DETERMINANTS OF PRIVATE INVESTMENT AND ITS EFFECTS ON ECONOMIC GROWTH IN SOUTH AFRICA (1982-2019)

BY

AVHASEI SHIELA RHANGANI

Student Number :15003420

Dissertation submitted in fulfilment of the requirements for

MASTER OF COMMERCE IN ECONOMICS

In the

DEPARTMENT OF ECONOMICS

SCHOOL OF MANAGEMENT SCIENCES

UNIVERSITY OF VENDA

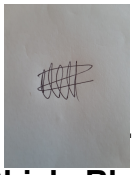
SUPERVISOR: DR M.A. DAGUME

CO-SUPERVISOR: MS T. MUNZHELELE

October, 2021

DECLARATION

I, Avhasei Shiela Rhangani (student number: 15003420) do hereby declare that the dissertation titled "**Determinants of private investment and its effects on economic growth in South Africa (1982-2019)",** for a Master of Commerce in Economics at University of Venda has not been previously submitted, in part or in full, for a degree at this or any other institution except where due acknowledgement has been made. It is a product of my own investigation and all reference materials contained therein have been fully acknowledged and a list of references is given.

Signature  **…… Date 18 October 2021**

Avhasei Shiela Rhangani (15003420)

ACKNOWLEDGEMENTS

I would like to express my gratitude to God Almighty who gave me wisdom and strength to complete this research. It is with pleasure to take this opportunity to acknowledge the great support I received from my supervisor, Dr MA Dagume. His motivation and dedication contributed a lot to the successful completion of this work. His corrections and inspirations were paramount to the successful completion of this research. I would also want to thank my husband, Dr TA Rhangani, who stood by my side always and for his all-round support throughout my life. My children, Phuletshedzo, Aritikaho, Atikiwaho, Ngearitsireledza and Robvelela, who always gave me the motive to pursue my goal of completing this research so that I can be a good example to them. I would also want to thank my mother, Naledzani Virginia Mufunwaini for her endless support and encouraging words throughout this study. I would also want to dedicate this research to my late father, Mr TA Mufunwaini, who always taught me that education is the key to success.

ABSTRACT

Private investment stimulates growth in any economy, and increasing it is one of the prerequisites for achieving a sustainable economic growth, hence, private investment is another source of employment, in addition to positively contributing to national economic output. Countries which can accumulate high levels of investment achieve faster rates of economic growth and development. Motivated by concerns on the persistent decline in private investment, the purpose of this study is to investigate effects of private investment on economic growth in South Africa using time series data for the period 1982 - 2019. A total of 37 observation of economic growth, inflation rate, public investment, credit to private sector, real exchange rate, Human capital, Labour force, Private investment and interest rate were be used in this study. Multiple regression and co-integration methods were employed to analyse the data. To avoid spurious regression results on time series data, the first step was to test for the stationarity of the data by using Augmented Dickey-Fuller. The study used Johansen co-integration technique to establish if the non-stationary variables are co-integrated. The study concludes that private and public investment are positively correlated with economic growth in the short and long run in South Africa. The study informs policymakers and stakeholders, including the government, municipal authorities and employers in the private and public sectors in relation to formulation of possible policy intervention to help stimulate and sustain private investment and therefore economic growth.

Keywords: Determinants, Private investment, Public investment, Cointegration, Economic growth.

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ADBG	African Development Bank Group
ADF	Augmented Dickey-Fuller
ARDL	Autoregressive Distributed Lag
BMA	Bayesian Model Averaging
C_K	Cost of Capital
CR	Credit investment period t
ECM	Error Correlation Model
ER	Exchange Rate
EU	European Union
FDI	Foreign Direct Investment
HDI	Human Development Index
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
GRT	Economic growth in period t
HC	Human Capital
INF	Inflation rate in period t
IMF	International Monetary Funds
IP	Public investment period t
IS	Private investment period
PP	Phillips-Peron
OLS	Ordinary Least Square
SA	South Africa
SARS	South African Revenue Services
STATSSA	Statistics South Africa
TFP	Total Factor Productivity
TK	The proportion of working population to total population in period
VECM	Vector Error Correction Model

TABLE OF CONTENTS

CHAPTER ONE: INTRODUCTION AND BACKGROUND OF STUDY

1.1 INTRODUCTION

Investigating factors that enhance or encumber private sector investment and economic growth has been one of the central tenets amongst theoretical and empirical investment and growth scholars, however very little accord, has been reached so far (Chirwa & Odhiambo, 2016). Several emerging economies have implemented a variety of fiscal and monetary policy changes in order to make private sector investment the primary engine of economic growth and development (Ogunbayo *et al.,* 2014). Economic growth and prosperity are largely dependent on a country's capacity to spend and make effective and profitable use of its capital. In line with Suhendra and Anwar (2014), view, when the regional and national economic conditions positively change, private investment will increase. The implication is that for private investment, economic growth and development, macroeconomic conditions must be conducive enough in order to attract investors.

In this chapter, the introduction and background of the study, statement of problem, research aim, research objectives, hypothesis, rationale or significance of the research, research delimitation, operational terms' definitions and outline of the research are addressed.

1.2 BACKGROUND OF THE STUDY

Several studies, Hashmi, Akram and Hashmi, (2012), Majeed and Khan (cited in Esubalew, 2014) and Batu, (2016) have revealed that investment is a critical factor in determining economic development. Investment, both private and public, has several advantages, including the creation of employment, a rise in per capita wages, a decrease in levels of poverty, an increase in quality of living, and increased Gross Domestic Product (Ilgbinosa, Michael & Watson, 2015).

According to Majeed and Khan(2008), investment plays a major role to increase productivity in the economy by promoting new production techniques and encouraging technological progress in the process of economic growth in any given country.

Another important role of investment is that it creates new capital goods and increases productive capacity in capital accumulation in the long run. Hence, increase in investment rate leads to rapid increase in the rate of capital stock accumulation. Acosta and Loza (2005) stated that increase in private investment together with higher private savings are important factors for future growth in the economy. They also added that in order to compliment private investment, infrastructure is vital instrument.

Regarding mechanisms to boost economic growth and private sector investment, there have been several perspectives, from different authors. In order to improve economic growth, Khan and Reinhart (1990) suggest that more focus should be put on attracting private investment through domestic and international financing. Chirinko (1993) warns that nations with slow investment are jeopardizing future growth opportunities, an assertion that is unsettling for a nation like South Africa, which has seen erratic and declining patterns in private investment, as well as a low Gross Domestic Product (GDP).

Experiences from successful developing countries indicated that for economic growth to increase in these countries, investment is a major contributing factor. “Some economists argue that when studying investment in developing countries, special features not accounted for in traditional theories of investment should be considered” (Majdzadeh, et al., 2014:229). In the early 1980’s, downward trends in economic growth were experienced by many developing countries. During the period 1973 to 1980, many developing countries average economic growth rate fell 0.4% to -1,2% (Oshikoya, 1994). During 1990’s , other developing countries experienced around 4.4% increase in per capita of GDP while African countries growth rate continues to decline. This sharp decline in economic growth in African countries can be explained by both internal and external factors. Gross investment rate deterioration may be one of the reasons which led to decline in growth rate during the 1980’s in Africa. Total domestic investment ratio to GDP decline from around 20.8 % to 1.1% during the period 1980 to 1989. However, this decline was not experienced by all African countries as other countries investment to GDP declined by around 10% (World Bank, 1996).

Increase in economic growth rate in 1994 experienced by Sub- Saharan Africa was generally not explained by increase in private investment. Though these countries

were experiencing increase in economic growth, their private investment rates continue to decline. Terms of trade improved due to high commodity prices across the region which led to increase in export earnings. However, in many countries, fear of high level business risk and fear that the commodity price boom may be short-lived, reduced response in investment in many countries.

In Nigeria, private investment has been declining from 1986 to date, though there was slight recovery after 2010, however, increase was insignificant. During the period 1991-1992, private investment declined from 12.3% of GDP to 8.3%, decrease in public investment during this period could also be the contributing factor to this decline. During 1993, private investment in Nigeria increased to 12.5%, followed by 16% increase in 1994. In 1996 it fell to 8.9%. During the period 2001-2005, private investment was averaged at 13% as it reached its peak during 2002 to 16.2% but it declined to 12% in 2005. Ever since, private investment increased in small ratios until 2015 (Ilegbinosa et al., 2015).

Growth in private investment has been growing slowly in Mauritius though its private investment was far above the regional average. Mauritius low growth rate in investment was due to net capital outflows because investors invested in production facilities in lower-labor cost neighboring countries. In countries like Mali, South Africa, Cote d' Ivoire and Madagascar their private investment rose to higher levels. In Cote d' Ivoire, private investment was at 8% to GDP, which was a little over half of its 1980 level. South Africa experienced increase in private investment due to political transformation which gave way to economic growth acceleration. Increase in private investment in South Africa after political transformation mark a departure from private investment downward trend that the country has been facing over the last decade (Oshikoya, 1994).

In South Africa, low levels of economic growth have remained a persistent problem; South Africa's real GDP growth has been declining since 1965, and despite a brief recovery in 1986-88, growth in the economy has become increasingly unstable. The economy of the country started to recover after 2017 early recession but improvement is not yet satisfactory. The global recovery has helped trading partners of South Africa with stronger growth and higher commodity prices. However comparative to its peers,

South Africa lags behind as recent statistics show that unemployment rate is 32.5% (StatsSA,2020) and declining per capita income has been evident. High level of investment, creation of job opportunities and rapid growth rate are needed in the economy to boost revenue and expanded service delivery. However, due to private investment declining associated with policy uncertainty and low business confidence, economic growth has been constrained. Due to growing concerns about the public finances' long-term viability, private sector investment decreased in 2015 and remained low until 2017(Budget Review, 2018).

Long-term investment trends experienced by South Africa was accompanied by savings rates. South African investment can be categorized into three phases since 1960. The first phase is from 1960 to 1980, where investment increased from 22% in 1960 to 33% in 1981, In the second phase, country investment rate decline sharply to 14% in 1993 and then remained the same until 2001. Last phase South Africa investment rate increased from 15% to 22.5% in 2008 before being affected by global crisis. Both public and private investment have been reinforcing each other even though public investment has more influence in directing aggregate investment (World Bank, 2011).

Investment is the solution for several challenges, crises and economic problems to be solved in many countries. South African economy introduced various economic policies to attract private investors as investment assist in transforming various economic challenges faced by the economy (Ilegbinosa et al.,2015). Understanding the effects of private sector investment on economic growth is crucial because the results would assist the government to come up with appropriate policies on investment and economic growth which may attract investors to achieve sustainable economic growth.

1.3 PROBLEM STATEMENT

Lin (2012) posits that any developed world can expand at a rapid pace for decades, if private investment is prioritised as it can improve comparative advantage (Lin,2012). Investment, according to Mlambo and Oshikoya (2001), is the most accurate indicator of future economic development. October also found that rapidly growing developing countries have GDFI-to-GDP ratios of more than 30%, whereas South Africa's is about

20%, compared to the NDP goal of 30%. This shows that South Africa is still performing lower than the 30% set by the National Development Plan. The World Bank (2018) alluded that South Africa is still facing detrimental effects due to its low growth potential.

The rate of private investment as a percentage of GDP in South Africa is a serious concern, because it has been weak for a long time and on a downward trend for some periods during 1982 to 2019. Some of the investment patterns can be traced back to the global lack of private investment following the global recession, whilst others can be traced back to political unrest. The period 1982 to 2019 marks stagnancy of private investment, between 10% and 15% of GDP. There is a linkage between some trends of investments and the global dearth of private investment after the global financial crisis, while others are linked to political uncertainty. Private investment remained between 10% and 15% of GDP for almost the whole period (1982 – 2019). It has been pointed out that after 1994, investment has been considerably lower than in comparable emerging countries, which include Brazil, Colombia, Chile, Turkey, Australia, Malaysia, India and China (Viegi & Dadam, 2018). The reduction of the investment ratios and rates is problematic owing to the notion that investment is important for growth and low investment raises economic vulnerability (Mlambo & Oshikoya, 2001). Slow private investment growth, according to the World Bank (2018), inhibits the country from taking advantage of new economic opportunities developing across the world and keeping up with other countries' standard of living.

Regardless of the efforts by the government of South Africa to boost private sector participation and economic development, private sector investment has stayed weak over time, stifling the economic growth of the country. The private sector investment rate is currently about 20% less than it was prior to the global financial crisis of 2008 (Viegi & Dadam, 2018). To the best of the researchers ' knowledge, this is the first study of its kind in South Africa to answer these issues in terms of determining whether low private investment is a major contributor to low economic growth and whether low economic growth is a contributing factor to low private investment growth. This study is conducted, therefore, to fill this gap in the body of knowledge.

One of South Africa's main challenges is to devise strategies that would encourage private investment in order to promote and support economic development. In order to boost private investment and sustainable growth, it is critical to recognise and analyse existing policies and their consequences for South Africa. This necessitates investigating effects of private investment on economic growth in South Africa, which is the focus of this study.

1.4 AIM OF THE STUDY

The aim of the study is to investigate the determinants of private investment and their effects on economic growth in South Africa, using data for the period 1982 -2019.

1.5 OBJECTIVES OF THE STUDY

The objectives of the research are as follows:

- To analyse trends of private investment and economic growth in South Africa.
- To empirically examine the impact of private investment on economic growth in South Africa over the period 1982-2019.
- To recommend public policies which will boost private investment, and subsequently economic growth.

1.6 HYPOTHESES OF THE STUDY

1.6.1 H_0 : Private Investment has no impact on economic growth

H_1 : Private investment has impact on economic growth

1.7 SIGNIFICANCE OF THE STUDY

According to the literature reviewed by the researcher, there are few studies done in developing countries compared to developed countries on the impact of private investment on economic growth. In the study conducted in South Africa by Molocwa, Choga and Mongale (2018), it was found that private fixed investment is correlated with economic growth. Makuyana (2017) studied the effects of public and private

spending on economic growth in South Africa from 1970- 2014. The findings revealed that private sector investment has a significant short and long term impact on economic growth, whereas public investment has a negative impact.

The current study like those of Molocwa, Choga and Mongale (2018) and Makuyana (2017), looks at the impact of private investment on economic growth in South Africa, but it differs from those of Molocwa, Choga and Mongale (2018) and Makuyana (2017). This is because, instead of using only four independent variables, such as GDP, real interest rate, real exchange rate and general tax rate, as proposed by Molocwa, Choga and Mongale (2018), this study will include three additional variables: credit to private investment, public investment and inflation. This is in keeping with Molocwa, Choga and Mongale (2018) suggestion and leaving out the general tax rate. Previous studies mentioned above used old data from 1970-2014, whereas the current study used data which is more recent from 1982-2019.

This study focuses on investigating the effects of private sector investment on economic growth in South Africa towards coming up with policy recommendations. The researcher will, hence, try to uncover the macroeconomic forces that drive private investment and growth in South Africa. The information gathered is expected to be used in the development of policy interventions to help promote and support private investment and economic growth. The government as the policymaker will be able to know specific factors necessary to affect private investments in order to improve the economic welfare of citizens. The information will help South Africa scholars and researchers to expand knowledge and be useful to the donors and other partners who are interested in investing in South Africa. From an academic perspective, academics can make referral to the study in their future research work and so the study can become useful research material to those interested in further research into the topic. This study will also add empirically verified ideas to the knowledge stock available.

1.8 DELIMITATIONS OF THE STUDY

The term "investment" encompasses a wide range of issues; this research, however, would focus solely on private investment and on macroeconomic factors and controlling of non-macroeconomic factors. The focus of this research is on the effects

of private spending on economic development in South Africa between 1982 and 2019, hence, the period of the current study will be limited to 37 years. The study intends to look only on the factors that influence private sector investment, and those that influence economic growth. The analysis of effects of private sector investment on economic growth shall only utilise South African data on GDP, interest rates, inflation, public investment, credit investment, exchange rate, private investment, human capital and labour. Time series data is obtained from the South Reserve Bank database and the World Bank database.

1.9 DEFINITION OF OPERATIONAL CONCEPTS

This section provides definitions of operational concepts in the study and these concepts are defined as follows:

1.9.1 Investment

Mbaye (2014) defines investment as the aggregation of newly-created physical entities, such as factories, machines, homes, and merchandise inventories. Investment can also be defined as putting cash into an asset with the intention of capital growth, dividends, and/or interest earnings (Mbaye, 2014). Economists use the word 'investment' to describe activities that maximize the size of the economy's actual aggregate wealth. This primarily consists of the acquisition (or production) of new actual, long-term properties, such as factories and machinery (Parker, 2010).

1.9.2 Business fixed investment

The procurement of new facilities and machinery by businesses for manufacturing purposes is known as 'business fixed investment' (Parker, 2010).

1.9.3 Inventory investment

Increases of supplies of unsold products or unused raw materials are referred to as inventory investment. Since inventory capital typically has a very short lifetime, this type of investment differs from company-fixed investment. Inventory investment is unfavourable as inventories fall from one cycle to the next, which can occur even at the aggregate stage. Another distinguishing characteristic of inventory investment is that it often happens by chance. Unsold items are counted as inventory investment

regardless of whether the company acquired them with the intention of stocking up on inventory or sold less than anticipated (Parker, 2010).

1.9.4 Private investment

Private investment refers to investments made by private companies for the purpose of generating future gains (Kumo, 2006).

1.9.5 Public Investment

Public investment includes investment by public enterprise and government on social and economic infrastructure, tangible assets, and real estate (Bakare, 2011).

1.9.6 Economic growth

Economic development is essentially compatible with a rise in future productivity, or development at "full employment," and is the primary driver of improvements in literacy, infrastructure, and economic output (Hashmi *et al.,* 2012). According to Nafziger (2012: 14), "economic growth refers to increases in a country's production or income per capita, wherein production is usually measured by gross national product, an economy's total output of goods and services". Economic growth, therefore, refers to the increase in the country's total production (Snowdon & Vane, 2006).

