THE IMPACT OF FDI ON ECONOMIC GROWTH IN SOUTH AFRICA: DOES THE SECTOR MATTER?

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

by
Mamontshi Gwendoline Keleme
KLMMAM001

February 2023

Supervisor: Prof. N Biekpe

PLAGIARISM DECLARATION

COMPULSORY DECLARATION:

1. I certify that I have read and understand the Commerce Faculty Ethics in Research Policy. http://www.commerce.uct.ac.za/Pages/ComFac-Downloads
2. I certify that I have read the General Rules and Policies Handbook (Handbook 3) regarding Student Rules of Academic Conduct: RCS1.1 to RCS3.2 and Rules Relating to examinations G20.1 to G22.2.
3. I certify that I have read and understand the document, "Avoiding Plagiarism: A Guide for students".
4. This work has not been previously submitted, in whole, or in part, for the award of any degree in this or any other university. It is my own work. Each significant contribution to, and quotation in, this dissertation from the work, or works of other people has been attributed, and has been cited and referenced.
5. I authorise the University of Cape Town to reproduce for the purpose of research either the whole or any portion of contents in any manner whatsoever.

Student number: KLMMAM001

Student name: Mamontshi Gwendoline Keleme

Signed by candidate

Signature of Student: .....

Date: 10 February 2022

ACKNOWLEDGEMENTS

At the end of every completed project, it is always important to reflect not only on the amount of work and time put into the project but also on the people who contributed to the finality of the project.

This dissertation would not have been possible if it was not for my Jehovah Nissi. Indeed, we can do all things through Christ, who strengthens us Philippians 4:13. God, you've got me covered. Thank you.

To Prof Nicholas Biekpe, thank you for providing the necessary guidance and support.

To my ever-understanding and loving family, thank you for encouraging and believing in me: ke ya leboha/Enkosi. Thank you to everyone who supported and believed in me throughout the whole journey. Much gratitude to you all.

To my grandmother Lydia Letsoenyo, I will forever be thankful to you. May your soul rest in eternal peace.

TABLE OF CONTENTS

ABSTRACT

Foreign Direct Investment (FDI) is crucial for wealth-creating economic growth. Conceptually, FDI could bridge the investment gap and raise much-needed revenue for South Africa's financial requirements. However, much of the existing evidence on the effects of FDI on economic growth is at the macro level, with scant attention focused on the impact of FDI on economic growth at sector levels in South Africa. Consequently, this study aimed to examine the impact of agricultural, manufacturing, mining, construction, finance, and transport FDI on economic growth for the period 1993 to 2019 in South Africa.

The study used panel data to estimate the relationship between the FDI-to-GDP ratio and economic growth. The Panel ARDL results revealed that the effect of sectoral FDI on national GDP was positive but insignificant in the long- and short-run. In addition, the results revealed that domestic investment had a negative and significant effect on growth in the long and short run, at 5% and 10% significant levels, respectively. In line with previous studies, all other variables, such as human capital, trade openness, and total consumption expenditure, had excepted signs in the short run. However, all variables were statistically significant in the long run and had unexpected signs.

The short-run PMG result shows that FDI inflows into the construction, mining, and transport sectors had a significant positive relationship with economic growth rate. In contrast, the FDI inflow in the agriculture, finance and manufacturing sectors had a significant negative relationship with economic growth.

Keywords: Sector level FDI, Agricultural sector, Construction sector , Economic growth, Financial sector, Manufacturing sector , Mining sector , Transport sector.

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ADF - Augmented dickey fuller

ARDL - An Autoregressive Distributed Lag

DTI - Department of Trade and Industry

IDC - Industrial Development Corporation

FDI - Foreign Direct Investment

GDP - Gross Domestic Product

GFCF - Gross Fixed Capital Formation

GNP - Gross National Product

SARB - South African Reserve Bank

Stats SA - Statistics South Africa

VAR - Vector Auto Regression

CHAPTER ONE

INTRODUCTION

1.1. Introduction and background

The purpose of this study is to re-examine the impact of sector-level Foreign Direct Investment (sector-level FDI) on economic growth in South Africa. South Africa became a democratic state in 1994 and is currently the second-largest economy in Africa (Republic of South Africa [RSA], Department of Trade and Industry [DTI], 2020). In 2020, the country was characterised by a high unemployment rate of 30.6 % and a low % growth potential of 2% (The South Africa Reserve Bank [SARB], 2020). The debt-to-GDP ratio surged from 63.5 in 2019 to 81.8%. As a developing economy, the country is characterised by low savings rates at 15.9%. SARB, 2020). For these reasons, South Africa sees FDI as the cornerstone of economic development, which could assist the Gross Domestic Product (GDP) to grow between 5% and 6% annually (Clark & Bogran, 2020). Accordingly, the government offers several incentives to attract foreign investment in the country (Industrial Development Cooperation [IDC], 2020) to close the revenue gap and promote economic growth.

The literature on the impact of FDI on economic growth is extensive, however inclusive. There are two opposing arguments concerning the growth impact of FDI. The first argument is the new growth theory, which argues that FDI provides increased economic growth through knowledge transfer and the technological spill over effect. The second argument is of the dependency theory. This theory argues that FDI prevents the full utilisation of domestic resources and weakens their potential multiplier effects, consequently creating monopolies in the host countries (Chaudhury et al., 2020). Despite these conflicting arguments regarding the impact of FDI on economic growth, much of the existing evidence about the effects of FDI on economic growth is at the macro level, with scant attention paid to the impact of FDI on economic growth at the sector level. Therefore, it is important to re-examine the impact of agriculture, mining, manufacturing, construction, finance, and transport FDI on economic growth. Hence, this study aims to identify which sectoral FDI enhances economic growth and employment in South Africa.

1.2. Research Problem

South Africa is characterised by low economic growth, a high unemployment rate, the debt-to-GDP ratio has surged and low savings rates. FDI could bridge the investment gap and raise much-needed revenue for South Africa. At the same time, such investment could promote economic growth through technology and skills transfer to the host economy. FDI could also generate horizontal and vertical linkages with domestic firms and promote exports (RSA, National Treasury, 2011). However, these benefits are not automatic and depend on the country's human capital, absorption capacity, economic sector, type, and investment mode. However, this investment may also not result in the spill-over effect required to create backward linkages with the domestic firm. As not all FDI is equal in creating economic growth and jobs; therefore, it is necessary to decompose FDI at the sector level to identify which sectoral FDI that could enhance economic growth and development in South Africa. Against this background, in this study, the researcher seeks to investigate the impact of sector level FDI on economic growth in South Africa.

Although Maseko (2015), Makhwebere (2014), and Nchoe (2016) examined the sector level FDI growth effect in South Africa, these studies are more than five years old. It is important to note that as the economic structure changes, the impact and the importance of FDI at the sector level may change. Therefore, this study aims to re-examine the impact of sectoral FDI on economic growth for the period 1993 to 2019 in the agricultural, manufacturing, mining, construction, finance, and transport sectors in South Africa.

1.3. Research question

The main questions that underpin this research are:

- What is the impact of Agricultural sector FDI on economic growth in South Africa?
- What is the impact of Manufacturing sector FDI on economic growth in South Africa?
- What is the impact of Mining sector FDI on economic growth in South Africa?
- What is the impact of Construction sector FDI on economic growth in South Africa?
- What is the impact of Financial sector FDI on economic growth in South Africa?
- What is the impact of Transport sector FDI on economic growth in South Africa?

1.4. Research objectives

The research is based on the premise that the FDI-growth effect may depend on the economic sector in which the FDI has been channelled.

1.4.1. Specific objectives

- To examine the impact of sector level of agricultural sector FDI on economic growth in South Africa.
- To examine the impact of manufacturing sector FDI on economic growth in South Africa.
- To examine the impact of mining sector FDI on economic growth in South Africa
- To examine the impact of construction sector FDI on economic growth in South Africa.
- To examine the impact of financial sector FDI on economic growth in South Africa.
- To examine the impact of transport sector FDI on economic growth in South Africa.

1.5. Hypotheses

Based on the above research questions, the hypotheses of this research paper are the following:

- *Hypothesis 1*
  H_0: FDI in the agricultural sector has no impact on economic growth in South Africa.
  H_1: FDI in the agricultural sector has an impact on economic growth in South Africa.
- *Hypothesis 2*
  H_0: FDI in the manufacturing sector has no impact on economic growth in South Africa.
  H_1: FDI in the manufacturing sector has an impact on economic growth in South Africa.
- *Hypothesis 3*
  H_0: FDI in the mining sector has no impact on economic growth in South Africa.
  H_1: FDI in the mining sector has an impact on economic growth in South Africa.
- *Hypothesis 4*
  H_0: FDI in the construction sector has no impact on economic growth in South Africa.

H_1: FDI in the construction sector has an impact on economic growth in South Africa.

- *Hypothesis 5*

  H_0: FDI in the finance sector has no impact on economic growth in South Africa.

  H_1: FDI in the finance sector has an impact on economic growth in South Africa.

- *Hypothesis 6*

  H_0: FDI in the transport sector has no impact on economic growth in South Africa.

  H_1: FDI in the transport sector has an impact on economic growth in South Africa.

1.6. Justification for the study

South Africa needs to attract FDI to overcome the existing revenue gap, high debt-to-GDP ratio and low economic growth. However, the empirical evidence has proven that not all sector FDI influences economic growth because FDI may negatively affect economic growth by crowding out local companies or leading to an enclave economic development. Therefore, it is important to understand the implication of sector composition of FDI and its impact on economic growth and development in South Africa. This would assist the policymakers in identifying which sector level FDI has a positive or negative impact on economic growth. The aim is to assist the country in channelling its campaign of attracting FDI in sectors with spill over effects and high net investment gains to generate much-needed revenue to lower its high debt-to GDP ratio and promote economic growth and development. While on the other hand, encourage the country to implement measures that mitigate the risk of attracting FDI with minimal gains/no gains in net investment.

1.7. Organisation of the study

In the following chapter (Chapter 2), the researcher discusses the literature review regarding the manner in which FDI influences economic growth. The methodology employed is discussed in Chapter 3. The results of these research studies are presented in Chapter 4. Lastly, in Chapter 5, the researcher discusses the conclusion and recommendations on the FDI-growth effect in South Africa.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

This chapter reviews the theoretical and empirical literature on FDI in this chapter. The first section discusses the definition and the importance of FDI in the host country. This is followed by the theoretical discussion of the relationship between sector-level FDI and economic growth. The study also briefly discusses the sector-level GDP and FDI contribution of FDI in South Africa. In the second section of this study, the researcher discusses neoclassical growth theory and new growth path theory, which are economic growth model theories that highlight the impact of FDI on growth. In the third section, the study presents the empirical findings regarding the impact of FDI on economic growth. Finally, the researcher makes a conclusion based on the literature reviewed.

2.2. Definition of FDI

FDI is the process where the residents of one country acquire assets to control the production, distribution, and other firms' activities in another country (Moosa, 2002). In contrast to foreign bank lending and portfolio investment, with a short-run objective, FDI is a longer-lasting investment between economies (Organisation for Economic Co-operation and Development [OECD], 2008). The investing company may either invest through a subsidiary or associated company in a foreign country or through share acquisition of an overseas company, merger, or joint venture (Khatoon, 2016).

Theoretically, FDI occurs in vertical or horizontal form. Horizontal FDI (intra-industry) occurs when multinational enterprises (MNE) manufacture the same goods or services, in multiple plants, in different countries, where each plant serves the local market. Horizontal FDI is motivated by a need to avoid transport costs or access to a foreign market, which could be served locally. However, the cost of establishing foreign plants, instead of exporting to a new country, are outweighed by the benefits of investing in the host country (Protsenko, 2004).
Vertical FDI (inter-industry) occurs when MNE geographically fragment their manufacturing stages to exploit differences in the relative factor's costs. It is referred to as *vertical* because

production states occur systematically in different countries, should MNE consider that it would be profitable to split production across countries (Protsenko, 2004).

2.3. The importance of FDI on economic growth

As mentioned above, different and opposing theories exist about the effect of FDI on economic growth. In line with the new growth path theory, FDI could increase economic growth through the knowledge transfer and technological spill over effect. In addition, FDI could generate horizontal and vertical linkages with domestic firms and promote exports (RSA, National Treasury, 2011). In general, the influence of FDI on growth is explained through *technological diffusion*; when a firm accepts foreign capital, it spreads to a related company through technical support of suppliers (customers) and the business environment (Melnyk et al., 2014). Table 2.1 (1) illustrates several channels for FDI spillovers.

Table 2.1 (1): Several channels for the FDI spillovers

Backward Linkages	The transfer of inventory and quality control techniques and improving suppliers' products by providing technical assistance to purchase inputs.
	Foreign investors may contribute to the development of the sales network.
Forward Linkages	Contribution towards the development of sales.
Training of local employees	The foreign investor shares technical and managerial skills with the local industries. This happens when a employees change work from a foreign to a domestic firm.
Demonstration and competition effects	Foreign product of higher quality stimulates quality improvements in domestic firms.

Source: Blömstrom and Kokko (1997)

Besides these channels, FDI is a major channel for developing economies to access advanced technologies (Borenstzein et al., 1998). Conceptually, FDI could bridge the investment gap and raise much-needed revenue for South Africa's financial requirements. Under the appropriate policy environment, FDI could serve as an essential vehicle for local enterprise development and improve the host economy's competitiveness (OECD, 2008). In addition, FDI could provide long-run finance (Miteski & Stefanova, 2017; OECD, 2008; Susic et al., 2017), debt-

free growth, and foreign reserve (Bekmurodova, 2020; Häberli & Smith, 2014), and promote export (Arezki et al., 2015). Consequently, this would increase foreign exchange earnings (Frimpong & Oteng-Abayie, 2006) and positively affect economic growth. FDI improves the competitiveness of recipients and investing economies (OECD, 2008). Essentially, FDI could boost the developing country's sovereignty against the donor countries' policies (Gochero & Boopen, 2020). As well as improve the living standards and reduces the financial gap between the country's revenue, taxes and expenditure (Chaudhury et al., 2020). Susic et al. (2017) argues that FDI's total investment will increase when FDIs enter a new market where there is no competition, whether in the primary, secondary, or tertiary sectors. In essence, FDI could initiate wealth-creating economic growth.

However, critics suggest that FDI reduces capital accumulation (Herzer, 2010) because spillover effects are not automatic (Petrović-Ranđelović, Janković-Milić, and Kostadinović, 2017). The spill over effects depends on human capital and the local firm's absorption capacity (Solow, 1956). According to the independency theory, FDI creates monopolies by preventing the domestic resources' full utilisation, thereby weakening the potential multiplier effect (Chaudhury et al., 2020). The argument is that when FDI enters a sector where it competes with domestic companies, a competitive struggle may ensue, delaying the investment, as well as the exit of domestic companies from the sector, which will reduce the total investment in the sector and the economy (Susic et al., 2017). In addition, FDI may crowd out the local domestic firms, leading to currency appreciation, inflation, and foreign trade deficit, when a country imports new technology.

2.4. The relationship between sectoral FDI and economic growth

Explaining the growth effect of FDI on the host country is challenging, as the growth effect depends on the human capital, the country's absorptive capacity, sectors of the economy, and the type of investment. As mentioned previously, not all sector-level FDI is equal in creating economic growth. The FDI benefits may differ across the primary, secondary and tertiary sectors. Therefore, it is important to understand the implication of sector composition of FDI in runs of its impact on economic growth and development in the host country. Hirschman (1958, p. 109, cited in Alfaro, 2003) asserts that sectors do not have the same absorption capacity or the ability to create linkages with the rest of the economy. For example, agriculture and mining have weak linkages; therefore, the absence of linkages would mean that FDI in

those sectors has a limited effect on economic growth. Hirschman (1958, p. 109, cited in Alfaro, 2003) adds that the absence of direct linkages in the primary sector leads to an *enclave* development, which means the benefits of FDI depend on export-led economic growth, resulting in minimal gains in net investment.

Similarly, Aykut and Sayek (2007) argue that FDI has different characteristics in runs of linkages to the rest of the economy. FDI comes from meg-projects with limited linkages to the domestic economy because they are used for a few local inter-mediate goods and are aimed at the export market. The scope of the linkages between foreign companies and the rest of the economy is limited in the primary sector since it is mostly capital-intensive. As a result, the FDI impact in the primary sector is not always expected to be positive.

