The relationship between infrastructure and foreign investment inflows to South Africa

A Dissertation

presented to

The **Development Finance Centre (DEFIC),**
Graduate School of Business
University of Cape Town

In partial fulfilment
of the requirements for the Degree of
Master of Commerce in Development Finance Degree

by

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April 2018

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ABSTRACT

Foreign direct investment (FDI) has emerged as a major source of external capital for developing countries in Asia, South and Central America and Sub-Saharan Africa. However, Sub-Saharan Africa's share of global FDI compares unfavourably with that garnered by other developing regions in the world. Until recently, South Africa has been the top recipient of FDI inflows among SSA countries as it has benefitted from the relatively stable macroeconomic and political environment. South Africa is, however, afflicted by significant deficits in the quality and quantity of economic and social infrastructure. Empirical studies on the significance of infrastructure development and FDI inflows at country level in SSA are limited, as are empirical studies on the determinants of FDI inflows to SSA countries. It is against this backdrop that this research sets out to examine the relationship between infrastructure and FDI inflows to South Africa between 1970 and 2015. Secondary time series data on indicators for infrastructure quality, infrastructure investment, market size, financial market development, macroeconomic stability, and trade openness was collected for empirical analysis. In accordance with time series analysis of macro-economic data, unit root and cointegration tests were performed prior to estimation of the error correction model.

The results of the research indicate that infrastructure quality, financial market development, trade openness, and market size all had a positive impact on FDI inflows in the long run, although significantly so in the case of the latter two indicators. Infrastructure investment stability had a negative but insignificant impact, while inflation had a negative but statistically significant impact on FDI inflows. In the short run, only trade openness and financial market development had a positive but statistically insignificant impact on FDI inflows. The other indicators reflected a negative and insignificant impact on FDI inflows. The results of the research suggest that besides advancing macroeconomic stability, the South African government should also foster inclusive economic growth and development which can enhance the country's attractiveness for FDI over the long-term.

TABLE OF CONTENTS

LISTS OF FIGURES AND TABLES

GLOSSARY OF TERMS

CPI	Consumer Price Index
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GEAR	Growth Employment and Redistribution
GFCF	Gross Fixed Capital Formation
ICT	Information Communications and Technology
M&A	Mergers and Acquisitions
MNE	Multinational Enterprise
NDP	National Development Plan
OECD	Organisation for Economic Co-operation and Development
SADC	Southern Africa Development Community
SARB	South African Reserve Bank
SSA	Sub-Saharan Africa
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNIDO	United Nations Industrial Development Organization
USD	United States Dollar
VAR	Vector Autoregression
WB	World Bank

ACKNOWLEDGEMENTS

My sincere gratitude to the following people, without whom I would not have reached the end of my MCom journey

- Dr Abdul Latif Alhassan – for agreeing to step in and supervise me. Thank you for your time, guidance, and patient support with this dissertation – it is much appreciated.
- Khahliso, Momo, Boki and Naty – for the inspiration and all your words of encouragement, and your patience and understanding throughout this journey.
- The MCom course – you made this such an enriching experience for me. In particular, my study squad – Cuthbert, Darlington, Khami and Isaac – it was a great pleasure collaborating and motivating each other along the way. Mavi and Elvis, thank you for your input.
- Mom, Dad, Sebi and Hloni – for your unwavering support and powers of motivation.

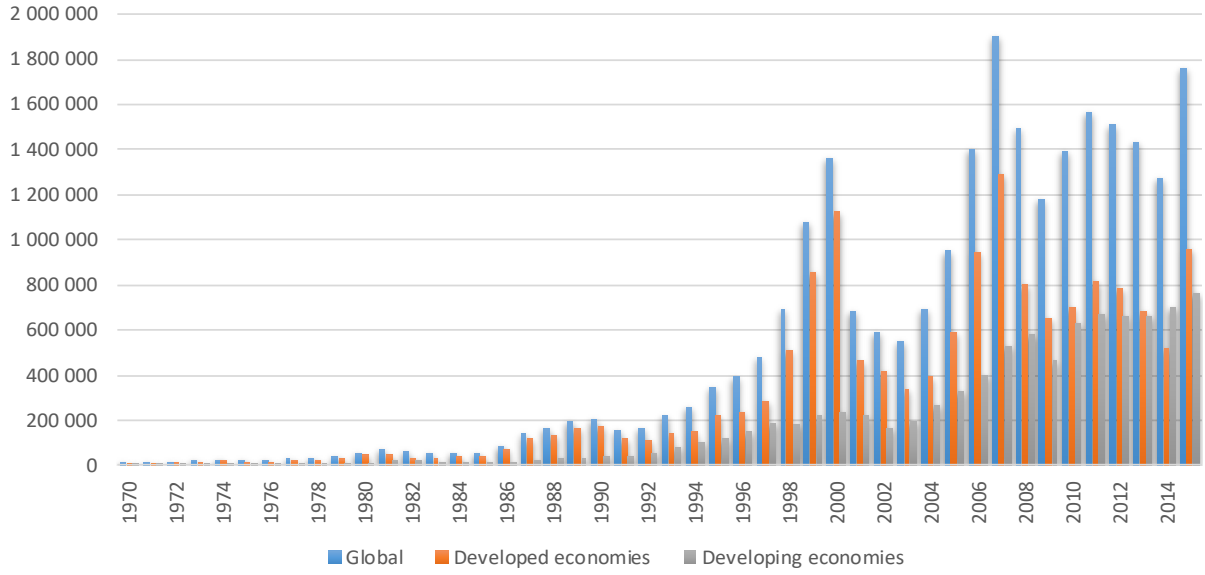
CHAPTER ONE
INTRODUCTION

1.1 Background to the Study

Foreign direct investment (FDI) is a major source of external capital for the host country. Amusa, Monkam and Viegi (2016) state that Sub-Saharan Africa (SSA) countries have increasingly relied on both FDI and Official Development Assistance to supplement their internal fiscal resources that have proved to be insufficient to fund their socio-economic development needs. This statement alludes to the value of FDI being a significant source of capital for developing countries. The viewpoint of Amusa et al. (2016) has also been widely conveyed (Bende-Nabende, 2002; Kok and Ersoy, 2009; Babatunde, 2011; Rehman, Ilyas, Alam and Akram, 2011; Abu Bakar, Che Mat and Harun, 2012; Loots and Kabundi, 2012), and is supportive of the consensus view of FDI being a positive tool that fosters economic growth. To illustrate the positive externalities of FDI, Loungani and Razin (2001) and Moolman, Roos, Le Roux and Du Toit (2006) list technology transfer gains, human capital development and an increase in tax revenue as some of the examples of significant positive externalities that a host country can derive from FDI inflows, particularly in the African context as FDI inflows can ultimately support economic development.

Figure 1 below graphs global FDI inflows recorded by the United Nations Conference on Trade and Development (UNCTAD) since 1970, together with the split between developed and developing countries. Loots and Kabundi (2012) assert that the growth in total FDI inflows since the 1990s is reflective of how FDI has now become regarded as a major source of external capital in developing countries. Two noticeable peaks in FDI inflows were recorded in 2000 and 2007 when reported global FDI inflows totalled USD1.358 trillion and USD1.902 trillion respectively. Bartels, Kratzsch and Eicher (2008) attribute these record highs to two factors: firstly, to the consequence of the structural adjustment policies that prescribed market liberalisation and deregulation as means to stimulate economic growth and development, and secondly, to the increasing mobility and capability of management within enterprises to organise and integrate their manufacturing operations across different locations and countries.

Figure 1: FDI inflows – Global, Developed economies and Developing economies



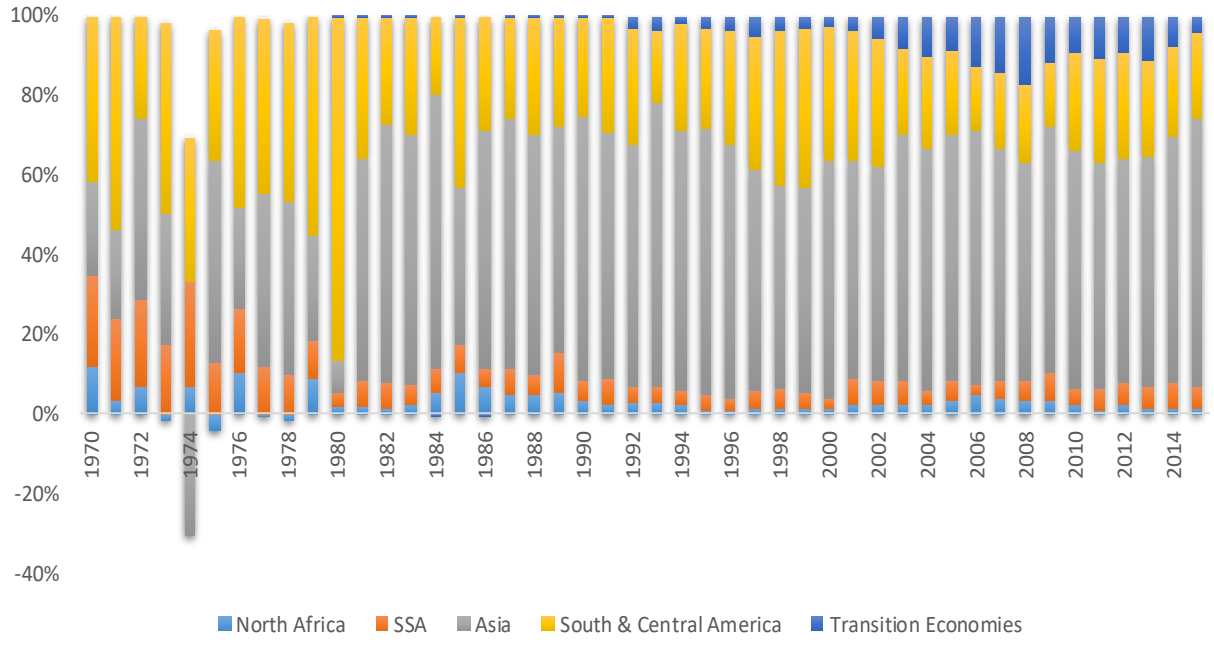
Source: UNCTAD (2016)

Annual FDI data documented by UNCTAD shows that since the early 2000s, FDI inflows have grown significantly in volumes and across regions. The Organisation for Economic Co-operation and Development (OECD) remarks this growth in FDI inflows as attributable to the size and number of transactions in the era of globalisation, characterised by multinational enterprises (MNEs) diversifying their operations away from their home economies into new countries and territories (OECD, 2008). Traditionally, large MNEs have been the main participants in FDI transactions. However, the OECD (2008) has noticed that in recent years, small and medium-sized enterprises have also participated in FDI transactions. In 2015, total global FDI inflows increased by 38% to USD1.762 trillion, the highest value of FDI inflows recorded since the 2008 global financial crisis. According to UNCTAD (2016), the total global FDI inflows in 2015 were primarily driven by a rebound in cross-border merger and acquisition (M&A) activity, which totalled USD721 billion, and continued high levels of Greenfield investments, with USD766 billion worth of transactions announced over the course of the calendar year. In unpacking the aforementioned statistics, it is noted that UNCTAD (2016) points out that a number of the cross-border M&A transactions that were concluded, were actually corporate reorganisations rather than deals that would have an impact on the productive capacity and operations of multinational companies. Excluding these corporate reorganisation transactions, UNCTAD (2016) reported that the 2015 growth in total global FDI inflows reduced from 30% to 15%. The strong growth in FDI inflows reported in 2015 represents a

reversal on 2014, when total global FDI inflows reportedly declined 11% to USD1.276 trillion. UNCTAD (2015) attributed the decline in total global FDI inflows in 2014 to the weak state of play in the global economy, investors' perception of policy uncertainty in several countries, and heightened geopolitical risks. The notable recovery in total global FDI inflows is counter-intuitive in light of the slow growth in emerging markets, driven by the fall in commodity prices and continued weakness in the global macroeconomic environment.

Figure 1 also illustrates that in 2015, developed countries reclaimed their status as being the major recipients of foreign investment, with FDI inflows up 84% to USD962.4 billion (2014: USD522.04 billion) versus inflows up 9% to USD764.6 billion (2014: USD698.4 billion) apportioned to developing economies that comprise African, Asian, and South and Central American countries. The average split over the period 1970 to 2015 is 68% developed economies and 30% developing economies. Figure 2 below graphs the regional split of FDI inflows to developing economies. Asia remains by far the largest recipient of FDI inflows that increased by 16% to USD540.7 billion in 2015, followed by Latin America and the Caribbean, which recorded a 2% decline in FDI inflows to USD167.5 billion. In comparison, SSA recorded an 11% decline in FDI inflows.

Figure 2: FDI inflows to developing regions



Source: UNCTAD (2016)

Cheadle (2016) comments that in general, foreign investors' perception of and decision on whether or not to invest in Africa has historically been influenced negatively by protracted wars and armed conflict in a number of countries, poor macroeconomic policies adopted by governments, legal and institutional deficiencies and policy uncertainty. FDI inflows into Africa declined 7% to USD54.08 billion in 2015 (2014: USD58.3 billion), which is split USD41.43 billion (2014: USD46.67 billion) and USD12.65 billion (2014: USD11.62 billion) between SSA and North Africa respectively. As reflected in Figure 2 above, Africa's share of FDI inflows to developing economies is insignificant when compared to the other developing regions. Despite SSA being renowned for its natural resource endowment, the region only accounted for 2.4% of global FDI inflows in 2015 (period average of 2.3%). In comparison, Asia accounted for 30.7% (period average of 17.6%) and South and Central America for 9.7% (period average of 9.5%). Interestingly, Figure 2 also shows that in the years when global FDI inflows were robust, such as 1998 to 2000, 2005 to 2007, and 2009 to 2011, SSA's share of global FDI inflows did not exhibit the same rate of growth. This observation suggests that during those periods of growth in FDI inflows, foreign investment by and large passed over SSA.

South Africa ranks as the top destination for FDI in Africa (UNCTAD, 2016), and according to Schoenwald (2015), the country still has great potential to maintain this top-ranking status due to the country's overall infrastructure stock being comparatively more advanced than its SSA peers. Even though South Africa has been the primary recipient of FDI inflows within the SADC region (Jenkins and Thomas, 2002), the country's share of FDI is comparatively much lower than peer emerging countries (Arvanitis, 2006). Despite this, Schoenwald (2015) recognises that the FDI inflows data does not match the widely noted potential of the country. In fact, Allix (2015) reports that some global companies operating in South Africa have raised concerns about the poor state of the country's infrastructure, both in terms of deficiencies and quality. The consequences of the deficient state of infrastructure is the potential adverse impact it has on the FDI decision-making process of global companies when they evaluate South Africa's attractiveness as an investment destination (Allix, 2015).

1.2 Problem Statement

Sub-Saharan Africa's infrastructure deficit covers all economic sectors, namely: electricity generation, transport and information and communications technology (ICT). Increasing the coverage and quality of economic and social infrastructure is important in enhancing economic development in SSA and the social welfare of its inhabitants. Ranganathan and Foster (2011) observed that in the period 1995 to 2005, infrastructure investments boosted economic growth within Southern Africa by 1.2% per capita per year. The National Development Plan (NDP) (2013) notes that Gross Fixed Capital Formation (GFCF) in South Africa halved from an average of around 30% of Gross Domestic Product (GDP) in the early 1980s to 16% of GDP by the early 2000s. It also recognises the need for increased levels of gross fixed capital investment of around 30% of GDP by 2030 in order to foster higher levels of inclusive and sustainable growth. The GFCF statistics from South African Reserve Bank (SARB) show a gradual recovery in the levels of infrastructure investment from 2003 to 2008 when average investment was 23% of GDP. Even though infrastructure investment has increased, the improvement is still currently below the target 30% of GDP that was recorded during the early 1980s. This concern echoes that of Fourie (2007), who commented on the importance of addressing the quantity as well as the quality of infrastructure planning and investment in order to enhance South Africa's profile as a trade and investment destination. It is against this backdrop that it is noted that infrastructure development has been assigned a pre-eminent role in the South African government's stimulatory fiscal package, the New Growth Path (Development Bank of Southern Africa, 2012) and more recently, the NDP (2013).

1.3 Research Questions and Objective

The research questions that this study proposes to address, include;

1. Does infrastructure quality have a significant relationship with FDI inflows to South Africa?
2. Does infrastructure investment have a significant relationship with FDI inflows to South Africa?

Based on the stated research questions, the objectives of the study are identified as;

1. To examine the effect of infrastructure quality on FDI inflows.
2. To identify the effect of infrastructure investment on FDI inflows to South Africa.

1.4 Justification of the research

While Arvanitis (2006) asserts that FDI inflows can have a positive impact in South Africa in terms of investment and economic development, Fedderke and Romm (2006) empirically established the positive growth impact of FDI on economic growth in South Africa between 1956 and 2002. Even though Kok and Ersoy (2009) point out that there is lack of consensus on explanatory variables that determine FDI, they – along with studies by Khadaroo and Seetanah (2007), Babatunde (2011), Rehman et al. (2011), Abu Bakar et al. (2012), Shah (2014), and Donaubauer, Meyer and Nunnenkamp (2014) – nevertheless acknowledge the importance of good and reliable infrastructure, particularly electricity, transport and ICT in attracting FDI inflows to developing countries. Good infrastructure, as indicated by measures of quantity and quality, is necessary in order to enable companies to produce and distribute their goods and services (Bende-Nabende, 2002). Therefore, it is reasonable to expect that underinvestment in hard infrastructure does not bode well for attracting FDI inflows. Compared to its peers in SSA – and indeed some in Asia – Arvanitis (2006) highlights that South Africa benefits from a more favourable macroeconomic environment, market size and natural resource endowment that are typical factors that foreign investors are likely to consider during the FDI decision-making process. Investing in infrastructure has emerged as a major area of focus for governments around the world, especially in the aftermath of the 2008 global financial crisis. The nature of infrastructure investment witnessed during that post-2008 crisis has modernised and enhanced the economic competitiveness of countries as well as acting as a lever towards addressing social challenges such as rapid urbanisation (Luiz, 2010). Infrastructure development in SSA is an imperative that, according to the OECD (2012), has the potential of being transformational. This potential of infrastructure development in SSA can be driven by innovation, advances in the regulatory landscape, and increased private sector involvement.

The research is justified in light of the reported comments from various stakeholders about the deficiencies and inadequacies of South Africa's infrastructure that have been noted by Allix (2015), also in light of the dearth of empirical studies at national level within SSA that have sought to establish and unpack the significance of the relationship between FDI inflows and infrastructure quality as well as infrastructure quantity.

1.5 Organisation of the study

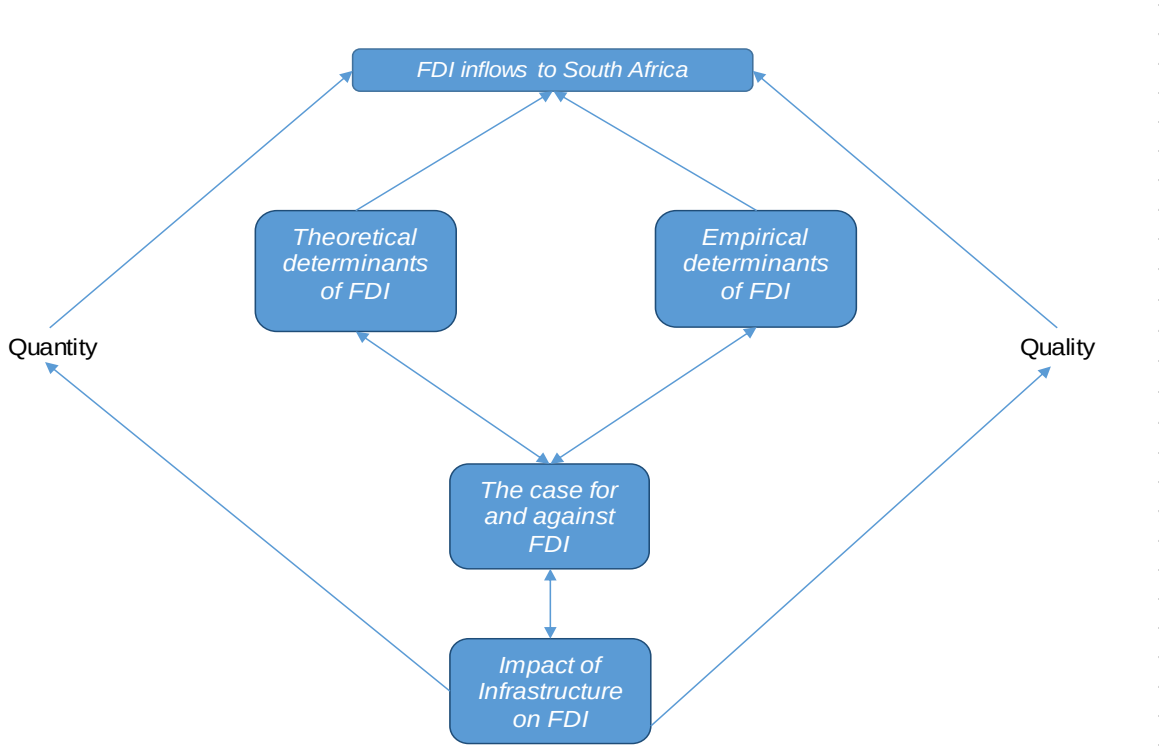
This study is organised into five chapters. Chapter One presents an introduction to the study and covers the background of the study, statement of research problem, statement of research questions and objective, and concludes with a justification of the research. Chapter Two presents the literature review that commences with an introduction and conceptual framework of the literature review, then proceeds to cover the concepts and definitions of FDI, theoretical frameworks of FDI, positive and negative externalities of FDI, a review of FDI inflows to SSA and to South Africa. Chapter Two then presents a review on infrastructure and economic development, and infrastructure in South Africa. This is followed by a review of empirical studies firstly on the determinants of FDI and secondly on infrastructure and FDI, before Chapter Two is concluded with a summary. Chapter Three presents an introduction to the research methodology, followed by a description of the research approach and strategy, data collection, and the regression model. Chapter Four presents a discussion of the research findings and analysis. Chapter Five concludes the study with a summary, policy recommendations and recommendations for future research.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

The literature on foreign direct investment is quite vast, which is reflective of the continuing importance of the topic to researchers and policy makers across different regions of the world. The literature on FDI has spanned several years and has tended to cover the theoretical perspective on FDI as well as empirical studies on foreign direct investment. In the literature offering a theoretical perspective, the purpose has been to explain the motivation behind enterprises engaging in FDI. The empirical studies on FDI have sought to test the determinants of FDI inflows into regions and countries or the impact of FDI on economic growth and development. According to Maxwell (1996), the conceptual framework sets out the concepts and phenomena to be researched and assists in informing the research design. The conceptual framework presented in Figure 3 below was developed to guide the literature review.