1.10 ORGANIZATION OF THE STUDY

This research comprises of six chapters. This Chapter one includes an introduction and a brief history of private sector investment, as well as the problem statement, study objectives, research hypothesis, research significance, study delimitations, operational concepts, organisation and summary of the study. Chapter two provides an account of private sector investment and economic development in South Africa, including patterns in private sector investment and economic growth as well as potential explanations for these trends. It will also discuss the factors that influence private and economic growth in general. Chapter three will provide a review of existing literature on private investment and economic growth which includes - theories of investment and economic growth, empirical review on the relationship between private investment and public sector, interest rates, credit to private sector, inflation rate, government investment and exchange rate. In addition, the relationship between

economic growth and private investment, public investment, labour and human capital will be looked at. Lastly, this chapter will also provide a summary of the literature reviewed. Chapter four will outline the methodology to be used in the study. It will describe the research sample size, data collection, data analysis, model specification, impulse responses and definition of variables, priori expectations, sources of data, estimation techniques, variance decomposition and diagnostic tests, ethical considerations and a summary. The introduction, description, and review of results will be covered in Chapter five, as well as how they are contextualized in literature and whether the literature confirms the findings. Chapter six contains the study's findings, including data analysis, explanation, and discussion, as well as the conclusion; limitations and recommendations are also covered in this chapter. Finally, the references and appendices are placed at the end of the thesis.

1.11 SUMMARY

This chapter provided a comprehensive background of the study. The chapter also provided statement of problem, research aim, research objectives, hypothesis, rationale or significance of the research, research delimitation, operational terms definitions and outline of the research.

CHAPTER TWO: OVERVIEW OF TRENDS AND DETERMINANTS OF PRIVATE INVESTMENT AND ECONOMIC GROWTH IN SOUTH AFRICA

2.1 INTRODUCTION

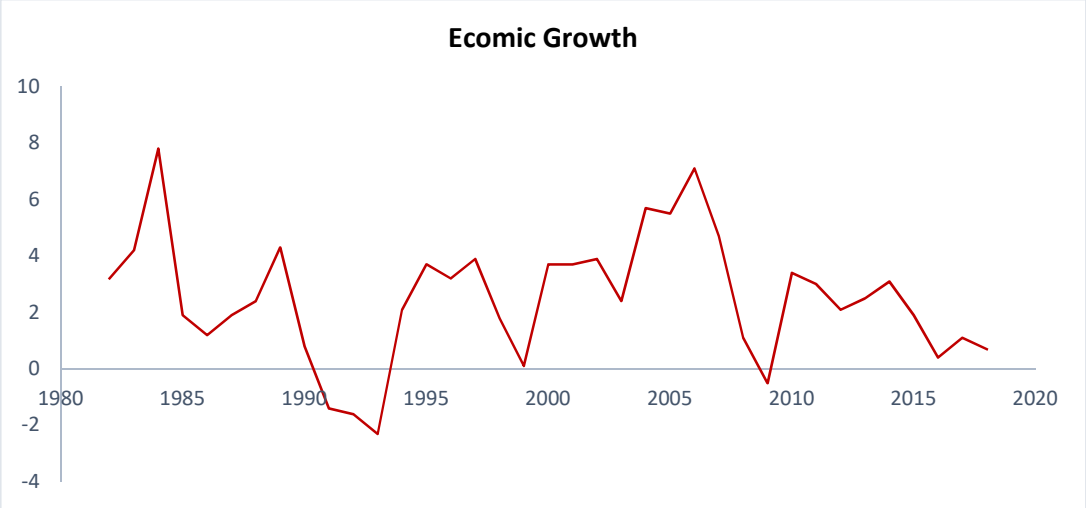
This chapter will analyse the trends of various variables used in the study. Trends in private investments, public investments, interest rate and exchange (independent variables) and economics growth (dependent variable) from 1982 to 2019 in South Africa will be analyzed with their supporting figures. The study will also will also look into the factors that affect private investment and economic growth in general.

2.2 BACKGROUND INFORMATION ON ECONOMIC GROWTH IN SOUTH AFRICA

Various structures of the South African economy are fundamental in a review of historic and current economic growth performance. The key contributors to economic growth in South Africa are household and government consumption, as well as private and public investment (ADBG, 2019). From 1982, international trade and forces of monetary policies (interest rate and exchange rate) have contributed to the competitiveness of South African exports, hence, adding on to growth rate through trade and investments. As such, the following sections present trends between private investments, public investments, interest rate and exchange (control variables) and economics growth (dependent variable) from 1982 to 2019 in South Africa.

2.3 THE TREND IN ECONOMIC GROWTH IN SOUTH AFRICA FROM 1982-2019

South African economic growth was on a rising trend in economic growth from 1982 until 1983 and had a positive trend in 1985 as shown in Figure 2.1. The positive trend in economic growth from 1982-1984 in South Africa was attributed to subsistence agriculture and hunting (Witness & Dzingirai, 2019), thus, commercial agriculture contributed to an increase in economic growth, complemented by hunting from foreigners.



Source: Author's Survey (2019)

Figure 2.1 Economic Growth in South Africa (1982-2019)

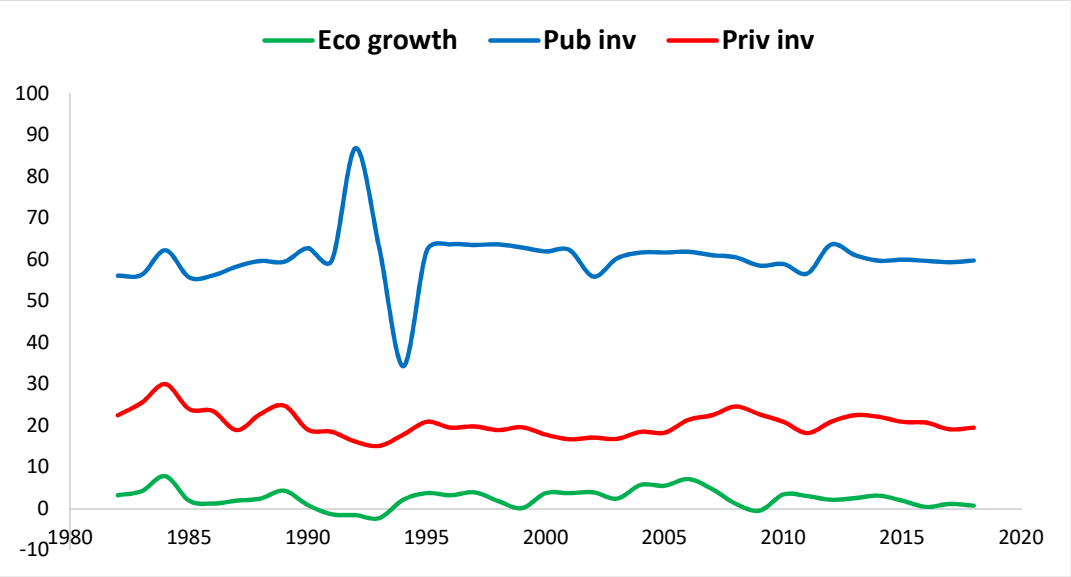
In addition to agriculture and hunting, good political reforms as well as foreign direct investment added to a positive increase in economic growth from 1986 to 1989. As stated in the report by World Bank in 2013, South Africa received more direct investment than any other country in Sub-Saharan Africa, however, from 1991 till 1994, the country experienced a gradual decrease in economic growth caused by political unrest as the nation was fighting against the apartheid regime (Hall, 2020). South Africa gained independence in 1994, and a sustainable political climate, along with expanded public and private investment; this ensured better economic efficiency. Furthermore, investor confidence was restored shortly after the creation of a democracy in 1994, and the economy became more stable (Enaifoghe, 2019).

As from 1997 to 2007, economic growth in South Africa increased from an average of 2.7% per annum (1997-2003) to 5.2% per annum (2000-2007) (StatsSA, 2014) and despite flactuations, as noted in Figure 2.1, South Africa recorded a positve annual avarage in economic growth. In 2008. the global economic crisis affected economies on a global scale which led to a negative growth as shown by a downward trend in Figure 2.1 above. Enaifoghe, (2019) mentions that the global economic crisis of 2008-2009 coupled with political and social challenges in South Africa weakened the economy (StatsSA, 2014), however, a positive economic growth was noted in 2010 which came as a relief, as the GDP showed growth (Grobler, 2019). In 2011, an annual growth rate of 3.2% was recorded although it dropped to 2.2% in 2012 and further

decreased to 1.5% in 2013 and ended up at 1.3% in 2018 (StatsSA, 2014). Considering the above trend, the following sections reviews the trends between economics growth and private investment, public investment, interest rate and exchange rate.

2.4 ECONOMIC GROWTH, PRIVATE AND PUBLIC INVESTMENT

Public investment entails investments by the state, through national, provincial, local governments, as well as public-owned industries and businesses (Ragosa & Warren, 2019). In terms of private investments, it is regarded as a macroeconomic perspective, where there is a purchase of capital assets with the aim of producing income or appreciate, or both generate income and appreciate (Ragosa & Warren, 2019). As shown in Figure 2.2, there are noticeable periods of upward and downtrend in terms of economic growth as a result of private and public investments. ceteris Paribas.



Source: Author's Survey (2019)

Figure 2.2 Economic Growth, private and public investment in South Africa (1982-2019)

Amid times of apparently fluctuating economic growth in South Africa, as seen in Figure 2.2, the economy witnessed noticeable growth in 1982 and 1984. The growth path in the economy was attributed to major investments made in both public and private sector. As shown in Figure 2.2, there is an upward trend in both public and

private sector which is also evident in the increase in economic growth. It is important to notice that in the period from 1982 to 1984, public and private investment had a sharp increase. According to Rodman (1994), South Africa has been performing well in terms of private and public investment ever since 1980. This has led to a probable increase in economic growth although the trend was slightly fluctuating. After a slight decrease in both public and private investment in 1984, from 1986 an upward trend was noticable in both private and public investment.

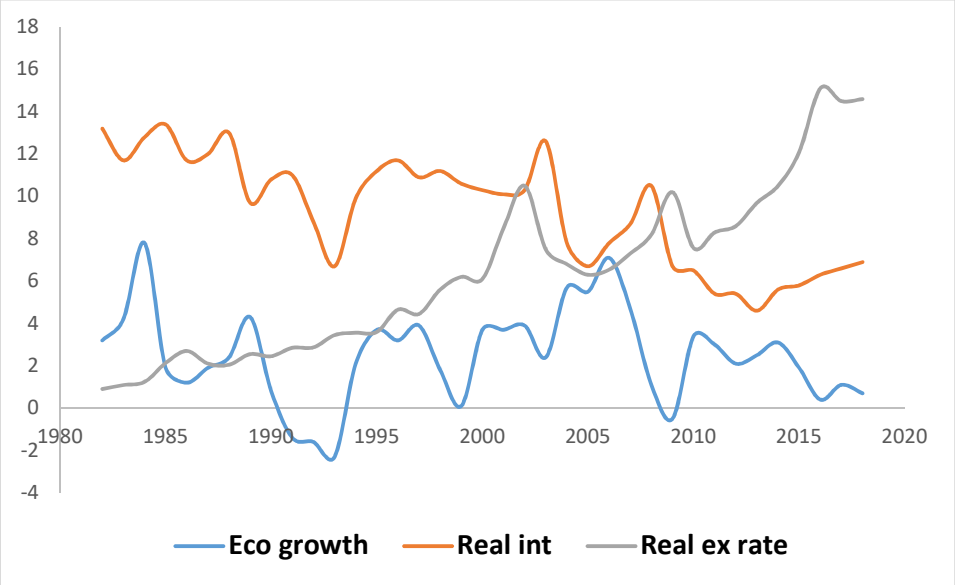
The apartheid government invested billions in ZAR for infrastructure development such as roads, hotels, ports, schools and hospitals (Barry, 2018). Within the economy, aggregate expenditure on public and private assets took a deep plunge in 1990 till 1994 as shown in Figure 2.2. The decrease in both private and public investments is a result of political uprising in South Africa which led to sanctions against investments (Rodman, 1994). Economic growth was affected and decreased significantly in the same period. Public investments took a downward trend since the apartheid government was facing political upheavals which eventually led to change of governments in 1994.

The birth of the new government led by African National Congress (ANC) implemented different strategies to revive the economic. Amongst others, public investment was linked to different economic growth programs such as Reconstruction and Development Programme in 1994 (Barry, 2018). Programs such as Growth, Employment and Redistribution (GEAR), Accelerated and Shared Growth Initiative for South Africa (ASGISA) and National Development Plan were initiated to further develop the democratic Republic of South Africa. In this respect, between 1994 and 2015, these programs contributed greatly to economic development (IDC, 2016) as nearly, 74.8 percent of gross household and private investment contributed to real economic growth. Around 1994 and 2007, fixed investment contributed a total of 29.3 percent and government expenditure contributed a total of 18.2 percent (IMF, 2016). The global financial crisis of 2008, however, led to a decrease in the economic growth and investments in South Also took a negative trend. After the global financial crisis of 2008 which extended into 2009, economic growth in South Africa began to increase and the soccer world cup, held in South Africa, in 2010, further improved economic growth as shown in Figure 2.2 above. Beyond, 2011, there were noticeable fluctuations in economic growth as also noted in Figure 2.2. Moving over to exchange

rate and interest rate management in South Africa, a more detailed discussion is presented below.

2.5 ECONOMIC GROWTH, EXCHANGE RATE AND INTEREST RATE MANAGEMENT IN SA

Exchange and interest rates' management are important in influencing economic growth, through international trade and foreign direct investments. Exchange rates determine the demand for exports and imports and interest rates determine the rate of borrowing and returns to investments (Koijen & Yogo, 2020). Exchange rates stand out to be an major factor of economic growth due to its relation to international trade and it determines international competitiveness (Avdjiev, *et al.,* 2019: Koijen & Yogo, 2020).



Source: Author's Survey (2019)

Figure 2.3 Economic growth, Exchange rate and Interest rate (1982- 2019).

Economic growth over the period from 1982-2019 has been fluctuating due to some of the reasons mentioned above as international trade, domestic and foreign investments, exchange rates and interest rates have played major roles. Before

democracy, it is noted that there were fluctuations in economic growth and similar trends were noted in interest rate and economic growth. From 1982, economic growth indicated a positive increase which was accompanied by decrease in both exchange rates and interest rate. According to Ilhan (2017), economic growth increased from 3,2% in 1982 to 7,8% in 1984 in South Africa. During the same period, real interest rate decreased from 13,2% in 1982 to 12,8% in 1984 while exchange rates recorded a minimal increase from 0,9% to 1,24%. The increase in economic growth and the decrease in real interest rate is shown in Figure 2.3 where there was a downward slopping real interest rate curve while economic growth took a sharp upward slopping curve. In 1989, a 4,3% increase in economic growth was record followed by a steep decrease of 0,8%, -1,4%, -1,6% and -2,3% in 1990, 1991, 1992 and 1993 respectively (Trading Economics, 2018). This is evident in Figure 2.3 where economic growth decreased significantly. In the same period, real interest rate fluctuated and 9,7% was recorded in 1990 followed by 10,8%, 11% and 8,8% in the same period (StatsSA, 2018). In terms of real exchange rates, 2, 45% was recorded in 1980, 2,85% (1991), 2,87% (1992) and 3,56% in 1993 (SARB, 2019). As such, the drop in economic growth was significantly affected by political unrest from 1990 till 1994 when South Africa became a democratic state.

After 1994, the South African economy experienced the beginning of economic success as the country gained momentum in economic growth. The normalization in the economy in South Africa was because of favorable real exchange rate which remained competitive in a long-term with notable downward trend that began in 2000 when South Africa adopted a flexible exchange rate regime. Economic growth rate reached one of the highest, of 7.60 percent, in the last quarter of 1994 due to major investments attracted by favorable interest rates on assets. Intrepid macroeconomic growth programs such GEAR and ASGISA boosted the economic competitiveness in international trade and local currency gained value against major currencies such as USD and British Pound (Trading Economics, 2018). Figure 2.3 shows that over the period 2000-2008, economic growth fluctuated more than the exchange rate and real interest but it took a sharp decrease in 2008 due to global financial crisis.

Soon after the global financial crisis of 2008, South Africa adopted an export-led economy and an outward-looking trade policy was implemented while the exchange rate was left floating. Interest rate was used to control inflation and local investments

which also ensured export growth due to favorable returns on investments. After 2008 (global financial crisis), the South African government encouraged multidimensional trade agreements such as General Export and Incentive Scheme African Growth which improved South African products in the international markets, such as the U.S (Barry, 2018); thus, between 2009 and 2018, the South African Rand was fluctuating against other currencies as shown in Figure 2.3. The year 2014 recorded a further appreciation of real interest to 11.89 from 11.41 in 2009. This was followed by a 1.4 percent annual growth on average. In this regard, it should be remembered that different phases of the South African economy are marked by different variations in economic development, exchange rates, and real interest rates. In addition, various cycles are characterized by an increase or decline in the exchange rate and economic growth.

2.6 DETERMINANTS OF PRIVATE INVESTMENT

Effect of public investment on private investment is ambiguous. Public investment may crowd-out private investment through high interest rate, increased deficits and the competition for some scarce resources such as raw materials and skilled labour. However, public investment may act as a crowding-in promoter via the key infrastructure delivery such as communication, irrigation projects, transport. Public investment has both crowding-in and crowding-out effects on private investment (Frimpong & Marbuah, 2010).

Private sector investment can be influenced by the real exchange rate, as real cost of imports is influenced by the real exchange rate. As currency devalues, real cost of purchasing imported capital goods increases, which leads to decline in private sector profitability, hence, investment decline in the economy. In addition, real income can decline in the economy as the results of real devaluation, thus reducing productive capacity. On the contrary, real currency devaluation may positively affect investment on those sectors that produces international traded goods as it increases export volumes and competitiveness. Profit in export oriented sectors is increased by real exchange rate depreciation which promotes investment in these sectors. Real exchange rate depreciation leads to increase in the cost of imported goods, hence

investment in the economy decreases. Real exchange rate and public investment has ambiguous effect on private investment (Frimpong & Marbuah, 2010).

Net capital inflow and domestic credit to private sector are both private investment sources of funds. “Within the context of flow of funds, the inflow of foreign capital to the private sector, be it trade credit or other forms of loans and equities constitutes a source of funds to this sector”(Majeed & Khan, 2008:49). In Developing countries, foreign direct investment is the significant factor in the inflow of capital from foreign investors. However, in the local private investment, whether capital from foreign investors came through portfolio investment or direct investment, there is no much difference. Thus, foreign capital inflow to the private sector is one the factors that influences private investment (Majeed & Khan, 2008).

