TRENDS AND DETERMINANTS OF INWARD FOREIGN DIRECT INVESTMENT TO SOUTH AFRICA

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TATONGA GARDNER RUSIKE

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ABSTRACT

Foreign direct investment (FDI) is seen as a way to provide the needed capital inflow to stimulate growth in a domestic economy. FDI can also result in increased employment levels, managerial skills and increase in technology. In efforts to attract FDI, host countries have undertaken various policy incentives to attract foreign investors. This study analyses the trends and determinants of inward FDI to South Africa for the period 1975-2005.

The study starts by reviewing FDI literature on its determinants and provides the macroeconomic background and FDI related policies undertaken in South Africa. The trend and sectoral analysis provides the actual nature of FDI flows to South Africa. An empirical model linking theoretical and empirical determinants of FDI is estimated using the Johansen cointegration and VECM framework. The study also augments the cointegration framework with impulse response and variance decomposition analyses to complement the long and short run determinants of FDI. Dummy variables are used in each of the estimated FDI models to take into account the possibility of structural breaks.

Results show that relative to the size of the economy and to other developing countries, South Africa still receives low levels of inward FDI. Only are few years are exceptional i.e. 1997, 2001 and 2005. From the sectoral distribution, the financial sector is now the major recipient of FDI followed by the mining and manufacturing sectors. The emergence of the financial sector could suggest that FDI motives could have shifted from the natural resource seeking and market seeking to efficiency seeking FDI. The United Kingdom emerges as the major source of FDI to South Africa followed by United States of America and Germany.

Empirical analysis indicated that openness, exchange rate and financial development are important long run determinants of FDI. Increased openness and financial development attract FDI while an increase (depreciation) in the exchange rate deters FDI to South Africa. Market size emerges as a short run determinant of FDI although it is declining in importance. Most of the impulse response analysis confirmed the VECM findings. Variance decomposition analysis showed that FDI itself, imports and exchange rate explain a significant amount of the forecast error variance. The influence of market size variable is small and declining over time.

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TRENDS AND DETERMINANTS OF INWARD FDI TO SOUTH AFRICA

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ABBREVIATIONS

ADF	Augmented Dickey Fuller
AGOA	African Growth and Opportunity Act
ASGISA	Accelerated and Shared Growth Initiative South Africa
DTI	Department of Trade and Industry
ERT	European Round Table of Industrialists
FDI	Foreign direct investment
FIG	Foreign Investment Grant
GDP	Gross Domestic Product
GEAR	Growth, Employment and Redistribution Strategy
GMM	Generalised methods of moments
IDZs	Industrial Development Zones
IIP	International Investment Practice
IMF	International Monetary Fund
MIDP	Motor industry development program
MNCs	Multinational companies
OLS	Ordinary Least Squares
PP	Phillips Perron
SA	South Africa
SADC	Southern Africa Development Community
SARB	South African Reserve Bank
SDIs	Spatial Development Initiatives
SIP	Strategic Investment program
SSA	Sub Saharan Africa
TISA	Trade and Investment South Africa
UNCTAD	United Nations Conference on Trade and Development
UK	United Kingdom
VAR	Vector Autoregressive
VECM	Vector Error Correction Modelling
WIR	World Investment Report

CHAPTER ONE: INTRODUCTION

1.1 CONTEXT OF RESEARCH

Many developing countries have undertaken policies that attract foreign direct investment (FDI), which stems from the belief that foreign investment positively influences economic growth (Asiedu 2002). These policies have met with mixed results in the developing countries and have been particularly unfavourable for some Sub Saharan African countries. Most of these countries lack capital due to low savings, and FDI is seen as way to provide the needed capital inflow to stimulate growth.

South Africa has not been left out in the scramble for FDI from developed nations. A number of actions and policies have been undertaken in an effort to attract foreign investment. In 1993, Nelson Mandela acknowledged that foreign investment could play a valuable role in SA economic development (Clark and Bogran 2003: 337). Since then, South Africa has passed new regulations promoting FDI in public and private partnerships. These include regulations that reduce tax burdens[1] and import tariffs, to allow for easier exchange and repatriation of profits, and to address lagging productivity and the overall socio-economic difficulties (Clark and Bogran 2003: 344).

South Africa has made itself more attractive for FDI as it is a vital element of the government's approach to economic development. The GEAR policy of 1996 adopted an outward looking and liberal stance, which included a lower fiscal deficit and inflation, reduction of tariffs and liberalisation of the capital account and financial system. The policy makers identified FDI as a key component to improve economic growth. Researchers such as Gelb and Black (2004) have also argued that, given that the low domestic savings rate is a constraint on growth, alleviation of the problem could come in the form of foreign investment.

[1] South Africa had signed 47 double taxation agreements by 1999.

The view that FDI can potentially increase economic growth emanates from a wide range of benefits that flow with FDI. Firstly, the inflow of FDI avails foreign exchange in an economy, which should improve the balance of payments account particularly the current account. Secondly, FDI can provide managerial knowledge and skills including organisational competence and access to foreign markets. Thirdly, it can enable the transfer of technology from developed countries to the developing nations. Fourthly, it may provide a wide range of goods and services to residents in the recipient country. Fifthly, FDI can also create jobs and capital for new investments, while providing access to lucrative export markets (Asiedu 2002). A number of other benefits could be enumerated, however, all summed up together will provide a catalyst for economic growth.

Global FDI has fluctuated since the 1990s. The United Nations Conference on Trade and Development (UNCTAD) shows that 1991-92 was a period of FDI recession. The trend shifted from 1993 as inflows gradually increased in both developed and developing countries. The increases in FDI continued until 2000. FDI inflows declined from \$853billion in 2001 to \$651billion in 2002 (WIR 2003). Since then, global FDI has continued to increase. The increase in FDI has been prevalent in developing countries particularly in Asia. In 2004 FDI in South-East Asia surged by 48% to \$26 billion from \$12.48billion, while South Asia, with India at the forefront, received \$7 billion from \$2.1billion, corresponding to a 30% rise (WIR 2005:3). The growth in FDI for Asia has been attributed to various policy changes at national and regional levels.

Whilst developing countries or emerging markets in South America and Asia have been successful in attracting substantial amounts of foreign investment, the African scenario has shown a different pattern. Africa’s share has declined from 5.3% experienced in the 1980s to around 2.3% in 2000 which has now stabilised at around 3% in recent years (Basu and Srinivasan 2002:4). However, some individual African countries, have received increased inflow of FDI particularly in the natural resources sector. Whilst the inflow of FDI in individual African countries might have increased in nominal terms

Basu and Srinivasan (2002:4) show that Africa's share relative to global FDI has decreased over time. Loots (2000) argued that the top ten FDI receiving countries in the developing world in 1999 fulfilled most of the criteria for sound economic performance or got the fundamentals right. These include:

- Belonging to a regional grouping
- Economic growth exceeding population growth
- Access to foreign markets
- A primary skilled labour market
- Availability of unskilled labour at low cost
- High GDP
- Fiscal discipline
- Corporate tax structure
- Political stability.

(Loots 2000:13)

Given the various initiatives undertaken by Sub-Saharan African (SSA) countries, very little has been achieved in terms of attracting the required levels of FDI. The progressive policies adopted by some countries are still to yield the desired results, as the current rates of FDI in Africa in general are still disappointing relative to developing countries in other regions (Basu and Srinivasan 2002).

Since 1994, South Africa has entered into various trade agreements with other countries and regional groupings to reduce trade barriers and implemented sound monetary and fiscal policies. This has resulted in a steady rate of economic growth and strong export growth. However, the rate of growth has failed to reach 6% as targeted in the GEAR macroeconomic policy framework.

Thomas and Leape (2005) note that South Africa receives comparatively low levels of foreign capital in the form of direct investment. The country is yet to experience the high levels of FDI required to increase the economic growth rate. Despite an improvement in the overall macro conditions and South Africa's advantages in terms of natural resources and market size, foreign investors have shown limited interest in acquiring, creating or expanding domestic enterprises. Dahl's (2002) study shows that there is still a poor correlation between economic performance and the magnitude of foreign investments in Southern Africa, including South Africa. Researchers such as Clark and Bogran (2003) have suggested that the problem of low levels of FDI into South Africa could be more because of perceptions on the part of prospective foreign investors than of reality.

Literature on FDI determinants has tended to classify determinants into different categories, which has meant different research methods being adopted for each class leading to a number of conflicting results (Tsai 1991:275). One approach has been to identify determinants on the demand side and supply side (Tsai 1991:275). Another approach looks at traditional and non-traditional determinants. The push and pull literature, distinguishes domestic factors or pull factors (such as market size and openness) and external factors or push factors (such as foreign interest rates and global economic conditions) and identifies broad categories of macroeconomic, institutional and policy variables that influence the inflow of FDI (Ahmed *et al* 2005:5).

Only a few empirical analyses such as Moolman *et al* (2006) and Fedderke and Romm (2004) focus on determinants of inward FDI to South Africa. From the determinants of FDI, only two factors, market size and openness are common to both Fedderke and Romm (2004) and Moolman et al (2006). While the role of exchange rate and infrastructure are significant variables in determining FDI in Moolman et al (2006:25), they were not included as variables in Fedderke and Romm (2004).

1.2 OBJECTIVES OF THE STUDY

The study has two main objectives:

- To provide a historical analysis of the trend of foreign direct investment inflows in South Africa for the 1975-2005 period. An attempt is also made to determine whether sources and sectoral distribution of foreign investment has significantly changed over time.

- To identify possible determinants of FDI inflows in South Africa.
- To propose policy recommendations based on the findings.

1.3 ORGANISATION OF THE STUDY

The thesis is organised as follows. Chapter two provides a review of the literature highlighting theoretical and empirical determinants of FDI. Chapter three provides an overview of the South African economy focusing on two aspects: Firstly the broad categories of macroeconomic, institutional and policy environment that influence the inflow of FDI. The aim is to identify the factors that might have influenced the inflow of FDI. The FDI related policies that were pursued during the period under review could explain any change in the distribution of inward FDI. Secondly, the sectoral and trend analysis of inward FDI, to give an insight into the nature of actual FDI inflows to South Africa. The analysis also provides an assessment of whether the inflow of FDI was necessitated by external factors and or internal factors. Chapter four presents the econometric methods used for analysis in the study. The data and variable selection are also described and explained in this chapter. Chapter five reports and discusses the results. Summary of findings, policy recommendations and conclusions derived are presented in chapter 6.

CHAPTER 2: FDI DETERMINANTS: THEORY AND EVIDENCE

2.1 INTRODUCTION

This chapter provides an overview of conceptual issues on FDI measurement, theories, classification of determinants and a review of empirical studies on the determinants of FDI. The section on FDI theories examines the development of theories of the behaviour of FDI vis-à-vis multinational companies. Given the different forms of FDI and the trends of FDI, literature has also classified the determinants into various classes which are explored in the following sections. The last section reviews empirical studies on the determinants of FDI in emerging or developing countries and on South Africa in particular.

2.2 CONCEPTUAL ISSUES OF FDI MEASUREMENT

Data on FDI usually measures different concepts depending on the source. This study follows the International Monetary Fund (IMF) and SARB system. The compilation and presentation of Balance of Payments (BOP) and International Investment Position (IIP) data by SARB follows international practice as set out in the fifth edition of the IMF Balance of Payments Manual (BPM5). Direct investment in the reporting economy (line 78bed) represents the flows of direct investment capital into the reporting economy. Direct investment includes equity capital, reinvested earnings, other capital and financial derivatives associated with various intercompany transactions between affiliated enterprises (Ahmed *et al* 2005).

SARB defines direct investment as an ownership stake of ten percent or more, in line with recommendations in the BPM5. However, BusinessMap Foundation measures FDI on the basis of announcements made by foreign companies or by foreign owned enterprises of actual or intended investments in South Africa. The implication is that the data from SARB and BusinessMap measure different concepts of FDI. The Reserve bank measure of net inward FDI is based on the BOP concept of foreign capital inflows (foreign liabilities[2]) less outflows (foreign assets). BusinessMap focus more broadly on the concept of investment activity in the local economy, either by new foreign entrants or by existing foreign-owned enterprises.

2.3 FDI AND GROWTH

Theoretically, inward FDI has a positive impact on economic growth of a host country through increased capital accumulation, greater efficiency, technological change and increased exports (Akinlo 2004:629). Lim (2001:3) suggests that FDI's contribution to growth comes through its role as a conduit for transferring advanced technology from the industrialized to developing economies. The inflow of FDI encourages the establishment of export-oriented operations which produces positive spillovers as they tend to attract more foreign investors including competitors into the location (Lim 2001:5). The benefits of FDI can vary across economic sectors, that is, primary, manufacturing and service sectors (Alfaro 2003:1).

Many empirical analyses have attempted to explain the relationship between FDI and growth. At a macro level, empirical analyses have generally tended to find a positive correlation between FDI and growth. Dees (1998) found that FDI has been significant in explaining China's economic growth, while De Mello (1997) found a positive correlation for selected Latin American countries (Lim 2001:9).

The extent to which FDI positively impacts on growth depends on the quality of environment i.e. rate of savings, degree of openness and technological development (Akinlo 2004:629). Therefore the productivity of FDI is dependent on initial conditions of the recipient economy i.e. technological and absorptive capacity. This is consistent with the arguments by Obwona (2001:65) that the impact of FDI on growth might vary across countries because of different stages of development and Lim (2001:4) that the positive spillovers depend on host country's ability to absorb the foreign technology.

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[2] This excludes portfolio investments

However, other researchers argue that the effect of FDI on growth is weak and such correlation could be driven by reverse causality, that is, it is the high rates of economic growth that attract FDI. Alfaro (2003) using cross-country data also found weak evidence of the effect of FDI on growth in host countries both at macro and micro levels.

To summarise, FDI can increase growth mainly in two ways, that is, increased foreign investment can attract higher levels of domestic investment, and the interaction of more advanced technology from FDI with the host's human capital would increase economic growth.

2.4 FDI THEORIES

A number of theories have been developed in FDI literature. These have subsequently been grouped into micro and macroeconomic approaches. The microeconomic theories focus on firm specific characteristics that influence the decision making of firms, for instance, market imperfections theories. Macroeconomic theories seek to analyse country characteristics that explain FDI flows within and across countries, that is, internalization and product cycle theories. FDI literature has also tended to review another set of theories in terms of FDI motives, that is, natural resource seeking, market seeking and efficiency seeking FDI. In explaining FDI theories, the aim is to identify determinants of FDI and how each of the factors impacts on FDI.

Hymer (1976) developed the market imperfections theories which aim at explaining behaviour of firms in non-perfect competitive environments, that is, oligoplistic or monopolistic environment. For firms to undertake FDI they need some unique advantage such as technology to compete abroad with local firms who already have location-specific advantages. Considering the market disequlibrium hypotheses, FDI will be transitory as it acts as an equilibrating force among segmented markets, which will be eliminated through the re-establishing of equilibrium. The disequlibrium is usually found in factor markets i.e. labour markets where FDI flows from high labour cost countries to low labour cost countries (Calvet 1981:45). Cost of labour emerges as an important determinant of FDI.

Market power theories focus on structural imperfections i.e. deviations from purely market determined prices brought about by the existence of monopolistic or oligopolistic market characteristics. Voutilanen (2005:4) shows that firm specific asset power enable MNCs to create impediments to new entrants and thus increase their own power. Therefore certain types of monopolistically competitive companies undertake foreign investment.

The internalization theory of Buckley and Casson (1976) supports the idea that there is a tendency in the economic system to generate sophisticated information and to transfer this information internationally in the form of FDI (Trevino and Daniels 1995:180). The generation and transfer of such information is because there are time and cost savings associated with transferring information internally. Internalization theories concentrate on identifying transactional market imperfections with a focus on the firm's choice to directly own the foreign assets (Voutilanen 2005:9). The internalization of markets across the boundaries of national markets creates MNCs. Knowledge and expertise are the important factors in imperfect markets.

Vernon's (1966) product life-cycle hypothesis postulate that firms engage in FDI at a particular stage in the life-cycle of products that they initially produced as innovations (Moosa 2002:38). Innovation and economies of scale are then used to explain the product cycle. The theory is production oriented, focusing on the production of industrial goods in manufacturing sectors. New products or initial production takes place in a domestic developed country because of high *per capita* income, easy access to markets and efficient communication process (Kim and Lyn 1987: 54). Other countries are served initially through exports and as a customer base is established, then production would follow. The maturity stage takes place when production methods are standardized and markets are saturated in emerging and less developed countries. According to Moosa (2002:39), FDI takes place as production costs become an important factor and this is the case when a product is standardized and in the maturity stage. From these theories, three factors emerge i.e. market size, cost of labour and openness.

Eclectic theory attempts to answer the question of why a firm would want to produce in a foreign location instead of exporting or entering into a licensing arrangement with a local firm (Lim 2001:10). According to Dunning (1988) three conditions must be satisfied for a firm to engage in FDI and these are ownership, firm specific assets or internalisation and locational advantages which subsequently came to be known as the eclectic theory or OLI paradigm.

Ownership advantage entails technological advantages, size and access to raw materials as well as comparative advantage over other firms arising from the ownership of some intangible assets (Moosa 2002:37). Location advantage applies where expansion by a firm is best accomplished either at home or in a foreign country. Countries might have advantages such as size of local market, availability of resources, government incentives and other location variables. Voutilanen (2005:7) emphasizes the importance of superior production processes, cheap labour and nearness to customers as factors that make production by MNCs preferable in host countries. Focusing on internalisation advantages multinationals choose between accomplishing expansion internally or alternatively selling the rights to means of expansion to other firms (Moosa 2002:37). The eclectic theory brings out a number of determinants of FDI and these include market size, cost of labour, government incentives, and access to raw materials.

2.4.2 FDI motives

Some authors such as Narula and Dunning (2000) identify the motives of FDI in foreign countries to be natural resource seeking, market seeking and/ or efficiency seeking, Determinants of FDI are discussed using this framework. Resource seeking FDI is related to the presence of natural resources. Loots (2000:12) suggests that resource or factor driven FDI includes the availability of low cost unskilled labour, skilled labour and quality of physical infrastructure as determinants of FDI. Given the abundance of natural resources in Africa, a greater amount of FDI would be expected to be in the primary sector. For instance, FDI to less developed countries such as Chad, Equatorial Guinea, Angola and Sudan which are resource abundant is manly in petroleum exploration (Moolman et al 2006:5).

The main objective of market seeking FDI is to serve domestic markets, which means that goods are produced in the host country, and sold in the local market. As a result this type of FDI is driven by domestic demand such as large markets and high income in the host country (Asiedu 2002:109). Market size, wage levels and growth become essential characteristics for countries which host market-seeking FDI. Market seeking FDI is also referred to as horizontal FDI since it usually involves building similar plants in a foreign location to supply that market (Lim 2001:11).

Hawkins and Lockwood (2001:21) assert that efficiency seeking or cost reducing investment is undertaken by MNCs to provide more favourable cost bases for their operations. Efficiency seeking FDI aims to minimise costs in the use of factors of production at an international level. The focus is on the prospect of lowering costs through utilizing government-induced structural imperfections, such as tax differentials, or reducing risks through diversification of production. The focus is on the productivity of labour, the cost of resources, input costs and the participation of regional integration frameworks. Efficiency-seeking FDI tends to be located in countries with skilled, disciplined workforces and good technological and physical infrastructure (Hawkins and Lockwood 2001:21).

Both market seeking and efficiency seeking may tend to cluster in a certain location, also known as the agglomeration effect. It could be as a result of linkages among projects, which then creates incentives to locate close to other firms. In another way, as Lim (2001:11) points out, clustering may occur if MNCs exhibit “herding behaviour”, i.e. when firms are uncertain whether a country is a good location, they may wait for the success of the first firm (as a signal for the suitability of underlying national conditions) before entering the market. This could also suggest that one of the determinants of FDI could be in the form of past FDI.

It should, however, be noted that FDI is not always good for the host country, particularly resource seeking FDI, because it could imply low value adding activity and low capital expenditure on plant and equipment with the exception of extractive industries (Narula and Dunning 2000:151). Furthermore, the kind of FDI a country might want to attract depends much on its stage in the investment development path. MNEs should thus be encouraged to invest in higher value adding activities which could come in the form of market seeking and other asset exploiting activities (Narula and Dunning 2000:160).

The theoretical framework above suggests a list of factors that may be important in affecting FDI such as distance/transport cost, market size, agglomeration effects, factor costs, fiscal incentives, business/investment climate, political and economic stability, trade barriers/openness and infrastructure quality.