Figure 3: Conceptual framework



In this chapter, the literature review that follows, firstly unpacks the concepts and definitions of FDI. Next, the main theoretical frameworks of FDI are presented before examining some of the positive and negative externalities of FDI. A review of FDI inflows to SSA and to South

Africa follows next. The chapter then surveys a selection of empirical studies conducted to test the determinants of FDI, followed by a review of literature focused on the relationship between infrastructure and economic development, and then infrastructure in South Africa. The final theme covered in the literature review is empirical studies on the relationship between infrastructure and FDI.

2.2 Concepts and definitions of FDI

The OECD (2002, 2008) describes FDI as a transaction whereby a direct investor resident in one country establishes a lasting interest in an enterprise that operates in another country. The concept of lasting interest implies that there is a long-term relationship between the direct investor and the enterprise. The description of FDI is further expanded on by the OECD (2002, 2008), stating that in a FDI transaction the direct investors acquire a minimum shareholding of 10% and voting power in the enterprise, all of which enable the direct investor to exert a degree of influence over the operations and management of the enterprise in the host country. The above description illustrates how the economic linkages brought about by FDI can also be a key driver of economic integration and economic development in the host country. A direct investor could either be an individual, a group of investors, a public or private enterprise, a group of enterprises, a government entity, or an estate or trust (OECD, 2008). This definition of the direct investor alludes to the potential complexity of parties and relationships within a FDI transaction. To illustrate this complexity, the OECD (2008) provides a framework for FDI that describes the variety of ownership structures and relationship in a FDI transaction that are particularly important when recording FDI statistics.

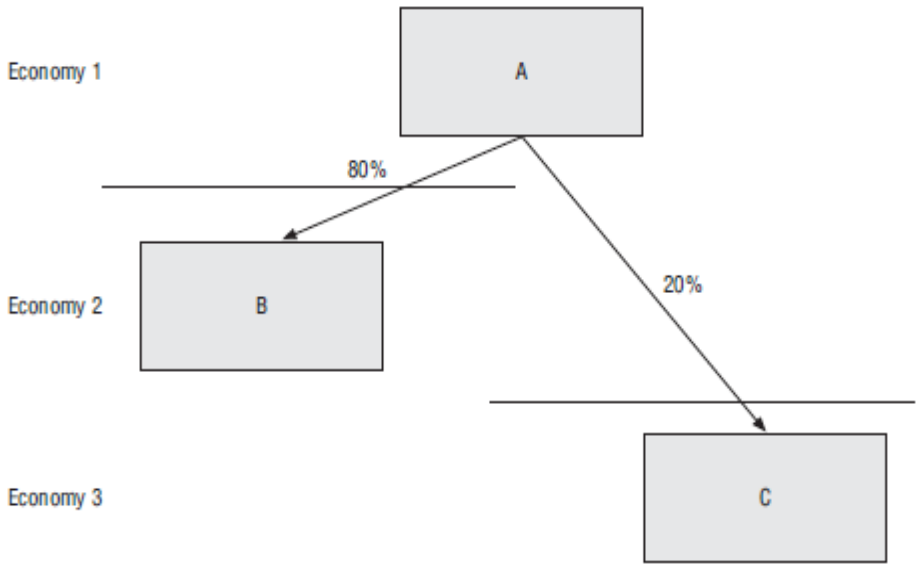
Figure 4 shows a simple and straightforward FDI transaction across three different economies. Company A directly owns 80% of Company B that in turn is an 80% direct shareholder of Company C, which gives Company A indirect control over Company C. According to the OECD (2008), Companies A, B and C would be viewed as being in a direct investment relationship and as such, any financial transactions and investment flows between the companies would be included in the FDI statistics.

Figure 4: Continuation of control

Source: OECD (2008)

In Figure 5, Company A is a direct investor in Companies B and C that operate in two different economies, and holds voting power and management control in each of these companies. As per the OECD (2008), the FDI statistics would include the financial transactions and investment flows between Companies A and B and between Companies A and C, with Companies B and C noted as fellow enterprises in the same FDI relationship with Company A.

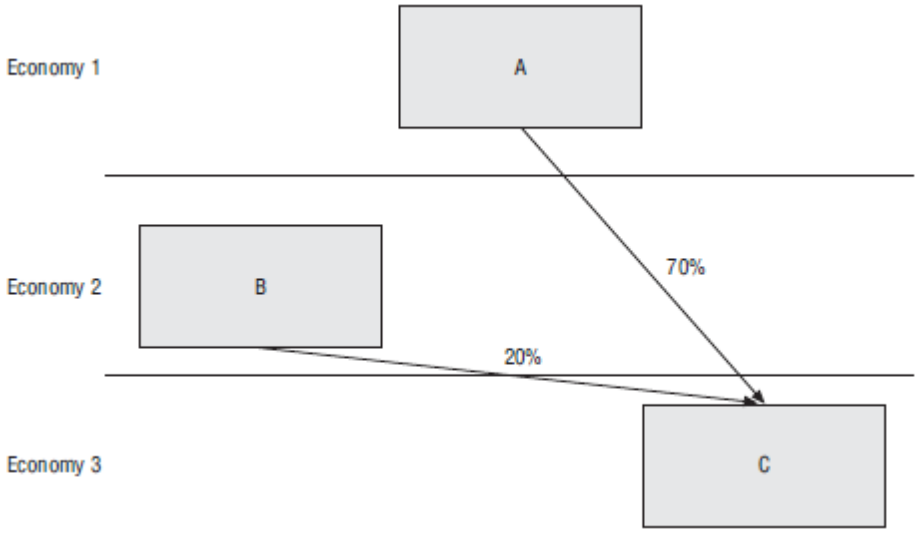
Figure 5: Fellow enterprises



Source: OECD (2008)

In Figure 6, Companies A and B both have their own direct investment relationship with Company C, in which they respectively hold 70% and 20% of the voting power. The financial transactions and investment flows between Companies A and C and Companies B and C would be recorded in the FDI statistics (OECD, 2008). Companies A and B are not in a direct investment relationship with each other.

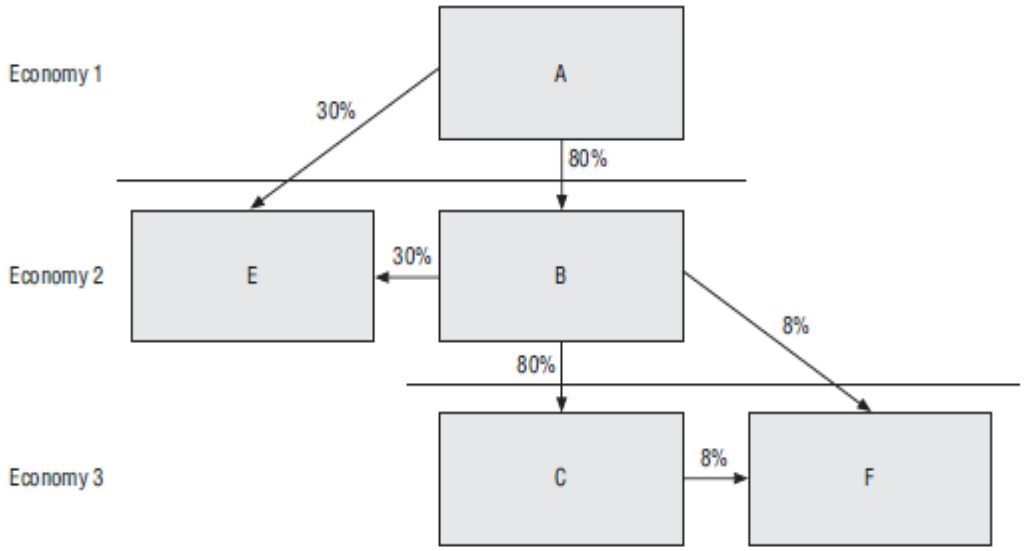
Figure 6: Multiple direct investors



Source: OECD (2008)

The FDI relationship also extends across subsidiaries in different economies as shown in Figure 7 below (OECD, 2008).

Figure 7: Joint ownership



Source: OECD (2008)

The financial instruments used to establish and define the direct investment relationship under FDI include equity in the form of either ordinary or preference shares, capital contributions and retained earnings, and debt instruments such as loans, trade credit, bonds, debentures, commercial paper and promissory notes, that a MNE may use to acquire or establish an interest in an enterprise in a host country (OECD, 2008). It is clear from the above description that FDI implies a transaction in which direct investment flows from one country to another. Kok and Ersoy (2009) expand on this implication of FDI in their analogy of trade and FDI being similar due to both these types of financial transactions linking national economies together. Nocke and Yeaple (2004) hypothesise that FDI occurs because of underlying differences in entrepreneurial ability and factor prices across countries, whereas Arvanitis (2006) and Fedderke and Romm (2006) draw a distinction between horizontal and vertical motivations for FDI. The horizontal FDI model is premised on cost reduction by producing both at home and in the host country while the vertical FDI model is premised on splitting operations to take advantage of low-cost production benefits in host countries (Arvanitis, 2006; Fedderke and Romm, 2006). It is noted that the foreign investment made by a direct investor includes all financial transactions, namely the initial equity transaction that establishes the 10% shareholding and all subsequent transactions, such as reinvested earnings and intercompany loans (OECD, 2008).

2.3 Theoretical frameworks of FDI

Morgan and Katsikeas (1997) and Denisia (2010) assert the production cycle theory, market imperfections theory, the eclectic theory of international production, and internalisation theory, as the main theoretical frameworks on FDI that were developed by Vernon (1966), Hymer (1970), Buckley and Casson (1997), and Dunning (1980) respectively. The assignment theory is a more contemporary theoretical framework hypothesised by Nocke and Yeaple (2004).

2.3.1 Production Cycle Theory

Vernon (1966) identified the need for a revised theoretical framework that provides a better understanding of the shifting patterns in international trade and investment witnessed post-World War II. Until then, the comparative cost concept was widely acknowledged as being the theoretical explanation for international trade (Vernon, 1966). To this end, Vernon (1966) developed the production cycle theory, describing four stages that companies go through: innovation, growth, maturity, and decline. According to Vernon (1966), these stages – and in particular, the timing of innovation, market expansion, economies of scale, and the roles of ignorance and uncertainty – influenced the patterns of international trade and investment from the USA to post-World War II Europe. Vernon (1966) hypothesised that because of their technological advantages, entrepreneurial American companies were able to identify opportunities for high income or labour-saving new products. These new products were initially manufactured in the USA for local consumption, with surplus new product exported to foreign markets that exhibited demand. As demand for the new product increased, production capacity was established outside of the USA, driven by the least-cost production concept. In time, the new product became standardised as the technological advantage regressed. Standardisation entails competition and thus highlights the importance of economies of scale to companies in order to compete with rival companies. In essence, the production cycle theory described FDI in terms of the stages that a company goes through by which it first innovates and creates new product locally, then by a subsidiary in a foreign territory, and eventually in any location where the company is able to exploit scale economies and produce at a low cost (Morgan and Katsikeas, 1997).

2.3.2 Market Imperfections Theory

Hymer (1970) acknowledged two sides to FDI, firstly that it is a mechanism in which to transfer capital, technology and skills between countries, and secondly that it is a means of managing competition between companies. Companies constantly survey their environment as part of their efforts in seeking out new opportunities in the market – the decision to invest abroad hinges on the company's ability to exploit a competitive advantage over rival companies in the host country (Morgan and Katsikeas, 1997). Therefore, in terms of the market imperfections theory, FDI will occur if the benefits that are derived from firm-specific competitive advantages exceed the relative costs of operating in a foreign market.

2.3.3 Internalisation

The internalisation theory was developed by Buckley and Casson (1976), who are cited by Morgan and Katsikeas (1997) and Denisia (2010) in stating that this theory sought to explain that multinational companies organise their operations internally if it lowers their costs and enables them to develop and exploit specific advantages over the competition. In their summary overview, Morgan and Katsikeas (1997) state that internalisation is essentially when a company brings various operations and activities in-house and is thus akin to being vertically integrated.

2.3.4 Eclectic Theory of International Production

According to Dunning (1980), there are three underlying theories that inform a company's decision to embark on international production: firstly, the extent to which a company can access assets that the competition cannot access: secondly, the benefit derived from granting a competitor access to assets instead of internalising the same assets; and lastly, the value derived from utilising the assets at the company's disposal together with indigenous resources found in a foreign country. To this end, the eclectic theory of international production describes three factors which inform the FDI decision of a company (Dunning, 1980), namely: ownership, location, and internalisation advantages, also referred to as OLI. With regards to ownership advantages, Dunning (1980) states that when seeking growth opportunities in foreign markets, an enterprise must possess ownership-specific advantages that enable it to compete against host country firms. These ownership-specific advantages range from inputs such as technology, patents, trademarks, brands, to raw materials or access to markets, to even economies of scale (Dunning, 1980). Although the ownership-specific advantages are not necessarily exclusive to the enterprise, the benefit that the enterprise ultimately derives is that having these inputs

outweighs the production costs of entering a foreign market. Location advantages, refers to specific endowments, resources and inputs that are found in a particular location and are only accessible to firms operating within a particular location. 'Internalisation advantages' describes the edge that an enterprise gains from utilising the endowments, resources and inputs it possesses for its own production rather than selling them to competitor firms. Dunning (1980) asserts that the presence of both ownership and location endowments are prerequisites in order to incentivise FDI.

2.3.5 Assignment Theory

Nocke and Yeaple (2004) developed the assignment theory as a result of delving deeper into FDI by looking at its composition in order to better understand the volume of FDI, which they assert had been the preeminent focus of prior literature on trade and FDI. A distinction was made between cross-border acquisitions and Greenfield investments as two different forms of FDI choices available to multinational companies (Nocke and Yeaple, 2004). Nocke and Yeaple (2004) describe cross-border acquisition as the purchase of a foreign corporate asset that the multinational company can optimally combine with a firm-specific asset. Greenfield FDI entails developing new productive capacity in a foreign country, thereby enabling the multinational company to exploit their firm-specific assets in that foreign country (Nocke and Yeaple, 2004). In terms of their hypothesis, Nocke and Yeaple (2004) do not regard cross-border acquisitions and Greenfield FDI as perfect substitutes. They do, however, state that they can co-exist, and that as factor price differentials reduce, FDI tends to take the form of cross-border acquisitions. Nocke and Yeaple (2004) assert that multinationals that pursue Greenfield FDI are more efficient than those that opt for cross-border acquisitions, on the basis that the decision to establish new productive capacity in a foreign country is ordinarily made following some form of evaluation by the multinational company of the costs versus benefits.

2.4 Positive and negative externalities of FDI

Loungani and Razin (2001) and Mosia (2012) note the consensus that FDI bestows considerably more positive externalities to the recipient country than negative externalities, with Amusa et al. (2016) arguing that FDI is also a development tool, particularly in resource-constrained countries, because of the benefits that arise from this type of funding. The positive benefits highlighted by Loungani and Razin (2001), Mwilima (2003), Anyamwu (2011), Mosia (2012), and Amusa et al. (2016) include:

i. Transfer of technology and management expertise. When the foreign company has access to more advanced or innovative technology together with management expertise that can be transferred to the operations in the new location, there can be positive spill-over effects for the host country.
ii. Skills transfer and human capital development through the training of local inhabitants required to staff newly acquired or Greenfield productive capacity and operations.
iii. Investment in productive capacity, whether through acquisitions or Greenfield investments, may stimulate job creation.
iv. Encouraging competition as host country companies may be forced to counter the impact of a foreign company's entry into the market by making efficiency gains or being innovative with their offering to the market.
v. Capital flows from FDI generate tax revenues for host country government.
vi. Increase in the quantity and quality of infrastructure delivery.
vii. Stimulating integration with global markets and adoption of best practices in governance.
viii. Providing access to new export markets.

Additionally, FDI flows are considered more advantageous compared to other capital flows due to its non-speculative nature, with Loungani and Razin (2001) highlighting the resilient nature of FDI inflows during times of financial crises. Babatunde (2011), on the other hand, comments that the benefits of FDI are dependent on a host country's stance on globalisation, which highlights the need for the host country to consider the potential effects of the investment policies and agreements entered to attract FDI. Notwithstanding the aforementioned positive benefits, Mwilima (2003) and Mosia (2012) caution that FDI can also give rise to negative externalities, with the form of FDI, economic sector targeted, and even the investment framework and bi-lateral agreement entered into cited by these authors as examples of factors that may influence the residual impact of FDI. The negative externalities of FDI highlighted by Mwilima (2003) and Mosia (2012) range from indirect job losses as a result of host country companies becoming displaced by a foreign entrant, to FDI that has effect of stifling local technology development and innovation. Further examples of the negative externalities described by Mwilima (2003) and Mosia (2012) range from foreign companies making use of excessive leverage to fund acquisitions in the host country, thereby reducing the expected gains from FDI, to worsening the trade deficit if the foreign investor imports more than it exports, to transfer pricing disguised under intra-company transaction, to uneven development outcomes

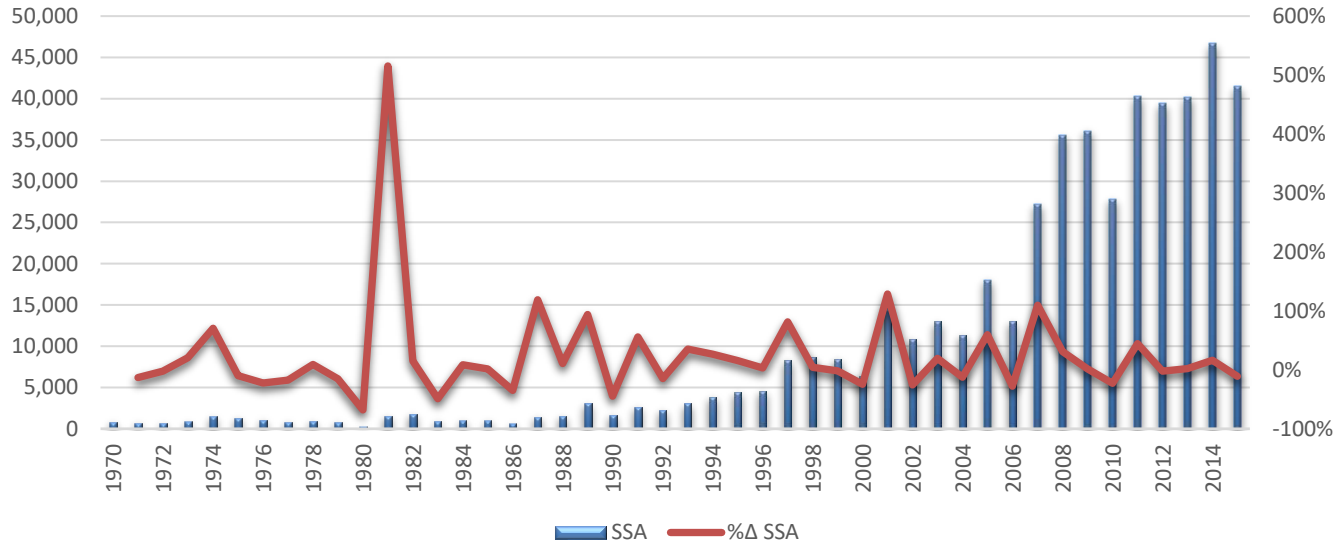
that widen the inequality gap, and finally the undue power and influence foreign investors may wield over host country governments to the detriment of the inclusive growth and development. In acknowledgement of both the positive and negative externalities that may potentially result from FDI, Bende-Nabende (2002) urges policy makers in recipient countries to carefully evaluate their trade and investment strategies and to implement those that minimise negative effects.