Incentive to invest is reduced by heavy debt because of the expected foreign tax on the investment returns and future income. Country’s huge external debt to GDP ratio means that existing debt must be serviced by any investment that the country may receive in the future which may lead to decline in investment. Several studies found that in developing countries, huge external debt to Gross Domestic Product (GDP) ratio has a negative effect on private investment (Oshikoya, 2019).

Macroeconomics instability is determined by inflation rates which can have negative impact on private investment. High inflation rate and unanticipated inflation makes long term investment to be risky which affects both private and foreign investors. Empirical results by other scholars concluded that unexpected inflation and high inflation rates, mostly in developing countries decreases investors’ confidence. Hence, high inflation rate influences private investment negatively (Oshikoya, 2019).

Well established firms investments depend on equity financing and retained earnings, however, in developing countries, private enterprises and small firms that are still emerging, relies on bank credit as their main source of investment financing. Impact of bank credit on private investment sector in developing countries is indistinct. Bank credit has a positive effect on private investment if private enterprises use the funds responsibly without misusing the facility. However, if bank credit is used for non-investment purpose, bank credit will have negative impact on private investment (Majeed & Khan, 2008).

2.7 DETERMINANTS OF ECONOMIC GROWTH

According to economists, four variables influence economic development and growth: human resources, physical capital, natural resources, and technology. Physical capital improvements and increased investment, such as roads, machines, and factories, will cut the cost of economic output and increase its efficiency. Factories and equipment that are modern and well maintained are more productive than physical labor. Higher productivity leads to increased output. Labor becomes more productive as the ratio of capital expenditures per worker increases. An improvement in labor productivity increases in growth rate of the economy. Quantity and availability of natural resources affect the rate of economic growth because the discovery of more natural resources, such as a boost to the economy by increasing a country's production capacity. Improvements in technology have a high impact on fact that as the scientific community makes more discoveries, managers find ways to apply these innovations as more sophisticated production techniques. The application of better technology means the same amount of labor will be more productive, and economic growth will advance at a lower cost. Thus, countries that recognize the importance of the four factors that affect economic growth will have higher growth rates and improved standards of living for their people (Woodruff,2019).

Furthermore, according to Boldeanu and Constantinescu (2015), direct factors such as human resources (land, underground resources, increased capital employed, or technical advancements) influence economic growth. It is also influenced by indirect factors which are institutions (financial institutions, private administrations etc.), the size of the aggregate demand, saving rates, and investment rates, the efficiency of the financial policies, migration of labour and capital and the efficiency of the government.Among many variables that may influence economic growth, several studies attested that economic growth rate is influenced by private capital formation. Private investment stimulates increase in employment and increases the per capita income which results in Gross National Product and Gross Domestic Product increase. Thus, it is acknowledged that increasing private investment should be considered in developing countries for their economies to grow. Analysis done recently on the sources of growth found that increase in Total Factor Productivity (TFP) and more

investment are the greatest contributing factors to economic growth of the country (Serven, 2010).

One of the major factors of economic growth is public investment. Government intervention is crucial for any given economy to grow. Sufficient economic growth, price stability are factors that require government intervention. Distribution of national income through spending on goods and services is one of the fundamental roles of the government (Apostolo & Crumbley, 1998). The importance of government policy on economic growth is vital. Government expenditure on productive goods has a positive effect on economic growth, on the contrary government expenditure on unproductive goods negatively impact growth rate in the economy. The challenges lies on government to identify unproductive goods before expenditure occurs. Hence, structure and composition of government expenditures as well as government expenditure are significant factors of economic growth (Easterly & Rebelo, 1993).

International flows of labour, increasing rate of structural transformation, increasing growth rate of capita output or income, capital and goods are the main features of economic growth (Ochejele, 2007). Gross Domestic Product (GDP) and Human Development Index (HDI) are used to measure economic growth. HDI is an index that measures national growth based on measures of life expectancy at birth, adjusted real per capita income, education attainment and literacy. Due to these factors, some economists argued that economic growth is sustained by actual goods and services produced in the economy.

Regardless of skilled labour and natural resources benefits, it was noted that the higher the capital formation of the country's economy, the faster the economy can grow its aggregate income. Increase in the total goods and services produced in the country, increases national income levels (Chirinko, 1993). Asante (2000) noted that in developing countries like Pakistan, Fiji and Ghana, private investment has been the major contributing factor to increase in economic growth.

2.8 SUMMARY

From the above information, it can be concluded that there is relationship between private, public, exchange rate, interest rate (independent variables) and economic growth (dependent variables). Exchange rate and interest rate have major influence

on economic growth through international trade. It can also be seen from the above analysis that major investment on public and private sectors affected economic growth positively, during its upward trends. It was concluded that public investment, real exchange rate, net capital inflow, domestic credit, high debt and inflation rate are some of the factors that affects private investment. Private investment, public invest FDI, total goods and services have influence on economic growth.

CHAPTER THREE: LITERATURE REVIEW

3.1 INTRODUCTION

This chapter gives a review of the theoretical framework and studies that have been conducted on the effects of private sector investment on economic growth in South Africa. It concludes with a synopsis of the chapter and introduces chapter four.

3.2 THEORETICAL UNDERPINNINGS OF THE STUDY

Theoretical underpinnings of the effect of private investment on economic growth are examined in this chapter, therefore, it delves into empirical evidence on the factors that influence private spending and economic growth.

3.2.1 Theories of investment

There are plethora of theories that have been established with regards to investment. In the context of this study, theories that are applicable include, the Keynesian theory, neoclassical theory, the accelerator theory, Tobin Q and the internal funds theory of investment.

3.2.2.1 Keynesian Theory of Investment

This theory is also called the ‘marginal product of capital’ or ‘marginal efficiency of capita’. The cost of capital is argued to be highly depended on the interest rate, thus, massive swings in investment, according to Keynes, are caused by changes in the investment-demand curve itself rather than variations around the curve. The investment-demand curve is dynamic, since it is based on firms' projections of investment profitability. In an economic boom, entrepreneurs expect the economy's fast growth and demand for their goods to grow. They increase their production capacity in response to these favorable potential market forecasts by investing heavily in new capital. This increased investment drives the growing demand for other businesses' products and improves their confidence. As the economy continues to deteriorate, many companies learn that they have considerable surplus capacity, both because demand is decreasing and because their high spending rates have equipped them with the potential to generate extremely high levels of production. Firms avoid investment as a result of the excess capacity, which reduces the overall demand and adds to the deceleration of the economy. Firms become ever more skeptical as

demand and productivity decrease, holding investment near zero throughout the contraction period of the cycle (Parker, 2010).

Both John M. Keynes and Irving Fisher claim that investments should be made before the current value of anticipated potential profits equals the opportunity cost of capital at the margin. This implies that investments should be made before the net present value of the investment equals zero for the expectation is that an investment would produce a supply of potential cash flows, C. (t). This can be represented as a negative cash flow, – C0, since investment, I, reflects an outlay at time 0. As a result, the net present value can also be expressed as:

$$NPV = -C_0 + \int_0^{\infty} C(t)e^{(g-r)t}dt$$

..... (1)

In this instance where growth rate is denoted by g, and the opportunity cost of capital is denoted by r. (discount rate). Investment would be worthwhile if the estimated return on investment, I is greater than the opportunity cost of capital, r. When r = I the NPV equals zero. Keynes' marginal utility of capital and Fisher's internal rate of return are equal to the return on investment, I. The PV of an investment, I, can be written as C1/(r-g) from equation (1), meaning that PV/I = 1. (Mbaye, 2014).

3.2.2.2 Neoclassical Theory of Investment

Jorgenson's (1963 & 1967) neoclassical investment theory begins with a firm's optimization problem. Profit maximization each time would result in an optimum capital stock, with the assumption that the production function can be written as a conventional Cobb-Douglas function (Mbaye, 2014).

$$Y(t) = f\big(K(t), L(t)\big) = AK^{\alpha}L^{1-\alpha}$$

.....(2)

In period t, Y(t) signifies firm output, K represents capital, and L denotes labor. As a result, the profit function for a representative firm can be written as follows:

$$\pi(t) = p(t)Y(t) - s(t)I(t) - w(t)L(t)$$

..... (3)

where $\pi(t)$stands for profit, p(t) for production price, s(t) for capital price, and w(t) for wage. Under the assumption of profit maximization, a firm's current value, V (0), can be expressed as:

$$V(0) = \max E_{\Phi_0} \int_0^{\infty} \pi(t) e^{-rt} dt$$

$$E_{\Phi_0} \int_0^{\infty} \left[p(t)Y(t) - s(t)I(t) - w(t)L(t) \right] e^{-rt} dt \quad \text{..... (4)}$$

s.t. $dK/dt = I(t) - \delta K(t) = \dot{K}(t)$
and

K (0) is given.

$$L = V(0) + \int_0^{\infty} \lambda \left[(I - \delta K) - \dot{K} \right] e^{-rt} dt \quad \text{.....(5)}$$

Which gives:

$$L = \int_0^{\infty} \left[pY - sI - wL + \right.$$
$$\left. \lambda(I - \delta K) - \lambda \dot{K} \right] e^{-rt} dt \quad \text{..... (6)}$$

From this we obtain the current value, Hamiltonian:

$$H = pf(K, L) - sL - wL + \Lambda(1 - \sigma K)$$

..... (7)

where the Lagrangian multiplier $\lambda(t)$ is our costate variable. It is necessary to note that $\lambda(t)$ denotes the capital shadow price. We obtain the following first order conditions by differentiating the Hamiltonian.

$$\frac{\partial H}{\partial I} = -s + \Lambda =$$

0..... (8)

The opportunity cost of capital must match the shadow price of capital, according to this condition.

$$\frac{\partial H}{\partial I} = pF_L' - w = 0$$

……(9)

Simply put, this condition states that labor should be utilized until its marginal revenue equals the wage. We may extract the following from the maximum theory (Tobin, 1969).

$$\frac{\partial H}{\partial X} = \frac{\partial K}{\partial t} = I - \partial K = 0$$

…… (10)

According to this, net investment should be zero in equilibrium, and gross investment should match K's depreciation. Ultimately, the capital marginal condition is:

$$\frac{\partial H}{\partial K} = pF_k^1 - \partial\sigma = 0$$ …… (11)

The canonical equation (Tobin, 1969) requires that $y = -\frac{\partial H}{\partial K}$, where y is the control variable such that $y = \Lambda e^{-rt}$ at time t, thus:

$$-\frac{\partial H}{\partial K} = \frac{d}{dt}[e^{-rt}\Lambda(t)] = \frac{\partial \Lambda}{\partial t} - r\Lambda$$

…… (12)

This implies that equation (11) can be expressed as follows:

$$-pF_k^1 + \Lambda\sigma = \frac{\partial \Lambda}{\partial t} - r\Lambda$$

…… (13)

From equation (8), s = Λ, which means that $\frac{\partial s}{\partial t} = \frac{\partial \Lambda}{\partial t}$. This also entails that $\frac{\partial H}{\partial K}$ can be stated in the following way:

$$pf_k' + s\sigma = \frac{\partial s}{\partial t} - rs$$

…… (14)

Rearranging this we obtain:

$$pf_k' = s[\sigma + r - (\frac{\partial s}{\partial t}/\text{s}]$$

…… (15)

Since pf_k' is the marginal rate of return on capital, mrr_k equation (11) can be written as the marginal product of capital:

$$f_k' = s[\sigma + r - (\partial s/\partial t/s]/p$$

…… (16)

Note that $f_k' = \frac{\partial Y}{\partial K}$. Jorgenson's (1963) user cost of capital, c, is defined as:

$s[\sigma + r - (\frac{\partial s/_{\partial t}}{s}]$, which means that:

$$pf_k' = C$$

…… (17)

This can now be utilized towards deriving the optimal capital stock, K^*, and the investment function. Adopting Cobb Douglass technology, the marginal product of capital will be expressed as follows:

$$\frac{\partial Y}{\partial K} = f_k' = \alpha k^{\alpha-1} L^{1-\alpha}$$

…… (18)

Which in turn can be expressed as:

$$\frac{\partial Y}{\partial K} = \frac{\alpha Y}{K}$$

…… (19)

Multiplying by P_t and recalling equation (17) we get:

$$\frac{\partial H}{\partial K} = p\frac{\alpha Y}{K} = C$$

…… (20)

When we solve for K we get an expression for the optimal capital stock:

$$K^* = p\frac{\alpha Y}{C}$$

…… (21)

It is now clear that K* is dependent on output, output price, and the consumer cost of capital, C. As a result, investment is determined by the difference in capital over two periods:

$$I = p\,\alpha Y/C - K\hat{}* \ (t - r)$$

…… (22)

Notice that this implies that K(t) adjusts to $K^*(t)$ instantly. If the change to the optimum stock is only minimal per time, equation (22) can be modified by adding an adjustment parameter that depends on the difference between real and expected capital).

The neoclassical theory of optimum capital accumulation serves as the theoretical foundation for the neoclassical theory of investment. According to the theory, demand and the price of capital resources, relative to the price of supply, determine the target capital stock. The cost of capital services is determined by the cost of capital goods, the interest rate, and how a company's income is taxed. As a result, changes in demand or the price of capital services relative to output, affect the desired capital stock, and ultimately investment. For the Neoclassical theory, investment decisions must be made depending on both expected profits and the cost of capital (Molapo & Damane,2015).

3.2.2.3 The Accelerator Theory

According to the simple accelerator model, proposed by Clark (1917), investment spending is equal to changes in production and is unaffected by capital costs. The simple accelerator model was premised on the notion that companies invest in new capital when they need to increase production. As a result, companies could invest if production was supposed to shift, but they would not invest if output was not expected to change. The basic accelerator model did an excellent job of describing the data, but it was considered insufficient because it failed to account for investment costs. The issue of whether the cost of capital has a substantial impact on investment has received a lot of attention in academic debates. In past studies, when the accelerator model is generalized to incorporate existing investment and historical shifts in income, it tended to be excellent at describing investment, more than the neoclassical model. This implies that the cost of capital is not the key determinant of investment. According to the accelerator model, a firm's investment choice is influenced by demand for its end product (whether or not sales of the end product are increasing or are projected to increase), and whether demand is expected to rise, capital stock volumes must be raised to accommodate the anticipated demand. Investment decisions are made based on profitability in the profit model of investment because profits are significant (Molapo & Damane, 2015).

The acceleration principle, or accelerator, was one of the first scientific investment models, and it is one of the first empirical investment models. The accelerator is a basic model that integrates the type of input from current output to investment that Keynes observed as a result of current output's impact on the expectations of the investors. The accelerator model suggests that a firm's optimal capital-output ratio remains relatively stable. This means that the ideal capital stock for each time t is equal to the amount of output in t, K t* = Yt, where the required capital-output ratio is the lower-case Greek letter sigma. Assuming that companies spend in period t to boost their capital stocks to Kt+1* in period t + 1, then the depreciation will be simply Lt =Kt+1* Kt ; however, since Kt = Kt*, It equals (Yt+1 – Yt), the simplest accelerator model assumes that future investment will be proportional to future demand growth. The accelerator is a simple model that integrates the type of input from current output

to investment that Keynes observed as a result of recent output's impact on investors' desires.

The accelerator model suggests that a firm's optimal capital-output ratio remains relatively stable. This means that the desired capital stock for each time t is equal to the amount of production in t, Kt* = Yt, where the desired capital-output ratio is the lower-case Greek letter, sigma. Assuming that companies spend in period t to boost their capital stocks to Kt + 1* in period t + 1, then, if depreciation is zero for simplicity, $I_t = K_{t+1}^* - K_t$. but since $K_t = K_t^*$, that means that $I_t = \sigma (Y_{t+1} - Y_t)$.The simplest accelerator model, thus, predicts that investment is proportional to the increase in output in the coming period (Parker, 2010).

3.2.2.4 Tobin Q Theory of Investment

The Tobin Q hypothesis was proposed by James Tobin in 1969 and looks at the ratio of a company's stock value to its replacement cost of capital. When the ratio is greater than one, companies will continue to spend more money, resulting in rapid investment. When the ratio equals one or unity, companies are undecided on whether or not to spend more money and when the ratio is less than one, it is easier for the company to sell current assets rather than buy new ones. Tobin Q has been criticized for being difficult to calculate or estimate replacement costs. The average Q, which is the ratio of the market value of a current stock of capital to its replacement costs, is frequently utilized instead of the marginal Q, which is difficult to calculate, due to methodological issues. Tobin Q's applicability to developed countries is constrained because it renders overly simplistic claims like perfect financial markets, perfect information flow, and little or no public investment (Mbaye, 2014).

The accelerator theory and the neoclassical theory of investment had two basic flaws, which led to the creation of the Q theory of investment. Firstly, the two theories, both indicates $K_t^* = K_t$ t in each period, implying that the capital stock change to the target amount is immediate and absolute in each period, however, adjusting the cost function to the optimization problem was noted as a probable solution. Another issue is that in both the neoclassical and accelerator theories, assumptions are not considered. Brainard and Tobin (1968) and Tobin (1969) proposed a mechanism to solve this matter, arguing that investments ought to be done until the point where the

replacement cost of assets is in equilibrium with the market value of the assets. They also found that the neoclassical theory was technically like the Q- theory by applying a marginal adjustment cost function to the profit function. After the addition of the adjusted cost function to the profit function, the value of the firm can be expressed as follows:

$$Where\ \vartheta(I(t))$$
.....(23)

is the cost function of marginal adjustment. The marginal conditions for K, L, and λ are the same as before after setting up the Hamiltonian and differentiating. In the same way, the current Hamiltonian value is expressed as:

$$H = pf(K,L) - sI - \vartheta(I)sI - wL + \lambda(I - \delta K)$$
.....(24)

Clearly it can be noted that except for investment, the marginal conditions are all the same as they are in neoclassical theory. The conditions have been updated to show the cost of the adjustment:

$$\frac{\partial H}{\partial I} = -s - \vartheta(I)s - \vartheta'(I)sI + \Lambda = 0$$
.....(25)

This can be written:

$$\Lambda = s[\,\vartheta(I) + \vartheta'(I)I + 1]$$
..... (26)

In the meantime, λ is the capital shadow price, and s is the cost of one more unit of capital. In other words, the quotient λ/s represents the incremental return on investments in relation to the cost of capital, hence, dividing by *s* and defining marginal *q* as $qm = \lambda/s$, equation (25) can be expressed as follows

$$q_m = \vartheta(I) + \vartheta'(I)I + 1]$$
.....(27)

This allows us to define investment as an implicit function of q_m:

$I = \emptyset(q_m)$ .....(28)

It is important to note that the q_m refers to the marginal return on capital and the opportunity cost of capital. The quotient λ/s is a marginal variant of Tobin's Q, and the marginal q, calculates the return on investment compared to the opportunity cost of capital.