2.5 CLASSIFICATION OF DETERMINANTS

Studies have classified determinants of FDI differently depending on the motivation of the study. Nunnekamp (2002) argues that as a result of globalization, the nature of FDI could have changed over time. From this perspective determinants have been classified according to traditional and non-traditional determinants[3]. Other studies with a focus on production have classified determinants according to the supply side and demand side determinants (Tsai 1991)[4]. Studies aimed at identifying country characteristics have classified determinants into push and pull factors (Ahmed et al 2005)[5]. From all these classifications, it is important to point out that a number of these determinants overlap in the different classifications. The crux of the issue is not in identifying the overlapping classifications, but in identifying determinants in an endeavour to make appropriate policy suggestions. Therefore, the study does not dwell on the overlapping of factors. Instead, the effort is to identify factors or determinants and how they impact on FDI.

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[3] See Nunnekamp 2002:17-18) for a detailed discussion on traditional and non traditional determinants
[4] See Tsai (1991: 275) for a detailed discussion on demand and supply factors
[5] See Ahmed et al (2005:5) for a detailed discussion on push and pull factors.

Tsai's (1991:275) supply and demand classification is important as the identification of demand side determinants provides a country with variables they can control to some extent. Empirically, demand side determinants are tested using aggregate variables such as the GDP of the host country. Supply side determinants are derived from the microeconomic behaviour of firms and market structure. Empirically they are tested using firm level microeconomic data**.**

Traditional determinants are usually related to resource seeking and market seeking FDI. Factors that affect efficiency- seeking FDI are considered non-traditional determinants. The basis of this classification is to assess whether variables have changed over time especially considering that in developing countries, FDI has traditionally been natural resource seeking and is moving towards efficiency seeking FDI due to globalization and liberalisation (Nunnekamp 2002:17-18).

Loots (2000:10) argues that the locational determinant is the only factor from the Dunning Ownership Locational and Internalisation (OLI) paradigm that host countries can influence. According to Loots (2000), location specific determinants can be classified into three classes, which are national policy framework, business facilitation and macroeconomic determinants. Fedderke and Romm (2004) classify determinants into policy and non-policy factors. The rationale for this classification is to identify variables that authorities can influence so that policies are correctly undertaken.

Push and pull literature distinguishes domestic factors (pull factors) and external factors (push factors) and identifies broad categories of macroeconomic, institutional, and policy variables that influence the level and composition of capital flows (Ahmed et al 2005:5). As Ahmed et al (2005) further argue, while push factors help explain timing and sizing of new capital inflows, pull factors explain better the regional distribution of flows. Host countries can be in a position to work towards improving some of the determinants such as various incentive schemes in an effort to attract inward FDI.

Table 2.1: Classification of determinants

	Nunnekamp (2002)		Tsai (1991)		Fedderke (2004)		Ahmed et al (2005)	
	Traditional	Non traditional	Supply	Demand	Policy	Non policy	Push	Pull
Labour cost		X		X				X
Market size	X			X		X		X
Economic integration				X				
Political stability	X			X		X		X
Fiscal Incentives				X				X
Product life cycle			X				X	
Economies of scale			X					
Oligopoly reaction			X				X	
Openness		X			X			X
Taxes		X			X			
Infrastructure quality		X			X			X
Availability of skills		X						X
Access to local finance		X						
Economic conditions	X					X		X
Exchange rate								X
Foreign interest rates							X	

2.6 DETERMINANTS OF FDI

Market size

Market seeking FDI requires a large market for efficient utilization of resources. The large market reduces the cost of production because of lower fixed costs and economies of scale (Lim 2001). As the market size of a country grows, it is expected that inward FDI will also increase as more goods and services can be produced. Investors are keen to invest in a growing economy where they can benefit from economies of scale and efficient utilization of resources from the large market size. Hence a positive relationship is expected.

Exchange rate

The impact of the exchange rate on FDI could happen in two ways; lowering costs of production by MNCs; and by affecting the competitiveness of the goods produced which yield profit for the foreign firms. From these perspectives, there is no consensus on the relationship between exchange rate and FDI. Lim (2001) argues that the depreciation of a currency (increase in the exchange rate) could imply that foreign firms would be able to purchase assets and technology in the host country cheaply thus increasing FDI. On the contrary, a decrease in the exchange rate, meaning an appreciation, would imply more foreign currency earnings for the foreign investors hence would increase FDI inflow.

Inflation

It is generally assumed that high inflation would be negatively correlated with FDI inflows. This emanates from the view that high inflation shows lack of monetary and fiscal discipline, thus reflecting poor macroeconomic conditions. According to Onyeiwu and Shrestha (2004:95), high inflation could also increase the cost of capital which would in turn affect profitability of FDI. Inflation trends seem to indicate that moderate inflation increases could be positively related with FDI. Economies in the boom phases of their business cycles, with increasing economic growth rates and increasing FDI, find themselves with moderate increase in inflation. As the economy is expanding, inflation increases as well, not as a signal of loose monetary policy but due to economic growth taking place in the economy.

Openness

As a country becomes more open, in terms of international trade transactions and more integrated with regional countries and the rest of the world, more FDI would be expected to flow to the host country. Less capital controls and liberal trade policies would encourage FDI whilst restrictive policies would deter FDI (Onyeiwu and Shrestha 2004:95). As in the case of South Africa, little FDI was received during the apartheid era as the country was less open to the rest of the world with a number of capital controls. The ability to move capital in and out of a country is an important consideration by foreign investors.

External debt

High level of external debt indicates inappropriate macroeconomic policies thus discouraging foreign investment. Onyeiwu and Shrestha (2004:96) suggests that countries with smaller debt burdens would be in a position to provide basic infrastructure such as roads, telephones, electricity and water thus can attract more FDI indicating a negative relationship.

Taxes

Foreign investors consider the nature of tax laws of host countries. Onyeiwu and Shrestha (2004:96) argue that high levels of taxation would discourage FDI whilst low levels of taxes would encourage foreign investors, hence there is a negative relationship with FDI. Host countries then provide a lower tax environment in an effort to attract foreign investment. However, Narula and Dunning (2000) suggest that tax rates may not be the deciding factor in MNCs investment decisions, and that other location specific advantages may have a much greater effect.

Labour costs

Product life cycle theory suggests that foreign firms consider lower labour costs as they make decisions to locate production of a product in the host country (Lim 2001). Efficiency seeking FDI aims to identify areas of imperfections in labour markets in different countries. Therefore, low labour costs should attract FDI to a host country hence a negative relationship. Not only do foreign firms consider cheap labour, they also consider the availability of skilled labour. Particularly for efficiency seeking FDI, the more skilled labour available, the more likely FDI will flow to a host country.

Financial development/ Access to local finance

Deeper financial markets may allow foreign firms to finance short and long term transactions more easily and meet capital needs in the local market (Ahmed et al 2005:9). The financing could be in the form of access to credit from the banking sector or through the use of debt instruments in the financial markets. The more developed the financial sector is, the more FDI potential the country would attract.

Government size

There is no consensus on the relationship between government size and FDI. Some evidence suggests that a smaller government attracts FDI (Asiedu 2002:112) while a bigger government i.e. huge spending by government would deter FDI. Other views indicate that high government spending particularly on infrastructure would attract FDI. Alternatively, governments could be responding to the increase in FDI from investors by expanding their expenditure, hence a positive relationship.

Infrastructure quality

High infrastructure quality usually entails a developed network of roads, airports, sea ports, supply of water and electricity as well as internet networks and telephones (Onyeiwu and Shrestha 2004:96). Countries with these characteristics would usually attract FDI flows therefore we would expect a positive relationship between infrastructure quality and FDI inflow.

Natural resource availability

Moolman *et al* (2006:5) show that a number of African countries i.e. Chad, Equatorial Guinea, Angola and Sudan have received significant FDI flows due to the availability of natural resources. This is because FDI in these countries is usually natural resource seeking. Natural resource seeking FDI also aims at exploiting cheap labour. Therefore, the more abundant are natural resources and access to raw materials the more FDI would flow, signalling a positive relationship.

Agglomeration effects

The size of the existing FDI stock in host countries is an important consideration for foreign investors. The more FDI stock a country has, the more FDI will flow to that country. Lim (2001:13) argues that agglomeration effects make clustering effective as it attracts more FDI. Furthermore, the host country's infrastructure and the size of existing FDI stock are two vital elements assessed by potential foreign investors.

Fiscal incentives

Locational advantages explained in the eclectic theory could be in the form of fiscal incentives provided by a host country to lure foreign investment. Lim (2001:13) shows that fiscal incentives increase the host country's location advantages. These incentives could be in the form of lower corporate tax rates, lower import and export duties or specific concessions such as tax holidays. These are linked with FDI related policies to attract FDI thus we expect a positive relationship. For instance, the industrial development zones (IDZs) developed by the Department of Trade and Industry (DTI) in South Africa aimed at encouraging export oriented manufacturing FDI through tax incentives and duty free imports of raw materials (Streak 1998:6).

Business environment

A friendly attitude to foreign investors attracts FDI. This lowers costs of doing business, and includes labour regulations, lower judicial hurdles, property rights and the general macroeconomic and political environment (Lim 2001:13). This could also include the provision of incentives to encourage inflow of foreign investment.

Political stability

A stable political environment attracts more FDI than an unstable one. In less democratic countries there could be little respect for property rights and the rule of law. When governments change, foreign investors would want to be certain that such changes may not affect their investments and businesses in general (Onyeiwu and Shrestha 2004).

2.7 EMPIRICAL REVIEW OF LITERATURE

In reviewing empirical literature the focus is on studies in developing countries and more particularly on South African studies. These studies analyse FDI determinants using macroeconomic variables, which is the purpose of this study and therefore it is more appropriate to review such studies.

2.7.1 Emerging markets/ Developing countries.

Ahmed *et al* (2005) identify determinants of the level and composition of capital flows in 81 emerging markets using the ordinary least squares (OLS) and general methods of moments (GMM) techniques from 1975 to 2002. Ahmed *et al* (2005:11) point out that due to the use of a lagged dependent variable, OLS estimates become biased and inconsistent; hence they estimate a dynamic panel model using GMM to provide unbiased and consistent estimates. The external factors or push factors that influence capital inflows are international interest rates and business cycle developments in industrial countries (Ahmed *et al* 2005:10).

The authors explain a number of broad categories of factors in a country such as macroeconomic performance, investment environment, infrastructure and resources, quality of institutions and global factors. They found that FDI tends to cluster in particular locations, which is known as the agglomeration effect. The implication, as argued by Ahmed *et al* (2005) is that past stock of FDI influences FDI flows in the future.

The results indicate that pull factors such as higher growth measured by GDP growth rate, trade openness and a better infrastructure proxied by number of telephones per 1000 people attract FDI inflows. Push factors, such as higher international interest rates, increase the opportunity cost of investing in emerging markets. Results also show that high inflation and domestic exchange rate volatility deter FDI in emerging markets (Ahmed *et al* 2005:13).

Loots (2000) analyses the determinants of FDI to the top ten[6] developing countries recipients by using a matrix approach to identify the most important economic determinants. The approach is used to identify factors that are common in most countries as influencing the inflow of FDI. Loots (2000) classifies the factors into macroeconomic determinants, national policy framework and business facilitation measures. National policy framework includes legislation on entry of foreign firms, trade and tax polices as well as privatization stance and policy framework on economic integration. Promotion efforts, investment incentives, reduction of corruption and administrative efficiency are used to measure business facilitation measures. Results show that business facilitation determinants are neither sufficient nor necessary for FDI to take place.

National policy frameworks are necessary but not sufficient to attract inward FDI (Loots 2000:11). Fiscal stability, competitive tax structure and low political risk which are important factors in attracting FDI do not provide conclusive evidence from the top ten countries analysed (Loots 2000:21). Macroeconomic determinants seem to be very important factors in efforts to increase FDI by host countries. Important determinants include a level of integration, high growth rates, access to foreign markets, low cost of labour, and a highly skilled labour force.

A surprising result in the analysis is the weak evidence to suggest that size of domestic market is important for developing countries (Loots 2000:16). Perhaps, as the author argued, macroeconomic determinants have changed over time due to globalisation and liberalization, hence market size, which is more of a traditional determinant when FDI is

[6] China, Malaysia, Singapore, Thailand, Indonesia, Poland, Hungary, Mexico, Brazil and Argentina.

largely based on resource seeking and market seeking becomes less important over time. If indeed FDI type is changing away from market seeking, then market size could become less important as foreign investors seek other non-traditional factors such as infrastructure quality. However, caution should be exercised in the analysis of panel data and this may not necessarily be the case for individual countries using time series data. Moreover, the developing countries considered are not SSA countries where FDI is mainly in the resource seeking and market seeking segments and as such may play a pivotal role.

Nunnekamp (2002) sought to assess whether determinants of FDI have changed with globalisation i.e. whether traditional determinants are losing importance whilst non traditional ones are increasingly gaining importance. Two approaches were adopted, namely survey data from European Round Table of Industrialists (ERT 2000) and simple correlation for 28 developing countries.

Market size (proxied by host country's population and the level of GDP) as a traditional determinant of FDI is said to have declined in importance over time. Other factors such as location cost differences, qualities of infrastructure, ease of doing business and the availability of skills measured by average years of schooling have become increasingly important as non-traditional determinants of FDI (Nunnekamp 2002:16).

The survey results were supplemented by World Bank data on variables that are considered important FDI determinants. Results show that traditional market related determinants still dominate determinants of FDI distribution among the countries considered (Nunnekamp 2002:24). Non traditional determinants such as cost factors and trade openness, measured by ratio of exports plus imports to GDP, have typically not become more important with globalisation. Of importance is the availability of skills, which is proxied by average years of schooling, which has become a relevant pull factor of FDI in the process of globalisation (Nunnekamp 2002:35).

An analysis of a developing country by Tsai (1991) focused on Taiwan by providing demand side determinants of FDI using time series data. Tsai (1991:279) employed OLS method using equations in logarithm form. Two equations were specified, i.e. first on the demand side determinants and the second using variables as ratios of GDP to eliminate possible supply side influences. A dummy variable was used to assess the impact of government incentive policies on FDI in different periods.

Tsai (1991: 276) suggests that for Taiwan only labour cost, market size and government incentive policies are important demand side determinants. Although FDI is seen to exploit cheap labour in developing countries, the case of Taiwan seems to show that growth in FDI with rising labour costs indicates that cheap labour may not be as important as expected.

No clear evidence was found to support the expectation that government incentive policies were effective in attracting FDI to Taiwan. An interesting finding in Tsai (1991:279) is that Taiwan's relatively outstanding economic performance as reflected in the expanding domestic market and ever increasing *per capita* GDP during 1965-85 was not particularly attractive to foreign investors. As Tsai argues, this could be attributed to FDI being supply side determined rather than demand side or perhaps non-economic factors outweigh the investment incentives.

It is generally believed that factors that determine FDI inflow in developing countries could have a different impact on SSA countries in particular. This is because developing countries outside Africa seem to attract huge FDI inflows while SSA attracts low levels of FDI. A cross-country study by Asiedu (2002) analysed whether factors that determined FDI in developing countries affect SSA countries differently. This was done using cross sectional data of 71 developing countries of which 32 were SSA and 39 non-SSA countries (Asiedu 2002:108). Using ordinary least squares method, Asiedu (2002:109) takes six variables widely used in the literature and examines the extent to which the variables explain FDI in the sample. The variables are, real GDP *per capita*, infrastructure quality measured by number of telephone lines per 1000 people, labour cost, openness proxied by ratio of imports plus exports to GDP, taxes and tariffs, and political instability measured by the number of assassinations and revolutions.

Asiedu (2002:110) used return on investment in the host country (inverse of real GDP per capita as proxy), infrastructure development, openness, political risk and other economic variables such as financial depth and government size. However, labour cost and taxes and tariffs were unable to be tested due to data unavailability in most African countries. Asiedu results show that SSA is indeed different. Firstly, a higher return on investment and better infrastructure has a positive impact on FDI to non-SSA, but no significant impact on FDI to SSA. Secondly, openness to trade promotes FDI to SSA and non-SSA (2002:108). Thirdly, SSA received less FDI than others due to geographical location.

The results of other economic variables used such as financial depth, government size, and economic stability show that economic variables and the measure of political risk are not significant (Asiedu 2002:113). The results then suggest that policy recommendations for developing countries could be different for SSA countries.

Another study in Africa by Obwona (2001) investigated the FDI-growth linkage for Uganda. Obwona used the investor surveys approach and econometric tests. Using investor surveys, both local and foreign investors were directly questioned regarding their decisions and decision-making processes when investing in Uganda (Obwona 2001:55). The focus was on productive investment, as such purely commercial and consulting activities were excluded. For econometric tests, time series data was used for the period 1975-1991 to estimate the determinants of FDI and growth.

Findings from the survey showed that increased foreign investment was a result of a conducive investment environment provided by government through its policies and institutions (Obwona 2001:56). The author concludes that from the investors surveyed, foreign investors are primarily concerned with fundamental factors, i.e. a stable macroeconomic and political situation and credible policy reforms.

For Uganda, Obwona considered pull factors such as growth prospects, liberalized exchange rate, low inflation and fiscal discipline. The major determinants are availability and cost of natural and human resources, adequacy of infrastructure, market size, trade policies, macro stability, economic growth and political stability (Obwona 2001:62). The importance of each of these variables, however, depends on the type of investment and motivations or strategy of investors. Obwona (2001:62) agrees with other researchers, such as Nunnekamp (2002) that given the shifts in the type of investment, the availability of low cost unskilled labour in location decisions has declined over time. This has meant more emphasis on skilled labour or the trainability of workers.

The FDI equation for Uganda is specified with growth rate of GDP, trade balance, inflation rate, proportion of public expenditure to GDP, domestic savings rate, external debt service as a proportion of GDP as explanatory variables (Obwona 2001:63). All coefficients had the correct signs but only GDP growth, market size, and trade balance were significant. Obwona shows that market size is significant in affecting location decisions.

2.7.2 Studies on South Africa

Whilst there have been numerous studies on FDI for developing countries, very few studies have been done specifically on South Africa using time series data. Two notable studies by Moolman et al (2006) and Fedderke and Romm (2004) have focused on determinants of inward FDI to South Africa.

Moolman et al (2006) sought to examine the macroeconomic link between FDI in South Africa and its resultant impact on output for the period 1970-2003. In so doing, they initially identified supply side determinants of FDI before analyzing their impact on output. Their research method follows the supply side macro econometric framework, which does not take into account the demand side determinants that are equally important as well. On model specification, five variables were explored as explanatory variables for FDI in the empirical estimation, namely, market size measured by real GDP, exchange rate proxied by the rand-dollar exchange rate, infrastructure, openness[7] and a dummy variable for sanctions.

The empirical results of Moolman *et al* (2006:3) indicate that market size, openness, infrastructure and the nominal exchange rate are factors which South African policy makers should focus on when seeking to attract FDI. The study focused on the direct link between FDI and output, as it filters through new capital formation. The FDI-output link does not take other factors such as increased employment, improved skills and new management techniques into account (Moolman *et al* 2006:29).

Fedderke and Romm (2004) investigated the growth impact and determinants of FDI in South Africa using the cointegration and error correction modeling framework. They developed a model of the location of the investment activity as an explicit choice in intertemporal context of locating the new capital stock either domestically or in an alternative foreign location. The FDI model was estimated for the period 1960 to 1997.

Their results show that political risk (measured by log political instability[8]), property rights (log property rights index[9]), market size (proxied by log of real GDP) , labour cost (measured by average wage rate), corporate tax rates and openness (exports plus imports as a percent of GDP) are important factors in attracting FDI. From the analysis, Fedderke and Romm (2004) recommend that South African policymakers should aim to reduce political risk, ensure property rights, increase growth in market size, moderate wage increases, lower corporate tax rates and increase openness.

Of importance is that the two South African studies seem to identify different factors determining FDI. Only market size and openness are common to both studies. The role of exchange rate is an important determinant of foreign investment in most countries. Particularly for South Africa, it should be considered whether it could be an important FDI determinant. Studies from developing countries have also identified other factors that

[7] Proxies used for infrastructure and openness are not provided in the paper
[8] Fedderke's own computed measure adapted from Fedderke (2001)
[9] Fedderke's own computed measure adapted from Fedderke (2001)

should be considered in the case of South Africa such as those of Loots (2000) and Ahmed *et al* (2005).

2.7.3 Synthesis of empirical studies

Analysis from the above studies produces mixed results on the importance of some variables. A number of studies such as Ahmed *et al* (2005), Asiedu (2002), Loots (2000), and Obwona (2001) agree on the importance of higher growth in attracting FDI by host countries. The high rate of economic growth would entail higher rates of return for foreign investment, thus FDI would tend to move into those countries. However, Tsai (1991) found that economic performance, which can be measured by a country's growth rate, was not an important variable in attracting FDI inflows in Taiwan.