2.5 Review of FDI inflows to SSA

According to Cockcroft and Riddell (1991), until the mid-1970s aggregate FDI inflows to Africa were on a par with the aggregate FDI inflows to the other peer developing regions of the world, with foreign investment into SSA directed towards the agriculture and mining sectors. During the course of the 1980s, SSA's share of FDI inflows began to lag behind foreign investment into the other developing regions of the world to such a degree that by the mid-1980s, SSA accounted for only 14% of FDI inflows in comparison to 27% in 1975 (Cockcroft and Riddell, 1991). This trend demonstrates a significant shift in FDI inflows to SSA during the 1980s, so that Cockcroft and Riddell's (1991) remark illustrates how foreign investment eventually came to constitute a comparatively minor source of external capital for many African countries. In a survey conducted by Bhattacharya, Montiel and Sharma (1997) among commercial banks, investment banks, and institutional asset managers, it was revealed that these funders and investors perceive the risks in SSA to be higher than in other developing regions. Furthermore, Bhattacharya et al. (1997) stated that these funders and investors allude to the existence of more obstacles in SSA that hinder their ability to identify and exploit investment opportunities compared to other developing regions. Bende-Nabende (2002) also observed the trend in FDI inflows to SSA, highlighted by Cockcroft and Riddell (1991) and Bhattacharya et al. (1997), and described the growth in FDI inflows to SSA as quite modest compared to the actual value of FDI inflows remaining well below those recorded in Asia and Latin and Central America.

Figure 8 below, illustrates the trend in FDI inflows to SSA from the period 1970 to 2015.

Figure 8: FDI inflows – SSA (USD million)



Source: UNCTAD (2016)

Bhattacharya et al. (1997) observed that since the 1980s, FDI inflows increased significantly, particularly to those countries with high per capita growth and those that were not members of the African franc zone. Following this observation, Bhattacharya et al. (1997) categorised the major recipients of FDI inflows into three groups. The first group consists of Botswana, Mauritius, Seychelles, Swaziland, and Zambia, and are described as the longer-term early recipients of FDI whose net flows have plateaued or are on the decline. The second group consists of countries that recorded significant increases in FDI inflows during the 1990s, namely Angola, Cameroon, Gabon, Ghana, Guinea, Lesotho, Madagascar, Mozambique, Namibia, Nigeria, and Zimbabwe, predominantly due to the natural resource boom in the oil and mining sectors. In the third group, Bhattacharya et al. (1997) have categorised those countries that experienced low and declining trends in FDI inflows during much of the 1980s to early 1990s, but have begun to witness a reversal in FDI trends. There are a few risk factors that a large number of countries in SSA have battled to overcome which have impeded the growth in FDI inflows to the region.

2.5.1 Civil conflict

Many countries in SSA have experienced civil conflict and in some instances, namely DRC, Liberia, Rwanda, Somalia, and Sudan, the civil war was so severe that FDI inflows ceased (Bhattacharya et al., 1997). Okafor, Piesse and Webster (2015) highlight that in general, high levels of economic and political risk in conflict states deter FDI. On the other hand, the end of civil conflict in Angola, Mozambique, Namibia, South Africa, and Uganda resulted in these countries experiencing significant influx of FDI inflows during the 1990s (Bhattacharya et al, 1997).

2.5.2 Macroeconomic instability

According to Bhattacharya et al. (1997), large structural fiscal deficits, erratic monetary policies, and weak financial and capital markets were common factors that affected and contributed to the often-volatile macroeconomic state of SSA countries. SSA countries that progressively managed or reduced the level of macroeconomic volatility fared better in terms of increasing FDI inflows (Bhattacharya et al., 1997). Okafor, Piesse and Webster (2015) specifically recount how the socialist macroeconomic policies adopted in several post-colonial SSA countries adversely impacted on the general investment climate as these countries became highly inefficient, and provided costly access to capital markets.

2.5.3 Slow economic growth

According to Bhattacharya et al. (1997), the poor economic performance witnessed in SSA from the 1980s to mid-1990s has not helped to develop the size, wealth and attractiveness of African domestic markets to a broad foreign investor base. To illustrate, Bhattacharya et al. (1997) point to GNP growth in SSA (excluding South Africa), which averaged 2.3% during 1983–1989 and 1.4% during 1990–95, whereas 3.8% and 5.1% average aggregate growth was achieved during comparative periods for all other developing regions. Okafor et al. (2015) also allude to the unfavourable reputation that evolved about SSA because of the unattractive location for firms intending to compete in the market-place and costly access to financial and capital markets.

2.5.4 Inward looking polices and onerous regulations

Whereas countries in other developing regions made significant strides in changing their economies towards becoming more market-based and open to foreign investment, SSA countries have tended to be more inward-looking with regards to economic policy with little effort to attract FDI inflows through investment promotion policies or reducing the regulatory obstacles for foreign investors (Bhattacharya et al., 1997). Bartels et al. (2009) offer a different perspective when they point to the incoherent nature of regional trade agreements in SSA as being a factor behind the comparative scarcity of foreign capital inflows to countries in the region. Okafor et al. (2015) attribute this tendency to widespread unease and suspicions that SSA countries had post-independence about foreign capital and its impact on political sovereignty and domestic firms.

2.5.5 Slow pace of privatisation

Bhattacharya et al. (1997) stated that privatisation programmes in several countries in South and Central America and Eastern Europe were fast-tracked, which significantly increased FDI inflows to the regions. In contrast, the pace adopted by SSA countries in privatising state-owned enterprises has been slow, with Bhattacharya et al. (1997) pointing out that the proceeds from privatisation in South and Central America, Eastern Europe and Asia during the period 1988 to 1994 totalled USD79.7 billion, whereas proceeds in SSA totalled only USD2.4 billion.

2.5.6 Poor infrastructure

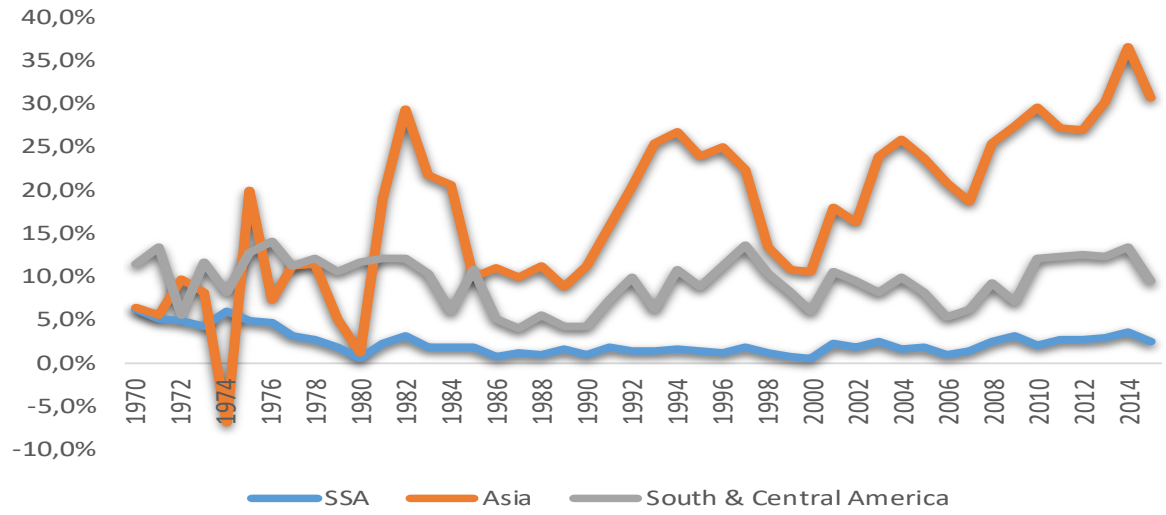
The low levels of investment in infrastructure, whether economic, social or institutional, have resulted in a significant infrastructure backlog and have adversely impacted on human development. According to Bhattacharya et al. (1997), the state of infrastructure in a number of countries in SSA has been in decline since the early 1980s as a result of heavy state intervention coupled with poor maintenance and implementation capacity, all of which have contributed to the reduction in FDI inflows. The lack of sufficient infrastructure to aid in the manufacture and delivery of output for domestic and export markets constrains FDI attractiveness (Okafor et al., 2015)

2.5.7 High production costs

One of the negative externalities of the poor macroeconomic policies adopted in SSA are the comparatively high labour costs in the region with Bhattacharya et al. (1997) remarking that production costs in SSA tend to be almost double those in low-income Asian countries. Furthermore, productivity levels in SSA are much lower than in other developing regions (Bhattacharya et al, 1997; Okafor, 2015).

Figure 9 below captures the evolution of the share of FDI inflows to SSA, Asia and South and Central America since 1970 as a percent of total FDI inflows.

Figure 9: Regional split of FDI inflows – Asia, SSA, and South and Central America



Source: UNCTAD (2016)

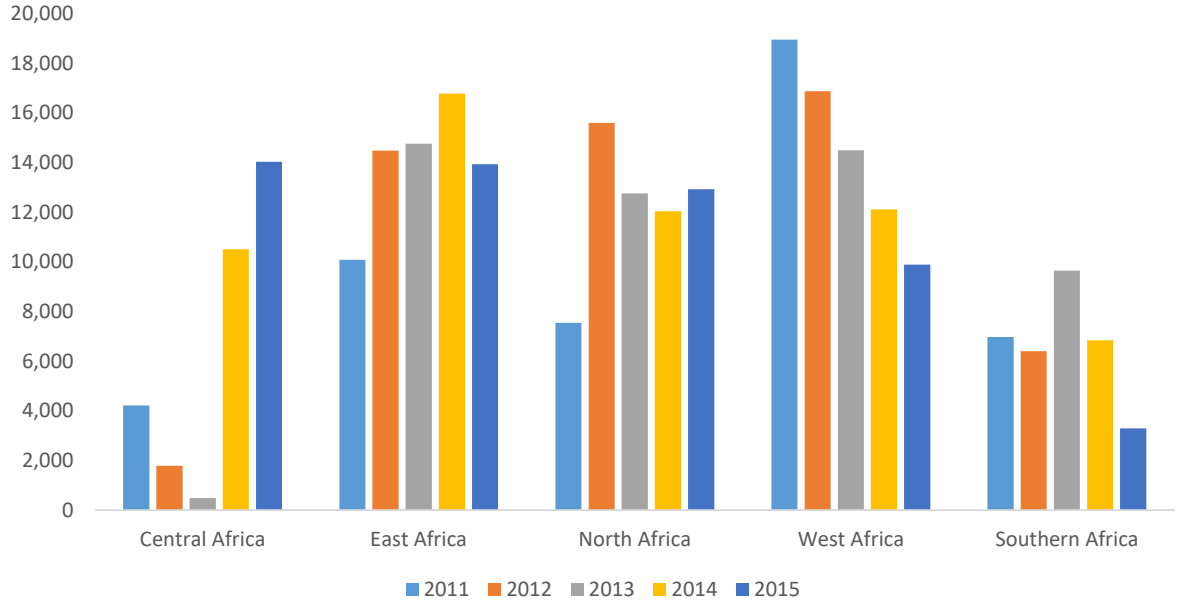
The comparatively small SSA share of the total FDI is surprising, considering that investors can earn much higher rates of return, with Bhattacharya et al. (1997) citing average return on investment of between 24% and 30% during the early to mid-1990s, compared to the average aggregate returns of 16% to 18% recorded in other developing regions combined. According to NDP (2013), in a study of publicly traded companies operating in Africa between 2002 and 2007, the average rate of return on capital was approximately two-thirds higher than peer companies in China, India, Indonesia and Vietnam. The NDP (2013) also highlights performance of American companies in comparison to their FDI in other developing regions, where SSA investments recorded higher rates of return.

Notwithstanding the comparatively small share of foreign investment into SSA highlighted above, the region has experienced sporadic spikes in FDI inflows. FDI inflows breached the USD 1-billion mark for the first time in 1974 with USD1.447 billion reported. However, from the late 1970s to early 1980s, 1977 until 1980, FDI inflows dropped below USD 1 billion. FDI inflows breached the one billion dollar mark again in 1981 and 1982, with USD1.526 billion and USD1.759 billion reported respectively. There were further periodic spikes in FDI inflow over the years, with another strong increase in FDI inflows in 1987, when volumes breached the USD1 billion mark again. In isolation, the rebound in the level of FDI inflows to SSA may be viewed positively. Further investigation of UNCTAD's FDI data reveals, however, that compared to other regions, SSA did not benefit much from increasing levels of FDI. To illustrate, according to UNCTAD (1999), the FDI inflows to Africa averaged approximately USD1.9 billion per annum between 1983 and 1987, approximately USD3.1 billion per annum between 1988 and 1992, and almost USD6 billion per annum between 1993 and 1997. It is further observed that, while FDI inflows to developing countries as a group almost quadrupled between 1981 and 1997, Africa's average share in total FDI inflows to developing countries has been on a downward trend from more than 11% between 1976 and 1980, to 9% between 1981 and 1985, to 5% between 1991 and 1995, and to 4% in 1997 (UNCTAD, 1999).

Further spikes in FDI inflows to SSA are demonstrated by the USD8.28 billion recorded in 1997, USD14.62 billion in 2001, USD18.02 billion in 2005, USD27.19 billion in 2007, USD40.23 billion in 2011, and USD46.68 billion in 2014, which set a new record high of FDI inflows to SSA. Cheadle (2016) attributes the growth in FDI inflows to SSA after the 2008 global financial crisis to high economic growth rates and urbanisation rates recorded in a large number of African countries, and the private sector's perception of improvements in Africa's political stability and the business environment.

Natural resource-endowed countries have been the main recipients of FDI inflows to Africa, particularly the oil-exporting countries. This trend has been observed in the literature by Moolman et al. (2006), Loots and Kabundi (2012), Okafor et al. (2015), and Cheadle (2016). This trend has resulted in the uneven distribution of FDI inflows throughout SSA, with Loots and Kabundi (2012) remarking that after North Africa, the balance of FDI inflow distribution skewed towards Central Africa, then West Africa, followed by Southern Africa and finally East Africa. Figure 10 below provides a regional split of FDI inflows into Africa for the five-year period 2011 to 2015.

Figure 10: Regional split of FDI inflows to Africa, in USD million



Source: UNCTAD (2014, 2015, 2016)

Data from the UNCTAD (2016) reveals that FDI inflows to Africa declined by 18% to USD54.1 billion and 36% to USD5.8 billion, and 2% to USD7.8 billion, respectively. Central Africa emerged as the region with the largest share of FDI inflows with USD14.03 billion, an increase of 34%. East Africa was second, with FDI inflows of USD13.9 billion, a decline of 17%, followed by North Africa which recorded an 8.8% increase in FDI inflows to USD12.9 billion. West Africa recorded an 18% decline in FDI inflows to USD9.8 billion. However, Southern Africa witnessed the sharpest decline of 52% to garner a meagre share of USD3.2 billion of 2015 FDI inflows to Africa.

Table 1 below lists the top ten recipients of FDI inflows in SSA for the period 2013 to 2015.

Table 1: SSA Top 10 recipients of FDI inflows, USD million

2013		2014		2015	
South Africa	8,300.10	South Africa	5,770.64	Angola	8,680.94
Mozambique	6,175.12	Congo	5,502.26	Mozambique	3,710.78
Nigeria	5,608.45	Mozambique	4,901.79	Ghana	3,192.30
Ghana	3,226.33	Nigeria	4,693.83	Nigeria	3,064.17
Congo	2,913.93	Ghana	3,356.99	Ethiopia	2,167.60
Democratic Republic of Congo	2,098.25	Zambia	3,194.78	South Africa	1,772.41
Tanzania	2,087.30	Ethiopia	2,132.00	Sudan	1,736.80
Zambia	1,809.80	Tanzania	2,049.30	Democratic Republic of Congo	1,673.50
Sudan	1,687.88	Angola	1,921.70	Zambia	1,653.00
Ethiopia	1,281.30	Democratic Republic of Congo	1,843.17	Tanzania	1,531.50

Source: UNCTAD (2014, 2015, 2016)

Inflows of FDI to SSA have fluctuated widely over the years, more so over the past five years. According to UNCTAD (2016), total FDI inflows of USD41.43 billion (representing an 11% decline on FDI inflows recorded in 2014 to the region) totalled USD42.9 billion, representing a 9.7 percent decline on 2014. Angola was the top FDI inflow destination in 2015, replacing South Africa, which dropped to sixth largest recipient of FDI inflows. Out of the top ten recipients, only Angola, Ethiopia and Sudan recorded growth in FDI, with all the other countries witnessing declines in foreign investment flows. According to UNCTAD (2016), weak commodity prices adversely impacted FDI inflows to SSA.

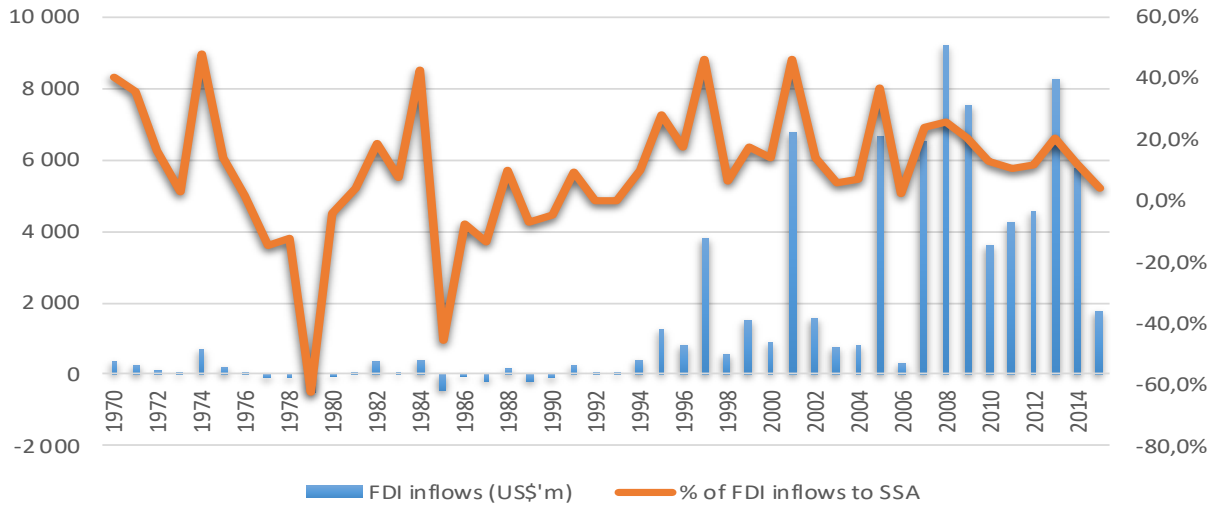
2.6 Review of FDI inflows to South Africa

Gelb and Black (2007) trace South Africa's history with FDI far back to the early 19th century when the country was a colony under British rule, and its financial system was dominated by British banks and economy centred on agricultural exports to Europe. Following the discovery of major diamond and gold reserves from the 1860s, direct and portfolio investment inflows into South Africa from Europe provided the capital to fund industrial development and the exploitation of the country's mineral resources (Gelb and Black, 2007). In particular, Gelb and Black (2007) state that direct investment from the United Kingdom, United States of America and Europe was instrumental in developing new industrial sectors in South Africa in the period 1920 to 1970, to such an extent that by the early 1970s, manufacturing accounted for 40% of

FDI stock, followed by financial and business services with 25% and mining down to 15%. Post-1970, FDI inflows into South Africa began to shift from direct investment to portfolio investment and also began to slow quite considerably as foreign investors were confronted with intensifying international campaigns against apartheid. To illustrate, Gelb and Black (2007) note that foreign investors started to disinvest from South Africa, with 225 American companies and 20% of British companies exiting during the 1980s. The capital outflows that resulted from this action and the sanctions imposed on the country contributed towards further economic deterioration. This situation assisted in paving the way for political transformation, evidenced by the unbanning of political parties and the start of political negotiations that eventually led to the all-inclusive democratic elections in 1994 (Gelb and Black, 2007). Direct and portfolio investment inflows resumed with the advent of the new South Africa. Gelb and Black (2007) and Mahembe and Odhiambo (2013) pointed out that government's GEAR macroeconomic policy framework was aimed at attracting FDI to South Africa in order to address the savings shortfall, boost economic growth, and reduce poverty and unemployment.