Tobin's Q is often calculated as the market-to-book ration, nevertheless, this corresponds to a calculation of average return on capital, which is not the same with $\lambda/s = q_m$. Hashmi et al. (2012) shows that average Q equals marginal Q only if certain conditions are met. These conditions include that the firm must be a price- taker, and there must be homogeneity in the production and installment functions (Mbaye, 2014).

James Tobin also developed the financial market-based investing philosophy; with this, a firm's investment level can be determined by the current value of established capital divided by the replacement cost of capital. Tobin's q is the ratio; when $q > 1$, according to the q theory of investment, companies will want to raise their capital stock, and when $q < 1$, they will want to decrease their capital stock. If $q > 1$ and at a replacement cost, a firm will be able to invest one dollar in capital and yield profitability that is worth more than one dollar. Firms raise profitability by bringing in more money; under those terms, we anticipate a high level of investment. If q is less than one, the present value of the profits gained by installing new capital is less than the capital's cost, so further investment ultimately results in a profit reduction. If q is less than one, we consider investment to be near zero. When q is less than 1, it is pertinent to note that anyone hoping to enter a specific market will accumulate the requisite capital assets for less money by purchasing an existing company rather than starting from scratch. This is grounded on the rationale that installed capital costs will be lower than the replacement costs. Tobin's q is precisely the co-state factor (or Lagrange multiplier) q, according to Roomer's study.

Roomer's equation (8.24) is the gateway to understanding the relationship between the co-state variable and Tobin's market interpretation of q. (8.24). The present value (as of time t) of the stream of real profits per unit of capital that will be earned from time t into the future, is equal to q(t). If a potential buyer of a share in a company has

a stake in this stream of earnings, she would be able to pay the exact present value of the stream on each unit of capital she indirectly purchases while purchasing shares in the company. Since the actual cost of new capital is normalized to one, q equals the market value of a firm's stock (qk) divided by the replacement cost of its capital (k). If q > 1, companies can sell new stock for more than a dollar, purchase capital for a dollar, and the difference will be kept as profit. This implies that investment will be higher when q is greater than 1. An attempt to solve the optimal rate of investment model, consequently increases the q function, $K(\ )t = f\ q\ t(\ (\ ))$, with $f' > 1$ and $f(1) = 0$. As reiterated earlier, when the adjustment cost function is quadratic, ultimately the *f* function is linear and investment is a linear function of *q* (Parker, 2010). Molapo and Damane (2015) elucidated that Tobin's q model argues that investment decisions are made only when the replacement costs of physical properties are smaller than the improvement in the valuation of company shares.

3.2.2.5 The Internal Funds Theory of Investment

The desired capital stock, and thus investment, is calculated by the rate of profit, according to the internal funds theory of investment. Investment is favorably linked to realized earnings and it is presumably dependent on projected income. Internally, managers, are said to have a strong preference for financing investment. Molapo and Damane (2015) further argue that investment decisions are made based on profitability in the profit model of investment because profits are essential in facilitating internal and external investment funding.

3.2.2 Economic growth theories

There are several theories which have been contributed by diverse scholars on the investment subject. Despite the existence of a plethora theories, in this research, the following theories are applicable to this research; Keynesian Model, Neoclassical growth model, Endogenous growth, Human capital theory and, lastly, Privatisation.

3.2.2.1 Keynesian Model

Keynes played an important role in identifying nations' sources of economic growth in the 20th century. Keynes is one of the classical economists who came with ideas on what causes nations' economy to grow after exploring the flow of economic growth

from different points of view, for more than three decades (Mustefa, 2014). According to Makuyana and Odhiambo (2016), public investment spending is one of the core sources of economic growth in all countries. Investment in public infrastructural projects, such as education, airports, highways, roads, power generation and transmission, water supply and sewage system, usually increase marginal productivity of private capital.

The implication is that if a country invests in people's education, people become more knowledgeable, informative and construct new ways of improving things in their country, hence the economy will grow. Secondly if the country can also invest heavily on the mode of transportations, this will improve importation and exportation of goods, which will make the economy to grow. Lastly if the economy continues to invest in health system and in water and sewage, individuals will be fit and healthier enough to become productive and they will spend less time absent from their jobs, hence the economy will grow both in the medium and long term. Nevertheless, this public and private investment reciprocity is subjected to the law of diminishing return. This means that as a country's income increases as a result of public investment to a higher income level, the marginal productivity of private investment increases at a steady rate (Bayraktar & Fofack, 2007).

3.2.2.2 Neoclassical growth model

The neoclassical model is based on the models which were devised by two economists - Solow and Swan in 1956 - on their models of growth, which focused mainly on aggregate production function and capital accumulation equation (Mustefa, 2014). The main feature of this model is that sustained increase in capital investment may lead to increase in economic growth. This model is an improvement of the Harrod–Domar Model which states that investment rate is important in determining the economic growth the country will attain. The Harrod–Domar model explains that economic growth can increase by either reducing capital or income (S / Y) or increase in the investment rate with savings or income (Mustefa, 2014). This model can also be described as the exogenous growth model, in which the long-run growth rate is dictated by exogenous factors, such as population growth and technological change. Theoretically, as posited by Epaphra and Massawe (2016) there is a degree of homogeneity of the neoclassical production function, meaning that there must be availability of factors and if not, the output will equal zero.

3.2.2.3 Endogenous Growth

Adam Smith in his early research, concluded that growth is a process that is viewed as strictly endogenous (Eltis, 1984). The Endogenous growth model was developed after the Neoclassical growth model's failure to empirically show consistency in predicting countries with similar technologies can produce similar output levels and can converge to a certain level in steady state. The second shortfall of the Neoclassical growth model is its failure to show how government policies can influence growth process (Mustefa, 2014). The Endogenous growth model addresses Neoclassical growth model shortcomings by suggesting ways to which steady state growth arises endogenously. One of the approaches to address failures of the neoclassical model is by introducing externalities in the growth process. Secondly, by viewing input in production as capital that can be reproduced, such as physical and human capital (Mustefa, 2014). Epaphra and Massawe (2016:9) explain that "the endogenous model followed the neoclassical growth model whose most important weakness was not to consider internal factors in long- term economic growth such as policies and institutions and focussed on the external factors such as technology and human capital".

3.2.2.4 Human Capital Theory

In the development literature, human capital theory is one of the methods used to counter Neoclassical growth shortfalls. It is pertinent to note that the accumulation of human capital is one of the causes of externalities that have been extensively discussed and stressed (Mustefa, 2014). According to endogenous growth model, physical investment is not the only source of output growth but investment in human capital, for instance, increase in government spending on education is also a source of output growth (Suhendra & Anwar 2014). Government spending and investment in human capital play a major role in the development of economic growth in the new growth model. Educated and skilled workers increase productivity and development in an economy, therefore, this theory suggests that increase in government spending on human capital results in an increase in economic growth due to increase in people's knowledge of how to produce output (Suhendra & Anwar ,2014). This means that investment in human capital will be vital to accelerate the South African economic growth.

3.2.2.5 Privatization

The notion of property rights is at the center of the privatization debate. Property rights, according to Investopedia, are individuals' theoretical and legal possession of real property, as well as their power to control how the property is used. Property interests must be formalized in order to be traded in a broader economy. Lack of structured property rights, according to Mustefa (2014), is one of the factors leading to underdeveloped countries' inability to sustain long-term development. Exchange of goods and services in the market expands as people acquire more formal property rights, hence, the economy will grow. Property rights obtained in the economy by individuals lead to long term sustained growth. Mustefa (2014) also argues that formal property rights enable individuals to gain access to credit, since they can use them as security to pursue long- term goals which will also lead to future growth in the economy.

3.3 EMPIRICAL LITERATURE REVIEW

In this section, the researcher will review past research on the effects of private investment on economic growth, as well as economic growth with emphasis on the global context and local scenarios. The effects of private spending and economic development have been discovered in several empirical studies, however, proof on the effects of private investment on economic development is ambiguous. The following subsections describe certain interesting conclusions reached on the subject.

3.3.1 International Evidence

3.3.1.1 Effect of private investment on economic growth

The findings of Batu's (2016) research indicate that output/national income, public investment, and the exchange rate are the most important factors influencing private investment efficiency. Other variables, such as interest rate, credit, inflation rate, international trade, and money supply, play a minor role in understanding private investment efficiency. Ultimately, Batu (2016) acknowledges that countries should focus their efforts on building an enabling climate for private investment.

Using time series data from 1966 to 2008, Jalloh (2014) assessed the macroeconomic effects of private investment in Sierra Leone. To empirically evaluate the relationships

between private sector investment and some primary macroeconomic variables, the research used Ordinary Least Square. The unit root tests for stationarity reveal that all variables are stationary with breaks, thereby, rationalizing the utilization of an Ordinary Least Square estimation method. The findings indicate that real GDP drives private sector investment, while real interest rates, inflation, and political instability, as shown by a decade-long civil war in the country, drive public sector investment and credit supply to the private sector.

Using a panel data survey of 15 developing countries in Asia from 1984 to 2009, Phetsavong and Ichihashi (2012) investigated the factors impacting economic development and the interrelatedness of public investment, FDI, and private domestic investment. The researchers argue that private domestic investment is the most important factor leading to economic development, followed by FDI, whereas public consumption and Asian financials tend to be detrimental to growth. Furthermore, studies of the effects of public investment on FDI and private domestic investment in emerging Asian countries indicate that when public investment exceeds thresholds, it decreases the positive influence of FDI and private domestic investment on economic development (crowding-out effect). When public investment exceeds 6.6-7.5 percent and 4.9-8%, the interactive variables FDI*Dm and PRICAP*Dm tend to become unfavourable in the second and third model methods, meaning that, the favourable impact of FDI and private domestic investment on growth is weakened. In general, public spending in Asia's developed countries have a substitutable impact on FDI and private domestic investment.

Hashmi, Akram, and Hashmi (2012) conducted a study in Pakistan to look at the importance of investment in economic development. Using a vector autoregressive approach, this research examined the effect of public and private spending, as well as the effects of political and macroeconomic instability on economic development (VAR). In the long term, both public and private investment had a favourable effect on economic development, but only private investment had a significant relationship with growth in the short run. Economic growth was slowed by government’s consumption spending, economic uncertainty, and political turmoil. The study also found that inflation-based volatility had a positive impact on GDP growth, but only in the short term.

Osman (2014) investigated a study on the relationship between private sector credit and economic growth in Saudi Arabia over the period 1974-2012 using annual time series data. The study employed Auto-Regressive Distributed Lag (ARDL) model. The study concluded that there is relationship between economic growth and private sector credit. The study also found both short and long run positive relationship among the variables.

Tan and Tang (2011) investigated the dynamic nexus between the user cost of capital, private domestic investment and economic growth in Malaysia during the period 1970-2009. The study employed Granger Causality, variance decomposition, impulse response and co-integration to attain the goals of the study. The study found that the user cost of capital is co- integrated with private domestic investment and economic growth. The study concluded that private domestic investment has a positive effect on economic growth in the long run. However, the user cost of capital negatively affects private domestic investment in the long run.

Impact of private investment on economic growth in Palestine over the period 1990 – 2015 using multiple regression and co-integration approaches was conducted by Abdaljawwad and Sarmidi (2018). Stationarity was tested using Augmented Dickey-Fuller unit root test in order to avoid spurious regression results. The results conducted found that variables are stationary in the first difference and long run relationship among variables was evident. Hence, the study concluded that there is both short and long run between private investment and economic growth in Palestina (Abdaliawwad & Sarmidi, 2018).

Kandenge (2010) conducted a study analysing the impact of private and public investment on economic growth in Namibia during the period 1975 – 2005 using the framework of endogenous model. The study adopted co-integration and error correlation modelling approaches. According to this study, it was concluded that imports, exports, labour, human capital were found to have positive impact on both short and long term economic growth in addition of private investment. However, on the contrary, the study found that real exchange rate and terms of trade have negative impact on economic in short and long run period (Kandenge, 2010).

In order to resolve the problem of model uncertainty, Bonga-Bonga & Ahiakpor (2015) used Bayesian Model Averaging (BMA) to measure the determinants of economic growth in Ghana from 1970 to 2012. The findings of the research indicated that the value of variables, that includes rate of inflation, growth of population, dual economy and balance of the current account impact economic growth in Ghana, using the Markov Chain Monte Carlo Model composition (MC) 3 for model choices. These findings suggest that Ghana's economic growth agenda need not be limited to a single growth paradigm, whether neoclassical or Keynesian. These results also show that economic growth policy in Ghana should not be confined within a specific growth theory, be it neoclassical or Keynesian.

From 1986 to 2014, Bernard (2016) studied the impact of private sector investment on economic development in the liberalized Nigerian economy. The results showed that the model is well defined and should be used for policy research, in line with the findings of the stationarity and normality tests. The findings of the co-integration test revealed that private sector spending and economic development have a long-term significant impact on one another. According to the modified coefficient of determination, private sector spending accounts for approximately 98 percent of increases in economic growth in Nigeria, making it a valuable instrument for improving the country's economic growth. Domestic Private Sector Investment (LnDPSI), Foreign Direct Investment (LnFDI), Foreign Private Investment (LnFPI), and Interest rate have a positive correlation with real GDP, while Inflationary Rate (INFR) and Exchange rate have a negative correlation with real GDP, according to the coefficients of OLS regression and their t-values. Both LnDPSI and LnFDI, however, are statistically important in describing improvements in economic development, while LnFPI, EXCHR, INTR, and INF are not. Further findings reveal a one-way causal association between domestic private sector investment (DPSI) and gross domestic product (GDP). The findings of the granger causality test also show signs of negative correlation between GDP FPI, EXCHR, INTR, and INFR.

Makuyana & Odhiambo (2016) carried out research in Zimbabwe from 1970 to 2014 to determine the association between three variables: private investment, public investment, and economic growth. The research used the ARDL-bounds testing method, which was recently introduced. They discovered that both private and public

spending have a long-term effect on growth rates, but that the impact of private investment is greater than the impact of public investment on economic growth. They also came to the conclusion that, in the short term, it is advantageous for the economy to make more investments in public rather than private capital.

3.3.2 Local Evidence

3.3.2.1 Effect of private investment on economic growth

Matsila (2013) assessed private investment functions for the South African economy. He used quantitative and annual data from the South African Reserve Bank (SARB) and Statistics South Africa for the period 1980 to 2012. To find the relationship between the variables in the sample, multiple regression was used. The author came to the conclusion that investment is necessary in South Africa in order to draw more private investments, and that public investment is crowding out private investment. Cassim (2000) used time series research at the sectoral level to analyze the determinants of investment in South African manufacturing. The author argued that low investment levels in the South African economy are regularly regarded as the primary cause of reduced growth rates.

Makuyana and Odhiambo (2016) investigated the relationship between public spending and economic growth in South Africa from 1970 to 2014. The ARDL (Autoregressive Distributed Lag) approach was employed. Their research discovered that private spending has a substantial short- and long-run effect on economic development. Public investment has a negative effect on economic growth in the long term and drives out private investment, although, private investment has a greater effect on growth rates in South Africa than public investment.

Mongale and Monkwe (2015) used a co-integrated vector autoregressive approach to analyze the determinants of growth in the South African economy. The Impulse Response Function is often used to describe how the variables respond to shock. The findings showed that GDP, export, import, and infrastructure spending are all co-integrated. Furthermore, the results show that all of the variables have impact on development which could either be positive or negative. These findings provide

policymakers some advice on which factors to weigh, in order to improve economic development in South Africa.

Manete (2016) conducted the study on the impact of sectoral investment in economic growth and unemployment in South Africa over the period 1994 - 2016. Autoregressive Distributed Lag (ARDL) and Vector Autoregressive (VAR) model were employed in the study. In order to determine shocks between variables, Impulse responds and Granger causality were used. The study concluded that sectoral investment has a positive impact on economic growth and unemployment. This means that additional increase in sectoral investment will results in increase in both economic growth and unemployment (Manete, 2016).

Masipa (2018) investigated the relationship between foreign direct investment (FDI) inflows and economic growth in South Africa during the period 1980-2014. Vector Error Correlation model (VECM) was employed to determine and estimate long-run nexus between the variables used in the model. The study concluded that there is positive relationship between FDI, the real exchange rate and economic growth. However, the study also concluded that there is a negative relationship between government expenditure and economic growth. The study suggested that South African government policy must be implemented in the way that it will attract foreign investors.

3.4 SUMMARY

The chapter provided a discourse of a plethora of investment theories amongst which the Keynesian theory contends that investment is an ultimate consequence of firms balancing their expected return on new capital. It is argued that investing is worthwhile if the anticipated return on investment exceeds the opportunity value of capital. According to Neoclassical theory, investment decisions can be focused on both expected profits and capital costs. For the Accelerator philosophy, a firm's investment choice is influenced by the market for its finished goods, because if demand is projected to rise, capital stock levels must be raised to accommodate the increased demand. As a result, as revenue grows, investment rises as well. Investment decisions are made only where the replacement costs of physical assets are less than the rise in the value of company securities, according to the Q theory of investment.

Investment decisions are dependent on profitability in the Internal Funds Theory of Investment because profits play a critical role in facilitating internal and foreign investment funding. The following models have been explored in terms of growth theories: Keynesian, Neoclassical, Human Capital, and Privatization. Previous studies have focused on the structural determinants of private spending and economic development, preceded by local scenarios.

