

**INTERNAL DETERMINANTS OF FOREIGN DIRECT
INVESTMENT IN SOUTH AFRICA**

BY

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As the candidate's supervisor, I have approved this thesis for submission.

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DECLARATION

This dissertation was undertaken in the School of Economics and Finance, University of KwaZulu-Natal, Pietermaritzburg under the supervision of Professor Tennassie Nichola. This is an original work by the author and has not been submitted in any form for any other degree or diploma to any other university. Where the work of others has been used, it has been duly acknowledged in the text.

Signature _____

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LIST OF ACRONYMS AND VARIABLES

AD – Apartheid Dummy

ADF – Augmented Dickey Fuller

ALSI – All Share Index

ANC – African National Congress

ASGISA – Accelerated Shared Growth Initiative for South Africa

BEE – Black Economic Empowerment

BG – Breusch-Godfrey

DF – Dickey Fuller

ECM – Error Correction Mechanism

EDUC – Education

EU – European Union

EXCH – Exchange Rate

EXCHV – Exchange Rate Volatility

FDI – Foreign Direct Investment

FEM – Fixed Effects Model

GDP – Gross Domestic Product

GEXP – Government Expenditure

GSP – Gross Sector Product

HDI – Human Development Index

HPI – Human Poverty Index

INF – Infrastructure

JSE – Johannesburg Stock Exchange

JSEV – Johannesburg Stock Exchange Volatility

JV – Joint Venture

LABC – Labour Costs

LABP – Labour Productivity

LDC – Less Developed Country
MNC – Multinational Corporation
NP – Nationalist Party
NTB – Non-Tariff Barrier
OPEN – Trade Openness
R&D – Research and Development
REM – Random Effects Model
SA – South Africa
SARB – South African Reserve Bank
SD – Sectoral Dummy
SMEDP – Small and Medium Enterprise Development Program
SSA – Sub-Saharan Africa
T – Trend
TNC – Transnational Corporation
US – United States (of America)
VAR – Vector Autoregressive
VIF – Variance Inflation Factor

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ABSTRACT

Foreign Direct Investment (FDI) is a powerful driver of economic growth and development, particularly in the developing world. FDI can lead to greater efficiencies in the local economy through a number of different channels such as the transfer of technology, increase in competition, and job creation. This dissertation discusses the costs and benefits derived from FDI as well as examining various complementary issues to FDI, such as the relevance of fiscal incentives and the varying effects of different modes of entry.

This study further analyses the determinants of FDI into South Africa for the period 1961-2009, through the use of two different econometric techniques – time series and panel data analysis. The results from the time series analysis concur largely with previous studies, finding market size, exchange rate, macroeconomic (in)stability and infrastructure to all be statistically significant determinants of FDI inflows into South Africa.

South Africa underwent a major political and economic change in 1994 with the end of Apartheid. This fundamental shift in the economy has also affected the determinants of FDI into the country. To this end a panel data analysis was conducted between 1994 and 2009, the results of which are more suitable for forecasting. This analysis found similar results to the time series analysis, although the relative importance of the determinants varies somewhat, and two additional variables – education and labour productivity – were also found to be statistically significant determinants in the panel data analysis.

The dissertation concludes by discussing the policy implications that derive from the findings of the econometric analysis and offers some policy advice in terms of attracting greater FDI into South Africa, based on the findings of this analysis.

CHAPTER ONE: INTRODUCTION

Foreign Direct Investment (FDI) is seen as an increasingly important driver of economic growth and development, particularly within the developing world. A number of authors have (e.g. Basu et al., 2003; Li and Liu, 2005) found a positive statistical relationship between FDI and economic growth. As a result, successfully attracting Multinational Corporations (MNCs) has become a major policy among developing country governments. Certain FDI determinants such as market size, education levels, infrastructure, macroeconomic stability, and openness appear to be relatively universal. However, these factors vary in relative importance from country to country depending on their levels in each, as well as the structure of the economy and the type of FDI that is generally attracted to each economy. This means it is important to conduct individual analyses of the determinants of FDI for each specific country – one size does not fit all.

South Africa is a medium sized, developing country. Its GDP in 2009 was reported as R2423 billion (Statistics SA. 2010). Real growth in GDP over the past 10 years has been strong, consistently above 2.5% per annum, and reaching 5.5% in 2007 (Statistics SA. 2010). Despite this consistent growth, poverty remains prevalent. According to the Human Development Report (2009), South Africa is only listed at 85th out of 182 countries in the Human Poverty index (HPI) and at a mere 129th in the Human Development Index (HDI).

One of the main reasons for South Africa's high poverty levels and lack of development stems from its political history. Prior to 1994, non-whites were excluded from the mainstream economy which resulted in a situation of high inequality, lack of skills and widespread levels of extreme poverty. In the last 15 years the country's new government (the African National Congress) has aimed at reducing these discrepancies; however as evidenced by the HDI and HPI figures, these initiatives have met with mixed success. The sustained levels of higher growth up until 2009 have certainly had a positive impact on South Africa. The higher growth rates are driven by consumption which encourages greater investment by firms; this includes hiring more workers and paying better wages. These workers then have more money to spend and so continue to drive consumption and hence economic growth whilst also reducing poverty.

Foreign Direct Investment has often been viewed as the important component of economic growth within developing countries (including South Africa), particularly within popular opinion, led in part by the media. Many developing country citizens feel that the developed world is much better at doing business more efficiently. Foreign Direct Investment therefore provides an opportunity for local firms to improve their productivity by learning from and competing directly with foreign firms, thereby increasing economic growth rates. There is a great deal of evidence to support these claims; with numerous authors (Saggi, 2002; Rodrik, 1999) providing support for this hypothesis and showing how this process can occur through externalities.

There have been a number of previous South Africa-specific studies on the determinants of FDI. Fedderke and Romm (2004) and Moolman et al. (2006) both conducted time series regression analysis, whilst Hausman et al. (2005) conducted a survey analysis of the top executives in South African-based MNCs as well as local South African firms.

These studies determined market size, trade openness, macroeconomic stability, exchange rate and infrastructure to be the most important determinants of FDI inflows into South Africa. These results largely concur with the findings of similar international studies, although education – deemed a most important determinant for many international studies – is excluded from the South African studies, primarily due to the lack of reliable data over the period studied. It is important to conduct country-specific analyses as, even if the findings largely concur with the international literature, the relative importance of these determinants will vary from country to country, which can significantly influence potential policy within the country.

The first objective of this dissertation, therefore, is to conduct a further time series analysis of the determinants of FDI inflows into South Africa. The time series model tests the relative importance of determinants of FDI into South Africa for the period 1961-2009.

The second aim of this study is to conduct a further, panel data analysis on a shorter, more recent time period in order to gain further insight into the main drivers of FDI flows into South Africa. South Africa ended Apartheid, a long period of political oppression, in 1994. The structure of the economy and, in particular, the

fundamental drivers of FDI inflows have changed since this time. During Apartheid, many countries imposed both moral as well as economic sanctions on the country which had a significant effect on FDI flows. The nature of Apartheid also meant that the majority of the population was barred from much of the mainstream economy which had a huge detrimental effect on economic growth and development. Lastly the constant political turmoil during Apartheid was in itself a major deterrent to potential investors, whilst it also led to increased macroeconomic instability which also deterred potential investors. We can therefore conclude that the determinants of FDI into South Africa have fundamentally changed since the end of Apartheid. This conclusion is supported also by empirical analysis – Fedderke and Romm (2004) include a sanctions dummy in their regression analysis to capture the effects of Apartheid on FDI inflows. This dummy variable was statistically significant and positive, indicating significantly higher levels of FDI inflows post-Apartheid.

This means that the relative importance of the different determinants of FDI inflows may have changed since the end of Apartheid, which in turn means that pre-1994 FDI analysis may be invalid for future forecasting and therefore not applicable for policymakers. Hence this panel data analysis will just focus on the post Apartheid period, thus eliminating this problem and producing more useful results for policymakers.

The panel data approach also allows the analysis of sector-specific FDI inflows, so that it is possible to see the individual impact of specific sectors on FDI inflows into South Africa. Lastly, much of the data is incomplete and unreliable for the period prior to 1994; hence the panel data model is able to include three additional and important variables: Education, Labour productivity and Labour costs.

Chapter two provides a comprehensive analysis of the previous FDI scholarship. This chapter discusses the findings of previous studies on the determinants of FDI in South Africa as well as in other countries and in cross-country analyses. The chapter also discusses the potential benefits and costs of FDI and deals with other FDI-specific issues including the merits of fiscal incentives and the different effects of different types of FDI.

Chapter three is an explanation of the econometric methodology used in the models included in this paper. This chapter discusses issues of stationarity and cointegration pertaining to time series analysis and explains both the Engle-Granger methodology as well as the Vector Autoregressive model. This chapter also discusses the panel data model and provides a justification for the use of the Fixed Effects Model in this case.

Chapter four presents the results from the different models tested in this analysis. These results largely concur with the findings of previous studies, but it is the relative importance of the various determinants that is the main difference between countries and this analysis provides a better understanding of this in the South African context.

Lastly chapter five concludes the paper and offers a brief discussion of the policy implications of these findings.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

FDI (Foreign Direct Investment) is defined as private capital flows into a country different to that in which the parent firm is situated. These investments include equity capital, intercompany debt and reinvested earnings. It is important to distinguish between FDI and portfolio investment. Capital investment is commonly described in the literature as being FDI as opposed to portfolio investment if it is large enough to give the parent firm some level of control over the management of the enterprise (Jensen, 2003: 588). This equity is usually greater than 10% of the firm. Unlike portfolio investment, FDI has long term horizons and is therefore generally not speculative or footloose investment. This stability is what makes FDI so valuable to recipient countries.

It is possible to distinguish between two types of FDI inflows: horizontal FDI and vertical FDI. Horizontal FDI refers to a case in which MNCs (Multinational Corporations) have their headquarters in their home country and have production plants both at home and abroad that produce the same goods. Vertical FDI, on the other hand, refers to a situation in which MNCs fragment different stages of production by having their headquarters in their home country and production plants in different foreign countries that produce different intermediate or final goods (Fedderke and Romm. 2004: 13).

FDI can also be divided into three categories by its purpose: natural resource-seeking FDI, market-seeking FDI and efficiency-seeking FDI. Historically, a large proportion of Foreign Investment was focused in natural resources, indeed the development of South Africa's mining industry following the discovery of diamonds and the gold in the late 19th century, owes much to the inflow of foreign capital into this sector (Gelb, 2002: 2). Although most FDI flows nowadays are based in either manufacturing or services, extractive industries still attract a large amount of FDI, particularly in Africa which is blessed with natural resource endowments and lacks a well-developed manufacturing or services sector.

Akinlo (2004) examines the effect of FDI inflows into extractive industries in Nigeria. Nigeria has attracted a large amount of FDI, predominantly in extractive industries, primarily oil. He argues that FDI in extractive industries has much lower indirect beneficial effects on the economy. The industry is usually separated from the rest of the economy with few linkages. Secondly, the transfer of technology from foreign firms to domestic ones may be less in extractive industries as the technology is usually embodied on highly capital-intensive production. Thirdly, due to the large economies of scale in the extractive sector, the presence of MNCs may not encourage new entrants as it would in manufacturing. Lastly, forward- and backward-linkages in the extractive sector are far less important as the production process requires significantly fewer inputs and intermediate goods from domestic suppliers, whilst the output is destined for foreign markets (Akinlo, 2004: 628).

Akinlo (2004) also conducts a time-series econometric analysis on the effect of extractive FDI on Nigeria's growth rate. He finds that there is only a positive effect after a considerable lag and is insignificant. He concludes that this shows that extractive FDI results in significantly lower economic growth for the country as compared to FDI into other sectors.

The majority of FDI goes into either manufacturing or the services sector. This FDI can be divided in market-seeking and efficiency-seeking FDI. Market-seeking FDI is attracted to the host countries market and aims to sell its products into that market. Market size and economic growth are key determinants of market-seeking FDI. The rationale of such investment is based on the desire to be close to the consumers, this could be due to high transport costs, discriminatory government procurement policies or to avoid import barriers (Agarwal, 1997: 12).

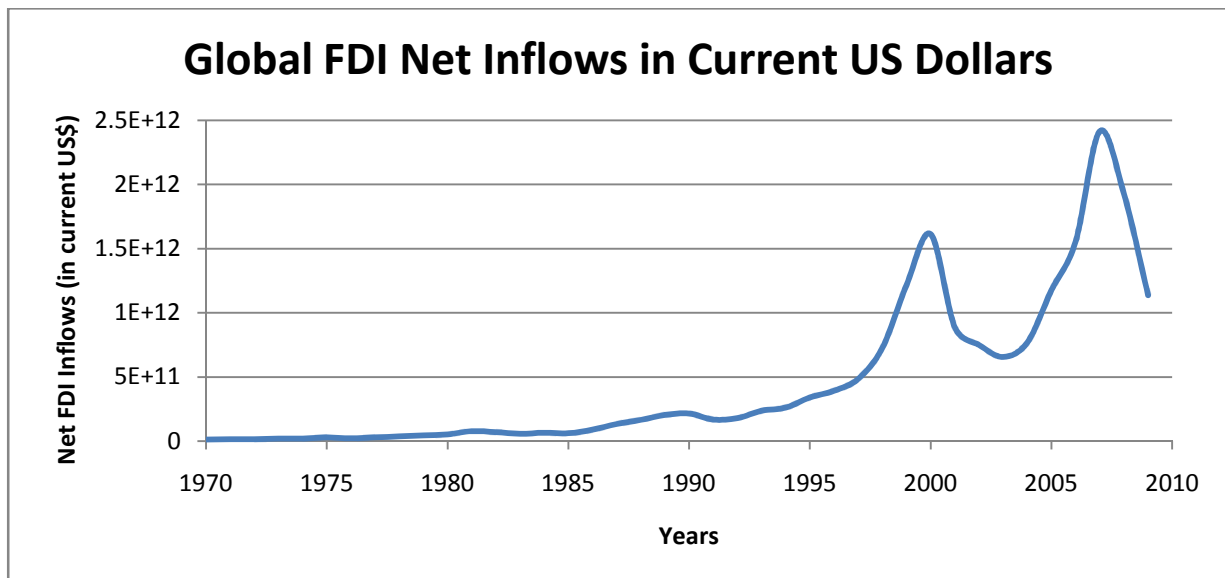
Efficiency-seeking FDI is focused primarily on the export market as opposed to the host market and so the determinants of this type of investment will be the lowest cost and lowest risk environment, including factors such as infrastructure, wage costs and taxes (Agarwal, 1997: 13). Efficiency-seeking FDI tends to be footloose with relatively narrow margins, thus making it less reliable and less-conducive to a country's long-term development as it is liable to leave as soon as another country offers a cheaper production environment (Kransdorff, 2010: 71).

2.2 Trends in FDI

Global attitudes towards FDI have changed over time. In the 1950s countries around the world, particularly more developed nations, embraced FDI and it was assumed that FDI was vital for long-term economic growth and development. However, the 1960s brought with it a reversal in attitudes towards foreign investment. It became universally accepted that the associated financial and political costs were unacceptably high, whilst research suggested that FDI was exploitative (Carim, 1994: 3).

The 1970s view towards FDI remained upon similar lines to that of the previous decades. However, by the end of the 70s and continuing into the 1980s, during which there were multiple economic crises, it became generally accepted that the anti-FDI view was largely misplaced. Countries once again focused upon attracting FDI, although most were more cautious than previously, attempting to learn from the old lessons (Carim, 1994: 3).

Figure 1

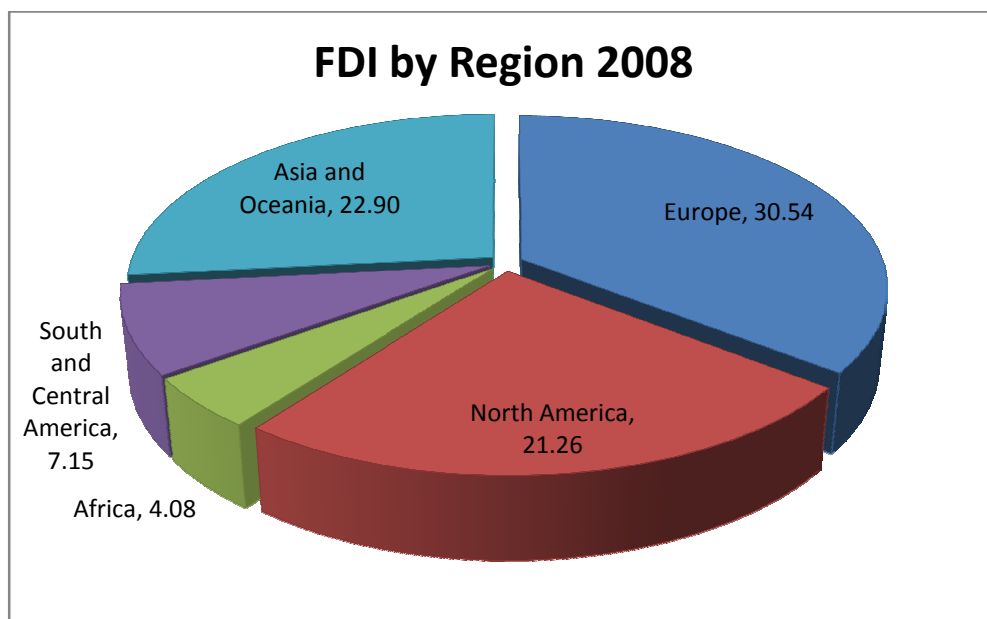


Source: Author's calculations based on World Bank Data

Since the mid-1980s FDI flows have grown very quickly. As figure 1 demonstrates, there has been significant upward growth in global FDI flows since 1985. Although

this growth has not been uniformly upwards, as evidenced by the two major dips – in 2000 and 2007/8, the trend has been upwards. Both of these dips in FDI can be ascribed to global economic crises. The first was the crisis following the bursting of the dot com bubble. Whilst the most recent is still ongoing and stems from the sub-prime lending crisis which began with US banks but has affected the entire global economy (World Bank, 2010).