Figure 11 below shows that the resumption of direct and portfolio investment inflows in 1994 led to an exponential increase in FDI inflows, with USD379.6 million recorded in 1994, and USD1,241.2 million recorded in 1995. FDI inflows reached a record USD3,816.7 million in 1997 (the year immediately following the adoption of GEAR). However, this performance is mostly attributed to the 30% partial privatisation of Telkom in 1997 (Arvanitis, 2006; Gelb and Black, 2007). The expectations of GDP growth and increased FDI volumes did not materialise following the implementation of GEAR in 1996 or subsequent frameworks adopted by government (Vickers, 2002; Gelb and Black, 2007; Mahembe and Odhiambo, 2013).

Figure 11: FDI inflows to South Africa



Source: UNCTAD (2016)

FDI inflows declined sharply to USD561.5 million in 1998, and then recovered to USD1,195.3 million over the next two years. Heese (2000) suggests that the combination of factors that contributed to the decline in FDI in 1998 included heightened investor perceptions about emerging markets risk, increased political risk due to uncertainty around South African's stability in the lead up to the second democratic elections, decreased investment from Asian investors dealing with the aftermath of the Asian crisis, and macroeconomic instability reflected by South Africa's exchange rate and interest rate volatility. Between 2001 and 2008, South Africa experienced volatility in terms of FDI, with a new record number of FDI inflows high of USD6,783.9 million reported in 2001, attributable to the Anglo-American and De Beers unbundling (Arvanitis, 2006; Gelb and Black, 2007). It was also during this period that the all-time high of USD9,209.3 million in 2008 was set. FDI inflows to SSA in 2008 were particularly robust because of rising commodity prices and cross-border M&As, with UNCTAD (2009) noting that in the case of South Africa, the acquisition of a 20% stake in Standard Bank by the Industrial and Commercial Bank of China for a value of USD5.6 billion was the primary driver of FDI inflows in 2008. FDI inflows once again declined sharply post-2008 in the immediate aftermath of the global financial crisis, in 2009 and 2010. The period between 2011 and 2013 saw recovery in the performance of FDI inflows. However, in the years since, FDI inflows have shown a decline once again, with only USD1,772.9 million recorded in 2015 – a 69% decline on the prior year. Per UNCTAD (2016), the marked reversal of FDI inflows into South Africa in 2015 to the lowest levels in over a decade was due to the deterioration in economic activity together with the impact of the decline in commodity prices and rising costs of electricity. This

performance saw South Africa lose its traditional status of being the top recipient country of FDI inflows to SSA since the 1990s (Loots and Kabundi, 2012) to Angola (UNCTAD, 2016). Notwithstanding the aforementioned, according to Schoenwald (2015), South Africa still has great potential to regain its top-ranking status due to the country's overall infrastructure stock being comparatively more advanced than its SSA peers. The consequences of the deficient state of infrastructure is the potential adverse impacts it has on the decision making of global companies when it comes to evaluating South Africa as a FDI destination (Allix, 2015).

2.7 Infrastructure and economic development

Fourie (2006) also notes that the impact, together with its incidence, may explain the various definitions for infrastructure. To illustrate, Fourie (2006) quotes Hirschmann (1958), who defined infrastructure as "capital that provides public services". From this definition, infrastructure has the characteristics of a public good, namely being non-rival and non-excludable (Rosen, 2002). Fourie (2006) further highlights that infrastructure may be defined in terms of functionality, such as transport, energy, communications, environmental or education infrastructure. Fourie (2006) identifies local, national or transnational as being three levels of infrastructure incidence. At the local level, infrastructure's impact is assessed within a specific locality with no consideration for possible externalities that may flow to surrounding areas, using cost-benefit analysis or 'theory of clubs' (Fourie, 2006). At the national level, infrastructure is recognised for having externalities and benefits beyond a specific location (Fourie, 2006). When infrastructure's spill-over impact goes beyond the borders of a country, infrastructure's incidence is said to be at the transnational level (Fourie, 2006). The consensus view that emerges from the literature is that infrastructure development is a major ingredient that promotes economic growth and development. In developing countries, the infrastructure deficiencies are higher than in developed countries and therefore, in these developing regions investing in infrastructure has become a priority in order to unlock economic growth, boost international trade, and drive poverty reduction. In comparison to other regions around the world, SSA is widely renowned for its significant infrastructure deficit, with the African Infrastructure Country Diagnostic (2010) estimating the total infrastructure financing requirement at US$93 billion a year. Bende-Nabende (2002) points out that, despite per capita income of SSA countries being on a par with Southeast Asian economies at the time of independence in the 1960s, poor economic policies pursued post-independence and mismanagement contributed to the decline in economic performance and comparative underinvestment in economic and social infrastructure prevailed in much of SSA. This view is

echoed by Luiz (2010) and the UN-Habitat (2011), who attribute the significant infrastructure deficit throughout SSA to a combination of factors such as poor political decision making in the early post-colonial years, corruption and the acute lack of maintenance of existing but weak infrastructure at the end of colonial rule. The effect of economic mismanagement in post-colonial SSA is that countries in the region tend to lag behind their peers in Southeast Asia in terms of their economic performance, and more specifically, their level of infrastructure development (Bende-Nabende, 2002). The inadequate state of infrastructure services in SSA is evidenced by the poor road network, ageing railways, congested ports and inadequate ICT infrastructure (UN-Habitat, 2011).

Fourie (2006) also acknowledges the distinction made between economic and social infrastructure. Economic infrastructure such as energy facilities, roads, ports, and telecommunications, generates economic activity, while social infrastructure such as health and education impacts on human development either directly or indirectly (Fourie, 2006). Fourie (2006, 2007) further notes that, while a distinction is often made between quantity and quality, both these descriptions of infrastructure positively impacts on economic growth. Calderón and Chong (2004) comment that in poorer areas, production and transaction costs may decline as a result of infrastructure investments. Fedderke, Perkins and Luiz (2006), on the other hand, specifically point out that when public infrastructure expenditure is productive, it promotes private investment, and increases in efficiency and output. These highlighted benefits essentially describe the direct and indirect effects of investing in infrastructure (Fourie, 2007). Ayogu (2007) views infrastructure as being a major poverty alleviation tool due to infrastructure's role in providing normal day-to-day consumption goods and services to consumers and also being a key input into private-sector production.

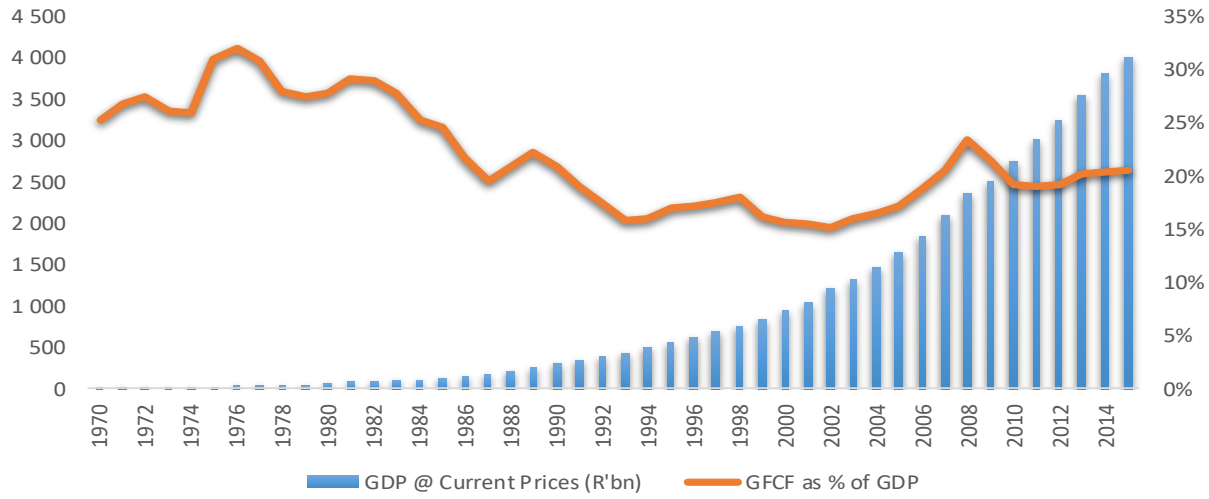
In a similar vein, Bhattacharya, Romani and Stern (2012) point out that scaling up infrastructure is in the best interests of developing countries as a means towards accelerating economic growth and development. It is therefore evident that investing in infrastructure generates significant public works expenditure, thereby increasing aggregate demand (Ayogu, 2007), and providing a strong catalyst for productivity and growth (Seneviratne and Sun, 2013). In light of the aforementioned, it would be reasonable to support Luiz's (2010) assertion that inadequate infrastructure poses an obstacle to economic growth which, in turn, can deter private investment and overall development. Infrastructure investment is robust and resilient, considering that it is pursued regardless of the prevailing economic climates. According to

Ayogu (2007), during a growth cycle, it can lead to indiscriminate public spending, while in a stagnating environment infrastructure expenditure is used to stimulate economic activity. This scenario alludes to the political nature of infrastructure that Calderón and Chong (2004) and Ayogu (2007) mention, whereby the planning, timing, scale and mix of infrastructure investments may be linked to political motives rather than economic rationale and efficiency motives. Finally, Bhattacharya et al. (2012) also attribute the increasing demand for infrastructure in developing countries to structural changes within these economies as a result of globalisation and trade patterns, increasing urbanisation of communities, imperative of environmental sustainability when formulating development agendas, and the legacy of poor maintenance of aging infrastructure.

2.8 Infrastructure in South Africa

South Africa's progressive underinvestment in infrastructure since the early 1980s is illustrated in Figure 11 below. GFCF declined sharply between 1980 (29% of GDP) and 1987 (19.6% of GDP) and reached a low of 15.2% of GDP in 2002. A gradual recovery in GFCF as a percent of GDP is noted from 2003 to 2008, when infrastructure investment grew to 23.5% of GDP. Government attributes this recovery to the creation of fiscal headroom for increased infrastructure investment, both public and private as a result of the prudent management of the economy (National Treasury, 2012). The level of infrastructure investment declined again following the global financial crisis, but has stabilised around an average of 20% of GDP over the five-year period to 2014.

Figure 12: South African GDP and GFCF as percent of GDP



Source: SARB (2016)

South Africa's underinvestment in infrastructure is noted by Bogetić and Fedderke (2006) and Fourie (2007), which, they contend, contributes to the country's low economic growth rate and increasing costs of trade. Bogetić and Fedderke (2006) performed an international benchmarking exercise of South Africa's infrastructure against other SSA countries and other middle-income country groups, using a WB data set with objective and subjective indicators of performance across the electricity, water and sanitation, ICT and transportation sectors. Overall, Bogetić and Fedderke (2006) assessed that the infrastructure services and quality provided by South African utilities were generally quite good when compared to SSA countries but below those of middle-income country peers. From a sector perspective, Bogetić and Fedderke (2006) gauged that access to electricity in South Africa was lower; however, quality indicated by technical performance was favourable compared to middle-income country groups. The picture in terms of access to water and sanitation and ICT was found to be similar to the state of electricity access. Quality of water and sanitation compared favourably to middle-income country peers, but not so in terms of the quality of ICT infrastructure (Bogetić and Fedderke, 2006). A different picture emerged with regards to transportation infrastructure, with Bogetić and Fedderke (2006) observing that indicators of road access and quality were lower than in middle-income country peer groups.

Fourie (2007) observes that researchers and policy makers tend to focus more on the issue of infrastructure stock rather than the quality of infrastructure. Infrastructure stock is concerned with the quantity of infrastructure, while infrastructure quality is concerned with the performance of infrastructure stock; however, both are acknowledged as having an important impact on economic growth (Fourie, 2007). Having made this observation and the distinction between infrastructure quantity and quality, Fourie (2007) sought to assess infrastructure indicators critically, with the purpose of focusing attention on infrastructure quality in South Africa. Measures of infrastructure quality are not widely documented, so Fourie (2007) relied on cross-country data compiled by Estache and Goicoechea (2005) in order to compare South Africa to other regions. The infrastructure quality indicators compiled by Estache and Goicoechea (2005) include electricity transmission and distribution losses, phone faults, travel time to work, and percentage of paved roads. Table 2 below provides a comparative overview of South Africa's performance.

Table 2: Infrastructure quality indicators

	Electricity transmission & distribution losses	Phone faults	Travel time to work, main cities	Paved roads (%)
South Africa	**8**	**48**	**35**	**21**
SSA	19	57	34	25
Middle East & North Africa	14	23	25	56
South Asia	22	97	27	38
East Asia & Pacific	12	39	36	32
Latin America & Caribbean	18	24	29	36
Europe & Central Asia	18	34	29	76
Low-income	22	64	33	30
Middle-income	15	25	29	52
Upper-income	14	18	29	57
High-income	6	11	32	82
World	14	37	31	50

Source: Fourie (2007), adapted from Estache and Goicoechea (2005)

The assessment by Estache and Goicoechea (2005) and Fourie (2007) of South Africa's infrastructure quality largely mirrored the results of the international benchmark performed by Bogetić and Fedderke (2006) in that the quality of electricity supply was found to compare well against peer income country groups. However, the quality of ICT and transport and logistics infrastructure was weaker. Good quality infrastructure provides basic consumption goods for households and inputs into production (Ayogu, 2007); therefore, should the lack of adequate and reliable infrastructure in SSA not be addressed, efforts to boost economic growth across the continent will be impeded. According to Fourie (2007), inadequate infrastructure will result in SSA foregoing positive externalities such as attracting FDI, enhancing the competitiveness of African countries in a global economy, reducing poverty, boosting international trade and regional integration. The NDP (2013) specifically acknowledges that South Africa needs significant investment in infrastructure to maintain but also expand its electricity, water, transport and ICT services to enhance economic growth and human development. Recognising that the current investment levels are wholly inadequate and that government's resources are limited, the NDP (2013) notes that the participation of private sectors in terms of development, implementation and funding is necessary to assist South Africa overcome its infrastructure delivery backlogs.

2.9 Review of empirical studies on determinants of FDI

The interplay between the competitive advantages of a company and country dynamics may determine the competitiveness of a country in attracting FDI (Suh and Boggs, 2011). Research into the determinants of FDI has tended to focus on regions and developed versus developing countries and used regression analysis to identify characteristics that impact on FDI inflows. Rehman et al. (2011) state that infrastructure facilitates both horizontal and vertical FDI and therefore deficient or inadequate infrastructure is likely to discourage FDI due to the limitations and increased costs of operating, with the resultant constraints. SSA's low share on FDI inflows was the concern variable in Asiedu's (2001) study to ascertain the determinants of FDI across developing regions over the period 1988 to 1997. The key explanatory variables that Asiedu (2001) examined were return on investment, infrastructure, trade openness and political risk. The results confirmed that FDI inflows were uniformly lower across SSA countries. Furthermore, Asiedu (2001) established that the effect of the aforementioned explanatory variables differed in SSA and other developing countries. While trade openness was a significant determinant of FDI, the marginal benefit was lower in SSA. Returns on investment and infrastructure development were also significant determinants of FDI in other developing regions, but not in SSA.

The focus of Bende-Nabende's (2002) study was to test the locational advantages as determinants of FDI into 19 SSA countries over the period 1970 to 2000. The basic premise of the study acknowledged four locational advantages that influence FDI, namely, cost-related factors, business climate and environment, macro-economic factors, and the development strategy of the recipient country. As a result, the independent variables used by Bende-Nabende (2002), i.e. real wage rates, interest rates, foreign exchange rates, total value of imports and exports, GDP, GDP growth rates, human capital development, and value of exports, were selected on the basis of data availability and suitability as proxies for the four aforementioned categories of locational advantages. The results of the study indicated that GDP growth as a proxy for market growth, value of exports as a proxy for export-orientated policy, and liberalisation were the most consistent long-run determinants of FDI in SSA. However, the results for real wage rates and human capital development were inconclusive (Bende-Nabende, 2002). Foreign exchange rate and GDP as a proxy for market size were the next explanatory variables that determined FDI to SSA, with the total value of imports and exports as a proxy for trade openness established as the weakest determinant of FDI to SSA (Bende-Nabende, 2002).

Jenkins and Thomas (2002) cite survey-based studies conducted by Mowatt and Zulu (1999) and Hess (2000) that sought to establish the determinants of FDI in Southern Africa. Mowatt and Zulu (1999) found that regional FDI typically emanating from South Africa was informed by investors' awareness of the economic and regulatory frameworks, financial factors and quality of infrastructure. On the other hand, Hess' (2000) survey sought to identify barriers to investment in SADC with political and economic instability, excessive bureaucracy and corruption, lack of transparency, deficient infrastructure coverage, and high taxation ranking as important barriers to FDI. In a later study aimed at expanding the literature on FDI, Asiedu (2006) specifically focused on 22 African countries and included natural resources as an additional explanatory variable together with enhanced proxy indicators that define the institutional and political variables. The study covered the period 1984 to 2000 and the results indicated that large local markets, natural resource endowments, good infrastructure, low inflation, legal clarity and good investment policy frameworks all promote FDI. Unsurprisingly, Asiedu (2006) found that corruption and political instability deter FDI.

Fedderke and Romm (2006) and Moolman et al. (2006) focused their empirical studies on determinants of FDI into South Africa. In the case of Fedderke and Romm (2006), covering the period 1956 to 2003, FDI was shown to have been vertical in nature and had a positive impact on growth. Fedderke and Romm (2006) surmised that the rate of return and South Africa's risk profile as being determinants of FDI. Moolman et al. (2006) studied the period 1970 to 2003 and confirmed Fedderke and Romm's (2006) finding. They also, however, argued that infrastructure and nominal exchange rate are important areas to focus on in order to attract FDI in South Africa.

Castro, Regis and Saslavsky (2007) conducted a study into FDI inflows into Argentina from 1991 to 2001. The purpose of the study was to investigate how following the implementation of structural reforms in the wake of the hyperinflationary crisis of 1989, Argentina became a major recipient of FDI inflows not only in South and Central America but also among all countries in the developing world. In particular, Castro et al. (2007) examined the geographic distribution of FDI within Argentina during this period in order to ascertain whether the spatial location of public infrastructure across the provinces was a determinant to FDI decision by MNEs. Theoretically, the expectation is that public infrastructure (which Castro et al. (2007) defined as a state providing goods or service that facilitates and link production with consumption) should play a significant role in a foreign company's location decision because

of the direct impact public infrastructure has on operating costs and revenue. Castro et al. (2007) applied econometric procedures for spatial analysis, namely the Spatial Autoregressive model and a spatial lag model to a sample of firm-level FDI inflows for a panel of 21 Argentine provinces for 1991 to 2001. Total paved roads together with gross electricity generation and installed electricity generation capacity were indicators used as the independent variable proxies for public infrastructure stock (Castro et al., 2007). Gross Provincial Product was the proxy for market size, construction as a percent of Gross Provincial Product was a proxy for investment, and primary and secondary school enrolment per capita were proxies for unskilled and skilled labour respectively (Castro et al., 2007). The results of the study indicated that Gross Provincial Product and population were the key determinants of FDI location, with Gross Provincial Product always positive and highly significant. Only 'paved roads' among the abovementioned proxies for public infrastructure stock was significant and positively correlated to FDI location (Castro et al, 2007). It could therefore be concluded that the quality of infrastructure as proxied by paved roads is an important determinant of FDI inflows to an Argentine province.

The focus of Bartels et al.'s (2008) study was also an investigation into the locational factors that determine FDI but instead of Argentina, the region examined was SSA. They sourced data from UNIDO's 2003 survey questionnaire completed by 718 MNEs in 11 SSA countries whose representatives gave reasons for their foreign investment decision based on a list of 22 location variables (Bartels et al., 2008). After applying factor analysis and cluster analysis to the data, Bartels et al. (2016) established that political economy of investment climate and the legal environment to be the most important locational factors behind the foreign investment decision. The factors low labour costs, availability of skilled labour, continental market access and the possibility to leverage off trade agreements, and incentives package were not critical in the FDI decision-making process, unlike economic factors such as availability of production inputs and local market demand that were of some importance in the FDI decision (Bartels et al., 2008). The conclusion drawn from Bartels et al.'s (2008) study is that political stability and regulatory certainty are the single most critical determinants of FDI into SSA, followed by the more traditional determinants of local market size and availability of production inputs.

Kundan and Gu (2010) note that Nepal is a poor country dependent on support from donors and private capital inflows to aid the country's growth and development. Even though Kundan and Gu (2010) observed that Nepal has one of South Asia's most liberalised economic policies, the

country's economic growth has been very poor. To this end, Kundan and Gu (2010) set out to examine the links between FDI and economic growth and test the causal relationship between the variables in Nepal over the period 1980 to 2006. After sourcing annual time series data on GDP growth and FDI as a percent of GDP, Kundan and Gu (2010) used Ordinary Least Squares (OLS) and the unit root test, co-integration test and Granger causality test to determine the nature of the relationship between FDI and economic growth. The results of Kundan and Gu's (2010) empirical study revealed a positive but insignificant relationship between Nepal's GDP growth rate and FDI inflows. In addition, the results suggested a one-directional relationship from FDI to GDP growth after four years, and led Kundan and Gu (2010) to conclude that GDP growth in Nepal is not dependent on FDI inflows.

