Foreign Direct Investment in Egypt
Determinants, Spillovers, and Causality

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Abstract

Foreign direct investment (FDI) is being widely considered as an important vehicle for economic growth in least developed countries (LDCs). Egypt is a particularly interesting case to examine for a number of reasons. First, the recent increase in the inflow of FDI in Egypt, although important in itself, is still lower than what is expected. Second, the role of FDI in promoting output and the direction of causation is still unknown as little empirical research has been conducted in this field for Egypt.

Most empirical studies of foreign direct investment (FDI) typically use either a cross-sectional or time series approach. The originality of the study is in the empirical investigation of these issues on the basis of a broad panel of sectoral data for Egypt. This thesis attempts to explore the determinants of FDI at the sectoral level in the Egyptian economy by using a panel data of 10 sectors over the period from 1983 to 2004. The results highlight that private domestic investment, openness' to trade, and government policies towards reforming and improving business and investment climate are important determinants of sectoral FDI in Egypt. Second, it attempts to fill the empirical gap in the literature by re-examining the impact of FDI on productivity for a cross sectional sample of the Egyptian manufacturing sector from 1975 to 2005. The results reveal that foreign direct investment inflows exert a positive spillover effect on productivity. Finally, it aims to study the causal link between FDI and GDP by using a time series data from 1978 to 2009. The econometric framework of cointegration and error correction mechanism were used to capture two way linkages between FDI and GDP. It is evident that in the long run there is a bidirectional relation, while in the short run, causality runs from FDI to GDP.

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Abbreviations

ASEAN	Association of Southeast Asian Nations
BOT	Build Operate Transfer
BOP	Balance of Payment
CAPMAS	Central Agency for Public Mobilization and Statistics
CBE	Central Bank Of Egypt
ERSAP	Economic Reform and Structural Adjustment Program
FDI	Foreign direct Investment
GAFI	The General Authority for Free Zones and Investment
GDP	Gross Domestic product
GNP	Gross National Product
GOE	Government of Egypt
IMF	International Monetary Fund
LDCs	Less Developed Countries
M & A	Mergers and Acquisitions
MENA	Middle East and North Africa
MNCs	Multinational companies
MNEs	Multinational enterprises
NICs	Newly Industrialized countries
QUIZ	Qualified Industrial Zones
R&D	Research and Development
S&T	Science and Technology
SOEs	State owned enterprises
UNCTAD	United Nations Conference on Trade and Development
VIF	Variance Inflation Factor

Chapter One

Introduction

1.1 Introduction

The officially announced development strategy in such East Asian countries as China and Southeast Asian Nations (ASEAN) is based on export development. Economic development policies, in these countries, have been based on promoting Foreign Direct Investment (FDI) as a main area of development. It has been argued that, if host countries manage to attract sufficient inflows of FDI, foreign investment will bring, technology, expertise to the host country, capital which will, in turn, enable all these countries to have access to international markets, resulting in rapid rates of economic growth. Since Egypt has pursued a policy of large scale economic reform, in addition to other macroeconomic policies under the Economic Reform and Structural Adjustment Programme (ERSAP), which started in 1991, and involved gradual processes of privatisation of state enterprises, reform of firm laws and consolidating equity markets; thus, in Egypt, emphasis from policy makers continues to be placed on export promotion with a view to invigorating the competitiveness of the Egyptian economy. Egypt is looking for FDI by multinational enterprises (MNEs) and urges private foreign investors to help fund modernisation of the local economy to boost and diversify output and exports, and to expand employment opportunities for the country's rapidly increasing population.

Egypt still lacks studies of FDI effects, the effect of FDI on output and the direction of causality; this deficiency has had a negative impact on the formulation of appropriate promotion policies for FDI in Egypt. As such, an analysis of this kind is crucially important and badly needed due to the significant policy consequences of FDI. If FDI positively affects output, it follows that FDI inflows should be encouraged and promoted without restriction. If, on the other hand, FDI does not have a positive impact on output, it follows

that there is no need for tax incentives or subsidies or promotion plans to attract FDI. It would be more rewarding and beneficial to orient such public resources towards the national economy (Carkovic and Levine, 2002; Nunnekamp and Spatz, 2003).

The determinants and effects of, and prerequisites for, FDI have received much attention in the literature on the subject, although, to date, there exist no consensus among economists regarding the positive effects of FDI on output. Given the importance of this issue for countries with emerging markets, particularly Egypt, the scarcity of studies on the subject, and the conflicting evidence and lack of consensus among economists, this study can be of crucial importance as it aims to study the effect of FDI on output in Egypt since 1974.

1.2 Objectives of the study

The purpose of this thesis is to show the contribution of FDI to economic growth to Egypt so as to establish whether the call for more FDI is truly justified. The relationship between FDI and economic growth in the country is discussed and the contribution of FDI to growth will be uncovered. To achieve these, scholarly opinions and suggestions will be discussed and empirical analysis on FDI will be carried out. Specifically, the study aims to find answers to the following questions:

A. What are the determinants of FDI?

B. What has been the contribution of the FDI inflow to output? Does it have a positive/negative or no spillover effect?

C. What is the direction of causality between FDI and growth?

1.3 Motivations for the study

Egypt has attempted to attract FDI since 1974 by offering generous incentives. Egypt was particularly motivated by low domestic savings rates accompanied by inefficient financial intermediation, which hampered strategies to finance growth. The recent increase in the inflow of FDI in Egypt, although important in itself, is still far below its potential given Egypt's comparative advantages in terms of the size and cost of its labour pool, its internal market and its strategic location (UNCTAD, 1999). As long as the Egyptian economy is seeking sustainable development and not merely a short term flash growth at the macro level, attracting FDI should be dealt with as a part of a development policy package.

1.4 Plan of the Thesis

This thesis consists of five main chapters: two introductory chapters (one introduces the objectives and motivations for, and plan of, the study, and the other highlights the practical difficulties in FDI statistics; and overviews of the macroeconomic policies in Egypt from 1952 till 2006); and three theoretical and empirical chapters for modelling (and empirically examining) Foreign Direct investment. Below, a brief introduction of each chapter's aims and methodology is provided.

Chapter two introduces the Egyptian economy, where a general overview of the macroeconomic policies is discussed. The chapter concentrates on three main periods: the first covers the period of change from private enterprise to Arabian socialism (1952-1973); the second is the Open Door policy (1974-1985), and finally, the era of reform is discussed.

The third chapter reviews the main determinants of FDI. The purpose of the section is to find from the literature on FDI theories and the empirical evidence on FDI locational

determinants which locational factors are more important in determining Multinational enterprises (MNEs) investment decision to help in assessing Egypt's experience with FDI and evaluating its performance in attracting FDI.

Chapter four is the main contribution of this paper to the empirical literature; it empirically tests the effect of FDI on output in the Egyptian manufacturing sector over the period 1974-2005. The purpose of the chapter is twofold; on the one hand, FDI in the manufacturing sector causes increases in physical capital, which is responsible for the bulk of growth in Egypt. On the other hand, FDI in the manufacturing sector is characterised by being labour intensive, and thus FDI in this sector enhances growth via increasing the demand for labour, which results in an increase in both wages and employment. To sum up, it is expected that FDI in the manufacturing sector will stimulate output via physical capital and labour productivity. The validity of this hypothesis is hereunder tested.

Chapter five follows a line of FDI literature that is concerned with testing the causality between FDI and GDP. Foreign Direct Investment inflows could promote long-run growth in the host economy, or strong GDP could invite FDI inflows into the host country by rendering the country more attractive to foreign investors. As such, FDI may be an endogenous factor in estimating output, but GDP can in turn be an endogenous factor in FDI determinants. The purpose of the chapter is to understand the direction of causality between FDI and output as it has very important policy implications, especially when formulating FDI promotional schemes.

1.5 Contribution of the study

Egypt lacks in studies on the assessment of FDI effects, investigation of its impact on output, and adequate outlining of the direction of causation. This deficiency has affected

the formulation of appropriate promotion policies for FDI in Egypt. As such an analysis is very important and has significant policy consequences; if FDI positively affects output then FDI should be welcomed and promoted without restriction. If, on the other hand, FDI does not exert a positive impact on output, then there should be no tax incentives or any other form of subsidies or promotion schemes to attract it. It would be more productive to commit these public resources to benefiting the national economy.

Chapter Two

Overview of Macroeconomic Policies in Egypt from 1952-2006

2.1 Introduction

By the end of the nineteenth century; Egypt was a completely open economy. Approximately 90 per cent of the paid up capital was sustained by French, British and Belgian interests. The 1920s witnessed an industrial drive with tariff protection and public credit providing an appropriate climate for the domestic private sector. FDI was encouraged, although it suffered a decline in the period between World War I and World War II. Between 1960 and 1964 all joint stock companies, domestic and foreign, were nationalised and private initiative was assigned no role in the agriculture sector due to central planning, controls on cropping procurement and price fixing. In October 1973, Egypt pursued an Open Door policy based on a return to a free market economy, resulting in the re-introduction of a more liberalised trade system and new investment and pricing policies. At the institutional level, restrictive legislative rules and regulations were reduced or abolished and replaced by more explicit property rights which encourage and protect domestic as well as foreign capital.

The legacy of state intervention inherited from the Nasserite period led to institutional rigidity, centralisation and the hegemony of the public sector over nearly all economic activity policy; however today's Egypt has largely restored the features of a fully functioning market system granting equal opportunities for private and public activities, and domestic and foreign enterprises.

The Egyptian economy is experiencing rejuvenation. Macroeconomic adjustment and stabilising effects, pursued since 1991, have successfully readjusted internal and external imbalances. Growth sources are equally broadly based as public expenditure diminished while investment by the private sector accelerated, particularly in the tradable sectors of manufacturing, mining, agriculture, tourism, and transport.

Egypt has also witnessed a regeneration of private initiatives and a rising entrepreneurial class. The export oriented manufacturing industry is expected to be the main drive behind economic growth. In the meantime, tourism and constructing sectors are expected to achieve high growth rates. The acceleration of privatisation coupled with a concomitant consolidation of capital markets can give an impetus to FDI and portfolio inflows into the economy.

2.2 Overview of macroeconomic policies in Egypt from 1952-2006

The period from 1952 up to the present in Egypt has witnessed a drastic shift from regulated and state controlled economy (Socialism) to a gradual process of privatisation of public and state-owned enterprises (market economy) and the beginning of the upward drive towards liberating Egyptian economy.

2.2.1 From private enterprises to Arabian socialism (1952-1973)

Before the1952 revolution, the Egyptian economy was mainly oriented towards a free market. It was based on private enterprises and foreign investment until the outbreak of the revolution of 1952. From 1952 up to 1973, the Egyptian economy applied a state-led industrialisation model. The economy was mainly based on the public sector as the main engine of economic growth, employment and investment. The public sector produced 97 per cent of the GDP and made available 25 per cent of employment opportunities. The state had to spend on public infrastructure, social services and agrarian reform. As for the sector, it provided the basic services for water supply, electricity, and railway transport, as well as managing state institutions (Brien, 1966). Since the government predicted the impossibility of achieving an economic breakthrough by continuing to pursue a free economy model, it had to replace the existing economic system with a socialist model, and in 1956 the

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industrial and financial structures were nationalised, allowing consequently for state intervention and the devising of a ten year plan.

The ten year plan was originally meant to cover the span from 1960 up to 1970, and was further subdivided into two five year plans with a view to maximise GDP. It is to be noted here that out of the two five year plans, only the first was implemented, while the second was reduced to annual plans due to increasing economic hardships and urgent military challenges. The first five year plan was meant to accelerate economic growth and to redistribute incomes in favour of low income social categories (Amin, 1974). Large-scale nationalisation in 1961 restricted the activities of the private sector to the domains of agriculture, real estate investment and the informal economy. Such domains were subjected to state control over prices, marketing raw material and foreign exchange. State-owned enterprises (SOEs) monopolised the banking sector, the manufacturing sector, and foreign trade and transportation sectors. Besides, the state imposed high protective measures on other economic spheres and policies. State control and government intervention were officially legitimated by the National Charter of 1962. Employment opportunities for holders of a secondary school diploma were made available and subsidies for many commodities and basic foodstuffs, public utilities, electricity and water supplies were inordinately granted by the government. In this period, GDP rose by 31.8 per cent (although 45 per cent was predicted due to annual growth). It is to be noted that the highest growth rate in 1962-1963 reached 8.6 per cent and the lowest to 3.5 per cent in 1961-1962 (due to the damage of cotton crop because of climate condition and the decrease of agricultural crops sustaining other agricultural products). It is also noticeable that the public sector developed tremendously as a result of the policies of nationalisation in addition to

the investment it helped to create. For instance, in 1964-1965 investments in the public sector represented 93.4 per cent of all investments conducted during this period, while investments of the private sector targeted merely agricultural and real estate investments, and constituted only 6.6 per cent (Dos Santos, 1970). The economic policies pursued then were accompanied by laws of a socialist character, allowing for providing employment for the economically underprivileged, reducing working hours, agrarian reforms, greater state role in fixing prices, determining the ceiling prices of rents, and regulating the relation between landlords and tenants (Al Barawy, 1972).

Most analysts studying this period assign the 1967 military setback a great role in impacting GDP growth rate, as governmental intervention was maximised, and the share assigned to the private sector in GDP was extremely limited. In addition to import policies, business efficiency inadequate levels, labour productivity stagnation, exports, particularly industrial products, were mostly oriented towards communist-leaning countries with low requirements of quality (Weiss and Wetzel, 1998).

2.2.2 The Open Door Policy or the Consumption Phase (1974 -1985)

The Open Door Policy was launched in Egypt at the start of the 1970s. It could be divided into two major phases; the first phase lasted from 1971 up to 1973. During this phase, the ground was paved for certain cultural, legal and informational transformations. With this end in view, several laws were promulgated to crystallise a new economic vision (Caporaso and Zare, 1981). The second phase lasted from 1974 up to 1985. It was at this phase that Egypt experienced the application of the open door policy which profoundly and drastically changed practically the structure of all sectors of economic life in Egypt, such as changing the economic, political, legal and normative orientations of the country. With a

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view to attracting Arab and foreign investments which were hitherto closed to Egyptian economy, Sadat prompted private Arab as well as foreign capital to flow into Egypt while maintaining a large portion of the public sector. Law No.43 of June 1974 was promulgated, allowing tax concessions for foreign private firms in the form of tax exemption from labour laws, import and export licenses and exchange rate control regulations. A distinction was drawn between free zones such as Port Said where tax holidays were indefinite, and joint projects in partnership with local firms, and inland projects where setting up partnerships with local firms was required.

Contrary to all expectations, foreign investors, with the exception of Saudi Arabia, did not hurry to benefit from investment opportunities afforded by the open door policy. This could be attributed to the reason that these policies were not accompanied by monetary policy changes, the maintenance of local currency overvaluation (impacting export negatively) and negative interest rate practice from 1974 up to 1985. The Egyptian economy suffered major structural imbalances which impeded sustainable growth such as the imbalance between government revenue and spending, saving, required investments, imports and exports, demand for labour and labour supply. Fortunately, these imbalances were soon to be readjusted due to the increase of oil prices, reopening Suez Canal, the remittances from Egyptians working at the Gulf area and other Arab countries, thus leading to an influx of foreign exchange and a redistribution of revenues on the part of the state which increased subsidies and continued to back up the employment scheme previously established by Nasser. In addition, the state created favourable conditions for truly remunerative investment and import opportunities. An overvalued exchange rate, coupled with the creation of a free zone at Port Said, led to the exponential growth of luxury goods,

leading in turn to underutilised capacity in the domestic industry. Such imbalances in addition to market insufficiencies, caused mainly by government intervention, led to the utter incapacity of the economy to sustain high growth rates, given the tremendous increase of oil prices and the concomitant rise in the share of private investments following 1974. The period also witnessed sharp fluctuations in per capita GDP growth rate, with lower rates of -0.13 per cent, -1.40 per cent, and 0.34 per cent achieved in 1972, 1973, and 1974 respectively, and highest rates of 12.14 per cent, 10.35 per cent and 7.36 per cent in 1976, 1977, and 1980 respectively (World Bank Data Base).

To conclude, the Open Door Policy did not have a genuinely positive effect on the institutional and economic structure in Egypt and was not fully integrated into a truly comprehensive reform programme. It may be argued that the Open Door Policy represents more a programme of corrective measures consisting of some strategies for crisis management than a truly fully-fledged reform programme.

2.2.3 An era of reform

In the early 1990s, the Egyptian government launched an Economic Reform and Structural Adjustment Programme (ERSAP) enhanced by arrangements with IMF and a Structural Adjustment Loan from the World Bank, in addition to a bilateral debt forgiveness/ debt service relief from the Paris Club. The programme is designed to achieve stability at the macroeconomic level, consistently with the partial reforms implemented in the early 1980s, and debt rescheduling in 1987; the programme also aims at reforming the financial sector, liberating interest rate, reducing subsidies, standardising exchange rate, liberalising foreign trade, and public sector reform. Ultimately, this policy is basically designed to create an open market-oriented decentralised economy, which is most likely to

attract foreign direct investments (FDI), and to involve the participation of the private sector in national economy.

The said policy has been successful in fixing adjustment quality since stabilisation programme managed to achieve its major objectives. Average growth rate of per capita GDP increased from 1.36 per cent for the period 1991-1995[1] to 3.23 per cent for the period 1996-2000. Fiscal deficit fell from 15 per cent of GDP over the next four years[2]. Inflation returned to single-digit values. Devaluation of the national currency resulted in ameliorating the current positive account (from a deficit of about 5 per cent of GDP to a surplus of about 1 per cent). This has been accompanied by a rapid accumulation of foreign exchange reserves (Subramanian, 1997). The government similarly launched a massive privatisation programme, resulting in the privatisation of one third of state-owned enterprise assets between 1991 and 1998 (Khattab, 1999). Macroeconomic stabilisation and privatisation programmes were complemented by the creation of a free foreign exchange market for account transactions and by easing restrictions on capital account, thus leading to elimination of real exchange rate misalignment and black market premium; this, in turn, has significantly contributed to economic growth acceleration (Domac and Shabsigh, 1999). It also led to the growing expansion of the stock market which was hitherto receiving little attention. According to World Bank data, average tariff was reduced from 27.8 per cent in 1991 to 20.5 per cent in 1998, while on the other hand, the Investment/GDP ratio dropped from 22.25 per cent in 1991 to below 20 per cent except in 1998 and 1999. Meanwhile, the increase in economic growth despite the decline in total

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[1] We include the years 1991 and 1993 - the first year was the Gulf War as well as the second was the beginning of the implementation of the ERSAP.

[2] The reduction of budget deficits in the first half of the 1990s was achieved largely through a fall in public investment, particularly in the central government's capital expenditure.

investments could be due to efficiency gains from private investments and the growing interest in privatisation in Egypt, and the rise in FDI (Roe, 1998).

2.3 The Development of FDI in Egypt

Foreign Direct Investment[3] (FDI) inflow into Egypt has received much attention in the literature on this topic over the past twenty years due to its economic importance, the relative increase of overall FDI inflows to such low-income countries as Egypt. Despite the relative increase in FDI inflows into the region, only a few African countries have successfully managed to attract a significant number of FDI inflows. In global terms, Africa's share of FDI inflows rose from 2.3 per cent in 2001 to 5 per cent in 2008 (UNCTAD, 2002, 2009).

Egypt has an uneven pattern of political and economic development which is reflected in the uncertain FDI inflows, changes in policies and uneven growth patterns. The Egyptian government already recognises the relevance of investment to economic growth and is currently implementing private-sector economic growth policies. This can be achieved through several channels, such as maintaining a stable macroeconomic environment (by guaranteeing monetary discipline), consolidating monetary tools (boosting economic growth rate), opening the economy to foreign investors and pursuing the process of privatisation (creating investment-friendly environment, transparent regulations and other favourable institutional frameworks), and developing capital markets (increasing competitiveness in the financial sector, consolidating financial market institutions and capital market authority).

Analysis of available data reveals that pursuing these policies proved successful in many significant areas, including the reduction of inflation, promotion of financial stability,

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[3] A complete definition of FDI is given on page 61.

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elimination of licensing requirements, removal of tariff barriers which impede FDI inflows, abolishing exchange controls and reducing opportunities for foreign exchange black market. Despite the successes of this reform programme, there are some major challenges confronting higher FDI inflows into Egypt since it has attracted lower FDI inflows than other low-income economies.

The analysis of the development of the pattern of FDI inflows into Egypt is based on the trend of FDI inflows to Egypt assumed during the period of study and the changes which came over the performance of Egyptian government relative to other MENA[4] countries, and sectoral composition of FDI.

2.3.1 Trends of FDI Inflows to Egypt

The trend of FDI inflows in Egypt has passed into three successive stages which can be roughly categorized as follows:

i. First phase (from 1970 till 1990)

During the Nasserite era (1954-1970), Egypt pursued a regulated economic policy with state control over a significant portion of the economy and an inward-looking trade policy relying mostly on import substitution. The problems that emerged from political instability, relatively financial insecurity, and nationalisation of major industries combined to discourage foreign investment, particularly FDI inflows into the country. It was not until the 1970s that FDI inflows started to increase relatively, due to the Open Door Policy, as is shown in Table 2.1. The table shows the top ten developing economies in attracting FDI inflows since 1970 (UNIDO, 1996). Seen that way, the relative decrease of FDI inflows to

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[4] The term MENA, for "Middle East and North Africa", is an abbreviation used in academic and business writing. The term covers an extensive region, it generally includes all the Arab Middle East and North African countries It includes Algeria; Djibouti; Egypt; Iran; Iraq; Jordan; Lebanon; Libya; Morocco; Syrian Arab Republic; Tunisia; West Bank and Gaza; and the Yemen.