With the changes in globalization and efficiency seeking motive of FDI, availability of skills has increasingly become an important factor. Nunnekamp (2002), Tsai (1991) and Obwona (2001) agree on the importance of skilled labour in developing countries. This has meant the declining importance of cheap labour as a motivating factor in FDI inflows. The market size variable produces mixed results. Loots (2000) and Nunnekamp (2002) agree that market size is no longer a significant variable in attracting FDI. However, a number of studies by Obwona (2001), Moolman *et al* (2006) and Fedderke and Romm (2004) show that market size is still an important variable in the attraction of inward FDI by host countries.

Moolman *et al* (2006), Ahmed et al (2005), Fedderke and Romm (2004), Asiedu (2002), and Obwona (2001) show that trade openness is a significant variable for FDI inflow. As a country becomes more open, foreign investors are willing to invest in that host country. Infrastructure quality is also a significant and important variable for host countries in efforts to increase inward FDI. This is substantiated by Moolman *et al* (2006), Ahmed *et al* (2005) and Asiedu (2002).

Loots (2000) shows that national policy frameworks, although necessary, are not sufficient to attract FDI flows into developing countries. Tsai (1991) confirmed this result with Taiwan data, as government incentive policies were not an important factor in attracting FDI in Taiwan. Another finding in the empirical analyses is the agglomeration effect of FDI. Ahmed *et al* (2005) demonstrated that FDI tends to cluster in certain areas. Asiedu (2002) also showed that SSA received less FDI than non-SSA countries due to location. Therefore, developing countries in non-SSA countries received more FDI. The implication is that past stock of FDI is a significant factor influencing future inflows.

The role of the exchange rate is also another significant determinant of FDI. Ahmed *et al* (2005) considered exchange rate in the context of its volatility and concluded that greater volatility would deter FDI. Moolman *et al* (2006) considered exchange rate in the case of the nominal exchange rate. The finding was that an appreciating currency would increase inward FDI. Aristotelous and Fountas (1996) consider real exchange rate to determine the effect of relative wealth and relative labour costs on FDI. A real depreciation leads to capital inflows as foreign countries take advantage of relatively cheaper domestic labour (1996:577).

Push factors such as international interest rates considered in Ahmed *et al* (2005) are important in understanding the inflow of FDI in developing countries. Although not explicitly considered in empirical estimations, qualitative analysis shows that they are vital in the timing of inflows.

2.8 CONCLUSIONS

It is evident from the theoretical review that a number of factors are important in attracting foreign direct investment by host countries. Understanding the specific ownership, internalization and locational advantages of multinational firms will aid in the comprehension of the behaviour of firms as countries seek to attract the right kind of foreign investment. MNEs could seek resources, large markets or low cost production as motives driving their international expansion across countries. It can be noted that various factors of FDI affect different countries differently depending on their individual country characteristics, policies and location. Whilst a number of studies on FDI have been carried out for developing countries, there is no consensus as to particular factors that affect a group of countries or individual countries. Mixed results are evident with regards to the importance of certain variables in determining FDI. Variables considered include growth, skills, labour, market size, openness, infrastructure, exchange rate and international interest rates. Other broad factors include national policy frameworks and government incentive policies. The empirical review established that the importance of each of these factors varies across regions, countries and time. Only market size and openness are common determinants of FDI in both studies considered for South Africa. Therefore the lack of knowledge on other factors determining inward FDI provides a rationale for this study for South Africa.

CHAPTER THREE

3.1 INTRODUCTION

This chapter first provides an overview of the macroeconomic environment in South Africa and the various FDI related policies implemented. These include the Strategic Investment Program (SIP), Foreign Investment Grant (FIG) and the Motor Industry Development Program (MIDP) among others. Trend analysis is provided in the subsequent sections starting from the global flows to analysing the inflows of FDI to South Africa by sectoral and source distributions.

3.2. MACROECONOMIC ENVIRONMENT

During the apartheid era, South Africa was under economic sanctions and political isolation from the rest of the world. As a result, the country experienced falling investment and economic growth, high inflation and interest rates (Nowak 2005:1). During the period 1980-1994, economic growth averaged 1,5% (Nowak 2005:1). Since the democratisation process which started in 1994, the South African economy has undergone rapid changes through its macroeconomic policies. The Growth Employment and Redistribution (GEAR) policy of 1996 entailed liberalisation of markets and integration of the economy with the rest of the world. Emphasis on private sector participation in the economy was part of these reforms. The macroeconomic reforms have led to increases in real GDP growth from an annual average of 3% in 1994 to around 5% in 2005 (SARB 2006).

Table 3.1: GDP growth rates

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Growth rate %	3.2	3.1	4.3	2.6	0.5	2.4	4.2	2.7	3.7	3.1	4.8	5.1

Source: SARB statistics (series 6006z)

Contributing to the increased growth rates was a supporting external environment together with the structural reforms (IMF 2006:5). Economic growth came as a result of the strengthening of public finances and sharp turnaround in productivity performance (Nowak 2005:2). The lowest budget deficit was estimated at 0.5% of

GDP for the fiscal year 2005/6 (Frankel *et al* 2006:8). The 2006/07 budget produced a surplus of R5billion (0.3% of GDP) which is also expected to continue in the 2007/08 fiscal year to about 0.6% of GDP (Budget speech 2007:5). However, growth rates have remained below 6%. Higher growth rates could have been impeded by low levels of fixed investment which have fluctuated around 15-17% of GDP since 1994 (Nowak 2005).

As the economy grew over time, it also diversified into other sectors from the traditional dependence on commodities to the recent dominance of services sectors (SARB 2006). The new economic strategy, Accelerated and Shared Growth Initiative South Africa (ASGISA) introduced in 2004, aims to raise economic growth to 6% by 2010 (IMF 2006:5). The economy is also currently experiencing a boom in its business cycle which has mainly been driven by consumption in durables and investment in the non tradable sector (Frankel et al 2006:9).

Nowak (2005) showed that inflation has progressively declined from 10-15% levels in the 1990s to around 3% by mid 2005. Inflation averaged 3.9% in 2005 and 4.6% in 2006 (Budget Speech 2007:4). According to Ricci (2005:190) domestic inflation has been driven mainly by world inflation and domestic monetary policy. The decline in inflation is mainly as a result of stronger monetary discipline (Nowak 2005:2). Monetary policy has also become more effective since February 2000, when formal inflation targeting was adopted. Since 2002, inflation has remained within the target range of 3-6%. The low and stable levels of inflation have also implied a low and stable interest rate regime. In 2005, long term interest rates registered a thirty five year low of 7.3% whilst inflation was at its lowest levels ever recorded in thirty seven years during the period 2004 and 2005 (Frankel *et al* 2006:8).

South Africa has experienced several episodes of high exchange rate volatility. The exchange rate was under severe pressure from external and domestic shocks due to the weak international reserve position in the 1990s. This resulted in SARB making efforts through market intervention to counter such pressures, particularly in 1998 during the Asian crisis, as well as in 2001 (but the cause in 2001 was unclear) (IMF 2006:15). Since then, an improved international reserve position has contributed to lower currency volatility (Nowak 2005:3). From 2002-2004, the rand appreciated considerably before moderate depreciation in 2005. The exchange rate depreciation in 2005 was mainly as a result of significant inflow in FDI as well as portfolio investments in the financial markets (SARB 2006:34). The South African foreign exchange market also experienced some volatility in the first quarter of 2007 due to movements in commodity prices and concern about the size of the current account deficit among other movements (SARB 2007:30). The concern about the exchange rate volatility is the possible impact it may have on reducing economic growth. With the managed floating exchange rate system and inflation targeting regime, it appears that the two prices (exchange rate and inflation) have remained under control without impeding the growth process.

3.3. FOREIGN DIRECT INVESTMENT RELATED POLICIES IN SOUTH AFRICA.

FDI is believed to positively influence economic growth in developing countries. This has led to a number of countries providing incentives to attract FDI. South Africa, like other developing countries, has also implemented a number of FDI related policies and incentives to attract inflow of FDI. Given South Africa's apartheid policies before 1994, FDI was not actively pursued. With political change in 1994, the new ANC led government adopted outward looking policies that aimed to attract investment. Although South Africa has clearly acknowledged the importance of FDI in its broad macroeconomic policies, there is a lack of a specific and coordinated FDI policy that guides the country in efforts to lure foreign investment. However, FDI related policies have been pursued in specific sectors. A number of departments and sub units have the responsibility for formulating and implementing FDI related policy. These include the Department of Trade and Industry (DTI), the Department of Minerals and Energy and the South African Reserve Bank (SARB) among others.

From the broad macroeconomic framework outlined in 1996, as contained in Appendix 12 of the GEAR policy, the need for FDI in South Africa in pursuit of growth was recognised. This would be attained through gradual trade liberalisation, government deficit reduction, consistent monetary policy as well as the gradual relaxation of exchange controls (GEAR 1996). South Africa underscored the need for providing the right macroeconomic environment as a starting point in attracting FDI.

Stable macroeconomic as well as stable political and social environments are believed to be key ingredients in the increased participation of foreign investors in the country.

Streak (1998:6) argues that supply side measures to attract FDI can be grouped into two segments. Firstly, tax holidays to reduce investors costs; and secondly, technology and human resource development incentives. It is also important to point out that South Africa's FDI strategy implicit in GEAR (1996) places greater emphasis on private investment in stimulating growth related to government investment. GEAR (1996) also focused on improving domestic savings as well as gradual reductions in the fiscal deficit. Whilst fiscal deficits have been gradually reduced, domestic savings have remained very low, hampering the desired increases in foreign investment.

In order to supplement the low savings and investment rates in South Africa, an industrial policy, Spatial Development Initiatives (SDIs), was introduced in 1996 by the Department of Trade and Industry (DTI) to stimulate and foster sustainable industrial development (Moeti 2005:149). The SDIs are based on the principle of a desired increase in private investment and less government participation thus placing more emphasis on private investors. Another strategy relies on Industrial Development Zones (IDZs) that aim to encourage export oriented manufacturing FDI. This is done through providing investors' duty free status for imported raw materials, tax incentives, easy access to airports and seaports, world class infrastructure and services, the latest IT and first class IDZ management (Streak 1998:6). The emphasis on providing incentives for investors is linked to the theoretical notions advanced by Narula and Dunning (2000) that governments are adopting friendly attitudes towards investors and providing incentives in an effort to attract the right kind of FDI.

The DTI and Trade and Investment South Africa (TISA) have provided incentives to investors through three main strategic programs namely the Strategic Investment Program (SIP), the Foreign Investment Grant (FIG) and the Motor Industry Development Program (MIDP).

Strategic Investment Program

The main aim of SIP which was introduced in November 2001 is to contribute to the growth, development and competitiveness of specific industrial sectors such as manufacturing (Barbour 2005:23). BusinessMap (2002:33) noted that one way has been to provide tax relief to qualifying industrial projects. The rationale is to provide an initial capital allowance (ICA) of 50% or 100%, depending on the qualifying points score (Babour 2005:23). For points to be awarded, strategic goals and employment creation are assessed (Babour 2005:23). Large investments are allowed a deduction against taxable income for investment in specified industrial assets. Specifically, a minimum investment of R50million, a 50% investment allowance is provided for projects capped at R300million while 100% is granted to projects capped at R600million (Coega 2005). The key objective of SIP is to attract industrial investments in South Africa that will serve to improve the industry and create employment opportunities (Coega 2005). Potential foreign investors can invest in any business sector of their choice without prior approval from the government due to the few or no restrictions on the extent or level of foreign investment.

Foreign Investment Grant

The foreign investment grant (FIG) which was introduced in September 2000, is a cash incentive scheme to foreign investors who invest in new manufacturing businesses in South Africa (Department of Trade and Industry 2007). It was also implemented to assist firms to establish plants in South Africa through the provision of grants to partially offset the costs of importing capital equipment. The FIG provides 15% cost recovery (up to a maximum of R3million per entity) for foreign entrepreneurs to transfer new machinery and equipment to South Africa as part of their invested capital (Department of Trade and Industry 2007).

Motor Industry Development Plan

The MIDP was introduced in 1995 for the automotive industry to stimulate local production and exports in the sector, as well as the reintegration of South Africa into the global economy. The MIDP was based on four critical elements (Flatters 2005) Firstly, a gradual effective reduction in import duties on motor vehicles and components; Secondly, an export-import complementation scheme under which exporters could earn tradable certificates (Import Rebate Credit Certificates) to offset duties on imported motor vehicles and components; Thirdly, access to rebates on imported components by exporters. Fourthly, duty free allowance on imported components of certain value of vehicles produced domestically. Among other reviews, the mid term review of MIDP was undertaken in 2000 and the plan has been extended to 2012 (Barbour 2005:22). The reviews have reduced the speed of tariff reductions and added a new incentive in the form of the Productive Asset Allowance (PAA) (Flatters 2005:14). The PAA aims to reduce the number of vehicle platforms and models locally assembled coupled with increased investment and exports with increased local content. The rationale is to save customers money by using the rebate certificate to offset import duties on vehicle imports (Coega 2005).

The South African MIDP was crafted along the lines of the Australian motor industry development program (Flatters 2005:2). Since the implementation of MIDP, substantial investments have been made in the industry, accompanied by the rapid growth of both exports and imports (Flatters 2005). Vehicle exports increased from very low amounts in 1995/1996 to over 100 000 units per year in 2004 (Flatters 2005). The MIDP has been successful in encouraging considerable investment from most major auto manufacturers: Ford investment in April 2002, Toyota SA in July 2002 and Volvo SA in October 2002 (BusinessMap 2005:33-34)[10].

Moeti (2005: 150) also shows that other measures by the DTI include the FDI scheme (FDIS), the export marketing and investment assistance scheme (EMIA) and the inward investment missions scheme (IIMS) which are aimed at providing financial assistance to exporters so that they partially cover costs incurred in recruiting inward FDI to South Africa.

Minerals Policy

The 1998 Green paper on Mineral Policy in South Africa provides legislation and a structure that is specific to the mining industry to attract FDI. With regards to mining, the Income Tax Act provides for a deduction of capital expenditure for tax purposes. This is specific to a mining location which is known as ring fencing, and a deduction of the provision of environmental funds from income among other benefits (Green

[10] BusinessMap records announcements of intentions not the actual investment

Paper 1998). The rationale for the mining incentives is to lower costs of exploration and mining in South Africa, in order to make the sector competitive internationally thus attracting investors.

Bilateral Agreements

For trade related purposes, South Africa has entered a number of bilateral agreements with other countries. These include bilateral investment and protection agreements (BIPAs) where investors are granted the most favoured nation (MFN) status (Department of Trade and Industry 2007). Babour (2005) shows that South Africa has signed over 30 bilateral investment treaties since 1994.

Exchange control

SARB has gradually removed exchange controls that inhibited movement of goods and capital across countries. Especially from the start of a new political dispensation in 1994, in the following year (1995), SARB abolished the financial rand system. Other exchange control measures included the abolition of exchange control on all current account transactions, non residents and the release of emigrants` blocked funds among others in 1995 (Brand 2002). The 2006 national budget made some relaxations on exchange control particularly with regards to South African outward foreign investment.

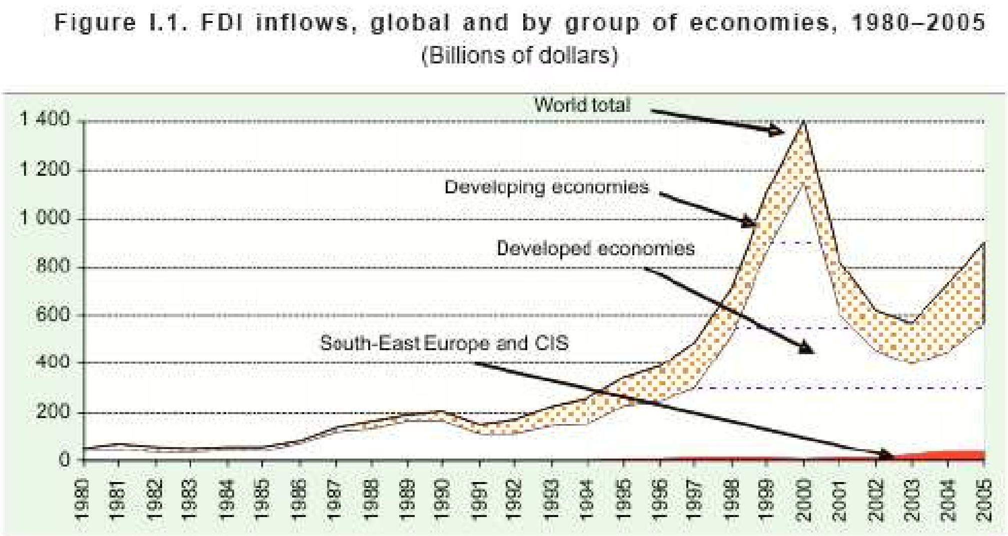
All the FDI related policies aimed to encourage and increase foreign investment to South Africa. Particularly, for the manufacturing sector with a number of initiatives, for instance, the IDZ’s, SIP and FIG to attract manufacturing FDI and increase exports. As evaluated in subsequent sections, very little FDI was received in manufacturing sectors relative to its traditional dominance and to the emerging financial sector.

3.4. OVERVIEW OF FDI FLOWS GLOBALLY AND TO AFRICA

This section largely draws information from various issues of the World Investment reports (WIR). Developed countries have traditionally received the greater share of FDI inflows since the 1980s. This has however been reduced over time, although slowly. According to the WIR (1995:14) during 1982-86 developed countries’ share was 70% whilst 30% was for developing countries. By 1994, the developed countries' share of FDI had been reduced to 60% and developing countries' increasing to 40% and has fluctuated around these ratios.

Globally the years 1991 and 1992 were a period of FDI recession with inflows declining as low as US$115billion and US$111billion respectively. From 1993, FDI inflows increased gradually with more FDI flows to developed and developing countries estimated at around $135billion in 1994 (WIR 1995:43). The growth in FDI was mainly attributed to increased privatisation across regions particularly in SSA. FDI continued to accelerate to $865billion in 1999. From 2001-2003 the FDI trend changed as inflows declined from $853billion in 2001 to about $651billion in 2002 and $635billion in 2003 (WIR 2003 and 2004). Since then, global FDI has increased considerably. In 2004 world FDI inflows increased to $648billion and for 2005 increased to $916billion (WIR 2005 and 2006). This is attributed to a significant increase in flows to developing countries and regions in 2004 as well as increased participation of companies in cross-border mergers and acquisitions. The figure below shows the amounts of FDI received by developing countries, developed countries and the world total.

Figure 3.1: Global FDI inflows



Adapted from UNCTAD (World Investment Report 2006)

The United Kingdom was the largest recipient of FDI in 2005 with $165billion (WIR 2006:1). FDI flows to developing countries have been increasing, particularly in Asia. The WIR (2005:7) noted that inflows to developing countries surged by 40%, to $233 billion in 2004 from $140billion in 2003. East Asia had a 46% increase in inflows, to reach $105 billion. In South-East Asia, FDI surged by 48% to $26 billion, while South Asia, with India at the forefront, received $7 billion, corresponding to a 30% rise. China remained the largest developing country recipient with $61 billion in FDI inflows (WIR 2005). In 2006, the largest recipients were the usual, namely China and Hong Kong, Singapore, Mexico and Brazil in that order (WIR 2006). The growth in FDI for Asia has been attributed to various policy changes at national and regional levels. Free trade agreements were signed by Asian countries particularly with the United States, and the Association of Southeast Asian Nations (ASEAN) and China signed an agreement to establish a free trade area by 2010 (WIR 2005).

3.5 TRENDS IN AFRICAN COUNTRIES

Basu and Srinivasan (2002) explain that the stock of FDI in Africa increased significantly for the period 1980-2000. However, Africa's share of the global stock of FDI has declined from about 5,3% in 1980 to about 2,3% in 2000 (Basu and Srinivasan 2002:4). After the new millennium (year 2000), Africa's share of inward FDI on a global scale has remained relatively low at 3% (WIR 2005 and 2006).

Whilst FDI has been increasing for developing countries in general, Africa's contribution remained at the same level ($18 billion) for 2003 and 2004 (WIR 2005:7). However, for 2005 there was a sharp increase from around $17billion to $31billion, where South Africa was the largest recipient with $6.4billion (WIR 2006). This was attributed mainly to the Barclays Bank (United Kingdom) acquisition of ABSA (South Africa).

The report further noted that inward FDI has mainly been in the natural resources sector, which is perhaps a reflection of high oil and mineral prices contributing to profitability of investment in the primary sector. Angola, Equatorial Guinea, Nigeria, Sudan and Egypt, endowed with abundant natural resources, were the top recipients, accounting for a little less than half of all inflows to Africa. Other forms of FDI have been through several mergers and acquisitions concluded in the mining industry (in 2004) and in the services sector, specifically in the banking sector (WIR 2005 and 2006). The WIR (2006: 45) records that FDI to the manufacturing sector declined in 2005 due to the end of quotas that were established under the Multi-Fibre Arrangement (MFA). In the same vein, countries such as Kenya, Lesotho, Mauritius and Uganda that were receiving FDI in the textile and apparel industry, in part under the African Growth and Opportunity Act (AGOA), also registered declines in their industries (WIR 2006:45).