However, manufacturing FDI sectors are directly linked to the rest of the economy, Hirschman (1958, p. 109, cited in Alfaro, 2003). Unlike the primary sector FDI, manufacturing FDI impacts the economy through various potential linkages-intensive activities. The impact of the FDI in the manufacturing sector is larger, and the linkages to the host country can be defined better. Manufacturing FDI has both horizontal and backward linkages. Usually, foreign firms manufacture in a country, instead of exporting to a country, for either efficiency or market-seeking purposes (Aykut & Sayek, 2007). However, Goldberg (2007) argues that the technology transfer from the manufacturing FDI is compelling only in theory. Empirically, it is challenging to quantify this channel's strength in developing countries. Javorcik (2004) observed that productivity spillovers from FDI take place through the affiliation between the foreign affiliates and their local upstream suppliers (vertical linkages). The study did not find evidence of intersectoral spillovers (horizontal linkages) in sectors supplying intermediate inputs.

The literature suggests service FDI have positive growth effects (Aykut & Sayek, 2007; Goldberg, 2004; Hirschman, 1958, p. 109, cited in Alfaro, 2003). Aykut and Sayek (2007) argue that FDI in the services sector, such as finance, has a strong forward linkage, while the backwards linkages differ per industry. In addition, these authors argue that FDI in the banking sector could lead to an efficient and stable banking system through increased competition in global financial markets (Aykut & Sayek, 2007). As a result, the financial sector FDI positively affects the whole country. Goldberg (2004) also indicates that financial sector FDI has a growth effect because it improves the efficiency of credit allocation within the host countries..

Makwembere (2014) asserts that the construction industry enhances the country's absorptive capacity and accelerates economic growth. Likewise. Vieira (2009), argues that investment in this industry is usually capital-intensive, consequently resulting in capital formation and increasing economic growth.

According to Dar et al. (2016) the service sector growth attracts FDI, creating more linkages with the manufacturing sector. However, Alfaro (2003) states that the growth effect of service sector FDI is ambiguous. In their study, Amed et al. (2015) observed that the growth effect of the transport, electricity, finance, and community services FDI was neutral. Makhembere (2014) on the other hand argues that the transport FDI has the greatest impact on economic growth because it creates a spill over into other industries. In the following section, the researcher briefly discusses the South African economic sector and trends of FDI in South Africa.

2.5. South Africa economic sector and trends of FDI in South Africa

2.5.1. Economic sectors in South Africa

South Africa became a democratic state in 1994 and has the second-largest economy in Africa; however, the country is characterised by a high unemployment rate of 30.6%, low growth potential and 2%, and a high debt-to-GDP ratio of 81.8%. This negatively affects the country's economic prospects and employment creation opportunities. The low economic prospect is mainly due to low business and investor confidence because of depressed domestic demand, policy uncertainty, infrastructure challenges, worsening fiscal position, as well as challenging trading and investment environment (IDC, 2020), for example, under-recovery in investment, electricity supply disruptions, labour unrest (National Treasury, 2019), and alleged corruption. South Africa has three main sectors, namely, primary, secondary and tertiary. In Figure 2.1, the economic sectors in South Africa are presented.

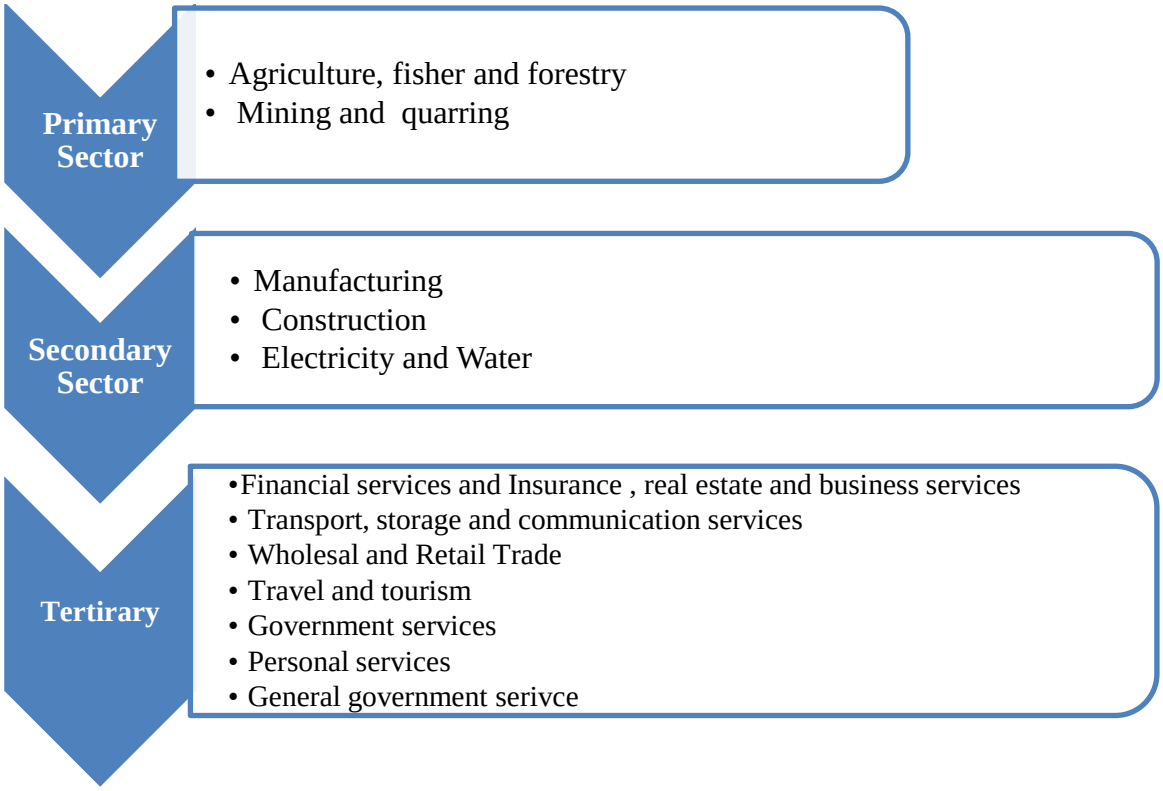


Figure 2.1: Economic Sectors in South Africa

Source: Researcher's own compilation from the Reserve Bank's website

According to Statistics South Africa (Stats SA, 2022), a change in the financial sector has a noticeable impact on GDP. This sector has grown much faster than the industry and agricultural sectors. The strong growth in the financial sector could be attributed to the quality of the banking sector.

2.5.2. FDI contribution in South Africa in 2019

South Africa's FDI potential attractiveness is high, as opposed to other African countries. However, the government fails to attract sufficient FDI, despite improved macro-economic conditions, such as the size of the market, stable exchange rate, strong institutions, and low inflation (Arvanitis, 2005). FDI as a percentage of GDP has stayed relatively low, with an average of 1.29% from 1994 to 2019.

In 2019, FDI inflow declined by 15% to $4.6 $billion, however, this a quite improvement relative to low inflows of an average of $2 billion between 2015 and 2017 (United

Nations Conference on Trade and Development ([UNCTAD] 2020). FDI in South Africa is mainly directed at mining, manufacturing (automobiles, consumer goods), and service (finance and banking). However, approximately 70% of most FDI is from the services sector. **Figure 2.2** displays the Sectoral FDI contribution in South Africa.

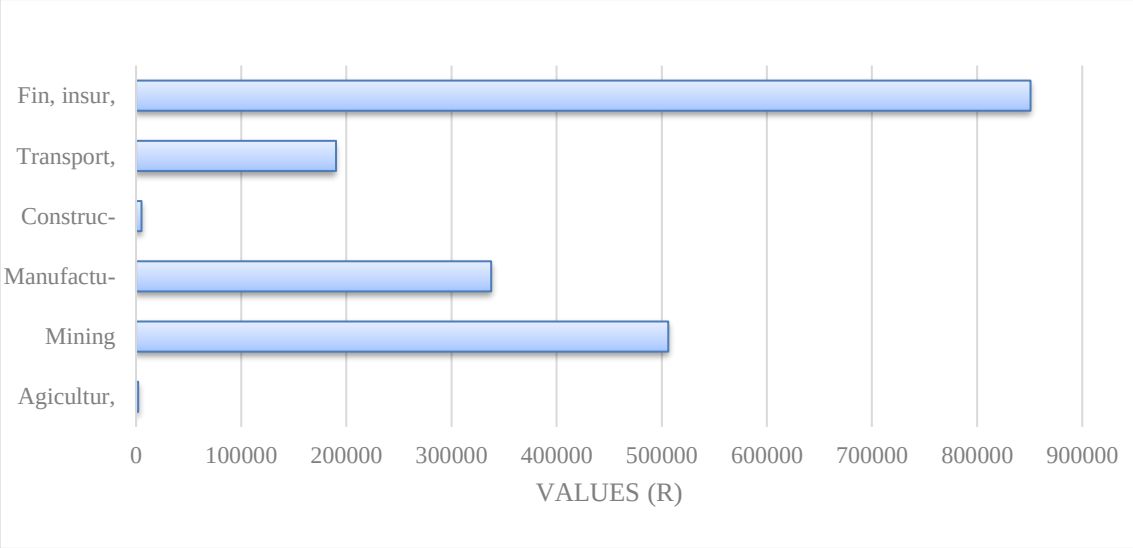


Figure 2.2: FDI contribution in South Africa for 2019

Source: The South Africa Reserve Bank, 2019

2.6. Theoretical Literature

Research has presented various theories to explain the growth effect of FDI.

2.6.1. Economic Growth and FDI-Nexus

The study discusses neoclassical growth and new growth path theories, which are economic growth model theories. These are theories that are relevant to this research study.

2.6.1.1. The neoclassical growth models

The neoclassical theory, also known as the *exogenous growth model*, predicts that output is defined by two factors of production, namely, labour and capital (Solow, 1956). The production function Y=F (K L) represents technological possibilities. Technology is treated as a public good (Solow, 1956). In this model, the technology improves for reasons outside the model, as, ultimately, the capital stock increases without any technological change (Romer, 1994). In contrast, the model maintains

that FDI promotes the creation of capital stock and productivity, which eventually contributes to economic growth. However, foreign capital efficiency is similar to a domestic investment with negligible spill over effect (Romer, 1994). Ultimately, the impact of FDI on economic growth is neutral. The growth rate converges because of diminishing marginal product capital, even if FDI production may temporarily expand (Miteski & Stefanova, 2017). \

However, *exogenous growth models* faced much criticism, which led to the formulation of *endogenous growth models*. Barro and Sala-i-Martin (2004, p. 62), in their book on development economics, emphasise that the neoclassical growth model could not be used as a tool to explore the economic growth determinants since these models predict that, without technological change, the economy will eventually converge to a steady state, with zero per capita growth, due to diminishing returns to capital. However, the critics argue that the way out of this challenge was to include human components and technological progress to prevent the economy from ultimately reaching diminishing returns. They emphasise that it was important to treat technological progress as *exogenous* to explain the progress within the growth model. These criticisms led to the formation of *endogenous growth models*.

2.6.1.2. Endogenous growth model/New growth theory

The endogenous growth model is essential to explain how FDI could positively influence economic growth or performance in South Africa. This model describes how capital accumulation and technology from FDI increase the host country's economic growth. The endogenous model assumes that markets are characterised by imperfect competition (Romer, 1994). According to Piętak (2014), the first endogenous growth model was developed by Frankel and Arrow. In endogenous models, economic growth is defined by factors inside the model. Simultaneously, investment decisions define the technical level of the economy. Romer (1990) resembles Solow's (1956) model of technological change; however, technology is endogenous rather than exogenous in his model because the model assumes that a technological change incentivises capital accumulation and technological change increases output per worker (Romer, 1994). Mankiw et al. (1992) also augmented the Solow model production by considering constant returns. In this model,

government expenditure and financial systems influence capital formation through savings or reallocation with different technologies. The growth process starts at the firm or industry level due to constant returns to scale (Romer, 1994).

According to Arrow (1992, cited in Romer, 1994), the model assumes that the stock of physical capital and technology level increases with each unit of capital invested through the spill over effect. The negative spill over effects results from an increase in the total labour supply because the growth rate does not depend on the total size of the labour force or population but on the increase in the stock of human capital and free international trade. However, trade openness enhances the scale of spill over effects, consequently leading to economic growth (Romer, 1990). Therefore, human capital, capital accumulation, and technological change are necessary to explain economic growth (Gallardo Pérez et al., 2019). The model also assumes that the growth rate in developing economies is defined by the catch-up process at the technology level, as growth is influenced by how the new technologies are adopted and implemented in leading countries. Therefore, the endogenous models are relevant to developing economies, as these models explain how the FDI-growth effect could transpire through several channels (Moosa, 2002, p. 73).

However, Ek (2007) highlights that some new growth rate theory assumptions are still based on neoclassical theory; thus, making them unsuitable for developing economies, as they also assume that a production sector is only one and industries are symmetric. The models, therefore, do not allow the reallocation of labour and capital between sectors, even though they positively affect growth. However, this research paper will be based on the endogenous model since this model is appropriate for South Africa as a developing country, which is characterised by imperfect market conditions, such as information asymmetry, high barriers to entry and a high level of market concentration.

2.6.2. FDI-Growth effect: the evidence from macroeconomic studies in Africa

In this section, the researcher reviews and discusses the main findings of empirical studies conducted in the African countries, including South Africa, regarding the impact of FDI on economic growth. The findings from these studies revealed that the growth effects of FDI are mixed. The first section comprises the macro-level studies of the

impact of FDI on economic growth in Africa. The second section explores the sectoral impact of FDI on economic growth.

2.6.2.1. The positive relationship between FDI and economic growth in Africa

Appiah et al. (2019) used panel data from five developing African countries to investigate the role of FDI on economic growth. The study results revealed that FDI has a positive influence on economic growth. Similarly, the research findings of Joshua et al. (2021), while examining the effect of FDI in Sub-Saharan countries, revealed that FDI influenced economic growth positively in those developing countries. In South Africa, Mabule (2012), Masipa (2014), Mothibi and Ferreira (2019), as well as Sunde (2017) observed a positive relationship between FDI and economic growth. Masipa (2014) examined the relationship between FDI and growth and employment from 1990 to 2013. The results revealed a positive long-run relationship between FDI, GDP, and employment.

Mothibi and Ferreira (2019) analyse the impact of FDI and domestic investment on economic growth in South Africa, using the Autoregressive distributed lag model (ARDL) method for 1994-2018. The study results revealed that foreign and domestic investment positively influences economic growth. Sunde (2017) examined the relationship between the economic growth rate in FDI in South Africa from 1990-2014. The study findings revealed that FDI positively affects economic growth and generates a unidirectional causality from FDI to economic growth. On the other hand, Awolusi and Adeyeye (2016) examined the relationship between FDI and economic growth in some randomly selected African countries, including South Africa, from 1980 to 2013. The research results revealed that the FDI growth effect in African countries was positive, albeit limited or negligible.

2.6.2.2. The negative and neutral relationship between FDI and economic growth in Africa

Herzer (2010) used cross-sectional data to test the FDI-growth effect from 1970-2005 in 44 developing countries, including Africa. The results revealed a negative FDI growth effect; however, the impact differed in those countries. Zardoub (2021) explored the link between financial flows and economic growth in Tunisia from 1995 to 2017. The results revealed that the FDI growth effect is negative in the

short run and insignificant in the long run. Marandu (2018), however, assessed the impact of FDI on the economy in Southern African countries, including South Africa, from 2000 to 2015, using panel data techniques. The study results revealed no relationship between FDI and economic growth in Southern Africa.

In South Africa, Mazenda (2014) examined how FDI influenced economic growth in South Africa from 1980 to 2010. Their Johansen cointegration and VECM revealed a negative relationship between FDI and economic growth in South Africa. However, Joshua et al. (2020) found the effect of FDI on economic growth to be neutral in South Africa from 1994 to 2018.

2.6.2.3. FDI-growth impact: Sectoral studies in Africa

In runs of sector decomposition, Owusu (2017) investigated the FDI- growth, using time series data for the period 1980 to 2012 in Ghana. The research results revealed a positive and significant relationship between FDI inflows in the agricultural and manufacturing sectors and economic growth in the short and long run. While the service sector showed a positive effect in the short run, the impact of the FDI growth was negative in the long run. Gochero and Boopen (2020) examined the FDI-growth effect in mining while using non-mining FDI and the domestic investment sector as a control, in Zimbabwe, from 1988 to 2018. The study results revealed a positive long-run FDI -growth effect in mining, non-mining, and domestic investment. However, the FDI-growth effect in the mining sector was higher than in the non-mining sector and domestic investment. The short-run result revealed a low FDI-growth impact in mining, non-mining, and domestic investment. Ultimately, the conclusion was that the FDI-growth takes time to have a full effect.

