



# Foreign Direct Investment and the Determinants of the Regional Distribution

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The case of five Asian countries

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19/6/2012

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## **Abstract**

FDI is an issue widely tested in the economic literature, as it has become an important factor that contributed to the gradual growth of the less developed world the last decades. The first goal of this thesis is to offer substantial information about what exactly FDI is, its measurement and its potential benefits and drawbacks. A second goal is to offer a historical review of FDI, which indicates the progress of FDI activity up to nowadays. Moreover, the thesis gives emphasis and demonstrates through tables and figures the geographical and sectoral distribution of FDI worldwide. Finally, through an empirical investigation based on panel data methods, the relationship between FDI inflows in five south Asian countries and their potential determinants is revealed.

# 1. Introduction

Over the last decades, Foreign Direct Investment (FDI) has been the greatest source of external finance for developing countries, exceeding portfolio investment and other private capital flows as well as official development assistance (ODA). This thesis is willing to investigate several aspects of the Foreign Direct Investment activity. The thesis is organized as follows: Section 1 gives the definition of FDI, its measurement, and the potential benefits and drawbacks of FDI inflows. Section 2 offers an analytical historical review of FDI up to the recent period. Section 3 deals with the geographical and sectoral distribution of the global FDI. Section 4 presents the potential determinants of FDI and their impact on FDI. Section 5 is our own empirical investigation on the potential determinants of FDI in five Asian countries. Finally, Section 6 presents the concluding remarks of the thesis.

## 1.1 Definition of FDI

According to the definition used by UNCTAD<sup>1</sup>, FDI is “an investment involving a long-term relationship and reflecting a lasting interest and control of a resident entity in one economy in an enterprise resident in an economy other than that of the foreign direct investor (foreign affiliate)” (UNCTAD 2009: 23). An equity capital stake of 10 percent or more of the ordinary shares for an incorporated enterprise, or its equivalent for an unincorporated enterprise, is normally considered as the threshold for FDI.

FDI has three components:

- *Equity capital* is the direct investor’s purchase of shares of an enterprise in a foreign country. FDI projects that entails the establishment of new entities (greenfield FDI), is also part of this component;
- *Reinvested earnings* are the direct investor’s share of earnings not distributed as dividends by affiliates, or earnings not remitted to the direct investor;
- *Intra-company loans* are short- or long- term borrowing and lending between direct investors and affiliates.

Transactions whereby an investor acquires influence or control of a foreign entity without taking an equity stake are not FDI, even though they can have effects similar to those achieved through equity ownership. Such *non equity modes* (NEMs) include contract

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<sup>1</sup>The UNCTAD definition is based on OECD (2008) and IMF (2009).

manufacturing, services outsourcing, contract farming, franchising, licensing, and management contracts.

The modes by which foreign investors enter into a foreign market vary. There are two primary routes: (a) merging with, or acquiring an existing company; and (b) setting up a new entity.

Mergers and acquisitions (M&As) entail the taking over or merging of capital, assets and liabilities of existing enterprises. The main difference between mergers and acquisitions lies in the fact that a new legal entity is established in the former case, but not in the latter. Otherwise, these two forms may be treated as identical.

M&As have the important advantage of providing immediate access to the host market, to the assets owned by the local enterprise (including potentially its intellectual property), to a skilled and experienced workforce, and to an established supply chain. It has the disadvantage of carrying higher risks because M&As involve two firms, which could have rather different corporate organizations and cultures. Establishing a new entity as the vehicle for the investment is advantageous since the new enterprise can be structured more easily to fit the investor's business needs and can be expanded gradually if necessary. It involves less risk, but may also offer smaller immediate rewards.

FDI is not usually about investing in land or property, although such investments can be very profitable. An affiliate may own assets including land or buildings, but there are usually connected with the running of the business. FDI is about investing in an overseas market in order to carry out a specific business activity.

In terms of investment motives, there are four basic types of FDI:

- Market seeking;
- Efficiency seeking;
- Resource seeking; and
- Strategic asset seeking FDI.

*Market seeking* FDI is driven by the current size or expected growth of the host market. The market size can be further enlarged by regional, preferential and bilateral trade agreements with other countries. Diplomats are in a unique position to promote such

international legal arrangements, and this is often done as a part of the embassies' work to develop value propositions to potential investors.

*Efficiency seeking* FDI aims to rationalize the investor's operations by taking advantage of lower costs or economies of scale and scope. *Resource seeking* FDI takes place when the investor wants to acquire resources such as raw materials, while *strategic asset seeking* FDI is driven by access to created assets, for example special skills or technology. It is worth noting that many TNCs engage in FDI that combines characteristics of the above categories. The motives for foreign investment may also change when a firm becomes more internationally established and experienced.

The companies involved in FDI are called transnational corporations (TNCs). They comprise "parent enterprises" and their "foreign affiliates". A *parent enterprise* controls assets of other entities other than its home country, usually by owning a certain equity capital stake. A *foreign affiliate* is an enterprise in which an investor, who is a resident in another economy, owns a stake that permits a lasting management interest. Subsidiaries, associates and branches are all referred to as foreign affiliates or just "affiliates".

In a *subsidiary*, the foreign investor owns more than 50 percent of the shares, giving it the right to appoint or remove a majority of the board members, and so control the company. A subsidiary is an incorporated company, that is to say "a legal person in its own right, able to own property and to sue and be sued in its own name". If the investor owns 10-50 percent of the shares of an incorporated enterprise, it is called an *associate*, as the investor influences rather than controls the company. A *branch* is an unincorporated enterprise in the host country, owned wholly or jointly by the investor. This may involve ownership of substantial assets, including land and buildings, or equipment such as aircraft or ships.

Affiliates may begin as small operations that later expand and diversify. Such expansions also fall within the definition of FDI.

The process leading up to a decision to invest abroad usually involves a systematic comparison of prospective locations. Once a decision to invest has been taken, the process enters into the implementation phase which may feature a complex series of transactions.

Overseas investment involves risk. If it goes wrong, an investment can weaken the company so that it becomes a target for a takeover, or cause it to go bankrupt. Companies seek to mitigate the risk by conducting due diligence about the market, but this takes time, even for large TNCs. Investing in another economy involves special challenges, as the economy may not be very familiar with local conditions at the outset of the due diligence process. This means that decisions to invest abroad can be lengthy.

## **1.2 Measurement and Relevance of FDI**

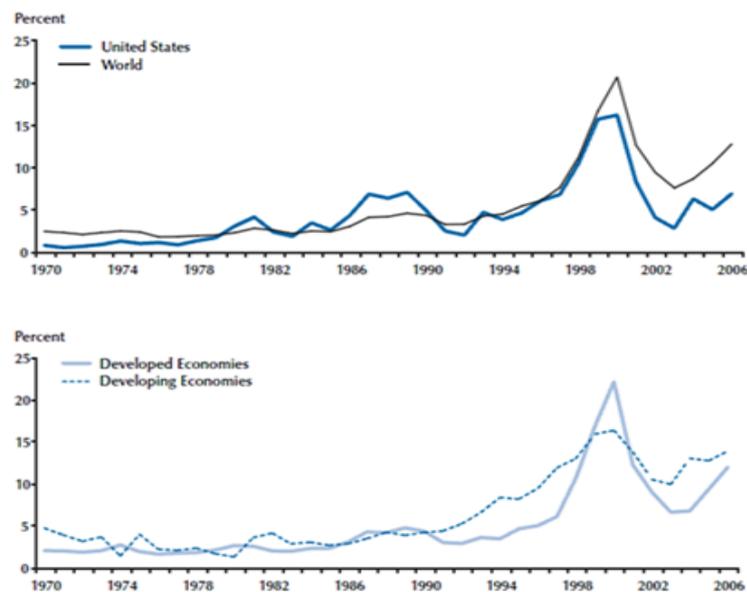
Typically available macroeconomic time series for FDI include the nominal value of the flows in or out of a country (inward and outward) and stock values. Both measures have problems that sometimes undermine the cross-country comparability of the series, especially because statistical agencies of different countries may use different definitions of FDI. For example in Estonia, the 10 percent benchmark for equity ownership suggested by the International Monetary fund/ Organization for Economic Co-operation and Development (IMF/OECD) definition of FDI has been applied only since the beginning of 2000, whereas the previous threshold was 20 percent. Prior to 1997, Poland used a criterion of “effective voice in management” that might not have amounted to 10 percent or more ownership. In both cases, the series are clearly not comparable before and after the change in methodology, and large changes in their levels may either be a purely statistical artifact or have an economic basis to them.

A second problem with datasets available from international organizations, such as IMF, the World Bank and the UNCTAD, is that they often have missing data points, particularly for developing countries.