Basu and Srinivasan (2002:7) provide case study examples of African economies[11] that were successful in attracting substantial amounts of foreign investment. Their analysis indicate that sustained efforts to promote political and macroeconomic stability and implement essential structural reforms have been the key elements contributing to increased foreign direct investment in Africa.

3.6 SOUTH AFRICAN TRENDS

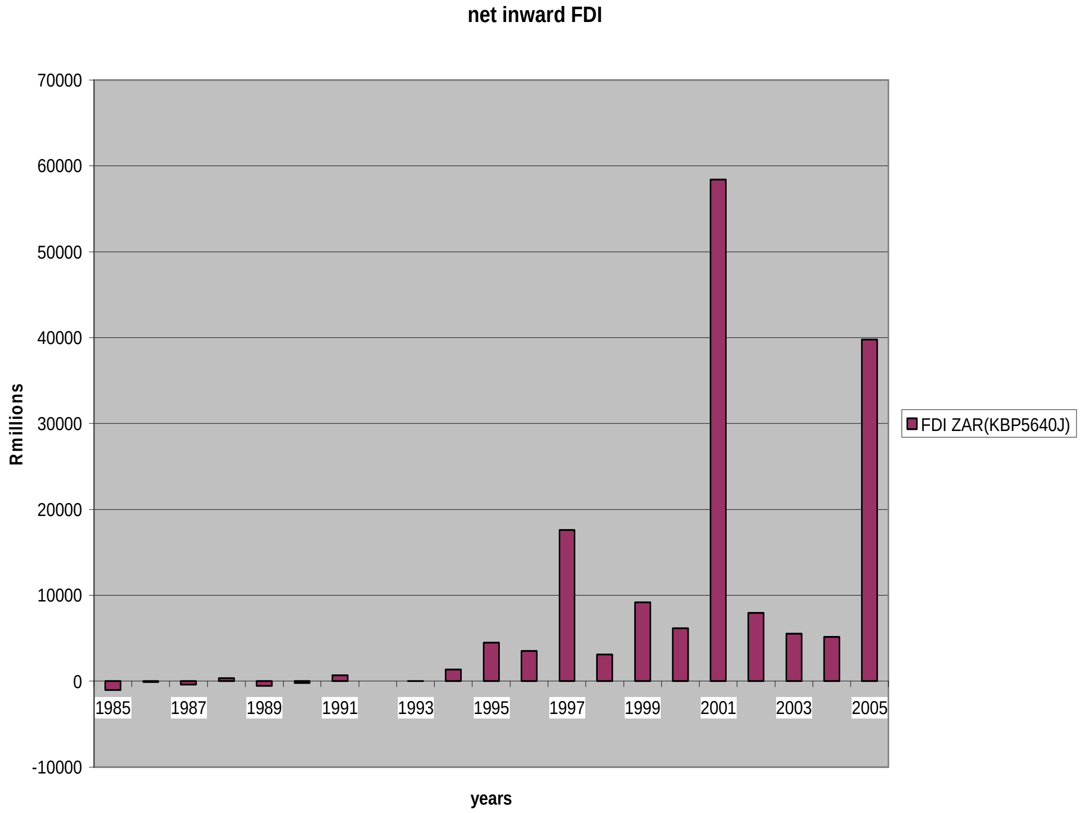
For South Africa, as the country of analysis in this study, a historical background of inward FDI is first provided before the analysis of recent trends. This will also put into context the changes in the type of FDI and sectoral distribution over time.

Gelb and Black (2004) show that, due to the nature of FDI in the 1950s and 1960s, that is, natural resource seeking, the mining sector continued to receive flows of FDI although some flows were in the manufacturing and service sectors. However, by the early 1970s, 40% of the FDI stock was in manufacturing and 25% in financial and business services, with only 15% in mining (Gelb and Black 2004:177).

[11] Botswana, Namibia, Lesotho, Swaziland, Mauritius, Mozambique and Uganda.

3.5.1 Trends of net inward FDI 1985-2005

Figure 3.2: Net inward FDI to South Africa



Source: South African Reserve Bank statistics. (Series KBP5640J)

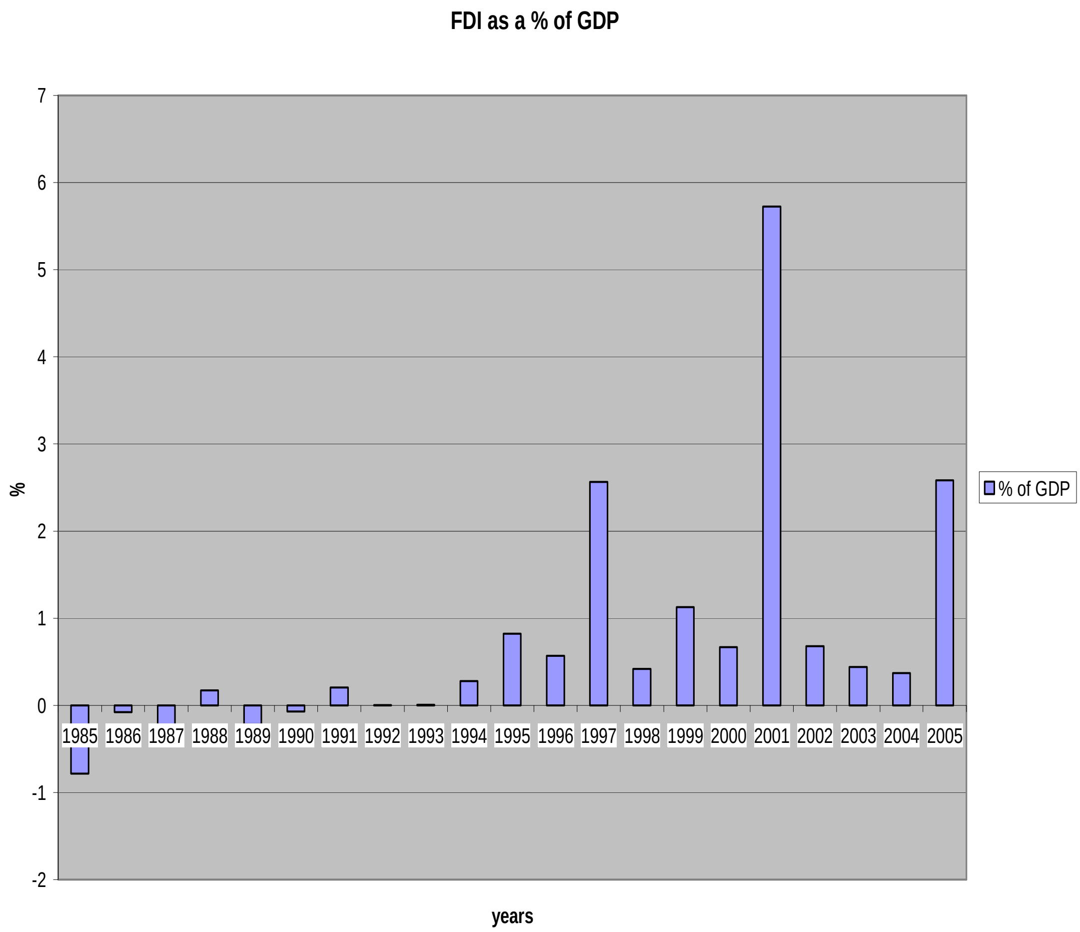
The graphical plot above shows that South Africa received negative or very little inward FDI from 1985 to 1993 which fluctuated below R33 million. This is attributed to the disinvestments of the 1980s, which was in response to the political isolation of the apartheid regime (BusinessMap report 2002:1). Clark and Borgran (2003:340) argued that during the apartheid era, South African economic policies were not conducive to FDI as there was extensive state intervention in the economy. Furthermore, the economic distortions and political unrest in the 1980s had a negative influence on foreign investors. From the mid 1970s through to the 1980s and early 1990s, trade sanctions and investment boycotts were imposed by the world against apartheid South Africa (Clark and Borgran 2003:344). Given that FDI inflow prior to 1994 was very low more attention is devoted here to the period after 1994.

After 1994 there was a gradual increase from around R1.3billion to R3.5billion in 1996. This is perhaps as a result of the political democratization and subsequent openness of the economy. 1997 shows a marked increase in FDI inflow as it increased from R3.5billion to R17.6billion. The large inflow of investment in 1997 is a reflection of foreign participation in the partial privatization of Telkom (Thomas and Leape 2005). There is also a huge increase of 196% in 1999 from R3.104 billion in 1998 to R9.184 billion in 1999.

Another marked increase was in 2001 when FDI inflow increased to a peak of R58.4billion from R6billion. The sale of a strategic stake in Telkom, which was a wholly government owned monopoly until 2001, contributed significantly to FDI in that year. The Thintana consortium paid around $1.2bn for 30% of Telkom (BusinessMap foundation 2005:3). The marked increase is also attributed to the unbundling and delisting of De Beers (Business Map 2002:1). However, the FDI inflow dropped in the following years to R5.1billion in 2004. In 2005 inward FDI increased by 671% to R39.7billion from R5.1billion in 2004. This was a result of a large transaction in the acquisition of ABSA (SA) by Barclays (UK) for R33 billion.

It would appear that FDI has increased over time since the political democratisation process of 1994, but relative to the size of South Africa's economy and other similar developing countries classified as emerging markets, FDI performance is still below expected levels. The FDI seems to be mostly in mergers and acquisitions, not Greenfield investment. Taking into account the size of South Africa's economy, Figure 3.3 below shows the ratio of inward FDI to gross domestic product.

Figure 3.3: Net inward FDI as a ratio of GDP



Source: South African Reserve Bank statistics. (Series KBP5640J and KBP6006J)

Assessing inward FDI as a share of GDP shows that net inflows are very low as they are mostly below 1% of GDP. The exceptional years are 1997 (2.6%), 1999 (1.1%), 2001(being the highest with 5.7%) and 2005 (2.6%). This is not good in comparison with other developing countries which average 3-5% of GDP as illustrated in Table 3.2 below:

Table 3.2 FDI as a percent of GDP: developing countries

	2000	2001	2002	2003	2004
Brazil	5.45	4.42	3.60	2.01	3.01
Chile	6.41	6.13	3.79	5.95	8.00
China	3.20	3.34	3.39	3.26	2.84
Czech Rep	8.95	9.27	11.52	2.23	4.14
Hungary	5.89	7.54	4.59	2.62	4.58
India	0.78	1.14	1.11	0.76	0.77
Malaysia	4.19	0.63	3.36	2.38	3.91
Mexico	2.94	4.45	2.38	1.92	2.54
Poland	5.45	3.00	2.09	1.90	5.00
Thailand	2.74	3.37	0.75	1.36	0.87
South Africa	**0.67**	**5.73**	**0.68**	**0.44**	**0.37**

Source: World Bank, World Development indicators database, April 2006,

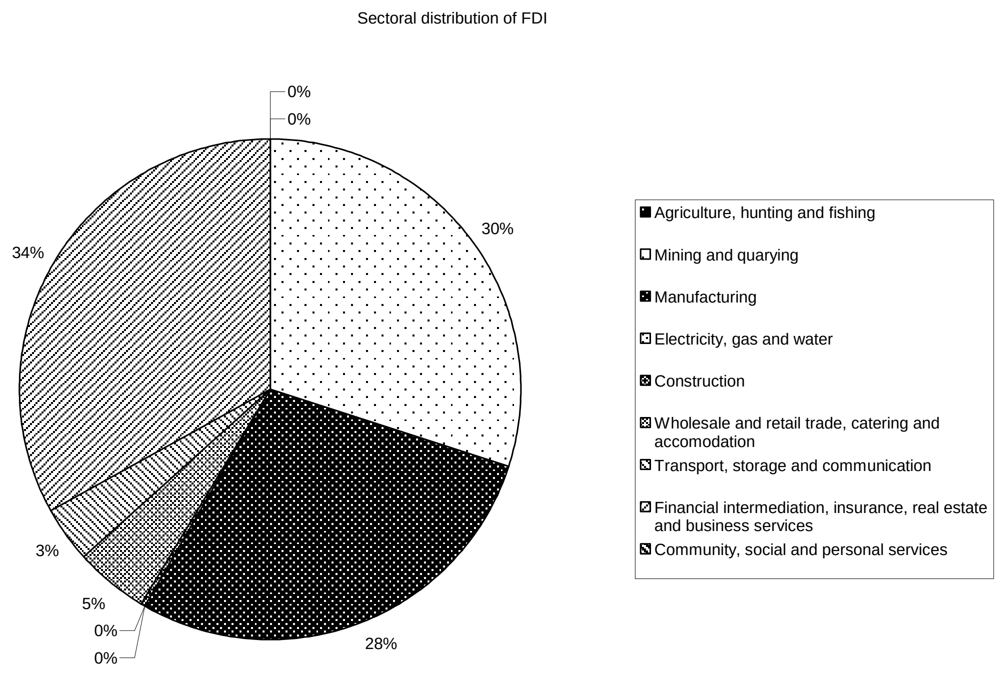
In order to select countries, the criteria and grouping used in UNCTAD (2005) is followed where Chile, Mexico, Malaysia, Czech Republic, Hungary and Poland are upper middle income economies. South Africa, Brazil, China and Thailand are classified as middle income economies and India is the only low income economy. From that respect, only India's FDI-GDP ratio averages less than one percent. For the rest of the other countries, the average is at least three percent. From this analysis it is evident that South Africa's FDI-GDP ratio is very low averaging less than one percent excluding 2001 which is an outlier. This suggests that effort is still needed to attract more foreign investment into South Africa, if the country is to match the levels of other developing countries in its category.

Thomas and Leape (2005:5), citing recent studies of investment in emerging markets, argued that perhaps the presence of a mature domestic corporate sector and a developed financial market in South Africa may be associated with differences in the forms of FDI observed in the country. For instance, in a study to examine the mode of entry of foreign investors in South Africa, Gelb and Black (2004) found out that almost half (45%) represent investments by acquisition as opposed to new greenfield investments or joint ventures. Another study by Estrin and Meyer (2004) came up with similar results. The hypothesis postulated then, is that the existence of a network of existing domestic firms and a developed capital market has facilitated more entry by acquisition in South Africa.

The trend analysis suggests that South Africa receives relatively low levels of FDI. Thomas and Leape (2005) assert that this does not necessarily mean that investment by foreign firms in South Africa is insignificant.

3.7 SECTORAL ANALYSIS OF FDI IN SOUTH AFRICA

Figure 3.4: Sectoral distribution of FDI



Source: SARB quarterly bulletins 1994-2005

An analysis of inward FDI shows that the financial sector is the major recipient of foreign investment, followed by the mining and manufacturing sectors respectively. The financial sector's share is 33 percent followed by mining with 30 percent and manufacturing with 28 percent. Electricity and Community sectors have attracted very little FDI over the past years with each of the percentage shares close to zero. The emergency of the financial sector as an attractive investment sector is mainly due to the political emancipation and subsequent liberalization of the sector, together with confidence by investors. This has resulted in the shift of FDI from the traditional mining and manufacturing sectors. The trend could suggest the possibility of a shift in terms of the motives of FDI from natural resource seeking to market and efficiency seeking FDI.

3.8 SOURCES OF FDI INFLOWS TO SOUTH AFRICA

An analysis of regional sources for the period 1994- 2005 shows that Europe is the largest source of FDI in South Africa, followed by America, Asia, Australia and Africa. Total inward FDI from Europe amounted to R2.3billion accounting for eighty six percent of total inward FDI from all regions. It is followed by America with R235million accounting for nine percent of total inflows and Asia's four percent (R112million). Africa and Australia show very little contribution with one percent (R30million) and less than one percent (R5million) respectively (SARB).

Table 3.3: Regional sources of FDI

Source Region	**Amount (Rmillion)**	**Percentage share**
Europe	2,315,091	86
America	234,510	9
Africa	30,109	1
Australia	5,415	0,002
Asia	111,727	4

Source: SARB quarterly bulletins-1994-2005

The major source of FDI in South Africa from individual countries is mainly the United Kingdom followed by the USA, Germany, Netherlands, Switzerland and Malaysia in that order. FDI from UK has amounted to R1,803 309 million since 1994 which accounts for seventy percent of total FDI inflows from the top ten sources of FDI.

Table 3.4: Top ten FDI sources by country 1994-2005

Source country	**RMillion**	**Percentage share**
UK	1.803,309	70
USA	212,711	8
Germany	197,442	8
Netherlands	104,757	4
Switzerland	73,821	3
Malaysia	52,940	2
France	41,746	2
Other Europe	37,953	1
Japan	35,305	1
Luxemborg	16,106	1
Total	**2.576,090**	**100**

Source: SARB quarterly bulletins-1994-2005

According to BusinessMap (2005:7), Malaysia invested around $2.4bn in South Africa over 10 years (1994-2002) which came through the purchase of Engen by Petronas, and partly from the privatisation of Telkom. The dominance of the EU as a source of investment since the late 1990s emanates from South African MNCs now domiciled in the UK. These include Anglo American, BHP Billiton, Old Mutual and SABMiller. The shift in domicile meant that the firms became the most important foreign investors in South Africa. For other countries, Thomas and Leape (2005) attribute the inflows to periodic large transactions. As argued by Thomas and Leape (2005), the data shows some broadening of investment sources over time with countries like Netherlands, Malaysia and Japan increasing their investment to South Africa.

In summary, it is evident that United Kingdom is the largest source of inward FDI in South Africa which is mainly concentrated in the services and natural resource sectors. More particularly, Barclay's acquisition of ABSA in the financial services sector and the activities of mining companies such as Anglo American and BHP Billiton show evidence of the dominance of UK as the major FDI source. There is also a shift of dominance from the traditional natural resources sector to the financial services sector. This could indicate a paradigm shift in terms of FDI coming to South

Africa. It could also imply that attention to attract more FDI should thus move with the trends and place more focus on the emerging sectors.

3.9 CONCLUSIONS

It is evident in this chapter that since 1994 the economy has witnessed positive economic growth rates. This has also been a result of increased productivity and emergence of other dominating factors apart from the traditional mining and manufacturing sectors. The discussion of FDI related policies has also indicated that South Africa lacks a single coordinated national FDI policy. However it is anticipated that the different sectoral policy initiatives will have a positive impact on FDI to South Africa as opposed to the past. Compared to other sectoral policies, the MIDP has been relatively successful and managed to attract substantial foreign investment hence its continued review over time. Some policies are still to be reviewed to determine their success or failure. Outside the outstanding years of 1997, 2001 and 2005, FDI levels have been very low. The scenario could then suggest that the inflows have not been consistent with the initiatives undertaken. This supports the need to investigate the actual factors that determine FDI to South Africa. This is explored in subsequent chapters.

CHAPTER FOUR: METHODOLOGY AND DATA DESCRIPTION

4.1 INTRODUCTION

This chapter discusses the model specification, variable selection and the estimation methods used in the study. Particularly, model selection criteria and the respective proxies for the variables chosen are motivated. An explanation of the cointegration and VECM framework used for estimating the model is provided. Lastly, the impulse response and variance decomposition analysis employed in the study are explained.

4.3 MODEL SPECIFICATION

4.3.1 Variable selection

From the theoretical and empirical literature in the previous chapters, a number of possible determinants of FDI have been suggested. These include market size, openness, infrastructure quality, exchange rate, skills, labour cost, inflation, financial depth, external debt service and international interest rates. Due to data availability, some of the variables i.e. infrastructure quality, skills and labour cost could not be included in the FDI model for this study. Since annual data is employed in the analysis, all variables cannot be included in a single model due to loss of degrees of freedom that might occur as a result of too many parameters.

To begin with, variables that have been found to be significant in past South African studies are chosen (Fedderke and Romm (2004) and Moolman *et al* (2006)). These are three variables, i.e. market size, exchange rate and openness established in Moolman *et al* (2006). The base model was then extended by adding other variables for which there was data. This exercise yielded three possible models which produced results that were economically meaningful. All variables in the models were expressed in log form. In addition, credit to private sector, foreign debt, exports, imports and government expenditure were expressed as ratios of nominal GDP as commonly employed in the FDI literature.

$$LFDI = f\,(\underset{+}{LRGDP}, \underset{-+}{LNEER}, \underset{-+}{LIMP}, \underset{-+}{LGEXP}, \underset{+}{LCR}, \underset{-+}{LCPI}, DUM1) \qquad (1)$$

Where

LFDI is foreign direct investment liabilities as a ratio of nominal GDP

LRGDP is real gross domestic product

LNEER is nominal effective exchange rate

LIMP represents imports as a ratio of nominal GDP

LGEXP is government expenditure as a ratio of nominal GDP

LCR is credit to private sector as a ratio of nominal GDP

LCPI is consumer price index

DUM1 is a dummy variable where 1975-1992=0 is the base period and 1993-2005=1

The signs (-+) below the variables represent the relationship of each variable with LFDI. Gross domestic product and credit to private sector have a positive relationship with FDI whilst exchange rate, imports, government expenditure and consumer prices could have either a positive or a negative relationship with FDI.