Egyptian economy during the 1980s and their decline during the first half of the 1990s can be explained in terms of a concomitant decrease in economic rate from 7.4 per cent in 1983 to 5.7 per cent in1990, resulting in an increase of inflation from 16.1 per cent to 16.8 per cent, and an increasing unemployment rate from 6.6 per cent to 8.6 per cent, and ultimately increasing the ratio of external debts to the gross national income from 115.06 per cent to 116.66 per cent (Table 2.2).

Table 2.1 Average annual FDI inflows to 10 Largest LDC recipients, 1970-2006.
(Millions of Dollars)

Host country or area	1970-1980	Host country or area	1981-1990	Host country or area	1991-2000	Host country or area	2000-2006
Brazil	1328	Saudi Arabia	2703	China	32765	China	59813
Mexico	598	Mexico	2442	Brazil	13101	Mexico	22483
Indonesia	414	China	1962	Mexico	10047	Brazil	16871
Malaysia	381	Brazil	1629	Argentina	7671	Russian Federation	12033
Islamic Republic of Iran	269	Malaysia	1132	Malaysia	4933	India	8189
Nigeria	223	Egypt	878	Chile	3667	United Arab Emirates	6744
Egypt	205	Thailand	754	Thailand	3260	Turkey	6523
Argentina	180	Argentina	700	Venezuela	2535	Thailand	6167
Algeria	139	Nigeria	608	Russian Federation	2136	Saudi Arabia	5678
Panama	128	Chile	526	Colombia	2001	Chile	5419

Source: UNIDO, Industrial Development Global Report, 1996.

Table 2.2 Economic indicators of the investment climate in Egypt

Years	World FDI (Million US$) [1]	MENA FDI (Million US$) [1]	Egypt FDI (Million US$) [1]	MENA / World [2]	Egypt / World [2]	Egypt / MENA [2]	GDP Growth (%) [1]	Inflation (%) [1]	Unemployment Ratio [1,3]	Reserves (Billion US$) [1]	External Debt (% of GNI) [1]	Population Growth (%) [1]
1983	48946.84	358.80	490	0.73	1	136.57	7.40	16.08	6.60	1698.90	115.06	2.63
1984	57214.43	1005.21	729.14	1.76	1.27	72.54	6.09	17.04	6.00	1485.99	112.61	2.68
1985	56888.21	1458.92	1177.57	2.56	2.07	80.72	6.60	12.11	-----	1587.36	114.99	2.71
1986	85596.24	1101.45	1217.43	1.29	1.42	110.53	2.65	23.86	-----	1779.68	124.33	2.74
1987	129730.26	745.85	947.71	0.57	0.73	127.07	2.52	19.69	-----	2555.64	110.34	2.75
1988	158445.46	1659.21	1190	1.05	0.75	71.72	5.30	17.66	-----	2261.15	132.40	2.70
1989	194798.93	1700.74	1250.18	0.87	0.64	73.51	4.97	21.26	6.90	2495.36	116.66	2.57
1990	204493.69	757.36	734	0.37	0.36	96.92	5.70	16.76	8.60	3619.93	78.51	2.40
1991	157355.05	1156.61	253	0.74	0.16	21.87	1.08	19.75	9.60	6185.28	89.12	2.21
1992	167853.15	2342.33	459	1.40	0.27	19.60	4.43	13.64	9.00	11620.22	75.06	2.06
1993	220234.18	2799.35	493	1.27	0.22	17.61	2.80	12.09	11.1	13854.27	66.27	1.94
1994	248392.57	2461.96	1256	0.99	0.51	51.02	3.97	8.15	11.1	14412.96	63.31	1.89
1995	328380.14	817.08	598	0.25	0.18	73.19	4.64	15.74	11.3	17121.79	55.76	1.89
1996	373933.88	1262.74	636	0.34	0.17	50.37	4.99	7.19	9.6	18296.47	46.50	1.89
1997	468216.08	3582.72	890.55	0.77	0.19	24.86	5.46	4.63	8.4	19370.58	37.92	1.88
1998	696466.10	3551.40	1076	0.51	0.15	30.30	4.04	3.87	8.2	18823.90	37.63	1.88
1999	1094494.39	2605.72	1065.30	0.24	0.10	40.88	6.11	3.08	8.1	15190.02	33.60	1.89
2000	1518702.11	4884.52	1235	0.32	0.08	25.28	5.37	2.68	9	13785.04	28.77	1.89
2001	794779.89	4051.74	509.90	0.51	0.06	12.58	3.54	2.27	9.2	13598.23	28.42	1.90
2002	737539	4969.21	646.90	0.67	0.09	13.02	2.37	2.74	10.2	14076.05	32.10	1.91
2003	641570.88	7855.13	237.40	1.22	0.04	3.02	3.21	4.51	11	14603.57	35.23	1.91
2004	751652.29	7493.75	1253.30	1	0.17	16.72	4.08	11.27	10.3	15338.51	39.31	1.90
2005	1116370.60	16118.67	5376.60	1.44	0.48	33.35	4.48	4.87	11.2	21856.78	32.98	1.88
2006	1457090.68	28066.93	10042.80	1.93	0.69	35.78	6.85	7.64	10.6	26006.84	26.83	1.86

Source: 1. World Bank Data Base.

2. Calculated by the researcher from World Bank Data Base.

3. Central Bank of Egypt [Unemployment Ratio, from years 1993-2006].

4. (----) are not available.

ii. Second Phase (1990 till 2000)

Although since the early 1990s Egypt has been trying hard to promote itself as an attractive locus for foreign investment, drawing on its strategically significant geographical location, its access to human resources and its vast population of potential consumers, the early 1990s witnessed a considerable decline in FDI inflows into Egypt. Data in Table 2.2 show that FDI amounted to US$ 253 million. This is most probably attributable to the Gulf war crisis, the rise in inflation rates, unemployment rates and economic stagnation which the region witnessed in the aftermath of the war. Privatisation policies in Egypt since the mid-1990s played a crucial role in facilitating foreign capital inflows; the Central Bank of Egypt reported that that Egypt experienced some fluctuations in FDI inflows since they reached about US$ 636 million, and then rose to US$ 890 million and continued rising until they reached US$1.07 billion in 1998, and ultimately rose in 2000 to 14.7 per cent to reach US$ 1.23 billion. The significant point here is that FDI inflows do not actually mirror developments in world FDI inflows standards, except in the decade of the 1990s. Formerly, they were more related to regional and domestic conditions rather than to fluctuations in world FDI inflows.

iii. Third Phase (from 2000-2006)

The third phase started from 2000 to date. FDI inflows to Egypt started to exhibit a noticeable decrease, reaching US$ 509 million in comparison with the year 2000 in the aftermath of the events of September 11. In 2006, however, FDI inflows to Egypt increased to reach US$ 10.04 billion, maybe because of the successes of the domestic economic reform programme (Table 2.2) in increasing economic growth rate from 1.08 per cent in 1991 to 6.85 per cent in 2006, surpassing population growth rate which reached 1.86 per

cent during the same year. By the same token, inflation rate decreased from 19.75 per cent in 1991 to 7.64 per cent in 2006. Local exchange and interest rates showed a high degree of stability, while official reserves were estimated at US$ 26 billion in 2006, in comparison with an estimate of US$ 6.18 billion in the year 1991. Table 2.2 also indicates that unemployment rate decreased from 11.1 per cent in 1993 to 10.6 per cent in 2006. Similarly, the ratio of external debts to the gross national income decreased from 89.12 per cent in 1991 to 27.36 per cent in 2006.

2.3.2 Egypt's FDI Inflows from a Global Perspective

Egypt's share of world FDI inflows increased, reaching its peak in 1985, with a relative weight of 2 per cent of total net FDI inflows. Since then, this share started to decrease and was found to reach 0.73 per cent in 2006. The decline of Egypt's FDI inflows as an FDI recipient country is obvious from its rank, using the UNCTAD-developed two FDI indices, inward FDI performance index, and the inward FDI potential index (Table 2.3). Ranked by the inward index in 1990-2005, Egypt's position was at 31 out of 141 countries covered by the index, higher than a ranking of 105 in 2000 and down from number 15 in 1999 (UNCTAD, 2008). Out of 141 countries, the second index shows Egypt`s position in the middle, with a ranking of 83rd for 2006, which has remained stable since 1990 (UNCTAD, 2008).

Table 2.3 Egypt's FDI Performance and Potential Indices

Years	FDI Performance Index	FDI Potential Index
88-90	14	67
90-92	58	88
92-94	42	79
94-96	72	87
96-98	105	69
98-2000	102	71
2000-2002	113	70
2002-2004	108	81
2004-2006	31	83

Source: UNCTAD, World Investment Report, Different issues.

2.3.3 Egypt's Position of FDI Inflows in the MENA region

The MENA region is not highly successful in attracting FDI inflows (Table 2.2).The MENA'S share in the world's FDI inflows surged in the first half of the 1980s reaching 2.26 per cent which could be attributed to the high development and huge projects witnessed in the wake of the boom in oil prices in the 1970s. From the second half of the 1980s up to 2000, the share of these countries in world FDI inflows declined steadily till it reached 0.32 per cent. Egypt's share also declined, with an average share of 96.19 per cent over the period 1983 up to 1990, to 35.50 per cent over the period 1991 up to 2000, then down to 19.08 per cent for the period 2001 up to 2006. Thus, the growth of FDI inflows into Egypt witnessed a considerable slowdown over the past 30 years, resulting in a gap between the performance of Egyptian government and the enormous potential it has.

The deterioration in Egypt's FDI share is not only observable at the global level, but is also noticeable within the regional framework of MENA countries. Gloom may be looming large inside the picture since Egypt has failed to attract a sufficient share of FDI inflows. Yet, the promises of a deservedly proper place in a globalised economy are in the offing.

2.3.4 Sectoral Composition of Foreign Direct Investment

Analysing sectoral composition, a conclusion may be reached to the effect that the manufacturing sector occupies top priority, with a 42 per cent share of FDI for the period studied (Figure 1). The share of the manufacturing sector does not constitute the only major component of FDI, but it has been steadily growing in importance since 1992; this trend is not quite in keeping with the international pattern revealing the declining share of FDI inflows into the manufacturing sector in addition to the decreasing share of the manufacturing sector from FDI inflows to developing and emerging markets, particularly

from the 1990s up to 2005. The 42 per cent share of the manufacturing sector, out of the total FDI in Egypt is consistent with the average of other developing economies which obtained an average share of 41 per cent over the period 2000 up to 2003, thus exceeding the 18 per cent average of developed countries over the same period. Tourism constitutes the second largest FDI sector in absolute value, with investments mounting to 13 per cent of total investment rates. Finance comes next and is found to represent the third largest factor of FDI.

2.3.5 The obstacles facing the inflow of FDI to Egypt

Despite the various efforts exerted by the Egyptian government to attract foreign investments, there are some impediments to inflows of FDI to Egypt, given its enormous potentials. These impediments may be roughly summarised as follows:

- Lack of the necessary know-how or expertise to promote FDI inflows to Egypt in an internationally competitive climate.

- Absence of an adequate investment map outlining attractive investment locations.

- Red-tape and bureaucracy and other obstacles impeding investment processes in general and foreign investments in particular.

- Lack of skilled labour indispensible to the effective implementation of investment projects.

- High costs of advanced European technology affordable to developing countries, and particularly to Egypt, after European unity.

- Problems related to the export sector and difficulties associated with trade policies.

whole period

- IND
- TOUR
- BANK & Finance
- OTHER
- TRANS
- AGRI
- Gov. Social & Personal S.
- CONST
- ELEC & utilities

1983-1990

- IND
- TOUR
- BANK & Finance
- OTHER
- TRANS

1991-1995

- IND
- TOUR
- BANK & Finance
- OTHER
- AGRI

1996-2000

- IND
- TOUR
- AGRI
- OTHER
- BANK & Finance

2001-2006

- IND
- OTHER
- TRANS
- TOUR
- BANK & Finance
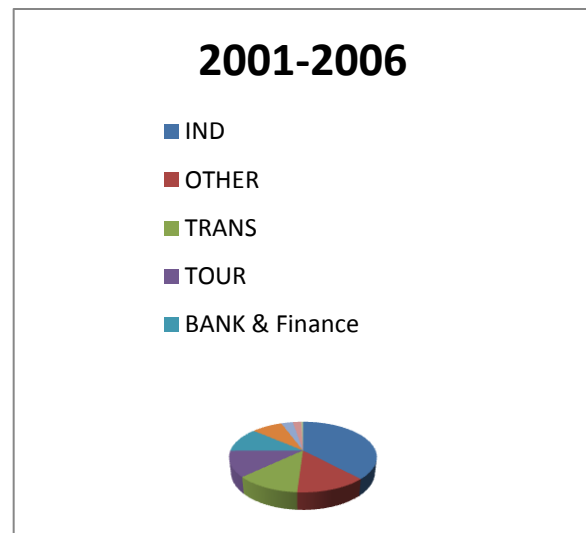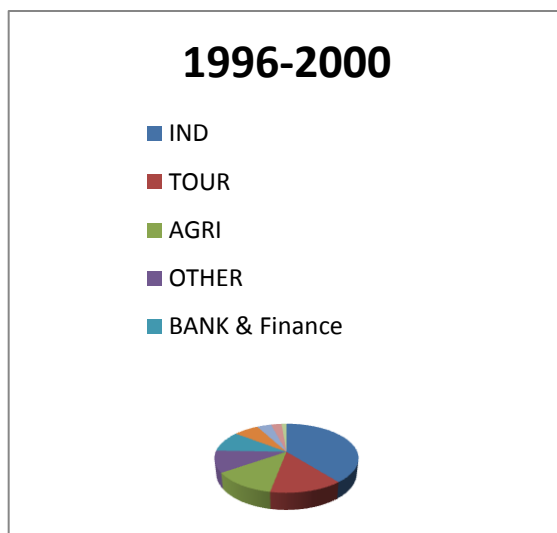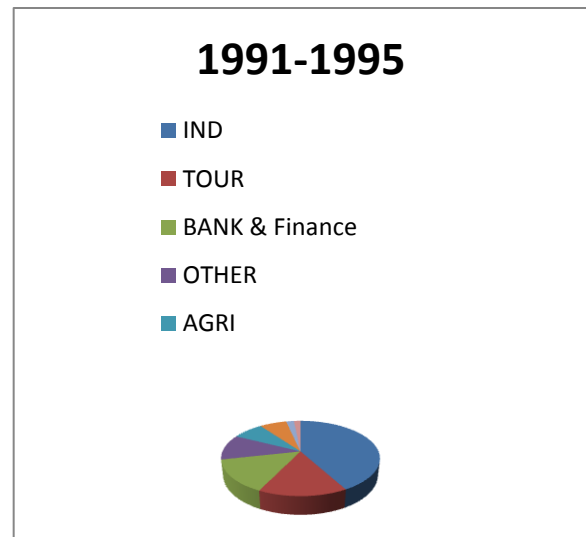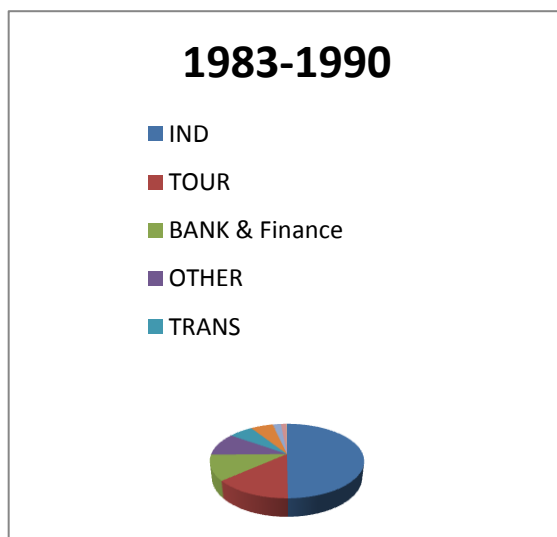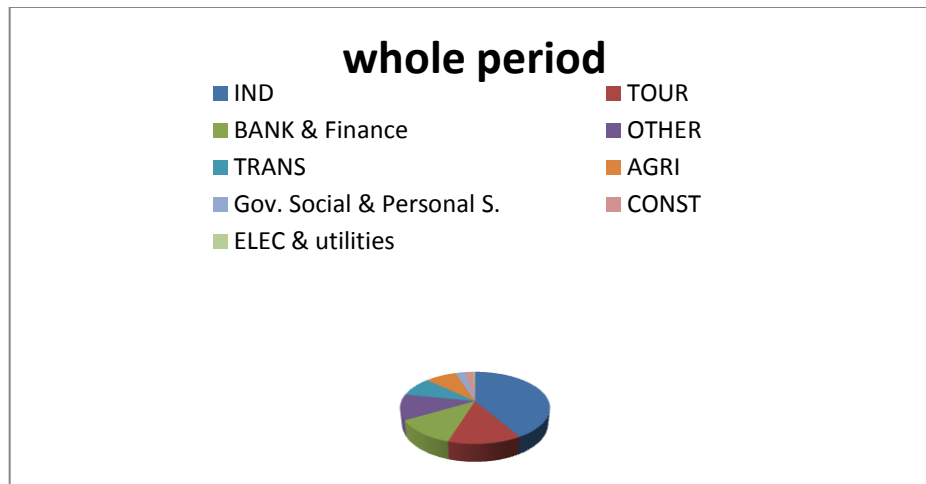
Figure1. Sectoral Distribution of FDI

2.3.6 The salient regulations adopted by the Egyptian government to ameliorate the investment climate

Egypt is currently pursuing a policy of attracting foreign investments on a regular basis. With this end in view, the government promulgated several laws and regulations, as follows:

- The promulgation of Law no.13/2004 concerning the amendments of investment guarantees in order to provide a climate favourable for foreign investors. A number of other legislations have been enacted to facilitate the investment process. Law no. 65/1971 has been issued to regulate Arab capital investment and free zones, followed by Law no. 43/1974 that was amended by Law no. 32/1977, which was to be followed by Law no. 1591/1989 in addition to Law no. 8/1997 regarding investment guarantees and incentives amended recently by Law no. 13/2004. The said amendment was essentially meant to streamline investment procedures for Egyptian as well as non-Egyptian investors on an equal footing, and to deal with any obstacles that may impede the investment process.

- The introduction of a new ministry for investment, encompassing the sectors formerly affiliated to the ministry of public enterprise, general authority for investments and free zones, capital market authority and the higher council for general authority for real estate finance control. This ministry is assigned the tasks of ameliorating investment climate, eliminating all the obstacles hindering investment, enforcing the tasks formerly performed by the authority for investment such as garnering support for domestic as well as foreign investment activities and seriously tackling investors' problems through a special unit and restoring

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confidence between investors and the government, in addition to creating adequately legal frameworks favourable to investments to guarantee sufficient FDI inflows into the country.

- Reducing customs tariff and the restrictive regulations imposed on imports to consolidate confidence in the vigour of Egyptian economy and court more domestic and foreign investments, thus boosting other economic sectors through empowering them and rendering them able to import all their productive needs (i.e. capital goods, tools and appliances, equipment, intermediate goods at deceased costs and low prices). Such measures as these are meant to rectify inconsistencies in customs tariffs and to counter red-tape absurdities; the new tariff has been designed in such a way as to strike a compromise between tariff protection and economic efficiency. The establishment of Model Customs and Tax Centre, based as it is on customs handling techniques, proved to be of crucial importance in this regard.

- Enforcing more economic contracts and arrangements such as the agreement of liberalising trade among Arab countries (2005) and the arrangements of Qualified Industrial Zones (Quiz).

- Developing infrastructural projects and industrial zones, whether free or otherwise.

- Liberalising the Egyptian pound, while pursuing new monetary policies and expanding financial policies based on non-government intervention into market forces and shying away from tampering with wages or prices or taxes.

2.4 The Manufacturing Sector

The manufacturing sector is characteristically held by the Egyptian government to be the main drive to propel the economy, and hence the interest in the structure of manufacturing

activities. The process of industrialisation relies for the most part on technology transfer, natural resources and labour. Paradoxically, most of the Egyptian manufacturing technologies are imported from abroad. Egypt has a competitive advantage in its abundant labour force. Consequently, labour–intensive exports represent a significant measure of the exported manufactured products (Mobarak, 2001).

In the 1920s, the Egyptian economy was an agricultural economy since three quarters of Egyptian exports consisted mainly of raw cotton; industrial output was based on cotton-related industries such as spinning and weaving in addition to some minor industries like preserved food, tobacco, soap and handicrafts. Out of an average total population of 13 million, the number of people actively involved in this industry never exceeded half a million which is by all standards a relatively small number (Aglan, 2003). Bank Misr helped the private sector to establish a number of industries, particularly textiles, which laid the foundation for the development of the modern Egyptian manufacturing sector. The 1930s ushered in a new phase for the private sector since it led to the rise of new industrial products such as cement, fertilisers, paper and chemical products. It was the strategic position of Egypt in the Middle East during the Second World War that consolidated the growth of the manufacturing sector, leading to the emergence of several engineering and construction industries to meet the needs of allied forces (Aglan, 2003).

Egypt under Nasser witnessed a new phase of industrialisation. For at this crucial phase of Egyptian history, there grew a state-led drive with a major shift towards heavy industries. The textile industry continued to receive a high measure of attention only to be followed by other industries such as iron and steel, mineral industries, fertilisers, and paper. The pattern and level of investment allocation led to a considerable short term growth. In

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1965, due to a noticeable rise in imports of raw material and capital goods, large expenditure on construction and social services, lack of a comprehensive set of policy tools, and an overemphasis on social targets, the sector got stuck. As a result, investment slowed down and ultimately growth was interrupted (Chang *et al*., 1995).