Acknowledging that Africa has not been a major destination for FDI inflows, Anyanwu (2011) conducted a study to examine which factors attract FDI inflows to the continent, using panel data analysis of seven five-year non-overlapping windows for the period 1980-2007. The explanatory variables that Anyanwu (2011) tested included urban population and GDP per capita as proxies for market size, and trade openness proxied by total trade as a percent of GDP. Financial development was proxied by domestic private sector credit extension as a percent of GDP, macroeconomic stability proxied by inflation and exchange rate, number of telephone lines and mobile subscribers and government expenditure as indicators of infrastructure coverage (Anyanwu, 2011). International remittances as a percent of GDP, political rights, and natural resource endowment were additional explanatory variables in the study (Anyanwu, 2011). The results indicated that the urbanisation rate has a significant positive relationship with FDI inflows whereas GDP per capita (the other proxy for market size) did not indicate a positive or a significant relationship. A positive and significant relationship with FDI inflows was also indicated by the coefficients of the openness, government consumption expenditure, international remittances, agglomeration effects, and natural resource endowment indicators. Financial development and exchange rate fluctuations were both found to have a negative but significant relationship with FDI inflows (Anyanwu, 2011).

Loots and Kabundi (2012) noted the limited number of empirical studies on FDI into Africa (Morisset, 2000, Asiedu, 2002-2004, Naude and Krugell, 2003, Akinkugbe, 2005), Breslin and Samanta, 2008, Rojid et al., 2009, and Hailu, 2010), and thereafter surmised that there are no conclusive determinants of FDI inflows into Africa, particularly for the period post-2000. In the empirical study conducted by Loots and Kabundi (2012), cross-section regression analysis

rather than panel regression analysis was used in order to account for missing data obtained on 46 African countries for the period 2000 to 2007. The explanatory variables in the study were selected on the basis of them being similar to independent variables used in prior studies. These independent variables are trade and exports as a percent of GDP, real GDP as proxy for market size, inflation rate as proxy for macroeconomic stability, gross domestic investment as percent of GDP, oil exporting countries versus non-oil exporting countries as a dummy variable, and road coverage as proxy for infrastructure quality. Market size and oil endowment were found to be significantly and positively correlated with FDI inflows, and individually the regression results established these variables to be statistically significant determinants of FDI in Africa. Inclusion of the other independent variables in a multiple regression model established market size, oil exports and to a lesser extent, trade openness as significant determinants of FDI. Macroeconomic stability and good infrastructure, however, were found not to be significant determinants of FDI in Africa since 2000 (Loots and Kabundi, 2012).

According to Acheampong and Osei (2014), FDI inflows to Ghana between 1993 and 2005 fluctuated widely in spite of investment-friendly policies introduced by government in the 1990s. Post-2005, Acheampong and Osei (2014) note that FDI inflows improved to such an extent that Ghana was propelled into the top three recipients of FDI in West Africa. As a result of this improvement, Acheampong and Osei (2014) set out to analyse the long-run and short-run determinants of FDI inflows to Ghana during the period 1980 to 2010 using a Vector Error Correction model. The ratio FDI to GDP was their dependent variable, with GDP as a proxy for market size, real exchange rate as a proxy for macroeconomic stability, average international country risk rating as a proxy for political stability, share of fuel and minerals in total exports as a proxy for natural resource endowment, and telephone lines per 1000 people as a proxy for infrastructure (Acheampong and Osei, 2014). In their results, Acheampong and Osei (2014) found that market size had a positive but insignificant relationship with FDI both in the long and short run. In the long run, natural resources had a negative relationship with FDI but positive in the short run. In both instances, the relationship was significant. In the long run, real exchange rate had a negative but significant relationship but positive and insignificant relationship in the short run. Political stability has a negative relationship that was significant in the long run but insignificant in the short run. Finally, in the long run, infrastructure had a positive and significant relationship but negative relationship in the short run (Acheampong and Osei, 2014).

Amusa et al. (2016) conducted a panel data analysis study to establish the determinants of FDI in a sample of 31 SSA countries for the period 1995 to 2012. Amusa et al. (2016) used fixed effect, random effect, and systems-GMM estimation techniques, and found that poor infrastructure proxied by fixed line and mobile density, and inflation hindered FDI inflows. Trade openness proxied by the sum of exports and imports as a percent of GDP, and population size enhance FDI inflows. Interestingly, productive sector aid was found to be positively and significantly related to FDI, whereas socio-economic aid was found to be insignificant (Amusa et al., 2016).

2.10 Infrastructure and FDI

From a theoretical perspective, there seems to be a broad consensus that infrastructure plays an important role in a country's ability to attract investment into the economy from both domestic and international investors (Arvanitis, 2006; Moolman et al., 2006; Kok and Ersoy, 2009; Rehman et al., 2011; Donaubauer et al. 2014; Shah, 2014; Okafor et al., 2015). Even though there have, over the years, been a number of empirical studies on the determinants of FDI, the literature review indicates that prior empirical studies tend to investigate the determinants of FDI at cross-country or regional level. More specifically, the literature review also indicates a number of studies that have sought to examine empirically the relationship between infrastructure and FDI inflows at a regional or country level (Babatunde, 2011; Suh and Boggs, 2011). These are discussed below.

Babatunde's (2011) study was premised against the backdrop of the lacklustre economic performance witnessed in a number of countries in SSA over the period 1980 to 2003. Acknowledging that SSA countries are endowed with natural resources to varying degrees which should in principle help foster economic growth and development, Babatunde (2011) noted corruption, unemployment, poor leadership, bad policies, and deficiencies in infrastructure as examples of factors whose presence discourages domestic and foreign investment into the economy that can stimulate sustainable economic growth and alleviate poverty. Having noted prior empirical studies conducted by Ng'ang'a (2005) and Asiedu (2002; 2003; 2006) that demonstrated the positive impact of trade openness and infrastructure in attracting FDI inflows into developing countries and SSA respectively, Babatunde (2011) used a panel data technique to analyse the relationship between trade openness, infrastructure, FDI and economic growth in 42 SSA countries in the period 1980 to 2003. In the study, Babatunde (2011) specified net inflow of FDI as a percent of GDP as the dependent variable. With regards

to the independent variables, total trade exports and imports as a percent of GDP was used as a proxy for trade openness, natural log of the total number of mobile users and fixed telephones lines was used as a proxy for infrastructure development, annual growth rate in real GDP per capita was used as a proxy for market size, and CPI was used as a proxy for macroeconomic stability (Babatunde, 2011). The interaction between trade openness and infrastructure was an additional dependent variable specified in Babatunde's (2011) model. The empirical findings of the study were that trade and infrastructure development both had positive coefficients and were found to be significant in attracting FDI inflows, and thus were in line with Babatunde's expectation (2011) and consistent with prior findings of Ng'ang'a (2005) and Asiedu (2006) cited in his study. Furthermore, the empirical results also showed that market size has a positive and significant relationship with FDI inflows while inflation has a negative and significant relationship with FDI. These two findings were also in line with Babatunde's (2011) expectations. The empirical findings support the notion that SSA countries should consider implementing policies that encourage trade, infrastructure development, and manage inflation in order to enhance the country's attractiveness to foreign investors.

Suh and Boggs (2011) attribute the strong surge in FDI inflows witnessed since the 1990s to increased competition in many countries that sought to attract inward investment from high skill, high wage and high technology industries. This assessment formed the premise of Suh and Boggs' (2011) empirical study, which was aimed at investigating the role of ICT infrastructure within the context of global competition for FDI. More specifically, the focus was not only on ICT infrastructure and ICT utilisation, but also on whether local market size, cultural and trade openness are additional factors that determine FDI into developing and developed countries (Suh and Boggs, 2011). To this end, Suh and Boggs (2011) used panel regression analysis of time-series data collected from a sample of 19 developed and 19 developing countries over the period 1996 to 2004. Net FDI inflows formed the dependent variable in Suh and Boggs' (2011) model specification. ICT infrastructure was proxied by a composite variable comprising the number of fixed landlines and mobile phone subscribers, while ICT utilisation was proxied by international telecommunications traffic (Suh and Boggs, 2011). The other independent variables specified by Suh and Boggs (2011) include trade to GDP as a proxy for trade openness, annual GDP growth rate and GDP as proxies, labour cost, and exchange rate and inflation rate as proxies for macroeconomic stability. The empirical findings of the study found that ICT infrastructure was positively and significantly correlated with FDI inflows in developed countries over the long run period of 1996 to 2004 but was

insignificant over a short run period of 2000 to 2004. In the case of developing countries, Suh and Boggs (2011) found that ICT infrastructure was insignificant over both the long run and short run periods. ICT utilisation, however, was positive and significantly correlated to FDI inflows for developing countries, but only over the short run period, but insignificant for developed countries (Suh and Boggs, 2011), leading the authors to conclude that infrastructure usage is as important as infrastructure availability in developing countries as a means to attract FDI.

The empirical findings in respect of the other independent variables included an insignificant relationship between trade openness and FDI inflows which is contrary to Babatunde's (2011) findings. In terms of market size, whereas GDP was significant for both developing and developed countries, the annual GDP growth rate was significant only in the short run, as was labour cost (Suh and Boggs, 2011). In terms of macroeconomic stability, exchange rates were insignificant to FDI inflows as was inflation, except in the case of developed countries (Suh and Boggs, 2011). The take-out from Suh and Boggs' (2011) study is that ICT infrastructure and utilisation are just as critical as traditional factors such as market size in foreign investment decision making.

Rehman et al. (2011) acknowledge the positive impact and role FDI may have in developing countries in terms of facilitating economic growth and development. However, recognition of the dearth of empirical research that centred on infrastructure as a critical determinant of FDI prompted their own study. To this end, Rehman et al. (2011) investigated the role and impact infrastructure availability together with market size and macroeconomic stability had on FDI inflows at national level, namely Pakistan between the periods 1975 to 2008. It is noted that Pakistan embarked on a process of liberalisation and market reform during the early 1980s which opened the country to foreign investors (Rehman et al., 2011). Time series data was collected on telephone landlines as a proxy for infrastructure, GDP as a proxy for market size, and exchange rate as a proxy for macroeconomic stability (Rehman et al., 2011). Applying the autoregressive distributed lag approach, the empirical findings of the study found infrastructure to have a positive and significant impact on FDI inflows to Pakistan, both in the short run and long run, which was in line with Rehman et al.'s (2011) expectation. It noted, however, that the above finding is contrary to that of Suh and Boggs (2011) of ICT infrastructure being insignificant for developing countries. The empirical findings for market size were as expected, namely positive and significant, which was also the case with Babatunde (2011) and Suh and

Boggs (2011). Exchange rate had a negative coefficient, but it was significant (Rehman et al., 2011).

Similar to the empirical study conducted by Rehman et al. (2011), Abu Bakar et al.'s (2012) study examines the role of infrastructure on FDI inflows at national level. Malaysia is renowned for its success in attracting high levels of FDI among its Southeast Asian neighbours, which Abu Bakar et al. (2012) largely attribute to government policies that were implemented to compete for and attract foreign investment. Malaysian time series data for the period 1970 to 2010 was collected. Unlike the empirical studies of Babatunde (2011), Suh and Boggs (2011) and Rehman et al. (2011) mentioned above, real government expenditure per real GDP was used as a proxy for infrastructure (Abu Bakar et al., 2012). Real GDP per capita was collected as a proxy for market size, trade openness was a proxy as per the prior studies, and total education expenditure as a proxy for human capital development. Applying ordinary least squares regression, the empirical findings of Abu Bakar et al. (2012) confirmed the findings of Rehman et al. (2011), that infrastructure had a positive and significant impact on FDI inflows to Malaysia. Similarly, market size and trade openness were both positive and significant, while human capital development was negative but significant (Abu Baker, 2012). The results of the study therefore suggest that the availability of infrastructure can attract foreign investment.

Similar to the empirical study by Rehman et al. (2011), that by Zeb, Qiang and Shabbir (2014) focused on Pakistan and was aimed at examining the role of telecommunications infrastructure in attracting FDI inflows in the period 1990 to 2012. The premise of the study was in recognition of how, in the 1990s, the government of Pakistan opened up the telecommunications sector, among others, to foreign investment (Zeb et al., 2014). Furthermore, Zeb et al. (2014) noted how critical telecommunications had become to enable business and industry to operate and participate in the domestic and global economy. To this end, Zeb et al. (2014) collected data on mobile subscriptions as the main independent variable and proxy for the availability of ICT infrastructure. The other independent variables comprised labour proxied by employed labour force, market size proxied by GDP, and trade openness proxied by trade as a percent of GDP. Zeb et al. (2014) applied the ordinary least squares technique to test the significance of the independent variables' relationship with FDI inflows. The empirical results showed that the availability of ICT infrastructure has a positive and significant relationship with FDI inflows, which was expected and also confirmed by Rehman et al.'s (2011) empirical finding on ICT infrastructure. The empirical results on market size,

however, were contrary to the findings of Rehman et al. (2011) as the coefficient was negative and insignificant. Zeb et al.'s (2014) empirical results in respect of the other independent variables were negative and insignificant for labour, and positive and significant for trade openness in line with Babatunde (2011) and Abu Bakar et al. (2012). The results from Zeb et al.'s (2014) study suggest that the availability of infrastructure stimulates FDI in Pakistan.

In another study conducted by Shah (2014), annual data over the period 1980 to 2007 was collected in order to determine the significance of the availability of infrastructure in stimulating FDI inflows into 90 developing countries. Shah (2014) noted that the total length of paved roads and of rail networks, uninterrupted power and water supply, the number of ports of entry, and telecommunication density have been typically captured in FDI literature as a proxy for infrastructure availability. As a result, GFCF and sea access were proxied as alternative indicators of infrastructure availability, together with mobile and landline subscribers (Shah, 2014), with all these variables expected to be positive. Similar to other studies, Shah (2014) incorporated indicators of market size, economic development, trade openness, macroeconomic stability, geographical location and foreign language skills as additional independent variables. Using fixed effects and random effects regression analysis, Shah's (2014) empirical findings revealed ICT infrastructure to be positive and significant; however, GFCF was positive but insignificant. Market size proxied by population, economic development proxied by GDP and GDP per capita, and trade openness proxied by trade as a percent of GDP, were all positive and significant and confirming expectation (Shah, 2014). Inflation was negative and significant, while exchange rate was positive, and geographical location and foreign language skills were found to influence FDI decision making (Shah, 2014). Overall, Shah's (2014) empirical findings support the view that the availability of infrastructure attracts FDI inflows to developing countries.

Fitriandi, Kakinaka and Kotani (2014) noted that high levels of infrastructure development are regarded as an important determinant of foreign investment in the FDI literature and conducted an empirical study to examine the relationship between infrastructure development and FDI inflows at provincial level in Indonesia over the period 2000 to 2009, given the process of decentralisation in the country. Compared to the prior studies discussed, Fitriandi et al. (2014) collected data on four alternative proxies for hard infrastructure development, namely: electricity distribution per area, road coverage per area, water distribution per population, and water capacity per population. The other independent variables specified in Fitriandi et al.'s

(2014) model were government size measured by government expenditure as a percent of provincial GDP, market size measured by real provincial GDP, trade openness measured by the sum of imports and exports as a percent of provincial GDP, industrialisation measured as a percent of industrial value added to provincial GDP, and provincial labour cost and unemployment. Pooled ordinary least squares techniques and random effects were two of the model estimation methods applied. The empirical results of the study showed that all four measures of infrastructure development had a positive and significant relationship with FDI inflows to Indonesian provinces, with Fitriandi et al. (2014) observing that those provinces with higher levels of infrastructure development attracted higher volumes of FDI. With regards to the other independent variables, Fitriandi et al. (2014) reported government size and labour cost to both have negative and significant relationships with FDI inflows. On the other hand, market size, trade openness, industrialisation, and unemployment were all found to have insignificant relationships with foreign investment inflows (Fitriandi et al., 2014), which was generally contrary to the empirical studies discussed.

The purpose of the empirical study by Ramirez and Kőműves (2014) was to establish the existence of a causal relationship between economic infrastructure, private capital formation and FDI inflows to transition economies, with specific reference to Hungary. According to Ramirez and Kőműves (2014), Hungary was first among the eastern and central European countries to embark on socioeconomic and political reforms that resulted in the country adopting market-based investment policies and becoming integrated with the European Union in 2004. Quarterly data for the period 1995 to 2012 was collected, with gross value added in transportation and ICT used a proxy for economic infrastructure (Ramirez and Kőműves, 2014). Using an error correction model, Ramirez and Kőműves (2014) reported the existence of a long run positive relationship between economic infrastructure and FDI stock and between real exchange rate and FDI stock, whereas there was a negative relationship between real GFCF and FDI stock in the long run. The results of the study suggest that an increase in economic infrastructure and depreciation of the currency would in the long run attract FDI to Hungary.

Finally, using Vector Auto Regression econometric analysis, Kaur, Khatua and Yadav (2016) investigated how FDI inflow to India between 1991 and 2010 was influenced by infrastructure quality and human resources. The premise put forth by Kaur et al. (2016) is that garnering market share in the host country or leveraging from a low-cost production base are factors that influence a MNE's investment decision. These two factors are enhanced by infrastructure

quality and human capital development in the host country. A number of indicators were selected by Kaur et al. (2016) as proxies for infrastructure quality, namely investment in energy projects, air transportation and rail freight, paved roads, and internet users. Public spending on education and the wage rate of skilled labour were selected as proxies for quality of human resources. The results of Kaur et al. (2016) generally found a positive relationship between infrastructure quality and FDI inflow to India. More specifically, the relationship between FDI inflows and air freight and paved roads as independent variables was statistically significant. However, Kaur et al. (2016) did not find a significant relationship between the independent variables investment in energy, air transportation, and internet users with FDI inflows. It is noted that Kaur et al. (2016) found the results for the investment in energy contrary to their expectation. The relationship between human resources and FDI was significant and positive as expected (Kaur et al, 2016).

2.11 Summary

The literature review has unpacked the conceptual definitions of FDI together with examples of some of the typical relationship structures that may underpin a FDI transaction. The theoretical framework on FDI was also expounded on, followed by a discussion on the positive and negative externalities of FDI noted in the literature. The review of FDI inflows in to SSA, and more specifically into South Africa, provided a picture of the evolution of foreign investment flows. The review of empirical studies revealed that infrastructure is widely regarded as being an important factor that attracts FDI along with other factor endowments such as market size, macroeconomic stability and trade openness. While the general consensus in the literature is that the presence of all these factor endowments are key determinants in the FDI decision-making process, the results of the empirical studies discussed highlight that variances may occur among regions and at national level. Furthermore, the empirical studies have revealed that generally, infrastructure has a positive and significant impact on FDI inflows. However, it is noted that the measures of infrastructure development have tended to be proxied by either telecommunications infrastructure or length of paved roads. It is noted that Fourie (2007) asserts that measures of infrastructure quality tend to be more challenging to measure, contrary to measures of infrastructure quantity. Babatunde (2011) and Abu Bakar et al. (2012) cite a study conducted by Cheng and Kwan (2000), who observed that infrastructure quality was not a significant determinant of FDI inflows to China. This study aims to add to the FDI literature by examining whether or not a significant relationship exists between infrastructure quality and FDI inflows with specific reference to South Africa.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

The objective of the study is to establish whether or not there is a significant relationship between infrastructure, both quality and coverage, and FDI inflows to South Africa. To this end, the study entailed the collection and analysis of aggregate annual time series data for the period 1970 to 2015. This aggregate annual time series data was downloaded from the online databases of SARB and the World Bank (WB). The purpose of the study did not include establishing a cause-and-effect relationship between infrastructure quality and FDI inflows to South Africa nor between infrastructure coverage and FDI inflows to South Africa. Furthermore, the objective was not to assess whether other factors and locational variables as highlighted in the empirical literature review are significant determinants in the FDI decision-making process of investors evaluating South Africa as an investment destination. Given the objectives of the study, the first section in this chapter details the research approach and strategy that was adopted. This section is followed by a discussion of data collected, and then a description of the estimation model specified. The chapter is concluded with an outline of the research methodology.

3.2 Research Approach and Strategy

The objective of the study is to establish whether or not there is a significant relationship between infrastructure quality and FDI inflows to South Africa. In order to answer the research question, the research approach adopted a correlational study that Leacock, Rose and Warrican (2009) describe as a research design whereby one seeks to establish a relationship between two variables without necessarily identifying a causal relationship between the variables. The purpose of this study was not to establish a cause-and-effect relationship between infrastructure and FDI inflows to South Africa nor was it to assess whether the other factor and locational variables are significant determinants in the FDI decision-making process. The choice of conducting a correlational study was largely informed by the research question, but it was also influenced by the availability and source of data for the study.