Figure 2



Source: Author's calculations based on Global Finance Data

Figure 2 shows the distribution of FDI by region. The figure clearly shows the lack of FDI flows into Africa, with the region receiving a paltry 4% of total global FDI flows. Developed countries receive the majority of FDI flows – about 65% of global flows, with developing countries receiving the remainder (Global Finance, 2010).

Since the 1980s, investment flows have shifted towards technology-intensive manufacturing and, in particular, services. Over 60% of global FDI flows are now within the services sector rather than manufacturing or natural resources (Noorbakhsh et al., 2001: 1594).

2.3 Dunning's Eclectic Theory

John Dunning's framework is generally considered as the paradigmatic theory of explaining a multinational firm's investment decision. He details three main reasons for a firm to invest abroad: ownership, location and internalization (Jensen. 2003: 590).

Firms have ownership specific advantages when they have some technological advantage over existing firms in the foreign market, such as a better product, asset or more efficient process. MNCs will invest abroad in order to exploit these advantages and secure higher returns e.g. a firm has ownership advantages over its rivals in terms of a patent or knowledge of marketing; its brand name; or its marketing techniques (Dunning, 1981: 31; Jensen. 2003: 591; Gastanaga et al., 1998: 1300).

Firms may invest in a foreign country because of locational advantages i.e. why it is preferable for the MNC to locate in the host country (as opposed to in another country). Locational advantage is based on the firms' decision whether to internalise the use of their assets i.e. set up a direct subsidiary within the host country, or rather to sell the right to manufacture those products or use a specific technology to firms based in other countries (Dunning, 1981: 31). This advantage may come from a host country's comparative advantage or from that lack of tariffs incurred by producing locally or due to lower transportation costs to these markets (Gastanga et al., 1998: 1301). Or it could be related to endowments – either natural resources or high quality and low cost of labour force (Jensen. 2003: 591).

The third factor, according to Dunning, in firms determining whether to invest locally is named internalisation advantages. This concept captures the firm-specific motivations for a firm choosing to produce the product abroad within the organization itself, rather than not simply license a foreign producer to make the item for the parent company (Jensen. 2003: 591). This depends on the attraction of location-specific endowments i.e. those endowments that are offered by the host country and not the home country and that are non-transferable across geographic boundaries (Dunning, 1981: 31).

Dunning's framework explains why a MNC would invest in a foreign market but it does not explain which countries will attract that FDI. FDI remains a firm-level decision but countries have varied in their ability to attract it. The first factor depends primarily on the individual firm and its production techniques and decisions, however the second and third advantages are influenced by host country endowments, policies and institutions (Gastanaga et al., 1998: 1301).

Dunning (1981: 38) also finds evidence that the levels of both inward and outward FDI are linked to a country's stages of development. He posits a four stage investment-development process. In the first stage there is very little FDI of any sort. This stage is followed by a period of rising inward FDI, but outward FDI remains low. The third stage is a period of rising outward investment but Net Investment is still negative, i.e. inward FDI still exceeds outward FDI. In the Final stage Net Investment is positive, this stage relates to well-developed countries (Dunning, 1981: 38).

2.4 Domestic vs. Foreign Investment

An important question in the study of FDI relates to domestic investment. Firstly, why is foreign investment more desirable than domestic investment, if in fact it is; and secondly, does FDI crowd domestic investment in or out?

Both Foreign and domestic investment are important for a country – both increase capital accumulation and both are constantly seeking to be more productively efficient. Additional investment of either kind also implies greater competition in the relevant industry which should augment the process and reduce society's deadweight loss. However, foreign investment is associated with a number of indirect effects, particularly technology transfer and diffusion which can raise productivity for all local firms and therefore has a significant additional benefit (Carim, 1994: 7).

The fundamental reason why FDI should be more productive than domestic investment is due to the fact that domestic firms have local knowledge and expertise which gives them an advantage in the domestic market. In order for foreign firms to be able to compete with this disadvantage, they must be more productively efficient

than local firms; if they weren't then they would not enter in the first place. This greater productive efficiency is likely gained from more advanced technology or production techniques and hence advanced technology transfer to the local market can occur (Borensztein *et al.*, 1998: 133).

De Soysa and O Neal (1999) tested for the relative effects of domestic and foreign investment using a sample of 97 countries for the years 1980-1991. They find that both domestic and foreign investment have a positive effect on the growth rate. Domestic capital stocks were nearly thirteen times as large as foreign capital stocks but new foreign capital was 2.5 times as productive as domestic investment. It was also established that the two sources of capital are complementary. Investment by one source may encourage the other source of the benefits of an investment. Both will also invest in infrastructure for their business which will have spillover effects for others. Other externality effects such as technology transfer may also occur, thus benefiting all other firms and investment.

Borensztein *et al.* (1998) ran a similar regression, including a sample of 69 developing countries and found similar results with regards to both the relative productivity of the two sources of investment, as well as the complementarity between the two.

Different types of economic distortions may, however, diminish the role of FDI as an engine for advanced technology transfer. By offering fiscal incentives, such as tax breaks, the disadvantage that foreign investment naturally faces due to lack of local knowledge, is eradicated and thus FDI entering the local market may be no more efficient than domestic investment and, depending on the extent of incentives, may even be less efficient than domestic investment. This will then eradicate FDI as a means for technology transfer and will be more likely to crowd out domestic investment (Borensztein *et al.*, 1998: 134).

Similarly a highly protectionist trade regime may cause similar distortions as foreign firms are forced to invest locally due to the huge tariffs, hence ruling out exports for the firm. In this case the foreign investment is once again, not necessarily more efficient than local firms but is forced to invest due to economic distortions (Borensztein *et al.*, 1998: 134).

Both Foreign investment and domestic investment are important contributors to a country's development, however the unique conditions which allow and encourage foreign investment, namely greater productivity, means that FDI can act as an engine for the transfer of advanced technology to the host country which then has spillover effects for local firms. Empirical evidence confirms the higher productivity of foreign investment, as well as indicating that there is complementarity between the two sources of investment. However, introducing market distortions, such as fiscal incentives or a protectionist trade regime, may completely change the incentive structure for foreign investment, thus eradicating the benefits to the host country of foreign investment.

2.5 Mode of Entry

The choice between exporting and FDI is a key decision for MNCs. Exporting is generally associated with high(er) transport costs as well as (and usually more significantly) barriers to entry into the local market which include not only tariff barriers but also non-tariff barriers (NTBs) which can take many forms including meeting minimum environmental, labour and health standards. On the other hand, FDI usually requires significant sunk costs with the initial investment, though marginal costs will generally be lower due to the lack of export costs.

Saggi (2002: 202) proposes a two period model to explain a firm's choice between FDI and exports. The firm initially exports to the market which yields information regarding the local demand for the firm's product. If the demand is large enough to justify the large sunk costs of FDI, then the MNC will invest directly in the second period.

If a firm has decided to invest directly in a foreign market, it must then make the crucial decision regarding its mode of entry. A MNC can establish a wholly owned subsidiary in the host country, which is known as a Greenfield investment; or can work with a local partner through a Joint venture (JV), or can simply buy a local firm in the form of an acquisition. There are costs and benefits for each form of entry for both the firm as well as the host country.

An MNC will choose to invest via a JV in order to gain knowledge of the domestic market which it would otherwise have to learn itself, a potentially costly process. However when an MNC has only partial control over an investment it is far less likely to impart technology transfer. In the case of a Greenfields entry, technology transfer between the parent firm and the affiliate is far more likely (Bhaumik and Gelb, 2005: 7).

Technology diffusion between the MNC affiliate and the rest of the local economy will happen at a faster rate in the case of a JV, as the local partner is constantly attempting to acquire the technological advantage of the foreign firm. In practice, JVs rarely last more than a couple of years due to the constant conflict between the partners, and after a couple of years the foreign partner will have acquired the requisite local knowledge (Bhaumik and Gelb, 2005: 7).

Acquisitions are wholly owned by the MNC and so technology transfer to the affiliate will be greater than in the JV and the MNC can gain local knowledge as well as local market share through an acquisition. However, there are significant restructuring costs associated with acquisitions as well as the cost of acquisition itself, may make such a transaction expensive for a MNC (Bhaumik and Gelb, 2005: 8)

Hence, a Greenfields entry; which entails a foreign investor investing directly in a new enterprise in the home market without any form of acquisition or joint venture; is the most cost-effective, and therefore most likely, if the MNC has previous experience operating in the market. Greenfield investment is also more likely if there is only a small cultural distance between the home country and the host. Conversely, if the local market is underdeveloped and government a hindrance to business then entrance costs are greater and hence a JV is more likely (Bhaumik and Gelb, 2005: 9).

The type of industry may also have an impact on the mode of entry. Smarzynska (1999) argues that industries in the technological sectors or that use more advanced technology in their production processes are more concerned about protecting their technology and hence are more likely to enter directly in the form of a Greenfields investment. On the other hand, Saggi (2002: 204) argues that firms in industries

which are characterized by a fast changing technological environment will only be hurt for a short period of time by technology diffusion.

2.6 Potential Benefits

There are numerous benefits to countries able to attract FDI. These benefits can be divided into direct benefits; such as employment creation, supplementing local savings and improved foreign exchange reserves; and indirect benefits; such as technology transfer and enhanced efficiency. Most of these benefits are ultimately channels through which FDI leads to higher economic growth and development. Numerous studies (e.g. Basu et al., 2003; Li and Liu, 2005) have examined this link between FDI and growth. Despite methodological difficulties, such as reverse causation, most of these studies have found a positive relationship between FDI and economic growth, thus lending weight to the theoretical argument.

When MNCs enter the local market, they primarily employ local workers and thus there is a direct creation of jobs (Dupasquier and Osakwe, 2006: 243). Furthermore, a number of studies (De Soysa and O Neal, 1999; Borensztein *et al.*, 1998) have found foreign and domestic investment to be complementary, suggesting that the arrival of MNCs in the local market does not lead to significant job losses amongst already established local firms. Aaron (1999: 3) estimates that the direct employment effect of FDI in developing countries in 1997 was about 26 million jobs. Indirect employment through increased linkages with local firms i.e. the creation of new local firms in order to supply inputs to the MNCs can have an even larger effect on employment (Dupasquier and Osakwe, 2006: 243). Aaron (1999: 3) estimates a multiplier of 1.6 (1.6 indirect jobs created for every direct job created by the entry of an MNC).

Multinationals entering the market will also widen the tax base and will, depending on whether and the amount of fiscal incentives offered by the government, increase government revenues (Carim, 1994: 6).

Another benefit from FDI is that it can supplement local savings. The savings rate in many Less Developed Countries (LDCs), particularly in Africa is very low. FDI can

help to fill the gap between savings and required investment, thus helping with capital formation and hence growth (Dupasquier and Osakwe, 2006: 244).

FDI inflows may also assist a developing country build up foreign exchange reserves, thus allowing greater monetary stability and assisting with increased trade and global integration (Carim. 1994: 6)

The indirect benefits from FDI are just as important, if not more so, than the direct effects from FDI. The indirect benefits from FDI to a host country focus primarily on the transfer of advanced technology and management techniques from developed countries to the host economy. This improved technology will improve productive efficiency in the host economy, which in turn increases economic growth. This technology transfer can occur through a number of different channels.

There are four major channels through which FDI can lead to technology transfer to the domestic market:

- Demonstration effects – local firms can imitate multi-national firms' techniques. Reverse engineering and other similar procedures allow firms to 'learn-by-doing' (Saggi, 2002: 209).
- Labour training effects – workers trained by multi-national firms may transfer information and skills to local firms by switching employers or starting their own businesses via natural labour turnover. An excellent real-world example of the labour turnover effect was demonstrated in Bangladesh. Desh, a Bangladeshi garment manufacturer, though not strictly a MNC, benefited from very close ties to the Korean firm Daewoo. Eventually 115 out of 130 workers left Desh to set up their own firms or join newly established garment manufacturers (Saggi, 2002: 211).
- Competition effect – Multi-national firms are more efficient when first entering the market, this is necessary as they need to enter the market in the first place and they lack local knowledge and market share. So in order to survive they must have lower costs and higher productive efficiency. This will ensure that the market becomes more competitive and forces domestic firms to streamline and become more efficient themselves in order to compete. So their productivity will improve because of greater competition (Carim, 1994: 14).

- Vertical linkages – multinationals may transfer technology and skills to local firms that are potential suppliers of intermediate goods or buyers of their products (Saggi, 2002: 212). The Mexican automotive industry provides an example of the vertical linkages effect. Within 5 years of investments by major auto manufacturers there were over 300 domestic producers of automobile parts and accessories, of which 110 had annual sales of more than \$1 million (Moran, 1998).

The idea that foreign ownership of firms increases efficiency and as a result profitability and therefore, ultimately economic growth, is supported by empirical evidence. Perez-Gonzalez (2005) investigated firms' productivity after a foreign investor had gained more than 50% of the firm's equity i.e. total control. He found strong evidence suggesting that productivity, computed using data on future earnings, increases. These findings are further supported by a second paper by Chari et al. (2005). They show that there is a positive response in the stock market price of the firm following a foreign ownership takeover.

Basu et al. (2003) studied a panel of 23 countries for the period 1978 to 1996. Their results indicate that there is a long-run steady state relationship between FDI and growth.

Hansen and Rand (2006: 22) also find a positive relationship between FDI and GDP and estimated that a one percentage point increase in FDI leads to a 2.25% increase in GDP. They also find that 11 out of 14 previous econometric studies examining this relationship, similarly find a positive correlation between FDI and GDP.

Li and Liu (2005) used a dataset covering 84 countries, and encompassing both developed and developing countries, over the period 1970-1999. They conclude that FDI has a positive and statistically significant effect on economic growth in both developing and developed countries. They also find that this relationship has become more endogenous over time. FDI is attracted to a large market size and FDI leads to higher growth which in turn increases the market size further. Similarly, FDI is attracted to locations with high human capital and infrastructure, whilst FDI has a

positive effect on local skills and infrastructure resulting in a virtuous circle. Unfortunately it also means that those small, undeveloped countries struggling to attract FDI become even more unattractive to FDI over time.

This endogeneity is problematic when trying to isolate the effect of FDI on economic growth. However most studies that do test for Granger causality (Choe, 2003; Li and Liu, 2005; Zhang, 2001) agree that FDI does have an effect on growth (Hansen and Rand, 2006: 37)

2.7 Potential Costs

Despite the significant potential benefits to a host country able to successfully attract FDI, there are also a number of potential costs when encouraging huge multinational enterprises into a developing country.

One of the major criticisms of FDI centres on the relative size of most MNCs when compared to smaller developing countries. The turnover of many MNCs is many times larger than the GDP of many developing countries, resulting in the fear that MNCs may exert higher than optimal influence on these governments and their policies. This could result in a loss of sovereignty or in the MNCs 'capturing' the policymakers so that future policies are designed to benefit MNCs and not necessarily the economy or country as a whole (Carim, 1994: 10).

Not many developing countries would see the activities of TNCs as a threat to their sovereignty. [Some] countries... have been able to take advantage of TNC investment to increase employment, exports and government revenues, to improve living standards, and even to enhance their own national economic power. In particular, TNC inward investment, correctly handled, has proven to be an effective way of enhancing domestic management capacity and technological skills... and there is certainly now a new and more pragmatic approach. This derives from the belief that developing countries can structure their relationships with transnational corporations in ways that will ensure that the overall benefits... are not outweighed by negative factors (UNCTC, 1992: 4-5).

Multinationals have tended to be fairly good corporate citizens in practice. Most are law-abiding and work cooperatively with governments as generally the optimal policies and practices of the two entities coincide. For example, both MNCs and government would promote a favourable business environment as both will benefit (Carim, 1994: 10).

Controlling MNCs can be a difficult prospect. There is no supranational body to regulate and control their operations and the competing legal frameworks of the various host countries undermine the collective power of the individual governments. There are two issues for governments to address, firstly the feasibility and ability to exert some element of control over MNCs, and secondly whether there is political will to control MNCs (Carim, 1994: 11).

Another concern stems from the fact that MNCs generally raise most of their capital in the host country and may crowd out domestic firms from raising capital from domestic sources (Carim, 1994: 11). There is also a great deal of scepticism regarding the labour practices of certain multinationals, particularly those invested in footloose capital. These firms tend to leave at a moment's notice, which may result in the long-term costs exceeding the short-term benefits from such investment (Carim, 1994: 12).

Critics argue the benefits of FDI come at a considerable cost to governments and their citizens. The push to attract FDI frequently pressures governments to provide a climate that is more hospitable to foreign corporations, in the process potentially changing domestic economic policy and increasing inefficiencies rather than reducing them. In the extreme there is even the potential to challenge the sovereignty of the nation state and the capacity for democratic governance as large MNCs put undue pressure on weak developing governments (Jensen, 2003: 594).

However these arguments are generally baseless. Governments should always be aware that Foreign investment is only superior to domestic investment if it introduces new technologies to the market i.e. is more efficient than local firms. Any failure to take cognisance of this fundamental of FDI is a failure by government and the local bureaucratic processes rather than a criticism of FDI itself.