A third issue with the use of aggregate data in studying FDI is that the records may not capture a part of investment in the foreign project. The fact that multinational activities can be financed using local or foreign financial markets implies that measures of FDI flows and stock that capture only the foreign financing of the projects provide a potentially distorted measure of the extent of multinational activity across countries. Therefore, using the flow of FDI might lead to incorrect inference, as part of the capital used to finance the multinational activity might be raised locally and hence not be recorded as an international capital flow in the balance of payment.

A common way to gauge the relevance of FDI is by comparing FDI with domestic investment. Figure 1 plots inward FDI flows as a percentage of gross fixed capital formation for developed and developing countries, as well as the world and the United States. The time series show clearly that these ratios were basically flat during the 1970s and part of the 1980s and subsequently started growing during the 1980s, eventually crossing the threshold of 5 percent.

**Figure 1: Inward FDI Flows as a Percentage of Gross Fixed Capital Formation**



Source: UNCTAD

### 1.3 Potential Benefits and Drawbacks of Inward FDI

Much of the discussion in recent years of the economic effects of FDI has focused on the possible risks and costs. It seems appropriate, however, to discuss the potential benefits as well. After all, direct investment is a form of international integration, and as with more traditional forms of integration such as trade in goods and services or portfolio investment, we may take as a first presumption that direct investment yields gains in efficiency. Graham and Krugman (1995) stated that “only once we have thought about the gains of FDI does it make sense to turn to the potential costs”.

First and foremost, FDI brings *capital*, which may be in short supply in the host country. FDI is the largest source of external finance for developing countries and FDI inflows are generally also more stable and easier to service than commercial debt or portfolio

investment. In distinction to other sources of capital, TNCs typically invest in long-term projects. FDI may also stimulate new investment by other foreign or domestic producers, for example when firms supplying a foreign affiliate invest in order to service the needs of their customer better.<sup>2</sup>

TNCs can bring *new technologies*, some of which may not be available without FDI, and they can raise the efficiency with which existing technologies are used. They can also adapt technologies to local conditions, drawing upon their experience in other countries. Moreover, foreign investors can stimulate technical efficiency in local firms, suppliers, clients and competitors, by providing assistance, acting as role models and intensifying competition.

Furthermore, TNCs can provide *access to exports markets*, both for existing activities and for new activities that exploit the host country's comparative advantages. The growth of exports itself offers benefits in terms of technological learning, realization of scale economies, competitive stimulus and market intelligence.

FDI generates *employment* both directly and indirectly. In 2010, over 68 million workers were employed in TNCs' foreign affiliates, according to UNCTAD estimates. The number of jobs and required skills vary according to the nature of the investment. TNCs also possess advanced skills and can transfer these by bringing in experts and by training the local workforce. Furthermore, FDI may help to improve management techniques in the host country as the investors train local managers how to operate the local facilities. In addition, the presence of TNCs may force local firms to strengthen their managerial capabilities as well.

Foreign investors can also help improve the host country's *environment*. TNCs may possess clean technologies and modern environmental management systems and can use them in all countries in which they operate. For example, a foreign investor may introduce new low-carbon production processes, goods or services to the host country.

Finally, foreign affiliates can be an important source of government revenue, for example through payment of corporation tax, or duties on traded goods. The local workforce will also pay income tax and the affiliate will pay tax on the goods and services which it receives. This revenue could, however, be offset by tax breaks used as incentives to help

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<sup>2</sup> In case the supplier is also a foreign TNC, this investment is referred to as "associated FDI".

persuade foreign TNCs to invest. The result of FDI can thus be to boost the overall competitiveness of the host country.

Economic arguments against FDI may be arrayed on a scale of increasing sophistication. At the crudest level it is charged that FDI will *cost jobs* or *worsen the trade deficit*. On one side, supporters of inward FDI point to the large number of employees hired by foreign-owned firms and argue that this represents substantial job creation. On the other side, critics argue that foreign owners tend to obtain more of their production inputs from abroad, and that the resulting reduced demand for the products of domestic suppliers both costs jobs and worsens trade balance. Responding to this heated debate, many studies of FDI have tried to measure the direct and indirect effects of such investment on employment. Although FDI has essentially no net effect on employment at national level, it may have some effect on the regional distribution of that employment. A region that succeeds in attracting foreign greenfield investments may well increase overall employment in the region as a result, in the same way and for the same reason that similar investment by domestic firms may increase overall regional employment. The important point is that such gains in employment come essentially at other regions' expense, and are likely to introduce migration into the favored region from the disfavored ones.

FDI could furthermore have *adverse effects on net exports*. Foreign affiliates have to conform to sourcing patterns imposed by parent enterprise and they are usually more prone to source inputs from abroad than domestic firms. The inputs may be imported from other affiliates in the TNC network, or from established suppliers based in the investor's home country or third countries.

In addition, the business models of foreign investors may be *economically, socially or environmentally unsustainable*. Concerns have been raised, for example, about FDI in agriculture, which could, if poorly managed, lead to land degradation, water depletion, or loss of biodiversity. There is also some concern that TNCs may choose to relocate polluting activities from highly regulated jurisdictions to countries with less stringent or no environmental regulation.

For all these reasons, it is important that investment promoters carefully target foreign investors, not only to maximize development benefits but also to minimize negative impact on the host location.

## **2. Historical Review**

Foreign Direct Investment typically appeared when the Multinational Enterprise (ME) started acting as a trade regulator. This happened during the second part of the previous century. In order for its role to be fully understood a short historical review is considered to be necessary.

### **2.1 Ancient Forms of Production**

The ancient history is full of examples where production activity was quite similar to the activity of a ME. The most typical examples were the ancient Greek colonizations, which due to the lack of raw materials, constructed a trade net between them and their metropolitan town. The duration of this “trade relationship” had a long duration, often longer than the duration of a giant contemporary ME. However, the characteristics of such activities are not sufficiently analyzed by the scope of economics. That is why the “ancestor” of contemporary MEs is detected in the medieval Europe.

### **2.2 The MEs during the 19<sup>th</sup> Century**

The Industrial Revolution is the typical characteristic of this period. Due to the Industrial Revolution, the form of the enterprise changed rapidly. The factories are now the new means of production and professional managers appear as production regulators. (Dunning 1993). This period, the demand for products that could be produced neither in Europe nor in the USA started increasing and the available technology improving. Although ME did not have its final form, these innovations caused a huge wave of FDI flows, the majority of which came mostly from the UK (44.6% of the total FDI flows), and from other countries like USA, Germany, France, Belgium, Sweden and Switzerland.

Regarding the host countries, as it was obvious, they were underdeveloped countries which absorbed the bigger part of FDI flows (62.8%), whereas the dispersion of these capitals was impressively wide.

### **2.3 The Interwar Period (1914-1940)**

This period was considered to be particularly turbulent. However, during these 25 years there was a satisfying increase of the level of FDI. Tables 1 and 2 show this fact.

**Table 1: FDI stocks according to home country**

	1914		1938		1960	
	\$ millions	%	\$ millions	%	\$ billions	%
<b>Developed Countries</b>	<b>14582</b>	<b>100</b>	<b>26350</b>	<b>100</b>	<b>65.4</b>	<b>98.9</b>
<b>N. America</b>	2802	19.2	8000	30.4	34	52
USA	2652	18.2	7300	27.7	31.9	48.3
Canada	150	1	700	2.7	3	3.8
<b>W. Europe</b>	11000	75.4	16850	63.9	27.8	42.1
UK	6500	44.6	10500	39.8	10.8	16.3
Germany	1500	10.3	350	1.3	0.8	1.2
France	1750	12	2500	9.5	4.1	6.2
Belgium					1.3	2
Italy					1.1	1.7
Netherlands	1250	8.6	3500	13.3	7	10.6
Sweden					0.4	0.6
Switzerland					2.3	3.5
<b>LDCs</b>	780	5.3	1500	5.7	3.2	4.8
Russia	300	2.1	450	1.7		
Japan	300	2.1	750	2.8	0.5	0.8
Australia					0.2	0.3
N. Zealand	180	1.2	300	1.1		
S. Africa						
Other					2.5	3.8
<b>Developing Countries</b>					<b>0.7</b>	<b>1.1</b>
<b>Whole</b>	<b>14582</b>	<b>100</b>	<b>26350</b>	<b>100</b>	<b>66.1</b>	<b>100</b>

Source: Dunning (1993: 117)