In line with the studies reviewed in the literature review, particularly those by Babatunde (2011), Suh and Boggs (2011), Rehman et al. (2011), Abu Baker et al. (2012), Zeb et al. (2014), Shah (2014), Fitriandi et al. (2014), Ramirez and Kőműves (2014), and Kaur et al. (2016), the

study intuitively calls for a quantitative research approach to establish whether there is a significant relationship between FDI inflows to South Africa and infrastructure. According to Marczyk, DeMatteo and Festinger (2005), quantitative data enables the use of statistical tools and methods to establish findings on the nature and significance of the relationship between a dependent variable and one or more independent variables. This assertion suggests that quantitative research is an ideal research approach for studies where data is collected, measured, and analysed in a systematic and defined manner. In the case of this study, the availability of secondary time series data over a long period of time that captures observations over a number of economic cycles, essentially informed the 1970 to 2015 data collection period. The empirical literature reviewed informed the systematic identification and selection of the various annual time series data that was collected and analysed to answer the research question posed. Due to the periodic and regular observations of the specified time series data, a longitudinal time series analysis was conducted.

As stated earlier, the research objective of this study is to ascertain whether or not infrastructure quality and infrastructure investment are major determinants of FDI inflows to South Africa. To this end, indicators of infrastructure quality and infrastructure investment in South Africa are the concern variables that will be assessed in relation to FDI inflows.

3.3 Data

Secondary time series data for the prescribed period of 1970 to 2015 was identified, sourced, and downloaded onto Excel worksheets from the online databases of SARB and the WB. This period captures observations over a number of economic cycles, including FDI inflows during the apartheid years and since the advent of a democratic South Africa in 1994. The end of apartheid that was marked by the lifting of economic sanctions against the country by the international community under the auspices of the United Nations. The secondary time series data downloaded was annual aggregate data that was either recorded as a nominal value or as a specific macroeconomic economic indicator. Table 3 below describes the time series and source of the data collected.

Table 3: Description and Source of Variables

Description	Indicator	Abbreviation	Source
Foreign Direct Investment	Foreign Liabilities: Total Direct Investment (in Rand)	FDI	SARB
Infrastructure Quality	Electricity Transmission and Distribution Losses (% Output)	ELEC-LOSS	WB
Infrastructure Investment	Gross Fixed Capital Formation – Electricity, Gas, and Water (Investment in Rand)	GFCF-EGW	SARB
Financial Market Development	Private Credit Extension to Total Domestic Credit Extended (%)	PVT-CREDIT	
Market Size	GDP per Capita (in Rand)	GDP-CAPITA	
Macroeconomic Stability	Average Annual Rate of Inflation (%)	CPI	WB
Trade Openness	Sum of Exports and Imports to GDP (%)	TRADE-GDP	

The indicators identified in Table 3 above were ideal, based on their availability, relevance in answering the research question, and their use in other empirical studies discussed in the literature review. The online databases of SARB and the WB are easily accessible and comprehensive in terms of the availability of South African annual time series data. SARB is the central bank of South Africa while the WB is a leading multilateral development bank. The time series databases from these two institutions provide a reliable repository of historical macroeconomic, financial and development indicators at country level. This characteristic of the databases safeguards the reliability of a study's attempt to establish, explain, predict or control the relationship between the selected variables (Adams, 2007). Furthermore, secondary data sources ensure that the analysis and interpretation of results can easily be replicated (Adams, 2007). The general form of the model to be estimated is represented by the formula below.

FDI = f(ELEC-LOSS, GFCF-EGW, PVT-CREDIT, GDP-CAPITA, CPI, TRADE-GDP) (1)

A description of the selected indicators in Table 3 is detailed below.

3.3.1 FDI inflows

This is the dependent variable in the study. UNCTAD (2015) describes FDI inflows as comprising all forms of capital provided by or to a foreign direct investor, either directly or indirectly via a subsidiary to an enterprise in the host country. Similar to the FDI data used by Adrino (2012), time series data on inward investment in South African Rand was downloaded from SARB; specifically, their record of foreign liabilities: total direct investment.

3.3.2 Infrastructure Quality

This is the concern variable to be assessed in the study and represented by the electric power transmission and distribution losses measured as a percent of output. According to WB (2016), the output referred to is the total number of GWh generated, and includes losses in transmission between sources of supply and points of distribution and also losses in the distribution to end customers. It is expected that expanding electrification and generation capacity would be an important driver of economic activity. Given that countries are increasingly dependent on reliable and secure electricity supply to underpin economic growth and development, the expectation is that the lower the electricity losses, the higher the level of FDI inflows.

3.3.3 Infrastructure Investment

Indicated by GFCF relating to investment in electricity, gas and water infrastructure, expressed in Rand.

3.3.4 Market Size

Measured as GDP per capita in Rand. Market size is a commonly used variable in the estimation models specified in FDI literature and the expectation is that there would be a positive relationship with FDI inflows.

3.3.5 Financial Market Development

Measured by the ratio of private sector credit extended to total domestic credit extended. The expectation that there would be a positive relationship with FDI inflows

3.3.6 Macroeconomic stability

Measured by the consumer price index which reflects the percentage change in the average cost of basket of goods. In line with FDI literature, the expectation is that high inflation would not attract high levels of FDI inflows.

3.3.7 Trade openness

Measured by the sum of exports and imports as a percent of GDP. In line with FDI literature, the expectation is that there would be a positive relationship between trade and FDI inflows.

3.4 Estimation Approach

Leacock et al. (2009) reiterate that having collected the sample data, the analysis of the data must be guided by the need to answer the research question. The first step in the data analysis was to observe the descriptive statistics for each variable. The second step entailed establishing the nature of the relationship between the variables. In this regard, the coefficient of correlation was obtained in order to determine whether there is a positive, negative or no relationship between the variables (Leacock et al, 2009; Keller, 2012). In determining the correlation between the variables, it is noted that the correlation does not imply causation (Keller, 2012). The third step in the data analysis is defined by the nature of the secondary data collected, namely annual time series data whose analysis is framed by the model specified in Equation 2. In line with the empirical studies presented in the literature review, the variables are transformed into their natural logs.

$$lnFDI_t = \beta_0 + \beta_1 lnELEC - LOSS_t + \beta_2 lnGFCF - EGW_t + \beta_3 lnPVT - CREDIT_t + \beta_4 lnGDP - CAPITA_t + \beta_5 lnCPI_t + \beta_6 lnTRADE - GDP_t + \varepsilon_t \quad (2)$$

To determine the relationship between infrastructure and FDI inflows to South Africa, macroeconomic time series data was collected for analysis. According to the empirical literature reviewed on time series studies, unit root and cointegration tests were performed. Phillips and Xiao (1999) state that most observed economic and financial time series tend to be nonstationary. As observed in the literature, testing for unit roots is an important procedure in time series analysis, because if a time series is nonstationary, it can lead to spurious regressions in which the goodness of fit reflected by R^2 is high and the coefficients of the independent variables are significant whereas, in fact, there is no correlation between the variables (Granger and Newbold, 1974). Spurious regression can ultimately lead to meaningless analysis and

prevents reliable inferences being made because the standard errors produced in regressions involving nonstationary variables are biased (Mahadeva and Robinson, 2004). Nonstationary in time series is demonstrated by the presence of a unit root that in effect does not aid long-run estimation of the relationship between the variables. In this study, the Augmented Dickey Fuller and Phillips Perron using Eviews method was used to check the order of integration through unit root test.

Cointegration is an econometric concept, attributed to Granger (1981) and Engle and Granger (1987), that states that macroeconomic variables can exhibit long-run equilibrium relationship between themselves even though the variables may be nonstationary (Ssekuma, 2011; Majumder, 2016). The Engle-Granger and Johansen are two common techniques for cointegration analysis cited in the literature (Rehman et al., 2011; Ramirez and Kőműves, 2014; Majumder, 2016). The Johansen approach is employed in this study as it is cited for being the better approach when two or more variables are specified in the model (Bilgili, 1998; Ssekuma, 2011; Majumder, 2016**).** The trace statistic and maximum Eigenvalue test are used to determine the number of cointegrating relationships between the endogenous time series namely FDI inflows, Infrastructure Investment, Infrastructure Quality, Macroeconomic Stability, Market Size, and Trade Openness. Ssekuma (2011) points out that with the trace test, the null hypothesis of *r* cointegrating vectors is tested against the alternative hypothesis of *n* cointegrating vectors. Furthermore, with the maximum Eigenvalue test, the null hypothesis of *r* cointegrating vectors is tested against the alternative hypothesis of *r +1* cointegrating vectors (Ssekuma, 2011).

CHAPTER FOUR
RESEARCH FINDINGS, ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter presents and discusses the results and findings of the study following the statistical analysis that was conducted as outlined in Chapter 3. The chapter begins with a presentation of the descriptive statistics for all the variables collected, followed by a presentation of the correlation matrix. Next the results from the empirical econometric estimations performed are presented. More specifically, these results include optimum lag(s) selected, unit root tests, cointegration test, estimates from the Two-Step Engle-Granger Error Correction Model, and post-estimation diagnostic tests, namely serial correlation, normality, and heteroskedasticity.

4.2 Descriptive Statistics

Summary statistics for each of the variables used in the model are provided in Table 4 below. The descriptive statistics were generated using the Data Analysis Tools in Excel. There were 46 observations for all the variables except for infrastructure quality that had 45 observations due to electricity loss data being reported on from only 1971 onwards.

Table 4: Summary of descriptive statistics

	FDI	Infrastructure Quality	Infrastructure Investment	Financial Market Development	Market Size	Macro-Economic Stability	Trade Openness
Mean	356 124 088 889	7,49	17 997 977 778	93,52	20 487	9,56	53,15
Median	36 334 000 000	7,66	4 941 000 000	95,51	11 623	9,16	53,15
Standard Deviation	535 055 436 843	1,26	29 901 188 013	5,53	22 049	4,18	7,68
Skewness	1,58	-0,39	2,18	-0,96	1,12	0,19	0,08
Range	1 965 748 000 000	5,81	114 027 000 000	22,55	74 001	17,27	34,22
Minimum	4 664 000 000	4,20	275 000 000	79,55	631	1,39	38,65
Maximum	1 970 412 000 000	10,00	114 302 000 000	102,10	74 632	18,65	72,87

Source: Author's estimate from research

Of note is that CPI, which was selected as a proxy for Macro-Economic Stability, has a mean of 9.56%, which is well above the target inflation band of 3%-6% that has been adopted by SARB since February 2000 as part of their monetary policy framework (Van der Merwe, 2004). The mean for CPI implies that during the period under review, South Africa's inflation was relatively high, with 18.65% as the highest CPI recorded in 1986. The skewness values are

predominantly positive, except for Infrastructure Quality and Financial Market Development that are -0.39 and -0.96 respectively. Negative skewness implies that most of the values are greater than the mean, with the distribution skewed to the left, while a positive skewness implies that most of the values are less than the mean with the distribution skewed to the right. The inference that is drawn on the negative skewness of infrastructure quality is that during the period under review, the infrastructure quality was increasing at a relatively high rate.

4.3 Correlation Matrix

Table 5 below presents the correlation coefficients of the variables, measuring the extent of association among the variables.

Table 5: Correlation Matrix

	FDI	Infrastructure Quality	Infrastructure Investment	Financial Market Development	Market Size	Macroeconomic Stability	Trade Openness
FDI	1						
Infrastructure Quality	0.6384	1					
Infrastructure Quantity	0.9543	0.5306	1				
Financial Market Development	0.4419	0.1229	0.3685	1			
Market Size	0.9753	0.6713	0.9148	0.5402	1		
Macroeconomic Stability	(0.5932)	(0.7437)	(0.4462)	(0.1755)	(0.6361)	1	
Trade Openness	0.5780	0.3763	0.5223	(0.0501)	0.5161	(0.1650)	1
p-values							
FDI	-						
Infrastructure Quality	0.002753	-					
Infrastructure Quantity	0.375253	0.006729	-				
Financial Market Development	0.023607	0.777109	0.071823	-			
Market Size	0.615822	0.002631	0.132326	0.005988	-		
Macroeconomic Stability	0.000000	0.000000	0.000000	0.440661	2.832E-18	-	
Trade Openness	0.004030	0.063974	0.007467	0.955071	8.088E-03	0.498841	-

Source: Author's estimate from research

The correlation coefficients Infrastructure Quality (0.6384), Infrastructure Investment (0.9543), Financial Market Development (0.4419), Market Size (0.9753), and Trade Openness (0.578) are all positive, which implies that when these variables increase, so does FDI. The sign of these correlation coefficients is in line with expectation and also in line with those recorded by Okafor et al. (2015) and Amusa et al. (2016) in their respective studies. The sign of Macro-Economic Stability is negative (-0.5932) and in line with expectation and with the findings of Suh and Boggs (2011), but contrary to the results obtained by Okafor et al. (2015) and Amusa et al. (2016).

4.4 Stationarity tests

Univariate stationarity tests results using the Augmented Dickey Fuller (ADF) and Phillips Perron (PP) methods, are presented in Tables 6.1 and 6.2 respectively. The ADF and PP tests were performed to determine the order of integration of each variable, namely FDI Inflows, Financial Market Development, Infrastructure Investment, Infrastructure Quality, Macroeconomic Stability, Market Size, and Trade Openness. Stationarity tests further provided as a necessary condition towards testing whether the respective economic variables jointly had a long-run relationship.

Table 6.1: Augmented Dicky-Fuller (ADF) Unit Root Tests‡

Data Series	Lag Length	Critical Values		t-statistic	Prob.†
		α = 1%	α = 5%		
log(FDI inflows)	0	-4.180	-3.515	-1.857	0.659
dlog(FDI inflows)	2	-4.198	-3.523	-4.386**	0.006
log(PVT-CREDIT)	0	-4.180	-3.515	-1.801	0.686
dlog(PVT-CREDIT)	0	-4.186	-3.518	-6.700**	0.000
log(GFCF-EGW)	5	-4.211	-3.529	-2.940	0.161
dlog(GFCF-EGW)	1	-4.192	-3.520	-3.803*	0.026
log(ELEC-LOSS)	0	-4.180	-3.515	-2.905	0.170
dlog(ELEC-LOSS)	0	-4.186	-3.518	-8.525**	0.000
log(CPI)	1	-4.186	-3.518	-3.965*	0.017
dlog(CPI)	3	-4.205	-3.526	-6.357**	0.000
log(GDP-CAPITA)	0	-4.180	-3.515	0.016	0.995
dlog(GDP-CAPITA)	0	-4.186	-3.518	-5.385**	0.000
log(TRADE-GDP)	0	-4.180	-3.515	-1.855	0.660
dlog(TRADE-GDP)	2	-4.198	-3.523	-5.134**	0.000

†denotes MacKinnon (1996) one-sided p-values

*(**) represents significance at 5 percent and 1 percent levels, respectively

The selection of lag length of the ADF unit root tests was determined by default in EViews based on the Akaike Information Criterion (AIC)

‡ The detailed computed unit root test results, graphs and statistics are provided in the Appendix

Based on ADF test results presented in Table 6.1, only one variable, "Macroeconomic Stability", was stationary at level at 5 percent level of significance, hence the null hypothesis of unit root was rejected. However, the variable "FDI inflows" and other remaining exogenous variables, namely Financial Market Development, Infrastructure Investment, Infrastructure Quality, Market Size, and Trade Openness, all contained units root at level, which implies that each of the variables was not stationary at level. The results show that the series of the respective exogenous variables – Infrastructure Investment, Infrastructure Quality, Macroeconomic Stability, Market Size, and Trade Openness – became stationary at first difference, that is I(1)

1 percent level of significance. The graphical expositions of all variables trends are presented in the Appendix.

Table 6.2: Phillips Perron (PP) Unit Root Tests‡

Data Series	Bandwidth	Critical Values		t-statistic	Prob.†
		α = 1%	α = 5%		
log(FDI inflows)	4	-4.180	-3.515	-1.870	0.652
dlog(FDI inflows)	5	-4.186	-3.518	-6.984**	0.000
log(PVT-CREDIT)	1	-4.180	-3.515	-1.825	0.675
dlog(PVT-CREDIT)	4	-4.186	-3.518	-6.699**	0.000
log(GFCF-EGW)	2	-4.180	-3.515	-1.622	0.767
dlog(GFCF-EGW)	9	-4.186	-3.518	-3.140	0.110
log(ELEC-LOSS)	1	-4.180	-3.515	-2.814	0.199
dlog(ELEC-LOSS)	5	-4.186	-3.518	-8.836**	0.000
log(CPI)	7	-4.180	-3.515	-3.450	0.057
dlog(CPI)	42	-4.186	-3.518	-11.919**	0.000
log(GDP-CAPITA)	9	-4.180	-3.515	0.315	0.998
dlog(GDP-CAPITA)	13	-4.186	-3.518	-6.009**	0.000
log(TRADE-GDP)	5	-4.180	-3.515	-1.826	0.674
dlog(TRADE-GDP)	15	-4.186	-3.518	-6.157**	0.000

†denotes MacKinnon (1996) one sided p-values

*(**) represents significance at 5 percent and 1 percent levels; respectively

Selection of Bandwidths of PP unit root tests were determined automatically in EViews based on the Newey-West Bandwidth criterion performed using Bartlett kernel spectral estimation method

‡ The detailed computed unit root test results, graphs and statistics are provided in Appendix

Based on PP test results presented in Table 6.2 none of the variables was stationary at level at 5 percent level of significance, hence the null hypothesis of unit root could not be rejected. Apart from the variable "Infrastructure Investment", all variables namely "FDI inflows" and exogenous variables Financial Market Development, Infrastructure Quality, Market Size, and Trade Openness, became stationary at first difference at 1 percent significance level, which implies that each of the variables no longer contained a unit root at first difference. The variable "Infrastructure Investment" still contained a unit root at first difference. The graphical expositions of all variables trends are presented in the Appendix.

4.5 VAR Lag Length Selection Criteria

Estimation of the VAR framework for FDI inflows and Infrastructure Investment, Infrastructure Quality, Financial Market Development, Macroeconomic Stability, Market Size and Trade Openness was performed before the optimal number of lags to be selected was determined. These results are presented in the Appendix.

Subsequent to econometric estimation of the VAR model, the maximum number of lags applied was determined using VAR-based Lag Order Selection Criteria.

Table 7: VAR Lag Order Selection Criteria

VAR Lag Order Selection Criteria
Endogenous variables: log(FDI inflows), log(PVT-CREDIT), log(GFCF-EGW), log(ELEC-LOSS), log(CPI), log(GDP-CAPITA), log(TRADE-GDP)
Exogenous variables: C
Sample: 1971 2015
Included observations: 41

Lag	LogL	LR	FPE	AIC	SC	HQ
0	21.57938	NA	1.16e-09	-0.711189	-0.418628	-0.604655
1	342.2969	516.2770	2.10e-15	-13.96570	-11.62521*	-13.11343
2	392.5446	63.72871	2.45e-15	-14.02656	-9.638148	-12.42854
3	450.2202	53.45551	3.01e-15	-14.44977	-8.013424	-12.10601
4	575.6501	73.42235*	3.46e-16*	-18.17805*	-9.693782	-15.08855*

* indicates lag order selected by the criterion
LR: Sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Based on the results presented in Table 7 above, Likelihood Ratio (LR) test statistic, Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC) and Hannan-Quinn Information Criterion (HQIC), four lags were selected as the optimal lag length at 5 percent level of significance. Therefore, the maximum lag length equal to 4 was used for all the variables namely FDI inflows, Financial Market Development, Infrastructure Investment, Infrastructure Quality, Macroeconomic Stability, Market Size, and Trade Openness, in all equations of the model. The equations in which the selected optimal lag length was applied were the Johansen cointegration test, Engle-Granger Two-Step Error Correction Model, and diagnostic tests, particularly serial correlation, heteroskedasticity and normality.

4.6 Cointegration Test Statistics

The Trace statistic shows the presence of three cointegrating equations at 5 percent level of significance. The null hypothesis that r = 0 was therefore rejected at 5 percent significance level. Similarly, the Maximum Eigenvalue statistic suggests existence of one cointegration equation among all the variables used in the analysis.

Table 8: Cointegration Test Results-No Deterministic Trend, Lag Interval: 1 to 1‡

H_0	r = 0	r ≤ 1	r ≤ 2
H_1	r = 1	r = 2	r = 3
Trace statistic	158.630*	110.888*	71.032*
Critical value	125.615	95.753	69.818
Prob.**	0.000	0.003	0.039
Max-Eigen statistic	47.742*	39.855	24.022
Critical value	46.231	40.077	33.876
Prob.**	0.034	0.052	0.453

*Denotes rejection of the null hypothesis at 5% significance level

** MacKinnon-Haug-Michelis (1999) p-values

‡ The detailed results on the cointegration test are provided in the Appendix

Given that the results of the Trace statistic and Maximum Eigenvalue statistic presented in Table 8 above indicate the existence of cointegration among FDI inflows, Infrastructure Investment, Infrastructure Quality, Macroeconomic Stability, Market Size and Trade Openness, it is concluded that the series were suitable for an econometric estimation of their dynamic inter-relationships. The Engle-Granger Two-Step Error Correction Model is used and the findings thereof are presented in section 4.7.