2.8 Fiscal Incentives

Due to the large potential benefits from FDI, governments attempt to attract FDI. One of the foremost methods of attracting FDI (though not necessarily the most effective) is by offering fiscal incentives such as tax holidays to potential investors. The trend has been an increasing number of governments offering such incentives as the potential benefits of FDI are further realised and as trade liberalisation and the resultant market integration has reduced the importance of other determinants of FDI, most notably market size (Blomstrom and Kokko, 2003: 2).

The economic rationale behind fiscal incentives is based on the spillover effects in the form of technology transfer from foreign firms, which can be modelled as a positive externality and will therefore be underprovided in a market. Hence subsidising this investment through fiscal incentives such as lower tax can be seen as simply correcting for market failure (Blomstrom and Kokko, 2003: 3).

In practice the reasons for offering tax incentives are more political in nature. Any government will find it difficult to back out of a bidding contest with another country for FDI as it will be viewed as a government failure and a loss of pride, given that politics and elections are all about public perception, this is a crucial factor and may result in a 'race to the bottom' with each country undercutting the others in an attempt to lure the FDI, even if the fiscal incentives far outweigh the potential benefits (Blomstrom and Kokko, 2003: 17). This situation can be modelled as a multi-person prisoner's dilemma, with the result that all countries end up worse off, whilst the MNC benefits (Morisset and Pirnia, 2000: 20).

Some of the perceived benefits from FDI, particularly increased employment, are immediately observable, whilst the costs are delayed and almost impossible to quantify (Blomstrom and Kokko, 2003: 17). Hence governments are encouraged to attempt to attract FDI and as a result may well overbid.

Fiscal incentives will primarily target efficiency-seeking FDI. Market-seeking FDI is drawn primarily by market size and complementary factors, whilst natural resource-seeking FDI is primarily attracted to natural endowments. Efficiency-seeking FDI however is drawn by the cheapest production location of which tax is a major determinant. Efficiency-seeking FDI focuses primarily on the export market and has

slim margins. As a result this form of FDI is footloose and will leave as soon as a more profitable location is available and is therefore not ideal for stimulating long-term growth and development within the host country. Nevertheless, in the short- to medium-term, whilst the FDI remains in the host country, it will benefit the country's economic growth, employment and development (Kransdorff, 2010: 71).

There are a number of different fiscal incentives available to governments in attracting potential foreign investment. The first option is for governments to simply maintain a low general corporate tax rate. The simplicity of the system itself is a major benefit and attraction as it reduces compliance costs for the MNC and reduces bureaucratic and administrative costs for the host country, whilst also reducing tax avoidance. A low general tax rate, as opposed to specific, targeted taxes also indicates the government's willingness to allow the market to work without interference to determine the most profitable investments. However, a low general tax rate will reduce the tax revenues, at least in the short to medium term before additional FDI enters the market to widen the tax base (Morisset and Pirnia, 2000: 13).

As a result, many governments rely on tax incentives which have a minimal initial effect on tax revenue and allow the government to target certain industries which would, theoretically, bring greater benefits to the country (Morisset and Pirnia, 2000: 14).

A popular and frequently used tax incentive is the tax holiday, which temporarily reduces the corporate tax rate. The primary benefit of the tax holiday is that a profitable firm will immediately benefit significantly, whereas the benefits from a lower general tax rate will accumulate slowly over time. As a result, tax holidays mainly benefit short-term investments in footloose industries and therefore fail to have as large an impact on the host country as would be desirable. Tax holidays also tend to reward investment in a new firm rather than reinvestment in a new firm and they penalise long-term investors (Morisset and Pirnia, 2000: 14).

Many countries, particularly in the developed world, also allow fast write-offs for investment expenditures. The advantage is that this incentive correctly targets the desired activity as the firm will only earn lower capital investments if it engages in

capital expenditure. Such an incentive also encourages firms to take a long-term view of their investment (Morisset and Pirnia, 2000: 15).

Lastly governments can reduce or even eliminate taxes for specific firms or industries. This allows government to target those firms which will distribute higher potential benefits (Morisset and Pirnia, 2000: 15). However, this assumes that government has perfect information and can correctly identify which firms will be most beneficial, which is unrealistic. Allowing the market to decide is more likely to produce optimal host country benefits. Secondly those foreign investors not offered preferential treatment may refuse to invest as a result and lastly such a discretionary system invites corruption.

UNCTAD (1995) illustrates just how high and costly fiscal incentives can be. They report that between 1983 and 1995, ranged from US\$14 000 per job, up to an astounding US\$254 000 per job for Volkswagen and Ford investing in Setubal, Portugal.

The majority of the literature finds relatively minimal effects of tax incentives on FDI inflows. Barlow and Wender (1955) and Robinson (1961) both conducted surveys of over 200 US firms. Both found that less than 20% of those surveyed listed taxes as an important determinant of FDI location decisions. Robinson (1961) also found an interesting dichotomy between the beliefs of private investors and government employees. Whilst the firms failed to identify taxes as important to FDI decisions, government listed it as the number one determinant of FDI decisions.

“Tax exemption is like a dessert; it is good to have, but it does not help very much if the meal is not there (Morisset and Pirnia, 2000: 6).”

In general, more recent surveys have found similar results (Fortune/Deloitte & Touche, 1997; Ernst & Young, 1994). If tax policy matters; it is certainly not the most influential factor in the site selection by multinationals.

Historically, most econometric studies tended to support the results of surveys that investors are mostly influenced in their decision by market and political factors and that tax policy appears to have little effect on the location of FDI (Root and Ahmed, 1978; Lim, 1983).

However, although relatively unimportant, this does not mean that tax incentives have no influence on potential foreign investment. Indeed, a number of theorists (e.g. Blomstrom and Kokko, 2003: 2; Kransdorff, 2010: 71) have argued that due to the increasing integration of global markets combined with increased liberalisation of financial markets, tax incentives are becoming an increasingly important differentiator between various potential investment location decisions. Ireland's tax policy has been touted as an important factor in its ability to attract foreign investment over the past two decades (Morisset and Pirnia, 2000: 8). Indeed Hines (1999: 309) found that a 1 percentage point reduction in the effective tax rate would increase FDI by approximately 2%, assuming a base corporate tax rate of around 30%.

Although fiscal incentives can help to attract FDI, there are a number of costs and risks associated with introducing such a policy programme. The most obvious and direct of these is the lost revenue which could have a highly detrimental effect on the fiscus, depending on the extent of the incentives and the level of development of the host country. The main loss is in the case when incentives are offered to investors which would have invested regardless. These free riders benefit to the detriment of all host country citizens (Kransdorff, 2010: 77).

Tax incentives can also cause distortions in the long run. Some economic activities will be pursued simply because they are artificially more profitable because of the incentives and not necessarily because there is a comparative advantage. Not only does this encourage projects with relatively low productivity, but it also draws vital resources away from potentially high productivity projects and industries (Kransdorff, 2010: 78).

Rent-seeking and corruption are also major issues associated with fiscal incentives. Firms that receive large tax breaks and other advantages, will want to maintain the status quo and may engage in pay-offs to government officials in order to ensure that is the case (Kransdorff, 2010: 78; Morisset and Pirnia, 2000: 22). South Africa has already experienced a similar case with its domestic fiscal incentive scheme. The former head of the small and medium Enterprise Development Program (SMEDP) was dismissed for alleged financial mismanagement and the programme suspended (Kransdorff, 2010: 78).

Tax incentives can also be highly complicated to administer, thus increasing compliance costs for the firms and the bureaucratic and administrative costs to the government, as well as increasing the likelihood of tax avoidance. These controls can also result in uncertainty and delays which increases the financial risk to investors and therefore reduces the attractiveness of the country as a potential investment location (Kransdorff, 2010: 78; Morisset and Pirnia, 2000: 22).

Whilst fiscal incentives can help to attract foreign investment, they are costly in terms of foregone revenue, administrative costs and can result in distortion in the market as well as rent-seeking or corruption. Empirical studies have indicated that there is no strong link between taxes and FDI although as markets continue to integrate and liberalise, taxes may be becoming an increasingly important differentiator between potential investment locations. Nevertheless the costs of incentives appear to outweigh the benefits, which are virtually impossible to quantify and so resulting in governments offering overly generous incentives. As a result, the least costly and distortionary way to attract FDI through lower taxes is by maintaining a simple, lower, general tax rate.

2.9 Global Determinants

There are numerous factors; economic, political, and social; that influence the spatial distribution of FDI. The determinants of foreign Investment will vary with type of investment i.e. market-seeking FDI will have different determinants to efficiency-seeking FDI. The determinants of FDI will also vary with geographical location, changing from country to country, region to region, situation to situation. However there are a number of determinants of inward FDI that tend to be universal, factors that are crucial to the attraction of FDI throughout the world.

Historically, the strongest and most influential factor in attracting FDI was market size. Nunnenkamp (2002: 6) found that strong correlations existed between absolute FDI flows and market size, which has been the case for the last 50 years at least. Janicki and Wunnava (2004: 508) find similar results when testing a sample of Eastern European EU (European Union) accession candidates.

Tsai (1994: 139) uses a simultaneous equations model in order to capture the endogenous effects of FDI and growth – higher growth rate may attract more FDI, which fosters higher growth rate and so on. He explains that a larger market size not only provides a larger market of consumers for MNCs engaging in market-seeking FDI, but also allows for more efficient utilisation of resources and allows firms to exploit economies of scale. Tsai (1994: 145) empirically finds that market size has a strong and statistically significant effect on FDI inflows to a given country.

Many economists (Addison and Heshmati, 2003: 6; Noorbakhsh et al. 2001: 1602) have argued that globalisation and increased integration has resulted in the determinants of FDI changing e.g. A Multinational Corporation (MNC) may now invest in a country but export the products i.e. efficiency-seeking FDI. Due to the increased liberalisation of trade this is now affordable. In this situation the main determinants of trade would be wage and other input costs as well as trade openness as opposed to the size of the local market. Empirical evidence (Nunnenkamp, 2002: 35) has so far failed to support such claims and market size remains a crucial determinant of FDI globally.

However one factor that has, undoubtedly grown in importance and universality is local skills and human capital. This is a vitally important factor in firstly attracting FDI and secondly taking advantage of it. Companies will only invest in a country if they will be able to employ people who have the necessary skills to run their business, otherwise there is no point. Furthermore many of the developing countries that have attracted the most FDI, particularly in Asia, have attracted it based on their level of technological innovation and levels of local skills. Noorbakhsh et.al. (2001: 1603) even go so far as to suggest that countries that attract FDI with low cost labour will attract significantly less FDI and experience significantly lower growth rates than countries which attract FDI due to high levels of human capital.

Noorbakhsh et al. (2001: 1596) conduct an econometric analysis to test for the effects of school enrolment on FDI inflows. They find that this proxy for local skills and human capital is strongly and significantly positively related to FDI inflows to those developing countries tested in the sample.

Addison and Heshmati (2003: 21) find a similarly strong positive correlation between secondary school enrolment and FDI. They go on to show that not only is local skills a strong determinant of FDI, but its importance has increased over time.

Local skills and education is not only important to attract FDI, but is also crucial for the host country to reap the benefits from foreign investment. MNCs may bring advanced capital into a country, but if the local population are unable to understand or use it, then it will have no benefit on the economy as a whole. Xu (2000: 491) estimated that a developing country needs to reach a human capital threshold of approximately 1.9 years (in terms of mean male secondary school attainment) in order to benefit from the technology transfer from US MNC affiliates. Borensztein et al. (1998: 125) similarly calculated a human capital threshold value required for developing countries to benefit from advanced technology transfer from MNCs. They estimated this value to be somewhat lower – at 0.51 years of mean male secondary school attainment.

Dunning and Zhang (2007) argue for the relevance of institutions as a major determinant of FDI. These would include laws and regulations; behavioural norms and customs; content and quality of local innovatory systems and the protection of intellectual property rights; and the extent of crime and corruption and social dysfunction. Durham (2004: 288), for example, argues that legal heritage, specifically the distinction between civil law, made by legislature (e.g. France, Germany), and common law, made by judges (e.g. British), can explain much of the variation in the measures of financial development. A good legal environment will protect entrepreneur's and investor's ideas and investments thus encouraging investment as there is little risk of this capital being expropriated on a whim as has been evidenced in much of Africa, notably the Zambian mines, which have been nationalised and then privatised again on at least three separate occasions (van de Walle, 1989: 604).

Gastanaga et al. (1998) and Wei (1997), amongst others, find that corruption has a significantly adverse effect on FDI inflows. They also find that corruption is correlated to other explanatory variables such as political and macroeconomic stability and thus corruption has an indirect effect as well as the direct effect on FDI flows.

Another major determinant of FDI is natural resource endowments. Developing countries with a rich endowment of natural resources tend to attract greater inflows of FDI. This is particularly true in Africa; Asiedu (2006) finds a strong correlation between FDI inflows and natural resources (share of minerals and oil in total exports) and market size for a sample of African states over time.

Conventional wisdom is that Multinationals prefer to invest in authoritarian regimes as a dictator can provide MNCs with preferential entry deals because of the lack of populist pressure and because the repression on labour unions drives down wages. There is some support for this viewpoint in the literature (Rodrik, 1999). However Jensen (2003: 592) shows that democracy is in fact positively correlated with FDI inflows. The reason for this, as explained by North (1990) and North and Weingast (1989), is that MNCs requires property rights to be credibly enforced. Under an authoritarian regime there is no reason why their capital and enterprise will not be seized or nationalised at short notice as has been evidenced in a number of African states; most notably Zimbabwe and Zambia. FDI is relatively illiquid *ex post* and therefore the credibility of democratic institutions is important for MNCs to reduce political risk (Jensen. 2003: 593).

Wage rates are another important factor in determining the potential location of FDI. For efficiency-seeking FDI, in particular, wage rates can be the defining factor in a Multinational's investment decision.

Both Janicki and Wunnava (2004) and Fazekas (2005) studied the effect on FDI of mean wage rates in the transition countries of Eastern Europe. These nation's economies are in a crucial stage of development as they shift from centrally controlled economies to market economies. Many of these economies shed numerous jobs e.g. Hungary lost 1.5 million jobs which was equivalent to 30% of the total employment following the collapse of the socialist economy (Fazekas, 2005: 85). As a result wages remained very low and FDI was attracted. The inflow of FDI to the region created numerous employment opportunities which has helped to stimulate economic growth in the region. Both papers also find strong evidence of a negative relationship between FDI inflows and average wage rates.

These results are supported by a number of other cross-country, panel-data studies (Addison and Heshmati, 2003; Chakrabarti, 2003; Jensen, 2003) which all find negative correlations between FDI and average wage rates across countries.

However, a number of authors have also argued and shown (Noorbakhsh et al, 2001; Xu, 2000) that attracting FDI on the basis of low wage rates may be less beneficial to the host country than other FDI as such a country may not have the absorptive capacity due to low levels of FDI to take advantage of the advanced technology transfer from the MNC affiliates. Secondly investment in these low-wage industries may be less technologically advanced than others and must certainly be labour-intensive for them to attract FDI on the basis of low wage rates. Such industries are less likely to engage in significant Research and Development (R&D) or even, necessarily, use particularly advanced technology.

Taxes are another important factor in the locational distribution of FDI. MNCs seek both lower taxes, as well as a simple and transparent and predictable tax environment (Carim, 1994: 12). As has been discussed previously, tax incentives and lower taxes can attract FDI (Blomstrom and Kokko, 2003: 2; Kransdorff, 2010: 71). However, many studies (Barlow and Wender, 1955; Robinson, 1961) have found that tax incentives have only a minimal benefit in attracting FDI, whilst the costs can be exorbitant.

Two fundamental conditions for foreign investment are profitability and investor confidence. Both of these are reliant on a stable political situation and macroeconomic policies that are consistent and transparent, and that help induce economic growth and encourage investment (Carim, 1994: 9). Greater political stability in a country will result in a higher probability of revenues being able to be appropriated by the multinational from sales made in that country. This effectively lowers the risk, which in turn allows the MNC to reduce the risk premium in the prices of its goods – reflected in the mark-up, which makes the MNCs more competitive in the local market. This will then make the location more attractive to FDI and so more FDI will flow into the country (Chakrabarti, 2003: 161).

The level of protectionism or openness of a country is another key factor for foreign investment decisions. Openness can work in two different ways: market-seeking FDI

may be more encouraged to invest if there is a high degree of protection for the market. High tariffs and NTBs make exporting relatively more expensive and so making direct investment a more attractive option for MNCs. Conversely, efficiency-seeking FDI aims to export most of its products from the host country and hence highly protectionist regime will have a strongly negative effect on the likelihood of such FDI investing in a given country (Chakrabarti, 2003: 161).

However, both market-seeking FDI and efficiency-seeking FDI require inputs to their production, given that they come from outside of the host market they are more likely to source, at least some of, these inputs from outside the host country. In this case they would be required to pay the high tariffs in a highly protected market, thus making them less competitive and hence less profitable and attractive to investment (Carim, 1994: 12).

Most studies (Addison and Heshmati, 2003; Chakrabarti, 2003; Moolman et al., 2006) find strong evidence that the degree of openness is positively correlated with FDI inflows.

There are a number of differing opinions on the effect of the exchange rate on FDI inflows. Chakrabati (2003: 162) argues that a stronger currency results in the profits made in the host country, translating into relatively higher profits overseas. He calls this the revenue channel. However he also identifies a cost channel, where certain immobile input factors will be relatively more expensive with a stronger currency. Therefore Chakrabati (2003: 162) argues that if the revenue channel exceeds the cost channel, FDI will flow into the country. Ngowi (2001: 119) argues that a country with a weak exchange rate will attract more FDI. Furthermore he argues that due to the cost of converting profits, the parent company will be more likely to reinvest profits locally.