CHAPTER FOUR: RESEARCH METHODOLOGY

4.1 INTRODUCTION

This chapter explains the methodological approaches that were used to carry out the present research. This chapter details the overview of the sampling size, empirical model, data analysis and data collection procedure.

4.2 DATA COLLECTION PROCEDURES

A quantitative data collection approach is used in this research. The data for this research was collected from STATSSA and SARB. This implies that secondary time series data was used. Saunders and Lewis (2012) define secondary time series as data that has been collected over a period at frequent intervals. This will cover the period from 1982 to 2019, which is long enough to capture the long-run relationship between the variables. All the data will be annual and expressed at constant 2000 prices. Due to inaccessibility of several data variables utilizing quarterly data, annual data was used.

4.3 SAMPLE SIZE

For this study, the period chosen for econometric analysis was 1982 to 2019. It is a period of thirty- seven years. A total of 37 observations per series were used in this study starting from 1982 to 2019 . This period was selected grounded on the premise that this is the time frame in which data of the selected variables can be solicited. The period consists of two different regimes in the South African economy. Prior to 1994 (12 years before the democratic government), South Africa was sanctioned and not allowed to trade with other countries due to its apartheid regime, however, after 1994, when the democratic regime took over, South Africa started integrating with global economies. Data that was collected for this research, included private investment as a percentage of the GDP, interest rates, inflation rates, real exchange rate, credit to private investment, human capital and economic growth. This information is open to the public and can be found in the online databases of Statistics South Africa (STATSSA) and the South African Reserve Bank (SARB).

4.4 DATA ANALYSIS

The collected data will be entered into EXCEL, a computer programme or spreadsheet, before being exported into a software to be used. The study will use regression analysis to find the impact of determinants of private investment on economic growth as well as impact of determinants of economic growth on private investment. Economic growth as the dependent variable will also be regressed against private investment, human capital and labour. For this study, E-views 12 software will be used to test the validity of the econometric procedures which will be carried out in this study.

4.5 MODEL SPECIFICATION AND DEFINITIONS OF VARIABLES

This study will adopt the model used by Suhendra and Anwar (2014)) to investigate the determinants of private investment and their effects on economic growth in Indonesia. Despite the fact that Suhendra and Anwar study (2014), which is the study that will be examined for the current investigation, has two models, instead of using both models, as suggested by the authors, only one model, the growth model will be employed in this investigation. Economic growth model is used to run regression as it comprises Investment model. This model is based on Solow's (1956) neoclassical growth model, which is detailed in Chapter 3, Section 3.2.2.2.

The model of economic growth (GRT) is formulated as a function of:

GRT= *f(* IS, IP, HC, TK)……(1)

Equation (1) converted into an estimation equation with an error term μ_t leads to equation (2) below.

$GRT_t = \alpha_0 + \alpha_1 IS_t + \alpha_2 IP_t + \alpha_3 HC_t + \alpha_{24} TK_t + \mu_t$ …… (2)

Where:

GRT = economic growth in period t

α_0 = Intercept

IS = private investment period t

IP = public investment period t

HC = human capital period t

TK = the proportion of working population to total population in period t.

μ_t = error term

4.6 DEFINITIONS OF VARIABLES

Economic growth has a strong theoretical grounding and is easily quantified as an increase in aggregate output (Feldman *et al.,* 2016). Real Gross Domestic Product was used as a measure of Real Output. This is defined as the natural logarithm of Gross Domestic product (GDP) at market prices, in constant local 2000 prices. It provides a measurement of a country's net production of goods and services for final use arising within its domestic jurisdiction, regardless of how domestic and international claims are allocated (Chibuye, 2013). According to Mustefa (2014), actual GDP growth is the accelerator in the neoclassical principle of the versatile accelerator (Mbaye, 2014).

Public investment: The total of both domestic and externally-financed infrastructure spending is known as public investment. Public investment, according to Ag'enor, as quoted in Mbaye (2014), will influence growth in a variety of ways. First, public infrastructure spending boosts public capital formation and the pace of physical capital accumulation overall. Second, public investment boosts competitiveness, which boosts production. The development of human capital is supported by physical capital. A rise in public spending would lead to more private investment and boost capital production if the two were to balance each other.

Private Investment: Private investment is the combination of both Foreign Direct Investment (FDI) and investment by local enterprises. Increase in private investment helps to sustain economic growth cycle over time (Mbaye, 2014).

Human Capital: Human capital refers to experience, skill sets and knowledge that workers have in the economy. Investing in people education can improve the quality of work. Investment in human capital positively affects economic growth as improvement in the quality of workers increase productivity in the economy (Kilindo, 2017).

4.7 PRIORI EXPECTATIONS

South Africa's **Gross Domestic Product (GDP)** would have a positive impact on private spending. Real GDP is used to capture the economy's gross demand conditions, and it is projected to have a positive impact on private spending. This

implies that economic growth can spur the private investors to increase their investment (Suhendra & Anwar, 2014). It was concluded that economic growth has positive impact on private investment ($\beta_1 > 0$).

A positive relation is expected between **public investment** and **private investment**. This means that increasing government investment results in increased private investment. The consequence is that increased government investment, in the form of services and utilities such as roads and electricity, would be able to enhance South Africa's private investment. This is confirmed by many scholars including Osman (2014), Mittnik & Newman (2011) and Suhendra & Anwar (2014), hence ($\beta_3 > 0$), $\alpha_1 > 0$) and $\alpha_2 > 0$).

Human Capital (HC) is theoretically expected to have a positive effect on economic growth. Meaning that as a government invests in HC, people will become innovative, productive and use their skills and knowledge to boost the growth of the economy, therefore, economic growth will increase. This was also confirmed by Esubalew (2014), hence, $\alpha_3 > 0$.

Labour force (TK) is theoretically expected to have a positive effect on economic growth, hence, $\alpha_{\backslash 4} > 0$

4.8 SOURCES OF DATA

This research focused on the determinants and effects of private sector investment on economic growth in South African economy from 1982 - 2019. The data will cover categories of macroeconomic variables which comprise of private investment, GDP growth, inflation rate, credit to private sector, exchange rates, public invest, human capital, labour and interest rate. The research used annual time series secondary data from the World Bank, IMF, South African Reserve Bank, and Statistics South Africa for the period 1982 to 2019. These data sources chosen are assumed to provide authentic, appropriate, and trustworthy information.

4.9 ESTIMATION TECHNIQUES

This section provides in detail the unit root, Augmented Dickey Fuller, Phillips-Perron, Informal test, Johansen Co-integration, Vector Error Correction Model, Granger Causality test, Variance decomposition and Impulse response.

4.9.1 Unit Root test

Primarily, the research examined and tested whether the series are faced by non-stationery variables. When the mean, variance, and covariance of a model evolve over time, it is said to be non-stationary. One issue with time series is that if an independent variable has the same underlying pattern as the dependent variables, it will tend to be more important than it is, causing non-stationary variables to seem to be connected whereas they will not be (Gujarati, 2009). Owing to the series' non-stationarity nature, it is possible to create relationships between economic variables that seem to be real but are not. Consequently, performing unit root tests before any econometric calculation has become common practice. If a series X_t becomes stationary after differencing d times, hence, comprises d unit roots, it is said to be incorporated in order d. It is said that an I(O) sequence is stationary. Unit root checks are used to check for stationarity or order of integration of each sequence of variables. Argumented Dickey Fuller Test(ADF) and Philips Perron(PP) tests will be included in this respect, as suggested by Dickey and Fuller (1979) and Mbaye(2014).

4.9.2 Augmented Dickey Fuller (ADF) test

Augmented Dickey Fuller (ADF) test was employed to determine the order of integration of variables. The ADF test equation employed was as follows:

$$\Delta X_t = \mu + \gamma T + \beta X_{t-1} + \sum_{i=1}^{k} \lambda_i \Delta X_{t-i} + U_t \quad \ldots\ldots (1)$$

Where:

X_t is the variable in question

T is the time trend

K is the lag length

U_t is the error term assumed to be white noise

The null hypothesis of unit root non-stationarity (H0:=0) is evaluated against the alternative hypothesis of no-unit root/stationarity (H1:0) in the ADF test. The estimated measured t-statistic is contrasted to Mackinnon critical values. The null hypothesis of a unit root (non-stationarity) is denied if the absolute value of the measured t statistic

is greater than the critical value, then we infer that the sequence X t is stationary. The degree of the time series is said to be incorporated of order zero in this case, (O). To put it another way, the judgment rule for this test is that the ADF test statistic significance must be greater than the Mackinnon critical value at any conventional degree of significance (1 percent, 5%, or 10%) and at absolute value. The level of importance for this research will be set at 5% (Ogunbayo *et al.,* 2014).

4.9.3 Phillips- Perron (PP) test

The PP test differs from the ADF test(t) in that it corrects for serial association in the residuals rather than assuming white noise residuals. To allow for serial similarity in the residuals, the test employs a non-parametric approach. When correcting for serial correlation, it does not supplement the Dickey-Fuller test equation, rather, it changes the test figure. The ADF statistic and the modified(t) statistic of the PP test have the same distribution; the ADF is a good example of this. The null hypothesis of a unit root/non stationarity (H0:=0) is evaluated against the alternate hypothesis of no unit root/stationarity (H1:0) in the PP test, much as it is in the ADF test. The estimated computed t-statistic is compared to the critical value for that estimate. The null hypothesis of a unit root (non-stationarity) is dismissed if the absolute value of the measured t statistic is greater than the critical value, and we infer that the sequence is stationary. The degree of the time series is seen to be integrated of order zero in this case, thus, (O).

4.9.4 Informal Testing

The best basic way for stationarity detection depend on plotting the data, or functions of it, and determining visually whether they present some known property of stationary or non-stationary data. It is dubious to determine whether a time series is stationary or not by just by looking at its graph. However, comparing the informal (graphs) and formal testing (both Augmented Dickey Fuller and Phillips-Perron) assist interpretation (Ogunbayo *et al.,* 2014).

4.9.5 Johansen Co-integration Tests

These tests are used to evaluate long-run relationships in cases where the sequence is non-stationary. If the findings demonstrate that a co-integration vector exists, then the error correction model (ECM) should be adopted to determine the equation's short- and long-run relationships. It will be also possible to measure which one affects the other, since co-integration vectors have a cause and effect relationship (Mbaye, 2014). The Johansen method is adopted in this research to assess whether the variables are co-integrated or have entered a stationary equilibrium in the long run. A co-integration test can help decide the number of long-run co-integrating/equilibrium relationships among non-stationary variables that are integrated in the very same order.

The effects of private investment in South Africa was studied in this research, which used time series data from 1982 to 2019. When it comes to determining the lag period, Johansen's co-integration tests are widely thought to be very sensitive. Consequently, VAR (Vector Auto regression) model was adopted in the application of data to discover a fitting lag structure (Chang & Claudill, 2005).

4.9.6 Vector Error Correction Model (VECM)

If two variables are co-integrated, they are in long-run equilibrium, according to Granger (1969). Granger concluded that the dynamic of the short run dis-equilibrium relationship may be represented by an Error Correction Model, since variables can be out of equilibrium in the short run with disturbances being equilibrating error. Error Correction Model indicates how quickly the model returns to equilibrium after an exogenous shock.

4.9.7 Granger Causality Test

In order to determine whether one time series is suitable in predicting another time series, Granger Causality test is employed. This test was first introduced in 1969 by famous economist C.W.J Granger. This was after he conducted a study of Investigating causal relations by econometric models and cross spectral methods. Granger argued that to test causality in economics, the ability to forecast the future values of a time series using previous values of another time series, the past time

series values must be measured. He stipulated that time series X is said to Granger cause Y if it can be proven through F-test and t-test (Granger, 1969).

4.9.8 Variance Decomposition

Variance decomposition supports Granger Causality results. Variance decomposition is disintegration of mean square error into contributions of each variable. Variance decomposition is used to analyse the impact of each variable‘s update on another variables which shows relative effects. The variance decomposition enables assessment of economic significance of this impact as a percentage of the forecast error for a variable sum to one. Results of variance decomposition are obtained from econometric software (Chipeta *et al.,* 2017).

4.9.9 Impulse Responses

The receptiveness of variables to shocks resulting from endogenous and exogenous variations are evaluated by Impulse responses (Chipeta, Meyer & Muzindutsi, 2017). Generally, Impulse Response is the response of any dynamic system in reaction to some external change. Impulse response functions are tools that helps in visualizing the behavior of the variables understudy in response to various shocks. Impulse responds shows the dynamics of transmission of shocks, direction and magnitude of the shocks.

4.10 DIAGNOSTIC TESTS

The following tests for diagnosis were done:

4.10.1 Multi-collinearity of the Independent Variables

In contrast to normal regressions, where multi-collinearity among the regressors is often seen as a challenge, in a co-integrating static regression, this multi-collinearity is needed and since no linear combination of time series would be constant if variables do not meet identical patterns over time, multi-collinearity is useful. Granger-causality is what co-integration entails. The correlation matrix of explanatory variables was used to check for multi-collinearity in the regression equation (Mbaye, 2014).

4.10.2 Normality of the Random Variable

The OLS assumes that the error term has a natural distribution with a mean zero and a continuous variance across observations. When this is not the case, even though OLS projections are the best linear impartial estimators, they cannot be trusted. The Jarque-Bera test was adopted in this study to determine if there is null hypothesis of normality (Mbaye, 2014).

4.10.3 Autocorrelation of the Error Term

When error terms are correlated that include E (U i;U j)0 for I j, this is known as 'autocorrelation'. Estimating the model in the presence of autocorrelation can yield erroneous and inaccurate results, and the estimators can no longer be BLUE (Gujarati, 2009). As with heteroscedasticity, it is critical to verify the presence of autocorrelation in the model prior to projecting its results. OLS estimators are impartial yet inefficient in the presence of autocorrelation; of all the linear unbiased estimators, they have the lowest variance. The Breusch-Godfrey Lagrange Multiplier (LM) serial correlation test was used to test for the null hypothesis with no serial correlation of order one and the Akaike and Schwartz knowledge criterion was used to determine the order. According to the two standards, testing a higher order autocorrelation will result in a higher penalty, in terms of degrees of independence (Mbaye, 2014).

4.10.4 Autoregressive Conditional Heteroscedasticity

Heteroscedasticity occurs where the error term's variance is not constant, so that E(U_i)= σ_i^2. Heteroscedasticity was checked since estimating Ordinary Least Squares (OLS) in the presence of heteroscedasticity would result in inaccurate and unreliable outcomes, as well as overly broad Confidence Intervals (Gujarati ,2009).The variance of the OLS estimators would be no longer cause minimal variance assumptions in the case of heteroscedasticity, and the estimates would no longer be Best Linear Unbiased Estimates (BLUE), because the presence of heteroscedasticity in the model can be checked.

When the error term variance is auto correlated to the squared error term in the previous time, it is known as 'Autoregressive Conditional Heteroscedasticity' (ARCH). Standard OLS assumption is not invalidated by ARCH, however, ignoring ARCH can

result in a loss of quality. The ARCH LM test can be used to see whether ARCH impacts are present (Mbaye, 2014).

4.10.5 Correct Model Specification

When a model is not properly defined, such as by adding an additional variable, missing a related variable, incorrect functional type – integrating a linear functional form into a non-linear functional form, or measurement errors, the term "model specification" is used (Gujarati, 2009). The model was put to the test to see if misspecification is an issue. As a result, it is critical to determine if the model has missed any variables, has an erroneous functional structure, or whether explanatory variables and residuals are correlated. The researcher used the Ramsey Reset test to match the residuals to see if there is any model misspecification.

4.11 ETHICAL CONSIDERATIONS

Before commencement, this study was assessed by an independent ethics committee, which assessed the appropriateness of the study procedure in a neutral, impartial way (Acevedo Pérez *et al.,* 2017). Research does not always involve collection of data from participants. The existing data, such as the time series data are publicly and freely available from South African Reserve Bank and Statistics South Africa; these data have no identifying information (Tripathy, 2013). Since the data is freely available on internet, no written permission and no application for ethical clearance were required.

In this research, secondary data in the form of time series data starting from 1982 to 2019 were used to determine the impact of private investment and its effects on economic growth in South Africa. Data was sourced from Statistics South Africa and South African Reserve bank. According to Tripathy (2013), most of the concern regarding the use of secondary data is its potential harm to individual subjects and its issue of return for consent, however, if the data has no identifying information like in this study, no full review is required by the ethical board.

4.12 SUMMARY

The chapter provided a discourse of the design adopted by the researcher. It then highlighted the population of the study, illustrated the sampling techniques and

identified the reason why purposive non-probability sampling was used. It also discussed the empirical model that was used in this research. Granger causality, variance decomposition and impulse responses were also discussed. The chapter also provided some diagnostic tests that were used in the research, which included the residual normality measure, autocorrelation, multi-collinearity, and heteroscedasticity.