4.2.2 Definitions and analysis of variables

This section provides a discussion of the measurement of variables and their justification in estimating the determinants of FDI to South Africa. In employing measures of determinants of FDI, the aim is to use proxies that have been used in most FDI literature, particularly for South African studies, in order to provide a basis for comparing results obtained. In most FDI estimations, FDI is usually measured as a ratio of nominal GDP (Ahmed et al 2005, Asiedu 2002) or as log of total FDI liabilities (Fedderke and Romm 2004). We follow Asiedu (2002) and Ahmed *et al* (2005) in using FDI as a ratio of nominal GDP.

As earlier reviewed in chapter two, for market size the standard measure of log of real GDP is used. For South Africa, the increase in real GDP captures growth in market size. The nominal effective exchange rate is used to measure the effect of exchange rate on FDI. South Africa uses headline cpi as a standard measure of inflation which is reported by IMF. Consumer price index excluding mortgage and interest costs (cpix) which is a relatively new measure does not capture data for earlier periods. Following Fedderke and Romm (2004), two measures of openness i.e. exports and imports expressed as ratios of nominal GDP are included to assess their impact on

FDI. Financial development is proxied by domestic credit to the private sector. The proportion of public expenditure to GDP is used as a measure of the size of government as it captures government spending and also following Obwona (2001).

4.3 DATA DESCRIPTION

The study employs annual data from 1975-2005. The study starts from 1975 due to lack of data for some of the variables prior to 1975. Annual data is used because FDI is a long term phenomenon which flows infrequently during the course of a year. Furthermore, most of the FDI studies reviewed in chapter two have used annual data. The data for the empirical estimations is sourced from the IMF International Financial Statistics CD ROM and the South African Reserve Bank. From IMF, credit to private sector (line 22d), consumer prices (line 64), government expenditure (line 82), foreign debt (line 89b), exports of goods and services (line 90c.c), imports of goods and services (line 98c.c) and nominal effective exchange rate (line neer) are used. From SARB, real GDP (6006z) and FDI (5550J) are used. Table 4.1 below provides a summary of the variables used in the models.

Table 4.1: Variable names and descriptions

VARIABLE NAME	VARIABLE DESCRIPTION
LCPI	Log of consumer prices
LCR	Log of credit to private sector as a ratio of GDP
LDEBT	Log of foreign debt as a ratio of GDP
LEXPORTS	Log of exports as a ratio of GDP
LFDI	Log of FDI as a ratio of GDP
LGEXP	Log of govt expenditure as a ratio of GDP
LIMP	Log of imports as a ratio of GDP
LNEER	Log of nominal effective exchange rate
LRGDP	Log of real GDP

4.4. ESTIMATION TECHNIQUES

4.4.1 Unit root tests

A preliminary step in regression analysis using time series data is to perform unit root tests to check the characteristics and behaviour of the data. In this study, to examine the time series properties of the data, the Augmented Dickey Fuller (ADF) and the Phillips Perron (PP) tests are employed.

An issue which arises with the ADF and PP tests is the determination of optimal lag length in the dependent variable. The rationale for determining the appropriate lag length is to ensure that there is no serial correlation in the residuals. According to Brooks (2002: 380) using too few lags will not remove all of the autocorrelation and using too many will increase the coefficient standard errors which will have the effect of using up the degrees of freedom from the increase in the number of parameters. To determine lag length, the various information criteria were explored.

4.4.2 Cointegration Analysis

If two series appear to move together over time, it suggests that there exist an equilibrium relationship. According to Harris (1995:52), if two variables that are integrated of order one I(1) and the residuals obtained from regressing Y_t and X_t are I(0) then the two series are cointegrated. Having identified such a cointegrating relationship, then it is possible to analyse and interpret regressions involving non-stationary variables.

In the development of cointegration tests, two types of tests have emerged i.e. residual based tests and maximum likelihood estimation based on VAR system. The former include the two-step Engle-Granger, and the three step Engle and Yoo approach while the latter includes Johansen (1988). The two step Engle-Granger is a single equation based technique which suffers from a number of weaknesses. These include lack of power in unit root tests, simultaneous equation bias and the impossibility of performing hypothesis tests about the actual cointegrating relationships (Brooks 2002:395). Although the Engle and Yoo approach attempts to improve on the Engle-Granger technique, it also suffers the same problem of inability to test the actual hypotheses concerning the cointegrating relationship and is rarely used in empirical studies (Brooks 2002:395).

Consequently, this study employs the Johansen (1988) and Johansen and Juselius (1990) method to test for long run equilibrium relationships in the FDI equations. The advantage of this method is that it permits the identification of all cointegrating vectors within a given set of variables i.e. if there exist multiple cointegrating vectors, as opposed to the Engle-Granger method which does not permit the testing of hypotheses on the cointegrating relationships themselves (Brooks 2002:407). The Johansen procedure also has better asymptotic properties which yield more robust results. After ascertaining the existence of cointegrating relationships, the vector error correction model (VECM) is estimated to test for the short-run dynamics.

The Johansen approach could be summarized in 5 steps

- Test order of integration
- Specifying the VAR(k) order
- Test for cointegration
- Normalisation
- Test of hypothesis/ Diagnostic test

In testing for the order of integration, unit root tests, as earlier explained in this chapter, are used. The idea is to ascertain that the variables or series are integrated of order one I(1) so that the combination of these variables will produce residuals that will be integrated of order zero I(0) indicating existence of a cointegrating relationship. However, it is still possible to include variables of different orders such as I(0) or I(1), as argued by Harris (1995:80). The argument by Harris (1995:80) is that stationary variables, I(0), might play a key role in establishing a long run relationship between non stationary variables, especially if theory suggests that the variables should be included.

The Johansen (1988) and the Johansen and Juselius (1990) procedure uses a maximum likelihood approach. The procedure is specified as follows with a vector autoregressive (VAR) model representation of order k:

$$Y_t = \Pi_1 Y_{t-1} + \Pi_2 Y_{t-2} + ...\Pi_k Y_{t-k} + \varepsilon_t \qquad (2)$$

Where

Y_t is *n x 1* vector of I(1) endogenous variables (FDI and its determinants) in the VAR system

ε_t is a vector of white noise error terms.

The VAR model of equation (2) above is turned into a VECM of the following form:

$$\Delta Y_t = \mu + \Pi_k Y_{t-k} + \sum_{i=1}^{q} \Gamma_i \Delta Y_{t-i} + \mu_t \qquad (3)$$

where q = k - 1, ΔY_t are all I(0), Γ are n x n coefficient matrices which represent the short run coefficients. Π is the matrix whose rank *r* determines the number of cointegrating vectors among the variables. The Johansen test is based on the examination of the Π matrix. If r = 0 then there are no cointegrating vectors. But if Π has a reduced rank (r≤ (n-1)) then it can be decomposed as follows (Harris 1995):

$$\Pi = \alpha\beta \qquad (4)$$

Where α is an *n x r* matrix of error correction or speed of adjustment parameters while β is the long run vector.

In order to choose appropriate lag length for the VAR order, information criteria (IC) is used. The information criteria ensure that residuals are Gaussian. Various IC are available such as Akaike Information criterion (AIC), Schwarz criterion (SC), Hannan Quinn (HQ) and the Final Prediction Error (FPE). Where these provide conflicting results, the one which produces a white noise residual and the most economically interpretable results is chosen.

The Johansen procedure is designed to statistically determine the number of cointegrating vectors *r* in the VAR. In order to determine the number of cointegrating vectors or reduced rank, E-views provide a summary of the reduced rank for five deterministic trend assumptions.[12]

Assumption 1 and 5 are not conventionally used in practice and for this reason focus is on assumptions 2, 3 or 4. In choosing the deterministic trend assumption, assumptions made on unit root tests, i.e. intercept with no trend, are taken into account. Assumption 2 is chosen when none of the series appear to have a trend, Assumption 3, when the series is trending, but the trend is stochastic and Assumption 4 when some of the series are trend stationary which means stationary but non-stochastic (E-views 5 manual).

In cases where deterministic trend assumptions used in unit root tests do not agree, the approach in Seddighi *et al* (2000: 272) is followed in choosing the deterministic trend assumption that produces results that are economically interpretable. To confirm that the cointegrating vectors estimated are truly stationary, a graph of the residuals is plotted. The graph plots residuals from the linear combination of variables. Visual inspection of the graph should show that the residuals are stationary thus confirming the cointegrating relation. Having established the deterministic trend assumptions, the actual Johansen cointegration tests were performed. Johansen (1988) provides two different likelihood ratio tests to determine the value of r. These are the trace test:

$$LR = \mathrm{T}\sum_{ni} = r + 1\ln(1-\lambda_i) \qquad (5)$$

and the maximum Eigenvalue test statistics:

$$LR = \mathrm{T}\ln(1-\lambda_{r+1}) \qquad (6)$$

[12] Assumption 1: the level data Y(t) has no deterministic trends and cointegrating equations do not have intercepts. Assumption 2: the level data Y(t) has no deterministic trends and cointegrating equations have intercepts. Assumption 3: the level data Y(t) has linear trends but the cointegrating equations have only intercepts. Assumption 4: the level data Y(t) and the cointegrating equations have linear trends. Assumption 5: the level data Y(t) have quadratic trends and the cointegrating equations have linear trends (E-views 5 manual).

Where λ_i is the *i-th* largest eigen value of the Π_i matrix in equation (3). Trace statistic is a joint test where the null is that the number of cointegrating vectors is less than or equal to r against an unspecified or general alternative that there are more than r. Maximum eigen value test statistic conducts separate tests on each eigen value, and has its null that the number of cointegrating vectors is r against an alternative of r+1. The null hypothesis is tested sequentially from low to high values of r. The testing procedure ends when a null hypothesis fails to be rejected for the first time. A graphical plot of the cointegrating vector should be stationary if there is a true cointegrating relationship.

The analysis of error correction is based on the examination of all the error correction coefficients for all variables. Since focus is on the first variable i.e. FDI, the coefficient of the error correction terms corresponding to FDI in the cointegrating equation is examined. To check whether ΔY_t is the true cointegrating vector, the focus is on α, which must be negative and significant. When α possesses the above characteristics, the error correction coefficient is regarded as well behaved (Aziakpono 2006b:16). The true cointegrating vector becomes a candidate for normalization.

Thus, if FDI is the variable of interest, its error correction coefficient must be well behaved i.e. negative and significant. To confirm whether FDI is truly endogenous, a weak exogeneity test was performed in the VECM. Weak exogeneity test is a likelihood ratio (LR) test carried out to determine whether a particular variable is exogenous or endogenous. The test has its null hypothesis that the series is weakly exogenous (Harris 1995: 99). In this particular case the null is that FDI is weakly exogenous. This is done by placing a zero restriction on α i.e. α=0 is the $\Pi = \alpha\beta$ and observing the probability value from the restriction. From Harris (1995: 99) weak exogeneity analysis, if the probability value is greater than 10% or 0.1, then the null hypothesis fails to be rejected and FDI cannot serve as an endogenous variable. However, if the probability value is less than 10%, the null hypothesis is rejected and it is possible to conclude that FDI is weakly endogenous. If FDI is found to be weakly endogenous, the result will be consistent with FDI being the true cointegrating vector.

4.5 IMPULSE RESPONSE ANALYSIS

Innovation accounting and impulse response analysis in a VAR framework were pioneered by Sims (1980, 1981) and others as an alternative to classical macro econometric analyses (Lutkepohl 1993:58). Impulse response analyses trace out the responsiveness of the dependent variables in a VAR to shocks from each of the variables (Brooks 2002:341). A unit shock is applied to the error term for each variable in each equation separately and the effects on the VAR system are observed over time (Brooks 2002:341). According to Brooks (2002:341), if the system is stable, the shocks should gradually die away. If the series are not stationary at level, impulse responses are computed from the VECM because the forecast error variances estimates will be consistent and the predictions asymptotically optimal (Aziakpono 2006a: 21).

The generalised impulse response analysis is used in this study. The approach fully takes into account historical patterns of correlations amongst the different shocks (Lutkepohl 1993). Furthermore, Lutkepohl (1993) explains that the technique does not require orthogonalisation of shocks and is invariant to the ordering of the variables in the restricted VAR.

4.6 VARIANCE DECOMPOSITION ANALYSIS

Variance decomposition analysis provides the proportion of movements in the dependent variables that are due to its own shocks, against shocks to other variables (Brooks 2002:342). Brooks (2002:342) points out that variance decomposition determines how much of the *s*-step ahead forecast error variance of a given variable is explained by innovations to each explanatory variable. Empirical research has often shown that own series shocks explain most of the error variance of the series in a VAR (Lutkepohl 1993:59 and Brooks 2002:342).

Brooks (2002:342) suggests that ordering of variables is important in impulse response analysis and variance decompositions which can be solved by using financial theory. Sims (1981) cited in Lutkepohl (1993:59) suggests that the problem can be solved by trying different orderings and analyzing the sensitivity of results when ordering is changed. However, according to Lutkepohl (1993:54), ordering is less of an issue when residuals are not contemporaneously correlated.

4.7 STRUCTURAL STABILITY TEST

The dummy variable is used to take into account possibility of structural breaks in the estimated FDI models. The possible potential breaks could be due to government policy changes or developments in the economy at a particular time period. For the period 1975-1992, a value of zero is assigned. From 1993-2005, a value of 1 is assigned. The rationale is to check if there are differences in FDI inflow after 1993. Graphical plots of the FDI series in Chapter 5 suggests that FDI in South Africa starts to show an upward trend in 1993 explaining the rationale for choosing 1993. Furthermore, 1993, also borders the pre and post apartheid regimes. From this perspective, the value of 1 is assigned from 1993. If the dummy variable is significant in a model, it implies that policy changes in that year had a significant impact on FDI from that year onwards.

4.8 CONCLUSIONS

This chapter explained the variable selection and definitions of the determinants of FDI to South Africa. The estimation method employed in the study i.e. Johansen Cointegration and VECM framework was presented. This was followed by weak exogeneity tests and diagnostic tests. The chapter ends with the discussion of impulse response and variance decomposition analysis. The next chapter deals with the actual estimation of FDI determinants using the above mentioned techniques.

CHAPTER 5: ESTIMATIONS AND ANALYSIS OF RESULTS

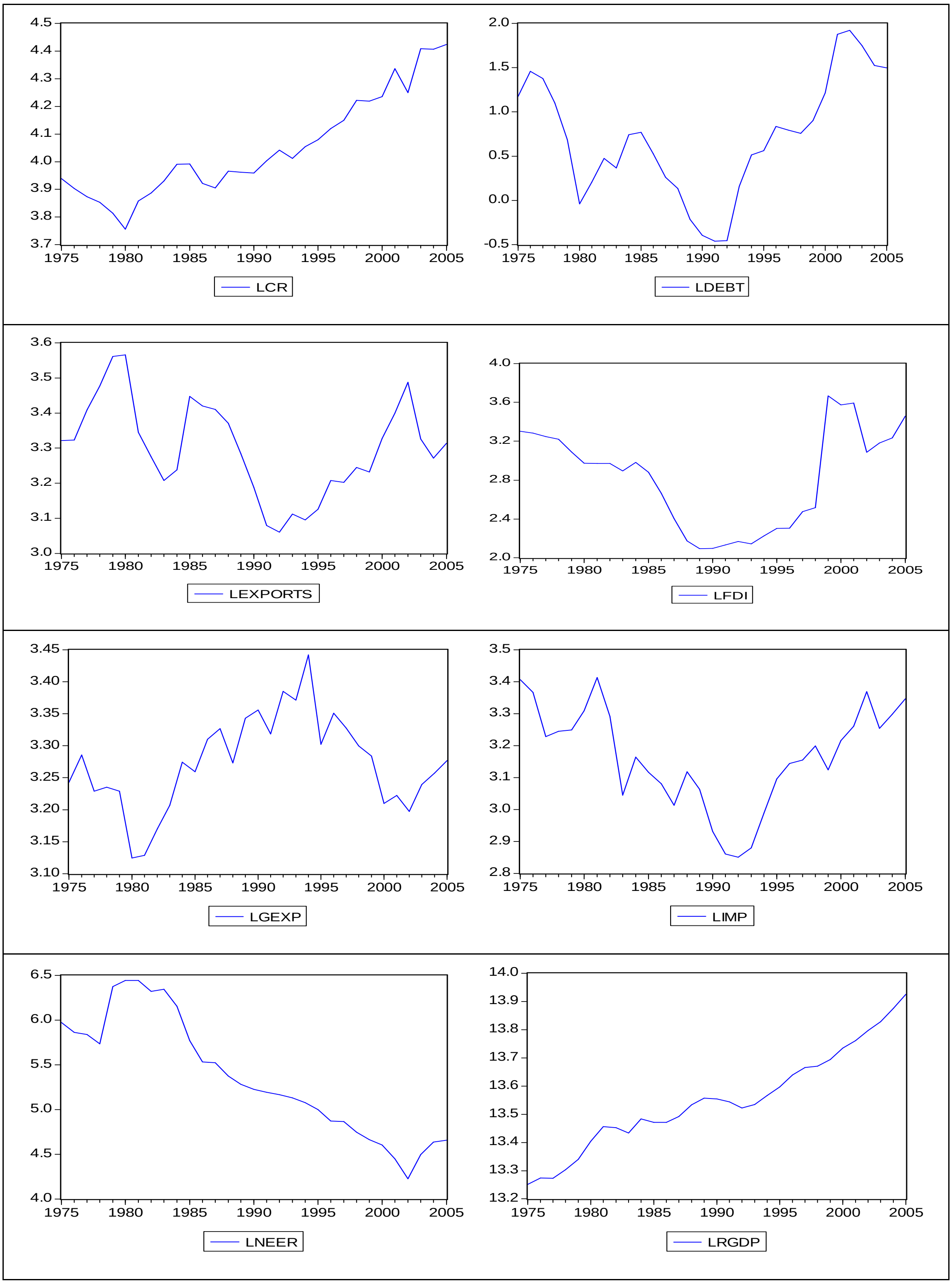
5.1 INTRODUCTION

This chapter presents and discusses the results of the study. The chapter is divided into six sections including the introduction. The second section provides graphical analysis and unit root tests of the series using the Augmented Dickey-Fuller and Phillips-Perron tests. The third section focuses on the cointegration analysis using the Johansen (1988) and Johansen and Juselius (1990) maximum likelihood method. Weak exogeneity tests and diagnostic tests are also discussed in the same section. The long and short run interpretations of FDI determinants are presented in section four. Impulse response and variance decomposition analysis are presented in section five and section six concludes the chapter.

5.2 UNIT ROOT TESTS

A preliminary test for unit root is first carried out using the graphical method. The rationale is to check the properties of time series data. For cointegration purposes, it is required that individual series should have a unit root i.e. non stationary at level. Graphical plots below suggest that four variables i.e. LCR, LRGDP and LCPI seem to be trending upwards while LNEER is trending downwards. LEXPORTS, LDEBT, LGEXP and LIMP do not show a clear trend as they fluctuate over time. The LFDI series seems to be trending downwards until 1993 when it starts to exhibit an upward trend. All of the series seem to be exhibiting a time varying mean and variance suggesting that they are non stationary in levels. Due to the limitations of the graphical method, we proceed to perform formal unit root tests using the Augmented Dickey-Fuller and Phillips Perron tests.