Carim (1994: 17) claims that a lower real exchange rate will reduce the costs and therefore make investment more attractive. Moolman et al. (2006: 24), on the other hand, shows that in the South African case, a depreciation of the Rand/Dollar exchange rate results in significantly lower FDI inflows to the country. Gastanga et al. (1998: 1310) tests a panel data set comprising 49 developing countries over the

period 1970-1995, and finds that the exchange rate has no significant effect on FDI inflows.

A volatile exchange rate however, should reduce FDI. A more volatile exchange rate will make it much more difficult for firms to make long-term plans which are a fundamental part of FDI. It often takes more than 18 months from the time the decision to invest is made until the investment actually comes to fruition; therefore a widely fluctuating exchange rate and rampant inflation make it very difficult for the management to make informed decisions on cost structures and revenues. This makes the investment relatively more risky and hence will deter FDI (Fedderke and Romm, 2004: 8).

The availability and reliability of infrastructure will result in higher FDI inflows. Foreign firms require basic infrastructure such as a road network, telephone, internet, electricity, water, etc. If these are not reliably and freely available, it will make doing business that much more difficult, inefficient and costly – resulting in lower investment. Asiedu (2006: 72); Moolman et al. (2006: 23); and Addison and Heshmati (2003: 22) all use the number of fixed line and mobile users per 100 people as a proxy for infrastructure which, unfortunately, only captures the availability portion and not the reliability of the infrastructure. Both Asiedu (2006: 72) and Moolman et al. (2006: 23) found a strong positive correlation between FDI and infrastructure but Addison and Heshmati (2003: 22) report that the estimates for infrastructure were mostly insignificant.

Finally, another important determinant of a country's capacity to attract FDI depends on that country's policies towards FDI. Although this may appear as an obvious factor in attracting FDI, many developing countries try to attract foreign investment yet retain strongly anti-FDI policies and legislation (IFC, 1997: 29).

These restrictions can take many forms and are usually not aimed at restricting foreign investment but rather at protecting domestic firms. These restrictions include; restrictions on foreign ownership, forcing MNCs into JVs, with all their associated problems and costs; local content rules, where all products produced domestically must contain some percentage of locally sourced inputs; and official approval, where MNCs must seek official authorization which takes time and money. All of these raise

MNC's costs and reduce their benefits, thus reducing the appeal of the country as a potential investment opportunity and so deterring FDI (IFC, 1997: 30).

2.10 Africa-specific FDI

Like many countries around the world, African nations remained sceptical about the benefits of FDI up until the mid-1980s, during which African states maintained high barriers to trade and investment, whilst following import-substitution policies in order to protect domestic industries. However these perceptions began to change in the late 1980s as countries in the region have shifted towards outward-looking development strategies, including attracting FDI (Dupasquier and Osakwe, 2006: 242).

Despite this shift in policy, Sub-Saharan Africa (SSA) has been largely unsuccessful in attracting investment. Over the periods 1980-1989 and 1990-1998, FDI to SSA grew by 59% (excluding South Africa). This is compared to 5200% in Europe and Central Asia and an average of 672% for all developing countries (Asiedu, 2001: 2).

Africa's participation in the global economy has also fallen over time, Dupasquier and Osake (2006: 242) report that the region's share of world exports fell from 5.9% to 2.3% between 1980 and 2003. Meanwhile Africa's share of global FDI fell from 3.3% in 2003 to 2.7% in 2006 (Bartels et al., 2009: 248).

The FDI flows to SSA tend to be focused in the natural resources sector. The three largest recipients of FDI in the region between 2000 and 2002 were South Africa, Nigeria and Angola, who, between them, accounted for over 65% of the total FDI flows into the region. All three of these countries boast significant natural resource endowments, with South Africa the only country in the region that has attracted notable investment in non-natural resource industries (Asiedu, 2006: 63).

The fact that the majority of FDI attracted to the region goes into extractive natural resource industries is detrimental to the growth prospects of the region. Akinlo (2004) examined the effects on economic growth of FDI in extractive industries in Nigeria. The results show that foreign investment has an insignificant effect on economic growth and even that effect is only after a considerable lag.

There are several reasons why the growth effects of FDI are less in extractive natural resource sectors. The extractive sector is usually an enclave sector and hence has few linkages to the rest of the economy. Secondly the technology transfer from foreign firms to domestic ones will be less in the extractive sector as the technology is usually embodied in highly capital intensive production. Extractive industries also have large economies of scale and hence the presence of MNCs may crowd out domestic investment rather encourage new entrants as may occur in manufacturing. Lastly, backward and forward linkages are much less important in this sector (Akinlo, 2004: 628).

Whilst most of the general, global determinants of FDI apply in a similar fashion to SSA countries, certain factors are relatively more and less important in attracting FDI into Africa. Asiedu (2001: 13) finds a strong negative effect on her African dummy – countries in Africa attract less FDI simply because they are situated in Africa. She ascribes this result to two possible explanations: Firstly, the region is perceived as being inherently risky. Haque et al. (2000) provide empirical support for this explanation; they find that commercial risk-rating agencies frequently rate African nations as riskier than is justified by their fundamentals. A second possible explanation derives from a lack of investor knowledge of the region. Investment decisions may be led by inferences about neighbouring countries rather than about the actual situation and conditions within the potential investment location.

Asiedu (2001: 14-15) also finds that neither openness to trade nor higher returns on investment have a significant impact on FDI flows into African countries, despite having a significant effect on FDI inflows to non-SSA countries. This may be due to the relative riskiness and lack of credibility of governments in the region. Due to the high risk nature of the investment, higher potential returns may have very little additional impact on the investment. The lack of credibility of governments in the region means that liberalisation reform has little impact on FDI as it is not believed to be long-term. Previous reform in the region has tended to be ad hoc and liable to be reversed at a moment's notice.

Asiedu (2001: 16) determines that infrastructure development has little impact on FDI into Africa. She argues that this is due to the prevalence natural-resource based FDI which does not require a very high level of infrastructure development,

particularly with regards to the proxy of telephone lines. However in a later paper (Asiedu, 2006: 69), she finds that the influence of infrastructural development is a statistically significant determinant of FDI into Africa. Dupasquier and Osakwe (2006: 251) also argue that the lack of supporting infrastructure is a major constraint to FDI to the region.

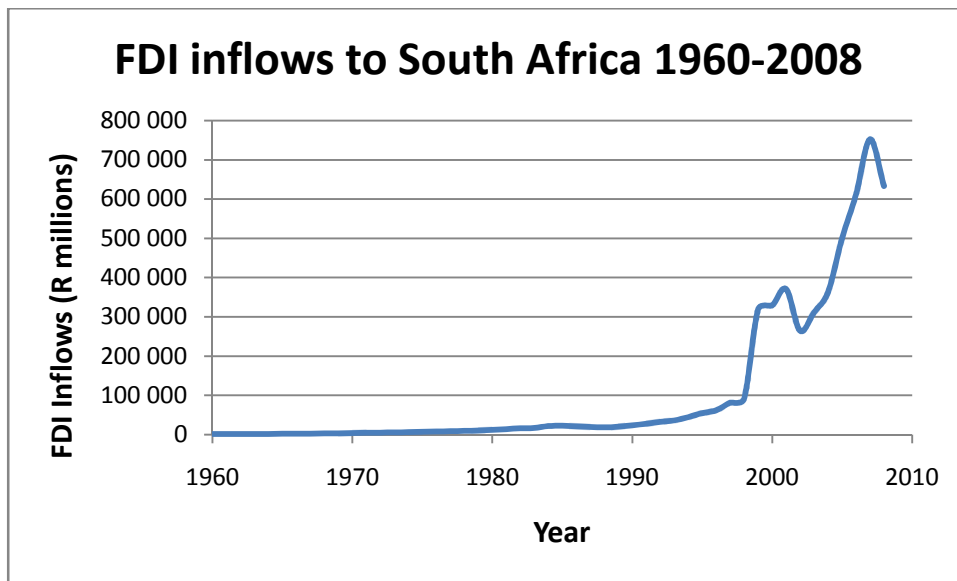
Both political and macroeconomic instability are major constraints to investment into the region. The high incidence of wars and civil unrest in the region makes potential investment risky. The frequently changing political regimes in many states also means changing official attitudes and policies towards FDI, further increasing the risk of investment (Dupasquier and Osakwe, 2006: 250). The high levels of macroeconomic instability also increase uncertainty and therefore risk for investors. The relatively frequent currency crashes and high inflation have restricted FDI inflows to the region (Dupasquier and Osakwe, 2006: 250).

Corruption and lack of transparent governance are also key restrictions to foreign investment. They increase the cost of investment as well as the uncertainty and undermine the rule of law. Asiedu (2006: 71) finds corruption to be strongly, negatively correlated with FDI inflows.

2.11 South Africa FDI

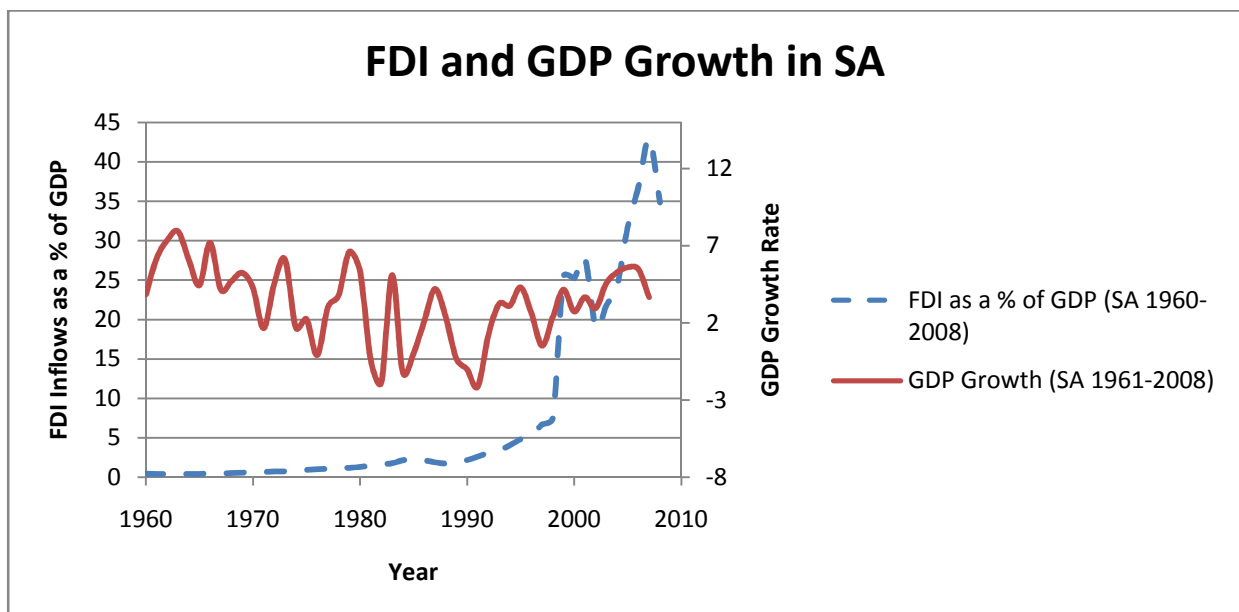
FDI inflows to South Africa have more than doubled over the last decade. Since the turn of the century South Africa has seen steady and significant growth in FDI inflows. This period has also coincided with the country's longest period of sustained positive annual economic GDP growth.

Figure 3



Source: Author's calculations based on South African Reserve Bank (SARB) data.

Figure 4



Source: Author's calculations based on South African Reserve Bank (SARB) data.

Following 1960 and the Sharpeville massacre, public sentiment towards South Africa around the world changed. Increasing civil tensions, political instability combined with greater government interference deterred numerous would be investors, whilst

some of those already invested in the country began to withdraw. This situation was further exacerbated following the Soweto riots of 1976. International sanctions were then placed on the country during the 1980s, meaning that investors began to leave in even greater numbers (Kransdorff, 2010: 72).

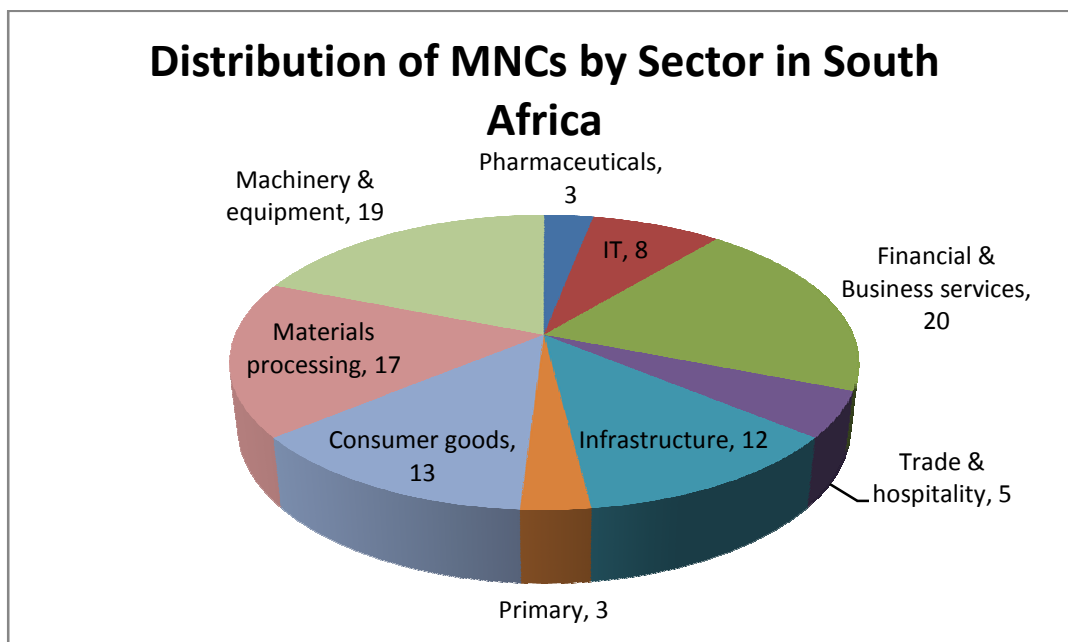
The political situation began to change in the early 1990s when the ruling Nationalist Party (NP) opened negotiations with the then banned African National Congress (ANC). These negotiations eventually produced the first democratic elections in the country's history.

"Please come and invest in my country."

- Nelson Mandela, 1994

The new governing party, the ANC, reopened the country's borders as it tried to attract FDI back into the country. The policy was met with only limited success during the 1980s, however, since 2000; FDI inflows into South Africa have seen huge increases.

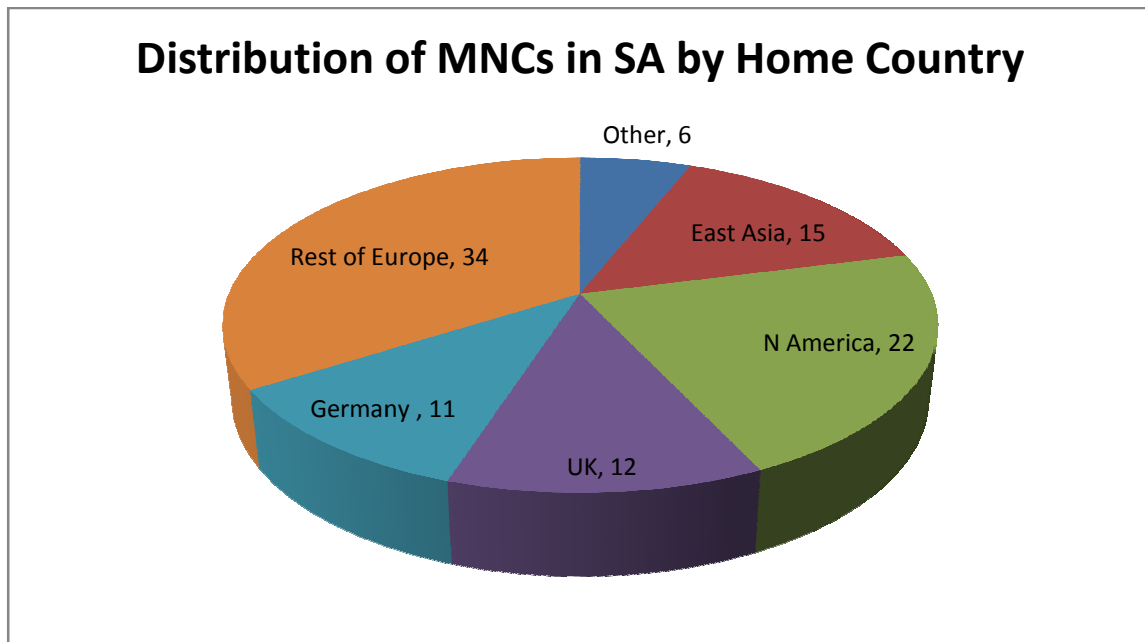
Figure 5



Source: Author's calculations based on data from Gelb, 2002: 3

The largest proportion of the firms during the 1990s went into Financial and Business services (20%) with machinery & equipment and Materials not far behind (19% and 17% respectively). Infrastructure (12%) and Basic consumer goods (13%) were also attractive destinations (Gelb, 2002:3).

