis on Industrial Level. *Paper Presented at Management Science and Engineering, 2006. ICMSE '06. 2006 International Conference on***:** 1877-1881.

Rachev, S., Mittnik, S., Fabozzi, F., Focadri, S. and Jasic, T. (2007). *Financial Econometrics: from Basics to advanced Modeling Techniques*. New York: John Wiley & Sons.

Rahbek, A. and R., Mosconi. (1999). "Cointegration rank inference with stationary regressors in VAR models." *Econometrics Journal* 2: 76-91.

Rahman, A. (2007). The Convergence Implications of Biased Technological Diffusion. *United States Naval Academy*, Working Paper No. 16.

Rajan, R. (2004). "Measures to Attract FDI: Investment Promotion, Incentives and Policy Intervention." *Economic and Political Weekly* 3: 12-16.

Ram, R. and Zhang, K. (2002)."Foreign Direct Investment and Economic Growth: evidence from Cross-country Data for the 1990s." *Economic Development and Culture Change* 51 (1): 205-215.

Rama, M. (1990). Empirical Investment Equations in Developing Countries, *The World Bank. Working Papers*, WPS 563.

Ramey, V. and Shapiro, M. (1998). Costly capital reallocation and the effects of government spending. *Carnegie-Rochester Conference Series on Public Policy, Elsevier*. 48 (1)**:** 145-194, June.

Ramirez, M (2000). "Foreign Direct Investment in Mexico: A Cointegration Analysis." *Journal of Development Studies* 37(1): 138-162.

Ramirez, M (2006). "Is foreign direct investment beneficial for Mexico? An empirical analysis, 1960–2001 " *World Development* 34(5): 802-817.

Rappaport, J. (2000). How does Openness to Capital Flows affect Growth? 00-11, RWP.

Razin, A. (2003). FDI Contribution to Capital Flows and Investment in Capacity. *HKIMR* Working Paper No.5/2003.

Razin, A. (2003). "FDI Flows and Domestic Investment: Overview." *CESifo Economic Studies* 49(3): 415-428.

Reganati, F. and Sica, E. (2005). Do domestic firms benefit from the presence of MNEs? The case of the Italian manufacturing sector. Dipartimento di Scienze Economiche, Matematiche e Statistiche (DSEMS), 23/2005.

Reisen, H. and Soto, M. (2001). "Which Types of Capital Inflows Foster Developing-Country Growth?" *International Finance* 4(1): 1-14.

Rodriguez-Clare, A. (1996). "Multinationals, Linkages, and Economic Development." *The American Economic Review* 86(4): 852-873.

Rogers, M. (2004). "Absorptive capability and economic growth: how do countries catch-up?." *Cambridge Journal of Economics* 28(4): 577-596.

Romer, P. (1990). "Endogenous Technological Change." *The Journal of Political Economy* 98(5): S71-S102.

Romer, P. (1993). "Idea gaps and objects gaps in economic development." *Journal of Monetary Economics* 32: 543-573.

Romer, P. (1993). "Two Strategies for Economic Development: Using Ideas and Producing Ideas." *The World Bank Economic Review*: 63-98.

Roodman, D. (2006). How to Do xtabond2: An Introduction to "Difference" and "System" GMM in Stata. *Centre for global Development*. Working Paper Number 103.

Root, F. and Ahmed, A. (1979). "Empirical Determinants of Manufacturing Direct Foreign Investment in Developing Countries." *Economic Development and cultural Change* 27(4): 751-767.

Ros, J. (2000). *Development Theory & The Economics of Growth*. Michigan, USA: The University of Michigan Press.

Rosen, S. (1981). "The Economics of Superstars." *The American Economic Review* 71(5): 845-858.

Rothmuller, L. (2003). *Does FDI Matter for Trade in Brazil? An Application of the Gravity Model. Proceedings of the 31st Brazilian Economics Meeting, c71, ANPEC*, Brazilian Association of Graduate Programs in Economics

Ruffin, R. (1979). "Growth and the Long-Run Theory of International Capital Movements." *The American Economic Review* 69(5): 832=842.

Runkle, D. (1987). "Vector Autoregression and Reality." *Journal of Business and Economic Statistics* 5: 437-454.

Sachwald, F. (2003). "FDI and the Economic Status of Korea: The Hub Strategy in Perspective. Confrontation and innovation on Korean Peninsula." *Korean Economic Institute's Ad-hoc Annual Publication* 5: 85-95, KEIA, Washington, DC.