In South Africa, Maseko (2015) examined the causal relationship between FDI and economic growth in the primary, secondary and tertiary sectors of FDI from 1985 to 2012. The study findings revealed no causal relationship between primary and secondary sector FDI on economic growth. However, the findings established causality between tertiary FDI and economic growth. Similarly, Nchoe, (2016) employed a time series analysis from 1970 to 2014 in South Africa to analyse the FDI growth effect on three sectors: agriculture, industry, and service. The research

revealed that the FDI-growth effect was significant and positive in the services and industry sectors, while the contract agricultural sector results were negative. Makwembere (2014) employed a panel data estimation technique to estimate the impact of sectoral FDI on economic growth from 2007 to 2013. The study findings revealed that the impact of FDI on economic growth varied per sector. However, the conclusion was that no form of FDI was preferable to enhance economic growth. All FDI are significant. The recent research by Kolisi (2021) assessed how manufacturing FDI could influence economic growth from 2006 to 2018. The study findings revealed a negative relationship between FDI and economic growth in the long run. In Table 2.2 (2), a summary of the reviewed literature is illustrated.

Table 2.2 (2): Summary of the reviewed literature

Authors	**Period**	**Country**	**Methodology**	**Findings (FDI-growth effects)**
Appiah, Li, & Korankye (2019)	1995-2015	Cote D Ivoire Ethiopia Ghana Senegal Tanzania	Panel ARDL model	Positive
Awolusi & Adeyeye (2016)	1980-2013	Several African countries, including South Africa	OLS and GMM	Positive but weak
Masipa (2014)	1990-2013	South Africa	Granger Causality	Positive
Joshua, Babatunde, & Sarkodie (2021)	1990-2018	Sub-Saharan countries	ARDL. Pooled OLS, Fixed and Random effects, GMM	Positive
Mothibi & Ferreira (2019)	1994-2018	South Africa	ARDL, ECM	Positive
Sunde (2017)	1990-2014	South Africa	ARDL, VECM	Positive
Zardoub (2021)	1990-2017	Tunisia	Panel ARDL model	Negative in the short run but

				insignificant in the long run
Herzer (2010)	1970-2005	Several African countries	VECM	Negative
Mazenda (2014)	1980-2010	South Africa	VECM	Negative
Marandu (2018)	2000-2015	South Africa	Random and Fixed effects model	Neutral
Joshua, Adedoyin, & Sarkodie (2020)	1980-2015	South Africa	ARDL, ECM	Neutral
Majavu (2015)	1980-2012	South Africa	VECM, Granger Causality Test	No causality between FDI and economic growth
Sectoral Studies				
Owusu (2017)	1994-2018	Ghana	ARDL	Positive in the short run for Agriculture, Manufacturing and Services. Positive for Agriculture and Manufacturing in the long run. Negative for the services in the long -run
Gochero & Boopen (2020)	1988-2018	Zimbabwe	ARDL	Higher in the mining than non-mining sector and domestic investment
Nchoe (2016)	1970-2014	South Africa	VECM	positive on the services and industry sector, and while it was negative on the agricultural sector
Makwembere (2014)	2007-2013	South Africa	Fixed Effects and Random Effects	Transport and communication have a great

				significant impact. Mining significant relationship. , Wholesale and agriculture have a significant impact. Finance has no significant effect. Manufacturing has no significant impact.
Kolisi (2021)	2006-2018	South Africa	ARDL	Negative-Manufacturing
Maseko (2013)	1985-2012	South Africa	Granger Causality	Primary and Secondary negative. Tertiary Positive

Source: Compiled by the researcher

2.7. Conclusion

FDI is an important source of revenue stream and debt-free growth. The discussion above has established that economic and non-economic factors could influence FDI in the host country. The study has also discussed that the endogenous growth model is important in explaining how FDI could influence on economic growth or performance in South Africa. The endogenous model assumes that the growth rate in developing economies is defined by the catch-up process at the technology level, as growth is influenced by the manner in which the new technologies are adopted and implemented in leading countries. Consequently, the endogenous models are relevant to developing economies.

Interestingly, in this study, the researcher has demonstrated that the direction of a relationship between FDI and growth is mixed at a macro level. In addition, it has been revealed that the sectoral composition of FDI is important in defining the growth effect of FDI. In the following chapter, the researcher discusses the methodology and data used to investigate the impact of sectoral FDI on economic growth in South Africa.

CHAPTER THREE

METHODOLOGY

3.1. Introduction

In this chapter, the researcher presents the methodology to investigate the impact of sector level FDI on economic growth in South Africa. This chapter outlines the research design and data collection methodology. Subsequently, the researcher discusses the variables used to investigate the objective of this research, followed by an explanation of the economic model and panel data techniques employed to analyse sectoral FDI's impact on South Africa's economic growth.

3.2. Research design

The study employed a quantitative analysis approach. The study uses descriptive and inferential statistics to analyse the relationship between the variables. The descriptive analysis could be a detached research product in cases where phenomena or patterns in data have not been recognised previously (Loeb et al, 2017). This research approach is ideal for analysing, summarising, organising, making sense of huge data sets, and understanding characteristics that may influence the researchers' conclusions. On the other hand, the regression analysis identifies the relationship between the dependent and independent variables, as well as makes predictions and identifies the strength of how independent variables influence the dependent variable (Sarsted & Mooi, 2014). The study uses secondary data from the South African Reserve Bank and Statistics South Africa, World Bank and United Nations Conference on Trade and Development (UNCTAD).

3.3. Data collection

In this section, the researcher describes the variables that are used to investigate the relationship between sector-level FDI and economic growth. Based on the available information, the key sectors identified are agriculture and mining, manufacturing, construction, finance and transport. The data covers the period from 1993 to 2019. The researcher uses panel data with 156 observations in total and the GDP growth rates (GDP) as the dependent variable. The

information on the national GDP data was obtained for the World Bank, and the sector-level FDI data from the South Africa Reserve bank (SARB database).

Gross fixed capital formation as a percentage of GDP (GFCF), a proxy of domestic investment, was obtained from United Nations Conference on Trade and Development (UNCTAD). Following Alfaro (2003), Borensztein et al. (1998), Herzer (2010), and Wang (2009), trade openness is calculated as the rate of export and imports to GDP (TO). The annual change in consumer price index as a measure of inflation (INF), and total government consumption expenditure, as a percentage of GDP (TCE). According to Mankiw et al. (1992), human capital accumulation represents the investment in physical capital and population. Several studies, including Alfaro (2003), Borensztein et al. (1998), Herzer (2010), and Mankiw et al. (1992) use the gross enrolment ratio in secondary education as a Proxy for Human Capital (HC) accumulation. These data were obtained from the World Bank. The data validity and reliability are assured by the official website.

3.4. Justifications of the variables used.

FDI encourages and promotes economic growth by transferring technology and skills to the host economy. The endogenous growth model suggests that macroeconomic variables, such as the size of the market, human capital, country stability, trade openness, government expenditure, inflation, and gross fixed capital formation, are important factors that influence FDI and economic growth. The explanatory variables in the endogenous growth models were used by Alfaro (2003), Borensztein et al. (1998), Herzer (2010), and Wang **(**2009) when investigating the relationship between growth and FDI.

3.4.1. Economic Growth (Constant)

Economic growth is a national measure of gross domestic product (per capita GDP or GNP) and helps to analyse a country's performance (Stats SA, 2022). Countries want to increase economic growth because a high economic growth rate could improve welfare and a country's standard of living. As well as elements such as income distribution, health availability, and access to education are essential for economic growth (Najeb, 2014), as a higher economic growth rate attracts FDI in the country. In this study, the GDP growth rate is used as the indicator of economic performance.

3.4.2. Foreign Direct Investment

FDI is believed to be crucial to generate much need revenue and wealth-creating economic growth in South Africa. As indicated above, the economic sectors differ in the way they could contribute to economic growth and development. Sectoral literature in South Africa revealed that not all sector-level FDI are equal in creating economic growth. For example, Makwembere (2014), Maseko (2013), and Nchoe (2016) examined the impact of sector-level FDI on economic growth in South Africa. These studies observed that the impact of FDI on economic growth varies across the sector, while their results differ in each sector. Maseko (2013) and Nchoe (2016) observed a negative relationship between primary sector FDI and economic growth. In line with the empirical studies, in this study, the expectation is that the effect of FDI in finance, manufacturing, construction, transport, mining and agriculture will be either positive or negative.

3.4.3. Trade Openness

Trade is important for the stimulation of economic growth. It helps the countries to acquire foreign reserves and increase their competitiveness. Trade openness enhances the scale of spill over effects, leading to economic growth (Romer, 1990). This study uses the exports and imports ratio as a proxy for trade openness, representing the technology spillover effect (Hye & Lau, 2015). Therefore, a positive relationship between trade and economic growth is expected in this study.

3.4.4. Gross fixed capital formation

Neoclassical and new growth theories argue that physical capital (investment) enhances economic performance. Gross fixed capital formation (GFCF) represents a domestic investment and is vital to accelerate the country's performance. GFCF could promote economic growth by increasing the investment and scale of economies through the transfer of information, technology, and knowledge spill over effects (Ali, 2017). A positive coefficient is expected in this study.

3.4.5. Human Capital

In endogenous growth theories, long-run economic growth does not only result from technological progress. However, it is also the result of human capital, science and technology, patents and protection of intellectual property rights, as well as a favourable investment climate by the government (Sharipov, 2015). Endogenous theories argue that

high knowledge positively affects the economy and the country's competitive advantage (Ali, 2017). Better human capital helps to equip the country to adapt and acquire efficient technologies (Barro, 2001). One extra year of average education leads to a moderate increase in per capita output. The study uses secondary school enrolment rates as a proxy for human capital, as used by Alfaro (2003) and Herzer (2010), and a positive coefficient is expected.

3.4.6. Government Size

The New Growth Theory argues that an increased government expenditure stimulates growth (Romer, 1990). The level of total government expenditure is a proxy for government size; consequently, in this study, a positive government consumption coefficient is expected.

3.4.7. Macroeconomic stability

The inflation rate is a general increase in the price of goods and services over a given period. It is measured as a percentage change in the Consumer Price Index (CPI). CPI is the annual percentage change in the average consumer's cost to acquire a fixed basket of goods and services, which measures inflation by diminishing the volume of resources for domestic investment (Nketsiah & Quaidoo, 2017). In addition, it is a benchmark against which countries measure price stability. The inflation rate reduces domestic savings, and part of the savings are channelled out of the country while reducing FDI inflow (Barro, 2001), consequently affecting economic growth negatively. In this study, the researcher expects inflation to negatively affect the economic growth rate (Aisen & Veiga, 2011; Barro, 2001).

3.5. Population and sampling

The population is the South African economy. For this study, the researcher selected FDI in agriculture, mining, manufacturing, construction, finance, and transport to assess their effect on growth based on the limited available information.

3.6. Model specification

The neoclassical theory, also known as the *exogenous growth model*, predicts that output is defined by two factors of production, namely, labour and capital. However, neoclassical growth

models had some weaknesses that led to the formulation of *endogenous growth models*. The exogenous model assumes that technology is *exogenous*. Romer (1990) concurs with Solow's (1956) model of technological change; however, technology is *endogenous* rather than *exogenous*. The theoretical framework of this paper follows Romer's (1994) endogenous growth model. The model postulates that the catch-up effect explains the FDI-growth effect at the technology and human capital levels. The methods of Borensztein et al. (1998) and Wang (2009) used the following Cobb-Douglas function:

$$Yt = AH^{\alpha}{}_{t}\ K^{l\alpha}{}_{t} \qquad (1)$$

The function entails Yt, the output produced at time *t*, at constant efficiency. The exogenous state of the *environment* is represented by A, human capital is represented by H, and K denotes physical capital. The environmental state includes variables that influence the economy's productivity level, and human capital H is a given endowment (Borensztein et al., 1998).

In this section, the researcher outlines the estimation technique used to examine the effect of sectoral FDI on gross domestic product growth. The empirical framework adopted in this study follows Nchoe (2013), Suleiman et al. (2013), as well as Wang (2009), which are based on a model of endogenous growth, where technology absorption and the level of human capital influence growth. This study specifies its models as follows:

$$GDP_{It} = \beta_0 + \beta_1 SFDI_{it} + \beta_{it} X_{it} + \varepsilon_{it} \qquad (2)$$

Equation (1) can be rewritten in a linear regression framework as follows;

$$GDP = f\ (SFDI/GDP_{it} + GFCF_{it} + HC_{it} + TCE_{it} + TO_{it} + INF_{it} + \mathcal{E}_{it}) \qquad (3)$$

$$GDP_{it} = \beta_0 + \beta_1\ FDI/GDP_{it} + \beta_2\ GFCF_{it}\ t + \beta_3\ TCE_{it} + \beta_4 TO_{it} + + \beta_6\ INF_{it} + \mathcal{E}_{it} \qquad (4)$$

GDP_{it} is a dependent variable, indicating GDP growth rate; FDI_{it} the foreign direct investment inflows indicate FDI in sector i during period *t.* Gross Fixed Capital Formation represents a domestic investment, $which$ indicates $GFCF_{it}$ in sector *i* during period *t.* This will allow the researcher to compare the impact of these two types of investment on economic growth.

This study follows the previous empirical studies that examine the impact of FDI on economic growth that use the FDI/GDP ratio instead of the natural logarithmic (Herzer, 2010).

According to (Herzer, 2010), the reason for using the FDI/GDP ratio is to avoid simultaneous bias because of both FDI/GDP components. A positive linear correlation may emerge between FDI and GDP, not because FDI contributes to GDP. Therefore, to avoid double counting, the study will also use the ratio FDI/GDP ratio.

Trade openness and inflation are necessary macroeconomic conditions that influence the FDI inflow in the country. HC represents Human capital stock, TCE represents Total Consumption Expenditure, TO represents Trade Openness, and INF represents Inflation. B_0 is a constant, representing the growth effect of FDI beyond a change in FDI volume, while $\beta_1 \ldots \beta_8$ are the coefficient of the independent variables, with independent ε as a stochastic error run that is independently and identically distributed.

Table 3.1 (3): Expected priori

Variable	**Expected sign**
Sectoral Foreign Direct Investment:	Positive (+)
Human capital:	Positive (+)
Gross Fixed Capital Formation:	Positive (+)
Total Consumption Expenditure:	Positive (+)
Trade Openness:	Positive (+)
Inflation:	Negative (-)

3.7. Estimation and analysis techniques

In this study, the researcher uses panel data regression techniques, which could be used with insufficient time-series data. In addition, these techniques' power testing properties procedures are better, relative to the standard time-series method (Barbieri, 2008), and help avoid endogeneity problems. The estimation procedure starts with the unit root test, a vector autoregressive model (VAR) for optimal lag selection, followed by the panel ADRL analysis.

3.8. Unit root test

The first step is to test whether variables are stationary, using Levin et al. (2002). A variable is stationary when it has a unit root. This assumes that individual units share the same AR(1)

coefficient in the panel while effectively allowing for individual and time as a time trend possibility and the dependent variable to lag for serial correlation in the errors (Bornhorst & Baum, 2006). However, the restricted coefficients are homogeneous across all units; therefore, in this study, LLC, IM, Pesaran, and Shin [IPS] (2003) are used as an alternative to removing the above limitation. LLC is used to avoid autoregressive coefficients in a homogeneity hypothesis and a misleading conclusion when imposed on the heterogeneous coefficient (Barrreira &Rodrigues, 2005)

3.9. Panel long-run relationship

Therefore, the next step is to apply panel data to estimate the long-run and short-run relationship among the variables. In this study, ARDL, developed by Pesaran and Shin (1995), is used to analyse the effect of FDI on economic growth. Firstly, ARDL could be used when variables are integrated into different orders, whether as endogenous-I(0), exogenous-I(1), or both combinations. Secondly, the approach performs better in small samples than the test statistics (Pesaran & Shin, 1995). Thirdly, one can derive the error-correcting model (ECM) from ARDL through a linear transformation. Another advantage is that the ECM model has short-run dynamics and long-run equilibrium (Shrestha et al., 2019).

The suitable estimator for panel ARDL includes the pooled mean group (PMG), mean group (MG), and dynamic fixed effect. The Hausman h-test will be used in this study to assist in choosing between Pooled Mean Group (PMG) and Mean Group (MG) estimators. The Hausman h-test assumes that the difference between MG and PMG is insignificant; the alternative hypothesis is that there is no significant difference between the PMG and the MG (Rafindadi, 2013). Therefore, as PMG and MG are not significantly different, PMG will be used in this study because it is more efficient, as heterogeneity is allowed only in the short run. In contrast, heterogeneity is permitted in the short and the long run in the mean group (Menegaki, 2019).

3.10. Summary

In this study, the researcher analyses the growth effects of *six sectors* of FDI, namely *agriculture*, *mining*, *manufacturing*, *construction*, *finance*, and *transport* sector FDI in South Africa. The endogenous growth model suggests that the market size, human capital, country stability, trade, government expenditure, and gross fixed capital formation are important factors

that influence FDI. The researcher employs autoregressive distributed lag models to define the impact of all sectoral FDI on economic growth. The results from the analysis are discussed in the following chapter.