CHAPTER FIVE: DATA ANALYSIS, INTERPRETATION AND DISCUSSIONS

5.1 INTRODUCTION

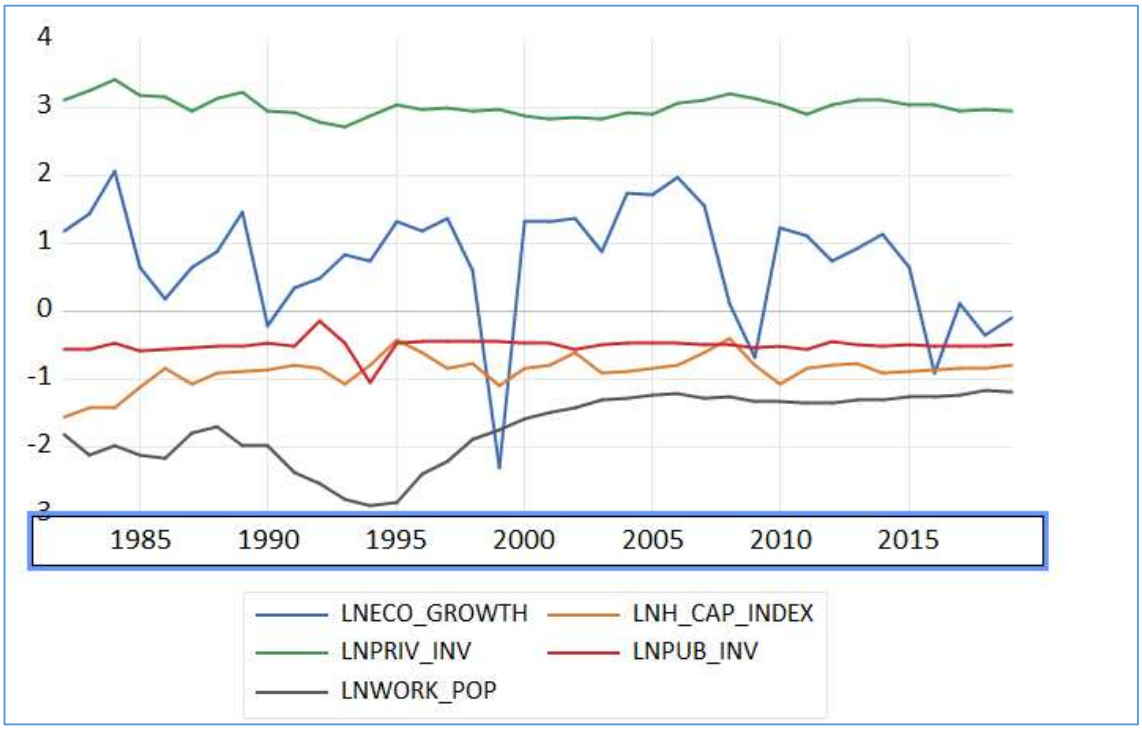
This chapter presents data analysis, as well as the interpretation and discussion of the results. To achieve this, the first section presented unit root test to check the stationarity levels of the variables (those that do not contain a unit root). Second, the current study, check if there were co-integrating equations in the given model. Lag order selection was then carried out to select the number of lags for both *Vector autoregression (VAR)* and Vector Error Correction Mechanism (VECM). Furthermore, diagnostic tests were done to confirm the goodness fit of the model in the study. Lastly, discussions and conclusions from the results were undertaken.

5.2 UNIT ROOT/ STATIONRY TESTS

The study assessed the presence of unit root among the variables using Augmented Dicky Fuller tests. The unit root test is regarded as an essential assessment to check if the variables are indeed stationary or not and this is done to avoid the problem of spurious regression (Gujarati, 2009). Hall (2020) mentions that a spurious result may occur if the data used contained a unit root, since this may render the results useless. Table 5.1 presents results for Augmented Dicky Fuller (ADF). Variables were subjected to intercept, trend and intercept and occurred, both on levels and first difference using ADF. This study tested the availability of unit root using both formal and informal approaches. The study applied the rule of thumb, graphical representation and lastly ADF results from e-views 12 at level and first differencing to test for stationarity.

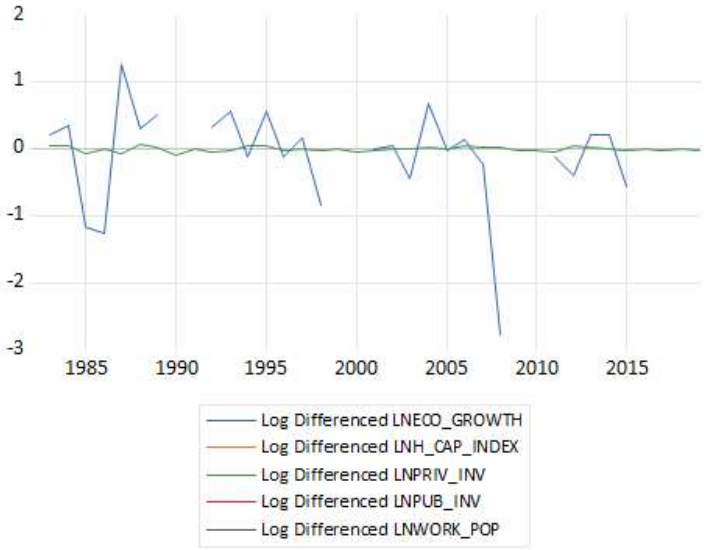
Firstly, in order to know whether this series has unit root or not, rule of thumb is considered. The rule states that if the value of R- squared is greater than Durbin-Watson (DW) statistics, there is an evidence that regression is non-stationary. Results of Ordinary Least Squares (OLS) regression are attached on appendix 8. According to the results, R-squared is 0.0199 and Durbin- Watson statistics is 1.4897 which confirms that regression is stationary. The study made use of informal graphical presentation to test for stationarity. Below is the stationarity graph representation of the economic growth model that this study employed.

Figure: 5.1 Stationarity graph for all variables at level



It can be seen from the above stationarity graph that some variables like private investment, working population, and economic growth are not stationary as their mean does not revolve around zero. Hence, first difference graph is conducted below for all variables .

Figure: 5.2 Stationarity graph for all variables at first difference



It can be seen from figure 5.2 above that the graph exhibit no trend on all variables as their mean revolve around zero. When there is no trend in time series, then the series is stationary. The results above confirm the rule of thumb conclusion that the series is stationary. Hence, the results can be used for predicting or forecasting hypothesis testing.

Another way of testing stationarity is formal testing using ADF testing on e-views. The table below presents the ADF test results at the level and first difference for the all variables included in the growth model - economic growth, public investment, private investment, human capital index and working population.

Table 5.1 Augmented Dickey-Fuller: Unit root test results

The table below shows the results of Augmented Dickey-Fuller (ADF) and Phillips-Perron Results (PP) as per Eviews 12 results.

Order of integration	**Variables**	**Augmented Dickey-Fuller (ADF)**			**Phillips-Perron Results (PP)**		
		Intercept	Trend & Intercept	None	Intercept	Trend & Intercept	None
Level1	lneco growth	2.3433	2.4532	1.9510	2.2341	2.1231	2.1220
1st difference	lneco growth	**6.3303*** **	**6.2258*** **	**6.7834*** **	**9.3482*** **	**9.2331*** **	**9.5414*** **
Level1	lnh cap index	1.7535	1.7332	1.5031	2.8791	2.7893	2.8123
1st difference	lnh cap index	**6.6131*** **	**5.9864*** **	**6.6445*** **	**7.5463*** **	**7.4563*** **	**7.8921*** **
Level1	lnpriv inv	2,5850	2.5779	2.6549	1.5678	1.8976	1.4564
1st difference	lnpriv inv	**6.2693*** **	**6.2037*** **	**6.3302*** **	**6.2898*** **	**6.1223*** **	**6.4322*** **
Level1	lnpub inv	2.4843	2.5927	2.3304	2.2167	2.1319	1.2675
1st difference	lnpub inv	**8.3558*** **	**8.2234*** **	**8.4860*** **	**5.8769*** **	**6.7685*** **	**6.8769*** **
level	lnwork pop	1.2267	1.8647	1.1001	2.4132	2.3214	1.4532
1st difference	lnwork pop	**4.5966*** **	**4.5165*** **	**3.5898*** **	**6.2312*** **	**6.2453*** **	**8.3453*** **
1%	Critical Value	3.6394	4.5289	3.6394	3.4353	3.5435	3.3432
5%		**2.9511*** **	**3.5485*** **	**2.9511*** **	**2.4865*** **	**2.9456*** **	**2.9455*** **
10%		2.6143	3.2071	2.6143	2.4324	2.4563	2.3451

Values with *** are stationary at 5% level of significance

The results in Table 5.1 show outcomes for ADF and PP in trend in intercept, trend and intercept as well as for no trend; in this regard, the calculated t-statistics on all levels were compared against computed critical values at 1%, 5% and 10%, respectively. First to note is that all variables were not stationary at levels as per above figures on table 5.1, hence, they contained a unit root. As stated by Gujarati (2009), if the computed t-statistics in absolute values are less than the calculated critical values the series contains a unit root, hence, the null hypothesis was not rejected in this regard. Variables with unit root can lead to spurious results which cannot be interpreted into meaningful results (Hall, 2020); however, after first differencing, all variables became stationary since the computed t-statistics were greater than the critical values at 5% level of significance (Table 5.1). For example, the computed t-statistics for *ECONOMIC GROWTH, HUMAN CAPITAL INDEX, PRIVATE INVESTMENT, PUBLIC INVESTMENT* and *WORK POPULATION* of 6.7834, 6.6445, 6.3302, 8.4860 and 3.5898 respectively, on *None*, are greater critical values at 1%(3.6394), 5% (2.9511) and 10% (2.6143) level of significance. Economic growth, private investment, public investment, human capital and working population are stationary after first differencing. This is a good indication that the series does not suffer from non-stationary data.

The confirmatory results under PP outcomes computed in levels, intercept, trend and intercept and none revealed that all the variables had a unit root. This led to the non-rejection decision of the null hypothesis. However, as shown in Table 5.1, after first differencing, all variables became stationary in all categories. For example, *EC ROWTH, PUB INV, PRI INV* and *HCP INDEX* computed 9.3482, 5.8769, 6.2898 and 7.5467 respectively on *None* are greater than critical values on 1% (3.4353), 5% (2.4865) and 10% (2.4324) respectively. Since all variables are stationary after first differencing and were integrated of the same order I(1), the current study concluded that the data are normally distributed and the use of parametric data necessitated other tests, such as co-integration using Johansen Approach and Lag order selection using Akaike Information Criterion.

5.3 JOHANSEN APPROACH (COINTERGRATION TEST)

Johansen approach is mainly centered on trace and eigenvalue test to identify if there is at-most one or more co-integrating equations. After establishing that all variables

were stationary and integrated of the same order, the next procedure performed was co-integration tests which determine whether there exists long run relationship amongst the variables. Hall (2020) states that the strict unit-root assumptions which justify economic modelling, necessitates the use of the Johansen approach to identify if there is any long run association between the variables in the model, thus, the use of both Trace and Maximum eigenvalue methods justifies if there is or there is no co-integrating equation amongst the variables. The difference between stationarity and co-integration test is that stationarity test is performed on single time series whereas co-integration deals with the association between a group of variables, each having a unit root (Gujarati, 2011).

The next procedure is to test for the existence of long-run relationships among the variables in the model. According to Gujarati (2009), co-integration test using Johansen test requires the estimation of a VAR equation. In this regard, the study estimated the VAR equation in order to make use of the Johansen co-integration approach. Thus, the first step is to test for the appropriate lag length in a VAR.

The study uses Lag Order selection Criteria and the results are presented in table 5.2 below. It is a condition for the use of the Johansen technique to indicate the lag order and the deterministic trend assumptions of the VAR. To choose the lag order for the Johansen technique, the Akaike Information Criterion (AIC) is applied in this study. The AIC measures the relative quality of statistical models for a given set of time series data (Hall,2020). Given an econometric model, the AIC can estimate the quality of the model. Thus, AIC provides a means for model specification as it offers a relative estimate of the information lost when a given model is used to represent the process that creates the data. In doing so, it deals with the trade-off between the goodness of fit of the model and the intricacy of the model. Table 5.2 below present the lag lengths selected by different information criteria.

Table 5.2: Lag Selection Criteria results

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-4.126787	NA	1.16e-06	0.521531	0.743723	0.598232
1	67.96272	119.4626*	8.00e-08*	-2.169298*	-0.836143*	-1.709093*
2	87.95969	27.42442	1.17e-07	-1.883411	0.560707	-1.039702
3	104.2678	17.70591	2.48e-07	-1.386730	2.168351	-0.159516

Source: Eviews 12. VAR Lag Order Selection Criteria.

* 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

Hall (2020) suggests that the lower the Akaike Information Criterion (AIC) better the model. Thus, results for lag order selection presented in table 5.2 above confirms that the criteria selected 1 lag. From table 5.2 above, -2.1692 under lag 1 is the lowest AIC. In this regard, 1 lag for VAR was chosen and to be used in the Johansen cointegration test and VECM. Having identified the number of lags to use, the Johannsen cointegration test was carried out and the results were presented in table 5.3 below. The results of Johansen Co-integration Test are presented in Table 5.3.

Table 5.3 Johansen Co-integration Test (Trace results and Maximum-Eigen test)

	TRACE RESULTS				**MAXIMUM-EIGEN RESULTS**			
	Eigen Value	**Trace Statistic**	**0.05 Critical Value**	**Prob.***	**Eigen value**	**Max-Eigen Statistic**	**0.05 Critical Value**	**Prob.***
None *	0.6243	86.6217	69.8190	0.0013	0.6243	35.2472	33.8769	0.0341
At most 1	0.4970	47.8561	51.3745	0.1102	0.4970	24.7363	27.5843	0.1110
At most 2	0.3442	26.6382	29.7971	0.1108	0.3442	15.1878	21.1316	0.2760
At most 3	0.2350	11.4504	15.4947	0.1153	0.2350	9.6459	14.2646	0.2362
At most 4	0.4889	1.8044	3.8415	0.1792	0.0489	1.8044	3.8414	0.1792

Trace test indicates 1 cointegrating Eqn(s) at the 0.05 level
*denotes rejection of the hypothesis at the 0.05 level
**Mackinnon-Haug-Michelis (1999) p-values

The results in Table 5.3 presents Trace and Maximum-Eigen results. As stated by Gujarati (2009), if the computed test statistic value is greater than the computed critical value at 5% level of significance, the null hypothesis which states that there is no co-integration equation is rejected in favour of the alternative hypothesis. In this regard, the computed results at *none** under trace results show that the trace statistic value of

86.6217 is greater than the computed critical value of 69.8190 and the corresponding p-value of 0.0013 is less than 5%. In this regard, the null hypothesis is rejected and the Maximum-Eigen results confirm this claim. The maximum-eigen value of 35.2472 is greater than the critical value 33.869 and the p-value of 0.0341 confirms that the null-hypothesis which states that there is no co-integration, equation is rejected.

Considering the computed trace statistics of 47.8561 *at-most 1* is less than the critical value of 51.3745 and the computed p-value 0.1102 is greater than 5%. In this regard, the null-hypothesis of no co-integration equation is rejected and it is concluded that *at-most 1* co-integration equation exists. Similarly, the results under Maximum-Eigen results on *At-most 1* confirms that there is one co-integration equation since the computed Maximum-eigen value 24.7363 is less than the critical value of 27.5843 and the p-value 0.1110 is greater than 5%. In this regard, the current study concludes that there is one significant long-run relationship between economic growth and its determinants and thus move in similar direction. As such, the Error Correction Model and Vector Error Correction Model (VECM) which were used to check for long-run association between certain variables and the results, are presented in Table 5.4 in the following sub-section.

5.4 ERROR CORRECTION MODEL RESULTS

Error Correction Model is regarded as a time series regression model that is mainly based on the behavioral assumptions that two or more variables in each model exhibit an equilibrium relationship for both short-run and long-run behavior (Granger, 1969). Residual for unit root were computed as per figure below.

Table 5.4: Residual testing

Null Hypothesis: ECM has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.295218	0.0223
Test critical values:	1% level	-3.621023	
	5% level	-2.943427	
	10% level	-2.610263	

*MacKinnon (1996) one-sided p-values.

Economic growth model residual was generated from e-views. Augmented Dickey Fuller was used to test if the residuals are stationary or not at level. As per the results above in table 5.4 null hypothesis is rejected. Meaning that the linear combination of Human capital, private investment, public investment and working population when economic growth is the dependent variable are stationary at level which implies that variables are co-integrated. Since it is confirmed that there is co-integration between economic growth and all dependent variables, it implies that there is a long run relationship amongst variables.

In this regard, the study assessed both short-run dynamics between economic growth and its determinants; the results are presented in Table 5.5.

Table 5.5. Short Run Dynamics Economic Growth

Error Correction Model results				
Parameters	**St coefficient**	**St error**	**T-stat**	**Prob***
LnDPub INV	1.456231	0.45553	3.19678	0.0032
LnPr INV	2.732162	0.8648326	3.15929	0.0134
LnHcp INDEX	-0,453675	0.3657432	-1.24041	0.2136
LnWork POP	0.321564	0.2314512	1.38933	0.3124
Resid1(-1)	0.595467	0.0543762	10.95763	0.0000

Table 5.5 presents results for Error Correction Model. The coefficient residual value (0.59) which measures the speed at which adjustment goes back to equilibrium if the economy experiences a shock, was attained. This shows that proximately 59% of the error in the economy if corrected in the first quarter, the economy reverts to its symmetric state. The speed of adjustment is statistically significant since the p-value of 0.000 is less than 5% level of significance and *t-statistic* (3.19678) is greater than two, indicating significant results. Similarly, the p-value for *LnPub INV* (0.0032) and *Dpr INV* (0.0134) are less than 5%, hence, statistically significant. Correspondingly, the computed T-statistics of 3.19678 for *Lnpub INV* and 3.15929 for *LnPr INV* are greater than 2, hence, statistically significant, however, *LnHcp INDEX* and *LnWork*

POP computed t-statistics 1.24041 and 1.38933, respectively, and these are less than two, hence, statistically insignificant.

The computed results show that there is positive relationship between public investment and economic growth in the short run in South Africa. A unit increase in public investment may lead to 1.456 increase in economic growth in South Africa. Similarly, a unit increase in private investment may lead to 2.73 increase in economic growth in South Africa. It can, thus, be concluded that private and public investment are positively correlated with economic growth in South Africa. In terms of human capital, the results show a negative association with economic growth, but the results are statistically insignificant. As such, the study further assessed the long run relationship between economic growth and private investment in South Africa.

5.5 VECTOR ERROR CORRECTION MODEL RESULTS

Vector Error Correction Model is a technique used to check for long dynamic behaviour for several structural parameters. The current study, thus, employed VECM on the growth model specified in Chapter three to check the long-run dynamics between economic growth and specified variables in the study.