**Table 2: FDI stocks according to host country**

	1914		1938		1960	
	\$ millions	%	\$ millions	%	\$ billions	%
<b>Developed Countries</b>	<b>5235</b>	<b>37.2</b>	<b>8346</b>	<b>34.3</b>	<b>36.7</b>	<b>67.7</b>
N. America	2250	16	4096	16.8	20.5	37.8
USA	1450	10.3	1800	7.4	7.6	14
Canada	800	5.7	2296	9.4	12.9	23.8
<b>Europe</b>	2500	17.7	2200	9	12.5	23
W. Europe	1100	7.8	1800	7.4	12.5	23
UK	200	1.4	700	2.9	5	9.2
E. Europe	1400	9.9	400	1.6		
Russia	1000	7.1				
Australia-Asia and S. Africa	450	3.2	1950	8	3.6	6.6
Japan	35	0.2	100	0.4	0.1	0.2
<b>Developing Countries</b>	<b>8850</b>	<b>62.8</b>	<b>15969</b>	<b>65.7</b>	<b>17.6</b>	<b>32.4</b>
Latin America	4600	32.7	7481	30.8	8.5	15.7
Africa	900	6.4	1799	7.4	3	5.5
Asia	2950	20.9	6068	25	4.1	7.6
China	1100	7.8	1400	5.8		
India and Ceylon	450	3.2	1359	5.6	1.1	2
S. Europe					0.5	0.9
Middle East	400	2.8	621	2.6	1.5	2.8
<b>Whole</b>	<b>14085</b>	<b>100</b>	<b>24315</b>	<b>100</b>	<b>54.3</b>	<b>100</b>

**Source:** Dunning (1993: 118)

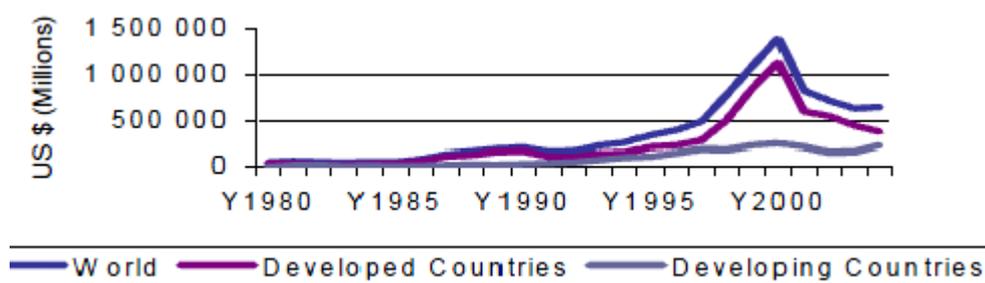
As it is obvious the “great winner” during this period was the USA, as its dividend of the total FDI outflows increased substantially, although it was still lower than this of the UK. However, German FDI outflows decreased substantially. The hesitation of the German enterprises to invest abroad along with a lack of capital and exchange were the two factors that dropped the German FDI outflows from 10.3% in 1914 to 1.3% before the World War II.

## 2.4 The Recent Period

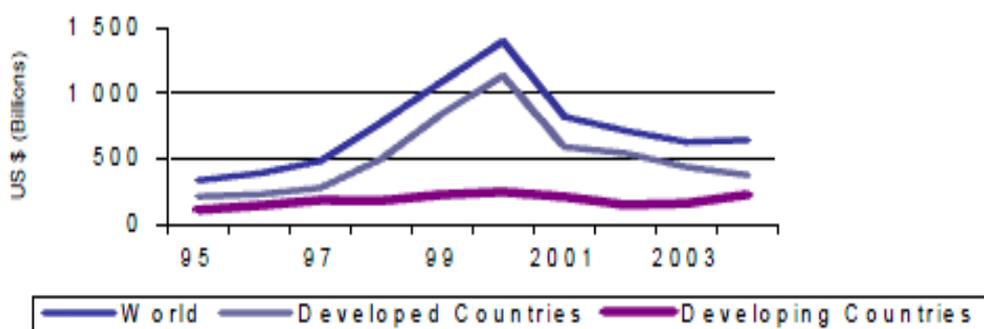
Over the last decades, the changing global economic and political environment has led to a renewed interest in Foreign Direct Investment. First, there has been a rapid and steady growth in global FDI flows since the late 1980s. Aggregate net inflows of FDI (in current US dollars) increased nearly six times from \$53 billion in 1985 to \$315 billion in 1996. Second, there was a sudden appearance of a large volume of FDI into the U.S., between 1985 and 1987: aggregate net inflows of FDI (in current US dollars) increased nearly three

times from \$20 billion to \$58 billion over the three year period.<sup>3</sup> Finally, during most of the 1980s, the majority of the developing economies were effectively shut out of the international capital markets following the borrowing binge of the 1970s and the breakdown of normal financial relations in 1982-1983 (the so-called “debt-overhang”). The financial constraint, particularly severe for the heavily indebted countries, quickly translated into a sharp decline in investment and growth rates in these economies. This resulted in the growing importance of FDI as a relatively reliable source of capital flows for the Less Developed Countries (LDCs). The next two figures show exactly the FDI flows since 1980s and since mid 1990s.

**Figure 2: FDI Flows since 1980**



**Figure 3: FDI Inflows by region since mid 1990s**



**Source:** Sahoo (2006)

Figure 2 looks at trends in global FDI flows since the 1980s. FDI flows were fairly stable in the first half of that decade, but started to rise steadily in the second half. This trend continued through the early 1990s, with the growth rate rising sharply in 1997. The years from 1997-2000 witnessed dramatic increases in FDI flows, which peaked in 2000 and declined sharply in the following three years, reflecting the global recession sparked by

<sup>3</sup> Source: World Development Report (1998)

the dotcom crash in 2000 and the economic effects of 9/11 in the US. They recovered marginally in 2004, settling at close to their 1998 level. FDI flows to developing countries were fairly stable in the 1980s. The 1990s witnessed a gradual rise in FDI, largely brought about by the dramatic changes in the policy structures of the “Asian Tigers”, which had begun to embark on programs of structural liberalization and open-market reform, aimed at ushering in a phase of export-led growth. Another contributing factor may have been the recovery of the Latin American economies, which had begun to emerge from the Debt Crisis in 1980s. However, as it was mentioned before; FDI is the greatest source of capital flows for the developing countries. Their progress over the years is going to be analyzed below.

The past decades have witnessed a dramatic increase in FDI to developing countries, with FDI increasing from \$24 billion (24% of total foreign investment) in 1990 to \$178 billion (61% of total foreign investment) in 2000 (World Bank 2001).

The 2007 Asian Development Outlook released by the Asian Development Bank pegged the growth rate of Asia at 8.2% for 2008. The rapid growth in Asia was led by two giants, one from South Asia and the other from East Asia, viz. India and China. The rate of growth of South Asia for 2007 was 8.1%, slightly lower than 8.7% in 2006, while East Asia’s growth rate was 8% for 2007, improving from 7.6% in 2006. One of the generally cited reasons for the growth in Asia is FDI. A large chunk of FDI in Asia is attracted by East and South Asia led by China and other five major economies, namely Thailand, Malaysia, Indonesia, South Korea, Vietnam and Philippines. Interestingly, the 1997 South East Asia economic crisis did not seem to have drastically affected the FDI inflows of South East Asian economies. A report released by the Asian Development Bank in 2001 said,

The crisis has not introduced a major discontinuity in FDI in the affected countries, apart from a modest decline in inflows in the immediate aftermath of the crisis. The FDI inflows to the five countries- Indonesia, Republic of Korea, Malaysia, Philippines, and Thailand- collectively reached US\$19.2 billion immediately before crisis, in the 1996. They dipped to US\$16.7 billion in 1998, but rebounded to US\$17.4 billion the following year (Asian Development Bank, 2001:14).

Contrary to the general belief that “after the crisis”, there would be a rollback of various liberalization policies related to attracting FDI, all the countries affected by the crisis had engaged in further liberalizing the regulations related to attracting FDI and this kept driving the FDI inflows in this region. By 2006, the total FDI inflows of South East Asian economies excluding Japan stood at US\$155 billion (UNCTAD 2007). On the other hand, the South Asian region led by India lags much behind East Asia in attracting FDI. South Asia as a region attracted as a region in 2006 FDI worth US\$20 billion. Though this is a great improvement from just under US\$3 billion in 2000 (Bhuhyan 2003), it is far behind its South East Asian counterparts.

The fact that FDI increased dramatically the last decades was welcome news, especially for poor countries that do not have access to international capital markets. However, Africa, the poorest region, did not benefit from FDI boom despite efforts to attract FDI. For example, over 1980-89 and 1990-98, FDI to sub-Saharan Africa (SSA) grew by 59%. This compares with an increase of 5,200% for Europe and Central Asia, 942% for East Asia and Pacific, 740% for South Asia, 455% for Latin America and Caribbean, and 672% for all developing countries (World Bank 2000a). Africa’s inability to attract FDI is troubling because FDI is crucial to the region. The reason is that FDI provides the needed capital for investment. In addition, FDI brings with it employment, managerial skills and technology, and therefore it accelerates growth and development. The role of FDI as a source of capital has become increasingly important to SSA. This stems from the fact that income levels and domestic savings in the region are very low. As a result, external capital is needed to supplement domestic savings in order to spur investment and growth. Most countries in SSA, however, do not have access to international capital markets and therefore have to rely on the other two forms of foreign finance: FDI and official loans (e.g., loans from multilateral organizations such as the World Bank). In addition, official lending to the region has declined substantially over the past decade. It is therefore imperative for SSA to increase its share of FDI in order to compensate for the decline in official assistance.