CHAPTER FOUR

DISCUSSION OF THE RESEARCH FINDINGS

4.1. Introduction

In this chapter, the researcher presents the data analysis and the empirical findings to assess the impact of sector-level FDI on economic growth. Econometric models are used to re-examine the impact of sector FDI on economic growth for the period 1993 to 2019. The researcher seeks to answer the following hypothesis:

- *Hypothesis 1*
  H_0: FDI in the agricultural sector has no impact on economic growth in South Africa
  H_1: FDI in the agricultural sector has an impact on economic growth in South Africa
- *Hypothesis 2*
  H_0: FDI in the manufacturing sector has no impact on economic growth in South Africa
  H_1: FDI in the manufacturing sector has an impact on economic growth in South Africa
- *Hypothesis 3*
  H_0: FDI in the mining sector has no impact on economic growth in South Africa.
  H_1: FDI in the mining sector has an impact on economic growth in South Africa
- *Hypothesis 4*
  H_0: FDI in the construction sector has no impact on economic growth in South Africa.
  H_1: FDI in the construction sector has an impact on economic growth in South Africa
- *Hypothesis 5*
  H_0: FDI in the finance sector has no impact on economic growth in South Africa.
  H_1: FDI in the finance sector has an impact on economic growth in South Africa
- *Hypothesis 6*
  H_0: FDI in the transport sector has no impact on economic growth in South Africa.
  H_1: FDI in the transport sector has an impact on economic growth in South Africa

In the first section, the researcher presents the results of descriptive statistics, Pearson's pairwise, to understand the characteristics of the data. In the second section, the researcher presents the stationarity results using both the graphical and formal unit root methods.

After confirming that the data was stationary at the first difference, the researcher employs VAR lag length selection criteria to define the optimal lag length. Results of panel ADRL follow this.

4.2. Descriptive Statistics

In this section, descriptive statistics are presented across all panels, as well as per sector.

4.2.1. Descriptive statistics for the group

The researcher uses descriptive statistics to understand the characteristic of each variable across each unit (Keller, 2017). The results of the descriptive statistics for each variable, pooled across all units, are summarised in Table 4.1 (4). The results reveal the series' name, the sample, and the number of observations at the top of the static tendencies, maximum and minimum values, standard deviation, and skewness.

Table 4.1 (4): Descriptive statistics for the group (4)

	NGDP	GFCF	HC	INF	SFDI	TCE	TO
Mean	2.675856	18.17054	58.53962	5.830429	59.92334	81.54295	55.85037
Median	2.824538	18.04345	58.74000	5.712924	17.26434	82.07776	56.98144
Maximum	5.603806	23.51128	60.13000	10.05528	478.9314	83.42088	72.86539
Minimum	-1.538089	15.17554	55.80000	-0.692030	0.040037	78.76935	40.76895
Std. Dev.	1.677314	2.137999	1.126368	2.309245	102.3707	1.441763	7.364380
Skewness	-0.313274	0.454980	-0.962961	-0.496547	2.063435	-0.478473	-0.073435
Kurtosis	2.934407	2.572513	3.335009	3.848904	6.094970	1.721455	2.643647
Jarque-Bera	2.579627	6.570016	24.83912	11.09469	172.9643	16.57775	0.965630
Probability	0.275322	0.037440	0.000004	0.003898	0.000000	0.000251	0.617044
Sum	417.4335	2834.604	9132.180	909.5470	9348.041	12720.70	8712.658
Sum Sq. Dev.	436.0743	708.5114	196.6494	826.5552	1624361.	322.1954	8406.284
Observations	156	156	156	156	156	156	156

Source: Researcher's estimates from research data

Table 4.1 (4) shows that the was a recession. This recession coincided with the 2007 to 2008 Global Financial Crisis, implying that, at some stage, the economy went into recession. Rena and Msoni (2014) mention that South Africa's economy was in recession for the first time in 19 years. The country has economic growth rate has a maximum of 5.603806, with an average of 2.675856 for the period 1993 to 2019.

Gross fixed capital formation measured by foreign domestic investment has a minimum of 15.16560, a maximum of 23.51128, and an average of 18.1705. However, on average, FDI/GDP (59.92334) was higher than domestic investment (18.17054). This confirms that South Africa has a comparatively low level of domestic investment; therefore, the country needs FDI to close the revenue gap. However, the standard deviation of the FDI/GDP was higher than the mean, which implies that the FDI is volatile. Given that most of the FDI is in the financial sector, this poses an economic risk for the country. Because in the event of economic uncertainty, investors could promptly move the funds out of the country.

During the same period, the inflation rate was a minimum of (0.692030,) a maximum of 10.05528, and an average of 5.883049. An average inflation rate of 5% indicates that South Africa has stable macroeconomic stability. The standard deviations for all other variables were less than the means, reflecting a small coefficient of variation. The data had 156 observations; therefore, it was balanced across all the variables. As indicated by the values of Jarque-Bera, which were greater than 0.05, it could be concluded that the data were normally distributed.

4.2.2. Sector descriptive analysis

In this section, the researcher presents the results of each sector's descriptive statistics. Tables 15 to 17 in Annexure A illustrate 26 observations, with significant differences between the maximum and minimum, suggesting a variation in FDI per sector. In line with the above results, a considerable portion of the FDI was allocated to the mining, finance, transport, and manufacturing sectors. The lower minimum and maximum in the construction and agricultural sectors suggest that a fraction of the FDI was directed into these sectors, which failed to attract much-needed FDI. It could also be observed that mining had attracted a large amount of FDI in the country, with a maximum and average of 244. 489 and 487.931, respectively.

The standard deviation of the mining, manufacturing, construction, and agricultural sectors' FDI were lower than the mean, which implies that the FDI in these sectors were less volatile. On the other hand, the standard deviation for the transport and finance sectors' FDI were greater than the means, reflecting a larger coefficient of variation, which indicates that the FDI has been volatile and may lead to uncertainty in those sectors. A larger mean suggests that the effect of the FDI on economic growth may be substantial. The greater data variation indicates that the panel estimation technique was more appropriate for this study.

4.3. Correlation Analysis

The researcher employed the Pearson correlation coefficient to analyse the strength of the linear relationship in the data (Keller, 2017). The correlation coefficient is judged when it is between [-1 through 0 to 1]. Therefore, when the correlation coefficient equals positive 1, a linear relationship exists between the variables. When the correlation coefficient is negative 1, a negative linear relationship exists between the variables. A zero-correlation coefficient indicates a linear relationship between the two variables, or they are uncorrelated (Keller, 2017; Sedgwick, 2012; Zhu, You, & Liu, 2019). The rule of thumb for inferring the size of a correlation is illustrated in Table 4.2 (5).

Table 4.2 (5): Rule of thumb for inferring the size of a correlation

Size of correlation positive or negative	Interpretation
0.90 to 1.00	Very high correlation
0.70 to 1.89	High correlation
0.50 to 0.69	Moderate correlation
0.30 to 0.49	Low correlation
0.00 to 0.29	negligible Little / if any correlation

Source: Asuero et al. (2006)

4.3.1. Correlation coefficient across panels.

The correlation coefficients, pooled across panels, are presented in Table 4.3 (6). The result also reveals a weak and moderate relationship between GDP growth and other explanatory variables.

Table 4.3 (6): Correlation coefficient across panels

	NGDP	SFDI	GFCF	TO	TCE	INF	HC
NGDP	1						
SFDI	-0,01835	1					
GFCF	-0,28906	0,100616	1				
TO	-0,09269	0,131259	0,760799	1			
TCE	-0,47168	0,006763	-0,07463	-0,1203	1		
INF	-0,21166	-0,07178	0,08466	-0,04306	0,051034	1	
HC	-0,07211	-0,05436	-0,28005	-0,24018	0,22647	0,153375	1

Source: Researcher's estimates from research data

The correlation matrix findings reveal a negligible if any, negative correlation between GDP growth in South Africa, sectorial foreign direct investment, inflation, human capital, and T0. A negligible positive correlation between sectoral GDP, trade openness, human capital, and gross capital fixed formation (Investment) could be observed, in line with the endogenous theory (Romer, 1994). In addition, the data above indicate negligible to moderate coefficients of correlations. Therefore, it is unlikely that this study will encounter multicollinearity.

4.3.2. Sectoral correlation coefficient analysis

The correlation between sector-level FDI, as a share of the sector GDP, and the overall economic growth is illustrated in Table 4.4 (7).

Table 4.4 (7): Sectoral correlation coefficient analysis FDI/GDP and GDP Growth

Sector	NGDP
Agriculture	0.322
Construction	(0.0878)
Finance	(0.02877)
Manufacturing	(0.2890)
Mining	0.0.0044
Transport	(0.1044)

Source: Researcher's estimates from research data

The correlation coefficient of the construction, finance, manufacturing, and transport sectors and GDP growth reveals a low or slight negative relationship between GDP growth and FDI in those sectors. In contrast, agriculture and mining FDI have a positive and negligible relationship with GDP growth. In contrast, finance and mining FDI have a positive and negligible relationship with GDP growth.

In the following section, the researcher presents the findings from the stationarity tests performed using both graphical and unit root testing. Tables 16 to 19 in Annexure A presents the correlation coefficients of each panel or sector.

4.4. Panel Unit Root Test

One of the prerequisites for the ARDL model variables integrated of order zero - I (0) [variables that are stationary without any differencing] and order one - I (1) [variables that are stationary after being defenced once] (Bornhorst & Baum, 2006). In this study, the researcher used panel unit root tests instead of the standard unit root test of the time series because the difference between the data series a large amount of information over time, which may result in more parameter estimators (Taylor & Sarno, 1998). The study employed Levin, Lin, and Chu (2002) and Im, Pesaran, and Shin (2003) to define whether the data should be regressed at first differenced or at the level. Stationarity tests were made at a level and first difference. The stationarity of the series was tested using various tests, and in this study, LLC (2002) and IPS

(2003) were used. The null hypothesis of the test is that the panels contain unit roots. Lags were auto-selected, using the Akaike Information Criteria (AIC), with maximum lags set at 2, owing to limited observations. In this study, the researcher employed formal and informal stationarity tests involving the graphical analysis, the Levin-Lin-Chu unit-root test, and the Im-Pesaran-Shin unit-root test. The formal tests are conducted in the following section/s, where unit root tests are conducted through Levin-Lin-Chu unit-root test and Im-Pesaran-Shin unit-root test.

Tables 4.5 (8) and 4.6 (9) present the unit root test results.

Table 4.5 (8): Stationarity test at level series

Variable	Model	Levin-Lin-Chu unit-root test	Im-Pesaran-Shin unit-root test
NGDP	Individual Intercept and Trend Individual Intercept None	-6.51107*** -4.14892*** -3.50601***	-2.03810** -2.30849**
GFCF	Individual Intercept and Trend Individual Intercept None	1.01222 -1.47902* -0.01363	-0.44838 -1.50172*
HC	Individual Intercept and Trend Individual Intercept None	1.02561 -0.62281 0.29810	1.06855 -1.53093*
INF	Individual Intercept and Trend Individual Intercept None	-5.91791*** -6.44440*** -3.31777***	-4.60290*** -5.44228***
LSFDI	Individual Intercept and Trend Individual Intercept None	-0.42269 -2.54110*** 3.53163	-0.27490 -0.93028
TCE	Individual Intercept and Trend Individual Intercept None	0.97072 0.65670 0.34661	0.97072 0.65670

TO	Individual Intercept and Trend Individual Intercept None	-2.70826*** -3.63834*** 1.32443	-1.35301* -2.04610**

Source: Researcher's estimates from research data

Table 4.6 (9): Stationarity test first Difference

Variable	Model	Levin-Lin-Chu unit-root test	Im-Pesaran-Shin unit-root test
LNGDP	Individual Intercept and Trend Individual Intercept None	-7.55619*** -8.94364*** -12.0765***	-7.37000*** -8.76033***
GFCF	Individual Intercept and Trend Individual Intercept None	-3.44107*** -4.82370*** -8.06392***	-2.87998*** -4.47883***
HC	Individual Intercept and Trend Individual Intercept None	-2.20024*** -3.22389*** -6.81140***	-2.17581** -3.17471***
INF	Individual Intercept and Trend Individual Intercept None	-8.69231*** -10.3049*** -12.0435***	-7.24376*** -8.82520***
LSFDI	Individual Intercept and Trend Individual Intercept None	-1.41922* -3.41161*** -8.89866***	-6.76182*** -7.56762***
TCE	Individual Intercept and Trend Individual Intercept None	-5.09824*** -6.20629*** -9.13893***	-4.21742*** -5.67846***
TO	Individual Intercept and Trend Individual Intercept None	-4.25065*** -5.82871*** -9.83546***	-5.58318*** -6.69867***

Source: Researcher's estimates from research data

Stationary at 1 % ***, Stationary at 5%**, Stationary at or non-stationary 10%*

The results are both I(0) and I(1) variables are presented in Tables 4.5 (8) and 4.6 (9) , making the ARDL model applicable to this study. The results for non-differenced data, where the following variables were found to be I(0) variables that were stationary at a 1% level of significance: GDP (LNGDP), inflation rate (infl), total consumption expenditure (TCE), gross fixed capital formation (GFCF), and openness of the economy (TO). The following were found to be I(1) variables at a 1% level of significance: Human Capital (HC) and total consumption expenditure (TCE).

Stationarity was examined for the variables at level series. The data graphs in Figure 4 of Annexure B reveal how stationary the data are, that is, how the data is trending around its mean at level series and first difference. When the graph crosses the mean or average value multiple times, the variable is most likely stationary. If this does not occur, it will indicate that the data are trending more persistently. The graphical plots of the data in Annexure B indicate that the variables of the study have some evidence of non-stationarity since they are trending more.
Figure 5 in Annexure B contains graphical presentations of all the differenced variables fluctuating around the mean; therefore, they are considered stationary and integrated at level series. However, definitive conclusions cannot be obtained from graphical interpretations only since they are regarded as informal tests.

4.5. VAR Lag order selection criteria

Following the unit root test results, indicating that Panel ARDL could fit the data, a VAR test was conducted to investigate a long-run equilibrium among the panels and variables. The choice of the correct lag length is a very important aspect of the ARDL cointegration method. To avoid selecting a higher order lag length than the true lag length, as this could cause the VAR's mean-square forecast errors to increase and underestimate the lag length, which could lead to autocorrelated errors (Lutkepohl, 2009).

In Table 4.7 (10), the information criteria are presented, namely, the Akaike Information Criteria (AIC), the Schwarz Information Criterion (SIC), the Hannan-Quinn Information Criterion (HQI), the Final Prediction Error (FPE), and the Likelihood Ratio Test (LR). In addition, the Var Lag Order Selection Criteria are indicated.

Table 4.7 (10): VAR Lag order selection criteria

VAR Lag Order Selection Criteria						
Endogenous variables: NGDP GFCF HC INF DUMMY SFDI TCE TO						
Exogenous variables: C						
Date: 01/26/23 Time: 10:45						
Sample: 1994 2019						
Included observations: 150						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-2693.581	NA	608082.5	36.02108	36.18165	36.08631
1	-1727.473	1816.283*	3.636829*	23.99297*	25.43808*	24.58007*
* 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						

Source: Researcher's estimates from research data

Given the number of observations, the optimum lag is lag one. The system chose AIC, indicating that there might have been one major selection based on the lowest AIC value. Akaike Information Criterion (AIC) measures the quality of each model relative to other models and provides a means for model selection (Mabitle ,2013).

4.6. Hausman test (1978)

A Hausman (1978) test was conducted to choose the appropriate estimation method between the Pooled Group Mean and the Mean Group. Based on the probability of 0.9928 instances, the null hypothesis is that PMG is better than MG. The test results are presented in **Error! Reference source not found. 4.8**(11)

Table 4.8 (11): Hausman (1978) test

Coefficients				
	(b) **mg1**	**(B)** **pmg1**	**(b-B)** **Difference**	**sqrt(diag(V_b-V_B))** **S.E.**
SFDI	**.3036601**	**.0002885**	**.3033715**	**1.542677**
GFCF	**-.0398984**	**-.1013402**	**.0614417**	**.2065431**
TO	**-.1546462**	**-.0953452**	**-.059301**	**.0823035**
TCE	**-1.056455**	**-.7394929**	**-.3169621**	**.4907935**
INF	**-.3650492**	**-.1857744**	**-.1792748**	**.2325557**
HC	**-.1257099**	**-.2097509**	**.084041**	**.3797571**
z	**1.132072**	**1.24488**	**-.1128075**	**3.145974**

b = consistent under Ho and Ha; obtained from xtpmg

B = inconsistent under Ha, efficient under Ho; obtained from xtpmg

Test: Ho: difference in coefficients not systematic

chi2(**7**) = (b-B)'[(V_b-V_B)^(-1)](b-B) = **1.11**

Prob>chi2 = **0.9928**

4.7. Regression analysis

The section presents an empirical analysis of the growth effects of FDI in the agricultural, construction, finance, manufacturing, mining and transport sectors. A panel, ARDL ECT model, was estimated using the Pooled Mean Group (PMG) approach, as it allows the retrieval of the sector-specific ECT and short-run equations. **Table 11** in Annexure C shows the two estimated models' long-run and short-run components.