Sadik, A. and Bolbol, A. (2001). "Capital Flows, FDI, and Technology Spillovers: Evidence from Arab Countries." *World Development* 29(12): 2111-2125.

Sadik, A. and Bolbol, A. (2003). "Arab External Investments: Relation to National Wealth, Estimation, and Consequences." *World Development* 31(11): 1771-1792.

Sahoo, P. (2006). Foreign Direct Investment in South Asia: Policy, Trends, Impact and Determinants. *ADB Institute*, Discussion Paper No. 56.

Sala-I-Martin, X. (2002). "15 years of new growth economics: What have we learnt?" *Journal Economia Chilean* 5(2): 5-15.

Samad, A. (2009). Does FDI Cause Economic Growth? Evidence from South-East Asia and Latin America. *Utah Valley University (USA)*, Working Paper No. 1-09.

Sanchez-Robles, B. (1998). "Infrastructure investment and growth: some empirical evidence " *Contemporary Economic Policy* 16: 98-108.

Sarkar, P. (2007). Does Foreign Direct Investment Promote Growth? Panel Data and Time Series Evidence from Less Developed Countries, 1970-2002, MPRA Paper No. 5176.

Satyanath, S. and Berger, D. (2007). "Capital Controls, Political Institutions, and Economic Growth; A Panel and Cross Country Analysis." *Quarterly Journal of Political Science* 2: 307-324.

Scaperlanda, E. and Mauer, L. (1969). "The Determinants of U.S. Direct Investment in the E.E.C." *The American Economic Review* 59(4, Part 1): 558-568.

Schindler, M. (2009). "Measuring Financial Integration: A New Data Set." *IMF Staff Papers* 56(1): 222-138.

Schoors, K. and Van der Tol, B. (2002). Foreign direct investment spillovers within and between sectors: Evidence from Hungarian data. Ghent University Working Paper 02/157.

Seabra, F. and Flach, L. (2005). "Foreign direct investment and profit outflows: a causality analysis for the Brazilian economy." *Economics Bulletin* 6(1): 1-15.

Sedgley, N. (1998). "Technology gaps, economic growth and convergence across US states." *Applied Economics Letters* 5: 55-59.

Sedgley, N. (2006). "A Time Series Test of Innovation-Driven Endogenous Growth." *Economic Inquiry* 44(2): 318-332.

Segerstrom, P. (1991). "Innovation, Imitation, and Economic Growth." *The Journal of Political Economy* 99(4): 807-827.

Sekmen, F. (2008). Cointegration and Causality among Foreign Direct Investment in Tourism Sector, GDP, and Exchange Rate Volatility in Turkey. *MPRA Paper No. 8736*.

Sethi, N. (2007). International Capital Flows and Growth in India: The Recent Experience. University of Hyderabad, department of economics.

Shahbaz, M., Awan, R. and Ali, L. (2008). "Bi-Directional Causality between FDI & Savings: A Case Study of Pakistan." *International Research Journal of Finance and Economics* (17): 75-83.

Shahbaz, M. and Rahman, M. (2010). "Foreign Capital Inflows-Growth Nexus and Role of Domestic Financial Sector: An ARDL Cointegration Approach for Pakistan." *Journal of Economic Research* 15: 207-231.

Shan, J. (2002). "A VAR approach to the economics of FDI in China." *Applied Economics* 34(7): 885-893.

Shan, J., Tian, G. and Sun, F. (1997). The FDI-led growth hypothesis: further econometric evidence from China. *National Centre for Development Studies*, Economics Division Working Papers 97/2.

Shatz, H. and Venables, A. (2000). The Geography of International Investment, *The World Bank Policy Research*, Working Paper 2338.

Shen, C., Lee, C. and Lee, C. (2010). "What Makes International Capital Flows Promote Economic Growth? An International Cross-Country Analysis." *Scottish Journal of Political Economy* 57(515-546).

Sims, C. (1980). "Macroeconomics and Reality." *Econometrica* 48(1): 1-48.

Sinani, E. and Meyer, K. (2004). "Spillovers of Technology Transfer from FDI: The Case of Estonia." *Journal of Comparative Economics*: 1-44.

Singh, H. and Jun, K. (1995). Some New Evidence on Determinants of Foreign Direct Investment in Developing Countries. *The World Bank Policy Research*, Working Paper series 1531.

Sjoholm, F. (1999). "Technology Gap, Competition and Spillovers from Direct Foreign Investment: Evidence from Establishment Data." *Journal of Development Studies* 36(1): 53-73.

Skonhoft, A. (1995). "Catching up and falling behind, a vintage model approach." *J Evol Econ* 5: 285-295.