Figure 6



Source: Author's calculations based on data from Gelb, 2002: 4

The US is the single most prominent country in terms of distribution of MNCs' home countries, with 18.5%. As a region, however, Europe is overwhelmingly dominant (Gelb, 2002: 4).

Bhaumik and Gelb (2005: 20) find that South Africa attracts more sophisticated MNCs than comparable developing countries, which spend relatively more of their revenues on R & D, which aids technology development and transfer to the local market. The affiliates in South Africa do not constitute a significant part of the MNC's worldwide operations.

Gelb (2002: 8) also found that a much larger proportion of FDI inflows to South Africa is in the form of acquisitions as compared to similar developing countries. 31% of the firms studied were full acquisitions with another 14% partial acquisitions, this is

compared to below 5% full acquisitions and about 10% partial in other countries studied. This may be attributed to the maturity of South Africa's equity market and may indicate that a large proportion of investors view the South Africa's asset base and structure as relatively similar to that which they are used to.

Fedderke and Romm (2004) tested for the determinants of FDI into South Africa between 1960 and 2002. They estimated a statistically significant correlation at the 5% level between 'LOG of real GDP' and FDI inflows. Their estimate of 'labour capital ratio' was also found to be statistically significant at the 5% level. Other statistically significant variables included average wage, corporate tax rate, a self-constructed property rights index, a self-constructed instability index and degree of openness to trade – exports/ GDP and imports/ GDP.

Moolman et.al. (2006) ran a similar analysis of South Africa's FDI inflows for the period 1970 – 2003. The most significant determinants of FDI for South Africa during this period according to this analysis included openness, which had a short term positive relationship on FDI as well as a long term positive relationship, market size was also found to be positively correlated with FDI.

Infrastructure was estimated to have a large positive impact on FDI, with a 5% increase in infrastructure resulting in a 9% increase in FDI inflows in the short-run and was estimated to raise the long-term equilibrium value of FDI by 0.4% (Moolman et al. 2006: 23).

Lastly Moolman et al. (2006: 24) estimated that the exchange rate level has a statistically significant relationship with FDI inflows. It was estimated that a depreciation of the Rand/dollar exchange rate would result in significantly lower FDI inflows to the country.

Hausmann et al. (2005) conducted a comprehensive analysis on South Africa's binding constraints to investment. This analysis included surveying the top executives at both South African and international companies about their perceptions of the investment environment in South Africa. It was largely on this document that the Accelerated Shared Growth Initiative for South Africa (ASGISA) was based. They identified the following six major constraints to investment:

- Level and volatility of the real exchange rate
- Trade policy. The panel explain that the existence of tariff protection on intermediate goods acts as a tax on industries using them as inputs
- The Labour market, Problems with the relative cost and riskiness of the labour relationship.
- There is a lack of skilled labourers.
- Obstacles to structural transformation namely information externalities
- Black Economic Empowerment (BEE) often acts as an additional tax on companies.

2.12 Conclusion

Global FDI flows have risen exponentially during the last two decades, both globally, as well as within South Africa. This is partly due to realisation by governments of the potential benefits of FDI for economic growth and development within the host nation. FDI can create employment and increase the country's foreign exchange reserves. However the indirect effects of FDI are potentially the most valuable for the host country, MNCs bring new, advanced technology into the domestic market. This technology can then be transferred to local firms and the economy in general through a number of different channels. This better technology improves efficiency, productivity and ultimately spurs economic growth and development.

Governments often offer fiscal incentives in order to attract MNCs to invest in their country. Although such incentives can help to attract foreign investment, they are generally very expensive and MNCs are usually more concerned with other factors when investing. These other factors include market size, which is a crucial and highly influential determinant for market-seeking FDI; local skills/ human capital, which is a crucial determinant and is growing in importance. Other determinants of FDI include, but are not limited to, institutions, openness, exchange rate, macroeconomic and political stability, infrastructure and wage rates.

CHAPTER THREE: METHODOLOGY

3.1 Theoretical Model

A popular method of determining the determinants of investment into a country is to survey a number of local managers as to what the major constraints to investment are (e.g. Hausmann et al. 2005; de Mello. 1997). This method can prove very useful in that it can raise new constraints that the researcher may not have previously considered and it asks those actually involved in the decision making process why they will or will not make a specific decision.

However there are also a number of problems with such an analysis. Firstly, this looks at individual problems and may not give an accurate representation of the big picture. Secondly the problem with surveys are that they are hypothetical and therefore what a person says and actually does may be two different things. Another important factor is that those surveyed may not actually have much say in investment decisions, certainly in big MNCs most investment decisions will be made by the parent company which will not be included in a survey. Lastly from a practical viewpoint, such a survey is expensive to conduct and similar surveys are conducted relatively frequently by a number of organisations, therefore conducting another will not add significantly to the present literature (Morgan and Sonquist. 1963: 417; Bertrand and Mullainathan. 2001: 68).

For these reasons it is better to look at FDI decisions historically – to see what MNCs have actually done in terms of investing and then try to postulate that the same determinants will hold in the future as well. For these reasons this paper includes a time-series regression analysis of the determinants of FDI inflows to South Africa.

3.2 Cointegration

3.2.1 Stationarity

A high proportion of time series data are non-stationary. A process is weakly stationary if its mean and variance are constant over time and the value of the

covariance between two time periods depends only on the distance or gap between the two time periods and not the actual time at which the covariance is computed. It is important to distinguish between stationary and non-stationary time series data because if a time series is non-stationary, we can study its behaviour only for the period under consideration and can make no future predictions. Furthermore all the usual statistical tests and measures, such as t-stats, F-stats and R^2 are not applicable in a non-stationary time series due to non-standard distributions (Gujarati, 2003: 803).

Therefore the first task is to test each dataset for stationarity. It is possible to use graphical analysis or a sample correlogram to test for stationarity, however both of these methods rely to some degree on the subjective opinion of the researcher. Therefore the accepted method in the literature (see Fedderke and Romm (2003); Moolman et al. (2006)) is to use a unit root test, specifically the Dickey-Fuller unit root test. The Dickey-Fuller method, tests for correlation between the time series at time t and the time series at time $t-1$.

$$Y_t = \rho Y_{t-1} + \mu_t \quad (1)$$

If these are perfectly correlated i.e. the estimated coefficient on the lagged variable, ρ , is 1, then we have a unit root and hence the series is non-stationary. In practice Y_{t-1} is subtracted from both sides of the equation giving us:

$$Y_t - Y_{t-1} = \rho Y_{t-1} - Y_{t-1} + \mu_t = (\rho - 1)Y_{t-1} + \mu_t \quad (2)$$

This can also be written as:

$$\Delta Y_t = \sigma Y_{t-1} + \mu_t \quad (3)$$

Where $\sigma = (\rho - 1)$ and Δ is the first-difference operator. Therefore we can run this regression and test the null hypothesis that $\sigma = 0$ and $\rho = 1$. If the null hypothesis is accepted then the series is non-stationary (Gujarati, 2003: 818; Davidson and Mackinnon, 2004: 614).

The statistics used to test the null hypothesis are called the tau statistics. These are calculated by dividing the estimated coefficient by its standard error. The critical values were estimated by Messrs Dickey and Fuller. The Dickey Fuller test is

estimated in three different forms under three different null hypotheses each with its own critical values.

Y_t is a random walk:

$$\Delta Y_t = \sigma Y_{t-1} + \mu_t \quad (4)$$

Y_t is a random walk with drift:

$$\Delta Y_t = \beta_1 + \sigma Y_{t-1} + \mu_t \quad (5)$$

Y_t is a random walk with drift around a stochastic trend:

$$\Delta Y_t = \beta_1 + \beta_2 T + \sigma Y_{t-1} + \mu_t \quad (6)$$

If the critical value exceeds the calculated absolute tau value then we fail to reject the null hypothesis and it can be concluded that the series is non-stationary.

A fourth test is the augmented Dickey Fuller (ADF) test. The DF test assumes no correlation in the μ_t . When the μ_t are correlated the ADF test is used. The ADF test augments the DF test by adding lagged values of the dependent variable ΔY_t :

$$\Delta Y_t = \beta_1 + \beta_2 T + \sigma Y_{t-1} + \alpha_i \sum_{i=1}^m \Delta Y_{t-i} + \varepsilon_t \quad (7)$$

Where ε_t is a white noise error term and $\Delta Y_{t-1} = (Y_{t-1} - Y_{t-2})$, $\Delta Y_{t-2} = (Y_{t-2} - Y_{t-3})$, etc (Gujarati, 2003: 818).

The results of the four Dickey-Fuller unit root tests for each of the variables are presented in the appendix in Table 1 on page 83. Most of the variables were found to be non-stationary data series, therefore creating a problem for analysis. One way to overcome the problem of non-stationarity is to take the first difference of the variables; in most cases this eradicates the non-stationarity. However the major problem with this method is that most economic theory is based on interactions between variables in level form and not in first-differenced form, furthermore it can make the interactions between variables significantly more difficult to interpret (Gujarati, 2003: 814).

3.3 Engle Granger Test for Cointegration

The second way to overcome the problem of non-stationarity is through the concept of cointegration. Cointegration is based on the premise that two or more non-stationary variables which have a long-run relationship will give stationary results for a linear combination of variables when regressed on each other (Gujarati, 2003: 823).

There are two ways to test for cointegration. The Engle-Granger tests for stationarity in the estimated error term of the cointegrating regression. It uses a very similar methodology to the Dickey-Fuller tests described above except that the time series tested is the estimated residuals from the cointegrating equation:

$$\Delta\mu_t = \sigma\mu_{t-1} + \varepsilon_t \quad (8)$$

The tau test is then conducted in the same manner although the critical values are slightly different to the DF critical values (Gujarati, 2003: 825; Verbeek, 2004: 318).

The absolute calculated tau values from the Engle Granger test for the six time series regressions range between 6.543 and 10.765, which are all statistically significantly higher than the critical value of 4.32 at the 1% level. This suggests that the series of estimated residuals is stationary and therefore all the regressions are cointegrating and are not spurious. Furthermore this result indicates that there is a long-run relationship between FDI inflows and the set of explanatory variables.

The advantage of the Engle-Granger method is that it is simpler and easier to understand and because it is widely used by practitioners specifically in a macro-modelling context (Moolman et al. 2006). However Johansen's method is a newer technique and overcomes the problem of multiple cointegrating relationships. Both methods yield the same long-run relationship in the case where the Johansen test shows that only one cointegrating vector is present amongst the variables included in the test.

If we assume a fairly standard simultaneous equation model in its structural form:

$$Y_t = \alpha_0 + \alpha_1 X_t + \alpha_2 Y_{t-1} + \mu_t \quad (9)$$

$$X_t = \beta_0 + \beta_1 Y_{t-1} + \beta_2 X_{t-1} + \mu_t \quad (10)$$

The corresponding reduced form model would be the following:

$$Y_t = \pi_{10} + \pi_{11}Y_{t-1} + \pi_{12}X_{t-1} + v_{1t} \quad (11)$$

$$X_t = \pi_{20} + \pi_{21}Y_{t-1} + \pi_{22}X_{t-1} + v_{2t} \quad (12)$$

A distinctive property of the reduced form model is that all its endogenous variables are expressed in terms of lagged endogenous variables only. This model constitutes a 'vector autoregressive model of order 1', because the highest lag length of its variables is one, denoted by VAR(1) (Seddighi et al. 2000).

A VAR(k) model written in matrix form is as follows:

$$Y_t = \delta + A_1 Y_{t-1} + \dots + A_k Y_{t-k} + v_t = \delta + \sum_{j=1}^k A_j Y_{t-j} + v_t \quad (13)$$

Where Y_t is a $n \times 1$ matrix, k is the lag length, δ deterministic terms and v_t an error term.

This can be rewritten as

$$\Delta Y_t = \sum_{j=1}^{k-1} \Gamma_j \Delta Y_{t-j} + \Pi Y_{t-k+1} + v_t + \delta \quad (14)$$

Where $\Pi = \alpha\beta$

α is referred to as the loading matrix, containing the short-run dynamics, while β is the matrix containing the long-run equilibrium (cointegrating) relationships. The rank, r , of the matrix represents the number of cointegrating vectors and is tested using Johansen's method, using the standard trace and maximal eigenvalue statistics (Fedderke and Romm, 2004: 15).

There are two major drawbacks to Johansen's method. Firstly it is difficult to interpret the results. Secondly one has to model all the variables at the same time, which will be a problem if the relation of some variable is flawed and may give bias to the whole system (Sorenson, 2005).

3.4 Error Correction Mechanism

The Error Correction Mechanism (ECM) corrects for disequilibrium in the cointegrating relationship. The Granger representation theorem states that if two variables are cointegrated, then the relationship can be expressed as ECM in equation (9) as:

$$\Delta Y_t = \alpha_0 + \alpha_1 \Delta X_t + \alpha_2 \mu_{t-1} + \varepsilon_t \quad (15)$$

This equation states that ΔY_t depends on ΔX_t and also on the equilibrium error term. If α_2 is statistically different from zero then it means that Y_t does not adjust fully to changes in X_t in the same time period. α_1 can be interpreted as the short-run effect of X_t on Y_t whilst the cointegrating equation gives the long-term effects of the X s on Y_t . This effect also holds for the multivariate regression (Seddighi et al, 2000: 286).

3.5 Panel Data Techniques

“A panel data set contains repeated observations over the same units (in this case sectoral FDI), collected over a number of time periods (Verbeek, 2004: 341).”

There are a number of advantages of using panel data in economic analysis:

- As the data relates to the same units over time, there is certain to be heterogeneity in these units. Panel data techniques can take this heterogeneity explicitly into account (Gujarati, 2003: 637).
- Panel data is not just suitable for capturing or explaining why units behave differently but also models why a given unit behaves differently during different time periods (Verbeek, 2004: 342).
- Panel data, due to its greater scope captures and models certain effects that are not captured in a pure time series or cross-sectional model (Gujarati, 2003: 638).
- Lastly, more specific to this study, using panel data creates a much larger sample. As both cross-sectional and time-series data is included, there are many more observations. Much of the South African data is only reliable and complete since the early 1990s. A pure time-series analysis for such a short

period would not allow for a complete multivariate analysis due to the lack of degrees of freedom hence Panel data overcomes this problem.

There are two major panel data techniques: fixed effects and random effects. The Fixed Effects Model (FEM) is because, although the intercept may be different across units, each unit intercept does not vary over time, it is time invariant. To allow for the fixed effect intercept to vary between units, dummy variables are introduced, in particular differential intercept dummies (Gujarati, 2003: 642).

The Random Effects Model (REM) assumes that the dummy variables actually represent a lack of knowledge about the true model. REM proposes to express this 'ignorance' through the error term (Gujarati, 2003: 647).

The appropriate model for this panel data regression will be the fixed effects model (FEM). The FEM makes use of dummy variables to test for the different effects of each specific factor over time. It is also possible to create a dummy variable for each specific year in order to test for the fixed time effects; however it will be more appropriate in this case to introduce a trend variable in order to test for the time effect for two main reasons. Firstly, the effect of a specific year on FDI inflows is neither particularly interesting nor instructive to our analysis, we are more interested in the trend of FDI over time – whether it is increasing or decreasing over time. Secondly introducing dummy variables for each specific year will significantly erode the number of degrees of freedom, which was one of the initial reasons for undertaking the panel data analysis, and, apart from a few exceptions, the individual year dummies are unlikely to be statistically significantly different from each other.

The FEM model is the appropriate panel data model to use in this analysis due to the fact that we have the entire population of sectors in the model – the individuals in the sample are 'one of a kind', and therefore cannot be modelled as a random draw from an underlying population as is the case with REM. We are not testing for a larger population mean as in the Random Effects Model (REM) but rather for the individual differences in investment between sectors (Verbeek, 2004: 351).

The theoretical FEM model is as follows:

$$Y_{it} = \alpha_1 + \alpha_i D_i + \beta_i X_{it} + \mu_{it} \quad (16)$$

Where Y_t is FDI inflows, D_i is the dummy variable for each specific sector of the economy, it takes a value of 1 for that sector and 0 otherwise; and X_{it} are all the explanatory variables over space and time (Gujarati. 2003: 311).

3.6 Statistical Problems and Tests

The sample size is 48 with a total of 12 explanatory variables leaving 36 degrees of freedom. The sample size is not particularly large and is therefore vulnerable to small-sample biases and distortions. However the data only goes back as far as 1960 and although small, the sample-size is not tiny. It should be large enough in order to do some meaningful analysis. Gujarati (2003: 356) defines a large sample as being 40-50 observations and Moolman et al. (2006) and Fedderke et al. (2004) both run similar regressions with even smaller samples. Therefore the relatively small sample is something that needs to be kept cognisant, but should not be a major problem.

There are a number of potential statistical problems with any econometric regression. These include perfect multicollinearity, autocorrelation and heteroskedasticity. Should any of these be present in a given regression, they may render it spurious and therefore unusable. Hence it is important to understand each problem and then correct for it, should it be present in the regression.

3.6.1 Multicollinearity

Multicollinearity occurs when there is a linear correlation between two or more of the explanatory variables in a regression model (Gujarati, 2003: 341). This results in the estimators having large variances hence making precise estimation difficult. The t stats of some of the coefficients tend to be incorrectly reported as statistically insignificant. The R^2 , the overall goodness of fit, can also be incorrectly reported as very high. Thus the presence of multicollinearity can result in distorted regression results.

There are a number of different methods to test for multicollinearity. The first evidence of multicollinearity being present is very high R^2 while there are very few statistically significant t-stats (Gujarati, 2003: 359).