4.7.1. Long-run results of FDI growth impact

The panel ARDL results were estimated from the best model, ARDL (1, 1, 1, 1, 1, 1, 1, 1, 1), selected based on the Alkaike info criterion (AIC). The findings on the long-run impact of FDI on economic growth in South Africa are presented in Table 4.9 (12).

Table 4.9 (12): ARDL Panel long run results

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.***

Long-run Equation				
SFDI	0.000289	0.001210	0.238503	0.8120
GFCF	-0.101340	0.046074	-2.199507	0.0303
HC	-0.209751	0.058966	-3.557152	0.0006
TCE	-0.739493	0.086813	-8.518212	0.0000
TO	-0.095345	0.015517	-6.144386	0.0000
INF	-0.185774	0.036728	-5.058066	0.0000
DUMMY	1.244880	0.734108	1.695773	0.0932

Source: Researcher's estimates from research data

The researcher observed a weak positive, yet statically insignificant, relationship between sectors' FDI and economic growth. These findings are substantiated by Manete (2018), Alfaro (2003) and Suleiman et al. (2013), who found that investment in sectors positively impacts economic growth. In addition, the researcher observed that inflation has a statistically significant negative relationship with GDP in the long run, which findings are confirmed by Mamo (2012). However, contrary to these findings, Andres and Hernando (1997) observed that the inflation rate has no significant negative impact on growth.

The long-run analysis also revealed that human capital development has a negative impact on economic growth. These findings contradict the theory and the findings of Magoti et al. (2020), who observed that human capital positively and significantly influences total output and economic growth. As an economic injection, foreign direct investment was observed to have no statistically significant relationship with economic growth. Lastly, the findings confirmed a statistically significant relationship between trade openness and economic growth, in contrast to Moolman et al. (2006).

The study findings revealed that the GFCF was negative, though insignificant, which could mean that most efficiency benefits are imported rather than internally attained. With further increased importation of critical components within these sectors, GFCF could be relatively too low for a much-needed shift in growth due to technological change. In fact, several studies highlight this issue; South African industries respond to

global technological change but lag extensively (Deonarian, 2019; Harding & Rattsø, 2009). Therefore, for sectoral FDI and GCF to be significant in runs of growth across sectors, there in a need for increased focus on localised innovation, which is in line with the progress at the global level, would be important.

4.7.2. Sector-Related ECT and Short-run equation

While estimating the pooled group mean model in Table 4.10 (13)**Error! Reference source not found.**, the PMG method simultaneously estimates sector or panel-specific ECT and short-run equations. Such equations are critical to this paper to answer the research questions. The retrieved short-run cross-section coefficients are presented in Table 4.11 (14). GDP is the dependent variable. The ECTs are statistically significant, and all are negative, as expected, indicating that the models converge. In all these sectors, almost all distortion from the long-run equilibrium clears up in one period, in this case, one year.

Table 4.10 (13): Short-run analysis (13)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Short-run Equation				
COINTEQ01	-0.979005	0.016188	-60.47620	0.0000
D(SFDI)	-0.220362	0.170740	-1.290626	0.2000
D(GFCF)	-0.046492	0.018085	-2.570768	0.0117
D(HC)	0.691544	0.028327	24.41251	0.0000
D(TCE)	0.319653	0.028045	11.39774	0.0000
D(TO)	0.197655	0.006437	30.70837	0.0000
D(INF)	0.101424	0.017584	5.767949	0.0000
D(DUMMY)	0.036261	0.081336	0.445819	0.6567
C	81.51067	1.351754	60.29995	0.0000
Mean dependent var	-0.115862	S.D. dependent var		1.731406

S.E. of regression	0.664236	Akaike info criterion	2.281212
Sum squared resid	41.91489	Schwarz criterion	3.473784
Log likelihood	-116.9345	Hannan-Quinn criteria.	2.765583

Source: Researcher's estimates from research data

The ECT, lies within the acceptable range and has the correct sign (negative) as per *a priori* in the short-run equation. This indicates that the model converges to its long-run equilibrium path in the event of a shock. The coefficient of the error term of (0.979005) implies that approximately more than 97 per cent distortion from the long-run equilibrium clears up in one period, in this case, one year.

Table 4.10(13) shows that there is a positive but insignificant short-run relationship between economic growth and sector foreign domestic investment. Human Capital positively affects economic growth, which aligns with the endogenous growth model. GFCF is negative and at a ten significant level. On the other hand, macroeconomic variables, namely, inflation, trade openness, and government expenditure, which are used as a proxy for stability, are all statistically significant and have a positive effect on economic growth.

4.7.3. Cross-section short-run coefficients

In this section, the researcher seeks to answer the questions and the hypotheses proposed above, to explore whether sectorial FDI does affect the national GDP growth rate. The findings from Cross Section Short-run Coefficients are presented in Table 4.11 (14).

Table 4.11 (14): Summary of cross-section short-run coefficients (14)

Sectors	Variable	Coefficient	Std. Error	t-Statistic	Prob. *
Sector 1	COINTEQ01	-0.981697	0.015472	-63.44851	0.0000
	D(SFDI)	-1.037603	0.147320	-7.043217	0.0059

Sector 2	COINTEQ01	-1.042379	0.021685	-48.06934	0.0000
	D(SFDI)	-0.298685	0.068730	-4.345755	0.0225
Sector 3	COINTEQ01	-0.967125	0.019154	-50.49172	0.0000
	D(SFDI)	0.002233	3.68E-06	606.1658	0.0000
Sector 4	COINTEQ01	-0.987454	0.018598	-53.09382	0.0000
	D(SFDI)	0.008363	6.94E-05	120.4159	0.0000
Sector 5	COINTEQ01	-0.976532	0.020366	-47.94980	0.0000
	D(SFDI)	-6.14E-05	1.60E-06	-38.28999	0.0000
Sector 6	COINTEQ01	-0.918842	0.020648	-44.50129	0.0000
	D(SFDI)	0.003584	8.03E-06	446.2178	0.0000

Source: Researcher's estimates from research data

4.7.3.1. Sector 1: Agriculture, Fishery and Forestry

The study findings revealed no statistically significant relationship between foreign direct investment in the agricultural sector and economic growth. The negative effect of agricultural FDI on economic growth aligns with Alfaro's (2003) and Miteski and Stefanova (2017) findings. The reason behind this phenomenon could be due to the extremely low account for SFDI in Agriculture. The sector receives less FDI than other sectors and depends heavily on exports, local demand, and human capital as sources of growth. The negative growth effect of agricultural sector FDI is not surprising. Hirschman (1958) avers that agriculture has a weak linkage. Therefore, the absence of linkages would mean that FDI in those sectors has a limited effect on economic growth. Essentially, the FDI impact in the primary sector is expected to be inconsistently positive (Aykut & Sayek, 2007).

4.7.3.2. Sector 2: Manufacturing

The study findings revealed a statistically negative and significant relationship between foreign direct investment in manufacturing and economic growth. In line with the research of Makhwembere (2014) and Kolisi (2021), who assessed how manufacturing FDI could influence economic growth. In contrast, Alfaro (2003) observed a positive relationship between the manufacturing sector FDI and economic growth. The endogenous theory assumes that FDI creates technological and knowledge transfer and market access. This should be more relevant to the

manufacturing sector FDI (Alfaro, 2003). However, this is not the case in South Africa. Madonsela et al. (2014) observed that the manufacturing sector could not identify and integrate the ideal technologies into business due to the technical shortage and the limited use of ICT. According to the World Bank (2018), the country's manufacturing sector remains relatively uncompetitive globally.

4.7.3.3. Sector 3: Mining and quarrying

The findings revealed a statistically positive and significant relationship between foreign direct investment in the mining sector and economic growth. This aligns with Phuyal & Sanuwar (2017) and Gochero and Boopen (2020) finding, who observed a positive relationship between FDI and economic growth in the long run. In contrast, Khaliq & Noy (2007) observed a negative and statistically significant relationship between FDI in mining and economic growth. These results are expected in South Africa's absorptive capacity is well developed. Ghebrihiwet (2019) found that mining companies are more likely to introduce a product or process innovation in South Africa due to cooperative research and development with international suppliers and customers. Because the technological externalities are internalised, ultimately, this improves the performance of the local mining companies.

4.7.3.4. Sector 4: Construction

The study findings revealed a positive and significant relationship between FDI in the construction sector and economic growth. This aligns with Makhwembere (2014) and Khaliq & Noy (2007), who observed that construction sector FDI leads to output growth benefits. These results are expected given that (Ikuabe et al., 2022) found that FDI inflows in the South African construction sector have technological and knowledge spillover effects due to the joint ventures between the local and multinational countries.

4.7.3.5. Sector 5: Financial services and Insurance, real estate and business services

Theoretically, the FDI in finance is known to have a strong forward linkage, which could lead to an efficient and stable banking system through increased competition

and access to global financial markets (Aykut & Sayek, 2007). The findings revealed a negative and statistically significant relationship between FDI in the finance sector and economic growth. This implies that FDI in this sector does not generate the benefits of adopting new technology, skills transfer, or better management. Makhwembere (2014) and Alfaro (2003) observed the growth effect of the financial sector to be neutral. According to Sunde (2017), the potential benefits of financial sector FDI appear to be limited in the South African economy, even though South Africa's absorptive capacity is well-developed relative to other SADC countries. These results are unexpected, given that South Africa has the strongest financial sector, which has adopted global financial standards (World Bank, 2018).

4.7.3.6. Sector 6: Transport, storage and communication services

Theoretical investment in transport infrastructure is expected to, directly and indirectly, affect the economic growth rate. Transport plays a dominant role in South Africa, and how it connects to logistics and delivery services has become increasingly important in South Africa. The study findings revealed a positive and statistically significant relationship between FDI in the transport sector and economic growth. The findings support Makwembere (2014) and Saidi et al. (2020), which found a dynamic and positive linkage between transport, logistics, FDI, and economic growth.

4.8. Conclusion

In this study, the researcher analysed the impact of sector-level FDI and economic growth. The panel ARDL results revealed a positive and statistically significant relationship between sectoral FDI/GDP ratio and economic growth. From short-run cross-section coefficients, it was observed that only FDI in the mining, transport and construction sectors positively affected economic growth. On the other hand, the FDI in agriculture, manufacturing, and finance negatively affected economic growth.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1. Introduction

In this chapter, the researcher summarises the study's main findings and conclusion from Chapter 4. In addition, the researcher summarises the previous chapters that were discussed. Subsequently, the researcher discusses recommendations to the stakeholders mentioned in chapter 1 regarding whether sectoral FDI affects economic growth in South Africa. Finally, in this chapter, the researcher recommends avenues for future research.

5.2. Conclusion

As indicated above, FDI is crucial for wealth-creating economic growth. Conceptually, FDI could bridge the investment gap and raise much-needed revenue for South Africa's financial requirements. However, empirical evidence has proven that the FDI-growth effect differs by sector. The study findings revealed that sectoral FDI's effect on national GDP growth is positive, as well as insignificant in the short- and long-run. The neutrality suggests that the effect of FDI is not significant enough to impact economic growth or does not have strong forward and backward linkages. According to Jyun-Yi Hsu & Chih-Chiang (2008), an exogenous increase in the low level of DFI would temporarily raise the capital quantity and per capita GDP because growth will be limited by diminishing returns in the long run.

In addition, the research findings revealed that Gross fixed capital formation GFCF is significant, with an unexpected negative sign in the short- and long run. This suggests that GFCF could relatively be too low for a much-needed shift in growth, due to technological change. Human capital development has a negative impact on economic growth.

The PMG sector result or short-run equations revealed that the FDI variable coefficient is statistically significant at a 5% level in all sectors. The error correction term, ECT, in the short-run equation, lies within the acceptable range and has the correct sign (negative) as per *a priori*, which indicates that the model converges to its long-run equilibrium path in the event of a shock. The study findings also revealed that FDI inflows into the construction, mining and transport sectors have a significant positive relationship with economic growth. While the FDI

in the agriculture, finance, and manufacturing sectors have a significant and negative relationship with economic growth, which implies technological and knowledge spill over effects are relevant in these sectors.

This study aimed to investigate the impact of all sector-level FDI on economic growth for the past 30 years. However, the study faced data limitations, as some macroeconomic variables are reported annually instead of quarterly. As a result, this has also affected the sample size. Despite data limitations, the results are vigorous to include other growth determinants, such as inflation, financial development, government expenditure, and human capital. Interestingly, the study also revealed that domestic investment in finance, transport, mining, and construction negatively impacts economic growth. The FDI effect in mining is more positively impactful than in other sectors.

5.3. Recommendations

This study's findings confirm that the impact of FDI on economic growth is not equal and beneficial to South Africa. Although some sectors positively affect growth, the effect is weak and minute. Therefore, South Africa needs to implement additional reforms that will decrease the bureaucracy of registering a business by creating a one-stop shop that will enable an investor to register the business, apply for a permit, register for tax, and apply for the provision of essential services, such as water and electricity. This will increase the volume of FDI inflows in the country. In order to correct the negative impact of manufacturing FDI, South Africa needs to improve their technical skills, invest in new technology, and strengthen research and development. In addition, the country must be integrated into global and regional value chains to be competitive. Further, for sectoral FDI and GCF to be significant in the long runs to stimulate growth across sectors. Therefore an increase in focus on localised innovation, which is in line with the progress at the global level, would be important.

South Africa should also attract more FDI in the communication sector as FDI in this sector is essential to facilitate the adoption of digital technologies. The benefits will trickle down to manufacturing sectors. This finding also suggests that the sector matter. South Africa should continue to choose appropriate sector composition and implement the FDI-inducing policies targeted at the mining, construction, transport, storage and communication sectors. However, this does not imply that the country should not target FDI in financial, manufacturing, and

agriculture. Because manufacturing is one of the most important sectors for creating a forward and backward linkages. The country should just implement measures to mitigate the risk of attracting FDI in the financial and agricultural sectors.

5.4. Future Research

In this study, the researcher has decomposed FDI at the sector level to identify which sectoral FDI could enhance economic growth and employment in South Africa. However, the same research is warranted for a more extended period to exploit the sectoral FDI trend over a protracted period. Additionally, new research should define whether FDI in the agriculture, manufacturing and finance sector is crowding out the local industry.

REFERENCES

Aisen, A., & Veiga, F. J. (2011). How does political instability affect economic growth? IMF Working Paper 11/12. Washington, DC., USA: International Monetary Fund [IMF]. https://doi.org/10.5089/9781455211906.001

Acquah, A. M., & Ibrahim, M. (2020). Foreign direct investment, economic growth and financial sector development in Africa. *Journal of Sustainable Finance and Investment*, *10*(4), 315–334. https://doi.org/10.1080/20430795.2019.1683504

Alfaro, L. (2003). *Foreign Direct Investment and Growth: Does the sector matter?* Working paper. Boston, MA., USA: Harvard Business School. https://www.researchgate.net/publication/228966060_Foreign_Direct_Investment_and_Growth_does_the_sector_matter.

Ali, G. (2017). Gross Fixed Capital Formation and economic growth of Pakistan. *Impact Journals*, *1*(2), 25–34.

Ahmed, K. T., Ghani, G. M., Mohamad, N., & Derus, A. M. (2015). Does inward FDI crowd-out domestic investment? Evidence from Uganda. *Procedia - Social and Behavioral Sciences*, *172*, 419–426. https://doi.org/10.1016/j.sbspro.2015.01.395

Aisen, A., & Veiga, F. J. (2011). How Does Political Instability Affect Economic Growth? *IMF Working Papers*, *11*(12), 1. https://doi.org/10.5089/9781455211906.001

Andres, J., & Hernando, I. (1997). *Does inflation harm economic growth? Evidence for the OECD*. NBER Working Paper 6062. Cambridge, MA., USA: National Bureau of Economic Research. https://doi.org/10.3386/w6062

Appiah, M., Li, F., & Korankye, B. (2019). Foreign investment & growth in emerging economies: panel ARDL analysis. *Journal of Economics, Business, & Accountancy Ventura*, *22*(2), 274-282. http://dx.doi.org/10.14414/jebav.v22i2.1819

Arezki, R., Deininger, K., & Selod, H. (2015). What drives the global "land rush"? *World Bank Economic Review*, *29*(2), 207–233. https://doi.org/10.1093/wber/lht034

Arvanitis, A. (2005). Chapter 5: Foreign Direct Investment in South Africa: Why has it been so low? In M. Nowak & A. Ricci (Eds.), *Post-Apartheid South Africa: The first ten years* (pp. 64–75). Washington, DC., USA: International Monetary Fund.