4.7 Two-Step Engle-Granger Error Correction Model (ECM) – Long-run and Short-run Estimates

The results of the estimated ECM of South Africa's FDI inflows indicate that the model is significant in explaining FDI inflows for the country. This is demonstrated by the high adjusted R-squared, which indicates that about 97.7 percent variation in the country's FDI inflows is explained by the variables specified in the model. The model is, therefore, a good fit, as indicated by the high F-statistic for the joint significance of the fundamentals in the model. The Akaike Information Criterion (AIC) and Schwarz Information Criterion (SIC) confirm stability of the model, while the Durbin-Watson statistic equal to approximately 1.31 reveals presence of substantial autocorrelation between FDI inflows and the specified regressors.

Table 9.1: Long Run Results

Dependent Variable: LOGFDI
Method: Least Squares
Sample: 1971 2015
Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.084345	7.171729	0.708943	0.4827
log(PVT-CREDIT)	0.007582	1.526359	0.004968	0.9961
log(GFCF-EGW)	-0.003317	0.106262	-0.031213	0.9753
log (ELEC-LOSS)	0.609228	0.420264	1.449631	0.1554
log(CPI)	-0.594314	0.138842	-4.280498	0.0001
log(GDP-CAPITA)	1.090125	0.126801	8.597136	0.0000
log(TRADE-GDP)	2.544314	0.386990	6.574618	0.0000
R-squared	0.980488	Mean dependent var		25.02834
Adjusted R-squared	0.977407	S.D. dependent var		1.976232
S.E. of regression	0.297047	Akaike info criterion		0.552181
Sum squared resid	3.352999	Schwarz criterion		0.833217
Log likelihood	-5.424068	Hannan-Quinn criter.		0.656948
F-statistic	318.2508	Durbin-Watson stat		1.315472
Prob(F-statistic)	0.000000			

In the long run, the estimated coefficients of South Africa's FDI inflows model show that Market Size and Trade Openness had statistically significant and positive impacts on FDI inflows into South Africa during the sample period 1972-2015. The signs of the coefficients of these two variables are in line with the expectations that were outlined previously in Chapter 4. The results indicate that a 1 percent increase in Market Size led to an approximate 1.1 percent increase in FDI inflows, while a 1 percent increase in Trade Openness led to an approximate 2.5 percent increase in FDI inflows. Financial Market Development and Infrastructure Quality had a positive but statistically insignificant impact on FDI inflows during the period under review. These two results are also in line with the expectation that these variables would positively impact FDI. Although the signs of the coefficients were positive, the availability of credit extended by financial institutions, and electricity transmission and distribution losses; as the respective proxies for Financial Market Development and Infrastructure Quality are not significant determinants of FDI. Given that Consumer Price Index (CPI) is the proxy for Macroeconomic Stability, results show that an increase in the inflation rate, reflecting a worsening in Macroeconomic Stability, led to a statistically significant decrease in FDI inflows by approximately 0.59 percent during the sample period. On the other hand, Infrastructure Investment had an unexpected negative coefficient, which indicates that the fixed capital

investment in electricity, gas and water infrastructure did not result in an increase in FDI inflows into the country during the sample period. This negative relationship was insignificant.

The results of the residual diagnostic tests performed on the estimated ECM show that the model passed tests of serial correlation and normality. These results are presented in Table 9.2 below.

Table 9.2: Engle-Granger: First Stage Regression†

Residual Test	Measurement	Prob.
Serial LM Test	LM-Stat	0.075
Normality Test	Jacque-Bera	0.328
Heteroskedasticity	No Cross Terms	0.133

† indicates that results reported are for the joint tests

‡ The detailed results and graphs on the residual diagnostic tests are provided in the Appendix

Diagrams on the residual tests and correlograms are presented in the Appendix. The correlograms show that there potentially was no material autocorrelation left behind in the residuals.

Table 10.1: Short Run Results

Dependent Variable: dlogFDI
Method: Least Squares
Sample (adjusted): 1973 2015
Included observations: 43 after adjustments

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	0.264477	0.089022	2.970912	0.0053
dlog(PVT-CREDIT)	1.422828	1.250178	1.138101	0.2628
dlog(GFCF-EGW)	-0.159178	0.172836	-0.920978	0.3634
dlog(ELEC-LOSS)	-6.28E-05	0.274960	-0.000228	0.9998
dlog(CPI)	-0.159273	0.102444	-1.554742	0.1290
dlog(GDP-CAPITA)	-1.032115	0.744192	-1.386895	0.1742
dlog(TRADE-GDP)	0.294920	0.407700	0.723375	0.4743
Error Correction Term (ECT)	-0.382720	0.119803	-3.194567	0.0030
R-squared	0.364629	Mean dependent var		0.137917
Adjusted R-squared	0.237554	S.D. dependent var		0.208234
S.E. of regression	0.181826	Akaike info criterion		-0.405287
Sum squared resid	1.157130	Schwarz criterion		-0.077622
Log likelihood	16.71367	Hannan-Quinn criter.		-0.284454
F-statistic	2.869413	Durbin-Watson stat		2.066765

The Error Correction Term (ECT) coefficient; which measures the speed of adjustment towards long run equilibrium path, is -0.382 and has the right sign and is statistically significant at 1 percent significance level. The coefficient signifies that short run adjustments are made in correction of deviations from the long run equilibrium, and the speed of adjustment is relatively moderate. Based on the ECT coefficient, about 38.2% of the disequilibrium in FDI inflows is corrected within the period of one year. In other words, approximately 38% discrepancy between the long-term and short-term FDI inflows is corrected within a year, suggesting a moderate adjustment to the equilibrium.

In the short run, Financial Market Development and Trade Openness demonstrated positive but statistically insignificant impacts on FDI inflows into South Africa during the period 1973 to 2015. However, Infrastructure Quality, Infrastructure Investment, Macroeconomic Stability and Market Size had negative but statistically insignificant impacts on FDI inflows into the country during the same sample period. To illustrate, the results indicate that an increase in Infrastructure Investment by 1 percent resulted in an approximate 0.15 percent decrease in FDI inflows. Similarly, a 1 percent increase in CPI also resulted in an approximate 0.15 percent decrease in FDI inflows during the sample period. The adjusted R-squared suggests that about 36.46% overall variation in FDI inflows during the period could be explained by the variables specified in the model. The DW-statistic equal to 2.06 shows absence of serial correlation in the estimated model.

The residual diagnostic test results presented in Table 10.2 below indicate that the estimated ECM passed the tests of serial correlation and heteroskedasticity, but substantially suffered from non-normality.

Table 10.2: Engle-Granger: Stage Two Regression†

Residual Test	Measurement	Prob.
Serial LM Test	LM-Stat	0.273
Normality Test	Jacque-Bera	0.000
Heteroskedasticity	No Cross Terms	0.328

† indicates that results reported are for the joint tests

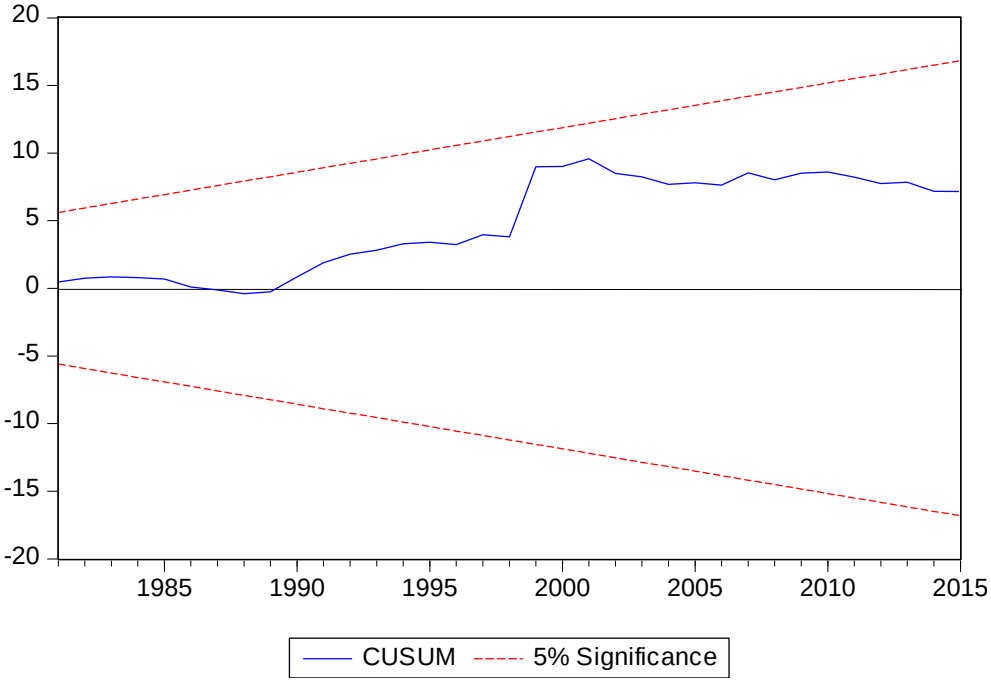
‡ The detailed results and graphs on the residual diagnostic tests are provided in Appendix

Diagrams on the residual tests and correlograms are presented in the Appendix. The correlograms show that there was potentially no material autocorrelation left behind in the residuals.

4.8 Model Stability Test

The CUSUM test approach was used to assess the stability of the Error Correction Model. The CUSUM and the residual coefficients tests were conducted to determine whether or not the model was stable.

Figure 13: CUSUM Test of Model Stability



The model was stable at 5% level of significance.

CHAPTER FIVE
SUMMARY AND CONCLUSION

5.1 Introduction

This chapter provides a summary of the study and conclusions thereof drawn from the results of the data analysis that was performed. The chapter concludes with recommendations based on the findings of the econometric estimation.

5.2 Summary of the study

South Africa has substantial infrastructure development backlogs. It is against this background that the purpose of this research was to ascertain whether infrastructure is a major determinant of foreign direct investment into the country. To this end, secondary time series data for the period 1970 to 2015 was identified and collected from the SARB and WB online databases. More specifically, FDI inflows to South Africa was the dependent variable, while South Africa's electricity transmission and distribution losses, Rand value of electricity, gas and water GFCF, private credit extended as a percent of total domestic credit extended, GDP per capita, inflation, and trade as a percent of GDP, were the independent variables. Unit root tests and tests of cointegration were performed prior to obtaining the long run and short run estimation model of the nature and significance of the independent variables on the dependent variable.

5.3 Conclusion

The results of the research indicate that in the long run, Infrastructure Quality, Trade Openness, Market Size and Financial Market Development are all positively correlated to FDI inflows. The relationship was significant in the instance of net trade to GDP and GDP per capita that were the proxies for Trade Openness and Market Size respectively. Infrastructure Investment and Macroeconomic Stability had a negative impact on FDI inflows, with the relationship being statistically significant in the instance of CPI. The long run results for Infrastructure Quality mirror the empirical outcomes reported by Suh and Boggs' (2011) results for developed markets, and Kaur et al. (2016) in respect of indicators for energy, internet usage and air transportation. The long run results for Trade Openness mirror those reported by Babatunde (2011), Abu Bakar et al. (2011), Zeb et al. (2011) and Shah (2014). GDP per capita was reported to be positive and significant by Abu Bakar (2011) and Shah (2014), while CPI was also reported negative but significant by Babatunde (2011) and Shah (2014). In the long run, Infrastructure Investment was negative but insignificant. It is noted, however, that the

coefficient sign reported by Fitriandi et al. (2014), and Ramirez and Kőműves (2014) for their proxies were similarly negative but significant.

In the short run, Infrastructure Quality had a negative but statistically insignificant impact on FDI inflows, as did Infrastructure Investment. These results were unexpected and suggest that the state of South Africa's infrastructure and level of fixed capital investment are not important determinants of FDI in the short run. Trade Openness had positive but insignificant impact on FDI inflows, similar to Suh and Boggs (2011) in respect of emerging markets, and Fitriandi (2014), while short run results in respect of CPI mirrors Suh and Boggs' (2011) finding for emerging markets.

5.4 Policy Recommendations

The results of the research suggest that the South African government should continue its focus on managing inflation in order to attract FDI inflows into the country in the long run. Furthermore, policies that promote trade and advance inclusive and sustainable economic growth and development will in the long run enhance the country's attractiveness as a FDI destination. Although infrastructure quality rather than the sum of infrastructure investment is positively linked to FDI inflows, electricity transmission and distribution losses as an indicator of quality, is, however, not a significant determinant of FDI inflows. Government must reduce the country's significant income inequality and adopt policies aimed at fostering more inclusive and sustainable economic growth that will increase South Africa's GDP per capita which is shown to impact positively and significantly on FDI.

5.5 Recommendations for Future Research

Further investigation into key indicators of infrastructure quality focused on logistics and ICT is recommended as an extension of this study. This would provide better perspective on whether the type of infrastructure is a significant consideration in the FDI decision-making process. It also recommended that future research could focus on the locational aspects at provincial level to determine whether this has any impact on FDI inflows to South Africa. Finally, extending on the results that indicate trade openness to be a significant determinant of FDI inflows, it is recommended that further research could focus on determining the impact of trade and FDI in alleviating poverty and socio-economic challenges in South Africa.

5.6 Limitation of the study

The use of the Johansen approach to cointegration is a limitation of the study. The Autoregressive Distributed Lag cointegration test would have been a more suitable approach, given that there are variables with different orders of integration. Infrastructure is I (2), Macroeconomic Stability is I(0), while the remaining variables are I(1).

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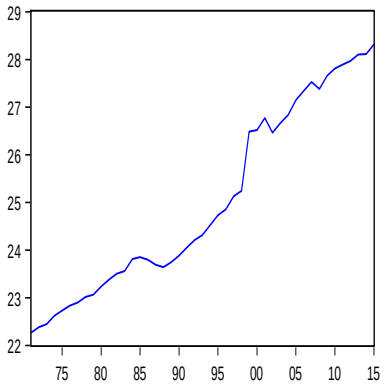
APPENDIX

Data of variables collected

Description:	FDI	Infrastructure Quality	Infrastructure Quantity	Financial Market	Market Size	Macroeconomic Stability	Trade Openness
Indicator:	Foreign Liabilities: Total Direct Investments	Elec Tx & Distr Losses	GFCF-EGW Investment	Pvt Credit Extended	GDP per Capita	CPI	Trade to GDP
Source:	SARB	WB	SARB	SARB	SARB	WB	WB
1970	4 185 000 000	-	249 000 000	88,06	585	4,06	47,14
1971	4 664 000 000	7,07	275 000 000	86,05	631	5,71	47,97
1972	5 236 000 000	6,37	290 000 000	85,51	695	6,46	48,17
1973	5 584 000 000	6,72	314 000 000	86,99	841	9,59	48,12
1974	6 671 000 000	6,95	371 000 000	86,02	1 011	11,64	56,53
1975	7 441 000 000	7,17	588 000 000	82,78	1 113	12,52	57,85
1976	8 223 000 000	7,18	854 000 000	80,39	1 229	11,02	56,70
1977	8 813 000 000	7,27	1 208 000 000	79,55	1 333	11,15	55,47
1978	9 855 000 000	8,01	1 470 000 000	84,46	1 495	11,14	58,01
1979	10 339 000 000	7,66	1 718 000 000	84,84	1 745	13,29	60,98
1980	12 273 000 000	7,63	1 959 000 000	88,74	2 271	13,66	62,73
1981	14 188 000 000	7,07	2 277 000 000	90,66	2 575	15,25	58,72
1982	16 092 000 000	7,27	2 999 000 000	94,21	2 857	14,64	53,32
1983	17 075 000 000	7,74	3 608 000 000	92,65	3 193	12,30	45,73
1984	21 830 000 000	6,19	4 344 000 000	95,80	3 658	11,53	49,13
1985	22 760 000 000	6,09	4 873 000 000	95,35	4 129	16,29	53,98
1986	21 451 000 000	4,20	4 190 000 000	96,45	4 734	18,65	52,34
1987	19 327 000 000	5,30	4 125 000 000	96,27	5 416	16,16	50,61
1988	18 422 000 000	4,97	3 943 000 000	97,16	6 363	12,78	51,71
1989	20 433 000 000	5,40	4 709 000 000	99,47	7 479	14,73	48,08
1990	23 602 000 000	6,03	4 941 000 000	96,36	8 430	14,32	43,00
1991	28 004 000 000	6,59	4 281 000 000	98,16	9 451	15,33	39,23
1992	32 552 000 000	7,22	4 590 000 000	96,67	10 377	13,87	38,65
1993	36 334 000 000	7,36	4 506 000 000	96,86	11 623	9,72	39,12
1994	44 701 000 000	7,79	5 470 000 000	94,55	12 870	8,94	40,77
1995	54 764 000 000	6,22	7 026 000 000	98,68	14 320	8,68	43,61
1996	61 976 000 000	7,67	8 392 000 000	94,54	15 782	7,35	46,67
1997	81 463 000 000	7,75	8 657 000 000	92,59	17 122	8,60	46,85
1998	91 862 000 000	8,15	6 837 000 000	92,06	18 162	6,88	48,90
1999	318 630 000 000	8,39	6 030 000 000	92,59	19 493	5,18	46,86
2000	328 859 000 000	8,20	5 422 000 000	93,34	21 657	5,34	51,44
2001	420 734 000 000	7,81	5 660 000 000	95,51	23 481	5,70	54,80
2002	310 046 000 000	6,32	7 128 000 000	92,36	26 778	9,16	59,76
2003	378 883 000 000	8,27	9 812 000 000	94,82	28 632	5,86	51,40
2004	451 966 000 000	10,00	11 772 000 000	95,72	31 370	1,39	51,08
2005	611 585 000 000	8,49	14 028 000 000	99,93	34 281	3,40	53,15
2006	745 295 000 000	8,72	15 490 000 000	102,10	37 899	4,64	60,28
2007	897 770 000 000	8,45	23 575 000 000	101,90	42 863	7,10	63,68
2008	778 352 000 000	8,79	41 254 000 000	97,79	47 512	11,54	72,87
2009	1 023 981 000 000	9,84	58 007 000 000	95,86	49 682	7,13	55,42
2010	1 190 802 000 000	9,53	58 447 000 000	97,03	53 823	4,26	55,99
2011	1 297 898 000 000	8,47	60 796 000 000	97,36	58 559	5,00	60,02
2012	1 390 024 000 000	8,72	71 520 000 000	96,92	62 297	5,65	60,74
2013	1 595 760 000 000	8,49	97 974 000 000	97,99	66 949	5,45	64,22
2014	1 608 652 000 000	8,88	109 877 000 000	97,02	71 108	6,38	64,36
2015	1 970 412 000 000	8,79	114 302 000 000	96,31	74 632	4,59	62,81