As for the Central and Eastern European Countries (CEECs) things are quite the same. European Union foreign Direct Investment to Eastern Europe increased exponentially in the 1990s when many Central and Eastern European Countries started their transition processes to democracy and a market economy. FDI in transition economies facilitated growth, promoted technical innovation, and accelerated enterprise restructuring in addition

to providing capital account relief (EBRD 2002). However, actual FDI flows to transition economies have been modest; in 2002, FDI to CEECs represented only 4.4% of world FDI, although it did increase from 2% in 1999 (UNCTAD 2003). The phenomenon of the FDI inflows to CEECs has been studied intensively in recent years because its potential impact on the industrial restructuring processes of the host countries (Hunya 1997; Sheehy 1994; Meyer 1995).

Generally, there has been an increase in the share of developing countries in FDI inflows. This increase has been accompanied, however, with a dramatic diversification in the composition of the major FDI recipients. This may reflect the existence of a wide variety of location-specific advantages over and above natural resources. Oil-producing countries are no longer important hosts. They accounted for a half of FDI flows to developing countries during 1979-81, compared to one-fifth during 1995-96.

The above review depicted the progress of FDI through the last decades. Nowadays, FDI still remains a great capital source for developing countries, whereas developed countries are still good exporters of investments.

### **3. Geographical and Sectoral Distribution of FDI**

#### **3.1 Geographical Distribution**

Private capital flows in the form of FDI have soared in recent years. From a yearly average of \$50 billion in 1980-84 FDI inflows jumped to \$300 billion in 1994-96. Developing countries received about 40% of global FDI inflows in 1994-96, compared to 25% in 1980-84.

Within the group of developing countries, the distribution of FDI flows varies widely both across regional groupings and individual countries, however, every developing region saw an increase in inflows. China has been the largest developing country recipient of FDI since 1992. With \$35 billion of FDI per year during 1993-96- equivalent to 35% of FDI flows to developing countries and 13% of global FDI inflows- China is the second largest recipient in the world behind the United States.

With \$68 billion on average in annual inflows during 1994-96, South, East and Southeast Asia received two-thirds of the developing-country total inflows over the same period. Excluding China, their share was 30% of the total.

Investment flows into Latin America and the Caribbean increased to a record level of \$39 billion per year during 1994-96. This amounts to 30% of all developing country inflows. This share is declining, however, from the peak of 39% in 1986. The investment stock in South, East, and Southeast Asia surpassed that in Latin America in 1988 and, since then, the disparity has widened.

The absolute level of FDI flows into Africa has increased from annual average of \$800 million during 1975-80 to an annual average of \$4.3 billion during 1994-96. This is more than a fivefold increase, compared with a 4.7 times increase in Latin America during the same period. Africa's share of developing- country inflows was 4.1% in 1994-96, the lowest share since 1980s. On average, Africa's share of developing- country inflows has more than halved, from 11% during 1986-90. While FDI flows into Africa have a small size and account for only a small share of flows into developing countries, their relative importance is quite high: in relation to gross fixed capital formation during 1994-96, FDI flows accounted for 7.8%. In 1996 Africa's FDI stock was 16.6% of the continent's GDP.

The above comments are briefly summarized in Table 3, which depicts the average FDI inflows worldwide from 1970- 2009.

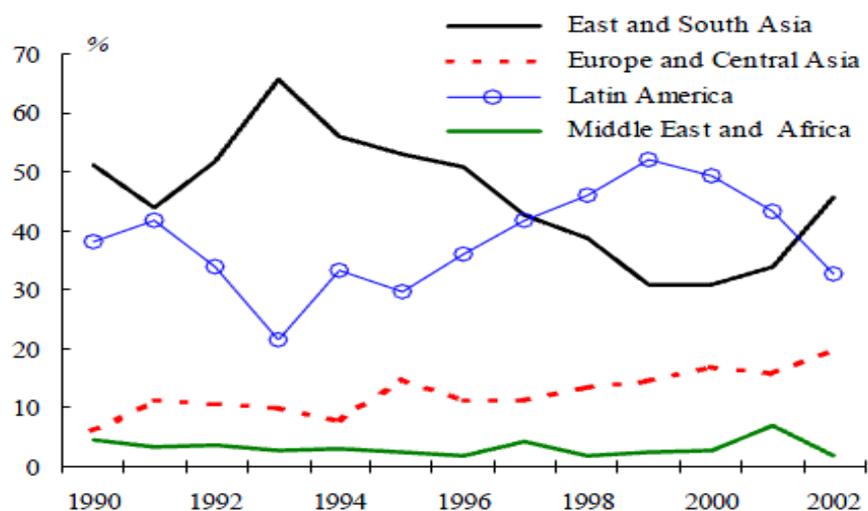
**Table 3: Average FDI Inflows for the World and Selected Regions; 1970-1990 and 1991-2009**

<b>Regions</b>	<b>1970-1990</b>		<b>1991-2009</b>	
	Average Inflows (in mill.)	As a Share of World Inflows	Average Inflows (in mill.)	As a Share of World Inflows
World	65533.5	100	810274.3	100
All Developed Economies	51234.9	78.2	536695.6	66.2
All Developing Economies	14291.1	21.8	247719.5	30.6
All Developing Economies Excluding China	13354.3	20.4	196489.8	24.2
Africa	1719.2	2.6	23081.5	2.8
America	4898.8	7.5	74861.4	9.2
Asia	7529.2	11.5	149154.9	18.4
Oceania	143.9	0.2	621.6	0.1

**Source:** World Investment Report (2010); Constant and Tien (2010)

As it was implied previously, during the 1990s and owing to economic developments, there have been changes in the relative importance of various geographic regions, with emerging countries (EMCs) being the most attractive FDI destinations. Driven by both market-seeking and efficiency-seeking investment, FDI in Asia rose rapidly in the early 1990s, with region's share in FDI to EMCs peaking at 63% in 1993. However, following the adoption of market-oriented reforms and the acceleration of the privatization of state-owned assets in a number of countries in Latin America, FDI to the region gained ground. This was reflected in the increasing share of Latin America in FDI to EMCs that mirrored the decline in the share of countries in Asia, with the latter reflecting the impact of financial crises. More recently, however, deteriorating economic conditions following the crisis in Argentina had led to a trend reversal, with FDI in Latin America declining, while flows to Asia continue to increase (Figure 5).