Asuero, A. G., Sayago, A., & González, A. G. (2006, January). The correlation coefficient: An overview. *Critical Reviews in Analytical Chemistry*, 36, 41–59. https://doi.org/ 10.1080/10408340500526766

Awolusi, O. D., & Adeyeye, O. P. (2016). Impact of foreign direct investment on economic growth in Africa. *Problems and Perspectives in Management*, *14*(2), 289–297. https://doi.org/10.21511/ppm.14(2-2).2016.04

Aykut, D., & Sayek, S. (2007). Chapter 3: The role of the sectoral composition of Foreign Direct Investment on growth. In L. Piscitello & G. D. Santangelo (Eds.), *Do multinationals feed local development and growth?* (pp. 35–59). Oxford, England, United Kingdom: Elsevier Ltd.

Barbieri, L. (2008). Panel Cointergration Tests . A Survey. *Rivista Internazionale di Scienze Social, 116*(1), 3-36. http://www.jstor.org/stable/41625199.

Barreira, A., & Rodrigues, P. (2005). Unit root tests for panel data: a survey and an application. In *Estudos II* (pp. 665–689). Faro, Algarve, Portugal: Faculdade de Economia da Universidade do Algarve/Faculty of Economics of the University of Algarve

Barro, R. J. (2001). Chapter 35: Inflation and growth. In J. Rabin & G. L. Stevens (Eds.), *Handbook of Monetary Policy* (1st ed., pp. 423–442). New York, NY., USA: Routledge. https://doi.org/10.4324/9780429270949

Barro, R. J., & Sala-i-Martin, X. (2004). *Economic growth* (2nd ed.). Cambridge, MA., USA: The MIT Press.

Bekmurodova, G. (2020). Theoretical features of FDI (Foreign Direct Investment) and its influence to economic growth. *International Journal of Management Science and Business Administration*, *6*(2), 33–39. https://doi.org/10.18775/ijmsba.1849-5664-5419.2014.62.1004

Blomstrom, M., & Kokko, A. (1997). *How foreign investment affects host countries. Policy Research Working Paper 1745.* Washington, DC., USA: World Bank. https://doi.org/10.1596/1813-9450-1745

Borensztein, E., De Gregorio, J., & Lee, J. W. (1998). How does foreign direct investment affect economic growth? *Journal of International Economics*, *45*(1), 115–135. https://doi.org/10.1016/S0022-1996(97)00033-0

Bornhorst, F., & Baum, C. F. (2006). *LEVINLIN: Stata module to perform Levin-Lin-Chu panel unit root test*. Statistical Software Components S419702. Chestnut Hill, MA., USA: Boston College Department of Economics, revised 24 Sep 2006.

Chaudhury, S., Nanda, N., & Tyagi, B. (2020). Impact of FDI on Economic Growth in South Asia: Does the nature of FDI matters? *Review of Market Integration*, *12*(1–2), 51–69. https://doi.org/10.1177/0974929220969679

Clark, H. R., & Bogran, A. (1999). Foreign Direct Investment in South Africa. *Denver Journal of International Law & Policy*, *27*(3), 337–358. https://digitalcommons.du.edu/cgi/viewcontent.cgi?article=1537&context=djilp.

Dar, A. A., Muhammad, H., Bhatti, A., & Muhammad, T. (2016). FDI and Economic Growth in Pakistan: A sector wise multivariate cointegration analysis. *The Pakistan Development Review*, 67-88. http://www.jstor.org/stable/44986476

Deonarain, B. (2019). *Technological change and sustainable mobility: An overview of global trends and South African developments.* Pretoria, Gauteng, South Africa: Trade & Industrial Policy Strategies (TIPS).

Ek, A. (2007). *The impact of FDI on economic growth. The case of China* [Bachelor's thesis,

The Jonkoping International Business School]. DiVA. http://urn.kb.se/resolve?urn=urn:nbn:se:hj:diva-1038 .

Frimpong, J. M., & Oteng-Abayie, E. F. (2006). *Bivariate Causality Analysis between FDI Inflows and Economic Growth in Ghana.* Munich Personal RePEc Archive (MPRA) Paper No. 351. https://mpra.ub.uni-muenchen.de/351/1/MPRA_paper_351.pdf.

Gallardo Pérez, H. J., Vergel Ortega, M., & Cordero Díaz, M. C. (2019). The economic growth model in developing economies. *Journal of Physics: Conference Series*, *1388*(1), 1–6. https://doi.org/10.1088/1742-6596/1388/1/012033

Gochero, P., & Boopen, S. (2020). The effect of mining foreign direct investment inflow on the economic growth of Zimbabwe. *Journal of Economic Structures*, *9*(1), 1–17. https://doi.org/10.1186/s40008-020-00230-4

Goldberg, L. (2007). Financial Sector FDI and Host Countries: New and Old Lessons. *Economic Policy Review, 13*(1), 1–17.

Goldberg, L. S., & Kolstad, C. D. (1995). Foreign Direct Investment, Exchange Rate Variability and Demand Uncertainty. International Economic Review, 36(4), 855–873. https://doi.org/10.2307/2527262

Gutiérrez, C. E. C., Souza, R. C., & de Carvalho Guillén, O. T. (2007). *Selection of Optimal Lag Length in Cointegrated Vars Models With Common Cyclical Features.* Working Paper Series 139. Brasilia, Brazil: Banco Centre do Brasil.

Häberli, C., & Smith, F. (2014). Food security and Agri-Foreign Direct Investment in weak states: Finding the governance gap to avoid "Land Grab." *Modern Law Review*, *77*(2), 189–222. https://doi.org/10.1111/1468-2230.12062

Harding, T., & Rattsø, J. (2009). *Industrial labor productivities and tariffs in South Africa Identification based on multilateral liberalization reform*. Discussion paper No. 585. Oslo, Norway: Statistics Norway, Research Department. Retrieved from http://www.ssb.nohttp://ideas.repec.org/s/ssb/dispap.html

Hausman. J. A. (1978). Specification tests in Econometrics. *The Econometrics Society, 46*(6), 1251-1271. https://doi.org/10.2307/1913827

Herzer, D. (2010). How does Foreign Direct Investment really affect developing countries growth? IAI Discussion Papers, No. 207. Göttingen, Germany: Ibero-America Institute for Economic Research (IAI), Georg-August-Universität Göttingen.

Hye, Q. M. A., & Lau, W. Y. (2015). Trade openness and economic growth: Empirical evidence from India. *Journal of Business Economics and Management, 16*(1), 188–205. https://doi.org/10.3846/16111699.2012.720587

Industrial Development Cooperation [IDC]. (2020, February 14). *Economic overview: Recent development in the global and South African economies*. Sandton, Johannesburg, Gauteng, South Africa: IDC, Department of Research and Information. https://www.idc.co.za/wp-content/uploads/2020/03/IDC-RI-publication-Economic-Overview-External-release-February-2020.pdf.

Im, K. S., Pesaran, M. H., & Shin, Y. (2003). Testing for unit roots in heterogeneous panels. *Journal of Econometrics, 115*(1), 53-74. https://doi.org/10.1016/S0304-4076(03)00092-7

Javorcik, B. (2004). Does Foreign Direct Investment increase the productivity of domestic firms? In search of spillovers through backward linkages. *The American Economic Review, 94*(3), 605-627. https://doi.org/10.1257/0002828041464605

Joshua, U., Adedoyin, F. F., & Sarkodie, S. A. (2020). Examining the external-factors-led growth hypothesis for the South African economy. *Heliyon, 6*(5), e04009. https://doi.org/10.1016/j.heliyon.2020.e04009

Joshua, U., Babatunde, D., & Sarkodie, S. A. (2021). Sustaining economic growth in sub-Saharan Africa: Do FDI inflows and external debt count? *Journal of Risk and Financial Management, 14*(4), 1–13. https://doi.org/10.3390/jrfm14040146

Keller. G. (2017). Statistics for Management and Economics (11th ed.). Boston, MA., USA: Cengage Learning.

Khaliq, A., & Noy, I. (2007). *Foreign Direct Investment and economic growth: Empirical evidence from sectoral data in Indonesia*. No 200726, Working Papers. Honolulu, Hawaii: University of Hawaii at Manoa, Department of Economics. https://www.economics.hawaii.edu/research/workingpapers/WP_07-26.pdf.

Khan, A. H., & Kim, Y.-H. (1999). *Foreign Direct Investment in Pakistan: Policy issues and operational implications*. EDRC Report Series No. 66. Manila Philippines: Asian Development Bank.

Khatoon, G. (2016). A study of the growth of Foreign Direct Investment in different sectors of Indian economy - A descriptive and analytical study. *International Journal of Business and Administration Research Review*, *1*(1), 58–67. https://www.researchgate.net/publication/315290158_.

Kolisi, N. (2021). *Manufacturing sector Foreign Direct Investment and economic growth in South Africa*. Southern Africa –Towards Inclusive Economic Development [SA-TIED] Working Paper #161, January 2021. Helsinki, Finland: United Nations University [UNU-WIDER].

Levin, A., Lin, C.-F., & Chu, C.-S. J. (2002). Unit root tests in panel data: asymptotic and finite-sample properties. *Journal of Econometrics*, 108(1), 1–24. https://doi.org/10.1016/S0304-4076(01)00098-7

Loeb, S., Dynarski, S., McFarland, D., Morris, P., Reardon, S., & Reber, S. (2017). Descriptive analysis in education: A guide for researchers. (NCEE 2017–4023). Washington, DC., USA: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance.

Lutkepohl. H. (2009). Chapter 8: Econometric analysis with Vector Autogressive model. In D. A. Belsey & E. J. Kontoghiorghes (Eds.), *Handbook of Computational Econometrics* (pp. 281-320). Hobboken, NJ., USA: Wiley.

Mabitle. M. (2013). *Dynamic linkages between monetary policy and the stock market: the case of South Africa* [Master's thesis, University of Fort Hare]. Seals.

http://vital.seals.ac.za:8080/vital/access/manager/PdfViewer/vital:11483/SOURCEPDF?viewPdfInternal=1

Mabule, B. (2012). *The determinants of Foreign Direct Investment on the South African economic growth* [Master's thesis, North-West University]. Boloka Institutional Repository. https://repository.nwu.ac.za/handle/10394/14963.

Madonsela, S. N., Mbecke, P., & Mbohwa, C. (2013). *Improving the South African manufacturing sector's competitiveness though the adequate use of ICT.* International Conference on Information Technology and Computer Systems Engineering (ITCSE '2013), Nov. 27-28, 2013, Johannesburg, Gauteng, South Africa). https://core.ac.uk/download/pdf/43603078.pdf.

Magoti, E., Mabula, S., & Ngong'ho, S. (2020). Triple Deficit Hypothesis: A Panel ARDL and DumitrescuHurlin Panel Causality for East African Countries. *African Journal of Economic Review*, *8*(1), 144–161. https://doi.org/10.22004/ag.econ.301055

Majavu, A. (2015). *The determinants of Foreign Direct Investment inflows in South Africa* [Master's thesis, The University of Fort Hare]. DSpace. http://libdspace.ufh.ac.za/handle/20.500.11837/961

Makwembere, S. (2014). *The impact of sector Foreign Direct Investment on economic growth in developing countries* [MBA dissertation, Gordon Institute of Business Science (GIBS), University of Pretoria]. UPSpace. https://repository.up.ac.za/handle/2263/43985?show=full.

Mamo, F. T. (2012). *Economic Growth and Inflation A panel data analysis* [Master's thesis, Södertörns University]. DIVA portal. https://www.diva-portal.org/smash/get/diva2:576024/FULLTEXT01.pdf.

Manete, T. K. (2018). *The impact of investment on economic growth and employment in South Africa: A sectoral approach* [Master's thesis, Vaal Triangle Campus North-West University]. *NWU* Institutional *Repository*. https://repository.nwu.ac.za/bitstream/handle/10394/28316/Manete_TKJ_2018.pdf?sequence=1&isAllowed=y.

Mankiw, N. G., Romer, D., & Weil, D. N. (1992). A contribution to the empirics of economic growth. *Quarterly Journal of Economics, 107*(2), 407–437. https://doi.org/10.2307/2118477

Marandu, S. H. (2018). T*he impact of FDI on economic growth in Southern African countries* [Master's thesis, The University of Cape Town]. Open UCT. https://open.uct.ac.za/handle/11427/28415?show=full.

Maseko, M. (2015). *Foreign Direct Investment and economic growth in South Africa: A sector level causality analysis* [Master's thesis, The University of Cape Town]. OpenUCT. https://open.uct.ac.za/handle/11427/29038

Masipa, T. (2014). The impact of foreign direct investment on economic growth and employment in South Africa: A time series analysis. *Mediterranean Journal of Social Sciences, 5*(25), 18–27. https://doi.org/10.5901/mjss.2014.v5n25p18

Mazenda, A. (2014). The effect of Foreign Direct Investment on economic growth: Evidence from South Africa. *Mediterranean Journal of Social Sciences, 5*(10 Spec. issue), 95–108. https://doi.org/10.5901/mjss.2014.v5n10p95

Melnyk, L., Kubatko, O., & Pysarenko, S. (2014). The impact of foreign direct investment on economic growth: case of post-communism transition economies. *Problems and Perspectives in Management*, 12(1), 17–24.

Menegaki, A. N. (2019). The ARDL Method in the Energy-Growth Nexus Field; Best Implementation Strategies. (0), 1–16. Department of Economics and Management of Tourist and Culture Units, Agricultural University of Athens, 33100 Amfissa, Greece. *Economies, 7*(4), 105. https://doi.org/10.3390/economies7040105

Miteski, M., & Stefanova, D. J. (2017). The impact of Sectoral FDI on economic growth in Central, Eastern and Southeastern Europe. Working Paper No. 1/2017. Skopje, Macedonia: National Bank of the Republic of Macedonia. https://www.econstor.eu/bitstream/10419/173721/1/wp-nb-rm-2017-01.pdf.

Moolman, C. E., Roos, E. L., Le Roux, J. C., & Du Toit, C. B. (2006). Foreign Direct Investment : South Africa's Elixir of Life? Working paper series, no. 2006-05. Pretoria, Gauteng, South Africa: University of Pretoria, Department of Economics, https://www.up.ac.za/media/shared/61/WP/wp_2006_05.zp39544.pdf.

Moosa, I. A. (2002). Chapter 2: Theories of Foreign Direct Investment. In *Foreign Direct Investment. Theory, Evidence and Practice* (pp. 23–67). London, England, United Kingdom: Palgrave Macmillan. https://doi.org/10.1057/9781403907493_2

Mothibi, L., & Ferreira, L. (2019). An empirical analysis of Foreign Direct Investment and domestic investment as drivers of economic growth in South Africa. Proceedings of International Academic Conferences 9912016. International Institute of Social and Economic Sciences. RePEc:sek:iacpro:9912016

Najeb, M. (2014). A contribution to the theory of economic growth: Old and New. *Journal of Economics and International Finance*, *6*(3), 47–61. https://doi.org/10.5897/jeif2013.0518

Nchoe, K. (2016). *The Effect of Foreign Direct Investment Inflows on Economic* [Master's thesis, The University of South Africa]. UnisaIR. https://uir.unisa.ac.za/bitstream/handle/10500/21691/dissertation_nchoe_kc.pdf?sequence=1&isAllowed=y.

Nketsiah, I., & Quaidoo, M. (2017). The effect of Foreign Direct Investment on Economic Growth in Ghana. *Journal of Business and Economic Development*, *2*(4), 227–232. https://doi.org/10.11648/j.jbed.20170204.14

Organisation for Economic Co-operation and Development [OECD]. (2008). OECD Benchmark Definition of Foreign Direct Investment (4th ed). Paris, France: OECD Publishing.