Figure 5.1: Graphical plots



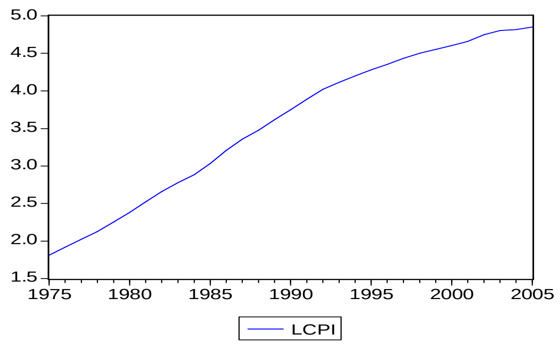


Table 5.1: Summary of Unit root tests

	ADF		PP	
	Level	**Ist diff**	**Level**	**1st diff**
LCR	1.020	-6.746	0.872	-6.749
LDEBT	-1.992	-3.551	-1.381	-3.605
LEXPORTS	-1.762	-3.939	-1.991	-3.734
LGEXP	-2.014	-7.309	-2.057	-7.154
LIMP	-1.805	-5.084	-1.805	-5.094
LCPI	-3.021	-0.124	-3.015	-0.849
LFDI	-1.266	-4.939	-1.443	-4.932
LRGDP	0.870	-3.568	0.652	-3.430
LNEER	-0.620	-4.317	-0.697	-4.319

Critical values for ADF and PP is -2.96 at 5%

The results reported above were carried out with intercept but no trend. Other deterministic trend assumptions were explored but did not yield better results. Under the assumptions of no intercept and trend in all cases and trend and intercept in some of the cases, the test statistics were insignificant, hence only the ones that produced better results were reported. The unit root tests using intercept only suggest that all series are non-stationary in level and become stationary after first differencing. The only exception is LCPI which seem to suggest that it is stationary at level i.e. $I(0)$ series. In line with Harris (1995:80), who suggests that variables integrated of different orders ($I(0)$ and $I(1)$) may be cointegrated, LCPI is therefore included in the model.

5.3 COINTEGRATION ANALYSIS

5.3.1. Model estimation.

Having established that all variables are non stationary in level except for consumer prices, which is stationary in level, the next procedure is to test the existence of long run relationship among the variables in the model. The cointegration test using Johansen test requires the estimation of a VAR equation. The variables i.e. LFDI, LRGDP, LNEER, LIMP, LCR, LGEXP and LCPI are entered as endogenous variables. It was established from the previous chapter that three models are estimated namely:

Model 1: LFDI= f (LRGDP, LNEER, LIMP, LCR)

Model 2: LFDI=f (LRGDP, LNEER, LIMP, LGEXP) and

Model 3: LFDI=f (LRGDP, LNEER, LIMP, LCPI)

In using the Johansen test, there is a need to determine the optimal lag length which eliminates serial correlation in the residuals as well as determining the deterministic trend assumptions for the VAR model.

From the three models, assumption three which was established in unit root tests using intercept only was used in model 1 and 2. Other deterministic assumptions were explored but did not yield interpretable results. For model 3, only assumption four provided economically meaningful cointegrating relationships. However, it did not yield significant error correction terms and well-behaved residuals. Four options were used to estimate each of the three models generating 12 possible models, which are all reported in the appendix. The first option is without a dummy as exogenous variable in the model, the second option is putting a dummy variable in the cointegrating equation, the third option is putting the dummy in the VECM while the fourth option is putting a dummy in both the cointegrating equation and VECM. From these options, dummy variable in both cointegrating equation and VECM was selected in all three models based on the behaviour of the residuals and error correction coefficients.

Various information criteria are used to choose the optimal lag length. In selecting lag length, the major limitation is too many parameters which reduce the degrees of freedom. For all three models, all the information criteria chose lag one as the maximum lag length in the models. After establishing one cointegrating vector, the behaviour of the error correction coefficient of the first variable (LFDI) in relation to other variables was observed. The error correction coefficient was found to be the highest, negative, significant and produced serially uncorrelated residuals.

5.3.2 Summary of cointegration assumptions

Table 5.2: Cointegration summary

	1	**2**	**3**	**4**	**5**
Data Trend:	None	None	Linear	Linear	Quadratic
Test Type	No Intercept No Trend	Intercept No Trend	Intercept No Trend	Intercept Trend	Intercept Trend
Model 1					
Trace	1	1	1	1	1
Max-Eig	1	1	1	1	1
Model 2					
Trace	1	1	1	0	1
Max-Eig	1	1	1	0	0
Model 3					
Trace	2	2	0	1	1
Max-Eig	2	2	0	1	1

Table 5.2 provides a summary of cointegration test for the three models. The results show that all assumptions produce one cointegrating vector in model 1, whilst all assumptions except assumption four show one cointegrating vector for model 2. In model 3, assumptions 1 and 2 produce two cointegrating vectors, whilst assumption three produces none and assumptions four and five produce one cointegrating vector. As argued in Chapter four, assumptions 1 and 5 are rarely used, and therefore are not explored. The unit root tests established assumption 3 and the graphical patterns showed that the data did not have a particular trend which favours the use of assumption 3. However assumption 4 in model 1 was also explored but did not yield significant error correction terms in FDI. The error correction terms using assumption 3 were found to be well behaved in both model 1 and 2. From the cointegration summary, it is evident that assumption three did not yield a cointegrating relationship in model 3, hence assumption four is used.

The VECM results are reported below together with short and long run terms as well as diagnostic tests to assess the behaviour of residuals. The first panel of the Johansen cointegration test reports the trace statistic and the maximum eigen value test statistic. In all the models, the trace and maximum eigen value tests suggest that there is one cointegrating vector using assumption three for model 1 and 2 as well as assumption four for model 3. Having identified a cointegrating vector, there is also need to determine the true cointegrating vector for the purpose of normalisation. To this end the next procedure is to estimate the vector error correction models.

Table 5.3: Results of estimations

Regression number	(1)	(2)	(3)
PANEL 1			
Cointegrating vectors Trace Max	 1 1	 1 1	 1 1
Lag length	1	1	1
Assumption	3	3	4
PANEL 2			
Long run terms			
LFDI	1	1	1
constant	3.81	2.27	-9163.32
LNEER	0.07 (0.29)	0.55 (2.01) **	-39.04 (-3.29) ***
LRGDP	1.34 (1.34)	0.35 (0.35)	669.47 (4.13) ***
LCPI			154.88 (5.33) ***
LGEXP		1.16 (0.55)	
LIMP	-4.43 (-8.08) ***	-5.24 (-5.87) ***	88.79 (2.99) **
LCR	-2.77 (-2.16) **		
PANEL 3			
α	-0.31 (-2.41) **	-0.24 (-2.11) **	0.01 (1.30)
Weak exogeneity	6.36 [0.01]	4.77 [0.03]	1.54 [0.21]
Short run terms			
LRGDP	-7.60 (-1.90) *	-7.78 (-1.82) *	-10.20 (-1.88)
DUM1	0.00 (0.00)	0.05 (0.38)	0.06 (0.27)
Diagnostics			
Heteroscedasticity	169.34 [0.91]	190.52 [0.58]	185.66 [0.67]
Serial correlation	33.18 [0.13]	35.18 [0.09]	26.05 [0.41]

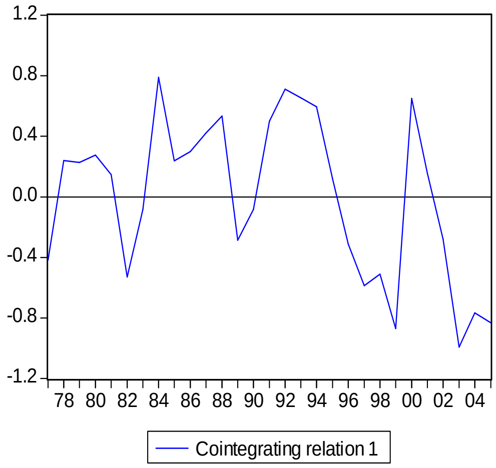
Normality test	39.29 [0.00]	33.07 [0.00]	32.63 [0.00]

Notes: figures in parenthesis, ( ) are t-values, [ ] are p-values. ***, **and * indicate significance levels at 1%, 5% and 10% respectively.

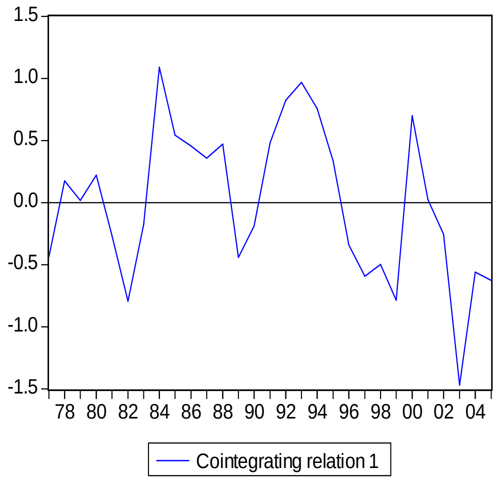
In the VECM, in order to check the true cointegrating relationship, the analysis is based on the α coefficient, which must be well behaved i.e. negative and significant. Since the aim is to model FDI, the parameter of FDI in relation to others is observed. Observing the error correction term, α, results show that the error correction coefficient for FDI is negative and significant in models 1 and 2 with high t-values of 2.41 and 2.11 respectively, which suggest that LFDI equation is the true cointegrating relationship in the vector. For model 3, the error correction coefficient for LFDI is not significant suggesting that there is no adjustment to equilibrium. Therefore no valid interpretations can be made for the short and long run terms estimated in the model. This is further confirmed by the following cointegration graphs which appear to be stationary for model 1 and 2 and non stationary for model 3.

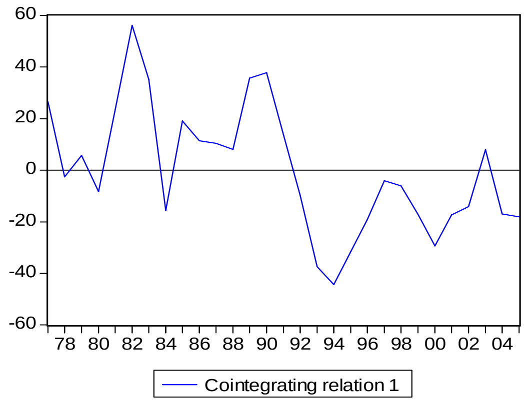
Figure 5.2: Cointegration Graphs

Model 1



Model 2





Subsequently, the endogeneity of FDI was further explored by carrying out the weak exogeneity test. The null hypothesis that FDI is weakly exogenous is tested by placing a zero restriction on the α coefficient of FDI. The null hypothesis is rejected in both models 1 and 2 at a 1% and 3% level of significance respectively. This shows that FDI is truly endogenous which confirms that FDI is indeed the true dependent variable in the models. For model 3, the weak exogeneity test shows that LFDI is weakly exogenous as the null hypothesis was only rejected at 21%. In this model, FDI was not the true cointegrating relationship. The explanatory variables in the models were also tested to check whether they are weakly exogenous and the results are reported in Table 5. 4 below:

Table 5.4: Weak exogeneity results

VARIABLE	**Chi square, probability values and t values** ([ ])					
	MODEL 1	ECM	MODEL 2	ECM	MODEL 3	ECM
LRGDP	2.31 [0.13]	0.01 (1.39)	3.35 [0.07]	0.01 (1.75)	10.30 [0.00]	-0.00 (-3.45)
LNEER	1.61 [0.20]	-0.11 (-1.17)	1.61 [0.20]	-0.12 (-1.36)	0.00 [0.97]	0.00 (0.04)
LIMP	12.63 [0.00]	0.16 (5.07)	15.49 [0.00]	0.15 (6.37)	18.51 [0.00]	-0.01 (-7.38)
LCR	0.72 [0.40]	0.02 (0.91)				
LGEXP			0.04 [0.85]	-0.00 (-0.20)		
LCPI					3.43 [0.06]	-0.00 (-1.74)

The weak exogeneity tests in Table 5.4 above suggest that LNEER, LCR and LGEXP are exogenous as the null hypothesis fails to be rejected in all cases and the error correction coefficients are not significant. LIMP and LCPI are found to be endogenous variables. This is confirmed in the VECM of model 3 as the t values of the error correction coefficients for LIMP (-7.38) and LCPI (-1.74) are both negative and significant although very small in magnitude. LRGDP is exogenous in model 1 and endogenous in models 2 and 3. In model 2 the error correction coefficient in relation to LRGDP is wrongly signed and insignificant whilst in model 3 it is negative and significant although very small in magnitude.

5.3.3 Diagnostic Checks

Diagnostic tests were performed on the residuals. This is to ensure that the residuals are well behaved. If residuals are serially correlated and have non constant error variance, it may indicate that the model is not efficient and as such the parameters estimated could be biased (E-views 5 Manual: 577-579). As reported in panel 3 of Table 5.3, three tests were explored namely, heteroscedasticity, serial correlation, and normality tests. For Serial correlation test, the Autocorrelation LM test is used, which is a test on the residuals and has a null hypothesis that there is no serial correlation. The results show that the null hypothesis of no serial correlation fails to be rejected as the probabilities are very high. Heteroscedasticity test was carried out using White Heteroscedasticity test with no cross terms. This has a null hypothesis of constant variance i.e. residuals are homoscedastic (E-views 5 manual: 579). The results fail to reject the null hypothesis as the probabilities in all three regressions are high. This shows that the residuals are well behaved.

The last diagnostic test is a normality test using the Jarque-Bera test which has a null hypothesis that the residuals are normally distributed. In all the cases, results show that the null hypothesis is rejected at 1% level and conclude that residuals are not normally distributed. However non-normality in the residuals is not a problem as argued by Harris (1995:83). The argument is that non-normally distributed residual are less of a problem if some of the variables are weakly exogenous such as LNEER, LCR and LGEXP in the estimated FDI models.

5.4 LONG RUN TERMS

The long run parameters in the models are reported in panel 2 of Table 5.3. Exchange rate has a negative long run relationship with FDI in the model. The t-value, 2.01 in model 2, is significant at 5%. The result is plausible since an exchange rate decrease, meaning appreciation in the exchange rate, may result in increase in FDI. The rationale is that a strong currency translates local currency profits into larger foreign currency profits i.e. a decrease of one percent in the exchange rate will result in 0,6% increase in FDI. The result is also in line with a similar result and argument by Moolman *et al* (2006) that a strong currency translates local currency profits into larger foreign currency profits.

Imports have a positive long run relationship with FDI which is shown by the high and significant t-values in the regressions. The implication of the result is that a one percent increase in imports will result in four times as much increase in FDI in model 1 and five times as much increase in FDI in model 2. The result is in conflict with Fedderke and Romm (2004) who found a negative relationship between imports and FDI. However, their FDI estimation was only up to 1997 and since then the direction of the relationship could have changed. From the trend analysis of South African data, it appears that the positive relationship between imports and FDI could be as a result of increased openness, increased trade, a change in the nature of imports and the growing economy which encourages FDI. Furthermore, evidence from earlier graphical plots suggests that both FDI and imports have increased in recent years.

Credit to private sector shows a positive relationship with FDI which is significant at 5 percent level. The relationship is consistent with economic theory. Recall that credit is used as a measure of financial development in the economy. The more credit that is provided, the more developed the economy would be. In this case a more developed financial sector would imply ease of transactions in the financial system which would attract FDI, thus the positive relationship.

Market size, which is measured by LRGDP, is negatively related to FDI and insignificant in models 1 and 2 but significant in model 3. The insignificance of market size as a long run determinant of FDI could suggest a possible shift in FDI motives from market seeking to efficiency seeking. The significant coefficient in model 3 should be interpreted with caution since the error correction coefficient in relation to FDI was found to be insignificant and exogenous.

In model 3, inflation which is a measure of macroeconomic stability is found to be significant and negatively related to FDI. The result implies that the lower the inflation rate indicating a stable macroeconomic environment, the more FDI will flow to South Africa. In the same model, government expenditure is found to be negatively related to FDI although insignificant. This indicates that the lower the size of government the more FDI is likely to flow to South Africa. However, both findings are interpreted with caution since the error correction term for FDI was found to be insignificant.

5.4.2 Speed of adjustment and Short run terms

The speed of adjustment coefficient is correctly signed and significant in both model 1 and 2. Following short run disequilibrium in FDI, error correction coefficients show that the average adjustment is 31% in model 1 and 24% in model 2 within a year. However, model 3 shows that the speed of adjustment coefficient is wrongly signed and insignificant. The result implies that there is no adjustment to equilibrium. LFDI may not be the true cointegrating equation in model 3.

In all the models, the lag of LRGDP is found to be a significant determinant of FDI in the short run with a t-value of -1.90 in model 1, -1.82 in model 2 and -1.88 in model 3. The coefficient shows that current FDI can increase by 7.6% if LRGDP is reduced by 1% in model 1, whilst in model 2 FDI can increase by 7.8% if LRGDP is reduced by 1% and in model 3, FDI can increase by 10% if LRGDP is reduced by 1% in the short run. This suggests that the importance of GDP could have declined over time. Given that earlier trend analysis seem to suggest that FDI to South Africa could have shifted from market seeking to efficiency seeking, the market size variable could be losing its importance.

The dummy variable, which has been included to take into account the possibility of a structural break in the FDI model, was found to be insignificant in all the three models. This indicates that during the sample period, there were no significant structural breaks in the data. Although, the dummy variable used could be insignificant, the dummy variable approach itself made a contribution in arriving at cointegrating relationships in the models. Hence models that included a dummy variable were chosen over those excluding the dummy.

5.5.1. IMPULSE RESPONSE ANALYSIS

The impulse response results are reported in *Appendix 5.1.* The focus is on the responses of FDI to shocks in its determinants since the study investigates the determinants of FDI. Most of the impulse response analysis results have the correct signs and confirm some of the findings from the short run analysis. In the models, a one period standard deviation shock on FDI produces a large positive impact on itself which is persistent over time. The large and positive impact of FDI on itself is consistent with the agglomeration effect. The agglomeration effect asserts that current and future FDI is influenced by past FDI (Ahmed *et al* 2005). Innovations to exchange rate show a positive impact on FDI which is very small but continues to be persistent. The sign, however, is different from the findings on long run parameters. Either sign could apply on exchange rate and FDI relationship since there is no consensus on the correct sign. It may depend on which sign has a larger impact at a particular point in time. Consistent with long run results on FDI and imports, innovations to imports show a positive impact on FDI in both models but do not die off.

For LRGDP, a one period standard deviation shock on LRGDP starts with a negative impact which changes to a positive impact in the fourth year as it works itself through the system. A shock on credit has a positive impact on FDI but does not die off.

Innovations on LGEXP show a negative impact on FDI which is persistent. The sign of LGEXP is consistent with earlier VECM findings on the relationship of FDI and LGEXP. The impulse response analysis confirms the earlier signs for most of the variables estimated in the models. Similar studies on FDI determinants for South Africa have not utilized the impulse response and variance decomposition analysis and as such cannot compare results of this study with other South African studies.

5.5.2. VARIANCE DECOMPOSITION ANALYSIS

This analysis provides a mechanism of assessing the relative importance of shocks to each of the determinants of FDI in explaining its variations. As with the impulse response analysis, only the results of changes in FDI following shocks to itself or its determinants are discussed. The results of variance decomposition for the models are presented in Table A5.2 in the appendix.

In the first model, 85% of the variation in FDI is explained by itself after ten years. This is consistent with impulse response results. The determinants together account for almost 15% of the error variance, where LIMP explains a significant 9%. The other variables each explain very little of the forecast error variance, LRGDP explain 2%, LCR explain 2% and LNEER explain 1.5% of the forecast error variance of FDI after ten years.

In model 2, LFDI explains a similar proportion (84%) of the error variance of itself. The rest of the other variables then account for the remaining 16%. The LIMP variable contributes a significant 10% of the variation in LFDI which is similar to the first model. The contribution of LNEER increased to 3% of the variation in FDI in the second model. The variation of LFDI explained by the error variance of LRGDP 1.3% and LGEXP 1.6% is low relative to other determinants.

Variance decomposition analysis has revealed that while market size (LRGDP) is a significant short run determinant of FDI, its importance is declining. This is shown by the low proportions explaining FDI. The results show that imports and exchange rate are still important and their influence could be increasing, as shown by their contributions in explaining FDI relative to market size variable, credit and government size. The variance decomposition analysis has also shown that imports and exchange rate, in that order, are ranked highest in influencing FDI whilst market size, credit and government size are lower ranked.

5.6 CONCLUSIONS

The chapter analysed the determinants of FDI to South Africa using the Johansen cointegration and vector error correction modeling framework. Graphical analysis and unit root tests showed that most of the series were non stationary in level but become stationary after a first difference. Proceeding with cointegration, one cointegrating vector in each of the three FDI models was established. Applying the VECM, short and long run determinants of FDI to South Africa were evaluated. Weak exogeneity tests confirmed the endogeneity of FDI. Diagnostic tests indicated that residuals are well behaved.

LCR, LIMP and LNEER emerged as significant long run determinants of FDI to South Africa whilst the lag of LRGDP plays a significant role in the short run. Most of the impulse response analysis results had the correct signs and confirmed cointegration findings. Most shocks, however, are persistent. Variance decompositions results showed that FDI itself explain most of the forecast error variance whilst LRGDP explain very little of the proportions of variation in FDI.