The variance inflation factor (VIF) increases as the collinearity of X_j on the remaining regressors increases. As a rule of thumb, if the VIF of a variable exceeds 10, which will happen if R^2_j exceeds 0.9, that variable is said to be highly collinear (Gujarati, 2003: 360).

A third test for multicollinearity is high pair-wise correlations among regressors. If the pair-wise or zero-order correlation coefficient between two regressors is high, >0.8 , then multicollinearity is a serious problem (Gujarati, 2003: 362).

There are a number of potential solutions to the problem of multicollinearity. The first is to drop collinear variables from the model. However one has to be very careful when dropping variables. The model is based on economic theory and so dropping variables to get rid of multicollinearity is not based on economic theory and is therefore ideologically unsound. Furthermore it can cause specification bias which is a more serious problem than multicollinearity (Gujarati, 2003: 364).

Another potential solution is to transform the data by first-differencing the variables and then running those variables in the regression. However, the economic theory is based on the variables being in level form and therefore using first-differenced variables would not provide an easily interpreted result (Gujarati, 2003: 364).

The final solution would be to find and use new data. This would be the best solution. Unfortunately this is the data for the period and there is no other data for the period in South Africa. Better proxies, particularly for skills, may help the problem but finding this data is unfortunately not possible either as explained previously (Gujarati, 2003: 364).

Blanchard suggests that econometricians might do nothing if multicollinearity is present as every remedy for multicollinearity has a drawback of some sort and the cure may be worse than disease (Gujarati, 2003: 363).

3.6.2 Autocorrelation

Autocorrelation occurs when the error terms are correlated i.e. there is a systematic pattern among the residuals. Autocorrelation will result in the coefficient estimates being inefficient. The usual t and F test are no longer valid and the R^2 will be incorrect (Verbeek, 2004: 97).

The first test for autocorrelation is the Durbin-Watson d test. If the reported d statistic is equal to 2 then there is no autocorrelation present in the model. The d test, however, has a couple of drawbacks. If it falls in the 'indecisive zone', one cannot conclude whether or not autocorrelation is present. Secondly if the model contains lagged values, the d stat is often around 2 even if autocorrelation is present. Furthermore the d stat only identifies first order AR(1) autocorrelation (Gujarati, 2003: 467; Verbeek, 2004: 102).

The Breusch-Godfrey (BG) test is another test for autocorrelation and is considered more general than the Durbin-Watson d test as it allows for nonstochastic regressors such as lagged values, higher-order autoregressive schemes and simple or higher order moving averages of white noise error terms (Gujarati, 2003: 472).

3.6.3 Heteroskedasticity

Heteroskedasticity is another violation of the classical linear regression model and means that the disturbances μ_i do not all have the same variance. In the presence of heteroskedasticity, the coefficient estimates are inefficient, making precise estimation difficult. Hence persisting with the usual testing procedures despite heteroskedasticity being present, may lead to misleading results and inferences (Gujarati, 2003: 394; Verbeek, 2004: 82).

White's test is a widely used method to establish whether heteroskedasticity is present in the regression model. The test entails first estimating the residuals μ_i . Then an auxiliary regression is run in which the squared residuals from the original regression are regressed on the original regressors. Under the null hypothesis that there is no heteroskedasticity, the sample size (n) multiplied by the R^2 from the auxiliary regression follows the chi-square distribution (Gujarati, 2003: 413; Verbeek,

2004: 92). If the calculated test statistic exceeds the critical value, then we reject the null-hypothesis of constant error variance and conclude that there is heteroscedasticity. If not, then we do not reject the null-hypothesis and conclude that there is no evidence of heteroscedasticity.

White also provides a remedial measure in order to correct for heteroskedasticity. This procedure allows statistical inferences to be made about the true coefficient values (Gujarati, 2003: 417).

3.7 Econometric Model

The econometric model used is a time series model which includes a number of hypothesised determinants of FDI inflows into South Africa. GDP_{t-1} provides a proxy for market size as the size of the potential market is an important factor in MNC's decisions on where to invest. The end of the Apartheid system caused a fundamental change in South Africa's economy and therefore the change in regime had a large impact on potential FDI into the country, hence an Apartheid dummy is included in the model. Openness to trade is a strong complimentary factor to FDI inflows – it acts as a proxy for the openness of the country to investment, whilst openness to trade in itself is also an important determining factor for efficiency-seeking FDI. Government Expenditure indicates the degree of state intervention within the economy; if too low, then essential and basic services will not be provided thus deterring potential FDI, however, if government expenditure is too high then this indicates a high level of government intervention in the economy – also a deterrent to potential FDI. The exchange rate is important to potential investors as its relative strength will impact on the cost of potential investment as well as the value of repatriated profits. A more volatile exchange rate makes long term planning, generally an important dynamic in foreign investment, that much more difficult. Similarly macroeconomic instability creates uncertainty and therefore increases the risk to investors; The ALSI volatility proxies this effect. Infrastructure is crucial to all business endeavours. The higher the infrastructure within a country, the more likely, MNCs will be willing to invest in that country. Lastly the trend captures the effect of the world's general move towards greater integration and globalisation. FDI has

been increasing over time and some of this increase is due to a general global movement toward free market ideology as well as the increase in technology over time, which makes communication and transportation cheaper and easier.

The econometric model that will be used in this model is as follows:

$$\ln\text{FDI}_t = \beta_0 + \beta_1\ln\text{GDP}_{t-1} + \beta_2\text{AD}_t + \beta_3\text{OPEN}_{t-1} + \beta_4\text{GEXP}_t + \beta_5\text{EXCH}_t + \beta_6\text{EXCHV}_t + \beta_7\text{JSEV}_t + \beta_8\text{INF}_t + \beta_9\text{T}_t + \mu_t \quad (17)$$

Where the natural log of real annual Foreign Direct Investment inflows into South Africa in the current period ($\ln\text{FDI}_t$) is the dependent variable. A Log-linear model is used as the estimated coefficients are easier to interpret intuitively than in a linear model as they indicate percentage change in FDI rather than absolute change. The variable does not include portfolio flows and is adjusted to constant 2005 prices and is measured in millions of Rand. The data is sourced directly from the South African Reserve Bank (SARB).

3.8 Independent Variables

3.8.1 Market Size ($\ln\text{GDP}_{t-1}$)

Annual GDP is a proxy for market size, therefore it would be expected that the higher real GDP is the higher FDI inflows will be. Therefore the relationship between these two variables is expected to be positive. Similarly the relationship between economic growth and FDI would be expected to be positive (Nunnenkamp, 2002: 6; Janicki and Wunnava, 2004: 508). If growth is higher then GDP will also be higher meaning growing market size, furthermore, economic growth indicates political and economic stability and countries that exhibit high growth rates tend to implement policies that attract FDI. The GDP data in this model is sourced from the SARB and is adjusted to 2005 prices and measured in millions of Rands. This variable is logged and lagged. The variable is logged so as to work in percentages rather than absolute figures as it makes is more intuitive to explain the effect of a percentage change in GDP, rather than a absolute change. The variable is lagged by one period as any potential

investor would only be aware of GDP for the previous year and hence that is the valid measure. Braga Nonnenberg and Cardoso de Mendonca (2005) showed in their panel data analysis of 38 countries that GNP growth rates in the previous period were significantly positively correlated with FDI flows in the current period but not GNP growth in the current period.

3.8.2 Apartheid Dummy (AD)

South Africa's political landscape saw a major change in 1994. Prior to that year all non-white citizens were excluded from voting and therefore from society and the economy in any real sense. As a result numerous countries imposed sanctions on South Africa. Furthermore the nature of the government and constitution changed between the two time periods. Prior to 1994 South Africa was considered an undemocratic country and there was a relatively high political risk associated with investments into South Africa due to ongoing conflicts arising from the suppression of non-whites.

North (1990) found a positive relationship between the presence of and degree of democracy and FDI, whilst Asiedu (2006) finds a strong negative correlation between political turmoil and FDI. The Apartheid dummy will capture the fundamental change that occurred in South Africa in 1994, which will include the effects described by North and Asiedu. We would therefore expect higher FDI inflows to be related with the post-1994 period.

The base category for the dummy variable is defined as the period prior to 1994. Therefore the dummy variable takes on a value of 0 for the period 1961-1993 and a value of 1 for the period 1994-2008. A second regression will also test the impact of the period of 'maximum closure' between 1980 and 1993 as suggested by Fedderke and Romm (2004: 25). This was the period of most significant and formal trade and investment sanctions against South Africa and hence may be more appropriate than a general Apartheid Dummy.

3.8.3 Openness to Trade ($OPEN_{t-1}$)

Openness to trade is an important determinant of FDI inflows and is growing in importance over time. Openness to trade gives a good idea as to how open a country is to foreign capital i.e. if a country has very few barriers to trade then it is likely that it will have few barriers to capital, therefore making it easier and cheaper for FDI inflows. Furthermore in the more recent past, more multinationals have begun to focus on exporting. Previously FDI was generally focused on the local market, however increasingly, FDI looks to export, and therefore low barriers to trade are important for any potential FDI (Addison and Heshmati. 2003). The openness variable is lagged one period and is calculated as $(\text{exports} + \text{imports})/\text{GDP}$. The data is sourced from the SARB.

3.8.4 Government Expenditure ($GEXP_t$)

National government expenditure as a percentage of GDP is another important factor for MNCs when determining investment. We would expect the relationship between government expenditure and FDI to be an inverted U shape. MNCs require that government expenditure is at a reasonable level in order to suitably provide the required public goods, good business environment, infrastructure etc. that are required to effectively conduct business. However firms are generally averse to a high level of government expenditure as this indicates a high level of government intervention in the economy and higher taxes.

3.8.5 Macroeconomic Stability ($JSEV_t$)

Macroeconomic stability is an important determinant of FDI inflows. Stability reduces the risk of investment and allows for profits to be successfully appropriated by MNCs (Chakrabarti, 2003: 161; Carim, 1994: 9). Inflation is frequently used in econometric analyses as a proxy for monetary discipline and macroeconomic stability. A high inflation rate suggests lack of discipline on the part of policymakers and makes it more difficult to do business. Bengoa and Sanchez-Robles (2003) found that the rate of inflation was significantly negatively correlated to FDI inflows. However, as many

of the variables, including FDI, GDP and Government Expenditure, are already corrected for inflation, introducing inflation as an independent variable would create a specification error. Hence I have included a measure of volatility from the Johannesburg Stock Exchange (JSE) All-Share Index (ALSI) as a proxy for macroeconomic stability or lack thereof. The variable is calculated as the sum of the squared differences between ALSI each month for a specific year i.e. $(\text{Jan} - \text{Feb})^2 + (\text{Feb} - \text{Mar})^2 + \dots + (\text{Nov} - \text{Dec})^2$. Due to the increasing index values over time, the calculated volatility will naturally increase over time, hence in order for the values to be comparable over time, this calculated volatility measure will then be calculated as a proportion of the end of year All Share Index, in this way controlling for the impact of inflationary pressures. This then measures the volatility in the ALSI which is a proxy for the economy as a whole. The data was sourced directly from the JSE.

3.8.6 Exchange Rate (EXCH_t) and Exchange Rate Volatility (EXCHV_t)

There are a number of differing opinions on the effect of the exchange rate on FDI inflows. Chakrabati (2003) argues that a stronger currency results in the profits made in South Africa translating into relatively higher profits overseas. He calls this the revenue channel. However he also identifies a cost channel, where certain immobile input factors will be relatively more expensive with a stronger currency. Therefore Chakrabati (2003) argues that if the revenue channel exceeds the cost channel, FDI will flow into the country. Ngowi (2001) argues that a country with a weak exchange rate will attract more FDI. Furthermore he argues that due to the cost of converting profits, the parent company will be more likely to reinvest profits locally. The exchange rate data is sourced from the SARB.

A volatile exchange rate however, should reduce FDI. A more volatile exchange rate has a similar effect to higher inflation, in that it makes it much more difficult for firms to make long-term plans which are a fundamental part of FDI. It often takes more than 18 months from the time the decision to invest is made until the investment actually comes to fruition; therefore a widely fluctuating exchange rate and rampant inflation make it very difficult for the management to make informed decisions on cost structures and revenues. This makes the investment relatively more risky and

hence will deter FDI. Exchange rate volatility is calculated as the difference between the exchange rate in two consecutive periods squared.

3.8.7 Infrastructure (INF_t)

A higher quality and more extensive infrastructure is likely to result in higher FDI inflows. Foreign firms require basic infrastructure such as a road network, telephone, internet, electricity, water, etc. If these are not reliably and freely available, it will make doing business that much more difficult, inefficient and costly resulting in lower investment. Moolman et al. (2006) found that a 5 per cent increase in infrastructure (using the proxy of number fixed telephone subscribers per 100 citizens) increases FDI by approximately 9 percent in the short-term. In this analysis the number of fixed line and mobile users per 100 people will be used as a proxy for infrastructure. Telephone subscribers are a commonly used proxy for infrastructure in the literature (see Asiedu, 2006) and are therefore appropriate in this analysis. The data is courtesy of the World Bank's world development indicators.

3.9 Panel Data Model

As explained previously, the advantage of introducing the panel-data model is twofold. Firstly the model allows me to test for sector-specific determinants of FDI – it will give an idea as to which sectors in the South African economy attract relatively more FDI, *ceteris paribus*. Secondly, the panel data model contains significantly more degrees of freedom which allow the model to focus purely on the determinants of FDI since 1994 (and the end of Apartheid). The data is more complete and reliable during this, more recent period, whilst it is also expected that due to the fundamental change in the political environment and hence the economic environment, the determinants of FDI may be different post-1994, compared to the determinants pre-1994. Three additional variables are also added to this model, as compared to the time series model, due simply to their limited availability prior to 1990. These three variables include; education, which is a very important determinant of FDI – if a host country does not have available skills, then MNCs will not be able to produce within

that country and hence will not invest; labour productivity; and labour costs. The cost and productivity of labour is also crucially important to MNCs as these variables impact directly on their production costs and hence profit margins.

$$\ln FDI_{it} = \alpha_0 + \alpha_1 SD_2 + \alpha_2 SD_3 + \alpha_3 SD_4 + \alpha_4 SD_5 + \alpha_5 SD_6 + \alpha_6 SD_7 + \alpha_7 SD_8 + \alpha_8 SD_9 + \beta_1 \ln GSP_{it-1} + \beta_2 LABP_{it} + \beta_3 LABC_{it} + \beta_4 EXCH_{it} + \beta_5 EXCHV_{it} + \beta_6 GEXP_{it} + \beta_7 JSEV_{it} + \beta_8 INF_{it} + \beta_9 EDUC_{it} + \beta_{10} T_{it} + \mu_t \quad (18)$$

In this model SD stands for Sectoral dummy and captures the differential effects of specific sector on FDI into that sector.

SD₁ is not included in the model to avoid falling into the dummy variable trap of perfect multicollinearity. SD₁ is therefore the base category and α_0 captures the constant for SD₁ whilst α_1 to α_8 capture the respective difference from the base category of their respective sectors.

SD₁ – Agriculture, Forestry, Hunting and Fishing

SD₂ – Mining and Quarrying

SD₃ – Manufacturing

SD₄ – Electricity, Gas and Water

SD₅ – Construction

SD₆ – Wholesale and Retail trade, Catering and Accommodation

SD₇ – Transport, Storage and Communication

SD₈ – Financial Intermediation, Insurance, Real Estate and Business Services

SD₉ – Community, Social and Personal services

3.9.1 GDP by Economic Activity (GSP)

This variable measures real output from each economic activity and serves the same purpose as GDP in the previous model – a proxy for the size of the market in each specific sector. This data is courtesy of the SARB.

3.9.2 School Enrolment (EDUC_t)

Another vital determinant of FDI is skills and education levels. Companies will only invest in a country if they will be able to employ people who have the necessary skills to run their business, otherwise there is no point. Furthermore many of the developing countries that have attracted the most FDI, particularly in Asia, have attracted it based on their level of technological innovation and levels of local skills (Noorbakhsh et.al, 2001). Unfortunately, complete and reliable data for any proxy for skills/education is not available for South Africa prior to 1990. The most complete data available is on percentage of children enrolled in secondary education. This gives a relatively good measure of skills/ education, although should be lagged at least 5 years as this is how long secondary school takes. The data is courtesy of the World Bank's development indicators.

3.9.3 Labour Productivity (LABP) and labour Costs (LABC)

Labour costs and productivity are another important determinant of FDI, particularly for efficiency-seeking FDI. Both Janicki and Wunnava (2004) and Fazekas (2005) found a strong correlation between wage costs and FDI in Eastern European countries. These results are supported by a number of other cross-country, panel-data studies (Addison and Heshmati, 2003; Chakrabarti, 2003; Jensen, 2003) which all find negative correlations between FDI and average wage rates across countries. The data is sourced from the SARB's quarterly bulletins. This reported data is calculated from basic data provided by Statistics South Africa, and originates from ongoing Surveys of Employment and Earnings.

The data is calculated relative to other years. So both Labour Productivity as well as Labour Costs is calculated relative to the year 2000, in which both variables are assigned a value of 100.

CHAPTER FOUR: DISCUSSION OF RESULTS

4.1 Time Series Model

The regression was run with the dependent variable, annual FDI inflows, in natural logged form. The Log-linear model's coefficients are easier to interpret intuitively. The results are presented in Table 1 on page 58.

4.1.1 Multicollinearity

The R^2 from all the regressions is above 0.95, however, a number of the coefficient estimates within all the regressions are statistically significant. Nevertheless there are also a number of estimates within the regressions that are not statistically significant. Hence based on the R^2 stat and t-stats it is not clear whether multicollinearity is present within the time series model.