**Figure 5: Geographical Distribution of FDI to EMCs (Share in total)**



**Source:** 1990-2002, Balance of Payments Statistic Yearbook; UNCTAD database or national sources.

### 3.2 Sectoral Distribution

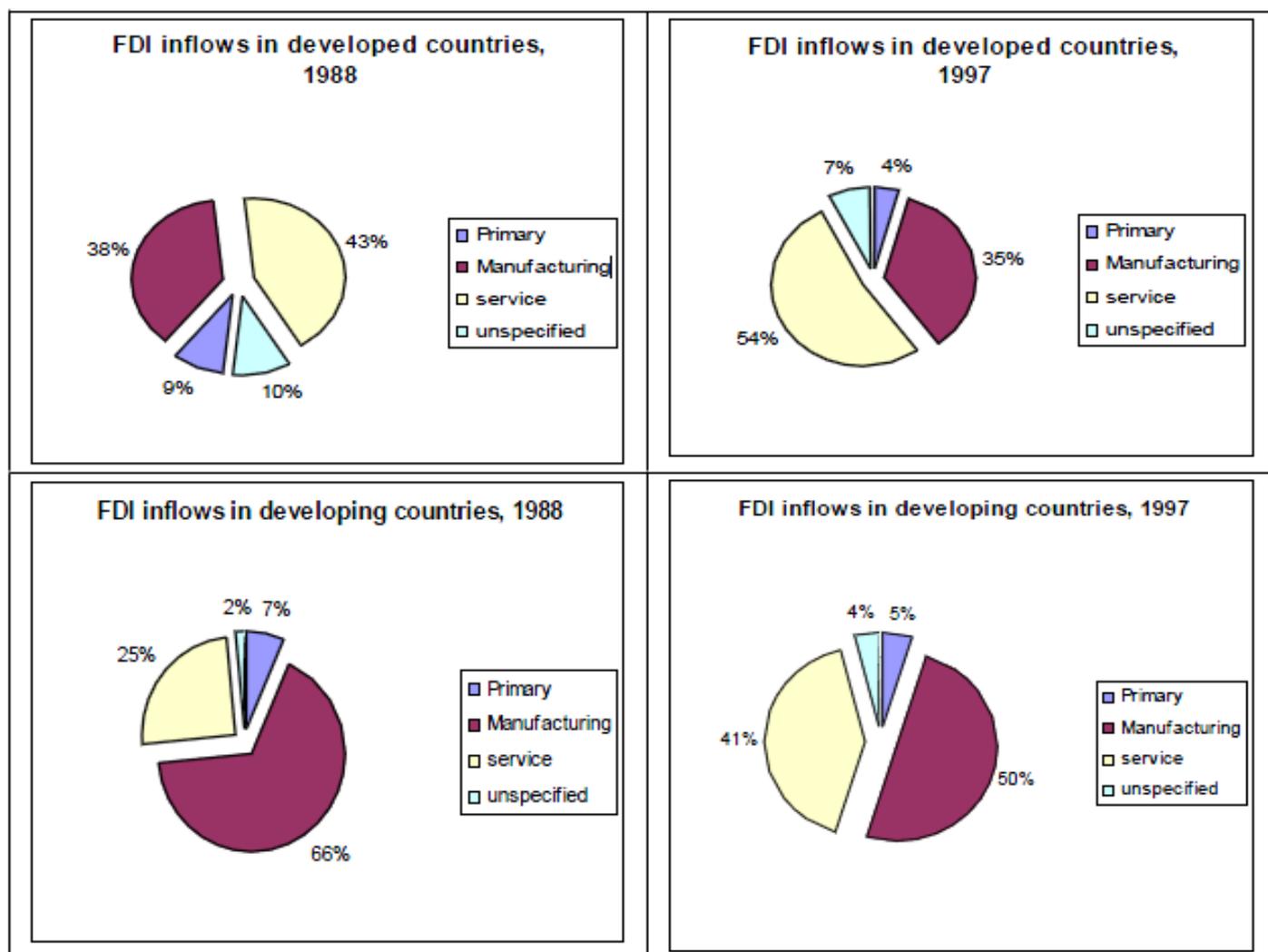
The rapid growth of FDI has been accompanied by significant changes in its sectoral composition as well. Broadly speaking, until the 1950s, FDI was concentrated in the primary sector and source-based manufacturing. The availability of natural resources was the most important host- country determinant of FDI (McKern 1996; UNCTAD 1998).

The relative importance of this factor has declined since the 1960s as FDI flowed into the manufacturing sector of developing countries to enter markets sheltered from international competition (*tariff-jumping* FDI).

During the 1980s, FDI inflows shifted toward services and technology-intensive manufacturing. In 1990, the share of services in the world stock of FDI was close to 50%. Their share in annual flows was almost 60%. During 1980-90, the share of capital- and technology- intensive industries in FDI rose faster in developing than developed countries, accounting in 1990 for more than 60% of developing countries' inward stock of FDI, compared to only about 40% in developed countries (UNCTAD 1993).

The sectoral distribution of world FDI inflows during the years 1988 and 1997, which means the last decades, is presented in Figure 6.

Figure 6: Sectoral Distribution of FDI Inflows in 1988 and 1997



Source: UNCTAD (various issues)

Looking at both developed and developing countries one can see how the share of services in total flows has increased quite substantially, whereas the share of manufacturing has dropped of what it was in 1988 in industrial countries. This shift is likely due to the rise of the service sector; the elimination of many restrictions to foreign entry and ownership, particularly in the banking and telecommunications sector. The pie charts in Figure 6 also reveal that the share of manufacturing FDI is consistently larger for developing countries than for developed countries, although less so as time goes by. Finally, this shift is also likely to be a response to comparative advantage and the emergence of vertical fragmentation of manufacturing production over the past decades.

The previous comments concerned a period from late 1980s to mid 1990s. However, Table 4 depicts the sectoral distribution of FDI inflows worldwide in the early 2000s.

**Table 4: Sectoral Distribution of World FDI Inflows in early 2000s (in US\$ billions)**

Sector	Developed Countries		Developing Countries		Total	
	Value	%	Value	%	Value	%
<b>Primary</b>	<b>22.2</b>	<b>2.1</b>	<b>17.8</b>	<b>8.9</b>	<b>40</b>	<b>3.2</b>
Agriculture	0.3	0	1.1	0.5	1.4	0.1
Mining	21.2	2	16.2	8.1	38.3	3.1
Unspecified	0.7	0.1	0.5	0.2	1.2	0.1
<b>Secondary</b>	<b>217.2</b>	<b>21</b>	<b>61.8</b>	<b>30.8</b>	<b>280.5</b>	<b>22.6</b>
Food, Drinks, Tobacco	7.5	0.7	3.9	1.9	12.4	1
Textiles	5.4	0.5	1.6	0.8	7	0.6
Wood and Wood Products	5.9	0.6	0.4	0.2	6.4	0.5
Publishing, Printing	5.1	0.5		0	5.1	0.4
Coke, Refined Petroleum and Nuclear Fuel	36.1	3.5	0.3	0.1	36.4	2.9
Chemicals	32.6	3.2	7.1	3.5	39.7	3.2
Rubber Products	2.3	0.2	0.2	0.1	2.5	0.2
Other Non-Metallic Mineral Products	4.8	0.5	0.5	0.2	5.4	0.4
Basic Metals	13.4	1.3	1.5	0.7	15	1.2
Manufacture of Machinery and Equipment	32.9	3.2	8.6	4.3	41.6	3.4
Electrical Machinery and Apparatus	39.2	3.8	9.5	4.7	48.7	3.9
Other Machinery	1.3	0.1		0	1.3	0.1
Transport Equipment	17	1.6	2.8	1.4	19.9	1.6
Other Manufacturing Industry	5.5	0.5	2.4	1.2	7.9	0.6
Unspecified	8.1	0.8	22.9	11.4	31.2	2.5
<b>Tertiary</b>	<b>734.2</b>	<b>71</b>	<b>113.2</b>	<b>56.3</b>	<b>849.7</b>	<b>68.5</b>
Electricity, Natural Gas and Water	16.8	1.6	9.7	4.8	26.5	2.1
Constructions	2.5	0.2	1.9	0.9	4.4	0.4
Commerce	54.4	5.3	16.3	8.1	71.5	5.8
Hotels and Restaurants	2.7	0.3	2.4	1.2	5.1	0.4
Transports	126.2	12.2	15.8	7.9	143	11.5
Financial Services	284.8	27.5	24.4	12.1	309.3	24.9
Business Activities	213.2	20.6	33.8	16.8	247.1	19.9
Health and Social Services	0.2	0	0.1	0	0.3	0
Other Services	30	2.9	7.3	3.6	37.3	3
Unspecified	3.6	0.3	1.5	0.7	5.2	0.4
<b>Private Purchases of Assets</b>	<b>0.4</b>	<b>0</b>		<b>0</b>	<b>0.4</b>	<b>0</b>
<b>Unspecified</b>	<b>60.1</b>	<b>5.8</b>	<b>8.1</b>	<b>4</b>	<b>68.3</b>	<b>5.5</b>
<b>Total</b>	<b>1034.2</b>	<b>100</b>	<b>200.9</b>	<b>100</b>	<b>1239.9</b>	<b>100</b>

Source: UNCTAD (2003: 192)

The main results of this table are:

The importance of the primary sector is rather limited, both for developed and for developing countries. Inside the primary sector, investments in agriculture in the two country groups is very limited, and as a whole of inflows they get only 0.1%. On the other hand, the vast majority of the primary sector is occupied by the mining, where the petroleum sector has central role.

In the secondary sector, the most important sectors could be grouped in two wider categories. The first concerns capital-intensive sectors (Coke, refined petroleum, nuclear fuel and chemicals), whereas the other is the scale-intensive category (basic metals, electric and electrical equipment). It is quite weird that the typical labor-intensive sectors (textiles and wood) have limited percentages, even in the developing countries.

The tertiary sector is by far the most important, especially for the developed countries (71% of the total FDI inflows). However, there are substantial differentiations between countries.

#### 4. The Determinants of FDI

There are two reasons why a firm wants to become a multinational one. Shatz and Venables (2000) express this view quite well. According to them, one reason is to better serve the local market, and the other is to get lower-cost inputs. When FDI is to serve local markets is called “horizontal” (market-seeking) FDI, as it involves building duplicate plants in a foreign location to supply the market there. FDI in search of low-cost inputs is called “vertical” (production cost-minimizing) FDI since it involves slicing the vertical chain of production and relocating part of the chain in a low cost location.