CHAPTER SIX: CONCLUSIONS

6.1 SUMMARY OF FINDINGS

This study set out to investigate the trends and determinants of inward FDI to South Africa from 1975-2005 using annual data. Theoretical and empirical literature was reviewed. In this endeavour, four classes of theories were discussed i.e. market imperfections, internalisation, product cycle and eclectic theories. The theoretical review identified a number of factors important in attracting FDI by host countries and firm specific characteristics as multinational companies seek expansion beyond national borders. Understanding the specific ownership, internalization and locational advantages of multinational companies helps to comprehend the behaviour of MNCs as countries seek to attract the right kind of FDI (Narula and Dunning 2000). The theory identified economic growth rates, skills, labour cost, market size, openness, infrastructure, exchange rate and international interest rates as major determinants of FDI. Other broad factors have included national policy frameworks and government incentive policies (Loots 2000).

Empirical studies have classified determinants of FDI into different classes i.e. supply side and demand side (Tsai 1991), traditional and non traditional (Nunnekamp 2002) and push and pull literature (Ahmed *et al* 2005). Empirical reviews suggested that the importance of each of the factors identified in theory differs across regions, countries and over time.

Broad macroeconomic reforms were undertaken after 1994 primarily to stimulate economic growth in the economy. As the economy grew, it diversified into other sectors from the traditional commodities sectors to the dominance of the services sectors. Among the economic policies were GEAR and the relatively new ASGISA launched to raise economic growth and to ensure a stable macroeconomic environment. In this endeavour, FDI would be actively pursued. SIP, FIG and the MIDP were among some of the policy initiatives to attract FDI to South Africa. The MIDP has been relatively successful compared to other sectoral policies as it has managed to attract substantial foreign investment, and also evidenced by its continued extensions over time.

Historical trend analysis was used to assess the distribution of FDI over time in South Africa. In a broader context, FDI to developing countries has been increasing. However, Africa as a region has received mixed fortunes. For countries such as Sudan, Egypt, Angola, Equatorial Guinea and Nigeria, endowed with natural resources, their FDI has been mainly in natural resources. Other forms of FDI have also been through mergers and acquisitions in the mining and services sectors.

Although it would appear that FDI to South Africa has increased over time, relative to its size and other similar emerging markets, FDI inflow is still below expected levels. Only a few years were exceptional i.e. 1997, 2001 and 2005. From the FDI inflows, the financial sector has been the major recipient followed by mining and manufacturing sectors. The major sources of FDI have been Europe dominated by United Kingdom followed by the USA and Germany.

Using the Johansen Cointegration and VECM framework, three FDI models were estimated. The variables used are: financial development, market size, openness, exchange rate, government size and inflation, where they emerge as long run determinants of FDI to South Africa. Increased openness and financial development attract FDI while depreciation in the exchange rate deters FDI to South Africa. The lag of LRGDP is the short run determinant of FDI. Most of the impulse response analysis confirmed the VECM findings. Variance decomposition analysis showed that FDI itself and imports explain a significant amount of the forecast error variance of FDI.

6.2 POLICY IMPLICATIONS AND RECOMMENDATIONS

Sectoral analysis indicated that the financial sector is now the major recipient of FDI to South Africa. The emergence of the financial sector as a dominant recipient of FDI suggests that FDI could no longer be resource seeking in South Africa i.e. targeting the traditional mining sector. The change also suggests the possibility of a shift in FDI motives from natural resource seeking and market seeking FDI to more efficiency seeking FDI. This is also confirmed by the increased role of the services sector in FDI where FDI has mainly been in the form of mergers and acquisitions as opposed to Greenfield investment. The scenario also identifies the uniqueness of South Africa relative to other developing and/or African countries still receiving their FDI in natural resource sectors. FDI policy for the financial and services sectors would then need to target the efficiency seeking FDI. It is also important for FDI policy to encourage the inflow of FDI in other sectors such as manufacturing to diversify and increase total inflows. This could entail the increase of incentives such as tax concessions and easier regulatory procedures to potential foreign investors for value adding FDI.

Although a number of multinational companies pulled out of South Africa toward the beginning of the democratization process and are now domiciled in their home country (UK), the United Kingdom is still the major source of FDI. The implication is that South Africa still needs to maintain strong bilateral relations with UK for FDI to continue to flow. From a different perspective, apart from consolidating FDI from UK there is also need to broaden sources of FDI taking into account countries like Japan, the Netherlands and others who still have smaller proportions of FDI to South Africa but have emerged on international scene as huge foreign investors.

Empirical results confirmed past South African studies (Fedderke and Romm 2004 and Moolman *et al* 2006) on two variables in our models i.e. openness and exchange rate. Apart from these, financial development emerges as an important determinant of FDI to South Africa. The implication of the results is that South Africa needs to continue to open up its economy as it trades with other countries. This could come in the form of relaxation of exchange control regulations and fewer regulatory requirements for foreign investors when registering a company in South Africa.

6.3 LIMITATIONS OF THE STUDY AND AREAS FOR FURTHER RESEARCH

The major limitation of most empirical studies is related to data limitations. Variables such as skills and infrastructure which have been found to be important determinants of FDI in other empirical studies for developing countries were not included in the estimations because of data constraints. Due to the change in FDI motives, multinational companies may no longer seek cheap labour but skilled labour as they make investment decisions in host countries which provides a strong argument for the inclusion of availability of skills as a determinant of FDI.

Although other FDI studies have used annual data in empirical estimations, the major limitation is that not too many variables can be included in such a model due to the small sample size problem. Inclusion of many variables will lead to loss of degrees of freedom hence a researcher may be unable to estimate a model with too many variables. The potential weakness of decomposing the model to three models is that the research does not provide a single model with all the important determinants of FDI. Quarterly data could be more appropriate and could perhaps give better indicators of the important determinants in FDI estimations since it is more frequent, and most variables are computed at quarterly intervals. However, the FDI series itself was not available quarterly, hence resorted to the use of annual data.

From the trend analysis it was shown that FDI to South Africa has largely shifted from the mining and manufacturing sectors to services sectors. The study did not investigate whether FDI to the traditional sectors had indeed decreased but only showed increases to the service sectors. As efforts are made to attract FDI, further research can focus on determining the right type of FDI that South Africa needs. It could be in the form of Greenfield investments or the recent trends in mergers and acquisitions, so that FDI policy can be tailored to suit the requirements. For empirical studies, the proposal from this study is that further research can attempt to utilise quarterly data to find out whether results will change from the ones obtained from annual data.

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APPENDIX

A2.1: Summary of empirical studies

Author	**Method**	**Variables**	**Proxy**	**Sign and / or significance**
Moolman *et al (*2006*)* **South Africa**	Single equation residual based estimation: supply side macro modeling context.	Openness Infrastructure Market size Exchange rate Dummy for sanctions	Not provided Not provided GDP Nominal Rand/$ exchange rate	Positive and significant Positive and significant Positive and significant Positive and significant
Fedderke and Romm (2004) **South Africa**	Cointegration and VECM framework	Market size Corporate tax Wage costs Openness Property rights Political stability	Log of real GDP Corporate tax rate Log of the average wage rate Exports + imports as a percent of GDP Log of political rights index Log of political instability	Positive and significant Negative and significant Negative and significant Positive and significant Positive and significant Positive and significant
Ahmed *et al* (2005) **Developing countries**	OLS and GMM techniques; Panel regressions 81 countries	Growth prospects Openness Infrastructure Institutional quality International interest rates Exchange rate volatility	Lagged GDP *per capita* Ratio of imports and exports to GDP Number of telephone lines per 1000pp An index of law and order Real short and long term US rates Annual standard deviation of monthly	Positive and significant Positive and significant Positive and significant Positive and significant Negative Negative

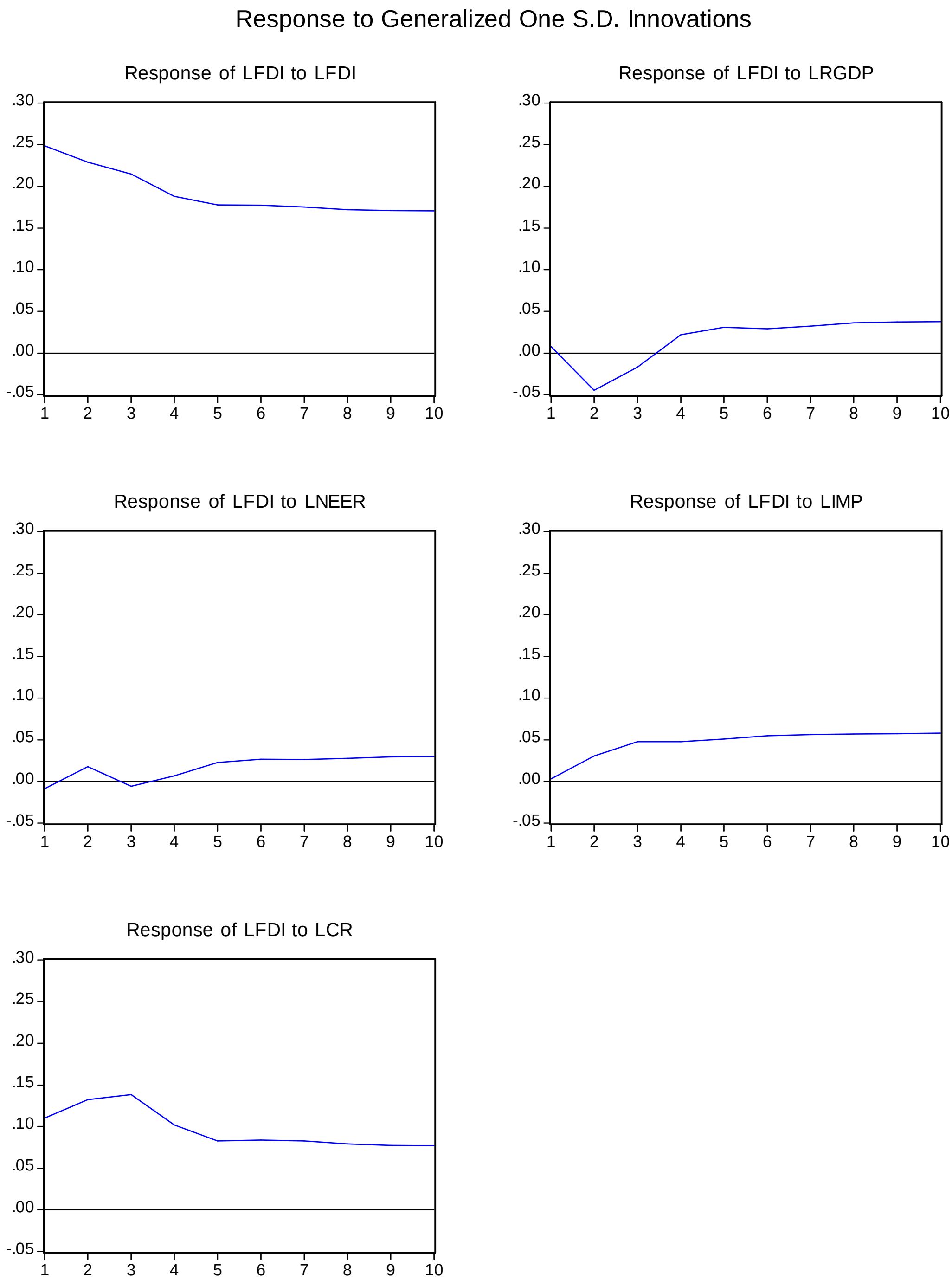
			changes in the real effective exchange rate	
Nunnekamp (2002) **Developing countries**	Correlation analysis	Market size Openness Skills availability	Population Ratio of exports plus imports to GDP Average of years of schooling	Positive and significant Positive Positive and significant
Tsai (1991) **Taiwan**	OLS in log form.	Domestic market size Incentive policies Labourcost	Annual change in GDP Dummy variable Dummy variable	Positive and insignificant Positive and insignificant Negative and insignificant
Asiedu (2004) **African countries**	OLS. Cross country and panel regressions for 71 developing countries.	Return on investment Infrastructure quality Openness Political instability Other economic variables	Inverse of real GDP *per capita* Number of telephone lines per 1000pp Ratio of imports plus exports to GDP Average number of assassinations and revolutions Financial depth, size of government and inflation	Positive and significant Positive and significant Positive and significant Negative and insignificant Not significant
Loots (2000) **Developing countries**	Matrix approach	Macro determinants National policy frameworks Business facilitation	Market size, economic growth, skills and openness Policy measures on entry, market structure, trade and tax policies, etc. Promotion efforts, investment incentives and corruption reduction	Very important Necessary Not necessary
Obwona (2001)	Econometric tests	Economic growth	Growth rate of GDP	Positive and significant

Uganda		Trade balance Inflation Government size Savings rate Market size External debt service	Exports plus imports as a ratio of GDP Inflation rate Ratio of public expenditure to GDP Domestic savings rate GDP External debt service as a ratio of GDP	Positive and significant Negative and Insignificant Negative and Insignificant Positive and Insignificant Positive and significant Insignificant

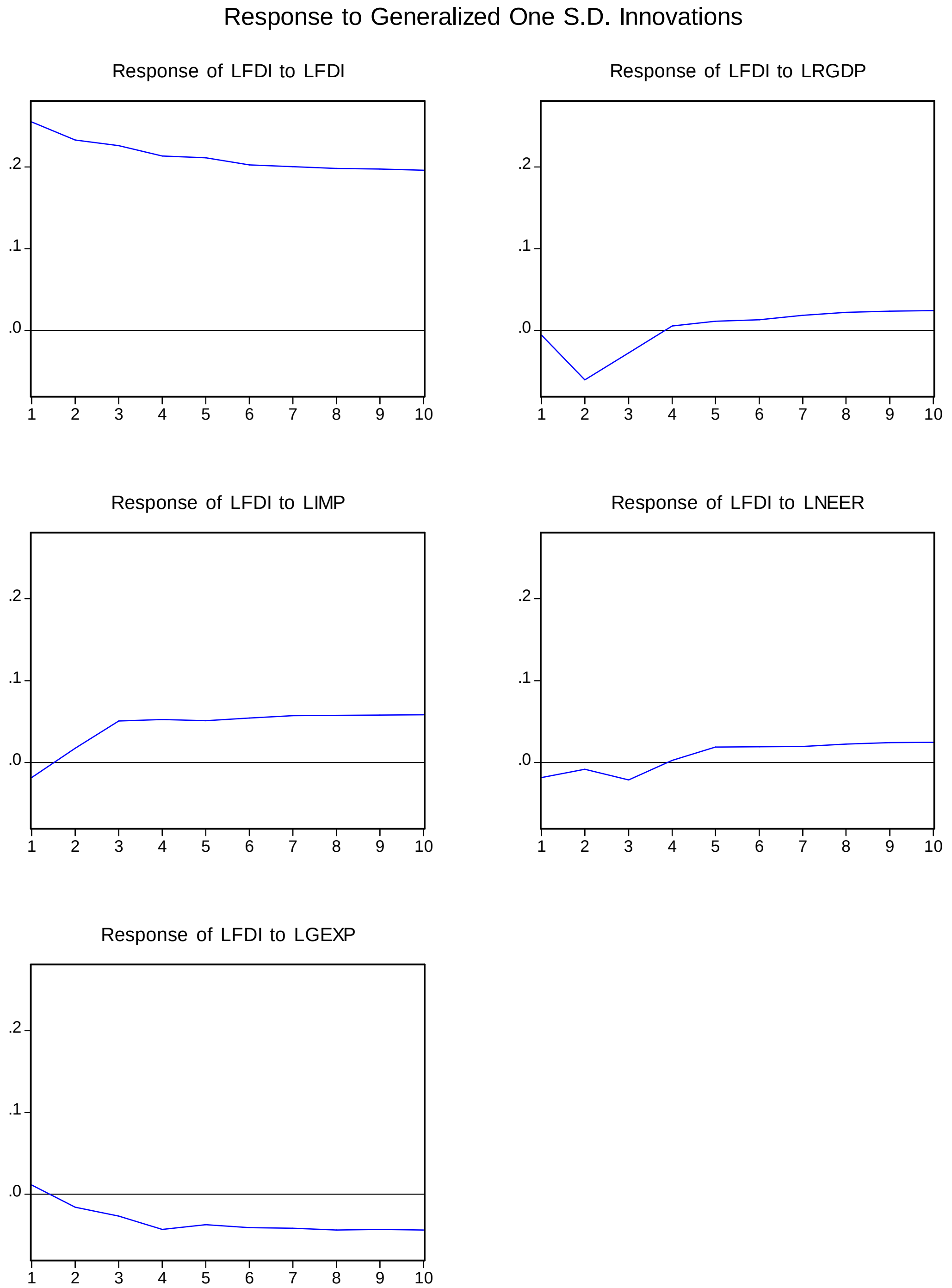
Own summary

A5.1: Impulse response results

Model 1



Model 2



Response to Generalized One S.D. Innovations
Response of LFDI to LFDI
Response of LFDI to LRGDP
Response of LFDI to LIMP
Response of LFDI to LNEER
Response of LFDI to LGEXP
.2
.1
.0
1
2
3
4
5
6
7
8
9
10

A5.2: Variance Decomposition results

Model 1

Period	S.E.	LFDI	LRGDP	LNEER	LIMP	LCR
1	0.248696	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.358387	89.01216	2.118794	0.816534	7.673014	0.379497
3	0.430733	86.54069	1.767855	0.578084	9.444828	1.668542
4	0.474907	86.90117	1.566912	0.534287	9.012594	1.985036
5	0.511811	86.91903	1.589359	0.720621	8.844384	1.926603
6	0.547155	86.57833	1.574419	0.935887	9.013601	1.897767
7	0.579753	86.24556	1.614871	1.095053	9.135724	1.908791
8	0.609694	85.96536	1.713186	1.241702	9.175266	1.904483
9	0.637977	85.69698	1.815506	1.385613	9.213387	1.888509
10	0.665049	85.44495	1.905336	1.514275	9.260576	1.874865

Cholesky Ordering:
LFDI
LRGDP
LNEER
LIMP
LCR

Model 2

Period	S.E.	LFDI	LRGDP	LIMP	LNEER	LGEXP
1	0.255148	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.363462	90.40295	2.316501	5.345083	1.593830	0.341637
3	0.441463	87.50067	1.830343	8.796412	1.403861	0.468715
4	0.499035	86.79032	1.474477	9.273987	1.569323	0.891898
5	0.549665	86.28822	1.300028	9.317705	2.070997	1.023054
6	0.593443	85.68270	1.203049	9.505065	2.429388	1.179800
7	0.633564	85.20045	1.186781	9.647066	2.675578	1.290123
8	0.670582	84.78037	1.217550	9.701171	2.896790	1.404123
9	0.705501	84.42338	1.256795	9.731777	3.100853	1.487195
10	0.738485	84.10538	1.297963	9.761403	3.271988	1.563270

Cholesky Ordering:
LFDI
LRGDP
LIMP
LNEER
LGEXP

A5.3

ALL ESTIMATED MODELS

MODEL 1

NONE (Assumption 4)

Vector Error Correction Estimates
Date: 07/29/07 Time: 22:34
Sample (adjusted): 1977 2005
Included observations: 29 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LFDI(-1)	1.000000
LRGDP(-1)	-16.49084 (3.35883) [-4.90969]
LNEER(-1)	1.639741 (0.37539) [4.36809]
LIMP(-1)	-2.285627 (0.77666) [-2.94290]
LCR(-1)	-2.997393 (1.51401) [-1.97978]
@TREND(75)	0.513756 (0.08491) [6.05025]
C	222.9614

Error Correction:	D(LFDI)	D(LRGDP)	D(LNEER)	D(LIMP)	D(LCR)
CointEq1	-0.043555 (0.09707) [-0.44870]	0.018680 (0.00620) [3.01135]	-0.066199 (0.06227) [-1.06303]	0.118227 (0.02025) [5.83806]	0.041974 (0.01699) [2.47117]

DUM1 on Cointegration (Assumption 3)

Vector Error Correction Estimates
Date: 07/29/07 Time: 22:36
Sample (adjusted): 1977 2005
Included observations: 29 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1				
LFDI(-1)	1.000000				
LRGDP(-1)	-1.796508 (1.43533) [-1.25163]				
LNEER(-1)	-0.012762 (0.31101) [-0.04103]				
LIMP(-1)	-5.833346 (0.78496) [-7.43136]				
LCR(-1)	1.041189 (1.77358) [0.58706]				
C	35.79760				
Error Correction:	D(LFDI)	D(LRGDP)	D(LNEER)	D(LIMP)	D(LCR)
CointEq1	-0.247409 (0.10671) [-2.31858]	0.009519 (0.00877) [1.08577]	-0.076067 (0.07624) [-0.99773]	0.126464 (0.02883) [4.38717]	-0.007359 (0.02338) [-0.31470]

DUM1 on VECM (Assumption 4)

Vector Error Correction Estimates
Date: 07/29/07 Time: 22:42
Sample (adjusted): 1977 2005
Included observations: 29 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LFDI(-1)	1.000000
LRGDP(-1)	-12.85494 (6.27917) [-2.04724]