The second test for multicollinearity is the VIF test. The VIF stats for almost all of the variables in all the regressions remain below the critical level of ten. In regression 2, the VIF for Openness and LaglnGDP both exceed ten. Whilst in regression 4, the VIF for Openness and Infrastructure both exceed ten. However all other variables VIF stats in all the other regressions, remain below ten.

The correlation matrix indicates only two instances of high pairwise correlations, above 0.8. Firstly the pairwise correlation between Government Expenditure and LaglnGDP, and secondly between Openness and the Sanctions dummy. Both of these relationships are easy to interpret: a higher GDP would mean that governments will likely earn more revenue and so be able to spend more. The second link shows that exports and imports to and from South Africa declined when sanctions were imposed. All other pairwise correlations are below 0.8.

These results indicate that while there is some limited evidence of multicollinearity within the time series model, particularly between specific variables, this is not a major problem in the model and that, as Blanchard suggests, doing nothing is the best solution in this case, as other solutions will almost certainly result in a

misspecification of the model. Furthermore all coefficient estimates have the correct signs – further indicating that multicollinearity is not a major problem in the model.

4.1.2 Autocorrelation

The reported d-stat in this model ranges between 1.4987 and 1.7543 for the different regressions, suggesting no autocorrelation.

The BG test critical values follow the chi-square distribution. In this model the calculated BG statistic is 1.596 which is significantly lower than the critical value of 11.8076 at the 5% level of significance. This means that we can accept the null hypothesis that no autocorrelation is present in this model.

4.1.3 Heteroskedasticity

Within the time series regression model, the calculated test statistics from White's test range from 8.754 and 14.422, which are all below the critical chi-squared value at the 10% level of statistical significance. We can therefore conclude that heteroskedasticity is not a major problem in this model

4.1.4 F-Stat

The reported F statistics for the models are all well in excess of the critical F-stat, with all being significant at the 1% level of significance, indicating that the regressors as a whole fit the model very well and together are highly statistically significantly different from zero.

Table 1 . Time Series Regression Results

Regression	(1)		(2)		(3)		(4)		(5)		(6)	
Variable Name	Estimates	(t-stat)	Estimates	(t-stat)	Estimates	(t-stat)	Estimates	(t-stat)	Estimates	(t-stat)	Estimates	(t-stat)
Ln GDP Lagged	3.28386***	(7.74)	2.522271***	(3.90)	3.44334***	(9.42)	4.48607***	(8.56)	1.6667452***	(3.24)	1.435672***	(3.24)
Apartheid Dummy	1.032119***	(3.89)	0.507543*	(1.94)					0.2842389	(1.21)		
Sanctions Dummy					0.3376782*	(1.79)	0.46933***	(3.93)				
Openness lagged	0.0430963***	(3.26)	0.0122772	(1.02)	0.0003154	(0.02)			0.00911245	(0.79)	0.0195234**	(2.38)
GVT Expenditure	-0.1077244***	(-1.94)	-0.0272959	(-0.82)	-0.111632***	(-3.55)			-0.0499782**	(-2.38)	-0.063277***	(-2.76)
Exchange Rate			0.173512***	(3.82)	0.2891253***	(7.70)	0.0756478*	(1.57)	0.1212346**	(2.42)	0.1144672**	(2.31)
Exchange Rate Volatility	-0.0201335	(-0.63)	-0.0837166	(-1.56)	-0.0528954	(-1.54)	-0.084461	(-1.34)	-0.0222567	(-0.76)	-0.020167	(-0.72)
ALSI Volatility	-0.0000749	(0.48)	-0.0002587*	(-1.87)	-0.000272*	(-1.89)	-0.000169	(-1.14)	-0.000222**	(-2.13)	-0.0002342**	(-2.14)
Infrastructure			.0093264***	(2.87)	0.0070235*	(1.85)	0.0075244**	(2.59)	0.0061245*	(1.89)	.0042659	(1.57)
Trend									0.0598721**	(2.59)	0.0790752***	(4.70)
Constant	-21.37021***	(-7.65)	-28.32304***	(-4.03)	-9.628184*	(-1.76)	-15.34567***	(-8.06)	-17.23194**	(-2.42)	-11.41388*	(-1.89)

*, **, *** statistically significant at the 10%, 5% and 1% levels, respectively

4.1.5 Real GDP

The variable used as a proxy for market size is lagged Ln GDP. This would be the reported real GDP for the previous period, logged, and therefore the most recent data a potential investor would have on market size. In all six regressions the coefficient estimate is highly statistically significant at the 1% level. All estimates are positive, therefore postulating, as expected, a strong positive relationship between. The results indicate that a 1% increase in real GDP results in an increase between 1.4% and 4.5% the following year.

The results from the Vector Autoregressive (VAR) Model (See Appendix, Table 2 on page 84) are similar. In all three regressions, the coefficient estimates for LnLagGDP are all positive and statistically significant at the 10% level.

The Error Correction Model (ECM) suggests that in the short term the increase in FDI inflows due to changes in GDP is statistically significantly lower than in the long run. The ECM estimate is statistically significant at the 5% level. The model indicates that a 1% increase in GDP results in only a 1.2% increase in FDI inflows in the immediate term.

4.1.6 Apartheid/ Sanctions Dummy

The Estimated coefficients for the Apartheid Dummy are statistically significant at the 10% level of significance, in 2 out the 3 regressions in which the dummy variable was included. In both cases, the estimates indicate that there was a significant increase in FDI inflows into South Africa following the end of Apartheid. The results of the VAR model concur with these results. The coefficient estimate for the Apartheid Dummy is positive and statistically significant at the 10% level.

The Sanctions Dummy tests the effect of Sanctions on South African FDI inflows, between the period of 1980-1993, generally regarded as the period of most closure due to political sanctions on trade and investment into South Africa by the International community. One of the coefficient estimates is highly significant at the 1% level, whilst the other coefficient estimate is significant at the 10% level. Both are positive, indicating that South Africa's FDI inflows were lower during the period of

maximum closure between 1980 and 1993. The coefficient estimate for the Sanctions Dummy in the VAR model is also positive but is not statistically significant.

4.1.7 Openness of Trade

The variable used as a proxy for openness is imports and exports as a percentage of GDP, lagged one period. In only 2 out of the 5 regressions in which it is included, is this coefficient estimate statistically significant. The lack of statistical significance may be due, in part, to the presence of multicollinearity, particularly between the Apartheid Dummy and the Sanctions Dummy. Self-evidently the impact of sanctions due to Apartheid would have been to decrease imports and exports and hence openness. This is supported by the fact that neither of these dummies is included in regression 6 (in which the coefficient estimate for Openness is statistically significant). Furthermore there is a reasonably high pairwise correlation between Openness and the apartheid dummy (over 0.5), whilst there is a very strong pairwise correlation between Openness and the Sanctions Dummy (over 0.8).

The coefficient estimate is positive in all regressions which indicates that there is a positive correlation between levels of trade openness and FDI inflows. As explained previously, this is likely due to the fact that an open trade regime indicates an open approach to money and goods entering and leaving the country and that many MNCs look to export their products.

The coefficient estimates for the Openness variable in VAR model are statistically significant at the 5% level in 2 out of the 3 regressions. In all cases the Openness coefficient estimate is positive. As explained previously, this is likely due to the fact that an open trade regime indicates an open approach to money and goods entering and leaving the country and that many MNCs look to export their products.

The estimate in the ECM is not statistically significant, suggesting the impact of trade openness is not significantly different in short-term compared to the long-term.

4.1.8 Government Expenditure

The coefficient estimates for government expenditure are all negative, with four out of the five estimates, statistically significant at the 10% level. The estimates from the VAR model are also negative, though not statistically significant. This suggests that if the previously hypothesised inverted U-shaped relationship between FDI and government expenditure holds, then South Africa' government expenditure is too high and is therefore on the downward-sloping area of the curve, and is deterring potential foreign investors.

The ECM indicates that there is a statistically significant difference in the impact of government expenditure on FDI inflows in the long run as compared to the short term.

4.1.9 Exchange Rate

Two measures were used to test the effect of the exchange rate on FDI inflows. The absolute exchange rate's estimated coefficients are statistically significant at the 10% level for all regressions in which the variable was included. The estimated coefficient on absolute exchange rate (Rand-Dollar) is positive. This indicates that as the Rand depreciates, FDI will increase. This result indicates that the initial costs of FDI are more significant to potential FDI than future profits as a weaker Rand makes the initial costs relatively cheaper for an MNC but the future profits relatively lower. A weak rand will also encourage re-investment of profits as taking them out of the country reduces their relative value due to the weak exchange rate. A depreciation of one Rand to the dollar increases FDI by between 0.07% and 0.3%.

The coefficient estimates from the VAR model concur with these results. All three coefficient estimates are positive, however none of these estimates are statistically significant at the 10% level.

The ECM estimated coefficient is also statistically significant and significantly lower. This indicates that the exchange rate effect works in the long-term rather than in the short-term.

The second measure of exchange rate that is tested in the model is the exchange rate volatility. None of the estimated coefficients for this variable are statistically significant at the 10% level. The sign on exchange rate volatility is negative which would be expected. A volatile exchange rate makes it much more difficult to plan for the future, estimate future profits and costs. Therefore, potential FDI is less likely to enter the market if it is less sure of the future exchange rate. The value of the estimated coefficient is not easy to interpret as exchange rate volatility is calculated as the change in the exchange rate between two periods squared. So it is not easy to attach any economic meaning to the estimated coefficient. The coefficient estimates for exchange rate volatility are also negative within the VAR model, with two out of three of the estimates statistically significant at the 5% level.

The coefficient estimate in the ECM is statistically significant, thus indicating that there is a difference in the effect of exchange rate volatility on FDI inflows in the long run as compared to the short run i.e. the long-run effect on FDI inflows is greater than in the short run.

4.1.10 ALSI Volatility

The ALSI volatility variable is calculated as the sum of squared differences between the monthly ALSI indexes for the year in question and then as a proportion of the yearly ALSI index so as to eradicate the effects of natural growth of the index. This variable is used as a proxy for macroeconomic (in)stability.

The coefficient estimates for this variable are statistically significant at the 10% level in 4 out of the 6 regressions. In all 6 regressions, the ALSI volatility variable is negative, as expected a priori. A higher volatility variable would indicate greater macroeconomic instability which one would expect to deter potential investors.

In the VAR model the coefficient estimates of ALSI volatility are negative and all are statistically significant at the 5% level, therefore supporting the result above.

The ECM coefficient estimate is statistically significant at the 1% level, indicating that the effect of macroeconomic volatility on FDI inflows is significantly larger in the long term than in the short term.

4.1.11 Infrastructure

The number of mobile and fixed line telephone subscribers per 100 people acts as a proxy for infrastructure. The coefficient estimates for the infrastructure variable are statistically significant at the 10% level in 4 out of the 5 regressions in which it is included. In all regressions the coefficient estimate is positive, indicating that as infrastructure improves, FDI inflows will increase.

The VAR model provides similar results. The coefficient estimates of Infrastructure in the VAR model are all positive and two out of three of the estimates are statistically significant at the 5% level.

The ECM indicates that there is a divergence in the short and long-term effects of infrastructure development on FDI inflows. This too is unsurprising, both infrastructure development and FDI are long-term decisions and therefore the relationship between them is largely a long-term rather than short-term one.

4.1.12 Trend

The Trend variable is included in two of the regressions and is statistically significant at the 5% level and positive in both cases. This shows that FDI inflows to South Africa have been increasing over time, independent of the other variables in the model. As time has gone by, the openness of many economies around the world to investment flows in and out has increased and MNCs have increasingly been looking for investment opportunities around the world. This effect is captured by the trend variable. The Trend variable will also capture some technology improvements. As global technology improves, it becomes easier and more profitable for MNCs to expand their activities into foreign territories.

4.2 Panel Data Model

The dependent variable in the panel data model is the natural log of FDI inflows to each specific sector for a given year. The period studied in this model is 1995-2009.

4.2.1 Multicollinearity

Within the panel data model, the R^2 value is also very high – over 0.96 in all four regressions. The majority of the coefficient estimates are statistically significant, though there are a reasonably large minority of coefficient estimates that are not statistically significant. Hence, these results do not conclusively confirm whether or not multicollinearity is present within this model.

The VIF stats for the panel data model tend to be somewhat higher than in the time series model for the first three regressions, with LaglnGSP and a number of the sector dummies' VIF values exceeding 10. This indicates that there may be high multicollinearity, unsurprisingly, between LaglnGSP and specific sector dummy variables. This is confirmed by the high pairwise correlations between these variables. Therefore, in the fourth regression, LaglnGSP is dropped from the model. In none of the first three models was this variable statistically significant, whilst there is also a relatively strong theoretical argument to suggest that this variable does not have a strong influence on describing sector specific FDI inflows.

The number of insignificant t-stats within the fourth regression is reduced to just three; whilst the average VIF for the model falls to 4.57, well below the critical value of 10, this suggesting that multicollinearity is not a major problem within this model.

Table 2. Panel Data Model Regression Results

Regression	(1)		(2)		(3)		(4)	
Variable Name	Estimates	(t-stat)	Estimates	(t-stat)	Estimates	(t-stat)	Estimates	(t-stat)
Ln GSP Lagged	-0.4830168	(-0.84)	-0.5700153	(-1.01)	-0.5771506	(-1.02)		
Openness lagged	0.0471947	(1.21)	0.000429	(0.01)	0.0031884	(0.07)	0.0004911	(0.01)
GVT Expenditure	-0.128542***	(-2.65)	-0.058554	(-1.08)	-0.0653144	(-1.16)	-0.064436	(-1.21)
Exchange Rate	0.1674646***	(3.22)	0.0311288	(0.44)	0.0332722	(0.47)	0.0308059	(0.44)
Exchange Rate Volatility	-0.0387555	(1.23)	-0.0840328**	(2.14)	-0.0812572**	(2.01)	-0.085834**	(2.41)
ALSI Volatility	-0.00033***	(-2.60)	-0.0003221***	(-2.54)	-0.0003209**	(-2.55)	-0.0003314***	(-2.69)
Infrastructure	0.0060927	(1.16)	0.0158824*	(1.86)	0.0150569*	(1.68)	0.1306198***	(2.77)
Education	0.1128695**	(2.36)	0.1252733**	(2.14)	0.1162901*	(1.72)	0.0155093**	(2.47)
Labour Productivity			0.0379653**	(2.10)	0.0336992	(1.43)	0.0401388***	(2.67)
Labour Costs (General)					-0.0180246	(0.40)		
Labour Costs (Private)			-0.0085808	(0.29)				
Sector 2 Dum	5.108267***	(7.64)	5.203052***	(7.94)	5.210826***	(7.95)	4.582017***	(20.47)
Sector 3 Dum	5.731765***	(5.12)	5.897252***	(5.37)	5.910824***	(5.38)	4.81298***	(21.5)
Sector 4 Dum	-4.004766***	(-16.35)	-4.017509***	(-16.77)	-4.018554***	(-16.78)	-3.934015***	(-17.57)
Sector 5 Dum	0.3536837	(1.50)	0.3458481	(1.50)	0.3452054	(1.50)	0.397187*	(1.77)
Sector 6 Dum	3.931886***	(4.22)	4.068122***	(4.46)	4.079295***	(4.47)	3.175503***	(14.18)
Sector 7 Dum	3.174404***	(4.52)	3.274517***	(4.76)	3.282727***	(4.77)	2.618578***	(11.70)
Sector 8 Dum	5.792959***	(5.06)	5.96234***	(5.31)	5.976232***	(5.32)	4.852551***	(21.68)
Sector 9 Dum	0.2124986	(0.17)	0.3945512	(0.33)	0.4094826	(0.34)	-0.7982595***	(-3.57)
Constant	0.8051963	(0.13)	-2.556631	(-0.39)	-2.182387	(-0.33)	-8.13112**	(-2.20)

*, **, *** statistically significant at the 10%, 5% and 1% levels, respectively

- Sector 1 Agricultural, Forestry and Fishing
- Sector 2 Mining and Quarrying
- Sector 3 Manufacturing
- Sector 4 Electricity, Gas and Water
- Sector 5 Construction
- Sector 6 Wholesale and retail trade, catering and accomodation
- Sector 7 Transport, Storage and Communication
- Sector 8 Finance, Insurance, Real Estate and Business Services
- Sector 9 Community, Social and Personal Services

4.2.2 Heteroskedasticity

The calculated test statistics of White's test from the panel data model are significantly higher than in the time series model, ranging from 61.329 to 64.621. However due to the much higher degrees of freedom within the panel data model, all of these calculated test statistics are below the critical chi-squared value at the 1% level. Therefore we can conclude that heteroskedasticity is not a major problem within the panel data model.

4.2.3 Real GSP

The variable GSP (Gross Sector Product) measures the gross output for specific sectors in specific years. This variable is therefore a proxy for the size of the sector and therefore how this affects the inflows of FDI to that sector. The variable is lagged one period and natural logged.

In all three regressions, the coefficient estimates are negative but are not statistically significant in any. The lack of statistical significance indicates that the size of the specific sector under consideration has little impact on FDI flows, suggesting that other factors, such as the nature of the sector and government regulation surrounding specific sectors are more important in determining FDI inflows.

The negative sign, though not statistically significant, suggests that the larger the sector, the smaller the FDI inflows into that sector. Initially this result appears counter-intuitive as MNCs should be attracted to a larger market size as shown in the time series regression. However as GSP measures only the size of specific sector under consideration, it is not really a very good measure of overall market size. It also indicates that the smaller sectors may be small due to underinvestment in those economic activities and foreign investment may see this as a profit opportunity due to less competition in those sectors.