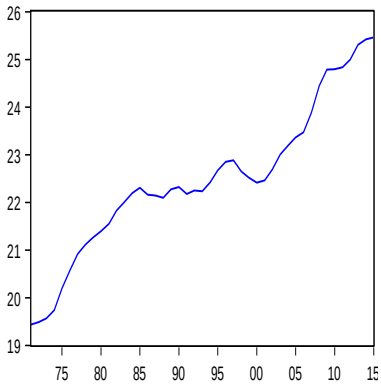
Graphs of Transformed (log) Variables

LOGFDI



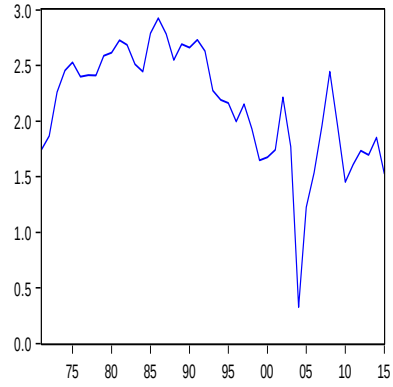
LOGFIN_MARK_DEV

LOGINFR_INVEST

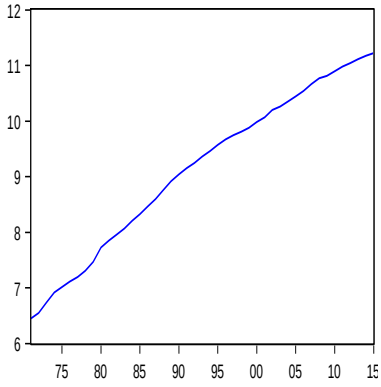


LOGINFR_QUAL

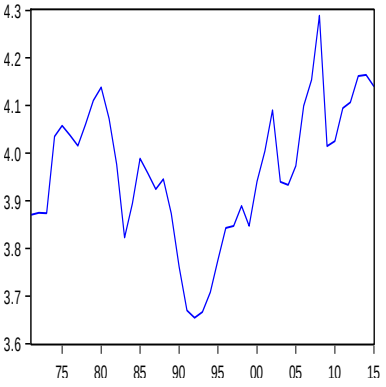
LOGMACRO_STAB



LOGMARK_SIZE

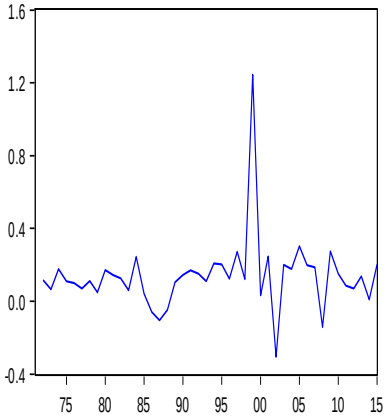


LOGTRADE_OPEN



Graphs of Differenced Transformed (dlog) Variables

DLOGFDI



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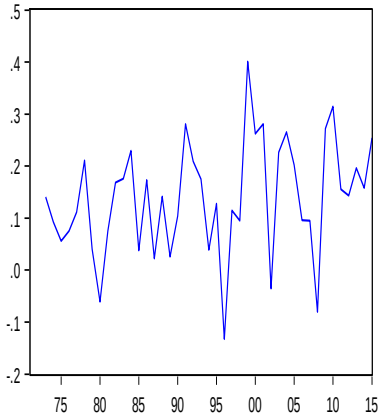
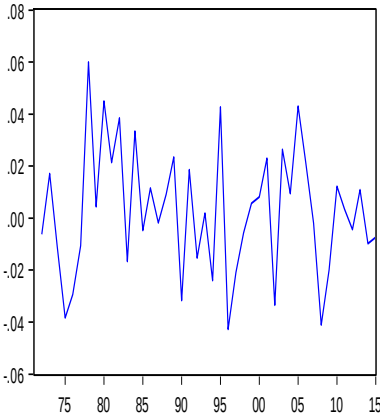
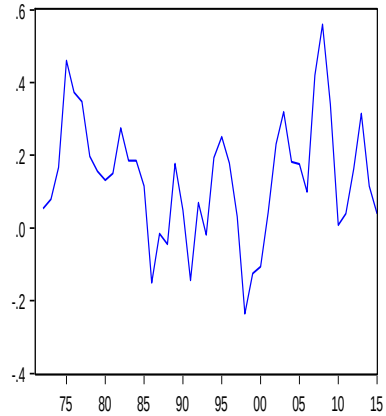


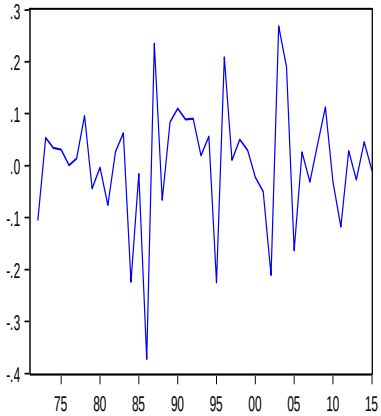
DLOGFIN_MARK_DEV



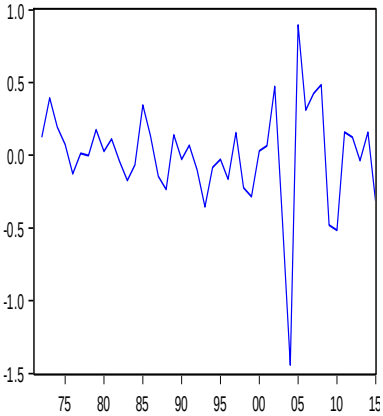
DLOGINFR_INVEST



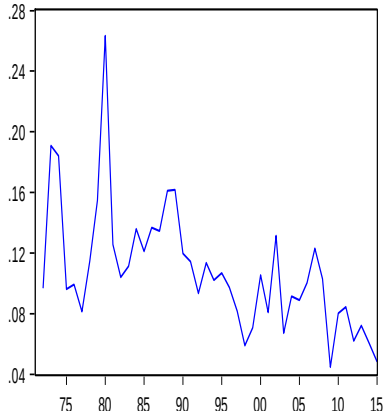
DLOGINFR_QUAL



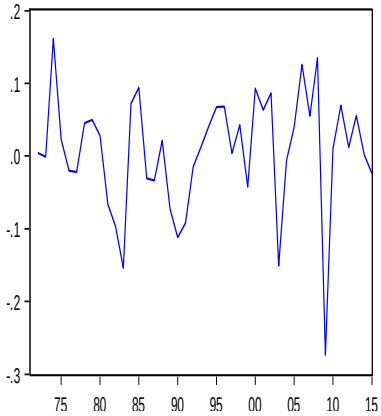
DLOGMACRO_STAB



DLOGMARK_SIZE



DLOGTRADE_OPEN



VAR Estimates

Vector Autoregression Estimates
Date: 09/22/17 Time: 12:32
Sample (adjusted): 1972 2015
Included observations: 44 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	LOGFDI	LOGFIN_MARK_DEV	LOGINFR_INVEST	LOGINFR_QUAL	LOGMACRO_STAB	LOGMARK_SIZE	LOGTRADE_OPEN
LOGFDI(-1)	0.663362	-0.011748	-0.000597	-0.011123	-0.152141	0.003687	0.093482
	(0.09864)	(0.01333)	(0.07885)	(0.06103)	(0.16078)	(0.01860)	(0.03739)
	[6.72519]	[-0.88099]	[-0.00757]	[-0.18228]	[-0.94627]	[0.19819]	[2.50049]
LOGFIN_MARK_DEV(-1)	-1.118033	0.761945	1.294271	-0.996973	3.921592	0.290579	0.108995
	(0.93858)	(0.12688)	(0.75030)	(0.58068)	(1.52988)	(0.17700)	(0.35574)
	[-1.19119]	[6.00510]	[1.72500]	[-1.71692]	[2.56334]	[1.64171]	[0.30639]
LOGINFR_INVEST(-1)	-0.041620	0.014847	0.852108	-0.057033	0.075862	0.000348	0.019284
	(0.06751)	(0.00913)	(0.05397)	(0.04177)	(0.11005)	(0.01273)	(0.02559)
	[-0.61647]	[1.62671]	[15.7886]	[-1.36545]	[0.68937]	[0.02734]	[0.75362]
LOGINFR_QUAL(-1)	0.488767	-0.016627	0.372471	0.594972	-0.023289	-0.017307	0.003012
	(0.26565)	(0.03591)	(0.21236)	(0.16435)	(0.43301)	(0.05010)	(0.10069)
	[1.83987]	[-0.46300]	[1.75394]	[3.62009]	[-0.05378]	[-0.34547]	[0.02991]
LOGMACRO_STAB(-1)	-0.151198	-0.020364	0.064414	0.040304	0.353276	-0.007176	-0.034659
	(0.10343)	(0.01398)	(0.08268)	(0.06399)	(0.16859)	(0.01950)	(0.03920)
	[-1.46185]	[-1.45644]	[0.77906]	[0.62986]	[2.09549]	[-0.36789]	[-0.88413]
LOGMARK_SIZE(-1)	0.458743	0.003864	0.074802	0.139665	-0.180981	0.967769	-0.140441
	(0.13325)	(0.01801)	(0.10652)	(0.08244)	(0.21720)	(0.02513)	(0.05050)
	[3.44272]	[0.21452]	[0.70224]	[1.69418]	[-0.83326]	[38.5130]	[-2.78080]
LOGTRADE_OPEN(-1)	0.486243	-0.008928	0.800899	0.150862	0.802692	0.014472	0.563007
	(0.34429)	(0.04654)	(0.27523)	(0.21301)	(0.56119)	(0.06493)	(0.13049)
	[1.41229]	[-0.19182]	[2.90996]	[0.70826]	[1.43033]	[0.22290]	[4.31448]
C	7.799289	1.120016	-7.135963	4.937425	-15.78710	-1.023682	-0.178282
	(4.40714)	(0.59578)	(3.52306)	(2.72658)	(7.18357)	(0.83110)	(1.67038)
	[1.76969]	[1.87991]	[-2.02550]	[1.81085]	[-2.19767]	[-1.23172]	[-0.10673]
R-squared	0.992861	0.863799	0.992502	0.687808	0.734398	0.999515	0.821358
Adj. R-squared	0.991473	0.837315	0.991044	0.627104	0.682753	0.999420	0.786622
Sum sq. resids	1.170905	0.021399	0.748252	0.448173	3.110923	0.041640	0.168204
S.E. equation	0.180347	0.024380	0.144169	0.111576	0.293963	0.034010	0.068354
F-statistic	715.2733	32.61636	680.7312	11.33051	14.22017	10594.09	23.64577
Log likelihood	17.34778	105.3964	27.19920	38.47556	-4.149350	90.74992	60.03559
Akaike AIC	-0.424899	-4.427110	-0.872691	-1.385253	0.552243	-3.761360	-2.365254
Schwarz SC	-0.100501	-4.102712	-0.548293	-1.060854	0.876641	-3.436962	-2.040856
Mean dependent	25.09119	4.538243	22.55057	1.999846	2.152603	9.195702	3.964821
S.D. dependent	1.953062	0.060446	1.523386	0.182716	0.521909	1.412728	0.147976

Determinant resid covariance (dof adj.)	6.79E-16
Determinant resid covariance	1.67E-16
Log likelihood	362.2420
Akaike information criterion	-13.92009
Schwarz criterion	-11.64930

Engle-Granger First Step

Dependent Variable: LOGFDI
Method: Least Squares
Date: 12/18/17 Time: 13:01
Sample: 1971 2015
Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.084345	7.171729	0.708943	0.4827
LOGFIN_MARK_DEV	0.007582	1.526359	0.004968	0.9961
LOGINFR_INVEST	-0.003317	0.106262	-0.031213	0.9753
LOGINFR_QUAL	0.609228	0.420264	1.449631	0.1554
LOGMACRO_STAB	-0.594314	0.138842	-4.280498	0.0001
LOGMARK_SIZE	1.090125	0.126801	8.597136	0.0000
LOGTRADE_OPEN	2.544314	0.386990	6.574618	0.0000

R-squared	0.980488	Mean dependent var	25.02834
Adjusted R-squared	0.977407	S.D. dependent var	1.976232
S.E. of regression	0.297047	Akaike info criterion	0.552181
Sum squared resid	3.352999	Schwarz criterion	0.833217
Log likelihood	-5.424068	Hannan-Quinn criter.	0.656948
F-statistic	318.2508	Durbin-Watson stat	1.315472
Prob(F-statistic)	0.000000		

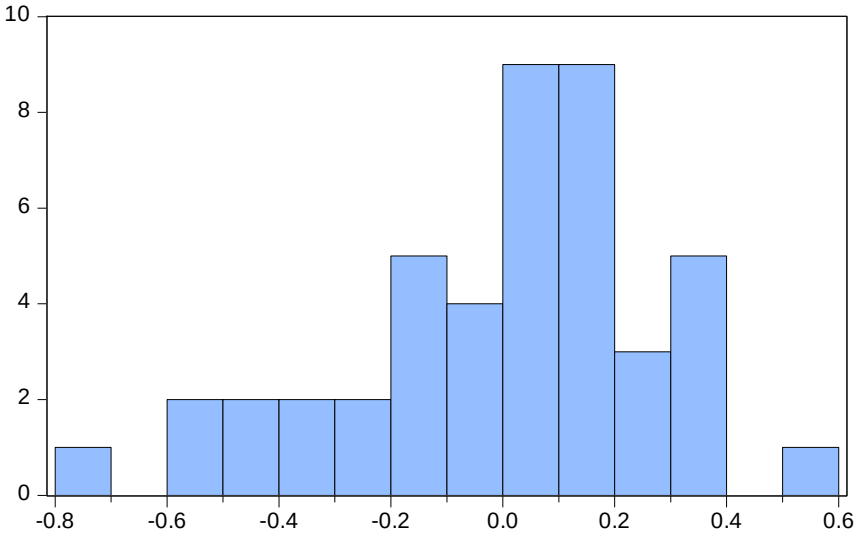
Diagnostic Tests

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	2.784494	Prob. F(2,36)	0.0751
Obs*R-squared	6.028639	Prob. Chi-Square(2)	0.0491

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 12/18/17 Time: 08:17
Sample: 1971 2015
Included observations: 45
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.483936	6.984984	-0.212447	0.8330
LOGFIN_MARK_DEV	0.371094	1.492584	0.248625	0.8051
LOGINFR_INVEST	0.005432	0.101915	0.053295	0.9578
LOGINFR_QUAL	0.236519	0.430406	0.549525	0.5860
LOGMACRO_STAB	0.054058	0.135789	0.398101	0.6929
LOGMARK_SIZE	-0.016806	0.121509	-0.138311	0.8908
LOGTRADE_OPEN	-0.190681	0.379864	-0.501972	0.6187
RESID(-1)	0.325710	0.166973	1.950677	0.0589
RESID(-2)	0.130470	0.177736	0.734065	0.4677

R-squared	0.133970	Mean dependent var	1.35E-15
Adjusted R-squared	-0.058481	S.D. dependent var	0.276052
S.E. of regression	0.284009	Akaike info criterion	0.497234
Sum squared resid	2.903798	Schwarz criterion	0.858567
Log likelihood	-2.187770	Hannan-Quinn criter.	0.631935
F-statistic	0.696123	Durbin-Watson stat	1.866706
Prob(F-statistic)	0.692474		0.692474



Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	1.762976	Prob. F(6,38)	0.1331
Obs*R-squared	9.798775	Prob. Chi-Square(6)	0.1334
Scaled explained SS	6.916108	Prob. Chi-Square(6)	0.3287

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 12/18/17 Time: 08:19
Sample: 1971 2015
Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.641178	2.436104	0.673690	0.5046
LOGFIN_MARK_DEV	-0.101618	0.518476	-0.195993	0.8457
LOGINFR_INVEST	-0.014345	0.036095	-0.397426	0.6933
LOGINFR_QUAL	-0.075557	0.142756	-0.529275	0.5997
LOGMACRO_STAB	-0.105556	0.047162	-2.238147	0.0311
LOGMARK_SIZE	0.009838	0.043072	0.228401	0.8206
LOGTRADE_OPEN	-0.125108	0.131453	-0.951727	0.3473

R-squared	0.217751	Mean dependent var	0.074511
Adjusted R-squared	0.094237	S.D. dependent var	0.106020
S.E. of regression	0.100901	Akaike info criterion	-1.607313
Sum squared resid	0.386881	Schwarz criterion	-1.326276
Log likelihood	43.16453	Hannan-Quinn criter.	-1.502545
F-statistic	1.762976	Durbin-Watson stat	1.812588
Prob(F-statistic)	0.133106		0.133106

Engle-Granger Second Step

Dependent Variable: DLOGFDI
Method: Least Squares
Date: 12/18/17 Time: 07:51
Sample (adjusted): 1973 2015
Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.264477	0.089022	2.970912	0.0053
DLOGFIN_MARK_DEV	1.422828	1.250178	1.138101	0.2628
DLOGINFR_INVEST	-0.159178	0.172836	-0.920978	0.3634
DLOGINFR_QUAL	-6.28E-05	0.274960	-0.000228	0.9998
DLOGMACRO_STAB	-0.159273	0.102444	-1.554742	0.1290
DLOGMARK_SIZE	-1.032115	0.744192	-1.386895	0.1742
DLOGTRADE_OPEN	0.294920	0.407700	0.723375	0.4743
ECT(-1)	-0.382720	0.119803	-3.194567	0.0030

R-squared	0.364629	Mean dependent var	0.137917
Adjusted R-squared	0.237554	S.D. dependent var	0.208234
S.E. of regression	0.181826	Akaike info criterion	-0.405287
Sum squared resid	1.157130	Schwarz criterion	-0.077622
Log likelihood	16.71367	Hannan-Quinn criter.	-0.284454
F-statistic	2.869413	Durbin-Watson stat	2.066765
Prob(F-statistic)	0.017771		0.017771

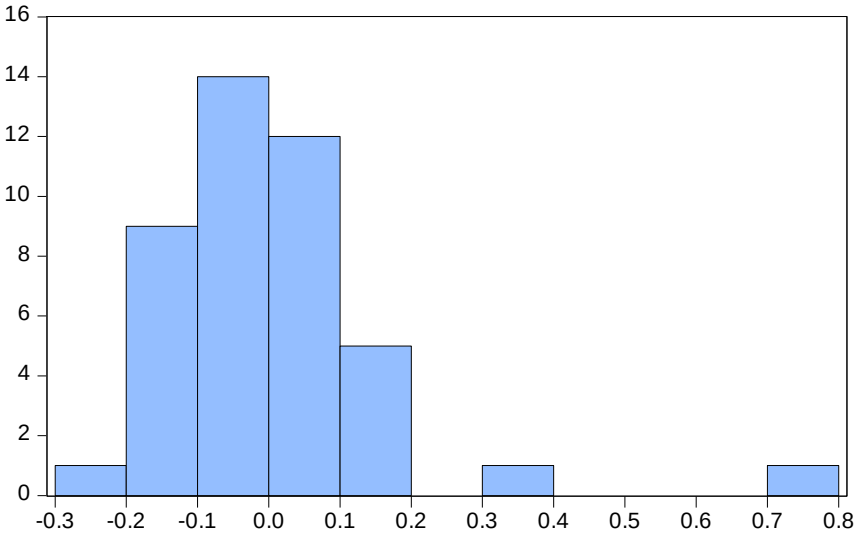
Diagnostic Tests

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	1.351995	Prob. F(4,31)	0.2731
Obs*R-squared	6.387146	Prob. Chi-Square(4)	0.1720

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 12/18/17 Time: 08:05
Sample: 1973 2015
Included observations: 43
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.032278	0.090144	-0.358075	0.7227
DLOGFIN_MARK_DEV	-0.066711	1.425254	-0.046806	0.9630
DLOGINFR_INVEST	0.123852	0.191371	0.647186	0.5223
DLOGINFR_QUAL	-0.009920	0.294133	-0.033726	0.9733
DLOGMACRO_STAB	-0.034509	0.104977	-0.328732	0.7446
DLOGMARK_SIZE	0.145420	0.769272	0.189036	0.8513
DLOGTRADE_OPEN	0.088352	0.411303	0.214810	0.8313
ECT(-1)	0.069709	0.144756	0.481561	0.6335
RESID(-1)	-0.114481	0.227036	-0.504242	0.6177
RESID(-2)	0.134858	0.187986	0.717384	0.4785
RESID(-3)	-0.359903	0.194284	-1.852460	0.0735
RESID(-4)	-0.187989	0.214652	-0.875781	0.3879

R-squared	0.148538	Mean dependent var	-4.53E-17
Adjusted R-squared	-0.153593	S.D. dependent var	0.165984
S.E. of regression	0.178276	Akaike info criterion	-0.380041
Sum squared resid	0.985252	Schwarz criterion	0.111457
Log likelihood	20.17088	Hannan-Quinn criter.	-0.198792
F-statistic	0.491634	Durbin-Watson stat	1.948996
Prob(F-statistic)	0.894051		0.894051



Series: Residuals
Sample 1973 2015
Observations 43

Mean	-4.53e-17
Median	-0.005517
Maximum	0.790005
Minimum	-0.295334
Std. Dev.	0.165984
Skewness	2.539567
Kurtosis	13.26105
Jarque-Bera	234.8638
Probability	0.000000

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	1.200810	Prob. F(7,35)	0.3281
Obs*R-squared	8.327108	Prob. Chi-Square(7)	0.3046
Scaled explained SS	33.82136	Prob. Chi-Square(7)	0.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 12/18/17 Time: 08:08
Sample: 1973 2015
Included observations: 43

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.059579	0.045918	1.297530	0.2029
DLOGFIN_MARK_DEV	-0.370419	0.644842	-0.574434	0.5693
DLOGINFR_INVEST	-0.152250	0.089149	-1.707820	0.0965
DLOGINFR_QUAL	-0.028505	0.141825	-0.200991	0.8419
DLOGMACRO_STAB	-0.048691	0.052840	-0.921480	0.3631
DLOGMARK_SIZE	-0.110191	0.383854	-0.287064	0.7758
DLOGTRADE_OPEN	0.171303	0.210292	0.814596	0.4208
ECT(-1)	-0.130282	0.061795	-2.108311	0.0422

R-squared	0.193654	Mean dependent var	0.026910
Adjusted R-squared	0.032384	S.D. dependent var	0.095343
S.E. of regression	0.093786	Akaike info criterion	-1.729358
Sum squared resid	0.307854	Schwarz criterion	-1.401693
Log likelihood	45.18120	Hannan-Quinn criter.	-1.608526
F-statistic	1.200810	Durbin-Watson stat	1.901055
Prob(F-statistic)	0.328105		