The above framework suggests a group of factors that may be substantial in affecting FDI, such as economic distance/transport cost, market size, agglomeration effects, factor cost, fiscal incentives, business/investment climate and political, economic stability/risk, and trade barriers/openness. While some of these factors are likely to affect all types of FDI, the different strategic objectives implicit in horizontal and vertical FDI also suggest that certain factors may affect one type of FDI more than the other. We discuss the rationales underlying the choice of these determinants and their likely impact on FDI below:

*Economic distance/transport costs:* to the extent that horizontal FDI will tend to replace exports if the cost of market access through exports is high, horizontal FDI will tend to increase if the distance between home and host markets is large, leading to higher transport costs. However, the vertical FDI, which is export-oriented, may be discouraged by high transport costs because of the need to ship vast amounts of imports and exports of components and final goods. The net impact of transport cost on FDI is uncertain.

*Size of the host market:* larger host markets are believed to reduce the cost of supplying the market because of economies of scale and lower fixed cost per unit of output. Thus, a larger host market will encourage horizontal FDI. Vertical FDI, however, is indifferent to the host’s market size. The net impact of market size on FDI is likely to be positive.

*Agglomeration effects:* to the extent that agglomeration effects make clustering attractive, their impact on both horizontal and vertical FDI will be positive. Factors contributing to agglomeration effects include the state of the host country’s infrastructure, the degree of industrialization, and the size of existing FDI stock. The net impact of agglomeration effects on FDI is positive.

*Factor cost:* production cost-minimizing vertical FDI will be stimulated directly by lower factor cost. Lower factor cost should also be viewed favorably by horizontal FDI. The net impact of lower cost on FDI is positive.

*Fiscal incentives:* fiscal incentives in the host country can increase the country's locational advantage for both types of FDI. However, production cost-minimizing FDI may be more likely to respond to fiscal incentives, since they are more sensitive to costs. Horizontal FDI tend to be more concerned about the viability of the host market and may thus tend to favor other policies (like protectionist policies) than fiscal incentives. However, all things being equal, the net impact of fiscal incentives on FDI should be positive.

*Business/ investment climate:* a friendlier business/ investment climate lowers the additional costs of doing business in a foreign country, thus benefiting both horizontal and vertical FDI. These costs have to do with factors like regulatory, bureaucratic, and judicial hurdles. In general, more restrictive performance requirements, an unstable political situation, or economic instability would make the host country less attractive for all types of FDI.

*Trade barriers/openness:* horizontal FDI undertaken to get behind trade barriers may decrease with an increase in openness. However, other FDI will be stimulated. Vertical FDI, which requires substantial flows of intermediate inputs and goods in and out of the host country, and benefits from a liberal and predictable trade environment, will increase with greater openness. In addition, other horizontal FDI may be stimulated to the extent that widespread trade liberalization in concert particularly with other liberalizing measures lead to a better business climate and expectations of better long term economic growth prospects and increasing market size. The net impact of openness on FDI is uncertain.

## 5. Empirical Section

After having analyzed the determinants of FDI in the previous section, we are now able to conduct our own survey on this matter. We have selected a number of potential determinants and we are going to investigate their impact on FDI inflows.

### 5.1 Literature Review

As it was mentioned several times before, it is well known that the growth of multinational enterprise (MNE) activity in the form of Foreign Direct Investment (FDI) has grown at a faster rate than most other international transactions, particularly trade flows between countries. These real-world trends have led to substantial recent interest by the international economics literature to empirically investigate the fundamental factors that drive FDI behavior.

Nunnenkamp and Spatz (2002) used a comprehensive survey data, collected by the European Round Table of Industrialists, on investment conditions in twenty eight developing countries since late 1980s. They separated the FDI determinants in traditional (population of host country, GDP per capita in host country, GNP growth of host countries, administrative bottlenecks, entry restrictions, risk factors) and non-traditional (complementary factors of production, cost factors, restrictions of foreign trade) and applied Spearman correlation coefficients and panel data regression models. They showed that traditional market-related determinants are still dominant factors shaping the distribution of FDI. The importance of non-traditional FDI determinants has increased only modestly.

Addison and Heshmati (2003) in their paper used a large sample of countries and together with panel data techniques, explored the determinants of FDI. The main findings were that democratization and ITC increase FDI inflows to developing countries.

Asiedu (2002) tried to explore whether factors that affect FDI in developing countries affect countries in sub-Saharan Africa differently. She applied a simple OLS method and resulted that Africa is *different*- suggesting that policies that have been successful in other regions may not be equally successful in Africa.

De Vita and Kyaw (2008) used a panel of thirty two developing countries over the period 1990-2004 and examined the significance of the key economic determinants of FDI and portfolio flows. Having applied recently developed panel data techniques that account for

individual and time effects, integration and cointegration properties, endogeneity and serial correlation, they ended up that for FDI flows to developing countries domestic productivity growth is the dominant determinant and for portfolio flows, domestic money growth is the major “pull factor”.

Resmini (2002) investigated the determinants of European Union FDI in the CEECs at sectoral level. The estimated model was a generalization of a three-way fixed effect model incorporating “classic” variables. The results confirmed the presence of heterogeneity at sectoral level.

Finally, Bevan and Estrin (2004) used a panel dataset of bilateral flows of FDI and studied the determinants of FDI from Western countries, mainly in the European Union (EU), to Central and Western European ones. They found the most important influences to be unit labor costs, gravity factors and market size.

The next table summarizes the above literature.

<b>Literature Review</b>			
<b>Authors</b>	<b>Data</b>	<b>Methodology</b>	<b>Conclusions</b>
Nunnenkamp and Spatz (2002)	28 developing countries since 1980	Spearman correlation coefficients and panel regression models	The traditional market-related determinants are the dominant determinants of FDI
Addison and Heshmati (2003)	207 countries; data from 1960 to 1999	Panel data techniques (Pooled OLS and within-estimation methods)	Democratization and ITC increase FDI inflows to developing countries
Asiedu (2002)	72 poor countries from Sub-Saharan Africa, Latin America and Caribbean, Asia and other	OLS method	Successful policies in other regions are not equally successful in Africa
DeVita and Kyaw (2008)	32 developing countries; data from 1990 to 2004	Recently developed panel data techniques (individual and time effects, integration and cointegration properties)	Domestic productivity growth and domestic money growth are the major determinants for FDI and portfolio flows respectively
Resmini (2002)	12 host countries of Central and Eastern Europe; data from 1990 to 1995	Three-way fixed effect model	Presence of heterogeneity at sectoral level
Bevan and Estrin (2004)	Western and Central European countries; data from 1994 to 2000	Fixed and random effects methods	Unit labor costs, gravity factors and market size are the most important determinants of FDI

## 5.2 Data and Model Specification

The panel data used in this study is annual data from 1987 to 2010, extracted from World Bank's (WDI) database. Five south Asian countries are included in the study. The countries are: China, India, Indonesia, Malaysia and Philippines. Although the selection of the sample was dictated by data availability, the study of these countries is considered

to be rather interesting as their macroeconomic environment has changed substantially over the last two decades. The sample includes the FDI inflows of these countries and their potential determinants over the years tested. The potential determinants are: the market size proxied by GDP in current US\$, the economic activity approximated by the GDP growth rate (GDPGR), The general government final consumption expenditure (GOVCON), the rate of industrialization (INDUSTR) approximated by the manufacturing degree of these countries as a percentage of GDP, the annual inflation rate (INFL) and the degree of openness (OPEN) calculated as the sum of imports and exports which are percentage of GDP.

Drawing from relevant literature, key economic determinants have been considered through a framework based on push and pull factors. The model we estimate can be written as:

$$y_{qi,t} = \alpha_i + \sum_{j=1}^N \sum_{t=1}^T \beta_j x_{ji,t} + \sum_{f=1}^N \sum_{t=1}^T \beta_f x_{fi,t} + \varepsilon_{i,t} \quad (1)$$

where  $y_{qi,t}$  denotes the capital flow type q received by country i at time t (where q refers to FDI);  $\alpha_i$  is the country specific effect;  $x_{ji,t}$  is a vector of domestic variable j at time t in country i;  $x_{fi,t}$  is a vector of external variable f at time t in country i;  $\alpha_i$ 's,  $\beta_j$ 's and  $\beta_f$ 's are parameters to be estimated; and  $\varepsilon_{i,t}$  is the error term (assumed to be independently and identically distributed across countries and time with mean zero and variance  $\sigma_\varepsilon^2$ ). Each country i (where  $i = 1, 2, \dots, N$ ) is observed for periods  $t = 1, 2, \dots, T$ .