It took a decade (from 1965 to 1975) for a new phase of industrial development to emerge. The ensuing phase witnessed the crystallisation and implementation of the open door policy, chiefly targeting domestic as well as foreign investment. Although the new policy coincided with the oil boom of the 1970s, Suez Canal revenues, and large capital inflows from abroad in the form of borrowing and aids, these resources were not oriented towards the productive sectors of the economy, particularly the manufacturing sector; most of the manufacturing activities continued to be run and financed by foreign investments.

Since 1985, however, the Egyptian government has attached great importance to the manufacturing system; it considers it to be the main driving force of the economy and the main milieu for affording employment opportunities and training the labour force. The sector also achieves high added value, economic prosperity, increases service capacity in the society and contributes to minimising the need for imports. The government aims at reducing the protective measures taken for the domestic industry, with a view to removing import barriers, maximising exports and consolidating the role played by the private sector in industrial development (Aglan, 2003).

Despite the decrease in the revenues of Egyptian external sources, there is a positive trend towards industrial development. Import projects shifted to industrial activity due to government encouragement, the enactment of new industrial cities law and the lifting of restrictive policies on import in order to protect domestic industries. Since 2001, value

added growth has shown a declining trend, due to the general sluggish economic conditions, as shown in Table 2.4. The table shows that Egypt`s manufacturing value added (average annual per cent growth) is relatively high compared to that of North Africa and low and middle income countries up until2000. On the other hand, the manufactured value added (per cent of GDP) is relatively high in comparison to North African and low in comparison to low and middle income countries. It is evident that relatively small sized domestic markets constrained the sector's growth due to high poverty rates. Besides, high import content of manufacturing production indicates that production relations have not changed in the direction of domestic outsourcing.

Table 2.4 Indicators of the Manufacturing Sector in Egypt

Indicator	Region	Years			
		1988-1990	1991-1995	1996-2000	2001-2006
Manufacturing, value added (average annual % growth)	**Egypt**	7.07	4.42	8.25	3.79
	Middle East & North Africa	5.48	3.04	5.98	6
	Low and middle Income	5.09	6.45	5.72	6.93
Manufacturing, value added (% of GDP)	**Egypt**	17.87	16.90	18.50	18.13
	Middle East & North Africa	14.29	14.71	13.31	12.67
	Low and middle Income	24.29	22.84	21.43	21.15

Source: World Bank Data Base.

i. The Structure of the Manufacturing Sector in Egypt

The Egyptian manufacturing sector is concentrated on a few industries. Table 2.5 shows the relative importance of manufacturing constituents in terms of their percentage shares in total value added of temporal manufacturing changes. Some of the industries' share in food, beverage and tobacco, non metallic mineral products, basic metal, and metal products seem to have expanded rather rapidly. Some industries, however, remained stagnant or are

gradually declining such as paper, printing and publishing, chemicals, petroleum and plastic products. On the other hand, the textile industry suffered a slowdown not merely in terms of productive capacity, but in the quantities and quality of exports.

Table 2.5 Manufacturing Value Added by sector

Manufacturing Sector	MVA Structure (% share)			
	Egypt		North Africa	
	1991	2001	1991	2001
Food products, beverages and tobacco	17.3	28.7	22	28.3
Textiles and textile products	15.5	8.5	16.7	13.4
Wood and wood products	0.4	0.4	2.7	2.6
Pulp, paper and paper products, publishing and printing	2.5	1.7	2.5	2.2
Chemicals, chemical products and man-made fibres	37	27.2	24	21
Non-metallic mineral products	6.3	8.6	9.4	10.8
Basic metals and fabricated metal products	8.6	10.6	6.2	7
Machinery and equipment	12	13.9	16.1	13.9
Other manufacturing industries	0.4	0.5	0.4	0.8

Source: Ronia Hawash, "Industrialization in Egypt - Historical Development and Implications for Economic Policy."

2.5 Conclusion

Between 1950 and 1990, Egypt had pursued a public sector-led and inward-looking development strategy, which featured import substitution policies and state ownership of key sectors of the economy. The consequence of this situation was a strong and dominant role of public enterprises in the economy. Indeed the share of the public sector in the GDP was one of the highest among developing countries. During this period, a new phase of industrialisation began with a major shift towards heavy industries, and the manufacturing sector was characteristically held by the Egyptian government to be the main drive to propel the economy. The economy performed relatively well, due to successive increases in the price of oil. Although the open Door Policy which was introduced in 1974 did pave the

way for some liberalisation of the economy, the development strategy continued to be based upon import substitution, with manufactured exports, other than textiles and clothing, remaining virtually stagnant.

The decade of the 1980s was one of external shocks (in the form of declines in oil prices, high interest rates and general economic decline), in the world economy. The Egyptian economy did not respond adequately to these shocks. The consequence was massive fiscal and current account deficits, which also paved the way for the accumulation of external debt, increasing the rate of inflation and unemployment. In response to this crisis, the government of Egypt decided to act decisively. A standby agreement was concluded with the International Monetary Fund (IMF) and an economic reform and structural adjustment programme (ERSAP) with the World Bank. The goals of ERSAP were: (a) stabilisation of the economy in order to restore macroeconomic balance and reduce inflation; (b) structural adjustment to stimulate medium and long term growth; and (c) modification of social policies to minimise transitory effects of economic reform on the poor.

The programme goals were largely achieved and socio-economic conditions improved considerably during and after the implementation. Major macroeconomic disequilibria were corrected and the inflation rate brought down to a single digit. GDP growth rate has increased. Major distortions in the economy such as negative interest rates have been removed as interest rates are now positive and there is a significant built up foreign reserve. The restructuring of the public enterprises and privatisation has been largely successful after an initial slow start, and there was a positive trend towards industrial development (The manufacturing sector achieved high added value, and contributes to minimising the

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need for imports). The successful implementation of policy measures envisaged under this programme has laid a sound foundation for effective implementation of subsequent structural policy changes to sustain economic development.

Chapter Three

Modelling Determinants of Foreign Direct Investment in Egypt

3.1 Introduction

Since the 1980s, the world economy has undergone a dramatic surge in FDI[5], including a growing interest in the literature on FDI location determinants as tailored for both the developing and developed countries. The domestic economy has been widely influenced both directly and indirectly by FDI inflows. Such influence has extended to production, employment, income, prices, exports and imports, economic growth, balance of payment and the overall prosperity of the recipient country (e.g. Romer, 1993; Borensztein *et al.*, 1998).

**Table 3.1 Average growth rate of
World Foreign Direct Investment and World Trade**

Years	FDI	Trade
1984-1986	22.28	6.97
1987-1989	13.10	4.36
1990-1992	8.89	2.96
1993-1995	9.33	3.11
1996-1998	2.30	0.76
1999-2001	5.27	1.75
2002-2005	12.22	3.05

Source: Calculated by the researcher from World Bank Data Base.

Driven by these potentials, many developing countries had to face fierce competition for inward FDI. Empirical studies on inward FDI inflows determinants tend to stress the economic conditions of the recipient country relative the FDI-sending countries. Over the past decades, governments in developing countries have been seeking best-practice policies, with a view to attracting more FDI inflows by eliminating the restrictive and protective measures formerly adopted in the 1960s, 1970s and 1980s, and liberalising and facilitating entry and operations of foreign firms by pursuing selective policies to attract FDI. With this end in view, incentives, both fiscal and in kind, have been generously

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[5] Over the last decade Foreign Direct Investment has grown at least twice as rapidly as trade as can be seen in Table 3.1

offered, resulting in the amelioration of economic fundamentals to court further FDI inflows and stimulate growth in the financial sector.

Egypt under the Nasserite regime had a high degree of state control and state intervention. To date the private initiative has no role with all joint stock companies as these companies are directly monitored and subjected to nationalisation. Egypt has embarked on its reform programme to court more FDI inflow into the country. Such a tendency has been adopted for the sake of regaining macroeconomic stability and economic growth, and activating a short-term stabilisation programme and long-term objectives. According to recent statistics, Egypt has, since 1974, managed its central control, reduced its restrictive and protective regulations, introduced a more liberalised system of trade, and introduced a new system of investment and pricing (UNCTAD, 1999). Such reforms need to take place gradually, not radically or abruptly. They cannot take place abruptly as the society is seen to be politically and socially fragile. Further, as the involvement of the government in the economy has not been in place for a long time compared to in some other countries such as those in Eastern Europe, it left behind institutional rigidity, centralisation, and a public sector where it proved difficult to dismantle economic hegemony. However, by the end of the 1990s, the Egyptian economy went ahead to regain its functionality in the market economy. It has been held, however, that Egypt failed to attract larger FDI inflows in comparison with its counterparts in other developing regions. This holds true compared to countries undergoing similar transformation in terms of their economic policy on foreign equity ownership and equal treatment of foreign and domestic investors (such as economic transition in central and Eastern Europe) (UNCTAD, 1999). Since 1974, the country has successfully managed to devise a legal framework to let in

FDI. The preceding highly restrictive policies have been gradually liberalised, enabling further industrial sectors to be open to foreign investment, and to remove the restraints on foreign equity, maximum number of local labours, and possession of land and buildings, with the emergence of law 1997. As a result of these policies, major economy sectors have perceived the importance of FDI without restriction which is likely to affect FDI in Egypt and may be relevant to policy makers. However, FDI capital inflows into the country have been fluctuating since their increase in the 1990s, which was followed by a slump in 2001 and 2002, and then by a further increase in 2005/2006.

Egypt still lacks extensive studies on FDI determinants. Little is indeed known about FDI determining factors in Egypt, which affect planning for and formulation of appropriate policies for FDI. In this thesis, a panel approach has been adopted to identity sector-specific determinants which can possibly determine the variation of FDI variables across the sectors and its growth over the period 1983-2004. Within the framework of the current empirical studies and by adopting a panel approach, the relative importance of sectoral and time series factors in determining FDI can be assessed as this varies dramatically across sectors.

The rest of the chapter is organised as follows. Section 3.2 summarises the theoretical and empirical work on FDI that forms the basis for the variables selected for the econometric model. The data and econometric procedure and results are discussed in Section 3.3. A summary in section 3.4 concludes the chapter.

3.2 Literature Review

3.2.1 Review of theory

In a study by Braunerhjelm and Svensson (1996) it has been shown that the theoretical basis of FDI is highly fragmented and assorted. This due to a number of economic methodologies adopted to account for locational patterns of firms. Many researchers have

put forward proposals with the aim of explaining FDI. These international theories are founded on the basis of comparative advantage and divergence in factors endowment. There are some factors that encourage the multinational companies to invest in a specific region such as its low labour costs or market size, confirming the validity of the theories of international trade as an explanatory paradigm of FDI. Such factors, on the other hand, fail to justify the reasons why multinationals choose to invest in a certain country and not engage in exporting or licensing as substitution for FDI. Other heuristic models of FDI have been developed. The theory of portfolio investment is one such model. It is based on interest rate differentials between countries. Hymer (1976) proposes that for multinational companies to invest abroad, they must have some monopolistic advantages like patent acquisition, know- how, and managerial competence which are not available to domestic companies. The reason behind this claim lies in the existence of market shortcomings (including marketing, pricing know how or lack of markets for certain products; or huge transaction costs or time delays, assuming that such markets do not exist). Capital is used to assist FDI rather than being an end in itself. Thus, engagement in direct investment can be more easily and efficiently conducted by multinationals than exporting or licensing. Hymer's theory is open to attack for more than one reason; he presents an oversimplified account of the role of structure market feature and ignores the transaction cost market failure. Hymer's theory also lacks a clear locational dimension coupled with a concomitant lack of a dynamic theoretical dimension since it fails to offer an intelligible account of the determinants of foreign investment timing.

Another heuristic model of FDI is Vernon's product life cycle theory. Vernon's model is based on the hypothesis that FDI comprises a stage in the life cycle of a new product. At

the initial phase of a new product, it is locally processed to meet the demands of the local market. Export needs arise when the local market is saturated. Once the product reaches ripeness and starts to lose its uniqueness, competition on the part of rival products becomes more intense. Consequently, producers search for lower cost location. At the global level, the theory accounts for the behaviour of multinationals seeking for new markets to reduce costs by taking advantage of external markets. Additionally, FDI has been noticed to act as a defensive mechanism for protecting existing markets (Dunning, 1993).

To provide a comprehensive explanatory model for FDI determinants, Dunning constructed an eclectic paradigm, incorporating Hymer's model and a combination of other approaches of FDI. Before tackling cross-border activities, Dunning (1993) proposed three factors which must be accomplished:

- The ownership advantages of a firm: These advantages are "firm-specific" and provide foreign firms more control over local firms, which results from ownership of advanced technology and other unique insubstantial assets and the firm's capability to coordinate complementary activities at the manufacturing and distribution levels.

- Internalisation advantages: such as the firm's capability of internalising its activities and reducing its transactional costs through market transactions. The company can still keep the rights to its assets so as to keep its competitive advantage.

- Location-specific advantages: such as the advantages of natural resource giving of the host countries, superior infrastructure, and macroeconomic stability that determine the profit factor with which ownership advantage and internalisation advantage should be combined.

In Dunning's syncretic paradigm, the host country has its influential role on the ownership and internalisation advantages. Thus, firms do not only perform FDI due to location- specific advantages in the host country, but also for three other possible motives:

- Market Seeking FDI: This indicates that FDI is meant to serve local and regional markets. Host country advantages that are likely to attract market seeking FDI include market size of the host country, per capita income and growth potential.

- Resource/asset Seeking FDI: This point to FDI that possesses resources (natural resources, raw materials, and skilled and unskilled labour) which are unavailable in the home country.

- Efficiency Seeking FDI: This kind of FDI is the concern of firms which are willing to achieve profits by exploiting economies with large scale and scope and diversification of risks.

According to a study by UNCTAD, there are a number of other features that affect FDI, including the economic policy frameworks of the host country (such as economic, political and social stability, rules regulating entry and operation of FDI, standards of treating foreign subsidiaries and affiliates, policies associated with the markets functioning and structure). In addition to these determinants, there are influential factors (such as international agreements on FDI, trade tax policies, privatization policy) and facilitation of business policies (such as investment promotions and incentives, hassle costs associated with corruption and administrative efficiency, the measure of financial institution development, and the enforceability of contacts and protection of proprietary rights and the quality of life) (UNCTAD, 1998).

3.2.2 Review of empirical evidence

Various studies have focused on the location of FDI Determinants. The studies conducted in this area show that FDI determinants are not mutually exclusive, and can in fact be mutually reinforcing. In terms of empirical work, the determinants are often classified into classical variables, i.e. traditional location factors; and agglomeration factors, which are not firm-specific, but arise out of advantages of being located to other firms. Classical factors have a direct impact on a firm's demand or production costs (e.g. market size, taxes, labour costs, etc). The relevance of classical or agglomeration variables to determine FDI location will be highlighted here. The relevance of classical factors suggest that policy operates on traditional location factors, but if the agglomeration factors are significant this may imply that FDI is self-perpetuating, i.e. FDI inflows may lead to further FDI inflows. Yet, this is a highly empirical matter, and attention has now shifted to handle this issue. Although there are several studies on FDI location, the evidence sometimes lacks consistency.

- **Classical Explanations**

  i. **Market Size**

Dunning (1993) argues that in order to keep and exploit new markets, several foreign firms choose to invest in a particular location. This will also enable the firms to protect or sustain existing markets. This hypothesis enjoyed wide popularity in economic studies, resulting in a wide acceptance and application of this explanatory variable in nearly all empirical studies on the determinants of FDI. Bandera and White (1968) employed aggregated pooled data to investigate US manufacturing FDI in seven European economies from 1958 to 1962. This led them to give credibility to the theoretical reliance of FDI levels

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on the level of national income in the host country. Schmitz and Bieri (1972) found market size to be a crucial determinant of FDI, basing their hypothesis on aggregate data on US direct investment in EEC over the period 1952- 1966. Lunn (1980) found similar results.

Schneider and Frey (1985) concluded that "real per capita GNP is a significant determinant of per capita FDI in developing economies". Culem (1988) studied bilateral inflows of direct investment among six industrial countries over the period 1969-1982. He found strong support for the market size hypothesis. Kravis and Lipsey (1982), Wheeler and Mody (1992) and Braunerhjelm and Svenssen (1996) compared markets in different countries, and found that the size of the market has a positive effect on FDI. Coughlin *et al*. (1991) found that market size has an important impact on the US as a host country. Billington (1999), Barrel and Pain (1999a) and Wei and Liu (2001) argued that the growth rate of market size, rather than level, has an influence on the determination of FDI location. Scarperlanda and Mauer (1969) found that market size does not affect location decision.

The validity of the market size hypothesis was proved across various countries, periods and specification of variables. The market size variable induced some statistical and conceptual problems; while per capita GDP served as a proxy for market size in most empirical studies on FDI; however, using per capita data may be biased since it places countries with a high population rate in a less attractive category. Some studies use absolute GDP as an alternative measure reflecting the overall size of the economy. Other studies use GNP or per capita GNP as measures of market size. GNP seems to be a less appropriate measure of market size since it captures earnings by nationals in foreign locations, and excludes the income of foreigners located in the home country; therefore it over-estimates

and underestimates the market for the products of multinationals located in the home country.

ii. Labour variables

Apart from market-seeking investment, resource-seeking can stimulate foreign institutions to invest in other countries. Labour is a "crucial income-generating asset" for companies. Thus, labour market conditions are seen as an important factor for the attractiveness to any country. Productivity and labour costs influence FDI location. Labour costs, measured by wages, or relative wages[6], have an adverse effect on FDI at the local level. Higher labour wages may discourage inbound FDI to have little or no positive association in this regard. Schneider and Frey (1985) and Culem (1988) found that higher labour wages discouraged FDI. Sader (1993) observes the negative impact of wages on FDI in a share equation, but only a weak inverse link in a per capita regression. Tsai (1994) ascribed the powerful support to the hypothesis of cheap labour over the period 1983-1986 but identified a weak link over the period 1975-1978. Owen (1982) analysed inter-industry determinants of FDI in Canadian manufacturing industries, and discovered the statistical insignificance of wage differentials between Canada and the USA. Gupta (1983) found that production workers' wages in Canada relative to those of their counterparts in USA was not a significant determinant in a comprehensive model. Edwards (1990) observed that the effect of wages on FDI for 58 developing countries during 1971-1980 is of no significance. Caves (1974), Nankani (1979) and Swedenborg (1979) noted the lack of any positive link between inbound FDI and real wages. Wheeler and Mody (1992) proved that wage has a high positive effect on the electronics industry but a weak link on the manufacturing sector.

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[6] Ratio of real country wages to real region wage rates (Dees, S., 1998).

Billington (1999)   observed that higher labour costs could be balanced by higher productivity. Friedman *et al*. (1996) handled labour costs and productivity separately, and showed the negative impact of labour costs and positive impact of labour productivity on FDI. Coughlin *et al*. (1991), Barrell and Pain (1999a) and Wei and Liu (2001) used another measure to overcome this problem. They used labour costs per unit of output and concluded that this has an undesired effect on FDI.

In a study conducted on labour availability, Billington (1999) asserted that unemployment rate could be a substitute for labour availability; higher unemployment rate affords a larger work force willing to invest in a certain region as well as a wider range of choice. The attractiveness of a region with a higher unemployment rate for investing firms is substantially increased by the readiness of the workforce to exert more effort to maintain its jobs, including working at lower wage rates (Coughlin *et al*., 1991 and Billington, 1999). Therefore, FDI location is positively affected by unemployment rate.

iii.   Real Exchange Rate

As a determinant of FDI, exchange rate is studied as a basic mechanism whereby exchange rates affect FDI inflows in the current literature on the subject. A rapid survey of the previous studies shows that devaluation of the local currency in the recipient countries stimulates FDI inflows. Conversely, appreciation of the value of the local currency of the recipient countries induces a considerable decrease in FDI inflows. Exchange rate affects FDI inflows through two channels: the wealth effect and relative production costs. Currency devaluation in the recipient country induces a decrease in local production costs compared to foreign currencies, raising the profitability expectation for foreign investors willing to export their products to other countries. Higher returns normally attract more FDI

inflows. Devaluation increases the wealth effect which can be defined as the wealth of foreign investors relative to domestic investors. Low costs of labour, machines and assets encourage foreign investors to acquire assets in recipient countries.

Some hypotheses, such as those of Cushman (1985), Froot and Stein (1991), and Blonigen (1997), revealed that exchange rate movements in the short-run induce an increase in FDI inflows into recipient countries. Xing and Zhao (2003a) found that foreign investment companies benefit by currency devaluation in the recipient countries more than local firms due to product differentials and brand name recognition barriers. Campa (1993), and Goldberg and Charles (1995) found that FDI decisions are affected by uncertainty and expectations concerning future exchange rate movements.

iv.   Infrastructural variables

Infrastructure is held to be an essential basis for economic growth and sustainable development. Physical infrastructure is believed to play an extremely effective role in influencing the trends of FDI inflows into recipient countries. The effect of infrastructure on FDI inflows trends is highlighted in several studies of the topic (Wheeler and Mody, 1992; Loree *et al*., 1995; Richaud *et al.*, 1999; Morisset, 2000; Asiedu, 2002 and Sekkat and Veganzones, 2004). Physical infrastructure ameliorates investment atmosphere for FDI through subsidising total investments costs for foreign investors, consequently increasing profitability. Objective measurement of the availability of infrastructural components in an inter-country context is challenged in empirical studies by the difficulty of analysing the role of infrastructure availability, such as transportation facilities (e.g. road networks, ports, airports, etc) and communications infrastructure (e.g. telecommunications networks,

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information infrastructure, energy availability, etc) (see World Bank, 1994, for indicators of the diverse dimensions of infrastructure).

v. Governmental policies

The impact of government policies on FDI inflows can possibly be divided into three categories, as follows:

- Overall economic policy at the macroeconomic level targeting fundamental economic factors including market size, availability of skilled labour, infrastructure, and the factors affecting the attractiveness of the recipient country to FDI inflows.