Smarzynska, B. J. (2004). "Does foreign direct Investment Increase the Productivity of Domestic Firms? In Search of Spillovers through Backward Linkages." *The American Economic Review* 94(3): 605-627.

Solow, R. (1956). "A Contribution to the Theory of Economic Growth." *The Quarterly Journal of Economics* 70(1): 65-94.

Solow, R. (1957). "Technical Change and the Aggregate Production Function." *The Review of Economics and Statistics* 39(3): 312-320.

Soreide, T. (2001). "FDI and Industrialisation: Why technology transfer and new industrial structures may accelerate economic development." *Development Studies and Human Rights* WP 2001: 3: 1-18.

Soto, M. (2000). "Capital Flows and Growth in Developing Countries: Recent Empirical Evidence." *OECD Working Paper No. 160*.

Stancik, J. (2007). Horizontal and Vertical FDI Spillovers: Recent Evidence from the Czech Republic. *Charles University, Centre for Economic Research and Graduate Education: Economics Institute*. ISSN 1211-3298, working Paper No. 340.

Stoever, W. (2005). "Restructuring FDI Policy in Emerging Economies: The Republic of Korea Case." *Thunderbird International Business Review* 47(5): 555-574.

Summers, L. (2000). "International Financial Crises: Causes, Prevention, and Cures." *The American Economic Review* 90(2): 1-16.

Sun, Q., Tong, W. and Yu, Q. (2002). "Determinants of foreign direct investment across China." *Journal of International Money and Finance* 21: 79-113.

Sun, X. (2002). Foreign Direct Investment and Economic Development: What Do the States Need To Do? Marrakech, Morocco, Foreign Investment Advisory Service (FIAS).

Tamirisa, N. (1999). "Exchange and Capital Controls as Barriers to Trade." *IMF Staff Papers* 46(1): 69-88.

Tang, S., Selvanathan, E. A. and Selvanathan, S. (2008). Foreign Direct Investment, Domestic Investment, and Economic Growth in China, United Nations University, *World Institute for Development Economics Research (UNU-WIDER)*, Research Paper No. 2008/19.

Taylor, M. P. and Sarno, L. (1997). "Capital Flows to Developing Countries: Long- and Short-Term Determinants." *The World Bank Economic Review* 11(3): 451-470.

Temple, J. (1998). "Equipment investment and the Solow model." *Oxford Economic Papers* 50: 39-62.

The World Bank (2008). Technology Diffusion in the Developing World. *Global Economic Prospects*. The International Bank for Reconstruction and Development, Washington DC, USA: The World Bank.

The World Bank (2008). World Development Indicators.

Titarenko, D. (2006). "The Influence of Foreign Direct Investment on Domestic Investment Processes in Latvia." *Transport and Telecommunication* 7(1): 76-83.

Toda, H. and Yamamoto, T. (1995). "Statistical inference in vector autoregression with possibly integrated processes." *Journal of Econometrics* 66(1-2): 225-250.

Tsai, P. (1994). "Determinants of Foreign Direct Investment and Its Impact on Economic Growth." *Journal of Economic Development* 19(1): 137-163.

UNCTAD (1999). Egypt: Investment Policy Review. Switzerland, United Nations.

UNCTAD (1999). Foreign Direct Investment and the Challenge of Development. *World Investment Report 1999*. New York and Geneva, United Nations.

UNCTAD (2001). Promoting Linkages. *World Investment Report 2001*. New York and Geneva, United Nations.

UNCTAD (2005). Transnational Corporations and the Internationalization of R&D. *World Investment Report 2005*. New York and Geneva, United Nations.

UNCTAD (2006). Bridging the Technology Gap Between and Within Nations. *Commission on Science and Technology for Development*. Geneva, 15-19 May 2006, United Nation, Economic and Social Council.

UNCTAD (2006). FDI from Developing and Transition Economies: Implications for Development. *World Investment Report 2006*. New York and Geneva, United Nations.

UNCTAD (2007). Investment Policy Review of Morocco. Geneva, 8–14 March 2007, United Nations.

UNCTAD (2007). Transnational Corporations, Extractive Industries. *World Investment Report 2007*. New York and Geneva, United Nations.

UNCTAD (2008). Transnational Corporations and the Infrastructure Challenge. *World Investment Report 2008*. New York and Geneva, United Nations.

UNCTAD (2009). Transnational Corporations, Agricultural Production and Development. *World Investment Report 2009*. New York and Geneva, United Nations.