Two types of estimators, fixed effects and random effects estimators are designed to incorporate individual effects and time effects. The fixed effects estimator uses a separate intercept for each country or time period. The random effects estimator is based upon the decomposition of  $\varepsilon_{i,t}$  into the individual effect, the time effect, and the purely random effect.  $\beta$ 's are estimated by generalized least square using the structure imposed upon  $\varepsilon_{i,t}$  by this assumption. The model given in (1) maybe re-written as:

$$y_{i,t} = \alpha_i + x'_{i,t} \beta + \varepsilon_{i,t} \quad (2)$$

where  $x_{i,t}$  denotes a vector of regressors which in our case are the determinants of FDI,  $\beta$  is a vector of parameters, and all  $x_{i,t}$  are assumed independent of all  $\varepsilon_{i,t}$ . The fixed

effects model involves intercept terms that vary over the individual units  $i$ ,  $\mathbf{a}_i$ . The covariance matrix for the fixed effects estimator  $\hat{\beta}_{FE}$  is given by

$$\sigma_\varepsilon^2 (\sum_{i=1}^N \sum_{t=1}^T (x_{i,t} - \bar{x}_i)(x_{i,t} - \bar{x}_i)')^{-1}.$$

Assuming that  $\mathbf{a}_i$  are random factors, the random effects model based on (2) can be written as:

$$y_{i,t} = u + x'_{i,t} \beta + \mathbf{a}_i + \varepsilon_{i,t} \quad (3)$$

where  $\mathbf{a}_i + \varepsilon_{i,t}$  is treated as an error term consisting of an individual specific component, that does not vary over time, and a remainder component, that is assumed to be uncorrelated over time. It is also assumed that  $\mathbf{a}_i$  and  $\varepsilon_{i,t}$  are mutually independent and independent of  $x_{i,t}$ . The covariance matrix of the random effects estimator is

$$\sigma_\varepsilon^2 \left( (\sum_{i=1}^N \sum_{t=1}^T (x_{i,t} - \bar{x}_i)(x_{i,t} - \bar{x}_i)') + \theta T \sum_{i=1}^N (\bar{x}_i - \bar{x})(\bar{x}_i - \bar{x})' \right)^{-1}$$

where  $\theta = \frac{\sigma_\varepsilon^2}{\sigma_\varepsilon^2 + T\sigma_a^2}$ . However, in cases where  $\mathbf{a}_i$  and  $x_{i,t}$  are correlated, the random effects approach leads to inconsistent estimators. This correlation problem between individual effects and explanatory variables in  $x_{i,t}$  can be handled by the fixed effects approach, which estimates  $\mathbf{a}_i$  from the model, thereby eliminating any problems that  $\mathbf{a}_i$  may cause.

In order to determine which of the two alternative models (fixed versus random effects) should be chosen, we use Hausman's (1978) specification test. The test is conducted for the null hypothesis that explanatory variables and individual specific effects are uncorrelated. The general idea of a Hausman test is that two estimators are compared: one that is consistent under both the null and alternative hypothesis and one that is consistent (and typically efficient) under the null hypothesis only. A significant difference between the two estimators indicates that the null hypothesis is unlikely to hold. The Hausman test statistic is computed as:

$$\xi_H = (\hat{\beta}_{FE} - \hat{\beta}_{RE})' [\hat{V}\{\hat{\beta}_{FE}\} - \hat{V}\{\hat{\beta}_{RE}\}]^{-1} (\hat{\beta}_{FE} - \hat{\beta}_{RE})$$

where  $\hat{\beta}_{FE}$  and  $\hat{\beta}_{RE}$  are the fixed effects and random effects estimators respectively and  $\hat{V}$ s denote estimates of the true covariance matrices. Under the null hypothesis, which

implicitly says that  $\text{plim}(\hat{\beta}_{FE} - \hat{\beta}_{RE}) = 0$ , the statistic  $\xi_H$  has an asymptotic Chi-squared distribution with K degrees of freedom, where K is the number of elements in  $\beta$ . The Hausman test thus tests whether the fixed effects and random effects estimators are significantly different.

Furthermore, if the data generating process (DGP) is characterized by panel unit roots, this can result in spurious inferences if the panel data properties are not carefully taken into account. Performing panel unit root tests is therefore essential. Levin and Lin (1992) propose the following panel unit root test, designed to deal with the problem of heteroskedasticity and autocorrelation:

$$\Delta y_{i,t} = \rho_i y_{i,t-1} + e_{i,t} \quad (4)$$

where  $\rho$  is the autoregressive parameter and  $e$  is the stochastic error. Under the null hypothesis  $\rho = 0$ , the adjusted t-statistic has a standard normal distribution. If we denote  $\rho_i$  the value of  $\rho$  for the  $i^{\text{th}}$  cross sectional unit, then the LL test specifies the null hypothesis as  $\rho_i = 0$  for all  $i$  and the alternative as  $\rho_i = \rho < 0$  for all  $i$ . Yet the latter hypothesis may be too strong as it is based on the assumption that all countries will mean revert at the same rate if they do converge (however, there is heterogeneity in the error variances and the serial correlation structure of the errors). This assumption may be relaxed by implementing the Im, Pesaran and Shin (IPS) (2003) test, which allows for heterogeneity in the autoregressive parameter under the alternative hypothesis (Levin et al., 2002). Moreover, Pedroni (2004) suggest that if the DGP is characterized by panel unit roots, testing for cointegration becomes paramount (details of panel cointegration test statistics are reported in the Methodology Section).

### 5.3 Methodology

The Engle-Granger (1987) cointegration test is based on an examination of the residuals of a spurious regression performed using I(1) variables. If the variables are cointegrated then the residuals should be I(0). On the other hand if the variables are not cointegrated then the residuals will be I(1). Pedroni (1999, 2004) and Kao (1999) extend the Engle-Granger framework to tests involving panel data.

Pedroni's (2004) panel cointegration procedure uses the residuals from the cointegrating regression  $y_{i,t} = \alpha_i + \delta_i t + x_{i,t} \beta_i + e_{i,t}$  for  $t = 1, 2, 3, \dots, T$ ;  $i = 1, 2, 3, \dots, N$ ; where

$\beta_i = (\beta_{1i}, \beta_{2i}, \dots, \beta_{Mi})'$  and  $x_{it} = (x_{1i,t}, x_{2i,t}, \dots, x_{Mi,t})'$ . This formulation allows for considerable heterogeneity in the panel, since heterogeneous slope coefficients, fixed effects and individual specific deterministic trends are all permitted. Under the null hypothesis of no cointegration, the residuals  $e_{i,t}$  will be I(1). The general approach is to obtain residuals from the previous equation and then to test whether residuals are I(1) by running the auxiliary regression,

$$e_{it} = \rho_i e_{it-1} + u_{it}$$

or

$$e_{it} = \rho_i e_{it-1} + \sum_{j=1}^{p_i} \psi_{ij} \Delta e_{it-j} + v_{it}$$

for each cross-section. Pedroni describes various methods of constructing statistics for testing the null hypothesis of no cointegration ( $\rho_i = 1$ ). There are two alternative hypotheses: the homogenous alternative, ( $\rho_i = \rho < 1$  for all  $i$  (which Pedroni terms the within-dimension test or panel statistics test), and the heterogeneous alternative,  $\rho_i < 1$  for all  $i$  (also referred to as the between-dimension or group statistics test). Pedroni shows that the standardized statistic is asymptotically normally distributed,

$$\frac{\mathbf{N}_{N,T} - \mu\sqrt{N}}{\sqrt{v}} \Rightarrow N(0,1)$$

where  $\mu$  and  $v$  are Monte Carlo generated adjustment terms. Details for these calculations are provided in the original papers.

The Kao test follows the same basic approach as the Pedroni tests, but specifies cross-section specific intercepts and homogeneous coefficients on the first-stage regressors. In the bivariate case described in Kao (1999), we have

$$y_{it} = a_i + \beta x_{it} + e_{it}$$

for

$$y_{it} = y_{it-1} + u_{i,t}$$

$$x_{it} = x_{it-1} + \varepsilon_{i,t}$$

for  $t = 1, \dots, T$ ;  $i = 1, \dots, N$ . Kao runs either the pooled auxiliary regression,

$$e_{it} = \rho e_{it-1} + v_{it}$$

or the augmented version of the pooled specification,

$$e_{it} = \tilde{\rho} e_{it-1} + \sum_{j=1}^p \psi_j \Delta e_{it-j} + v_{it}$$

Under the null of no cointegration, Kao shows that following the statistics,

$$DF_{\rho} = \frac{T\sqrt{N}(\hat{\rho} - 1) + 3\sqrt{N}}{\sqrt{10.2}}$$

$$DF_t = \sqrt{1.25}t_{\rho} + \sqrt{1.875N}$$

$$DF_{\rho}^* = \frac{\sqrt{NT}(\hat{\rho} - 1) + 3\sqrt{N}\hat{\sigma}_v^2/\hat{\sigma}_{0v}^2}{\sqrt{3 + 36\hat{\sigma}_v^4/(5\hat{\sigma}_{0v}^4)}}$$

$$DF_t^* = \frac{t_{\rho} + \sqrt{6N}\hat{\sigma}_v/(2\hat{\sigma}_{0v})}{\sqrt{\hat{\sigma}_{0v}^2/(2\hat{\sigma}_v^2) + 3\hat{\sigma}_v^2/(10\hat{\sigma}_{0v}^2)}}$$

and for  $p > 0$  (*i.e.* the augmented version),

$$ADF = \frac{t_{\rho} + \sqrt{6N}\hat{\sigma}_v/(2\hat{\sigma}_{0v})}{\sqrt{\hat{\sigma}_{0v}^2/(2\hat{\sigma}_v^2) + 3\hat{\sigma}_v^2/(10\hat{\sigma}_{0v}^2)}}$$

converge to  $N(0,1)$  asymptotically, where the estimated variance is  $\hat{\sigma}_v^2 = \hat{\sigma}_u^2 - \hat{\sigma}_{u\varepsilon}^2 \sigma_{\varepsilon}^{-2}$  with estimated long run variance  $\hat{\sigma}_{0v}^2 = \hat{\sigma}_{0u}^2 - \hat{\sigma}_{0u\varepsilon}^2 \sigma_{\varepsilon}^{-2}$ .