- Domestic policies having to do with FDI inflows such as the regulation of the entries and exits of FDI inflows such as imposing restrictive measures on the operations of foreign companies in different sectors of the economy or creating incentives to encourage foreign investments.

- International FDI policies affecting agreements with foreign partners under national treatment standards.

Empirical evidence on governmental capabilities and resources examined by Cheng and Kwan (2000) show that the Chinese government, despite its overt totalitarian regime, has pursued an open door policy ever since 1993. Ever since, China has attracted FDI inflows (second only to the USA). Morrisey and Rai (1995) maintain that institutional characteristics and the degree of government-led economic activities can contribute to the restructuring of the economy which can serve as a determinant of FDI inflows.

vi. Openness

The ratio of exports plus import to GDP has been the key to measure openness. It exhibits mixed evidence as a determinant of FDI inflows in the current literature on this topic. The current hypothesis of openness as a determining factor of FDI is that, given that the trade sector attracts most investments, the relevant factor in deciding FDI inflows is the degree of the openness of a country to international trade. Kravis and Lipsey (1982), Culem (1988), and Edwards (1990) show the powerful impact of openness on FDI. Wheeler and Mody (1992) lent credibility to this hypothesis in the manufacturing sector, but found a weak negative link in the electronics sector. Schmitz and Bieri (1972) found a weak positive link between openness and FDI.

vii. Agglomeration Explanations

Manufacturing agglomeration has elicited various explanations in the various empirical studies on the topic. Earlier studies, such as those proposed by Marshal (1920), suggest "three reasons for spatial concentration in industries: (a) localisation in industries provide a pooled market for skilled labour; (b) facilitates the development of specialized inputs and (capital) services and (c) empowers firms by technological knowledge spillovers". Marshall's ideas had a profound impact on modern economic approaches which similarly stress returns to scale, transportation costs and spillovers (Krugman, 1991a and Caniels and Romijn, 2003).

Several location studies have investigated the importance of agglomeration as a determinant of location choice. This indicates that regions which attract more FDI are likely to attract additional investments more than those with relatively few foreign firms. Wheeler and Mody (1992) conducted an investigation of the relevance of agglomeration economies

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to foreign investment decision of US firms in manufacturing electronics. The study revealed that the existence of foreign firms in a certain region, which can be viewed as a pointer of agglomeration, is a crucial determining factor of new FDI inflows. In addition, Braunerhjelm and Svensson (1996) conducted a study of Swedish MNE affiliates established abroad and found evidence to support the importance of agglomeration effects. Barrell and Pain (1999a) emphasised the significance of agglomeration special effects in the location pattern of US affiliates in the European Union (EU). Head *et al*. (1995) found powerful proof to maintain the positive effect of foreign agglomeration on location choice in 751 new Japanese plants built in the USA since 1980. The presence of foreign agglomerates attracts further FDI inflows due to knowledge spillovers and supplier linkages, given the overall effect of agglomeration. Yet, local competition can impede foreign investment. In addition, the supply of skilled labour can be insufficient to comply with the demands of the firms investing in the region, resulting in competition for labour even at a high cost. This rapid survey of the literature is meant to reveal the crucial role played by agglomeration economies in attracting FDI inflows. While classical variables such as market size and general market conditions seem to explain FDI location, it has been suggested by Head *et al*. (1995) and Guimaries *et al*. (2000) that these variables are determined by agglomeration factors. This might be conclusive evidence. Yet, caution should be exercised for a variety of reasons; it is difficult to distinguish between agglomeration and classical factors (e.g. industrialisation can capture market size). While classical variables can account for the initial phase of FDI, other factors can determine later phases of FDI accompanying the establishment of virtual industrialisation projects in a certain foreign location.

Macroeconomic and institutional variables have become so crucial that most studies devoted to FDI Inflows in the MENA region tend to concentrate on them. "These studies focus on economic variables such as economic growth, openness, real interest rates, rate of return on investment, infrastructure, natural resources, corruption and the degree of political stability in the region" (see Richards and Waterbury, 1996; Rivlin, 2001; Kamaly, 2002; and Eid and Paua, 2002). The empirical studies use fixed effects panel regressions and a small sample of MENA countries, stressing the relevance of macroeconomic stability, openness and political stability to FDI inflows into the MENA region. Kamaly (2002) employed a dynamic panel model to identify the determinants of FDI inflows to the MENA region for the period 1990-1999 and concluded that economic growth and the lagged value for the ratio of FDI to GDP are the only crucial factors among other macroeconomic indicators. Different studies for FDI determinants in different countries are shown in Table 3.2.

3.3 Data and Econometric Approach

3.3.1 Model Specification

The econometric approach followed in this paper uses annual observations on a cross-section of 10 sectors of the Egyptian economy over the period 1983 to 2004. This panel data set allows for the identification of sectoral determinants of FDI which are likely to influence the level and timing of FDI in Egypt over time.

A number of factors have been mentioned and analysed as potential determinants of FDI. The researcher has identified five potentially important determinants of FDI (market size, private domestic investment, infrastructure, governmental policies, and openness). The selection of potential determinants for regression analysis depends on data availability and the particular focus of the research. For example, in research into FDI across economic

sectors in a country, country-level variables such as exchange rate, inflation or country risk are unlikely to have strong explanatory power. The justification for these factors is as follows:

Market size has been seen as one of the important effects on the flow of FDI. In fact one driving force for FDI is to search for new markets. The reason for this is the potentials that the host countries have, such as larger market size, faster economic growth and a higher degree of economic development, which will offer better prospects for MNEs to take advantage of their ownership advantages, and therefore will attract more market-oriented FDI. Sectoral output measured by GDP is used to capture demand and size effect.

Private domestic investment may have its influence on FDI as well. An observable channel can be regarded as where the private domestic investors obtain more accurate information about the local business climate than foreign investors do. Incomplete information results in the domestic investment acting as a signal about the state of the economy to foreign investors. The other channel is that private domestic investment can be seen as an indicator for high returns to capital. Thus, the researcher would expect to see private domestic investment leading foreign direct investment. Harrison and Revenga (1995), for example, clearly included local investment as one of the determinants of FDI but they found that local investment compared with the size of the local market and openness to trade has no impact on FDI. In their study of the determinants of FDI in Sub-Saharan Africa, Ndikumana and Verick (2008) found that private investment is a motivation of FDI, indicating that African countries will benefit much from recovering the domestic climate. This paper includes sectoral private domestic investment as an indicator of the business climate and foreseen profitability of foreign direct investment.

Table 3.2 Coefficients of FDI determinants in different regions using Panel Data

Author	Topic	Data	Explanatory variables	Empirical
Cheng and Kwan (2000)	Determinants of the location of FDI in China	Panel data for 29 Chinese regions from 1985 to 1995	• Labour wage; • Infrastructure level; • Per capital income; • Education level; • Policy designations	Regional income, infrastructure, policy designations (i.e. SEZs) have a positive effect; Wage cost has a negative impact on FDI; Education level is not statistically significant on FDI
Dees (1998)	Determinants and effects of FDI in China	Panel data of 11 countries from 1983 to 1995	• Market size; • Labour wage; • Exchange rate; • Stock of patents	Inward FDI was motivated by the large Chinese market, the low cost of labour force, real exchange rate, and degree of innovation
Sun, Q. *et al.* (2002)	Determinants of foreign direct investment across China	Panel data for 30 provinces from 1986 to 1998	• Market size (GDP); • Labour cost; • Domestic investment per worker; • Labour quality; • Agglomeration • infrastructure	Wage has positive relationship with FDI before 1991 but has a negative relationship after then; Provincial GDP has no significant relationship before 1991 but becomes highly significant after 1991; Labour quality and infrastructure are important determinants of the distribution of FDI
Resmini, L. (2000)	The determinants of FDI in the CEECs	Panel Data for 10 CEECs from 1991-1995	• Market Size • Labour Costs • Distance • Degree of Openness • Manufacturing sector size • Operation Risk Index	FDI was motivated by market size, degree of openness, and operation risk index, while labour costs, distance, and manufacturing sector size has a negative impact.

Author	Topic	Data	Explanatory variables	Empirical
Tung, S. and Cho (2001)	Tax rates and tax incentives and FDI into certain designated areas in China	Panel data from 1988 to 1994 of 43 zones and cities	• Agglomeration • economics (population); • Unemployment rate; • Wage rate; • Infrastructure; • Percentage of tax rate • (dummy)	Zones and cities with lower tax and greater tax incentives attract more FDI; The 1991 tax laws are effective in increasing FDI during 1992-1994 period as compared to the 1988-1991 period
Owen C. H (2004)	Determinants of FDI in China: A sectoral Analysis	Panel data for 13 sectors of China and 9 sectors for Guangdong province over the period from 1997 to 2002	• Gross Domestic product • Wage rate • Innovation Level • Ownership Level	Gross domestic product and innovation level have a positive impact on the flow of FDI, while wage rates and ownership level have a negative impact
Onyeiwu,S. (2004)	Analysis of FDI Flows to Developing Countries: Is the MENA Region Different?	Panel data from 51 developing countries, 10 of which are from the MENA region for the 1975-1999 period	• Rate of Return on investment • Openness • Infrastructures • Corruption/bureaucratic • Economic growth • Inflation • Tax rate • External Debt • Human capital	Some of the determinants of FDI flows to developing countries are not significant for FDI flows to MENA countries. These include the Rate of Return on Investment, Infrastructures, and Economic Fundamentals. More importantly, if the values of all the determinants of FDI flows were the same for all developing countries, a MENA country is more likely to receive substantially less FDI than a non MENA country. Corruption and bureaucratic Red Tape and trade openness

Author	Topic	Data	Explanatory variables	Empirical
Giulietti,M. *et al.* (2004)	Foreign direct investment in the UK: evidence from a disaggregated panel of the UK food sector	disaggregated data of the food processing sector (14 sub sectors) over the period 1982 to 1991 in UK	• Ownership specific factors (product differentiation, managerial skills, and capital intensity) • Industry characteristics (sales growth rate, labour productivity, and market structure), • Macroeconomic locational variables (capital cost and labour cost)	The predominance of ownership specific, and industry characteristics in determining the flow of FDI in the sector, while macroeconomic factors have a marginal effect.
Liu,X. *et al.* (1997)	Country Characteristics and foreign Direct Investment in China: A panel data analysis	Panel Data cover the period 1983-1994 (1984-1994) and 22 (17) regions in the case of pledged (realized) FDI	• Market size • Wage rates • Exchange rates • Bilateral trade • Cultural differences	The results indicate that bilateral trade, cultural differences, and relative real changes in market size, wage rates, and exchange rates are important determinants of pledged FDI, and that bilateral trade, relative changes in wage rates and exchange rates affect realized FDI
Michael O.Moore (1993)	Determinants of German Manufacturing Direct Investment: 1980-1988	Panel data in five manufacturing sectors for the period 1980 through 1988.	• Real wage • Labour market index • Gross domestic product • Difference between host country and German growth in GDP • tariff	The results indicate that host country size and labour costs may help explain German FDI. The data also suggest that substantial differences among the five sectors exist. The result indicate that geographical proximity to Germany may help systematically in attracting investment
Culem,C.G (1988)	The locational determinants of Direct Investments among industrialized countries	Panel data among six industrialized countries, over the period 1969-82	• Tariff barriers • Market size • Growth rates • Labour costs • Export flows	Host market size, growth rate, tariff barriers are significant determinants. DI are stimulated by prior export flows while inter EEC FDIs are not motivated by lower labour costs

Infrastructure is an influential key of FDI. Foreign investors favour economies that have well-developed utilities such as roads, airports, water supply, uninterrupted power supply, telephones, and Internet access (Infrastructure). Undeveloped infrastructure maximises the costs of doing business and minimises the rate of return on investment. On the other hand, the costs of production are considerably lower in countries with well-developed infrastructure than in countries with poor infrastructure. Countries with good infrastructure are thus more likely to pull more FDI (Morisset, 2000). This paper uses sectoral public domestic investment as a proxy to infrastructure.

Another important determinant of FDI flows is the *governmental policies* as governments consider FDI flows as a means by which unemployment can be fought. It also helps to enhance national growth rates. A variety of forms of policies can be adopted by the government, such as tariffs, taxes, subsidies, privatisation policies, and lowering the additional costs of doing business. For instance these costs are linked to factors such as regulatory, bureaucratic, and judicial hurdles; issues of property rights; enforceability of contracts; labour regulations; performance requirements like mandatory joint partnerships and domestic content requirements; and political and macroeconomic stability. To test the effect of privatisation policy a specific dummy (D_1) is used for the application of privatisation policy. Therefore a value of one is assigned to the policy from the period 1991 till 2004 and a value of zero otherwise.

The FDI has been affected by *openness*. Open economy encourages FDI as it sustains foreign capital; thus, foreign investors become more familiar with the host economy. The researcher uses the total sum of exports and imports over GDP so as to measure the openness degree.

Having identified the determinants of FDI, the next step is to explore the extent to which some of these determinants affect the flow of FDI to Egypt. The general form of the econometric model is given by

$$y_{i,t} = \alpha + X_{i,t}\beta_k + u_{i,t} \qquad i = 1, \ldots\ldots, N; \qquad t = 1, \ldots.. T \qquad \textbf{(3.1)}$$

With i denoteing economic sectors, and t denoting time. The i subscript, therefore, denotes the cross-section dimension whereas t denotes the time series dimension. α is a scalar, β is k $\times$ 1 and $X_{i,t}$ is the i th observation on K explanatory variables. $y_{i,t}$ the dependent variable. $u_{i,t}$ represents the vector of the error component, with

$$u_{i,t} = \mu_i + v_{it}$$

As with all panel data studies a distinction between the fixed and the random effects model[7] is made. If there is no substantial reason to assume a significant correlation between the unobserved sector-specific random effects and the regressors, then the random effects model may be more appropriate (Greene, 2003), but if there is such a correlation, the random effects model would be inconsistently estimated and the fixed effects model would be the model of choice. The Hausman[8] specification test is the classical test to discriminate between fixed and random effects models.

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[7] A fixed group effect model examines group differences in intercepts, assuming the same slopes and constant variance across entities or subjects. Since a group (individual specific) effect is time invariant and considered a part of the intercept, μ_i is allowed to be correlated to other regressors. A random effect model, by contrast, estimates variance components for groups (or times) and errors, assuming the same intercept and slopes. μ_i is a part of the errors and thus should not be correlated to any regressor; otherwise, a core OLS assumption is violated (thus in the random effect model $\mu_i \sim$ IID $(0,\sigma^2)$)(Baltagi, 2008).

[8] The Hausman Test: Given a model and data in which fixed effects estimation would be appropriate, a Hausman test measures whether random effects estimation would be almost as good. In a fixed-effects kind of case, the Hausman test is a test of H_0: that random effect would be consistent and efficient, versus H_1: that random effect would be inconsistent. (Note that fixed effects would certainly be consistent.) The result of the test is a vector of dimension k which will be a chi-square (k) distributed. So if the Hausman test statistic is large, one must use FE. If the statistic is small, one may get away with RE (Dimitrious, A., and Stephan, G., 2006).

The two error terms, μ_i and v_{it}, behave somewhat differently. There is a different v_{it} for each individual at each point in time, but μ_i only varies across individuals, not over time. We regard μ_i as representing the combined effect on y of all unobserved variables that are constant over time. On the other hand, v_{it} represents purely random variation at each point in time, and it is assumed that v_{it} has a normal distribution with mean 0 and variance σ_v^2.

3.3.2 Data Description and Sources

The Balance of Payment defines FDI as "total inflow of FDI to Egypt (less capital repatriation) and foreign investors' equity participation in any local enterprise". This indicates that there is a long-term relationship between the direct investors and the enterprise. The direct investors own 10 per cent or more of the ordinary shares or voting powers (for an incorporated enterprise) or the equivalent (for an unincorporated enterprise). The Balance of Payments Compilation Guide prepared by the IMF Statistics Department pointed out the following three systems for the compilation of FDI data:

- The international transactions reporting systems.

- Information from approvals.

- Enterprise surveys systems.

As it is based on quality comparison, the enterprise survey is seen as the best system in spite of its basic high costs. This is founded on definite data acquired from FDI and any alterations which might come over them. The international transaction reporting system comes next and relies, for the most part, on banking system statistics which are based on cash flows. The IMF regarded the second system to be less effective than the first due to its

sole reliance on granted approvals to enterprises. In Egypt FDI data are compiled by two entities.

i. The Central Bank of Egypt (CBE)

To serve the preparation of BOP estimates is the primary objective of compiling FDI data. With this end in view, the Central Bank of Egypt relies on recorded data from the banks submitted to the General Department of Foreign Exchange. The FDI item includes the following:

- Replenishments of capital and operation accounts.

- Incoming transfers for the purchase of real estates.

- Incoming transfers for the purchase of securities which represent ten per cent or more of the corporate capital. This information is presented by Capital Market Authority.

ii. The General Authority for free zones and Investment (GAFI)

This entity couples FDI data presented by all other government institutions. These data include:

- Issued capital of direct investment enterprise in Egypt.

- Investment costs associated with FDI in oil business (These data are provided to GAFI by the Ministry of Petroleum.

Table 3.3 illustrates the advantages and disadvantages of data collected by these two entities:

Table 3.3 Advantages and Disadvantages of Data collection between CBE and GAFI

	The Central Bank of Egypt	*The General Authority for Investment*
Advantages	Keeping records of the actual foreign investment flows through the accounts opened at the CBE.	Keeping record of all foreign investment approvals.
	Complying with the IMFs methodology of recording FDI data.	The ability to directly record expansions and capital increases in companies (i.e. it does not depend on records of capital transfers from abroad through the banking system) in case companies report them to benefit from investment incentives
Disadvantages	Non cash flows are not recorded.	The time lag between the recording of FDI data and the transfer of invested funds. Sometimes, the investment does not go beyond the stage of company registration.
	Reinvested profits and dividends and internal transactions of these investments are not calculated.	Investment appears overvalued as only the issued capital of companies is recorded.
		The capital Market Authority data are only registered after companies convene their general assemblies.

These two entities which are responsible for recording FDI in Egypt show evident inconsistency in the data provided. The Central Bank of Egypt provides and publishes data that conform more to the methodology formulated by IMF and the data presented by the international organisation for this target. However, actual IMF practices have highlighted the insufficiency and shortcomings of these data since they ruled out:

- Direct governments corporate subscription in the form of in a" kind stocks.

- FDI data in the petroleum sector.

- Reinvested profits.

Hence, a joint committee was formed for the sake of getting an accurate figure representing the bulk of FDI in Egypt. The committee consisted of representatives of all Authorities concerned, particularly the CBE, GAFI, the Capital Market Authority, and the Ministry of Petroleum. As a result, they reached an agreement whereby the aforementioned

data are to be represented to the CBE by GAFI and the General Egyptian Petroleum Corporation. In this respect, GAFI, which is the only agency in charge of contracting foreign investors, is now developing its techniques of compiling. Such development is carried out concerning FDI data in order to guarantee getting more accurate and all-inclusive data. To this end, GAFI has founded several committees specialising in assessing the in-kind quotas of foreign investors in a certain resident investment enterprise, and evaluating the dividend reinvested (by the investment expansions committee). At present, a number of research projects are being conducted on the application of enterprise survey, concentrating on the various methods to attain the required financing to put this system into effect.

The empirical analysis in this study is based on a balanced panel consisting of 10 sectors (agriculture; industry; petroleum; electricity and utilities; construction; transportation, Suez canal and communication; banking, finance, trade and insurance; tourism; government social and personal services, and others) over a period of 22 years from 1983 to 2004 with a total of 220 observations.. The data contain information on foreign direct investment, gross domestic product, public investment, private investment in current and constant (1990) prices, exports and imports. The database has been built using a number of different sources. First, the data for foreign direct investment were collected from the General Authority for Investment (GAFI).

Second, the data for gross domestic product, public investment, private investment were collected from the Ministry of Economic Development. Finally, the data for exports and imports were collected from the World Bank database. Table 3.4 presents definitions and summary statistics of the key variables used in the empirical estimations.

Table 3.4 Dependent and Independent Variables measures

and summary statistics

Variables	Symbol	Unit of Measurement	Calculation	Mean	Std. Deviation	Reference
Foreign Direct Investment	*FDI*	Million L.E	(FDI/ Deflator)*100	4.7122	1.5643	1.Central Bank of Egypt 2. GAFI
Market Size	*MS*	Million L.E	(GDP/ Deflator)*100	9.1854	1.0215	Ministry of Economic Development
Trade Liberalization	*Openness*	Percentage	(Exports + Imports)/GDP	3.8781	.1675	World Bank Data Base
Private Domestic Investment	*PDINV*	Million L.E	(PINV/ Deflator)*100	6.5301	1.7969	Ministry of Economic Development
Infrastructure	*Infra*	Million L.E	(Pub Inv/ Deflator)*100	7.0675	1.2249	Ministry of Economic Development
Government policies	*D1*	0,1				

3.3.3 Estimation and Empirical Results

3.3.3.1 Estimation

In order to assess the influence of the variables described, a foreign investment equation may be built up in the following form:

$$ln\,FDI_{i,t} = \alpha + \beta_1 lnMS_{i,t} + \beta_2 lnPDinv_{i,t} + \beta_3 lninfra_{i,t} + \beta_4 lnOpenness_t +$$
$$\beta_5 D_{1t} + u_{i,t} \qquad\qquad \textbf{(3.2)}$$

Variables are measured in logarithmic values. This has two advantages: first, such transformation reduces the influence of large values and second, coefficients can be directly interpreted as elasticities. Based on the discussion above, we begin by estimating equation

(3.3) with sector fixed, random effects, and then running a Hausman test. The estimated coefficients are shown in Table 3.5.