Owusu, A. K. J. (2017). *Impact of Foreign Direct Investment on economic growth in Ghana* [Master's thesis, The University of Ghana]. UGSpace. https://ugspace.ug.edu.gh/handle/123456789/32646

Pesaran, M. H., & Shin, Y. (1995). Chapter 11: An autoregressive distributed-Lag modelling approach to cointegration analysis. In S. Strøm (Ed.), *Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium* (pp. 371–413). Cambridge, England, United Kingdom: Cambridge University Press. https://doi.org/10.1017/CCOL521633230.011

Petrović-Ranđelović, M., Janković-Milić, V., & Kostadinović, I. (2017). Market size as a determinants of the Foreign Direct Investment inflows in the Western Balkans countries. *Economics and Organisation, 14*(2), 93–104. https://doi.org/10.22190/FUEO1702093P

Phuyal, R. K., & Sunuwar, S. (2018). A sectoral analysis of Foreign Direct Investment on the economic growth of Nepal. *Journal of Business and Social Science Research, 3*(1), 1–14. https://doi.org/10.3126/jbssr.v3i1.24834

Piętak, Ł. (2014). Review of theories and models of economic growth. *Comparative Economic Research. Central and Eastern Europe, 17*(1), 45–60. https://doi.org/10.2478/cer-2014-0003

Protsenko, A. (2004). Vertical and horizontal Foreign Direct Investment in transition countries [Doctoral dissertation, Ludwig-Maximilians University of Munich]. https://d-nb.info/972021507/34

Rafindadi, A. A. (2013). An application of panel ARDL in analysing the dynamics of financial development and economic growth in 38 Sub-Saharan African continents. Proceeding - Kuala Lumpur International Business, Economics and Law Conference Vol. 2 (pp. 118–135). December 2 - 3, 2013. Hotel Putra, Kuala Lumpur, Malaysia.

Rena, R., & Msoni, M. (2014). Global financial crises and its impact on the South African Economy: A further update. *J Economics*, 5(1), 17-25. https://doi.org/10.1080/09765239.2014.11884980

Republic of South Africa [RSA], Department of Trade and Industry [DTI]. (2020). *Investing in South Africa: Roadmap 2020.* Pretoria, Gauteng, South Africa: Invest SA. http://www.thedtic.gov.za/wp-content/uploads/Investor-Roadmap-2020.pdf

Republic of South Africa [RSA], National Treasury. (2011). *A review framework for cross-border direct investment in South Africa: Discussion document*. Pretoria, Gauteng, South Africa: Invest SA. https://www.treasury.gov.za/documents/national%20budget/2011/Cover%20note%20-%20A%20review%20framework%20for%20cross-border%20direct%20investment%20in%20SA.pdf.

Romer, P. M. (1990). Endogenous Technological Change. The Problem of Development: A conference of the Institute for the Study of Free Enterprise System. *Journal of Political Economy*, *98*(5), S71–S102.

Romer, P. M. (1994). The Origins of Endogenous Growth. *A Journal of Economic Perspectives*, *8*(1), 3–22. https://doi.org/10.1257/jep.8.1.3

Saidi, S., Shahbaz, M., & Akhtar, P. (2018). The long-run relationships between transport energy consumption, transport infrastructure, and economic growth in MENA countries. *Transportation Research Part A: Policy and Practice*, *111*, 78–95. https://doi.org/10.1016/j.tra.2018.03.013

Sarstedt, M., & Mooi, E. (2014). *A concise guide to market research. The process, data, and methods using IBM SPSS statistics - Chapter 7: Regression analysis* (pp. 193–233). Berlin, Germany: Springer Texts in Business and Economics.

Sedgwick, P. (2012, July 7). Pearson's correlation coefficient. *BMJ (Online)*, 345, e4483. https://doi.org/10.1136/bmj.e4483

Sharipov, I. (2015). Contemporary economic growth models and theories: A literature review. *Ces*, *VII*(3), 759–773.

Shrestha, A., Tamošaitienė, J., Martek, I., Hosseini, M. R., & Edwards, D. J. (2019). A principal-agent theory perspective on PPP risk allocation. *Sustainability 11*(22), 6455. https://doi.org/10.3390/su11226455

Solow, R. M. (1956). A contribution to the Theory of Economic Growth. *The Quarterly Journal of Economics, 70*(1), 65–94. https://doi.org/10.2307/1884513

South Africa Reserve Bank [SARB]. (2019). Annual Report 2019/20. https://www.resbank.co.za/en/home/publications/publication-detail-pages/reports/annual-reports/2020/10040.

Statista Research and Analysis. (2022). *South Africa: Distribution of gross domestic product (GDP) across economic sectors from 2011 to 2021*. Hamburg, Germany: Statista. https://www.statista.com/statistics/371233/south-africa-gdp-distribution-across-economic-sectors/

Statistics South Africa [Stats SA]. (2022). *South Africa GDP grows by 1.6%*. https://twitter.com/StatsSA/status/1600060077431558145?ref_src=twsrc%5Etfw%7Ctwcamp%5Etweetembed%7Ctwrun%5E1600060077431558145%7Ctwgr%5E9ac07220df8df937c9f433bf388ab6c03c37d3ce%7Ctwcon%5Es1_&ref_url=https%3A%2F%2Fwww.iol.co.za%2Fbusiness-report%2Feconomy%2Fsouth-africas-gdp-grew-by-16-in-the-third-quarter-7c759949-f0b0-41fd-87b2-e8fd349138eb

Suleiman, N. N., Kaliappan, S. R., & Ismail, N. W. (2013). Foreign direct investments (FDI) and economic growth: Empirical evidence from Southern Africa Customs Union (SACU) countries. *International Journal of Economics and Management*, *7*(1), 136–149.

Sunde, T. (2017). Foreign direct investment, exports and economic growth: ADRL and causality analysis for South Africa. *Research in International Business and Finance*, *41*(May), 434–444. https://doi.org/10.1016/j.ribaf.2017.04.035

Susic, I., Stojanovic-Trivanovic, M., & Susic, M. (2017). Foreign direct investments and their impact on the economic development of Bosnia and Herzegovina. *IOP Conference Series: Materials Science and Engineering*, *200*(1), 1–16. https://doi.org/10.1088/1757-899X/200/1/012019

Taylor, M. P., & Sarno, L. (1998). *The behavior of real exchange rates during the post-Bretton Woods period*, *46*(2), 281–312. https://doi.org/10.1016/S0022-1996(97)00054-8

Thangamuthu, M., & Parthasarathy, K. (2015). Cointegration and the Stock market

developments interdependence: Evidence from South Africa, India and the USA. *S. Afr. j. econ. manag. sci*, *18*(4), 475–485. http://dx.doi.org/10.17159/2222-3436/2015/v18n4a3

United Nations Conference on Trade and Development [UNCTAD]. (1998). *World Investment Report 1998: Trends and Determinantsts.* New York, NY., USA: UNCTAD. https://unctad.org/system/files/official-document/wir1998_en.pdf.

United Nations Conference on Trade and Development [UNCTAD]. (2020). *World Investment Report 2020: International production beyond the pandemic.* New York, NY., USA: UNCTAD. https://unctad.org/system/files/official-document/wir2020_en.pdf.

Vieira, L. C. A. (2009). The impact of FDI on developing economies and environment. *Revista Ingenierias Universidad de Medellin, 8*(14), 111–128.

Wang, M. (2009). Manufacturing FDI and economic growth: Evidence from Asian economies. *Applied Economics, 41*(8), 991–1002. https://doi.org/10.1080/00036840601019059

World Bank. (2017). *South Africa economic update. Innovation for productivity and inclusiveness.* Washington, DC., USA: The International Bank for Reconstruction and Development/The World Bank. https://documents1.worldbank.org/curated/en/779551505322376708/pdf/119695-WP-PUBLIC-SA-EU-2017-Digital-Version-Sep-19.pdf.

World Bank. (2018). *South Africa economic update: Jobs and inequality*. Washington, DC., USA: The International Bank for Reconstruction and Development/The World Bank. https://documents.worldbank.org/en/publication/documents-reports/documentdetail/368961522944196494/south-africa-economic-update-jobs-and-inequality

Zardoub, A. (2021). Exploring the links between Financial Flows and Economic Growth: a Panel ARDL Approach. *PSU Research Review, ahead-of-print*(ahead-of-print). https://doi.org/10.1108/PRR-05-2020-0016

Zhu, H., You, X., & Liu, S. (2019). Multiple ant colony optimization based on Pearson Correlation Coefficient. *IEEE Access, 7*, 61628–61638. https://doi.org/10.1109/ACCESS.2019.2915673

ANNEXURES

Annexure A: Descriptive Statistics

Sector Descriptive Analysis

Table 1: Agricultural sector Descriptive and correlation analysis

NGDP	*NGDP*	*SFDI*	*GFCF*	*TO*	*TCE*	*INF*	*HC*
Mean	2,675856	1,707643	18,17054	55,85037	81,54295	5,830429	58,53962
Median	2,824538	1,654255	18,04345	56,98144	82,07776	5,712924	58,74
Standard Deviation	1,70504	0,332705	2,173341	7,486113	1,465595	2,347417	1,144987
Sample Variance	2,907162	0,110692	4,723409	56,04189	2,147969	5,510368	1,310996
Kurtosis	0,19153	0,642885	-0,251	-0,16402	-1,2917	1,309801	0,681396
Skewness	-0,33279	0,921409	0,483323	-0,07801	-0,50828	-0,52748	-1,02295
Range	7,141896	1,312361	8,335735	32,09644	4,651525	10,74731	4,33
Minimum	-1,53809	1,197885	15,17554	40,76895	78,76935	-0,69203	55,8
Maximum	5,603806	2,510247	23,51128	72,86539	83,42088	10,05528	60,13
Sum	69,57226	44,39873	472,4339	1452,11	2120,117	151,5912	1522,03
Count	26	26	26	26	26	26	26
	NGDP	*SFDI*	*GFCF*	*TO*	*TCE*	*INF*	*HC*
NGDP	1						
SFDI	0,322024	1					
GFCF	-0,28906	0,102947	1				
TO	-0,09269	0,219001	0,760799	1			
TCE	-0,47168	-0,04137	-0,07463	-0,1203	1		
INF	-0,21166	-0,37513	0,08466	-0,04306	0,051034	1	
HC	-0,07211	-0,56958	-0,28005	-0,24018	0,22647	0,153375	1

Table 2: construction sector descriptive and correlation analysis

NGDP	*NGDP*	*SFDI*	*GFCF*	*TO*	*TCE*	*INF*	*HC*
Mean	2,675856	0,658943	18,17054	55,85037	81,54295	5,830429	58,53962
Median	2,824538	0,439054	18,04345	56,98144	82,07776	5,712924	58,74
Standard Deviation	1,70504	0,787568	2,173341	7,486113	1,465595	2,347417	1,144987
Sample Variance	2,907162	0,620263	4,723409	56,04189	2,147969	5,510368	1,310996
Kurtosis	0,19153	4,834392	-0,251	-0,16402	-1,2917	1,309801	0,681396
Skewness	-0,33279	2,046082	0,483323	-0,07801	-0,50828	-0,52748	-1,02295
Range	7,141896	3,335569	8,335735	32,09644	4,651525	10,74731	4,33
Minimum	-1,53809	0,040037	15,17554	40,76895	78,76935	-0,69203	55,8
Maximum	5,603806	3,375607	23,51128	72,86539	83,42088	10,05528	60,13
Sum	69,57226	17,13252	472,4339	1452,11	2120,117	151,5912	1522,03
Count	26	26	26	26	26	26	26
	SecGDP	*NGDP*	*SFDI*	*GFCF*	*TO*	*TCE*	*INF*
SecGDP	1						
NGDP	0,579709	1					
SFDI	-0,20255	-0,08784	1				
GFCF	0,351445	-0,28906	-0,40871	1			
TO	0,291837	-0,09269	-0,65395	0,760799	1		
TCE	-0,47653	-0,47168	0,488175	-0,07463	-0,1203	1	
INF	0,133328	-0,21166	0,355905	0,08466	-0,04306	0,051034	1

Table 3: Finance sector descriptive and correlation analysis

Median	2,824538	16,53819	18,04344985	56,98144	82,07776	5,712924	58,74
Standard Deviation	1,70504	44,32658	2,173340572	7,486113	1,465595	2,347417	1,144987

Sample Variance	2,907162	1964,846	4,72340924	56,04189	2,147969	5,510368	1,310996
Kurtosis	0,19153	7,675357	-0,251003427	-0,16402	-1,2917	1,309801	0,681396
Skewness	-0,33279	2,831228	0,483323074	-0,07801	-0,50828	-0,52748	-1,02295
Range	7,141896	181,133	8,335735271	32,09644	4,651525	10,74731	4,33
Minimum	-1,53809	2,371333	15,17554238	40,76895	78,76935	-0,69203	55,8
Maximum	5,603806	183,5043	23,51127765	72,86539	83,42088	10,05528	60,13
Sum	69,57226	727,1828	472,4339293	1452,11	2120,117	151,5912	1522,03
Count	26	26	26	26	26	26	26
	SecGDP	*NGDP*	*SFDI*	*GFCF*	*TO*	*TCE*	*INF*
SecGDP	1						
NGDP	0,407414	1					
SFDI	0,200501	-0,02877	1				
GFCF	-0,55405	-0,28906	-0,270444215	1			
TO	-0,42635	-0,09269	-0,477449618	0,760799	1		
TCE	-0,51207	-0,47168	0,281026462	-0,07463	-0,1203	1	
INF	0,259599	-0,21166	0,325477704	0,08466	-0,04306	0,051034	1

Table 4: Manufacturing sector descriptive and correlation analysis

	NGDP	*SFDI*	*GFCF*	*TO*	*TCE*	*INF*	*HC*
Mean	2,675856	45,31659	18,17054	55,85037	81,54295	5,830429	58,53962
Median	2,824538	48,6087	18,04345	56,98144	82,07776	5,712924	58,74

Standard Deviation	1,70504	19,71928	2,173341	7,486113	1,465595	2,347417	1,144987
Sample Variance	2,907162	388,8501	4,723409	56,04189	2,147969	5,510368	1,310996
Kurtosis	0,19153	1,610585	-0,251	-0,16402	-1,2917	1,309801	0,681396
Skewness	-0,33279	0,566463	0,483323	-0,07801	-0,50828	-0,52748	-1,02295
Range	7,141896	89,99697	8,335735	32,09644	4,651525	10,74731	4,33
Minimum	-1,53809	12,99271	15,17554	40,76895	78,76935	-0,69203	55,8
Maximum	5,603806	102,9897	23,51128	72,86539	83,42088	10,05528	60,13
Sum	69,57226	1178,231	472,4339	1452,11	2120,117	151,5912	1522,03
Count	26	26	26	26	26	26	26
	NGDP	*SFDI*	*GFCF*	*TO*	*TCE*	*INF*	*HC*
NGDP	1						
SFDI	-0,2834	1					
GFCF	-0,28906	0,662872	1				
TO	-0,09269	0,667112	0,760799	1			
TCE	-0,47168	0,063636	-0,07463	-0,1203	1		
INF	-0,21166	-0,34741	0,08466	-0,04306	0,051034	1	
HC	-0,07211	-0,30962	-0,28005	-0,24018	0,22647	0,153375	1

Table 5: Mining sector descriptive and correlation analysis

	NGDP	*SFDI*	*GFCF*	*TO*	*TCE*	*INF*	*HC*
Mean	2,675856	244,4886	18,17054	55,85037	81,54295	5,830429	58,53962
Median	2,824538	283,1306	18,04345	56,98144	82,07776	5,712924	58,74
Standard Deviation	1,70504	125,8111	2,173341	7,486113	1,465595	2,347417	1,144987
Sample Variance	2,907162	15828,43	4,723409	56,04189	2,147969	5,510368	1,310996
Kurtosis	0,19153	-0,08365	-0,251	-0,16402	-1,2917	1,309801	0,681396
Skewness	-0,33279	-0,79768	0,483323	-0,07801	-0,50828	-0,52748	-1,02295
Range	7,141896	466,384	8,335735	32,09644	4,651525	10,74731	4,33

Minimum	-1,53809	12,54739	15,17554	40,76895	78,76935	-0,69203	55,8
Maximum	5,603806	478,9314	23,51128	72,86539	83,42088	10,05528	60,13
Sum	69,57226	6356,704	472,4339	1452,11	2120,117	151,5912	1522,03
Count	26	26	26	26	26	26	26
	NGDP	*SFDI*	*GFCF*	*TO*	*TCE*	*INF*	*HC*
NGDP	1						
SFDI	0,004419	1					
GFCF	-0,28906	0,272486	1				
TO	-0,09269	0,513031	0,760799	1			
TCE	-0,47168	-0,07301	-0,07463	-0,1203	1		
INF	-0,21166	-0,56377	0,08466	-0,04306	0,051034	1	
HC	-0,07211	-0,32786	-0,28005	-0,24018	0,22647	0,153375	1