Van Loo, F. (1977). "The Effect of Foreign Direct Investment on Investment in Canada." *The Review of Economics and Statistics* 59(4): 474-481.

Veiga, P. (2004). Foreign Direct Investment in Brazil: regulation, flows and contribution to development. Obtained through the Internet: http://www.iisd.org/pdf/2004/investment_country_report_brazil.pdf. [accessed 03/07/2009].

Vernon, R. (1966). "International Investment and International Trade in the Product Cycle." *The Quarterly Journal of Economics* 80(2): 190-207.

Verspagen, B. (1991). "A New Empirical Approach to Catching Up or Falling Behind." *Structural Change and Economic Dynamics* 2(2): 359-380.

Verspagen, B. (1993). *Uneven Growth between Interdependent Economies. An Evolutionary View of Technology Gaps, Trade and Growth*, Aldershot: Avebury, Ashgate.

Verspagen, B. and Wakelin, K. (1997). "Trade and technology from a Schumpeterian perspective." *International Review of Applied Economics* 11(2): 181-194.

Vittorio, D. and Ugo, M. (2006). Do institutions matter for FDI? A comparative analysis for the MENA countries. *Munich Personal RePEc Archive (MPRA)*. MPRA Paper No. 2426.

Wang, G. (2001). *Foreign Direct Investment Laws of china and Canada*. MSc Economics Dissertation. Institute of comparative Law, Montreal, Quebec, McGill University.

Wang, J. (1990). "Growth, Technology Transfer, and The Long-run Theory of International Capital Movements." *Journal of International Economics* 29: 255-271.

Wang, M. (2008). "Foreign direct investment and domestic investment in the host country: evidence from panel study." *Applied Economics* 1: 1-11.

Wang, M. and Ciruelos, A. (2004). International Technology Diffusion: Effects of Trade and FDI. Obtained through the Internet: http://ssrn.com/abstract=626163. [accessed 18/08/2010].

Wang, M. and Wong, S. (2009). "Foreign Direct Investment and Economic Growth: The Growth Accounting Perspective." *Economic Inquiry* 47(4): 701-710.

Wang, Y. (2006). North-South Technology Diffusion: How Important Are Trade, FDI and International Telecommunications?, *Carleton Economic Papers 06-01*, Carleton University, Department of Economics

Willem Te Velde, D. (2001). Policies towards Foreign Direct Investment in Developing Countries: Emerging Best-Practices and Outstanding Issues. Overseas Development Institute, London.

Wooldridge, J. (2001). *Econometric Analysis of Cross Section and Panel Data*. Cambridge, Massachusetts, London, England: the MIT Press.

Wooldridge, J. (2006). *Introductory Econometrics: A Modern Approach*. Mason, USA: Thomson South-Western.

Xu, B. (2000). "Multinational enterprises, technology diffusion, and host country productivity growth" *Journal of Development Economics* 62: 477-493.

Xu, B. and Wang, J. (2000). "Trade, FDI, and International Technology Diffusion." *Journal of Economic Integration* (Forthcoming): 1-19.

Xu, G. and Wang, R. (2007). "The Effect of Foreign Direct Investment on Domestic Capital Formation, Trade, and Economic Growth in a Transition Economy: Evidence from China." *Global Economy Journal* 7(2): 1-21.

Xu, Z. (2000). "Financial Development, Investment, and Economic Growth." *Economic Inquiry* 38(2): 331-344.

Yamashita, M. and Khachi, A. K. (2003). "Vector Autoregressive Analysis of the Validity of the Two-gap Model for Nine Large Recipients of Japan's ODA." *Economic and Social Research Institute, ESRI Discussion Paper Series No.43*.

Yamin, M. and Sinkovics, R. (2009). "Infrastructure or foreign direct investment? An examination of the implications of MNE strategy for economic development." *Journal of World Business* 44: 144-157.

Yanikkaya, H. (2003). "Trade openness and economic growth: a cross-country empirical investigation." *Journal of development Economics* 72: 57-89.

Young, A. (1993). "Substitution and Complementarity in Endogenous Innovation." *The Quarterly Journal of Economics* 108(3): 775-807.

Zhang, K. (2001). "Does foreign direct investment promote economic growth? Evidence from East Asia and Latin America." *Contemporary Economic Policy* 19(2): 175-185.

Zhang, K. (2006). Foreign Direct Investment and Economic Growth in China: A Panel Data Study for 1992-2004. *Paper Presented at The Conference of "WTO, China and Asian Economies", China in June 24-25, 2006*. University of International Business and Economics (UIBE), Beijing, Chain.