This specification appears to do a good job of explaining the variation in the dependent variable, the overall R^2 is high, and the F statistic is significant at the 1 percent level, Furthermore, the coefficients (Openness, Private Domestic Investment, Government policies) are correctly signed and significantly different from zero at the 5 percent level or higher, while the coefficient of infrastructure is statistically insignificant. On the other hand, the coefficient of market size is statistically significant and negative. The Hausman test for fixed versus. random effects suggests that using a panel data methodology with fixed effects is appropriate (prob >chi2 = 0.0000).

Table 3.5 Fixed and Random models estimation

Variables	FE	RE
Market Size	-.5389** (.1306)	-.2097*** (.1048)
Openness	0.5382*** (.2086)	.6705*** (.2173)
Private Domestic Investment	.5707*** (.03772)	.5974*** (.0371)
Infrastructure	.0146 (.0709)	-.0454 (.0655)
D1	.4822*** (.0885)	.3446*** (.0851)
Constant	3.4368 (1.6680)	.2394 (1.4591)
R^2 (Overall)	0.508	.726
Hausman (prob>χ^2)	.0000	
Number of observations	220	

Notes
1. All variables are expressed in natural logarithms.
2. Standard errors are in parenthesis.
3. *, **, and *** denote significance at the 10, 5, 1 percent level, respectively.

Empirical tests reveal that the estimates in Table 3.5 do not account for several important patterns in the model residuals. In the following discussion, we will identify some of these issues and consider how they might be addressed. This will set the stage for the next section, which will present an augmented model that takes account of these problems and becomes the baseline specification for this chapter. The issues we will focus on are cross panel heteroskedasticity and within-panel serial correlation, multicollinearity, endogeneity.

i. Multicollinearity

A problem with this data set is the possible high correlation between the various proxies. A high level of correlation among regressors may lead to serious multicollinearity among the model's independent variables which inflates standard errors and results in over-estimating the effects of some collinear variables and underestimating the effects of others. In order to ascertain the degree of multicollinearity, we calculate the correlation matrix between all the potential determinants. There are few formal tests for multicollinearity, and we apply an existing one (VIF, Tolerance)[9] to our panel data. The results for the five selected proxies are reported in Table 3.6 and confirm that none of the variables is highly correlated.

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[9] Multicollinearity can be assessed by examining Tolerance and the Variance Inflation Factor (VIF). Tolerance is 1- R^2 a small tolerance value indicates that the variable under consideration is almost a perfect linear combination of the independent variables already in the equation and that it should not be added to the regression equation. All variables involved in the linear relationship will have a small tolerance. Some suggest that a tolerance value less than 0.1 should be investigated further. The Variance Inflation Factor (VIF) is 1/Tolerance; it is always greater than or equal to 1. There is no formal VIF value for determining presence of multicollinearity. Values of VIF that exceed 10 are often regarded as indicating multicollinearity, but in weaker models values above 2.5 may be a cause for concern (Dimitrious, A., and Stephan, G., 2006).

Table 3.6 Partial correlation, VIF and Tolerance

Variables	Correlation	Sig	VIF	1/VIF
Market Size	0.2592	0.000	1.14	0.876
Openness	0.2252	0.001	1.04	0.962
Private Domestic Investment	0.8783	0.000	1.12	0.895
Infrastructure	-0.4216	0.000	1.04	0.958
D1	0.1242	0.069	1.06	0.942
Mean VIF			1.08	

ii. Heteroskedasticity and autocorrelation

A Modified Wald Test[10] for groupwise heteroskedsticity reveals the presence of cross-panel heteroskedasticity (χ^2= 10, p = 0.0106). which, while leaving coefficient estimates unbiased, can significantly influence standard errors and therefore affect hypothesis testing.Both random and fixed-effects panel models do not deal explicitly with temporally and spatially correlated errors. If there is autocorrelation in the model, it is necessary to deal with it because autocorrelation in linear panel-data models biases the standard errors and causes the results to be less efficient. One can apply one or more of several tests for

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[10] The null hypothesis specifies that $\sigma_i^2 = \sigma^2$ for i = 1,......, N_g where N_g is the number of cross- sectional units. Let $\hat{\sigma}_i^2 = T_i^{-1} \sum_{t-1}^{T_i} e_{it}^2$ be the estimator of the i *th* unit's error variance, based upon the T_i residuals e_{it}^2 available for that unit. Then define

$$V_i = T_i^{-1} (T_i - 1) \sum_{t=1}^{T_i} (e_{it}^2 - \hat{\sigma}_i^2)^2$$

as the estimated variance of σ_i^2. The modified Wald test statistic, defined as

$$W = \sum_{i=1}^{N_g} \frac{(\hat{\sigma}_i^2 - \hat{\sigma}^2)^2}{V_i}$$

Will be distributed as χ^2 [N_g] under the null hypothesis. Greene's discussion of Lagrange multiplier, likelihood ratio, and standard Wald test statistics points out that these statistics are sensitive to the assumption of normality of the errors. The modified Wald statistic computed here is viable when the assumption of normality is violated, at least in asymptotic terms. In terms of small sample properties, simulations of the test statistic's properties have shown that its power is very low in the context of fixed effects with "large *N*, small *T*" panels. In that circumstance, the test should be used with caution (Christopher F. Baum, 2001).

residual autocorrelation. The Wooldridge test[11] for autocorrelation in panel data models accepts the null of no first order serial correlation (F= 1.383, p = 0.2697). Thus, the estimates in Table 3.5 are not affected by serial correlation.

In order to account for heteroskedasticity within panels, we rely on a feasible generalised least squares (FGLS) estimator. The advantage of this approach is that it allows estimation in the presence of heteroskedasticity across panels. (results are presented in Table 3.7).

Table 3.7 GLS estimation results (Ln FDI)

Variables	Coefficient
Market Size	.1728***
	(.0461)
Openness	.9312***
	(.2555)
Private Domestic Investment	.7069***
	(.0251)
Infrastructure	-.2716***
	(.0382)
D1	.2047***
	(.0902)
Constant	-3.3066***
	(1.142)
Number of Observations	220

Notes
1. All variables are expressed in natural logarithms.
2. Standard errors are in parentheses.
3. *, **, and *** denote significance at the 10, 5, 1 percent level, respectively

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[11] Serial Correlation in linear panel-data models biases the standard errors and causes the results to be less efficient, researchers need to identify serial correlation in the idiosyncratic error term in a panel-data model. A new test for serial correlation in random- or fixed-effects one-way models derived by Wooldridge (2002) is attractive because it can be applied under general conditions and is easy to implement. The procedure regresses the residuals $\hat{e}_{it}$ from the regression with first-differenced variables on their lags and tests that the coefficient on the lagged residuals is equal to $-.5$ (David M. Drukker, 2003).

iii. Endogeneity

Endogeneity[12], or two way causality, presents problems in regression not only in terms of inference, but also for estimation, since the right hand side variable is potentially correlated with the variation in the dependent variable that is relegated to the error term.

To solve the problem of endogeneity one would usually use fixed-effects instrumental variables estimation (two-stage least squares or 2SLS). The endogeneity test for explanatory variables shows that private domestic investment is endogenous[13]. The instruments used were the lagged values of private domestic investment. In addition, Equation 3.2 was augmented with a time trend to proxy unobserved components[14]. The statistics of the 2SLS regressions showed that the instrument was strong (results are presented in Table 3.8)[15].

3.3.3.2 Empirical Results

The estimation shows that openness, private domestic investment, government policies, (D_1) are highly relevant to accounting for FDI flows, while market surge and infrastructure show insignificant coefficients. On the other hand, time trend shows a negative coefficient.

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[12] when variable X_i is regressed on a vector of exogenous variables X_j, the part of X_i explained by these variables is partialed out. The rest of X_i is explained by the residual from the estimation, v_i. This v_i is then added to the regressing of the structural equation. If the t-statistics for v_i is insignificant, then v_i is not correlated to the dependent variable, and so, v_i and X_i are not correlated to the error term of the structural equation.

[13] The endogeneity test shows that private domestic investment is endogenous (where Prob is 0.0397).

[14] An example of these unobserved components would be business facilitation measures, such as promotion efforts, the provision of incentives to foreign investors, the reduction of costs of doing business in a host country (reducing or eliminating corruption).

[15] The Hausman test for IV versus. OLS effects suggests that using a panel data methodology with IV is appropriate (prob >chi2 = 0.0000).

The market size of the recipient country is crucial as the target economies can provide larger economies of scale and spillovers effects. Market-oriented FDI has a clear target, i.e.

Table 3.8   Fixed Effect Two Stage Least Squares Estimation

Variables	Coefficient
Market Size	-.1035 (.1340)
Openness	.4358*** (.1972)
Private Domestic Investment	.7513*** (.0694)
Infrastructure	.0337 (.0713)
D1	1.067*** (.1224)
Trend	-.0911*** (.0128)
Hansen J Statistic (χ^2 P-val)	(0.545)
Number of Observations	200
Notes 1. All variables are expressed in natural logarithms. 2. Standard errors are in parentheses. 3. *, **, and *** denote significance at the 10, 5, 1 percent level, respectively.	

to establish enterprises that are able to supply goods and services to the local markets. Table 3.8 points out that the coefficient on Egypt's GDP has a negative sign but has no statistically noteworthy result on the magnitude of inward investment. This may be attributable to the low level of per-capita income.

Openness[16] is regarded as having a positive significant effect. Egypt is centrally located in close proximity to European market, North Africa and the Middle East. This market is an exemplary locus for transport, export and other services. Egypt pursued economic reform and open door policies to endorse trade by signing bilateral trade agreements and adopting

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[16] Another measure was used for openness which is Exports/GDP, and results reveal that it has a positive effect on the flow of FDI, so Egypt attract export- oriented FDI.

actions. Egypt has also complied fully with WTO commitments. It had to adopt a policy of eliminating non- tariff barriers, replacing them with tariffs. The Egyptian maximum tariff fell from 100 per cent to 40 per cent. Duty imports represent only 1.3 per cent of total imports, which is one of the lowest rates by international standards. Table 3.8 shows that the Egyptian economic experience shows a 1 per cent increase in trade openness resulting from FDI being raised by 0.435 per cent, which indicates that FDI in Egypt is generally export-oriented and is likely to be uninfluenced by the market of the FDI receiving economy, i.e. is of the vertical type. Thus, for foreign investors, the degree of openness of the economy is of higher importance than market size. The main export items of a country come from agricultural, mining and manufacturing sectors. This might explain the strong positive effect of openness on FDI.

It is assumed that the existence of physical infrastructure deeply affects the location decision: For instance, the presence of highways, railways and feasible transport methods which are adjusted to the size of the recipient country, help to increase FDI inflows. A cursory look at Table 3.8 would reveal that the coefficient upon infrastructure is found to have a positive but insignificant statistical effect on the bulk of inward investment. Over the last five decades, infrastructure in Egypt has experienced a remarkable improvement. This has undoubtedly supported the relatively strong economic growth performance of the country. Despite this progress, in the last years there has been a slowdown or even a decline in some areas of infrastructure, particularly power generation and transportation. Associated with this decline, capital expenditures in Egypt have been reduced in the last decade, raising concerns that the country may have reached an unsustainably low level of infrastructure investment.

The Egyptian economy achieved low growth performance levels, with an average of 3.2 per cent between 2000/2001 and 2002/2003, the lowest growth rate in more than a decade. One can simply attribute this slowdown to the erratic, economic external traumas experienced by domestic economy at the turn of the millennium, such as the consequences of September 11, the oil price blow, the abrupt slowdown of world trade in 2001 and regional conflict. The Government of Egypt (GOE) has followed some policies to reform and ameliorate business and investment climates in Egypt. With that end in view, GOE undertook a series of economic and institutional reform to provide a proper climate for investment and a more advanced business milieu in Egypt. A brief look at Table 3.8 points out the coefficient upon privatization (D_1), and private domestic investment are positive and highly significant (1per cent), confirming that privatization, and high return on capital for foreign enterprises is secured (1 per cent increase in private domestic investment raises FDI by 0.75 per cent), and the signals transmitted by the dummy variable, and private domestic investment are good indicators in this suspect.

3.4 Conclusion

In this chapter, our main interest has been to study how different variables or indicators explain the flow of FDI in Egypt. In explaining the sectoral distribution of FDI inflow, the study applied a two stage least squares technique using panel data between 1983 and 2004 across 10 sectors of the Egyptian economy. The location determinants examined consisted of two categories: first, sector-specific advantages such as large local market, private domestic investment, and infrastructure. The second group of variables to be examined were locational variables such as openness, and government policy (privatization).

In regression results, the market size has a negative but not statistically significant impact on the magnitude of inward investment suggesting that FDI in Egypt is normally export-oriented and tends to be uninfluenced by the size of the market. Government policies directed to mending and improving the business and investment climate (streamlining investment procedures, dismantling bureaucratic obstacles, and liberalising business) are essential for enabling a host country to attract foreign investment. It was found that the coefficient upon privatization (D_1) and private domestic investment is positive and highly significant. The other determinants of FDI inflow are openness' to trade, and infrastructure. Our results show that the more liberalised the country is towards external trade, the more FDI it will attract. This confirms the findings in earlier studies (Kravis and Lipsey, 1982; Culem, 1988; Edwards, 1990) that trade and FDI are complementary to each other. For an infrastructure indicator it is found that it yields a positive and insignificant coefficient.

Chapter Four

The Spillover Effects of Foreign Direct Investment in the Manufacturing Sector

4.1 Introduction

Throughout the last twenty years, the operations of multinational enterprises (MNES) and FDI are widely held to determine both domestic and foreign processes of economic development. The reason for this may be ascribed to the unprecedented overgrowth of international capital inflows, and also due in part to the assumption of the existence of FDI influencing the processes of economic development. Foreign Direct Investment brings in capital and leads to technology spillovers from advanced counties which are indispensible to the technological progress of the recipient country. In addition to that, FDI can have consequences in the increase of competition in the recipient country and in a better and more efficiently conducted allocation of resources. It can be argued that technological transfers from the FDI sending countries constitute the most significant channel for spreading modern technology. Recent empirical studies on this topic tend to imply that FDI can generate positive spillover benefits and ameliorate the productivity performance of the recipient country, which may account for the tendency of many governments to devise new regulations to court FDI.

Some of the current empirical studies have found that FDI has an impact from the positive spillovers on the productivity of the recipient countries (Caves, 1974; Kokko, 1994; Blomstrom and Sjoholm, 1999; Xu, 2000) and expanding infrastructural facilities, which makes it more remunerative for domestic companies to invest at the local level. Lack of appropriate institutional framework and the technological gaps in peripheral countries and other effects make it extremely difficult for these countries to benefit fully from FDI inflows (Dunning and Narula, 1996; Blomstrom and Kokko, 1998). However, other studies (Haddad and Harrison, 1993; Djankov and Hoekman, 1998; Aitken and Harrison, 1999; Kathuria, 2000; Konings, 2001; Kinoshita, 2001) claim that the existence of foreign terms does not have a detrimental effect on the productivity of local

firms in two different ways: first, positive spillovers are less prevalent than previously thought; they also assume that the existence of foreign firms can possibly induce significant negative spillovers due to fierce competition over limited resources, limited skilled labourers, and costs related to FDI - for instance, the foreign firms business practices are restrictive. This can also be exemplified by intra-firm trade, transfer pricing and profit repatriation and, in the case of developing economies, foreign tax revenue (or high subsidies) and a noticeable difference in the technological level between domestic and overseas firms (Haddad and Harrison, 1993; Aitken and Harrison, 1999). Second, recent empirical studies, such as those by Kokko (1994), Kokko *et al.* (1996), Girma *et al.* (2001) and Kinoshita (2001) assert that the occurrence of externalities is influenced by structural aspects. The commonly recognised prominent factor is the concept of absorptive capacity, indicating that positive externalities from FDI may occur only when domestic companies have a sufficient level of technological knowledge which enables them to absorb positive externalities from FDI.

Empirical studies show mixed support for maintaining the fact that FDI spillover effects on the productivity performance of recipient countries rely, for the most part, on the features of domestic firms, industries and the recipient country. Technological progress is believed to result from facilitation of FDI inflows into the recipient country. Researchers recommend testing the connection between output and FDI. This assessment of FDI effect on productivity is regarded as a standard technique of measuring the effects of FDI in the recipient country. Equally important is the need to investigate the actual contribution of capital inflows which is the degree of improvement in productivity in developing economies receiving FDI inflows.

This study aims at filling the gap left by updated empirical studies by examining the role of FDI and its potential impact on the manufacturing sector in Egypt over the

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period 1975-2005. A case study of the Egyptian Economy is necessary for a variety of reasons. Egypt is one of the developing countries which achieve high rates of economic growth (GDP growth was 6.84 per cent in 2006 compared to 5.14 per cent in the MENA region, and 3.84 per cent of the world) and a significant recipient of FDI in the MENA region (around 36.5 per cent in 2006). Second, despite the large proportion of FDI inflows into the manufacturing industries, with an estimated 35 per cent of total FDI (GAFI, 2008), the role of FDI in promoting productivity is considered ambiguous due to the limitations within the empirical research on the connection between FDI and output; hence the importance of this section lies in examining the relationship between output and FDI in the manufacturing sector. The proof of the positive effects of FDI on output would provide a potential rationale for the use of fiscal incentives to court more FDI inflows into the country and would have serious implications for development strategies planning in Egypt. This chapter aims at examining empirically whether FDI presence in the manufacturing sector is conducive to high productivity or not. The chapter is organised in four sections. Section 4.2 reviews the relationship between FDI and productivity. In section 4.3, the model, data, and empirical results are presented. Section 4.4 concludes the chapter.

4.2 Literature Review

Foreign Direct Investment is considered to have a vital position in many countries, especially in the developing economies; when multinational firms decide to start international operations in a foreign country, they bring with them proprietary and firm-specific knowledge and technology which helps to pose strong competition to local companies. Foreign firms may give rise to different types of externalities in the host country, which in turn can generate spillovers for the domestic firms. Productivity spillovers can occur both in the sector in which foreign firms are present (horizontal

effects) and among related companies such as suppliers (vertical effects). The influence of Foreign Direct Investment can be classified into three wide groups.

Product market effects are due to FDI causing firms to change the quantities of goods sold. For instance, horizontal FDI, which is likely to replace imports by local production in the host country, may crowd out the local competitors who were previously producing close substitutes, meaning that the local firms may be forced to reduce their sales or might be forced out altogether.

The composition of the labour markets for both recipient and home countries is altered by factor market effects of FDI. This occurs because FDI practices an upward pressure on the wages of, in particular, unskilled labour force in the FDI- host countries, combined with a downward pressure on the wages of the unskilled labour force in the FDI-home countries (Navaretti *et al.*, 2004). FDI may also help to upgrade local workers' abilities by providing on-the-job training.

In terms of spillover effects, knowledge and technology can be spread from the foreign-owned to domestically-owned companies in host economies through several channels. Blomstrom and Kokko (1998) and Saggi (2002) demonstrate that multinational firms, by penetrating into industries with high entry barriers for new companies, can lead to the increase of allocative effectiveness in the host country (Caves, 1974). The presence of MNCs may reduce monopolistic distortions and raise productivity by improving resource allocations in the host economy. In addition, foreign subsidiaries induce higher technical efficiency when upward competitive pressures or demonstration effects by the presence of foreign companies force domestically-owned companies to improve the use of the current resources. Labour turnover can be another channel for technology transfer from foreign to domestic firms. When employees previously trained by foreign firms change employment and move to domestic firms,

they bring with them knowledge and expertise in both the technological and managerial fields.