Table 5.6. The VECM results

Vector Error Correction Model				
Parameters	**St coefficient**	**St error**	**T-stat**	**Prob***
CONSTANT	4.65437	-	-	-
LnEC GROWTH	1.00000	-	-	-
LnPub INV	1.32143	0,41412	3.1918	0.01234
LnPr INV	2.54123	0,78541	3.2356	0.03213
Lncp INDEX	1.01231	0,25143	4.0267	0.01242
LnWork POP	-1.11212	0.95871	-1.1602	0.17612
	r^2 = 0.67543			

The results in Table 5.6 should be the long-run association between economic growth and given variables. In this regard, between the period of 1982 to 2019, on yearly basis, three variables, which are public investment, private investment and human

capital portrayed a positive long-run relationship with economic growth. The computed r-squared shows that at most 67% of variation in the economic growth is explained by the model, thus, the long-run VAR model vector is presented as follows;

EC GROWTH = 4.65437 + 1.32143 Pub INV + 2.54123 Pr INV + 1.01231 Hcp-1.11212 Work POP 5.1

The equation 5.1 shows that public investment, private investment and human capital are positively correlated with economic growth in the long run. As shown in Table 5.6, a unit increase in public investment, in the long run results in 1.32 increase in economic growth. Subsequently, a unit increase in private investment in the long run leads to 2.54 increasing in economic growth. In terms of human capital, a unit increase may lead to 1.01 increase in economic growth in the long run, however, there is a negative long run association with economic growth but the results are statistically insignificant, hence, may not be considered.

Given the short run and long run results the study concludes that both private and public investment exerts positive effect on economic growth in the short-run and the long-run. The current study, therefore supports Bernard (2016) who investigated the effect of private sector investment on economic growth and found a positive correlation. Similarly, Makuyana & Odhiambo (2016), conducted a study between private, public investment and economic growth in Zimbabwe and a positive correlation between the above stated variables. In this regard, the current study concludes that public and private investments are good for economic growth in the short and long-run in South Africa. As for human capital, the current study supports Suhendra & Anwar (2014) who state that investments in human capital increases economic growth. As such the currently study concludes that investments in human capital may positively influence economic growth in the short-run and long-run in South Africa. In order to substantiate the results, the current study conducted diagnostic tests and the results are presented in Table 5.6.

5.6 DIAGNOSTIC TEST

Diagnostic tests including Serial correlation (LaGrange Multiplier), test for heteroscedasticity (White test) and normality (Jarque-Bera) were conducted in this study. These tests were conducted to test for biased parameters and goodness fit of

the model used. All tests were conducted under the null hypothesis which claims no serial correlation for Lagrange Multiplier, no heteroscedasticity for white test and normal distribution for the Jarque-Bera test. The results are presented in Table 5.7 below.

Table 5.7 Analytical tests

	Null hypothesis	**T-stat**
Jarque-Bera test	Normal distribution	4.65491
LaGrange Multiplier	No Serial Correlation	5.81613
White Test	No Conditional heteroscedasticity	0.92312

The Jarque-Bera test results computed a test-statistic of 4.65491 and this leads to non-rejection of the null hypothesis which claims that the model is normally distributed. This decision is a resultant of the fact that the t-statistic of 4.65491 is greater than two, hence, the non-rejection. Similarly, the computed t-statistic for LaGrange multiplier is greater than two leading to non-rejection of the claim that there is no serial correlation. Ultimately, the null hypothesis of no conditional heteroscedasticity is not rejected since the F-statistic of 0.92312 was computed, thus, the model was correctly specified and the series was normally distributed. As such, well-behaving data gives suitable model for forecasting and the results may be used for policy formulation.

5.7 GRANGER CAUSALITY

Granger causality provides the short term dynamics and long run equilibrium information and provides speed of adjustment to equilibrium. Below is the results of granger causality.

Table 5.8 Granger Causality: Economic growth (Dependent variable)

VAR Granger Causality/Block Exogeneity Wald Tests
Date: 08/26/21 Time: 15:08
Sample: 1982 2019
Included observations: 36

VAR Granger Causality/Block Exogeneity Wald Tests

Date: 08/18/21 Time: 23:58
Sample: 1982 2019
Included observations: 36

Dependent variable: EC_GROWTH

Excluded	Chi-sq	df	Prob.
H_CAP_INDEX	10.19232	2	0.0061
PRIV_INV	8.880747	2	0.0118
PUB__INV	6.302778	2	0.0428
WORK_POP	0.029517	2	0.9853
All	16.89026	8	0.0313

Table 5.8 represent Granger Causality results. From the above table human capital , private investment and public investment has a causal effect on economic growth in the short run as their probability values of Chi- squared statistics are less than 0.05. Hence, we reject the null hypothesis. However, all lagged coefficient of working population has no effect on economic growth. As per the results above, private investment granger causes economic growth in the short run.

Table 5.9 Granger Causality: Private Investment (Dependent variable)

Dependent variable: PRIV_INV

Excluded	Chi-sq	df	Prob.
EC_GROWTH	4.461899	2	0.1074
H_CAP_INDEX	2.907488	2	0.2337
PUB__INV	2.805665	2	0.2459
WORK_POP	0.248421	2	0.8832
All	9.201055	8	0.3256

The above figure results shows economic growth Chi-squared statistics of 0.1074 which implies that we reject null hypothesis and conclude that economic growth does not granger cause private investment in the short run. The same applies to all the variables on the table 5.9, none of the variable has an impact on private investment in the short run.

5.8 VARIANCE DECOMPOSITION

Variance decomposition assists us to study the variation in Y that is due to its own shocks versus the component of the variation that is due to shocks in other variables Enders (2010: 68). The table below represent variance decomposition *of LNECO_ GROWTH.*

Table 5.10 Variance Decomposition of LNECO_GROWTH

Variance Decomposition of LNECO_GROWTH: Period	S.E.	LNECO_GROWTH	LNH_CAP_INDEX	LNPRIV_INV	LNPUB_INV	LNWORK_POP
1	0.845706	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.954178	82.21912	15.76975	0.002607	1.203390	0.805126
3	0.977773	78.61993	15.24923	2.557186	2.732460	0.841196
4	0.994233	76.86566	14.79387	3.967390	3.437979	0.935101
5	1.010543	75.39732	15.01885	4.151069	4.366711	1.066052
6	1.018114	74.66061	15.82696	4.090614	4.302307	1.119511
7	1.019716	74.43879	16.03961	4.099009	4.296502	1.126089
8	1.020110	74.41216	16.03008	4.108078	4.322427	1.127256
9	1.020354	74.40771	16.02937	4.110167	4.323360	1.129393
10	1.020478	74.39580	16.03188	4.109574	4.331650	1.131099

On the above table 5.10, all figures represent percentage of the focus error variance for economic growth. The study is forecasting ten years period into the future. Periods are divided into short and long run. In the short run period one, economic growth account for 100% variation of the fluctuation in economic growth (own shock). During this period, contribution of human capital index, private investment, public investment and working population is strongly exogenous which implies that they have very weak influence in predicting economic growth. In period three, economic growth account for 78.62% variation of the fluctuation in economic growth (own shock). Shock to private investment can cause 2.56% fluctuation in economic growth, whereas shocks to human capital index, public investment and working population can cause 15.25%, 2.73% and 0.840% respectively in economic growth.

As we focus into the future, over the period of ten years, the influence of economic growth to economic growth has decreased to 74.40% which exhibit weak endogenous influence to itself. However, human capital index, private investment, public

investment and working population increased which implies that they have influence in economic growth in the long run though.

Table 5. 11 Variance decomposition results of LNPRIV_INV

The table below represent *LNPRIV_ INV* results from the *e-views12* software. All figures represent percentage of the focus error variance for private investment.

Variance Decomposition of LNPRIV_INV: Period	S.E.	LNECO_GROWTH	LNH_CAP_INDEX	LNPRIV_INV	LNPUB_INV	LNWORK_POP
1	0.096003	2.862380	0.149066	96.98855	0.000000	0.000000
2	0.119409	4.350426	1.866862	83.25688	7.122223	3.403612
3	0.139468	15.17894	8.553527	64.39720	6.756358	5.113980
4	0.150645	16.90088	16.39652	55.62092	5.930705	5.150979
5	0.153415	16.49621	18.24335	53.63448	6.349223	5.276738
6	0.154057	16.40938	18.41304	53.25927	6.521519	5.396793
7	0.154269	16.48989	18.36686	53.16105	6.514868	5.467329
8	0.154398	16.53343	18.37467	53.07636	6.509438	5.506102
9	0.154496	16.52713	18.39405	53.01163	6.525532	5.541652
10	0.154550	16.51553	18.38595	52.97640	6.541169	5.580959

As per table 5.11 above, in the short run during period one, private investment account for 96.99% variation of the fluctuation in private investment (own shock). During period one, contribution of economic growth and human capital index are endogenous which implies that they have influence on private investment. However, public investment and working population are strongly exogenous implying that they have very weak influence in predicting private investment.

Over the period of ten years, private investment influence to itself has decline from 99.99% to 52. 98%. All variables have strong influence in the long run in predicting private investment as their values have increased.

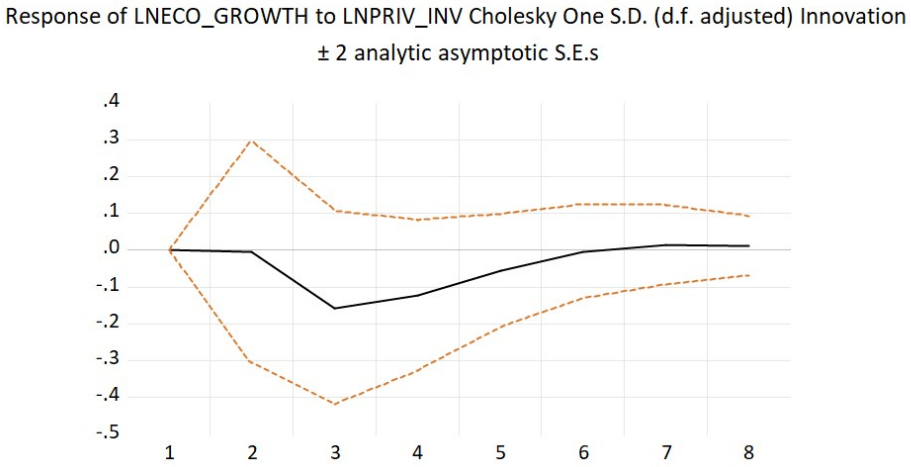
5.9 IMPULSE RESPONSES

The study uses impulse response function as an additional check of the Cointegration test's findings. Impulse response analysis identifies the responsiveness of the dependent variables (endogenous variable) in a VAR to shocks from each of the variables is the series (Gujarati, 2009). The impulse response function also indicates the directions and persistence of the response to each of the shocks over a period of

8 years. Importantly, the impulse response functions have the expected pattern and confirm the results from both the short-run and the long-run relationship analysis between the variables of the study.

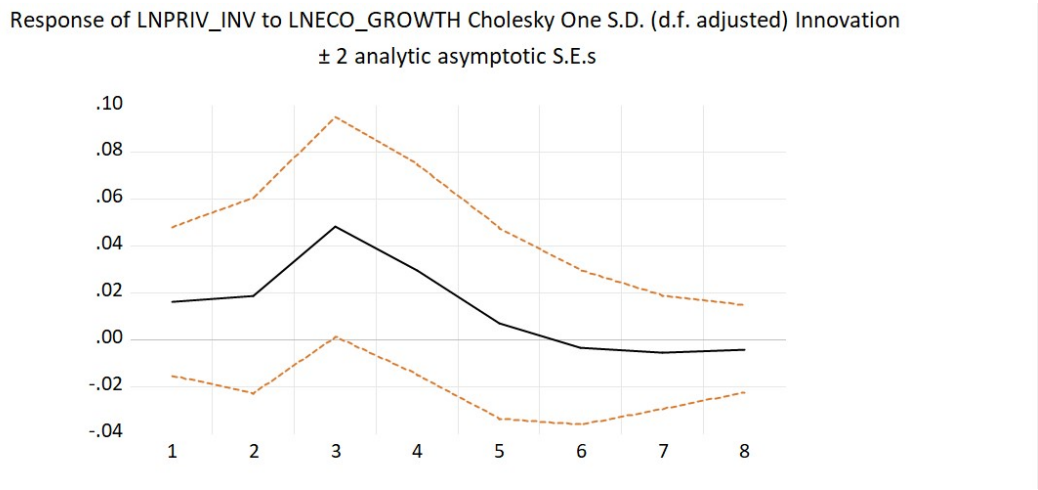
Figure 5.3 Response of LNECO_GROWTH to LNPRIV_INV

The figure below presents impulse response graph from e-views. The figure shows response of economic growth to private investment innovation.



From the above graph, the blue line is an impulse response function while the red lines are 95% confident interval. The purpose of the study is to investigate impact of private investment on economic growth. On the above graph if there is a standard deviation shock (innovation) to private investment, economic growth will start at the steady state, then the response decreases sharply until 3rd period. This decline is followed by an increase until it reaches steady state on the 6th period, it then gradually picks up to positive response. In the short run, private investment will have asymmetric impact on economic growth, however in the long run, private investment will have positive impact on economic growth.

Figure 5.4 Response of LNPRIV_INV to LNECO_GROWTH



Response of private investment to economic growth innovation is that at the early stage, private investment increase slightly until period 2 then it increased sharply to period 3, followed by decline until it reaches steady state at period 6. Private investment became negative as it went below zero line after steady state. Economic growth will have positive impact on private investment in short and negative impact in the long run period.

5.10 SUMMARY

This chapter presented data analysis, results interpretation and discussions. The first section assessed if the data was stationary or if it contained a unit root, however, after first differencing, all the data became stationary. Furthermore, the results show that private and public investment are positively correlated with economic growth in the short and long- run in South Africa. Co-integration tests were conducted soon after unit root tests. Johansen Maximum likelihood approaches were used to test for co-integration. Lag order selection criteria were also presented in this chapter. AIC was chosen as selection criterion and 1 lag was used. Diagnostic tests were also conducted and the results authenticated the model as it was concluded that there was no problem with residuals from the growth model. The study found that private investment granger causes economic growth, however, economic growth does not granger causes private investment in the short run. Variance decomposition reveals that in the long, all variables have positive influence on economic growth. Furthermore, Impulse response results concluded that private investment has positive impact on

economic growth in the long run, however in the short run, impact of private investment to economic growth is asymmetric. The following chapter presents the conclusion and recommendations from the study.

CHAPTER SIX: CONCLUSION AND POLICY RECOMMENDATIONS

6.1 INTRODUCTION

The focus of the study was to assess the effects of private investment on economic growth in South Africa. This chapter presented the summary of the study and its corresponding conclusions. Furthermore, policy recommendations from the study are also presented.

6.2 SUMMARY OF THE STUDY

The aim of the study was to assess impact of private investment on economic growth in South Africa. To achieve this, the study was guided by the objective to determine the relationship between private investment and its impact on economic growth in South Africa. The study is divided into six chapters. In Chapter one is presented the introduction and a brief background of the South African economy. Private investment in South Africa was found to be a serious concern, because it has been weak for a long time and showed downward trend for some periods during 1982 to 2019. Several measures have been taken by the South African government to stimulate private investment but investment has remained very low over the past decade in South Africa. Chapter two analyzed the trends on private investment, public investment, exchange rate, interest rate (independent variables) and economic growth (dependent variables) and found that all the independent variables have major influence on economic growth trend. Furthermore, determinants of private investment and economic growth were briefly discussed.

Chapter three reviews the existing literature on private investment and economic growth in South Africa. Chapter four detailed the research methodology of the study and all data analysis techniques used were explained. The models used were specified and variables were defined followed by prior expectations, data sources and estimation techniques. Chapter five outlines the data analysis, results interpretation and discussions. Results from the current study enabled conclusions and recommendations to be made. These are explicated in the following sub-section of the study.

6.3 LITERATURE FINDING AND CONCLUSION OF THE STUDY

6.3.1 Private investment and economic growth

Several conclusions can be deducted from the reviewed literature and the results of the study. Short-run and long-run dynamics were revealed and the literature reviewed depicted several implications between private investment and economic growth. In the short-run, the reviewed literature discovered that private investment has a negative impact on economic growth as opposed to long-run dynamics. In the long run, private investment was found to have a positive impact on economic growth, however, the results of the study revealed that private investment has a positive effect on economic growth in the short-run and long-run. The current study, thus, concludes that private investment among other variables, influences economic growth positively in the short-run and long-run in South Africa.

In terms of public investment, like private investment, the study revealed that it impacts economic growth positively in the short and long-run in South Africa. Similarly, the reviewed literature demonstrated that public investment plays a crucial role in contributing to economic growth. In this regard, the current study concludes that public investment positively contributes to economic growth in South Africa. For human capital, the current study concludes that it positively impacts economic growth in the long-run. Similar assumptions were arrived at from the current literature and it is probable to conclude that investing in human development exerts positive effects on economic growth in South Africa. Given the above-mentioned conclusions, several policy prescripts can be derived for the South African economy.

6.4 POLICY PRESCRIPTS AND RECOMMENDATIONS

The results from the current study revealed several outcomes which can be used for policy recommendations in South Africa.

- Private investment

Private investment was found to contribute positively to economic growth in South Africa, however, private investment is determined by several factors as indicated in the preceding chapter. The researcher, therefore, recommends that the South African government should continue investing in infrastructure development, mainly roads and buildings. Good road networks attract investments since it permits smooth transportation of goods. In addition, the South African should shorten the period taken to acquire permits and lessen the rules and regulations to conduct business in South Africa. In terms of interest rates and exchange rates, the current study recommends that the current interest rate anchoring regime should be revised and a flexible system adopted. Like exchange rates, may countries have a flexible exchange rate regime as it allows market forces to determine the rate price of one currency to another. Increase in private investment leads to an increase in economic growth, which may attract more investments for an economy.

- Public investment

Like private investments, good infrastructure attracts investments, hence, the study recommends the government to continue investing in infrastructure development in South Africa; fixed capital formation should increase and the government should enforce proper business behaviour in the economy since corruption is cancerous to investments. In this regard, the government should enforce rules and regulations which would limit corrupt acts in the economy. Increase in public investments leads to increase in economic growth.

- Human capital development

Human development entails investment in several areas such as skills development, health, educations and well-being of citizens in an economy. In this regard, investing in human development improves the skills and a skilled labour force attracts investments into the economy. The researcher recommends that investments in human capital, mainly skills development, should increase in South Africa since a skilled and educated population attracts investments, hence, economic growth. Human capital was found to have a positive effect on economic growth.

6.5 LIMITATION OF THE STUDY

The study should have increased data to at least 60 observation so that other scholars or institution that might want to use this research in their further investigation of study should have a more comprehensive picture what happened over period of 6 decades, which would include different factors over different regimes. The research should have increase independent variables like, agriculture, unemployment and COVID 19 as these independent variables also have a huge impact on economic growth.