LNEER(-1)	1.285504				
	(0.48387)				
	[2.65673]				
LIMP(-1)	-3.183637				
	(1.01280)				
	[-3.14341]				
LCR(-1)	-2.067388				
	(1.45971)				
	[-1.41630]				
@TREND(75)	0.388331				
	(0.16654)				
	[2.33171]				
C	176.6738				

Error Correction:	D(LFDI)	D(LRGDP)	D(LNEER)	D(LIMP)	D(LCR)
CointEq1	-0.182910	0.013602	-0.129317	0.137777	0.026446
	(0.11284)	(0.00751)	(0.07481)	(0.02384)	(0.02165)
	[-1.62095]	[1.81061]	[-1.72866]	[5.77918]	[1.22171]
D(LFDI(-1))	0.140553	-0.027779	0.040588	-0.109816	-0.090259
	(0.25504)	(0.01698)	(0.16908)	(0.05388)	(0.04892)
	[0.55110]	[-1.63600]	[0.24006]	[-2.03802]	[-1.84486]
D(LRGDP(-1))	-7.008644	0.751497	-1.530746	3.482621	1.953703
	(4.53384)	(0.30184)	(3.00568)	(0.95787)	(0.86972)
	[-1.54585]	[2.48968]	[-0.50928]	[3.63578]	[2.24635]
D(LNEER(-1))	0.418615	0.031747	0.297143	-0.001069	-0.097703
	(0.35593)	(0.02370)	(0.23596)	(0.07520)	(0.06828)
	[1.17610]	[1.33973]	[1.25927]	[-0.01422]	[-1.43095]
D(LIMP(-1))	1.016975	-0.134909	-0.006839	-0.528090	-0.367804
	(1.03870)	(0.06915)	(0.68860)	(0.21945)	(0.19925)
	[0.97908]	[-1.95089]	[-0.00993]	[-2.40644]	[-1.84591]
D(LCR(-1))	0.011342	-0.086643	-1.330646	0.128264	-0.209899
	(0.99573)	(0.06629)	(0.66011)	(0.21037)	(0.19101)
	[0.01139]	[-1.30700]	[-2.01579]	[0.60971]	[-1.09889]
C	0.071505	0.000921	-0.029925	-0.083171	-0.042552
	(0.13631)	(0.00908)	(0.09037)	(0.02880)	(0.02615)
	[0.52457]	[0.10149]	[-0.33115]	[-2.88803]	[-1.62732]
DUM1	0.242082	0.017078	0.125863	0.007269	0.035169
	(0.13384)	(0.00891)	(0.08873)	(0.02828)	(0.02568)

	[1.80869]	[1.91657]	[1.41847]	[0.25707]	[1.36978]

DUM1 on both (Assumption 3) **(selected as MODEL 1)**

Vector Error Correction Estimates
Date: 07/29/07 Time: 22:46
Sample (adjusted): 1977 2005
Included observations: 29 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LFDI(-1)	1.000000
LRGDP(-1)	1.342690
	(1.00219)
	[1.33975]
LNEER(-1)	0.065859
	(0.22445)
	[0.29342]
LIMP(-1)	-4.430332
	(0.54805)
	[-8.08382]
LCR(-1)	-2.768299
	(1.27914)
	[-2.16419]
C	3.808355

Error Correction:	D(LFDI)	D(LRGDP)	D(LNEER)	D(LIMP)	D(LCR)
CointEq1	-0.314933	0.013223	-0.111863	0.160965	0.024540
	(0.13066)	(0.00954)	(0.09555)	(0.03172)	(0.02711)
	[-2.41025]	[1.38663]	[-1.17074]	[5.07457]	[0.90524]
D(LFDI(-1))	0.206582	-0.023986	-0.007292	-0.094465	-0.081887
	(0.23659)	(0.01727)	(0.17301)	(0.05743)	(0.04908)
	[0.87317]	[-1.38913]	[-0.04215]	[-1.64477]	[-1.66832]
D(LRGDP(-1))	-7.601790	0.636628	-0.222706	2.740451	1.712139
	(4.00189)	(0.29207)	(2.92642)	(0.97149)	(0.83026)
	[-1.89955]	[2.17968]	[-0.07610]	[2.82086]	[2.06218]
D(LNEER(-1))	0.384667	0.040513	0.205328	0.071178	-0.079945
	(0.31751)	(0.02317)	(0.23218)	(0.07708)	(0.06587)
	[1.21153]	[1.74829]	[0.88436]	[0.92346]	[-1.21365]

D(LIMP(-1))	0.992243	-0.115537	-0.214825	-0.378340	-0.328131
	(0.94540)	(0.06900)	(0.69133)	(0.22950)	(0.19614)
	[1.04954]	[-1.67447]	[-0.31074]	[-1.64851]	[-1.67296]
D(LCR(-1))	-0.332555	-0.084940	-1.314403	0.208776	-0.209327
	(0.95680)	(0.06983)	(0.69967)	(0.23227)	(0.19850)
	[-0.34757]	[-1.21637]	[-1.87861]	[0.89885]	[-1.05452]
C	0.196647	-0.001953	-0.011338	-0.129331	-0.047402
	(0.14614)	(0.01067)	(0.10686)	(0.03548)	(0.03032)
	[1.34564]	[-0.18313]	[-0.10610]	[-3.64557]	[-1.56347]
DUM1	0.000389	0.030021	0.009644	0.151704	0.059757
	(0.13207)	(0.00964)	(0.09658)	(0.03206)	(0.02740)
	[0.00295]	[3.11449]	[0.09986]	[4.73157]	[2.18084]

MODEL 2

NONE (Assumption 3)

Vector Error Correction Estimates
Date: 07/29/07 Time: 22:14
Sample (adjusted): 1977 2005
Included observations: 29 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1				
LFDI(-1)	1.000000				
LRGDP(-1)	0.895842				
	(0.97739)				
	[0.91657]				
LIMP(-1)	-4.386134				
	(0.89218)				
	[-4.91621]				
LNEER(-1)	0.310782				
	(0.26430)				
	[1.17588]				
LGEXP(-1)	2.235442				
	(2.15467)				
	[1.03748]				
C	-10.08755				
Error Correction:	D(LFDI)	D(LRGDP)	D(LIMP)	D(LNEER)	D(LGEXP)

CointEq1	-0.285272	0.014187	0.158596	-0.121404	-0.009208
	(0.13163)	(0.01038)	(0.03234)	(0.09548)	(0.02356)
	[-2.16725]	[1.36723]	[4.90346]	[-1.27147]	[-0.39079]

DUM1 on cointegration (Assumption 3)

Vector Error Correction Estimates
Date: 07/29/07 Time: 22:19
Sample (adjusted): 1977 2005
Included observations: 29 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LFDI(-1)	1.000000
LRGDP(-1)	0.895842
	(0.97739)
	[0.91657]
LIMP(-1)	-4.386134
	(0.89218)
	[-4.91621]
LNEER(-1)	0.310782
	(0.26430)
	[1.17588]
LGEXP(-1)	2.235442
	(2.15467)
	[1.03748]
C	-10.08755

Error Correction:	D(LFDI)	D(LRGDP)	D(LIMP)	D(LNEER)	D(LGEXP)
CointEq1	-0.285272	0.014187	0.158596	-0.121404	-0.009208
	(0.13163)	(0.01038)	(0.03234)	(0.09548)	(0.02356)
	[-2.16725]	[1.36723]	[4.90346]	[-1.27147]	[-0.39079]

DUM1 on VECM (Assumption 3)

Vector Error Correction Estimates
Date: 07/29/07 Time: 22:23
Sample (adjusted): 1977 2005
Included observations: 29 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LFDI(-1)	1.000000
LRGDP(-1)	0.347822 (0.99048) [0.35116]
LIMP(-1)	-5.238531 (0.89200) [-5.87279]
LNEER(-1)	0.549841 (0.27254) [2.01748]
LGEXP(-1)	1.159216 (2.12014) [0.54676]
C	2.265559

Error Correction:	D(LFDI)	D(LRGDP)	D(LIMP)	D(LNEER)	D(LGEXP)
CointEq1	-0.241476 (0.11462) [-2.10673]	0.014088 (0.00807) [1.74686]	0.147177 (0.02310) [6.37159]	-0.115794 (0.08526) [-1.35806]	-0.004296 (0.02131) [-0.20158]
D(LFDI(-1))	0.192762 (0.24035) [0.80201]	-0.031740 (0.01691) [-1.87682]	-0.112657 (0.04844) [-2.32588]	-0.026532 (0.17879) [-0.14840]	-0.069517 (0.04469) [-1.55570]
D(LRGDP(-1))	-7.778203 (4.27476) [-1.81957]	0.728485 (0.30078) [2.42197]	3.320019 (0.86147) [3.85390]	-0.873415 (3.17989) [-0.27467]	-0.067648 (0.79475) [-0.08512]
D(LIMP(-1))	0.924704 (0.98858) [0.93538]	-0.141837 (0.06956) [-2.03908]	-0.492151 (0.19922) [-2.47034]	-0.139271 (0.73538) [-0.18939]	-0.168976 (0.18380) [-0.91937]
D(LNEER(-1))	0.392408 (0.32952) [1.19085]	0.032342 (0.02319) [1.39493]	0.035865 (0.06641) [0.54008]	0.213970 (0.24512) [0.87291]	-0.100092 (0.06126) [-1.63379]

D(LGEXP(-1))	-0.189328	-0.121560	-0.525785	0.189945	-0.394361
	(0.96144)	(0.06765)	(0.19375)	(0.71519)	(0.17875)
	[-0.19692]	[-1.79693]	[-2.71369]	[0.26559]	[-2.20623]
C	0.173210	-0.004857	-0.135086	-0.007931	-0.005768
	(0.14826)	(0.01043)	(0.02988)	(0.11029)	(0.02756)
	[1.16827]	[-0.46559]	[-4.52121]	[-0.07192]	[-0.20924]
DUM1	0.049554	0.028076	0.140160	-0.012777	0.003808
	(0.12896)	(0.00907)	(0.02599)	(0.09593)	(0.02398)
	[0.38426]	[3.09419]	[5.39314]	[-0.13319]	[0.15882]

DUM1 on both Cointegration and VECM (Assumption 3) **(selected as model 2)**

Vector Error Correction Estimates
Date: 07/29/07 Time: 22:29
Sample (adjusted): 1977 2005
Included observations: 29 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LFDI(-1)	1.000000
LRGDP(-1)	0.347822
	(0.99048)
	[0.35116]
LIMP(-1)	-5.238531
	(0.89200)
	[-5.87279]
LNEER(-1)	0.549841
	(0.27254)
	[2.01748]
LGEXP(-1)	1.159216
	(2.12014)
	[0.54676]
C	2.265559

Error Correction:	D(LFDI)	D(LRGDP)	D(LIMP)	D(LNEER)	D(LGEXP)
CointEq1	-0.241476	0.014088	0.147177	-0.115794	-0.004296
	(0.11462)	(0.00807)	(0.02310)	(0.08526)	(0.02131)
	[-2.10673]	[1.74686]	[6.37159]	[-1.35806]	[-0.20158]
D(LFDI(-1))	0.192762	-0.031740	-0.112657	-0.026532	-0.069517

	(0.24035)	(0.01691)	(0.04844)	(0.17879)	(0.04469)
	[0.80201]	[-1.87682]	[-2.32588]	[-0.14840]	[-1.55570]
D(LRGDP(-1))	-7.778203	0.728485	3.320019	-0.873415	-0.067648
	(4.27476)	(0.30078)	(0.86147)	(3.17989)	(0.79475)
	[-1.81957]	[2.42197]	[3.85390]	[-0.27467]	[-0.08512]
D(LIMP(-1))	0.924704	-0.141837	-0.492151	-0.139271	-0.168976
	(0.98858)	(0.06956)	(0.19922)	(0.73538)	(0.18380)
	[0.93538]	[-2.03908]	[-2.47034]	[-0.18939]	[-0.91937]
D(LNEER(-1))	0.392408	0.032342	0.035865	0.213970	-0.100092
	(0.32952)	(0.02319)	(0.06641)	(0.24512)	(0.06126)
	[1.19085]	[1.39493]	[0.54008]	[0.87291]	[-1.63379]
D(LGEXP(-1))	-0.189328	-0.121560	-0.525785	0.189945	-0.394361
	(0.96144)	(0.06765)	(0.19375)	(0.71519)	(0.17875)
	[-0.19692]	[-1.79693]	[-2.71369]	[0.26559]	[-2.20623]
C	0.173210	-0.004857	-0.135086	-0.007931	-0.005768
	(0.14826)	(0.01043)	(0.02988)	(0.11029)	(0.02756)
	[1.16827]	[-0.46559]	[-4.52121]	[-0.07192]	[-0.20924]
DUM1	0.049554	0.028076	0.140160	-0.012777	0.003808
	(0.12896)	(0.00907)	(0.02599)	(0.09593)	(0.02398)
	[0.38426]	[3.09419]	[5.39314]	[-0.13319]	[0.15882]

MODEL 3

NONE (Assumption 4)

Vector Error Correction Estimates
Date: 07/29/07 Time: 22:53
Sample (adjusted): 1977 2005
Included observations: 29 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LFDI(-1)	1.000000
LRGDP(-1)	291.8839
	(39.8843)
	[7.31826]
LNEER(-1)	-15.67136
	(3.50254)
	[-4.47428]
LIMP(-1)	26.27813

	(9.08391)
	[2.89282]
LCPI(-1)	63.26126
	(11.2847)
	[5.60594]
@TREND(75)	-14.17980
	(1.92310)
	[-7.37342]
C	-3956.372

Error Correction:	D(LFDI)	D(LRGDP)	D(LNEER)	D(LIMP)	D(LCPI)
CointEq1	0.011889	-0.002145	-0.001730	-0.012460	0.000681
	(0.00929)	(0.00056)	(0.00700)	(0.00195)	(0.00071)
	[1.27917]	[-3.81507]	[-0.24703]	[-6.40369]	[0.96187]

Dum1 on Cointegration test (assumption 4)

Vector Error Correction Estimates
Date: 07/29/07 Time: 22:55
Sample (adjusted): 1977 2005
Included observations: 29 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LFDI(-1)	1.000000
LRGDP(-1)	291.8839
	(39.8843)
	[7.31826]
LNEER(-1)	-15.67136
	(3.50254)
	[-4.47428]
LIMP(-1)	26.27813
	(9.08391)
	[2.89282]
LCPI(-1)	63.26126
	(11.2847)
	[5.60594]
@TREND(75)	-14.17980
	(1.92310)
	[-7.37342]

C	-3956.372				

Error Correction:	D(LFDI)	D(LRGDP)	D(LNEER)	D(LIMP)	D(LCPI)
CointEq1	0.011889	-0.002145	-0.001730	-0.012460	0.000681
	(0.00929)	(0.00056)	(0.00700)	(0.00195)	(0.00071)
	[1.27917]	[-3.81507]	[-0.24703]	[-6.40369]	[0.96187]

DUM1 on VECM (Assumption 4)

Vector Error Correction Estimates
Date: 07/29/07 Time: 22:57
Sample (adjusted): 1977 2005
Included observations: 29 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LFDI(-1)	1.000000
LRGDP(-1)	669.4789
	(161.934)
	[4.13426]
LNEER(-1)	-39.04060
	(11.8338)
	[-3.29907]
LIMP(-1)	88.79033
	(29.6708)
	[2.99252]
LCPI(-1)	154.8756
	(29.0476)
	[5.33178]
@TREND(75)	-33.51646
	(5.98573)
	[-5.59940]
C	-9163.319

Error Correction:	D(LFDI)	D(LRGDP)	D(LNEER)	D(LIMP)	D(LCPI)
CointEq1	0.005434	-0.000885	0.000111	-0.005643	-0.000367
	(0.00418)	(0.00026)	(0.00317)	(0.00076)	(0.00021)
	[1.30104]	[-3.45185]	[0.03508]	[-7.37947]	[-1.74133]
D(LFDI(-1))	-0.043728	-0.027662	-0.145639	-0.019540	0.012788
	(0.22364)	(0.01373)	(0.16951)	(0.04094)	(0.01128)
	[-0.19553]	[-2.01453]	[-0.85919]	[-0.47724]	[1.13356]

D(LRGDP(-1))	-10.19973	1.007555	1.215522	4.613219	0.051845
	(5.42156)	(0.33289)	(4.10932)	(0.99257)	(0.27348)
	[-1.88133]	[3.02672]	[0.29580]	[4.64774]	[0.18957]
D(LNEER(-1))	0.513379	0.002515	0.124414	-0.120855	-0.038603
	(0.38644)	(0.02373)	(0.29291)	(0.07075)	(0.01949)
	[1.32847]	[0.10601]	[0.42475]	[-1.70820]	[-1.98029]
D(LIMP(-1))	1.445285	-0.139804	-0.357007	-0.527815	0.122198
	(1.10445)	(0.06781)	(0.83712)	(0.20220)	(0.05571)
	[1.30861]	[-2.06160]	[-0.42647]	[-2.61035]	[2.19339]
D(LCPI(-1))	-4.671374	0.040181	-0.303592	1.060102	0.484822
	(2.87983)	(0.17682)	(2.18280)	(0.52724)	(0.14527)
	[-1.62210]	[0.22724]	[-0.13908]	[2.01067]	[3.33742]
C	0.710331	-0.001101	-0.044865	-0.192250	0.076484
	(0.45387)	(0.02787)	(0.34401)	(0.08309)	(0.02289)
	[1.56506]	[-0.03951]	[-0.13042]	[-2.31365]	[3.34072]
DUM1	0.062902	-0.006142	0.028160	-0.055959	-0.062275
	(0.22899)	(0.01406)	(0.17356)	(0.04192)	(0.01155)
	[0.27470]	[-0.43685]	[0.16225]	[-1.33482]	[-5.39138]

DUM1 on both (Assumption 4)

Vector Error Correction Estimates
Date: 07/29/07 Time: 23:00
Sample (adjusted): 1977 2005
Included observations: 29 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LFDI(-1)	1.000000
LRGDP(-1)	669.4789
	(161.934)
	[4.13426]
LNEER(-1)	-39.04060
	(11.8338)
	[-3.29907]
LIMP(-1)	88.79033
	(29.6708)
	[2.99252]
LCPI(-1)	154.8756

	(29.0476)				
	[5.33178]				
@TREND(75)	-33.51646				
	(5.98573)				
	[-5.59940]				
C	-9163.319				

Error Correction:	D(LFDI)	D(LRGDP)	D(LNEER)	D(LIMP)	D(LCPI)
CointEq1	0.005434	-0.000885	0.000111	-0.005643	-0.000367
	(0.00418)	(0.00026)	(0.00317)	(0.00076)	(0.00021)
	[1.30104]	[-3.45185]	[0.03508]	[-7.37947]	[-1.74133]
D(LFDI(-1))	-0.043728	-0.027662	-0.145639	-0.019540	0.012788
	(0.22364)	(0.01373)	(0.16951)	(0.04094)	(0.01128)
	[-0.19553]	[-2.01453]	[-0.85919]	[-0.47724]	[1.13356]
D(LRGDP(-1))	-10.19973	1.007555	1.215522	4.613219	0.051845
	(5.42156)	(0.33289)	(4.10932)	(0.99257)	(0.27348)
	[-1.88133]	[3.02672]	[0.29580]	[4.64774]	[0.18957]
D(LNEER(-1))	0.513379	0.002515	0.124414	-0.120855	-0.038603
	(0.38644)	(0.02373)	(0.29291)	(0.07075)	(0.01949)
	[1.32847]	[0.10601]	[0.42475]	[-1.70820]	[-1.98029]
D(LIMP(-1))	1.445285	-0.139804	-0.357007	-0.527815	0.122198
	(1.10445)	(0.06781)	(0.83712)	(0.20220)	(0.05571)
	[1.30861]	[-2.06160]	[-0.42647]	[-2.61035]	[2.19339]
D(LCPI(-1))	-4.671374	0.040181	-0.303592	1.060102	0.484822
	(2.87983)	(0.17682)	(2.18280)	(0.52724)	(0.14527)
	[-1.62210]	[0.22724]	[-0.13908]	[2.01067]	[3.33742]
C	0.710331	-0.001101	-0.044865	-0.192250	0.076484
	(0.45387)	(0.02787)	(0.34401)	(0.08309)	(0.02289)
	[1.56506]	[-0.03951]	[-0.13042]	[-2.31365]	[3.34072]
DUM1	0.062902	-0.006142	0.028160	-0.055959	-0.062275
	(0.22899)	(0.01406)	(0.17356)	(0.04192)	(0.01155)
	[0.27470]	[-0.43685]	[0.16225]	[-1.33482]	[-5.39138]