The presence of multinational firms, nevertheless, can over a short period of time, reduce the productivity of locally-owned corporations in the host country. Aitken and Harrison (1999) provide a simple but useful illustration of negative effects arising from the entry of the multinational firms into an imperfect competitive market with fixed costs of production. As shown in Figure 4.1 in the absence of foreign presence, the average cost curve associated with domestic firms is AC_0, firm i produce output at level Q_0. The presence of foreign firms in the host country is assumed to generate spillovers, which cause the average cost curve of domestic firms to fall, shifting from AC_0 to AC_1 . Productivity of the local firm is higher due to reduced average costs arising from the spillover effects from the foreign firms. The competitive pressure by foreign firms, however, forces the local counterparts to reduce output or even to exit the market. This causes the output of domestic firms to move back up the new average cost curve AC_1, resulting in an increase in the average cost of production.
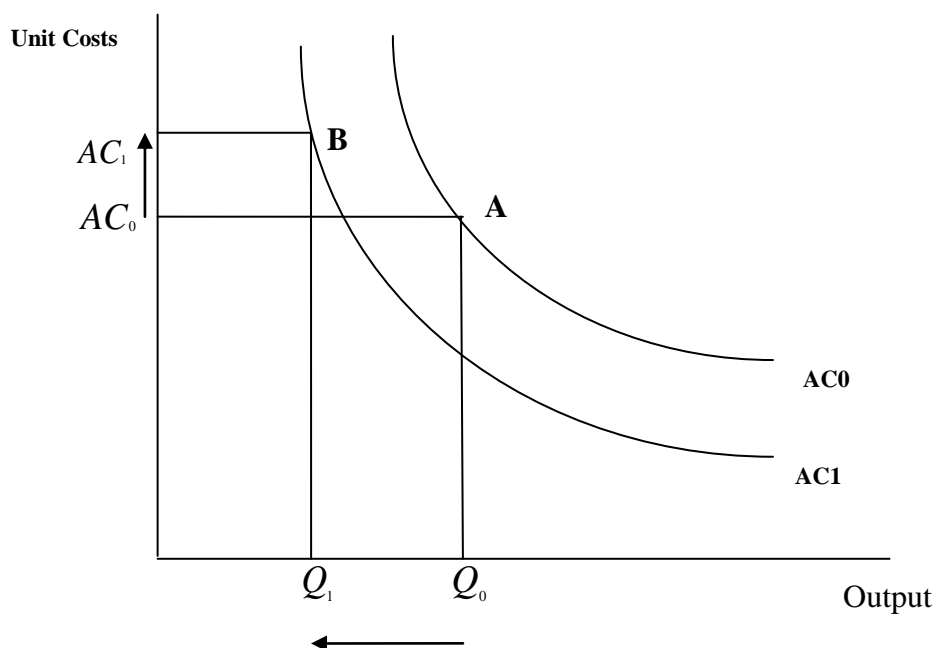

Figure 4.1 average Cost curves and Output

In examining the impact of the presence of FDI on local firms, firm-level performance is regressed on a foreign-presence variable and a set of control variables measuring the characteristics of the firms. The following general model is often applied in empirical analyses. The dependent variable in Equation (4.1) is usually either a measure of sector output (Aitken and Harrison, 1999); or labour productivity (Blomstrom and Sjoholm, 1999), or total factor productivity (Chuang and Lin, 1999).

$$Productivity\ Measure = \alpha_0 + \sum_{j=1}^{k-1} \beta_j X_j + \delta_k\ Foreign\ Presence + \varepsilon \quad \textbf{(4.1)}$$

The parameter of interest in the previous equation is the estimated coefficient on the measure of foreign presence δ_k , which serves to capture the contribution of foreign presence in a sector. While authors vary in their selections of foreign presence measures in a sector, the selection is made on the available data plus their reliability, and the choice is not necessarily founded on theory.

Caves (1974) addressed the empirical literature concerning the impact of FDI on local firm productivity. By applying an econometric technique to the Australian manufacturing industry (22 industries) for two years, 1962 and 1966, he found a positive and significant coefficient for foreign firms' presence, and thus concluded that higher subsidiary shares are accompanied by high levels of productivity in competing local companies. Globerman (1979) investigated the presence of indirect economic benefits on labour productivity from FDI by using different measures of foreign ownership on a sample of Canadian manufacturing industries. He concluded that capital intensity, quality of labour, average worked hours, and the amount of foreign ownership in an industry have a positive impact on productivity levels amongst the workforce. Granar and Isaksson (2002) noted that productivity growth is directly related to both mixed and pure foreign ownership. In their study of manufacturing plants in the USA between 1987 and 1996, Keller and Yeaple (2003) found a strong correlation between

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FDI and growth. During this period, around 14 per cent of the growth in productivity can be referred to FDI spillovers.

Griffith *et al.* (2003) have also studied the positive effect of FDI. They focused on the dynamics of productivity growth in manufacturing establishments in the UK from 1980 to 1992. They found that increasing foreign ownership in an industry is directly related with productivity growth in local firms by accelerating technology transfer. Griffith *et al.* (2003) extended their analysis of the role of absorptive capacity. They allowed for the disparate influence of FDI on firms situated at different quantiles of the productivity distribution. This takes place by using conditional quantile regression techniques. The paper was supported by the assumption that only companies with a certain degree of absorptive capacity profit from productivity spillovers. Driffield and James (2007) tested the effects of foreign investment on local productivity in the United Kingdom, and detected that different kinds of FDI clearly have different spillover impacts on productivity.

Kokko (1994) showed that spillovers depend on standard differences of technology between domestic firms and MNEs, and the complexity of the technology transferred by multinationals. The presence of productivity spillovers from competition between domestic and foreign companies is examined by Kokko (1996) using a simultaneous equation model on detailed (unpublished) industry data for 156 Mexican manufacturing firms in 1970. Kokko found that spillovers resulting from competition depend on the simultaneous interactions between foreign and local firms rather than foreign presence alone. By using a dataset of the Uruguayan manufacturing plants for the year 1988, Kokko, Tansini and Zejan (1996) tested whether technology gap differences between local and foreign companies affect the relation between foreign existence and domestic productivity through intra-industry spillovers. A positive spillover effect was found in a

sub-sample of domestic firms when the technology gap was small so that local plants were able to absorb the knowledge available from foreign firms. Using data (2-digit sectoral level) on nine manufacturing sectors for the period 1992-95, Flores *et al.* (2000) tested the presence of foreign investment effect on the productivity performance of local companies in Portugal. They found that there is a positive connection between local companies' productivity and foreign attendance; in particular, the difference in technology between foreign and local producers was taken into account, and when these spillovers are within advanced sectors.

Recent studies using firm level data provide mixed evidence about the effect of FDI over the productivity of local companies through both intra-industry and inter-industry linkages. Aitken and Harrison (1996) found two effects of FDI on local companies by using a panel data for Venezuelan manufacturing plants between 1976 and 1989. First, companies with 50 employees or less benefit from the productive advantages of foreign presence. Second, an increase in foreign ownership has a negative consequence on the productivity of locally owned companies in the same industry. The authors point out that technology spillover from FDI might not be positive in developing countries whose plants lack the necessary absorptive capacity. Using panel data for 48 UK industries over the period 1991-1995, Liu *et al.* (2000) examined the productivity spillovers from FDI within the UK manufacturing sector. Their findings pointed to the fact that the existence of foreign companies has a positive effect on the productivity of UK manufacturing firms, and that technological capabilities determine the size to which domestic companies benefit from the presence of advanced technology. Using 2-digit industry level panel data for the UK from 1983-1992, Hubert and Pain (2001) investigated the direct investment influence of multinational companies on the technical accomplishments and workers' efficiency. They figured that inward investment has

significance within industry spillovers. Inward investment seems to be a more important source of technical progress than international trade.

Wang and Gu (2006) checked out the effects of FDI on total factor productivity (TFP) growth in the Canadian manufacturing industries over the period 1973-1977. They indicate that, through both backward and forward linkages, FDI creates powerful and positive spillover impacts on TFP growth. Similarly, Le (2005) tested the impacts of foreign presence on labour productivity of 29 Vietnamese manufacturing industries over the period 1995-2002 and showed that the foreign presence creates a positive impact on the productivity of local companies. However, her study only examines the effects of FDI on the productivity of local firms through intra-industry linkages. Although these empirical studies at the industry-level data provide support for the FDI role that promotes the productivity of local companies, it is found that limitations lie in examining the influence of FDI on TFP growth through inter-industry spillovers including both backward and forward linkages in addition to the concurrent interactions between foreign and domestic companies at the industry data level.

Using panel data covering UK manufacturing firms from 1973 to 1992, Haskel *et al*. (2002) examined the presence of productivity spillovers from foreign direct investment to local companies. They found a positive and significant effect between foreign firms' activities in the manufacturing industry and domestic firm's total factor productivity. In addition, these studies provide proof of positive horizontal spillovers in developing host countries.

In contrast to earlier literature, which concentrated on intra-industry spillovers from FDI, Javorick (2004) checked the presence of productivity spillovers through backward and forward linkages based on a firm level panel dataset for Lithuania. His results

indicated the presence of productivity spillovers through backward linkages, while no evidence of intra-sectoral spillovers was found.

Using a firm-level panel data set in the UK manufacturing industry for the period 1991-1996, Girma *et al*. (2001) investigated the presence of productivity or wage gap between foreign and local companies, and whether the existence of foreign corporations in a sector increases the productivity of local companies They found no proof for productivity spillovers. However, their results show evidence of less spillovers gain when companies are operating in industries with low skill foreign competition sectors.

There have been various studies concentrating on developing countries which have benefited from the effect of FDI on the productivity levels of local companies including that of Blomstrom and Persson (1983). They investigated the impact of foreign investment on spillover efficiency for the manufacturing industry in Mexico; they applied a 4-digit industry-level data for the year 1970. Their study verified the existence of a positive spillover from foreign companies to locally possessed ones.

Using a cross-sectional data set for Indonesia at the firm level, Blomstrom and Persson (1983), Blomstrom (1986), Blomstrom and Wolff (1994), and Kokko (1994, 1996) verified the existence of positive spillovers from FDI. Additionally, FDI has a direct and statistically important impact on the productivity of local companies. Using a dataset of 29 manufacturing industries for the Shenzhen Special Economic Zone of China over the period 1993-1998, Liu (2002) investigated empirically if FDI creates externalities in the shape of technology transfer. He found that FDI has a significant spillover effect, as it increases both the level and growth rate of productivity for the manufacturing industries.

Haddad and Harrison (1993), by using the data on Moroccan manufacturing firms over the period 1985-1989, investigated the relationship between the presence of

foreign companies and the productivity of local companies. They found that an increase in the industry-level FDI is related to lower productivity of domestic companies. In particular, the authors concluded that this result was due to the absence of absorptive capacity of the domestic companies in the high-tech sector, which enabled them to absorb foreign technology.

Similarly, Djankov and Hoekman (1998) for the Czech Republic during the period 1992-1996, Konings (2001) for Bulgaria, Romania and Poland between 1993 and 1997, and Kathuria (2000) for India also identified negative spillover effects. Sadik and Bolbol (2001) failed to support the productivity spillover effects from foreign companies to domestic ones. Kinoshita (2001) used the data set for 1217 manufacturing firms in the Czech Republic for the period 1995-1998. She found no significant technology spillover effect of joint ventures or FDI on productivity growth either inside the company or in the industry as a whole.

Table 4.1 summarises the empirical studies on technology spillovers from FDI that provide different experiences among host countries. Mixed evidence from these empirical studies points out that technology spillover from FDI relies on domestic companies and host country-specific characteristics, which provides the main explanation as to why the impact of FDI on domestic productivity varies from one country to another, from one region to another, and from one industry to another. Moreover, there are limited quantitative studies on the effects of FDI on the productivity at the industry level, especially in Egypt. Thus, the review provided within this chapter goes some way to filling the gap in knowledge in this particular area.

Table 4.1 Coefficient of Spillover Variable in different regions

Region	Coefficient of Spillover Variable					
	Significantly (+ve)		Significantly (-ve)		Insignificant/ Mixed	
	Author	No	Author	No	Author	No
Developed countries	Caves (1974), Globerman (1979), Flores *et al.* (2000), Liu *et al. (2000)*, Hubert and Pain (2001),Haskel *et al.* (2002),Wang and Gu (2006), Driffield and James (2007)	8			Girma *et al.* (2001)	1
Developing countries	Blomstrom and Persson (1983), Blomstrom (1986), Blomstrom and Wolff (1994), Kokko (1994,1996), Kokko, Tansini and Zejan (1996), Liu (2002), Le (2005)	8	Haddad and Harrison (1993), Aitken, Hanson and Harrison (1997), Kathuria (2000)	3	Sadik and Bolbol (2001), Javorick (2004)	2
Transition countries			Djankov and Hoekman (1998), Konings (2001)	2	Kinoshita (2000)	1
All Region		16		5		4

4.3. Data and Econometric Approach

4.3.1 Model Specification

The econometric approach followed in this paper uses annual observations on a cross-section of nine sub-sectors of the Egyptian manufacturing sector over the period 1975 to 2005.

To investigate whether inward FDI generates productivity spillovers for domestic industries, we utilise a Cobb-Douglas[17] production function specified as:

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[17] To choose between Cobb Douglas vs. Translog production function, we use likelihood ratio test. The hypotheses to be tested are : $H_0 : P_1$'s $= P_2$'s and $H_1 : P_1$'s $\neq P_2$'s. Where, H_0 and H_1 represent the null and the alternative hypothesis respectively. P_1's and P_2's represent parameter estimates from unrestricted and restricted model respectively. Under the null hypothesis, this test statistic is distributed asymptotically as Chi-square distribution with degrees of freedom equal the number of restrictions that we are testing. To choose among nested model we calculate Chi-square. Then, if we get a calculated Chi-square less than tabulated one, we accept the null hypothesis and we conclude that restricted model is appropriate to our data. But, if test statistic is greater than critical value of Chi-square, we reject the null hypothesis and we say that the restricted model is inappropriate to our data (Dimitrious, A., and Stephan, G., 2006).

$$ln\ Y_{i,t} = \alpha + \beta_k ln\ Input_{i,t} + \gamma ln\ FDI_{i,t} + \delta_k Z_{i,t} + u_{i,t} \quad \textbf{(4.2)}$$

Where $\quad u_{i,t} = \mu_i + v_{it}$

In (4.2) subscripts *i*, and *t*, denote industry, and time. α, β, γ, and δ are parameters to be estimated. Value added of industries is denoted *Y,* their inputs denoted *Input*, foreign presence in the industry *FDI*, *Z* are other control regressors, and $u_{i,t}$ is the usual equation error term.

We regard μ_i as representing the combined effect on *Y* of all unobserved variables that are constant over time. On the other hand, v_{it} represents purely random variation at each point in time, and it is assumed that v_{it} has a normal distribution with mean 0 and variance σ_v^2

We identify three potentially important determinants of productivity within the Egyptian manufacturing sector. The choice of these explanatory variables was dictated by sub-sectoral characteristics which may influence the variation and growth of productivity over the period of study, and the availability of data. The justification for the factors is as follows:

- ***Foreign Direct Investment***

Researchers consider FDI as a key channel for technological spillovers. It is also regarded as superior organisational form from highly industrialised to developing economies. Besides, FDI is thought to create positive externalities as knowledge spills over into domestic economies. Such generation takes place through linkages with local suppliers and close clients (including both backward and forward linkages), learning from nearby foreign firms and training programmes directed to employees. Research also refers to negative externalities which are also possible hindrances to the access of technology and competition. The assumption prevalent in the recent literature on the subject is that positive externalities prevail over the negative ones. Consequently, FDI is

encouraged by governments as well as international organisations by providing grace periods for taxation purposes and other business enhancing schemes. Thus, FDI can constitute a cost rather than a profit if the outflow of profits becomes too high. In addition, FDI may replace domestic production instead of increasing competition.

- *Open economies*

Open economies are currently believed to grow more rapidly than closed economies. Integration into the global economy provides firms with access to larger markets, a wider variety of goods and services and more highly sophisticated technologies which can be adjusted for domestic use. In addition, exposure to international competition can lead to higher quality products and reduce the duplication of R&D efforts (Rivera-Batiz and Romer, 1991; Grossman and Helpman, 1994). Imports and exports are held to be the two main channels of openness.

With regard to imports, it is arguable that capital goods imports can increase domestic productivity, since capital goods encompass technological knowledge, and, subsequently R&D activity spillovers from one country to another through worldwide trade. The current literature on the subject seems to provide two fundamental mechanisms for such trade- related R&D spillover effects (Rivera-Batiz and Romer, 1991; Grossman and Helpman, 1995). First, recipient counties can imitate the technology if the cost of attaining it is lower than the cost of the corresponding invention. Secondly, R&D expenditure by foreign countries leads to the creation of new capital goods which differ from, or are superior to those already in existence.

As for exports, it is arguable that export expansion can endorse sector specialisation where a country has a distinctive advantage, including a re-allocation of resources from the relatively incompetent non-trade sector to the more production-orientated export sector. Second, exports growth may raise production levels by providing greater

economies of scale. Third, increasing exports can have a profound effect upon aggregate productivity through dynamic spillover effects on the rest of the economy (Feder, 1983).

Admittedly, the empirical literature on trade and productivity generally employs aggregate measures of international trade such as, for instance, the imports ratio plus exports ratio to GDP, usually termed 'openness' (see, for instance, Jonsson and Subramanian, 2001; Alcala and Ciccone, 2004). To capture the intricate relationship between foreign trade and productivity the following export and import ratios will be applied, Exp/GDP and IMP/GDP, separately. This will allow for considering specific differences in the relative contribution of exports and imports.

- *Technology Gap*

The theoretical literature on this topic reveals, albeit rather tentatively, that all firms are supposed to benefit by knowledge spillovers from multinationals. Instead, a firm's benefits rely, for the most part, on its absorptive capacity for assimilating knowledge and its relative backwardness. In this chapter, we follow Carkovic *et al*. 2002, Alfaro 2003, and Borensztein *et al.* 1998 in taking the difference between GDP per capita of the United States and Egypt's GDP per capita as a ratio to Egypt's GDP per capita, as a measure of the technological gap since the US is considered the most technological advanced country.

4.3.2 Data Description and Sources

The empirical analysis in this study is based on the manufacturing sector in Egypt. The data were obtained from the Central Agency for Public Mobilization and Statistics (CAPMAS), which collects and maintains a computerised sector-level database covering the manufacturing industry in Egypt. Our dataset is a balanced panel consisting of nine manufacturing sub-sectors (Food products, beverages and tobacco;

Textiles and textile products; Wood and wood products; Pulp, paper and paper products, publishing and printing; Chemicals, chemical products and man-made fibres; Non-metallic mineral products; Basic metals and fabricated metal products; Machinery and equipment; and Others) over a period of 31 years from 1975 to 2005 with a total of 279 observations. The data contain information on gross domestic product in current and constant (1990) prices, work force, capital, and imports. The data for foreign direct investment were collected from the General Authority for Investment (GAFI), while the data for the technology gap were collected from the Global Market Information Database. Table 4.2 presents definitions and summary statistics of the key variables used in the empirical estimation.

Table 4.2 Dependent and Independent Variables measures and summary statistics

Variables	Symbol	Definition	Calculation	Mean	Std. Deviation
Value Added	$Y_{i,t}$	Real value added per industry	(VA/ Deflator)*100	13.375	1.792
Capital	$K_{i,t}$	Real values of capital per industry	(Capital/ Deflator)*100	14.250	1.772
Labour	$L_{i,t}$	Total number of employees per industry		4.074	1.376
Foreign Direct Investment	$FDI_{i,t}$	Real values of FDI inflows per industry	(FDI/ Deflator)*100	10.166	1.930
Exports to GDP	$Exp_{i,t}$	The percentage of exports to GDP per industry	Exports/ GDP	-2.576	1.622
Imports to GDP	$Imp_{i,t}$	The percentage of imports to GDP per industry	Imports / GDP	-0.987	0.630
Technology Gap	TG_t	The difference between US GDP per capita and Egypt GDP per capita as a ratio to Egypt GDP per capita	(US) GDP per capita- (Egypt) GDP per capita/ (Egypt)GDP per capita	3.192	0.078

4.3.3 Estimation and Empirical Results

4.3.3.1 Estimation

In order to assess the influence of the variables described, an augmented production function may be built up in the following form:

$$ln\ Y_{i,t} = \alpha + \beta_1 ln\ K_{i,t} + \beta_2 ln\ L_{i,t} + \beta_3 ln\ FDI_{i,t} + \beta_4 ln\ (\frac{Exports}{GDP})_{i,t}$$

$$+ \beta_5 ln\ (\frac{Imports}{GDP})_{i,t} + \beta_6 lnTGap_t + u_{i,t} \qquad (\mathbf{4.3})$$

$$i = 1, \ldots\ldots, N; \qquad t = 1, \ldots\ldots T$$

With i denoteing manufacturing sectors, and t denoting time. The i subscript, therefore, denotes the cross-section dimension whereas t denotes the time series dimension. α is a scalar, (*K, L, FDI, Exports/GDP, Imports/GDP, TGap*), $(\beta_1, \ldots\ldots\ldots, \beta_6)$ represents explanatory variables and parameters respectively. $Y_{i,t}$ the dependent variable. $u_{i,t}$ represents the vector of the error component, with

$$u_{i,t} = \mu_i + v_{it}$$

The two error terms, μ_i and v_{it}, behave somewhat differently. Since a group (individual specific) effect is time invariant and considered a part of the intercept, μ_i is allowed to be correlated to other regressors. On the other hand, v_{it} represents purely random variation at each point in time, and it is assumed that v_{it} has a normal distribution with mean 0 and variance σ².

In the panel data literature, an important distinction is drawn between models with fixed and random individual specific effects. Subsequent investigation was therefore concerned with choosing the correct specification. The Hausman[18] specification test is the classical test to discriminate between fixed and random effects models. Initially, a fixed effects model was estimated via a simple OLS regression of Equation 4.3 inclusive of dummy variables to account for fixed effects. Misspecification tests applied to the fixed effects model revealed the absence of multicollinearity (as shown in table

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[18] For further description of the test go to footnote 10 page 60.

4.3), first-order auto-correlation[19], and the presence of heteroskedastic residuals[20].

Table 4.3 Partial correlation, VIF& Tolerance

Variables	Correlation	Sig	VIF	1/VIF
Capital	0.444	0.000	3.24	0.308
Labour	0.640	0.000	4.03	0.248
FDI	0.453	0.000	2.49	0.401
Exports to GDP	-0.270	0.043	1.13	0.888
Imports to GDP	-0.038	0.528	1.14	0.877
Technology Gap	0.097	0.108	1.13	0.887
Mean VIF			2.19	

In order to simultaneously account for heteroskedasticity within panels, we can rely on a feasible generalised least squares (FGLS) estimator. The advantage of this approach is that it allows estimation in the presence of heteroskedasticity across panels (as shown in table 4.4).

Table 4.4 GLS estimation results

Variables	Coefficient	Std. Error
Capital	.2686***	.0287
Labour	.6473***	.0436
FDI	.2425***	.0293
Exports to GDP	-.0954***	.0184
Imports to GDP	.0229	.0467
Technology Gap	.9290***	.4633
Constant	1.242	1.646
Number of observations	279	
Notes: **1.** All variables are expressed in natural logarithms. 2. *, **, and *** denote significance at the 10, 5, 1 percent level, respectively.		