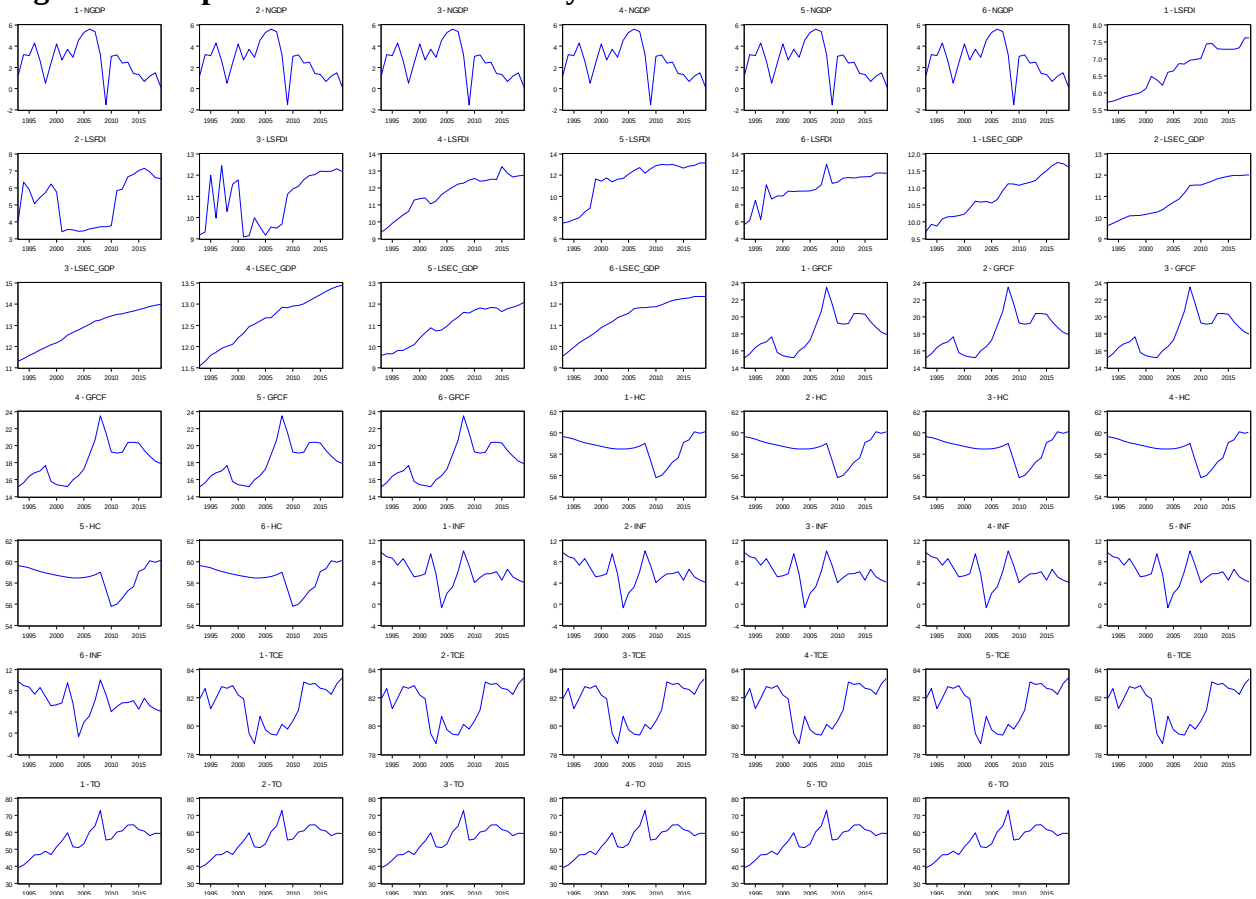
Table 6: Transport sector descriptive and correlation analysis

NGDP	*NGDP*	*SFDI*	*GFCF*	*TO*	*TCE*	*INF*	*HC*
Mean	2,67586	39,3997	18,1705	55,8504	81,543	5,83043	58,5396
Median	2,82454	25,462	18,0434	56,9814	82,0778	5,71292	58,74
Standard Deviation	1,70504	49,6525	2,17334	7,48611	1,4656	2,34742	1,14499
Sample Variance	2,90716	2465,37	4,72341	56,0419	2,14797	5,51037	1,311
Kurtosis	0,19153	17,0412	-0,251	-0,164	-1,2917	1,3098	0,6814
Skewness	-0,3328	3,87584	0,48332	-0,078	-0,5083	-0,5275	-1,0229
Range	7,1419	259,174	8,33574	32,0964	4,65152	10,7473	4,33
Minimum	-1,5381	2,0384	15,1755	40,769	78,7694	-0,692	55,8
Maximum	5,60381	261,212	23,5113	72,8654	83,4209	10,0553	60,13
Sum	69,5723	1024,39	472,434	1452,11	2120,12	151,591	1522,03
Count	26	26	26	26	26	26	26
	NGDP	*SFDI*	*GFCF*	*TO*	*TCE*	*INF*	*HC*
NGDP	1						

SFDI	-0,1044	1					
GFCF	-0,2891	0,5587 8	1				
TO	-0,0927	0,5208 3	0,7608	1			
TCE	-0,4717	-0,0136	-0,0746	-0,1203	1		
INF	-0,2117	0,3701 4	0,0846 6	-0,0431	0,0510 3	1	
HC	-0,0721	0,0913 9	-0,28	-0,2402	0,2264 7	0,1533 8	1

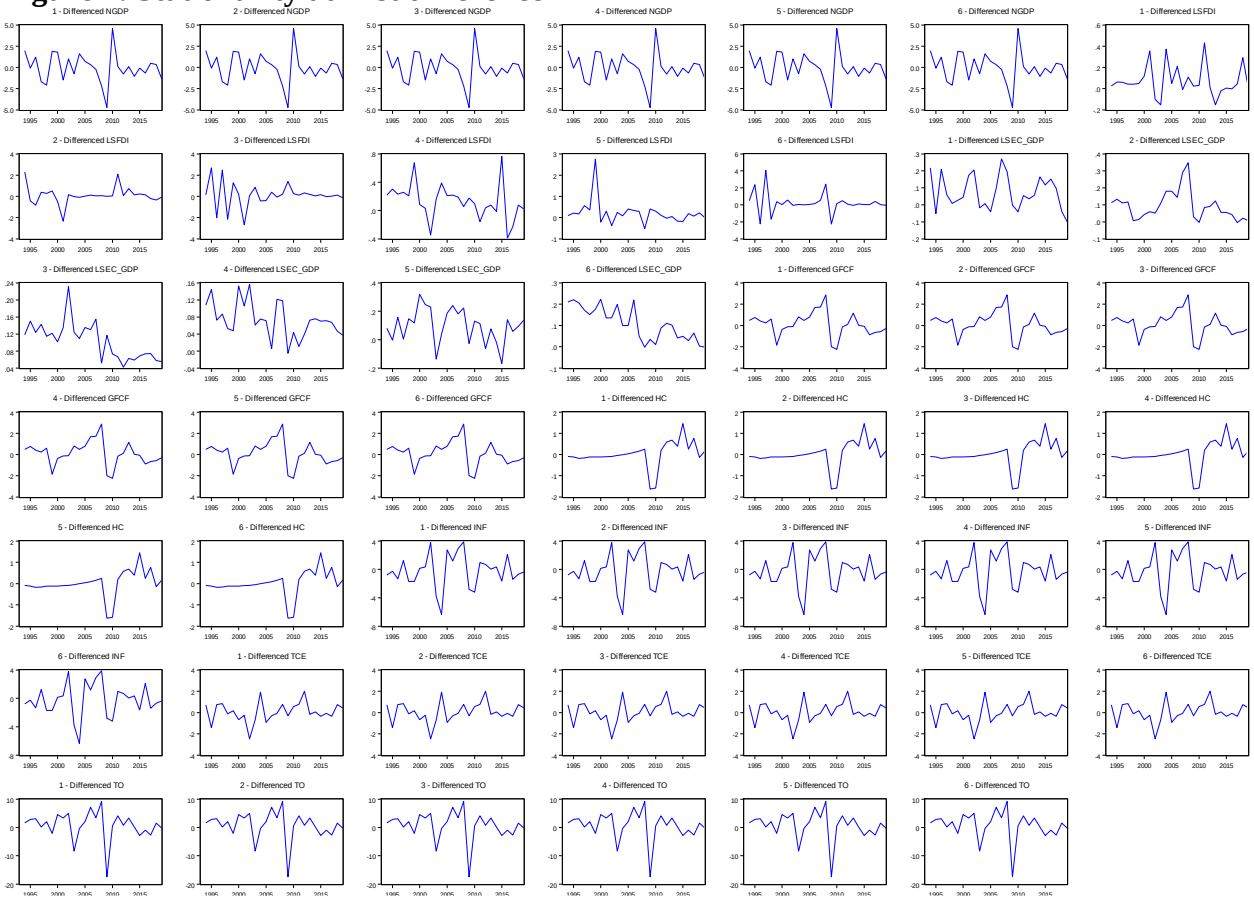
Annexure B: Stationarity tests

Figure 1: Graphical Method: Stationarity at level series



Source: Author's estimates from research data

Figure 2: Stationarity at first difference



Source: Author's estimates from research data

Annexure C: ARDL

Dependent Variable: D(NGDP)
Method: ARDL
Date: 01/25/23 Time: 16:27
Sample: 1995 2019
Included observations: 150
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (1 lag, automatic): SFDI GFCF HC TCE TO INF
DUMMY
Fixed regressors: C
Number of models evaluated: 1
Selected Model: ARDL(1, 1, 1, 1, 1, 1, 1, 1)
Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Long Run Equation				
SFDI	0.000289	0.001210	0.238503	0.8120
GFCF	-0.101340	0.046074	-2.199507	0.0303
HC	-0.209751	0.058966	-3.557152	0.0006
TCE	-0.739493	0.086813	-8.518212	0.0000
TO	-0.095345	0.015517	-6.144386	0.0000
INF	-0.185774	0.036728	-5.058066	0.0000
DUMMY	1.244880	0.734108	1.695773	0.0932
Short Run Equation				
COINTEQ01	-0.979005	0.016188	-60.47620	0.0000
D(SFDI)	-0.220362	0.170740	-1.290626	0.2000
D(GFCF)	-0.046492	0.018085	-2.570768	0.0117
D(HC)	0.691544	0.028327	24.41251	0.0000
D(TCE)	0.319653	0.028045	11.39774	0.0000
D(TO)	0.197655	0.006437	30.70837	0.0000
D(INF)	0.101424	0.017584	5.767949	0.0000
D(DUMMY)	0.036261	0.081336	0.445819	0.6567
C	81.51067	1.351754	60.29995	0.0000

Mean dependent var	-0.115862	S.D. dependent var	1.731406
S.E. of regression	0.664236	Akaike info criterion	2.281212
Sum squared resid	41.91489	Schwarz criterion	3.473784
Log likelihood	-116.9345	Hannan-Quinn criter.	2.765583

*Note: p-values and any subsequent tests do not account for model selection.

Cross Section Short-run Coefficients

SECTOR 1

H_o: FDI in the agricultural sector has no impact on economic growth in South Africa

H_1: FDI in the agricultural sector has an impact on economic growth in South Africa

Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01	-0.981697	0.015472	-63.44851	0.0000
D(SFDI)	-1.037603	0.147320	-7.043217	0.0059
D(GFCF)	-0.088090	0.039220	-2.246026	0.1103
D(HC)	0.630854	0.049882	12.64705	0.0011
D(TCE)	0.389915	0.022906	17.02249	0.0004
D(TO)	0.222162	0.001420	156.4611	0.0000
D(INF)	0.060326	0.007856	7.679330	0.0046
D(DUMMY)	-0.156540	0.345128	-0.453570	0.6809
C	81.74907	90.59139	0.902393	0.4334

The findings show a statistically significant relationship between foreign direct investment in the agricultural sector and economic growth.

SECTOR 2

H_o: FDI in the manufacturing sector has no impact on economic growth in South Africa

H_1: FDI in the agricultural sector has an impact on economic growth in South Africa

Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01	-1.042379	0.021685	-48.06934	0.0000
D(SFDI)	-0.298685	0.068730	-4.345755	0.0225
D(GFCF)	0.006940	0.046268	0.150004	0.8903
D(HC)	0.809866	0.064732	12.51107	0.0011
D(TCE)	0.397999	0.031936	12.46242	0.0011
D(TO)	0.175878	0.001925	91.37858	0.0000
D(INF)	0.163853	0.011257	14.55527	0.0007
D(DUMMY)	-0.070417	0.409560	-0.171934	0.8744
C	86.81267	128.2959	0.676660	0.5471

The findings show a positive and statistically significant relationship between foreign direct investment in the manufacturing sector and Economic growth.

SECTOR 3

H_0: FDI in the mining sector has no impact on economic growth in South Africa.

H_1: FDI in the mining sector has an impact on economic growth in South Africa.

Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01	-0.967125	0.019154	-50.49172	0.0000
D(SFDI)	0.002233	3.68E-06	606.1658	0.0000
D(GFCF)	-0.030006	0.042895	-0.699521	0.5346
D(HC)	0.708001	0.058634	12.07485	0.0012
D(TCE)	0.300968	0.027314	11.01900	0.0016
D(TO)	0.205132	0.001636	125.3763	0.0000
D(INF)	0.085814	0.010038	8.549146	0.0034
D(DUMMY)	0.044482	0.367237	0.121126	0.9112
C	80.52421	117.4052	0.685866	0.5420

The findings show a positive and statistically significant relationship between foreign direct investment in the agricultural sector and economic growth.

SECTOR 4

H_0: FDI in the construction sector has no impact on economic growth in South Africa.

H_1: FDI in the construction sector has an impact on economic growth in South Africa.

Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01	-0.987454	0.018598	-53.09382	0.0000
D(SFDI)	0.008363	6.94E-05	120.4159	0.0000
D(GFCF)	-0.038775	0.043317	-0.895137	0.4367
D(HC)	0.682031	0.061303	11.12555	0.0016
D(TCE)	0.318260	0.027063	11.75995	0.0013
D(TO)	0.198393	0.001562	126.9794	0.0000
D(INF)	0.137991	0.010007	13.78972	0.0008
D(DUMMY)	-0.016048	0.379375	-0.042302	0.9689
C	82.22169	111.9064	0.734736	0.5157

The findings show a positive and statistically significant relationship between foreign direct investment in the agricultural sector and economic growth.

SECTOR 5

H_0: FDI in the finance sector has no impact on economic growth in South Africa.

H_1: FDI in the finance sector has an impact on economic growth in South Africa

Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01	-0.976532	0.020366	-47.94980	0.0000
D(SFDI)	-6.14E-05	1.60E-06	-38.28999	0.0000
D(GFCF)	-0.018437	0.044456	-0.414720	0.7062
D(HC)	0.703660	0.065684	10.71282	0.0017
D(TCE)	0.299604	0.029765	10.06569	0.0021
D(TO)	0.197266	0.001712	115.2299	0.0000
D(INF)	0.104923	0.010485	10.00737	0.0021
D(DUMMY)	-0.001824	0.379745	-0.004804	0.9965
C	81.25624	127.7349	0.636132	0.5699

The findings show a negative and statistically significant relationship between foreign direct investment in finance and economic growth.

SECTOR 6

H_0: FDI in the transport sector has no impact on economic growth in South Africa.

Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01	-0.918842	0.020648	-44.50129	0.0000
D(SFDI)	0.003584	8.03E-06	446.2178	0.0000
D(GFCF)	-0.110588	0.044430	-2.489032	0.0886
D(HC)	0.614850	0.064967	9.464017	0.0025
D(TCE)	0.211171	0.031440	6.716658	0.0067
D(TO)	0.187100	0.001549	120.7690	0.0000
D(INF)	0.055637	0.010516	5.290659	0.0132
D(DUMMY)	0.417915	0.471361	0.886612	0.4406
C	76.50011	127.2098	0.601369	0.5900

The findings show a positive and statistically significant relationship between foreign direct investment in finance and economic growth.

Appendix D: Editorial Certificate

10 February 2023

To whom it may concern

Dear Sir/Madam

RE: Editorial certificate

This letter serves to prove that the thesis listed below was language edited for proper English, grammar, punctuation, spelling, as well as overall layout and style by myself, publisher/proprietor of Aquarian Publications, a native English speaking editor.

Thesis title

THE IMPACT OF FDI ON ECONOMIC GROWTH IN SOUTH AFRICA: DOES THE SECTOR MATTER?

Author

Mamontshi Gwendoline Keleme

The research content, or the author's intentions, were not altered in any way during the editing process, and the author has the authority to accept, or reject my suggestions and changes.

Should you have any questions or concerns about this edited document, I can be contacted at the listed telephone and fax numbers or e-mail addresses.

Yours truly

Signed by candidate

E H Londt
Publisher/Proprietor

Idea Corporation t/a
AQUARIAN PUBLICATIONS

STREET ADDRESS
9 Dartmouth Road
Muizenberg 7945

POSTAL ADDRESS
P O Box 00000
Muizenberg 7946

TELEPHONE
021 788 1577

FAX
021 788 1577

MOBILE
076 152 3853
082 878 9509

E-MAIL
eddi.idea@gmail.com
eddi.aquarian@gmail.com
eddi.londt@gmail.com

WEBSITE
www.aquarianpublications.com

PUBLISHER/PROPRIETOR
E H Londt