Fisher (1932) derives a combined test that uses the results of the individual independent tests. Maddala and Wu (1999) use Fisher's result to propose an alternative approach to testing for cointegration in panel data by combining tests from individual cross-sections to obtain a test statistic for the full panel,

$$-2 \sum_{i=1}^N \log(\pi_i) \rightarrow \chi_{2N}^2$$

#### 5.4 Empirical Results

The econometric analysis is carried out in two stages. The first stage deals with short run analysis, where the fixed and random effects estimators are calculated; and in the second stage we try to investigate the nature of any long run relationship between FDI inflows and the GDP. In order for these analyses to be conducted properly we first verify the order of integration of our data through panel unit root tests. Table 5 shows the results.

**Table 5: Panel Unit Root Tests**

Variable	LL stat	IPS stat	ADF stat	Order of Integration
FDI	0.115 (0.545)	1.623 (0.062)	16.086 (0.097)	I(1)
DFDI	3.174 (0.000)	5.002 (0.000)	44.030 (0.000)	I(0)
GDP	7.475 (0.859)	8.526 (0.654)	0.159 (0.871)	I(1)
GDPGR (DGDP)	3.592 (0.001)	3.621 (0.001)	31.639 (0.005)	I(0)
GOVCON	0.744 (0.228)	1.194 (0.116)	14.135 (0.166)	I(1)
DGOVCON	1.256 (0.000)	2.644 (0.000)	23.130 (0.000)	I(0)
INDUSTR	0.618 (0.268)	0.416 (0.338)	9.561 (0.479)	I(1)
DINDUSTR	5.473 (0.000)	7.855 (0.000)	68.876 (0.000)	I(0)
INFL	2.764 (0.003)	2.658 (0.004)	23.920 (0.008)	I(0)
OPEN	0.846 (0.198)	0.094 (0.537)	8.926 (0.539)	I(1)
DOPEN	3.390 (0.000)	3.551 (0.000)	31.618 (0.000)	I(0)

**Note:** The critical values for LL test and IPS test are based on Levin and Lin (1992)

and Im *et al.* (2003) respectively. Numbers in brackets are the *p-values*.

Although the test results are mixed, the null hypothesis of a unit root cannot be rejected in several cases.

### 5.4.1 Short Run Analysis

The fixed and random effects panel methods are based on the stationarity assumption. We take the first differences of the variables that are I(1). Thus, all the variables used for the estimation of the fixed and random effects estimators are I(0). Table 6 shows the results been accrued.

**Table 6: Fixed and Random effects estimators (Dependent Variable DFDI)**

	Fixed effects		Random effects	
	Estimated Coefficient	p-value	Estimated Coefficient	p-value
CONST	-0.06	0.76	-0.068	0.69
GDPGR (DGDP)	4.074 **	0.029	5.07 **	0.004
DGOVCON	1.227	0.282	1.436	0.225
DINDUSTR	0.158 **	0.042	0.158 **	0.042
INFL	0.001	0.934	0.008	0.428
DOPEN	1.486 **	0.026	1.257 **	0.041

**Note:** \*\* denote significance at 5 percent.

Only three of the potential determinants of FDI inflows are significant with GDP growth rate being the most substantial both in the fixed and in the random effects methods. It is also obvious that the significant determinants have the same positive impact on FDI inflows.

The choice between fixed and random effects approach is not easy. The results of the Hausman test (see Table 7) suggest that, for FDI inflows, the random effects model is the best choice.

**Table 7: Hausman test**

Chi-Squared statistic	p-value	Method selected
8.458	0.856	Random effects

### 5.4.2 Long Run Analysis

In the short run analysis we found out that GDP growth rate, the first difference of GDP, is the most substantial determinant of FDI. In the long run analysis we are willing to investigate if FDI and GDP are cointegrated. Both series are I(1) (see Table 1), which allows us to apply several panel cointegration methods. Table 8 summarizes the panel cointegration tests used in the analysis.

**Table 8: Panel Cointegration Tests**

		statistic	p-value
	Panel v-stat	2.487	0.006
	Panel rho-stat	-1.968	0.024
	Panel PP-stat	-2.638	0.004
<b>Pedroni's test</b>	Panel ADF-stat	-2.433	0.007
	Group rho-stat	-1.491	0.049
	Group PP-stat	-2.94	0.002
	Group ADF-stat	-2.707	0.003
<b>Kao's test</b>		-2.084	0.018
	trace test $r=0$	34,17	0,002
<b>Fisher's test</b>	$r \leq 1$	33,88	0,002
	max eig test $r=0$	20,40	0,025
	$r \leq 1$	33,88	0,002

The results of the application of the panel cointegration tests showed that according to Pedroni's test, the null hypothesis of no cointegration is rejected. Thus, there is a long run relationship between the FDI inflows and the GDP with the long-run coefficient being 2,06E-13 and statistically significant. From the above result it is obvious that FDI inflows and GDP are positively cointegrated. This result is compatible with the majority of the studies conducted on this matter.

## 6. Concluding Remarks

From the above analysis it became clear-cut that Foreign Direct Investment is a very important source of external finance worldwide especially for the developing countries, where FDI is considered to be the most substantial source of financing. This thesis coped with several issues related to the FDI.

First and foremost, in the first section an analytical definition of the FDI was offered. We stated that FDI is composed of three components- equity capital, reinvested earnings, and intra-company loans- and its basic types are the market seeking, the efficiency seeking, the resource seeking, and the strategic seeking FDI. Moreover, it was mentioned that nominal values of the flows in or out of a country (inward and outward) and stock values are used as a measure of FDI. However, many problems arise due to the availability of these macroeconomic time series. FDI is a controversial issue, which has benefits and drawbacks. In the last part of Section 1 we indicated some of them.

In the second section of the thesis we gave a quite analytical historical review of FDI. Having started from the ancient years and the trade relationship between the Greek colonization and the metropolitan town, which is referred as an early form of FDI activity, we ended up this section by mentioning the renewed interest in FDI in the recent period. Since the late 1980s, there has been a rapid and steady growth in global FDI flows. This was welcome news, especially for poor countries that did not have access to international capital markets.

Section 3 included a geographical and sectoral distribution of FDI. It was mentioned that during 1990s EMCs and Latin American countries became attractive FDI destinations. However, due the crisis in Argentina in early 2000s, FDI in Latin America started declining with FDI flows to Asia gaining ground. As far as the sectoral distribution is concerned, the available data indicated that in the early 2000s the primary sector is rather limited, both for developed and for developing countries. In the secondary sector, the typical labor-intensive sectors (textiles and wood) have limited percentages, even in the developing world. Finally, the tertiary sector is the most important sector, especially for the developed countries.

In Section 4, we analyzed the potential determinants of FDI, whereas in Section 5 we conducted our own survey on this matter. We selected five south Asian countries- China,

India, Indonesia, Malaysia, and Philippines- and investigated the impact of some determinants on FDI inflows in these countries during the years 1987 and 2010. The selected determinants were: the market size, the economic activity, the general government final consumption expenditure, the rate of industrialization, the annual inflation rate, and the degree of openness of the host countries. The short-run analysis included the estimations of fixed and random effects estimators. The result was that the GDP growth rate, proxy of the economic activity, was the most important determinant with a positive signaling. The Hausman test demonstrated the random effects model as the best choice. In the long-run analysis, we were willing to investigate whether FDI and GDP are cointegrated. Thus, we used several panel cointegration methods which indicated that there is a positive long-run relationship between them. This result is compatible with the majority of the studies which coped with the relationship between FDI inflows and their potential determinants.

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