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[19] The Wooldridge test for autocorrelation in panel data accepts the null hypothesis of no first order serial correlation. Thus, our estimate for equation (4.3) is not affected by serial correlation.

[20] Specifically, given the absence of a priori knowledge about the potential sources of heteroscedasticity, a Modified Wald Test for groupwise heteroskedsticity was applied. The results (χ^2= 37.85, p = 0.0000) reveals the presence of cross-panel heteroskedasticity at a 5 per cent significance level.

It should be noted, however, that further considerations regarding the specification were necessary, in other words, endogeneity, or two way causality, presents problems for both FDI and value added in regression. This is a particular concern for our key regressor of interest, FDI. To address this possibility, we model value added in the current time period as a function of FDI in the previous period so that the endogeneity problem is unlikely to arise. In addition, the estimation of the above model requires the strict assumption of exogeneity of the variables. However, if input choices are correlated with unobservable factors (factors arise from difficulties in observing and quantifying differences in the quality of human capital, intensity and effects of demand shocks across firms and industries), the exogeneity assumption will be violated and parameter estimates will be inconsistent and oversized. This information is barely captured and hence causing input variables to be correlated with the error term. In this case, both capital and labour may be endogenous.

To solve the problem of endogeneity[21] one would usually use fixed-effects instrumental variables[22] estimation (two-stage least squares or 2SLS). In addition, equation 4.3 was augmented with time dummies to capture time specific effects (as the application of privatization, September 11th event).

$$\ln Y_{i,t} = \alpha + \beta_1 \ln K_{i,t} + \beta_2 \ln L_{i,t} + \beta_3 \ln FDI_{i,t-1} + \beta_4 \ln \left(\frac{Exports}{GDP} \right)_{i,t}$$

$$+ \beta_5 \ln \left(\frac{Imports}{GDP} \right)_{i,t} + \beta_6 lnTGap_t + \gamma_t + \gamma_i + \varepsilon_{i,t} \qquad (4.4)$$

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[21] The endogeneity test shows that capital, technology gap are endogenous (where prob is 0.008, 0.001 respectively), and lagged values were used as instruments.

[22] The Hausman test for IV versus. OLS effects suggests that using a panel data methodology with IV is appropriate.

Table 4.5 Fixed Effect Two Stage Least Squares Estimation

Variables	FE estimation
Capital	.4053*** (.114)
Labour	.4250* (.1153)
LaggedFDI	.0848*** (.0382)
Exports to GDP	-.0707 (.0532)
Imports to GDP	-.3461*** (.1042)
Technology Gap	-1.769* (1.039)
Hansen J Statistic χ^2 P-val	(0.406)
Number of Observations	261

Notes
1. All variables are expressed in natural logarithms.
2. Standard errors are in parenthesis.
3. *, **, and *** denote significance at the 10, 5, 1 percent level, respectively.

4.3.3.2 Empirical Results

The estimation of the production function (Equation 4.4) reported in Table 4.5 reveals that the coefficients on capital and labour are statistically significant, reflecting that both physical capital and labour have a positive effect on productivity. The contribution of capital to the level of productivity is high with the value of 0.405, and is statistically significant at the 1% level. This implies that ceteris paribus firms raising more capital have higher productivity. In addition, the effect of labor force on output for the Egyptian manufacturing sector is correctly signed and statistically significant at the 10 per cent as the egyptian industry is low-tech and endowed with large quantities of semiskilled and unskilled manpower.

Exports which were included to proxy openness in the manufacturing sector and expected to have a positive effect on productivity was found to have a negative effect.

In Egypt there does not appear to be a close association between FDI and exports. While manufacturing industries receive more than half of all investment, manufactured products account for only a third of total exports. This results from the fact that the majority of egyptian manufacturing enterprises are small- and medium-size firms which generally lack operating technology, and organizational and managerial capabilities, and have difficulty in meeting the quality standards and delivery targets required by foreign companies (more than 60 per cent of manufacturing exports were low-skill products as the Egyptian industry is low-tech). Therefore, The egyptian export pattern and trends in the manufacturing sector suggest the need to encourage manufacturers to enter export markets and upgrade the country's production and trade structure.

Imports which were included to proxy openness in the manufacturing sector and expected to have a positive impact on productivity were found to have a negative effect on productivity. First, this is due to the high trade ratios of Egypt as they are confined to consumer goods with no technological spillovers. Second, despite concerted efforts to liberalise highly restrictive trade regime since the early 1990s, most manufacturing sectors continue to be highly protected mainly via a high and escalating tariff structure. Egypt's tariffs are still comparatively high, particularly in comparison with those of other developing countries with large internal markets and diversified industrial economies.

The extent to which a firm is able to exploit external knowledge depends on its level of absorptive capacity as well as on the complexity of the external knowledge. Hence, if the technology gap between foreign and domestic firms is too large, because the technology of foreign firms is too advanced, local firms may not be able to comprehend and adapt foreign technology. From table 4.5 technology gap has a negative significant effect on productivity at the 10 per cent level. This means that the wider the size of the

technology gap between Egypt and technologically developed countries is, the less productivity Egypt will witness. In other words the results show that to achieve higher levels of productivity, Egypt has to work on diminishing the technology gap.

As argued in most studies, foreign invested firms may transfer technology so as to foster domestic production efficiency through imports of advanced machinery and better materials, international competition, and training of local managers and workers. Therefore, one would expect to see that the larger the share of FDI in the industry, the greater the spillover effect on production. In table 4.5 the estimated coefficient on FDI is positive (0.084) and statistically significant at the 1 per cent level. This reflects that the presence of foreign firms positively influences the capacity for production in manufacturing industries. In other words, domestic firms in the manufacturing industries of Egypt benefit from foreign firms in the same industries. This may be explained by the fact that there may be a technological leakage from foreign firms to local firms in the same industry as local firms can learn by observing and imitating new technologies as well as new products from foreign firms. The coefficient of foreign spilloover is relatively low, compared to that found in empirical studies in some other developing economies (see, for example, Blomstrom and Sjoholm, 1999 for Malaysia; and Liu *et al*., 2001 for China). This may not be too surprising given the level of economic development , and absorptive capacity of other countries is higher, in addition, total FDI in those countries is also much higher.

4.4 Conclusion

This chapter has attempted to address the spillover effect of FDI on productivity in the Egyptian manufacturing sector. After reviewing the previous literature about inward FDI and productivity spillover, empirical analysis has been implemented to determine the factors that influence productivity. In explaining the spillover effect of FDI, the

study applied a two stage least squares technique using panel data between 1975 and 2005 across 9 sub sectors of the Egyptian manufacturing sector. A Cobb Douglas production function was used where productivity is established as a function of capital, labour, foreign direct investment, exports, imports, and technology gap.

The results from the production function suggest that physical capital and labour force are the main determinants of manufacturing productivity, underlining the fact that both physical capital and labour inputs are important to the productivity level in manufacturing sector. It is also found that the foreign presence enhance productivity in the Egyptian manufacturing sector. We view the positive effect of FDI on productivity as evidence which indicates that the FDI inflow is not merely a source of capital; it is also a conduit for technology transfer. On the other hand, both imports, and technology gap exert a negative and significant effect on productivity. This is due to high protection, high tariffs, and the technology of foreign firms is too advanced for domestic firms to adjust and absorb. In addition exports has a negative but insignificant effect as exports are mainly low-skill products.

Chapter Five

Foreign Direct Investment and Output in Egypt: a causality analysis

5.1 Introduction

FDI is assumed to play an important role in developing and growing the strategies of developing and emerging economies. Advocates of FDI such as development institution economists, academics and policy makers assert that FDI guarantees competitive allocation of resources compared to other forms of capital inflows, thus reducing undue reliance on debt accumulation as a source of development financing. In addition, consolidating human capital entrepreneurial skills and economic growth via technology transfers increased employment chances. The prevalent economic experience of the Far-East Asian countries, particularly of China and India, consolidated the conviction that FDI plays a crucial role in bridging the resources gap, ensuring accelerated economic growth. In spite of growth challenges, several countries with low growth rates started to pursue domestic policies geared at courting additional FDI inflows.

In the current literature on the subject, there are several theoretical and empirical studies on FDI and the connection to economic growth. A bi-directorial interaction model has been proposed in these studies on the relation to the economic growth of FDI. FDI is equally viewed by many scholars as a crucial element in solving the difficulty of local capital scarcity and total low output in several emerging and developing economies (De Mello, 1999; Eller et. al., 2005). Thus, flow of foreign direct capital is held to play a vital key role in the FDI receiving countries. However, Carkovic and Levine (2002) challenged this view. They deny the presence of a strong impact of FDI on economic growth, when country-specific level differences, such as endogeneity of FDI inflows and convergence effects are taken into account. In addition, Akinlo (2004) found that the economic growth is not, significantly, affected by the private capital and lagged foreign capital. They concluded that evidence seems to maintain the argument that extractive FDI may not be as growth-enhancing as manufacturing FDI.

Conversely, identifying the relevance of FDI to growth, economic growth has been frequently identified as an essential determinant among a range of determinants of FDI inflows into the recipient countries. Additional FDI from multinational companies (MNCS) may be encouraged by rapid growth of an economy, since they locate new profit opportunities (Hansen and Rand, 2006). This subject has been viewed within two approaches: the first approach tackles the impacts of FDI on economic growth, while the second approach admits the presence of such impacts and subsequently attempts to identity the determining factor of FDI inflows into the recipient countries. The possibility of a bi- directional causality running between the two variables is outlined by a third approach in recent literature on FDI, but this approach is of lesser magnitude (Choe, 2003).

This chapter does not claim to examine the interaction between the two variables; rather to examine the causal relationship between FDI inflows and Egyptian output where GDP is used as a proxy for output. To the best of my knowledge this study is the first attempt to examine causal links and relationships between FDI and output in Egypt. The study is intended to serve policy makers and development partners, enabling them to initiate, develop and manage long-term economic strategies based on empirical evidence.

The chapter is organised as follows. Section 5.2 briefly reviews the causal relationship between FDI and GDP. In section 5.3, the model, data, and empirical results are presented and discussed. Section 5.4 forms the conclusion.

5.2 Literature Review

Several theoretical approaches explain the relationship between FDI and economic growth. The industrial organisation theory studies the role of FDI in technology transfer and knowledge spillover and their influence on market structure and competition.

Endogenous growth theory implies that long-run growth in the host country through labour training programmes and skill acquisition can be promoted by FDI. This also leads to facilitating the introduction of alternative management practices and other organisational arrangements, knowledge diffusion from global markets to domestic companies, and consolidating exporting capacity.

The direction of causality between FDI and output growth are tested through many empirical studies, i.e. causal relationships between direct investment and economic growth and their impact on determinants. The results of the studies illustrate a diversity of proof showing that the main drive behind economic growth is foreign direct investment. Other studies show a reverse relationship, but in some other cases no relation has been reported.

Some studies show a causal link between FDI and economic growth. For instance, Blomstrom *et al*. (1992) examined the causality direction between FDI inflows and economic growth. They also studied changes over five consecutive years with a view of determining the lines and timing of such a causal. They found that growth rates of GDP per capita are associated with FDI inflow ratios in preceding and current five year periods, but not with FDI in the following periods. They found that causality runs from FDI to economic growth, not vice versa.

Cointegration and causality between FDI and economic growth of eleven developing countries in East Asia and Latin America over the period 1970-1995 are studied by Zhang (2001). His investigations show cointegration and long-run causality from FDI to GDP for five countries in the long and short-runs. For the period 1960-1995, Ramirez (2000) indicates FDI Granger-causes GDP in Mexico, both in the short and in the long-run. Campos and Kinoshita (2002) studied the possibility of reverse causality between FDI and economic growth, using the Granger causality framework. The results of the

tests show that lagged FDI cannot strongly predict current FDI levels and that lagged per capita FDI is a poor predictor of current levels of per capita FDI. Growth does not Granger-cause FDI or per capita FDI in transition economies between 1990 and 1998 is implied by the statistical insignificance of lagged per capita growth. This result is crucial since it weakens concerns arising from the possibility that fast growing countries attract more FDI. Such attraction does not appear to take place during transition. Xiaohui *et al*. (2002) used quarterly data for China from 1981 to 1997, and found that cointegration and bi-directional short and long-run causality between FDI and GDP.

Using quarterly data from 1980 to 2000, Cuadros *et al*. (2004) pointed to cointegration between FDI and GDP for two out of three Latin American countries. In the two countries, long-run and short-run causality runs from FDI to GDP. Hansen and Rand (2006) investigated the Granger causal relationship between FDI and GDP using estimators for heterogeneous panel data in a sample of 31 developing countries for the period 1970-2000. The study shows that FDI has a long-term effect on GDP and that GDP has no such impact on FDI. Higher ratio of FDI in gross capital formation has been found to have positive effects on GDP.

Thiam (2006) analysed the Toda-Yamamoto version of the Granger causality test for FDI inflows into eight East Asian economies and productivity growth. The test results prove that only two countries out of eight provided proof of uni-directional causality between FDI inflows and total factor productivity growth. Equally, in the sample economies, little evidence has been found to show that FDI inflows results in both technical and efficiency change. Other studies, such as that by Nonneemberg and Caradoso (2004) find the causality direction to run from growth to FDI, which is part of the current debate on the causality between FDI and growth. An econometric model is the core model of the study which is based on panel data analysis for 38 developing

countries, including transition economies over the period 1975-2000. The study has its own view concerning testing causality between FDI and GDP; it found a strong causality relationship between FDI and GDP, implying that GDP leads to FDI, not vice versa. Using data over the period 1971-1995 for 24 countries, Nair-Reichart and Weinhold (2001) tested causality for cross country panels. They stressed heterogeneity and applied the mixed fixed and random coefficient approach (MFR) to examine the effect of FDI on growth, and found that FDI impacts growth significantly, and that the relationship has a heterogeneous character across countries.

Choe (2003) claims, "the causality relationship between FDI and growth is a bi-directional relationship, though increased economic growth is more likely to attract more FDI". This means that in the presence of one-way causality from growth to FDI, growth can be treated as a motive to encourage inflows of FDI. Conversely, one-way causality from FDI to growth implies that FDI stimulates economic growth rate and leads to fixed capital formation and the maximisation of employment rates (Borenztein *et al*., 1998; Zhang, 2001). Given the presence of a bi-directional causality among these variables, there is a solid, mutually reinforcing causal relationship between economic growth and FDI.

Other studies found causality to run from growth to FDI, and conversely from FDI to growth. A study by Kasibhatla and Sawhney (1996) in the US found a uni-directional causal relationship running from economic growth to FDI. Xiaohui *et al*. (2002) used quarterly data for China over the period 1981-1997 and found evidence to support cointegration and bi-directional causality between FDI and GDP in the short and long-run. Basu *et al*. (2003) applied cointegration and causality tests to the issue of bi-directional causality between FDI and GDP. Using a panel of 23 developing countries over the period 1973-1996, the study used individual spatial and temporal

fixed effects in addition to country-specific cointegration vectors and found evidence to support cointegration between FDI and GDP. The results of the study found a two-way causality between the two variables in relatively closed economies. The study showed that long-run causality runs from growth to FDI in closed economies, meaning that growth and FDI are not consolidated by restrictive regimes.

Chowdhury and Mavrots (2006) resorted to a different approach by combining Granger causality tests and the Toda and Yamamoto specification to overcome possible pretesting problems related to cointegration tests between series. Based on data covering the period between 1969 and 2000, the study showed that FDI does not Granger- cause GDP in Chile but detected a two-way Granger causality between GDP and FDI in Malaysia and Thailand. Neto *et al*. (2008) studied the effects of aggregate FDI, cross border mergers and acquisitions (M&A) and Greenfield investments on economic growth by using a panel of 53 countries over the period 1996-2006. The study applied causality tests and single growth equations to suggest the presence of a two-way causality between FDI and growth. Economic growth Granger- caused Greenfields, not the reverse. Mousumi *et al*. (2008) investigated the causality between foreign direct investment (FDI) and economic growth for 66 developing countries, considering their interaction with exports and technological change. The main findings were that FDI causes growth in several developing countries. However, the mechanism through which this works differs across countries, and reverse causality from growth to FDI exists for many countries.

Chakraborty and Nunnenkamp (2008) tested Granger causality between industry-specific FDI and output data by using a panel cointegration model. The study showed that growth affects FDI and varies from sector to sector. FDI stocks and output are mutually reinforcing in the manufacturing sector. Yet, there is no causal link in the

primary sector. In the services sector, transitory impacts of FDI on output were the only effects to be detected. FDI in the services sector seems to promote growth in the manufacturing sector through spillovers across sectors.

Other studies detected no causality at all. De Mello (1999) studied causation from FDI to growth in 32 countries, of which 17 were Non-OECD countries, and by focusing initially on the time series aspects of FDI and growth. He concluded, "…the effect of FDI on growth is heterogeneous across countries". Secondly, by combining time series analysis with panel data estimations of the Non-OECD sample no causality from FDI to growth based on fixed effects regressions with country-specific intercepts was detected, and a negative short-run effect of FDI on GDP by using the mean group estimator. Charkovic and Levine (2002) used panel data from 72 developed and developing countries and a cross section Ordinary Least Square and the Generalized Method of Moments (GMM) analysis but found no strong causal link between FDI and economic growth.

From this survey of the literature on FDI, no consensus has been found as to the direction of causality between FDI and economic growth. Available evidence shows that causality can run from FDI to growth or from growth to FDI. Other studies show the absence of causality.

5.3 Data and Econometric Approach

5.3.1 Data Description and Sources

The empirical analysis in this part is based on a time series over a period of 32 years from 1978 to 2009. The data contain information on foreign direct investment, and gross domestic product. Data for foreign direct investment and gross domestic product were collected from the World Bank database.

5.3.2 Econometric Approach

There are numerous studies that recognise the theoretical possibility of two-way feedback between FDI and output along with their long-run and short-run dynamics; however, no empirical investigations in the context of the Egyptian economy can be found which explore cointegration as well as the long-run and short-run dimensions of the causal link between FDI and output.

Consequently, to assess the relationship between FDI and GDP, we utilise a bivariate VAR model approach. Theoretically, the relationship between FDI and GDP may take place in either or both directions. For that reason, to carry out our empirical analysis, we specify the following a two-variable vector autoregressive model comprised of foreign direct investment, and domestic output to test causality hypotheses.

$$\begin{pmatrix} FDI_t \\ GDP_t \end{pmatrix} = A_0 + A_1 \begin{pmatrix} FDI_{t-1} \\ GDP_{t-1} \end{pmatrix} + \ldots\ldots\ldots + A_s \begin{pmatrix} FDI_{t-s} \\ GDP_{t-s} \end{pmatrix} + u_t \qquad \textbf{(5.1)}$$

Where A_0 is a vector of constant terms, $A_{i=1,\ldots,s}$ are all matrices of parameters. The time series data used in this study are annual data, and cover the period 1978-2009. To assess the causal links between the referred variables, we estimate a vector error correction model that emanates from the cointegrated relationship between the variables. Two questions are of particular importance: (1) is there a long-run steady state relationship between FDI and output for the Egyptian economy? and (2) given the existence of a cointegrated relationship, can we accurately identify the causal effects between FDI and output by unravelling the short-run dynamics of the long-run relationship?

The empirical analysis under investigation regarding the association between FDI and output follows several steps. We begin by testing for non-stationarity in the two variables of FDI and output prompted by the existence of unit roots. The cointegration technique developed by Johansen and Juselius (1990) is used for the sake of testing a

long-run cointegrated relationship between the two variables in the second step of our estimation. An error correction model to uncover Granger causality in the relationship in the final step of our estimation is used, given the evidence of cointegration in the long-run FDI-GDP relationship.

Our analysis is limited to the bivariate relationship between FDI and GDP. This limitation is fairly common in the relevant literature. The bivariate approach has been used in several recent studies on the causal links between FDI and output, including those of Chowdhury and Mavrotas (2006), Frimpong and Oteng-Abayie (2006), and Hansen and Rand (2006). Favouring bivariate approaches in the relevant study is sought to avoid the complications resulting from indirect causality once the so-called auxiliary variables are accounted for in a multivariate framework (Dufour and Renault, 1998). For example, Ko'nya (2004) considers it a clear advantage that in a bivariate system no-causality for one period ahead implies no-causality at, or up to, any horizon. Moreover, the usable sample size tends to shrink considerably when testing for causality in a multivariate system (Ko'nya, 2004). Thus, the standard bivariate approach is followed. In this way, we aim at identifying the precise direction of causality between these two variables, rather than identifying the relative importance of various possible determinants of GDP.

5.4 Empirical findings

5.4.1 Tests for stationarity

In any econometric study, the first step in our methodology is to check the stationarity of the variables used as regressors in the model to be estimated. The variables used in the specified model required the test for the existence of unit root. The purpose of root test for individual variables of time series data is to ensure that the variables are integrated. In fact, non stationary series could result in spurious regression. Unit root test for stationarity are performed on both levels and first difference for all

variables. Two unit root tests are carried out; namely, Augmented Dickey Fuller (ADF), and Phillip-Peron (PP) Phillips[23]. The results indicate that the series are integrated of order one I (1). That is, the series is non stationary at level, but stationary at first difference. Results are shown in Tables 5.1a and 5.2b respectively.

Table 5.1A Unit Root Test (Levels)

Variables	ADF		PP	
	Constant	Constant & Trend	Constant	Constant & Trend
FDI	-1.832751 (0.3584)	-2.381691 (0.3812)	-1.985077 (0.2915)	-2.469134 (0.3399)
GDP	-0.571230 (0.8631)	-2.171214 (0.4881)	-0.510881 (0.8760)	-2.402550 (0.3711)

Notes: 1. Probabilities are in parentheses.