4.2.4 Openness

The coefficient estimates for the variable openness are not statistically significant in any of the regressions and is positive in all of them. The positive sign concurs with our a priori expectations in that a more open economy will attract greater levels of FDI. However, as in the time series model, the variable is not statistically significant. This may be due to potential multicollinearity. An alternative explanation could be that the variable is included primarily as a proxy for openness of the economy in general (not just imports and exports) and hence openness to FDI. In practice this may not be such a clear relationship. Also, most FDI into South Africa is market-seeking, as opposed to efficiency-seeking, and hence investors may not be particularly concerned by the openness of the economy to trade.

4.2.5 Government Expenditure

The Government Expenditure coefficient estimates are all negative, with one estimate being statistically significant at the 1% level. This result concurs with my results from the previous model, indicating that South Africa's government expenditure is higher than is optimal for attracting FDI.

4.2.6 Exchange Rate

The coefficient estimates for both exchange rate variables concur with the results from the previous results. The estimates for the exchange rate variable are all positive, with one statistically significant at the 1% level, indicating that FDI inflows increase when the exchange rate depreciates.

All three coefficient estimates for exchange rate volatility are negative, with three out of four statistically significant at the 5% level, indicating that higher exchange rate volatility corresponds with lower FDI inflows.

4.2.7 ALSI Volatility

The coefficient estimates for ALSI volatility are also consistent with those in the time series model, with all estimates negative. However the coefficient estimates for this variable are much more statistically significant in the panel data model, with all four estimates statistically significant at the 5% level. The shorter and more recent time period of the panel data model, as compared to the time series model may account for this difference. The size and therefore liquidity of the JSE has grown exponentially over the past two decades, therefore providing a much more fluid market and hence a much better and comprehensive measure of macroeconomic (in)stability. Furthermore the Stock exchange's 'public image' has grown just as swiftly, with its performance now freely and easily available almost constantly to a large proportion of the population. This would therefore also suggest that potential foreign investors have also started taking greater cognisance of the exchange as a measure of macroeconomic performance and stability.

4.2.8 Infrastructure

The coefficient estimates for the infrastructure proxy variable are all positive, with three out of four significant at the 10% level. These results are congruent with those from the time series model and unsurprisingly indicate that greater FDI inflows are correlated with greater infrastructure capabilities.

4.2.9 Education

Secondary school enrolment acts as a rough proxy for level of education or human capital in the economy as a whole. The variable was not included in the time series model as there were too many missing data points. Within the panel data model, the coefficient estimates for education are all significant at the 10% level and are all positive. This result concurs with a priori expectations as the level of education in the economy is expected to significantly raise FDI inflows, as indicated by this result.

4.2.10 Labour Productivity

Labour Productivity is measured each year by the Reserve Bank. In this data, 2000 is equal to 100 and all other years are calculated relative to this. Two of the coefficient estimates is significant at the 5% level and both are positive. As would be expected, a higher labour productivity is likely to lead to decreasing FDI inflows as MNCs would like to be as productive as possible so as to maximise potential profits. What is interesting about this result is that in recent years, the trend for labour productivity in South Africa has been downward – from a high of 104.7 in 2001, labour productivity in 2009 was calculated to be as low as 79.7.

4.2.11 Labour Costs

The cost of labour is very important to firms and is closely linked to labour productivity. Any firm would like to maximise their marginal productivity of labour, so higher labour productivity and lower labour costs should attract more foreign investment. In this model two measures for labour costs are included, in different regressions. The first is private labour costs, which are the costs of labour to the private sector only, which is where most FDI is concentrated. The second measure is general labour costs which is the costs of labour to the entire economy – both private and public sector. Annual labour Costs, similarly to labour productivity, is calculated in relation to one another. With 2000 being the base year, where labour costs equal 100.

Neither of the coefficient estimates is statistically significant, though both are negative. This result suggests that rising labour costs do lead to falling FDI inflows, but the result may not be particularly significant and so this effect may be small or negligible.

4.2.12 Sector Dummies

The Sector Dummies show which sectors FDI is attracted to relatively more, *ceteris paribus*. The base dummy is sector 1 which is agriculture, forestry and fishing. All

coefficient estimates for the other dummies indicate how much FDI inflows those sectors attract relative to sector 1.

Six out of the eight sector dummy coefficient estimates are highly statistically significant at the 1% level. This indicates that there is a statistically significant difference in the amount of FDI inflows to different sectors, based on the intrinsic factors of those sectors.

Sectors 2 (Mining and Quarrying), 3 (Manufacturing), and 8 (Finance, Insurance, real Estate and Business Services) have the highest coefficient estimates, indicating that these three sectors attract the most FDI. Sector 2 would attract natural resource based FDI, and due to South Africa's large mineral deposits, it is unsurprising that this is one of the main attractors of FDI. Sector 3 is Manufacturing which is a sector that traditionally attracts large amounts of FDI as foreign investors, with newer technology than the host country, are able to produce manufactured goods more efficiently and therefore more cheaply than local industries. Lastly, sector 8 is Finance and business services. The service sector is the largest in South Africa, as well as the fastest growing hence it is not surprising that it is also a major attractor of FDI. A few large foreign investments in this sector in recent years have also boosted this sector e.g. Barclays purchased a majority share of ABSA bank in 2005 for approximately R30 billion.

Sector 4 (Electricity, Gas and Water) attracted the lowest amount of FDI, *ceteris paribus*. This is unsurprising as this sector is mainly utilities which are all parastatals and so are owned by government. There is, therefore, little scope for foreign investors to invest in these enterprises unless there is privatisation, which has not occurred to this point.

4.3 Conclusion

The models find a number of variables which have consistently statistically significant coefficient estimates through different model specifications. The estimates for real GDP are consistently highly significant and positive, thus indicating that a larger market size results in higher levels of FDI inflows. The coefficient estimates for

the Apartheid and Sanctions dummies are also generally statistically significant and indicate that the Apartheid regime and the introduction of Sanctions on the country both had a negative effect on FDI inflows to the country, *ceteris paribus*.

The estimates for Openness are all positive, suggesting greater openness may lead to higher FDI, but only one estimate is statistically significant, though this may be partly due to multicollinearity. The estimates for government expenditure are all negative with about half statistically significant indicating that government expenditure in South Africa is too high to maximise FDI inflows.

The exchange rate estimates indicate that the weaker the Rand is relative to the dollar, the more FDI will flow into the country. The estimates for both exchange rate volatility and ALSI volatility are all negative and are mostly significant. This shows that potential investors dislike instability and uncertainty and will invest more readily in a less volatile economic environment.

The estimates for both infrastructure and education are positive and statistically significant and show that skill levels within society as well as the overall availability and prevalence of infrastructure are both very important to potential investors.

Labour productivity and costs are also important to foreign investors. MNCs require high productivity from its labour and relatively low costs for that labour.

Lastly, the panel data model shows that Sectors 2 (Mining and Quarrying), 3 (Manufacturing), and 8 (Finance, Insurance, real Estate and Business Services) are the three sectors that are intrinsically most attractive to FDI, whilst Sector 4 (Electricity, Gas and Water) attracted the lowest amount of FDI, *ceteris paribus*.

CHAPTER FIVE: CONCLUSION

This study used a two model approach to find the determinants of Foreign Direct Investment (FDI) into South Africa since 1961. Numerous studies have discussed and shown the potential benefits of FDI inflows to the host country. Thus FDI can act as an important driver of economic growth, particularly in developing countries such as South Africa. This foreign investment encourages greater efficiency through foreign technology transfer and increased competition. It is therefore important for countries to determine what the major determinants of FDI inflows are, in order to adjust policies and practices so as to become more attractive to potential FDI flows.

Studies from around the world have indicated that the major determinants of FDI include market size, education levels, infrastructure, openness, exchange rates, political and macroeconomic stability, and wage rates. All of these factors improve a country's investment climate as they increase potential benefits for foreign investors whilst reducing the costs of business as well as the risk. Such investment-friendly measures will not only benefit foreign investment, but also domestic investment. De Soysa and Oneal (1999) found that both forms of investment have a positive effect on economic growth and are complementary.

Although many determinants of FDI are relatively universal, it is important to establish country-specific determinants as each different country faces different challenges and may excel in certain areas but struggle in others. Every different country faces slightly different constraints and hence determinants of investment will vary as will the relative importance of these determinants. For example, South Africa's historical context, which included the Apartheid regime from 1948-1994, means that the country faces certain unique constraints and therefore it is important to establish South Africa-specific determinants and their relative importance in attracting FDI.

Fedderke and Romm (2004) and Moolman et al. (2006) have conducted previous studies on the determinants of FDI inflows to South Africa. Both used time series models and found average wage, corporate tax rate, a self-constructed property rights index, openness to trade, infrastructure, exchange rate, and market size to all be statistically significant variables in explaining South African FDI inflows.

This paper tests a relatively similar time series model to those presented above, for the period 1961-2009. The main statistically significant variable estimates included real GDP, as a proxy for market size, an Apartheid dummy, government expenditure, exchange rate, and infrastructure. These results concur with similar studies from around the world as well as with previous South Africa-specific studies. However, interestingly, coefficient estimates for Openness were only statistically significant in one regression model, although this may be due to problems associated with multicollinearity within the model.

This paper then goes further to conduct a panel data analysis of FDI inflows between 1995 and 2009. This analysis has a number of important advantages to the time series model. Firstly, in the South African context, due to the influence of the Apartheid regime, economic indicators and determinants of investment may have changed fundamentally since 1994 as the political (and economic) landscape changed fundamentally. As the aim of this study is to provide a potential policy guide for attracting future FDI inflows, this period may provide a better guide for future determinants as opposed to the rarefied nature of the Apartheid period.

A second advantage of the panel data model is the relative availability of data in recent years. Much of the data prior to 1990 for South Africa is incomplete and/or unreliable and hence a study including only recent years, allows the inclusion of a number of new but potentially very important variables. These include labour productivity, labour costs and most importantly a proxy for education levels within the economy. The panel data model also allows the specific investigation which sectors attract more FDI, *ceteris paribus* and to analyse the effects of sector size on the FDI inflows to each specific sector.

The results indicate that ALSI volatility (acting as a proxy for macroeconomic (in)stability) and exchange rate volatility are both negative and highly statistically significant. This indicates, unsurprisingly, that investors are averse to instability as it increases uncertainty and therefore risk. However what is interesting about this result is that the estimates are much more significant in the panel data model than in the time series model, suggesting that these variables have increased in importance over recent decades.

Other variables which show statistically significant coefficient estimates include education, infrastructure, and labour productivity indicating the importance of these variables. Lastly the model shows that the mining and quarrying; manufacturing; and finance, insurance, real estate, and business services sectors attract the most FDI based purely on the nature of these sectors.

5.1 Policy Implications

The results of this analysis give an idea of the major determinants of FDI inflows into South Africa. Policy makers can therefore potentially increase FDI inflows by improving or changing policies to affect the determinants highlighted by the analysis.

GDP or market size is a major determinant of FDI, however it is not really possible for policy makers to increase GDP easily. Increasing GDP or economic growth is a major aim of policy makers already and there is no quick or easy way to increase it. Furthermore there is two-way relationship between GDP and FDI.

Freeing up trade and increasing the openness of the economy may have a positive effect of FDI inflows; however, this analysis indicates that this effect may be fairly limited. There have been a number of significant tariff reductions over the past ten to fifteen years, suggesting that the focus of policymakers should now; perhaps shift towards other areas – at least with regards to maximising FDI inflows.

An interesting and illuminating result of this analysis is the effect of the exchange rate on FDI versus inflation. This study shows that a stable and weaker Rand relative to the dollar (and other currencies) will increase FDI inflows. Whilst it may be going too far to conclude that a fixed exchange rate at a depreciated level is the answer, it does suggest that some greater level of exchange rate management may benefit the country's attractiveness to Foreign investors, whilst recent calls for a depreciation in the exchange rate appear to hold some weight.

The ALSI variable acts as a proxy for macroeconomic (in)stability. The significance and negative value of its coefficient estimates show the importance of a stable macroeconomic (and political) environment. Hence policymakers should ensure long-term policies are instituted, with change kept to a minimum. Since 2001/2, it

would appear that the government has been reasonably successful in maintaining a level of macroeconomic stability – growth rates (until 2007/08) were quite predictable and constant from year to year; inflation-targeting by the Reserve Bank maintained inflation between a prescribed band, whilst the interest rate changes were well advertised and did not provide shocks to the environment. Unfortunately, through trade and investment ties to the rest of the world, South Africa is not immune to global economic crises resulting in the recent economic depression. However, even this setback was not as severe as it may have been (and was in other countries) due to the government's previous prudence with spending as well as the introduction of the Credit Act which was also aimed at ensuring a fairly stable economy (amongst other aims). Hence it would appear that policymakers have been fairly successful in maintaining macroeconomic stability within South Africa in recent years.

However due to the growing size and greater monetary in- and out-flows, the ALSI variable has become more significant in recent years. Policymakers need to also realise the importance of sentiment and investor beliefs. Whilst macroeconomic fundamentals may be sound, sentiment is often an important driver of foreign investment and therefore macroeconomic stability as well, albeit far less so with FDI. Hence political announcements, infighting and any generally unstable portrayal of the country may have negative impacts for investors' perception of the stability of the country and hence for FDI inflows.

The statistical significance of the coefficient estimates for the Infrastructure and Education variables illustrates the importance of an effective infrastructure and the development of skills. Therefore the South African government should promote infrastructure investment and skills development. However the effect of increasing government expenditure is negative, although this result is not statistically significant. Therefore the importance of improving the local infrastructure and skills outweighs the importance of decreasing government expenditure but the government should still aim to spend less, and so should aim to decrease spending in other areas and focus on improving infrastructure and skills. The government also needs to focus on how that money is spent rather than simply increasing expenditure. At the moment education receives more expenditure than any other department, yet the matric pass

rates continue to fall indicating that more effective institutions and processes need to be put in place rather than simply increasing expenditure.

Lastly, the regressions show that labour productivity is an important determinant of FDI inflows; however, the data also indicates that labour productivity is worsening. It is absolutely imperative that this trend is reversed. Improved skills and education is one avenue through which this can be improved, but fails to explain the current downward trend. The strict labour laws of South Africa ensure that it is very difficult to fire an employee, even if they are failing to work productively. This creates the wrong incentives for employees and may be part of the reason for the low and falling labour productivity within the country.

This paper has discussed the potential benefits from FDI to the host country, arguing that these benefits outweigh potential costs and that developing countries such as South Africa should pursue FDI, though not through distorting policies such as fiscal or tax incentives. The findings of this study broadly concur with the findings of most of the global literature as well as, more pertinently, with previous South Africa-specific studies with regards to the major determinants of Foreign Direct Investment inflows. This study also goes further than a simple time series regression analysis with the inclusion of the panel data analysis which tests for determinants of FDI since apartheid, shows which sectors are intrinsically most attractive to FDI and lastly allows for the inclusion of a number of additional explanatory variables for which reliable data is unavailable over a longer period.

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APPENDIX

Table 1. Table of Stationarity

	Random Walk without drift	Random Walk with drift	Random Walk with drift and trend	Augmented Dickey Fuller	Stationary/Non-Stationary
1% critical value	-2.62	-3.58	-4.15	-3.48	-
5% critical value	-1.95	-2.93	-3.5	-2.88	-
Variable Name	Calculated Tau Values	Calculated Tau Values	Calculated Tau Values	Calculated Tau Values	
FDI	1.871	1.169	0.886	2.073	Non-stationary
GDP	7.76	1.676	2.726	1.439	Non-stationary
Openness	0.566	-0.176	-0.242	-1.091	Non-stationary
GVT expenditure	1.167	-1.6	-2.123	-2.405	Non-stationary
Exchange Rate	1.335	0.186	5.301	0.191	Non-stationary
Exchange Rate Volatility	-2.018	-2.314	-3.058	-2.314	Non-stationary
ALSI Volatility	1.165	0.527	-1.136	-1.334	Non-stationary
Infrastructure	1.198	1.206	0.557	1.206	Non-stationary

Table 2 . Vector Autoregressive Model Results

Regression	(1)	(2)	(3)
Variable Name	Estimates	Estimates	Estimates
Ln GDP Lagged	0.8987669**	1.097301**	1.050028*
Apartheid Dummy	0.2819759*		
Sanctions Dummy			0.0240019
Openness lagged	0.0090918	0.0205695***	0.0222371**
GVT Expenditure	-0.0097199	-0.0235317	-0.0222943
Exchange Rate	0.0146323	0.0696085	0.0657966
Exchange Rate Volatility	-0.0263934	-0.0833574**	-0.0831566**
ALSI Volatility	-0.0001779**	-0.0001784**	-0.000181**
Infrastructure	0.0000453	0.0059015**	0.0060859**
Constant	-10.33819**	-13.76854**	-13.3323**

*, **, *** statistically significant at the 10%, 5% and 1% levels, respectively

Table 3 . Error Correction Model Regression Results

Variable Name	Estimated Coefficient
Ln GDP Lagged	1.249301**
Apartheid Dummy	0.0530319
Openness lagged	0.0085765
GVT Expenditure	-0.0396668***
Exchange Rate	0.1334388***
Exchange Rate Volatility	-0.0264053**
ALSI Volatility	-0.0002307***
Infrastructure	0.0040237*
Lagged Residuals	-0.2724437*
Constant	0.127551**

*, **, *** statistically significant at the 10%, 5% and 1% levels, respectively