Table 5.1B Unit Root Tests (1St Difference)

Variables	ADF		PP	
	Constant	Constant & Trend	Constant	Constant & Trend
FDI	-7.119775 (0.0000)	-4.610633 (0.0052)	-7.530929 (0.0000)	-13.18012 (0.0000)
GDP	-3.520234 (0.0143)	-3.359585 (0.0762)	-3.673640 (0.0099)	-3.527733 (0.0544)

Notes: Probabilities are in parentheses.

5.4.2 Tests for Cointegeration

Granger (1981) introduced the concept of cointegration. The concept was also extended and formalised by Engle and Granger (1987). Cointegration is of interest because of the possible existence of a long-run or a steady state equilibrium

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[23] ADF Test: $\Delta y_t = a_0 + \gamma y_{t-1} + a_2 t + \sum_{i=1}^{p} \beta_i \Delta y_{t-1} + u_t$

PP Test: $\Delta y_{t-1} = \alpha_0 + \gamma y_{t-1} + e_t$

The ADF test corrects for higher order serial correlation by adding lagged differenced terms on the right- hand side, the PP test makes a correction to the t statistic of the coefficient γ from the AR(1) regression to account for the serial correlation in e_t . So, the PP statistics are just modifications of the ADF t statistics that take into account the less restrictive nature of the error process (Dimitrious, A., and Stephan, G., 2006).

relationship. The investigation on cointegration tests has taken place in two main directions: (a) tests based on the residuals from a cointegration regression suggested by Engle and Granger (1987); and (b) tests based on the system of equations utilising vector autoregressive models suggested by Johansen (1988, 1991) and Johansen and Juselius (1990).

The test adopted by Johansen and Juselius is a method of cointegration testing based on the maximum likelihood estimation of the VAR model. It is adopted so as to determine the number of cointegrating vectors in the analysis. In this technique, two test statistics are manipulated to identify the number *(r)* of cointegrating vectors; namely the trace test statistics and the maximum eigenvalue test statistics. The trace statistics hypothesise the null hypothesis that there are at most *r* cointegrating vectors against the alternative of *r* or more cointegrating vectors. Meanwhile, the maximal eigenvalue statistics tests are for *r* cointegrating vectors against the alternative of *r+1* cointegrating vectors. It is widely accepted that the Johansen and Juselius approach is more powerful than the Engle and Granger tests[24]. Thus, it has been decided to use the Johansen and Juselius method to test for the long-run relationship at integrated variables. In the current study, the method of Johansen and Juselius is employed so as to test for the long-run relationship between variables using Johansen's full information maximum likelihood procedure.

The results of the tests for the model are presented in Table 5.3 and they indicate that both the trace test and maximum eigenvalue statistics reject the null of $r \leq 0$ against the alternative $r \geq 1$ at 5 per cent level of significance suggesting the evidence for the

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[24] The EG approach has some drawbacks:
- The test does not say anything about which of the variables can be used as regressors and why.
- It relies on two-step estimator. Thus, any error introduced in the first step is carried into the second step (Dimitrious, A., and Stephan, G., 2006).

presence of one cointegrating vector. Since VAR models are always sensitive to lag, it is necessary to decide the most appropriate lag length for the VAR model. The most adequate VAR model is selected when it minimises the distinct loss functions (e.g. Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Criterion (SC) and Hannan-Quinn Information Criterion (HQ)) in addition to the Likelihood Ratio (LR) statistic. Hence, the maximum lag length for the model is set at 1. This is an important step before estimating the model as the choice of lag length could influence the results obtained from the Granger causality test. The results of the lag length selection process are shown in Table 5.2

Table 5.2 Selection-order criteria

Lag	Log L	LR	FPE	AIC	SC	HQ
0	-39.01132		0.071518	3.037876	3.133863	3.066418
1	55.63267	168.2560*	8.69e-05*	-3.676494*	-3.388530*	-3.590867*
2	59.25951	5.910403	9.00e-05	-3.648852	-3.168913	-3.506141
3	61.46013	3.260180	0.000104	-3.515565	-2.843650	-3.315769

*Indicates lag order selected by the criterion.

Table 5.3 Johansen Cointegration Test

Null Hypothesis	Eigenvalue	Trace Test		Eigenvalue Test	
		Trace Statistic	0.05 Critical value	Eigen value Statistic	0.05 Critical value
None*	0.402359	16.13959*	15.49471	15.44293*	14.26460
At most 1	0.022954	0.696657	3.841466	0.696657	3.841466

Note: * denote rejection of the null hypothesis at the and 0.05. These nonstandard critical values are taken from Mackinon-Haug-Michelis (1999).

The study carries out misspecification tests of no-serial correlation, normality. Likewise, to inspect the evidence of first order serial correlation, the Lagrange Multiplier (LM) test is performed. The results imply that there is no-serial correlation. The normality test is performed through the joint Jarque –Bera (JB) statistics and it indicates that residuals are normally distributed for the model.

The long- run coefficients of the cointegrating vector normalising on GDP indicates a positive relationship between GDP and FDI and it is statistically significant at the 1 per cent level. This positive relation is consistent with the theoretical explanation of the neoclassical, endogenous growth models.

5.4.3 Error Correction Model

Once a cointegrating connection between relevant economic variables is recognised, the next step is to examine how these variables adjust in response to a random shock. This is an issue of the short-run disequilibrium dynamics. The short-run dynamics of the model is studied by analysing how each variable in a cointegrated system responds or corrects itself to the residual or error from the cointegrating vector. We employed the vector autoregression (VAR) technique and regressed on its own lags and the lag of other variable. Hence, we specify and estimate a vector error correction model (VECM) so as to test the causal relationship among these variables.

$$\Delta FDI = \delta_1 + \alpha_{11} ECM_{t-1} + \beta_{11} \Delta FDI_{t-1} + \beta_{12} \Delta GDP_{t-1} + \varepsilon_{1t}$$

$$\Delta GDP = \delta_2 + \alpha_{21} ECM_{t-1} + \beta_{21} \Delta GDP_{t-1} + \beta_{22} \Delta FDI_{t-1} + \varepsilon_{2t} \qquad (\mathbf{5.2})$$

Where ECM_{t-1} is the error correction term generated from the cointegrated regression from the Johansen multivariable process, ε is a disturbance terms, Δ denotes first differences required to induce stationary for corresponding variables, the estimated coefficients of β indicates the short- run causal effects, whereas the coefficient of ECM_{t-1} measures the long- run causal relationship implied through the significance of the t-statistics. The results of the bivariate causality from the VECM are presented in Table 5.4. From the results, we can see the existence of a long- term equilibrium connection between gross domestic product and foreign direct investment. The

empirical result of the estimated error correction models indicates the significance of the error correction term (ECM) which assures the long-run relationship[25].

The error term coefficient (ECM_{t-1}) (speed of adjustment coefficient) is of particular interest in that it has a significant implication for the dynamic of the system. From Table 5.4, the speed of adjustment coefficients of (ECM1, ECM2) shows that they are statistically significant and different from zero. This indicates that changes in GDP and FDI will respond to the deviation from the long- run equilibrium in previous period (T-1). In ECM1, the speed of adjustment is -0.0252 which is associated with a value of change of GDP and the speed of adjustment in ECM2 for FDI is -0.4622 which is associated with a value of change of FDI. So, the short dynamics adjustment in the ECM for FDI is faster than that of the short-run dynamics adjustment in the ECM for GDP.

Table 5.4 Error Correction Model

Independent Variables	Dependent Variable	
	Δ GDP	Δ FDI
Constant	0.0495*** (0.0108)	-0.3748 (0.2834)
ECM1(-1)	-0.0252*** (0.0092)	
ECM2(-1)		-0.4622*** (0.1734)
Δ FDI (-1)	0.0140*** (0.0052)	-0.3678*** (0.1754)
Δ GDP (-1)	-0.0034 (0.1985)	8.9252 (6.117)

5.4.4 Causality Test

The next phase is to carry out VECM causality tests among the variables of interest, once the level of cointegration has been established. This study performs three causality

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[25] Autocorrelation and normality tests were applied to the two models in table 5.4 and the results shows that there is no autocorrelation and normality of the residuals.

tests and these are: Short-run Granger non-Causality[26], Weak exogeneity[27] and Strong exogeneity tests respectively. These are performed through the popular Wald test, and the results are illustrated in Table 5.5. Testing the null hypothesis that ΔFDI is equal to zero in the short-run is rejected at the 5 per cent significance level, and it is revealed that FDI does Granger- cause GDP. Conversely, it is noted that at 5 per cent critical value GDP does not Granger- cause FDI.

The long-run causality is shown through the weak exogeneity test and it indicates evidence of bi-directional causality between gross domestic product and foreign direct investment. The overall causality in the system is examined through the strong exogeneity. It shows that the null hypothesis that FDI does not Granger-cause GDP is rejected at the 5 per cent level of significance. On the null hypothesis that GDP does not Granger-cause FDI is rejected at the 5 per cent level of significance[28].

Table 5.5 Causality Tests Result

Short – Run(granger causality)			Long - Run			Strong Exogeneity		
Null Hypothesis	χ^2(Value)	P> χ^2	Null hypothesis	χ^2(Value)	P> χ^2	Null hypothesis	χ^2(Value)	P> χ^2
H_0 : Output does not granger cause FDI	2.12	0.144	$\propto_{11}$ (FDI) = 0	7.41	0.006	$\beta_{11} = \alpha_{11} = 0$	15.4	0.0004
H_0 : FDI does not granger cause Output	7.10	0.007	$\propto_{21}$ (GDP) =0	7.22	0.007	$\beta_{12} = \alpha_{21} = 0$	14.7	0.0006

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[26] Granger causality refers only to the effects of past values of y_t on the current values of z_t. Hence granger causality actually measures whether current and past values of y_t help to forecast future values of z_t. A standard F- test is used: $a_{21}(1) = a_{21}(2) = a_{21}(3) = \cdots = a_{21}(p) = 0$ (Walter, E., 2004).

[27] In a cointegrated system, if a variable does not respond to the discrepancy from the long-run equilibrium relationship, it is weakly exogenous. Hence, if the speed of adjustment parameter $\propto_i$ is zero, the variable in question is weakly exogenous. The practical importance is that a weakly exogenous variable does not experience the type of feedback that necessitates the use of a VAR (Walter, E., 2004).

[28] In addition , the hypothesis of FDI led Exports was examined by testing the causality between FDI and exports, and the results shows that there is no causality in the short run but, there is a bidirectional causality in the long run.

5.5 Conclusion

This chapter concentrated on the FDI-led growth hypothesis in the case of Egypt. After reviewing the existing literature about the direction of causality between FDI and GDP, empirical analysis has been implemented to analyse the short-run and long-run relation between foreign direct investment and gross domestic product in Egypt using annual data over the period 1978-2009. To achieve this objective, the study employs the econometric theoretical framework of Johansen cointegration and error- correction model to capture the two-way relationship between variables of interest. Both the trace and maximum- eigenvalue cointegration tests simultaneously identify one cointegrating relation between FDI flows and GDP.

The estimation of the VECM model conveys important information about the short-run dynamics. There is strong evidence of FDI Granger causing GDP for Egypt, there exists no evidence of reverse causality: FDI plays a significant role in the short run adjustment process of GDP. For the long-run, there is a bi-directional relationship. In addition, the hypothesis of FDI led exports was also tested, and there is a strong evidence of bidirectional causality in the long run. These findings are supporting the government of Egypt's policy concerning attracting more FDI to foster economic growth.

Chapter Six

Conclusion and suggestions for future research

6.1 Conclusion

The core aim of this thesis has been to study policy implications and future research. Specifically, the study aims to find answers to the following questions: What are the determinants of FDI? What has been the contribution of the FDI inflow to productivity? Has the contribution been positive or not? What is the direction of causality between FDI and GDP?

Chapter two as a background was divided into two parts. The first part showed the macroeconomic policies that have been adopted in the economy as a whole, and the manufacturing sector in particular. The Egyptian economy, until the revolution of 1952, has been mostly a free market oriented economy; a transformation process of the Egyptian economy took place – passing from a private property based economy to a public sector based economy with a heavy implication of the state into the national economy. The new regime concentrated its attention on growing the state investments volume and their orientation towards major economic projects to assure the infrastructure development and social services assurances. This period was characterised by political instability, relatively financial insecurity, and nationalisation of major industries.

From 1974 to 1985, Egypt founded the economic policy known as the "Open Door" policy. The open door policy has as an objective of attracting arabian and foreign capital, and also encouraging the private capital to have an active role into the national economy development. The Open Door policy did not impact on the institutional economic aspects positively since the Egyptian economy suffered major structural imbalances which impeded sustainable growth. The economic development during the '80s was less favourable than that during the '70, bringing about economical and

financial problems that had been hidden during the preceding period; the growth of the external debt and state budget and external payments deficits.

The realization of a new economic reform began in 1990 by launching the Economic Reform and Structural Adjustment Program (ERSAP) designed to stabilize macroeconomic imbalances, eliminate pricing distortion, and transforming the economy from a centrally planned economy to a market-based open economy where the private sector assumes the leading role. The implementation of ERSAP was aided by a bilateral debt forgiveness/ debt service relief from the Paris Club. ERSAP was quite successful in stabilizing the macro-economy and eliminating many price distortions plaguing different sectors of the economy. As a result, the economy was revitalized and the growth in output reversed its downward trend to an upward path.

The second part of chapter two reviewed the development of FDI in Egypt. It showed that FDI growth in Egypt has been sluggish during the past 30 years, and this was obvious from its rank, using the UNCTAD-developed two FDI indices (inward FDI performance index, and the inward FDI potential index). The deterioration in Egypt's FDI share is not only observable at the global level, but is also noticeable within the regional framework of MENA countries.

In the third chapter we attempted to explore the determinants of FDI, and focused upon the spatial and temporal variation in FDI among Egypt's sectors. Such studies are minimal except for a few that use data at the country level. After reviewing FDI theories and empirical evidence, an empirical analysis has been implemented to determine the factors that influence the flow of FDI across the Egyptian sectors. Two issues emerged from this analysis of the determinants of FDI in Egypt.

First, the econometric approach followed in this paper uses annual observations on a cross-section of 10 sectors of the Egyptian economy. The results were limited by the

fact that most of the series started at 1983. Second, the selection of variables that determines the flow of FDI within the Egyptian sectors largely follows those used in previous econometric studies and reflects variables used to proxy for sector characteristics and locational factors. The inward FDI of Egypt's sectors was established as a function of market size, private domestic investment, infrastructure, openness, government policies (privatisation), and a time trend (proxy for promotion efforts, the provision of incentives to foreign investors, the reduction of costs of doing business). Initially, a fixed effects model was estimated via a simple OLS regression inclusive of dummy variables to account for fixed effects. Misspecification tests applied to the fixed effects model revealed the presence of heteroskedasticity, and endogeneity. Given the presence of these problems, a fixed-effects instrumental variables estimation (two-stage least squares or 2SLS) was used.

When comparing the results from this study with previous econometric studies analysing the determinants of FDI internationally, it seems that the variables with expected signs are generally in line with those in previous research. In terms of the effects of openness, private domestic investment, and privatisation policy, Egypt is in line with international results (Cheng and Kwan, 2000; Kravis and Lipsey, 1982; Culem, 1988; and Edwards, 1990). Of the unexpected effects is the negative and insignificant effect of market size, (although the Egyptian market appears to be an enormous market) and the negative effect of the time trend which shows that the Egyptian government must pursue a continuous process of reforms to boost the attractiveness of the country as an investment location.

Chapter four (the second of the three empirical chapters) has attempted specifically to fill the empirical gap in the literature relating to the spillover effect of FDI on productivity by re-examining the role that FDI played in affecting productivity of the

manufacturing sector in Egypt from 1975 to 2005. After reviewing the previous literature about inward FDI and productivity spillover, empirical analysis has been implemented to determine the factors that influence productivity, based on panel data of nine sub-sectors of the manufacturing sector from 1975 to 2005. The selection of variables follows those used in previous econometric studies. In order to assess the influence of the variables, an augmented Cobb Douglas production function was built where value added of Egypt's manufacturing sector is established as a function of capital, labour, foreign direct investment, exports, imports, and technology gap. Misspecification tests applied to the fixed effects model showed the absence of multicollinearity and serial correlation, but on the other hand reveal the presence of heteroskedasticity, and endogeneity. Given the presence of these problems, a fixed-effects instrumental variables estimation (two-stage least squares or 2SLS) was used.

When comparing the results from this study with previous econometric studies analysing the spillover effect of FDI internationally, the results reveal that foreign direct investment inflows, capital, and labour exert a positive effect on productivity which is generally in line with those in previous research for developing countries (Blomstrom and Persson, 1983; Blomstrom, 1986; Blomstrom and Wolff, 1994; Kokko, 1996; and Liu, 2002). On the other hand, technology gap, and imports exert a negative and significant effect on productivity, which means that Egypt is importing goods with no technological spillovers, since the technology of foreign firms is too advanced, and local firms may not be able to comprehend and adapt foreign technology; thus, the wider the size of the technology gap between Egypt and technologically developed countries is, the less productivity Egypt will witness. Therefore, the Egyptian government has to work on diminishing the technology gap.

Chapter five is devoted to explore the direction of interaction between FDI and GDP in the Egyptian economy. After reviewing the previous literature about the direction of causality between FDI and GDP, an empirical analysis has been implemented using a time series framework. In most of the previous studies, the relationship between FDI and GDP had been studied presuming that causality runs from FDI to GDP. The majority of the literature on the subject uses growth models in the context of growth accounting to test for the significance of FDI as an exogenous variable in the growth equation. In addition, time series data at the country level have been traditionally used. In this chapter, the econometric framework of cointegration and error correction mechanism was used to capture the two way linkages between FDI and GDP. Results indicate that FDI inflows and GDP are cointegrated in the long run. At the aggregate level, Granger causality tests point to a strong causal link running from FDI to output in the short run, while it is a bidirectional link in the long run. In general, the bidirectional causality between GDP and FDI indicates that while FDI promotes GDP, GDP also attracts more FDI inflows. In addition, the hypothesis of FDI led exports was examined by testing the causality between FDI and exports, and the results shows that there is no causality in the short run, but there is a bidirectional causality in the long run. This issue has an important policy implication as promotional policies should be directed to encourage inward flows of FDI.

6.2 Policy Implications

FDI shows an important element to enhance economic growth of Egypt through spillover effect and technology transfer. It should not only matter how much investment enters the economy, or how many jobs and how much output is created, but also how FDI affects the economy in general, including taxes, GDP, exports, overall employment, wages, technology and productivity and market structure; thus, Egypt

should have a clearer long-term strategy in relation to FDI. Based on the findings in this paper, four policy implications can be considered to boost the attractiveness of Egypt as an investment location.

First, as the indicators attest to, the privatization program - as one of the corner stones of macroeconomic reform and structural adjustment program (ERSAP) - made considerable contribution to the government and restructuring. This result suggests increasing the privatization adjustment process, and enhancing it through:

- Encouraging FDI in investment services;

- Improving information available to potential foreign investors on the privatization programme.

- Public support and fast application of privatisation.

Second, results suggest that Egypt should promote export-oriented FDI. Egypt is centrally located in close proximity to European market, North Africa and the Middle East. This market is an exemplary locus for transport, export and other services. Two broad target categories are proposed:

1. **Reducing trade-related transactions costs**

    Attracting export-oriented FDI requires easy access to overseas markets, and strengthening the trading infrastructure to facilitate imports and exports. Such strengthens could be achieved through:

- Tariff reforms.

- Reform of the process of estimating duties for importers.

- Improve quality testing facilities and locate them close to ports.

2. **Partnership**

    Egyptian-owned enterprises should be encouraged to enter in subcontracting and joint venture linkages with foreign firms for the purposes of technological

upgrading and accessing export markets. These firms, in the long term, may also become regional investors (either on their own or in partnership with MNEs) in other countries.

Third, to maximize the benefit of FDI, the Egyptian government should strengthen its technological capabilities to enhance the spillover benefits from FDI. It is difficult for domestic firms to extract the potential benefits of spillovers when a large technology gap exists between domestic and FDI firms. Thus, a longer-term objective is deepening linkages with foreign companies to become more closely integrated with the world's science and technology (S&T) networks. The government policy can play a role by investing in basic infrastructure -especially S&T infrastructure needs to be more supportive of the private sector, and links between research and development (R&D) institutions and industry need strengthening-, education and training, and encouraging domestic firms themselves to invest in technological development by providing technical and infrastructural services, and incentives or funds for technology upgrading. These policies can all help to increase domestic technological capability.

Finally, growth enhancing policies coupled with sound macroeconomic policies foster a healthy rate of returns to investment and hence attract FDI. To tap the gain of FDI, the Egyptian government should establish investment agencies, improve the local regulatory environment, develop the local financial market, and enhance transparency in macroeconomic policies. A sound and transparent legal system governing financial transaction should be put in place. A central body or institution should be established to promote and market investment opportunity and attract genuine FDI.

6.3 Suggestions for future research

Two main areas for further research emerge: analysis that is based on better (more disaggregated) data, and future analysis that focuses on particular forms of FDI.

First, better data and longer time periods are needed. While this study makes a major contribution in terms of understanding determinants and consequences of FDI, the analysis is only as good as the data on which it is based. While the need for better data is obvious for most areas of economic research, the issue here is that it needs to be possible to analyse Egyptian FDI for different sectors using disaggregated data. There should not be any reason why data on manufacturing industries are not available in a disaggregated form or why data on FDI (disaggregated) in different sectors are not available. Those data are essential to better analyse the determinants and consequences of FDI.

Second, the determinants (and potential consequences) of FDI are dependent on the form of FDI. In order to explore which combination of variables should be used to best explain the different FDI forms, a more detailed analysis should be carried out, going through each case individually.

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