6.6 FUTURE RESEARCH

Having identified the above limitations, it is suggested that other scholars who might want to further investigate factors that influences economic growth for any given country should also include agriculture, unemployment and COVID 19 as independent variables to see how they affect economic growth over a period.

REFERENCES

Abdaljawwad ,O.N.A. & Sarmidi , T.,2018. Private sector investment and economic growth in Palestine. *International journal of Islamic and civilization studies*. 01(20), pp 44-57.

Acevedo Pérez, I., Rapiman, M. E., Cáneo Orellana, M., & Rueda Castro, L., (2017). *Seven ethical requirements for quantitative and qualitative research in nursing: experiences of three research ethics committees from Santiago, Chile*.

Acosta, P.& Loza, A.,2005. Short and long run determinants of private investment in Argentina. *Journal of applied economics*, 4(2), pp 389-406.

African Development Bank Group.,2019. Country strategy paper 2018- 2022. https:// www.afdb.org/fileadmin/uploads/afdb/boards- documents/South_Africa.

Apostolo, N. G. & Crumbley, A. F., 1998. Handbook of Government. *Accounting and Finance.* New York, USA.

Asante, Y., 2000. Determinants of Private Investment Behaviou. AERC Research Paper No. 100, Nairobi AERC.

Avdjiev, S., Bruno, V., Koch, C. & Shin, S. H., 2019. The Dollar Exchange Rate as a Global Risk Factor: Evidence from Investment. *Springer Link*, 67(12), pp. 151-173.

Bakare, A. S., 2011. The Determinants of Private Domestic Investment in Nigeria. *Far East Journal of Psychology and Business,* 4 (2), August.

Barry, L., 2018. Struggling to Make the World a Better Place: Exploring Some Experiences of Activists in the Auckland Progressive Youth Movement (1965-1977).[Online]Available http://openrepository.aut.ac.nz/handle/10292/12790[Accessed 3 February 2020].

Batu, M.M., 2016. Determinants of private investment: a systematic review. *Int J Finance Mgmt., 4*, pp.52-56.

Bayraktar, N. & Fofack, H.,2007. Specification of Investment functions in Sub- Saharan Africa. *World Bank Policy Research Working Paper* (4171).

Bernard, A., 2016. Effect of private sector investment on economic growth in Nigeria. Ng *Journal of Social Development, 5*.

Boldeanu, F. T., & Constantinescu, L. (2015). The main determinants affecting economic growth. *Bulletin of the Transilvania University of Brasov. Economic Sciences. Series V*, *8*(2), 329.

Bonga-Bonga, L. & Ahiakpor, F., 2015. Determinants of Economic Growth in Sub-Saharan Africa: The case of Ghana. MPRA Paper NO.66923

Brainard , W. C., & Tobin, J., 1968. Pitfalls in Financial Model Building: *American Economic Review.*

Budget Review. http:// www.treasury.gov.za.

Cassim, R., 2000. 'Determinants of Investment in South Africa: A Sectoral Approach. *Final Report: Investment Study A*, 1.

Chang, T. & Caudill, S., 2005. Financial Development and Economic Growth: The Case of Taiwan. Applied Economics. *Taylor and Francis Journals, 37* (12), pp 1329-1335.

Chibuye, B.K., 2013. Public Investment, Private Investment and Economic Growth in Zambia. A Dynamic Approach. University of Zambia.

Chipeta, C., Meyer D. F., & Muzindutsi, P.F., 2017. The effect of exchange rate movements and economic growth on job creation. DOI, 62 (2) , pp 20-41.

Chirinko, R.S., 1993. Business Fixed Investment Spending: Modelling Strategy, Empirical Results, and Policy Implications. *Journal of Econometric Literature, 31*(4), 1875-1911.

Chirwa, T.G. & Odhiambo, N.M., 2016. Macroeconomic determinants of economic growth: a review of international literature. *South East European Journal of Economics and Business*, *11*(2), pp.33-47.

Clark, J.M., 1917. Business acceleration and the law of demand: a technical factor in Economic Cycles. *Journal of Political Economy, 25*(3), pp 217-235.

Dickey, D., & Fuller, W. A., 1979. Distribution of the estimates for autoregressive time series with unit root. *Journal of the American Statistical Association, 74*, 427- 431.

DSJ Research 2017. A market research company expertly researching your industry for almost two decades. Accessed online; April 26, 2019 from http: www.djsreserach.co.uk/glossary/item/Target-Population.

Easterly, W. & Rebelo, S., 1993. Fiscal Policy and Economic Growth: An Empirical Investigation. *Journal of Monetary Economics,* 32, pp 417-458.

Eltis, W., 1984. The Classical Theory of Economic Growth, London: Macmillan. Grossman, G. M. and Helpman, E. (1994). 'Endogenous Innovation in the Theory of Growth'*, Journal of Economic Perspectives, 8,* pp 23-44.

Enaifoghe, A. O., 2019. South Africa's Politics of Regional Integration in SADC and its Socio-economic Implications. *JSTOR*, 6(1), pp. 85-106.

Enders, W., 2010. Applied Econometric Time Series 3e, Wiley, USA.

Epaphra, M. & Massawe, J., 2016. Investment and economic growth: An empirical analysis for Tanzania. *Turkish Economic Review*, *3*(4), pp.578-609.

Esubalew, T.A., 2014. An Investigation of Macroeconomic Determinants of Domestic Private Investment Evidence from East Africa. *International Institution of Social Science.*

Feldman, M., Hadjimichael, T., Lanahan, L. & Kemeny, T., 2016. The logic of economic development: A definition and model for investment. Environment and Planning C: *Government and Policy,* 34(1), pp.5-21.

Frimpong, J. M. & Marbuah, G., 2010. The Determinants of Private Sector Investment in Ghana: An ARDL Approach. *European Journal of Social Sciences*, 15(2), pp 250-261.

Granger C. W. J., 1969. Investigating Causal Relations by Econometric Models and cross Spectral Methods. *Econometrica,* pp 424-38.

Grobler, A., 2019. Education, Openness and Economic Growth in South Africa: Empirical Evidence from VECM Analysis. *The Journal of Developing Areas,* 53(1), pp. 123-129.

Gujarati, D.N., 2009. *Basic Econometrics: 4th ed*. New York: McGraw-Hill.

Hashmi, M.H., Akram, W. & Hashmi, A.A., 2012. Role of investment in the course of economic growth in Pakistan. *International Journal of Academic Research in Economics and Management Sciences, 1*(5), p.48.

Hall, E. A., 2020. Foster v. Fourie: Race, Politics, and Betrayal in Apartheid South Africa. *The International Journal of the History of Sports,* 159(5), pp. 592-606.

IDC, Industrial Development Corporation, 2016. Economic trends : Key trends in the South African economy. http://www.idc.co.za/ images/download-files/economic-overviews/RI-publicayion-keytrends in SAeconomy_March2016.pdf.

Ilegbinosa, I.A., Michael, A. & Watson, S.I., 2015. Domestic investment and economic growth in Nigeria from 1970-2013: An econometric analysis. *Canadian Social Science,* 11(6), pp.70-79.

Ilhan, R., 2017. Dynamic Effects of Financial Development, Trade Openness and Economic Growth on Energy Consumption: Evidence from South Africa.

IMF, International Monetary Fund, 2016. World Economic Outlook Database, http//www.imf.org.

Jalloh, M., 2014. *P*rivate sector investment in Sierra Leone: an analysis of the macroeconomic determinants.

Jorgenson, D.W.,1963. Capital theory and investment behaviour. The American Economic Review. 52(2), pp 257-259.

Jorgenson, D.W.,1967. The theory of investment behaviour in Ferber R.ed., *Determinants of investment behaviour, New York, national bureau of Economic Research.*

Khan, M. S. & Reinhart C.M., 1990. Private Investment and Economic Growth in Developing Countries*. World Development.*18 (1), pp 19-27.

Kandenge, F. T., 2010. Public and private investment and economic growth in Namibia. *SSRN journal*, 7(11).

Kilindo, A.A., 2017. Determinants of Private Investment in Tanzania: 1970-2015. *Tanzania Economic Review,* 5(1-2).

Koijen, R. & Yogo, M., 2020. Exchange Rates and Asset Prices in a Global Demand System. [Online] Available at: https://www.nber.org/papers/w27342 [Accessed 3 February 2021].

Kumo, W. L., 2006. Macroeconomic Uncertainty and aggregate private investment in South Africa. *South African Journal of Economics. Vol. 74*(2), pp190 – 204.

Lin, J.Y., 2012. *New structural economics: A framework for rethinking development and policy*. The World Bank.

Majdzadeh, M.A, Ghazanfari, A., Ara.M.M., 2014.Determinants of private investment in Iran based on Bayesian model averaging. International journal of academic research in business and social sciences, 4(7), pp 229-240.

Majeed, M.T. & Khan, S., 2008. The determinants of private investment and the relationship between public and private investment in Pakistan. MPRA.

Makuyana, G. & Odhiambo, N.M., 2016. Public and private investment and economic growth: a review. *Journal of Accounting and Management, 6*(2), pp.25-42.

Makuyana, G., 2017. *Public and private investment and economic growth in South Africa: An empirical investigation.*

Manete, T., 2016. Impact of investment on economic growth and employment in South Africa: A sectoral approach.

Masipa, T.S., 2018. The relationship between foreign direct investment and economic growth in South Africa: Vector error correction analysis. *Acta Commercii,* 18(1), pp.1-8.

Matsila, N. R., 2013. *Estimation of Private Investment Functions for the South African Economy.* Gordon Institute of Business Science, University of Pretoria, pp 1 – 52.

Mbaye, E.Z.,2014. *Determinants of Domestic Private Investments in Kenya*. (Unpublished Master's thesis). University of Nairobi, School of Economics, Nairobi.

Mittnik, S. & Newman, T., 2011. Dynamic Effects of Public Investment: Vector Autoregressive Evidence from Six Industrialized Countries. *Empirical Economics,* 26(2), pp 429-446.

Mlambo, K. & Oshikoya, T., 2001. Macroeconomic factors and Investment in Africa. *Journal of African Economies,* 10(2), 12-47. Retrieved online from https://doi.org/1093/jae/10.Supp12.12

Molapo, S. & Damane, M., 2015. Determinants of Private Investment in Lesotho, 1982-2013. *European Scientific Journal Volume 11, No 34*, ISSN 1857-7881.

Molocwa, G.A., Choga, I. & Mongale, I.P., 2018. Determinants of private fixed investment in emerging country. *Risk Governance & Control: Financial Markets & Institutions,* 8(1), pp.6-13.

Mongale, I.P & Monkwe, K. (2015). Determinants of Growth in the South African Economy: CVAR Analysis. *Journal of Governance and Regulation, Vol.4 No.3*, pp 271-276 .

Mustefa, S., 2014. *Private Investment and Economic Growth Evidence from Ethiopia.* College of Business and Economics. Mekelle University. pp 1-43.

Nafziger, E. W., 2012. *Economic Development*. Cambridge University Press, USA, Fifth edition.

Ochejele, J.J., 2007. Economic Analysis. Jos: IchejumPress.

Ogunbayo, E.I., Sangodoyin, A.A., Lawal, J.O. and Okoruwa, V.O., 2014. Macroeconomic analysis of the determinants of private investment in Nigeria. *International Journal of Agricultural Economics & Rural Development, 6*(1), pp.84-101.

Oriavwote, V.E. & Oyovwi, D.O., 2013. Modelling Private Investment Behavior in Nigeria: A Cointegration Approach. *Accounting and Finance Research, 2*(3), pp14.

Oshikoya, T. W., 2019 Macroeconomic Determinants of Domestic Private Investment in Africa: An Empirical Analysis. *Economic Development and Cultural Change*. 42(3), pp 573-596.

Oshikoya, . R.,1994. Financial Determinants of Domestic Investment in Sub- Saharan Africa; *World Development*, 28(2), pp 381-400.

Osman, E. G. A., 2014. The Impact of Private Sector Credit on Saudi Arabia Economic Growth(GDP): An Econometrics Model Using (ARDL) Approach to Coitegration, *Am Int J Soc Sci*, 3 (6), pp 109-117.

Parker, J., 2010. Economics 314 Coursebook. Theories of Investment Expenditures. Middlebury College.

Parveen, S., Sadiqa, B. A., & Yasmin, F., 2021. Impact of Private Investment, Economic Growth and Financial Development on Environmental Degradation: Evidence from Pakistan. *Review of Economics and Development Studies*, 7 (1), pp 13-24.

Phetsavong, K. & Ichihashi, M., 2012. *The impact of public and private investment on economic growth: evidence from developing Asian countries.* Hiroshima University, International Development and Cooperation Discussion Paper.

Ragosa, G. & Warren, P., 2019. Unpacking the determinants of cross-border private investment in renewable energy in developing countries. *Journal of Cleaner Production,* 235(20), pp. 854-865.

Rodman, K., 1994. Public and Private Sanctions against South Africa. *JSTOR,* 109(2), pp. 313-334.

Saunders, M. & Lewis, P., 2012. *Doing research in Business management: An Essential Guide to planning your project*. Financial Times Prentice Hall.

Serven, I., 2010. Macroeconomic Uncertainty and Private Investment in Developing Countries: An Empirical Investigation; World Bank Policy Research Paper 2035, pp. 1-38.

Snowdon, B, Howard R. Vane. 2006. Modern macroeconomics: Its origins, Development and Current State. Britain:UK.

South African Reserve Bank. (2019). Quarterly Bulletin. Pretoria, South Africa.

StatsSA, Statistics South Africa. http:// www. statsa.gov.za.

Suhendra, I. & Anwar, C.J., 2014. Determinants of private investment and the effects on economic growth in Indonesia. *GSTF Journal on Business Review (GBR), 3*(3).

Tan, B. W., & Tang, C. F., 2011. The Dynamic Relationship Between Private Domestic Investment, The User Cost of Capital, and Economic Growth in Malaysia. *MPRA paper No* .27964, pp 1-12

Tobin, J., 1969. A general equilibrium approach to monetary theory. *Journal of money, credit and banking*, *1*(1), pp.15-29.

Trading Economics. http:// www.tradingeconomics.com.

Tripathy, J .P., (2013) Secondary Data Analysis: Ethical Issues and Challenges. *Iranian Journal of Public Health.* 42(12): pp. 1478 -1479.

Viegi, N. & Dadam, V., 2018. Investment in South Africa: Opening the Economy to Transform the Society. ***T****he Journal of the Helen Suzman Foundation* | *issue 82* |, pp.21-27.

Witness, B. & Dzingirai, C., 2019. Financial Development and Economic Growth in Sub-Saharan Africa: The Role of Institutions. *PLS Quarterly Review,* 72(291), pp. 315-334.

Woodruff, J (2019). Factors affecting economic development and growth. Small Business(CHRON).

World Bank 2018. South Africa economic Update, Jobs and inequality. Retrieved online; May 16, 2019 from pubdocs.worldbank.org/en/798731523331698204/South-Africa-Economic -Update-April-2018.pdf

APPENDICES

APPENDIX 1: ECONOMIC GROWTH MODEL

YEAR	Ec growth	Pub inv	Priv inv	h cap index	Work pop
1982	3,2	56,13	22,5	0,21	16,01
1983	4,2	56,36	25,5	0,24	12,02
1984	7,8	62,27	30	0,24	13,71
1985	1,9	55,73	24	0,32	11,83
1986	1,2	56,19	23,5	0,43	11,26
1987	1,9	58,35	18,9	0,34	16,47
1988	2,4	59,69	22,8	0,4	18,12
1989	4,3	59,49	24,8	0,41	13,55
1990	0,8	62,78	19	0,42	13,84
1991	-1,4	59,81	18,5	0,45	9,16
1992	-1,6	86,89	16,1	0,43	7,83
1993	-2,3	62,69	15,1	0,34	6,19
1994	2,1	34,31	17,8	0,45	5,61
1995	3,7	62,21	20,9	0,65	5,96
1996	3,2	63,69	19,5	0,54	9,04
1997	3,9	63,55	19,8	0,43	10,77
1998	1,8	63,68	18,9	0,46	15,00
1999	0,1	62,93	19,6	0,33	17,11
2000	3,7	61,98	17,8	0,43	20,57
2001	3,7	62,32	16,7	0,45	22,43
2002	3,9	55,92	17,1	0,54	23,72
2003	2,4	60,32	16,8	0,4	26,65
2004	5,7	61,72	18,5	0,41	27,65
2005	5,5	61,73	18,3	0,43	28,56
2006	7,1	61,90	21,4	0,45	29,22
2007	4,7	61,08	22,5	0,54	27,50
2008	1,1	60,56	24,6	0,66	28,08
2009	-0,5	58,56	22,7	0,45	26,54
2010	3,4	58,95	20,9	0,34	26,15
2011	3	56,65	18,2	0,43	25,74
2012	2,1	63,65	20,9	0,45	25,89
2013	2,5	61,12	22,5	0,46	26,86
2014	3,1	59,75	22,1	0,401	26,95
2015	1,9	60,00	20,9	0,41	27,93
2016	0,4	59,71	20,7	0,42	27,95
2017	1,1	59,39	19,1	0,43	28,55
2018	0,7	59,80	19,5	0,43	30,59

2019	0,9	60,01	18,9	0,45	30,41

APPENDIX 2: PRIVATE INVESTMENT MODEL

YEAR	Real int	Real ex rate	Inv cred	Ec growth	Pub inv	Priv inv
1982	13,2	0,9	15,3	3,2	56,13	22,5
1983	11,7	1,09	14,3	4,2	56,36	25,5
1984	12,8	1,24	16,7	7,8	62,27	30
1985	13,4	2,13	14,9	1,9	55,73	24
1986	11,7	2,7	15,6	1,2	56,19	23,5
1987	12	2,1	10,3	1,9	58,35	18,9
1988	13	2,05	9,4	2,4	59,69	22,8
1989	9,7	2,55	27,4	4,3	59,49	24,8
1990	10,8	2,45	24,3	0,8	62,78	19
1991	11	2,85	15,6	-1,4	59,81	18,5
1992	8,8	2,87	22,1	-1,6	86,89	16,1
1993	6,7	3,45	11,4	-2,3	62,69	15,1
1994	9,9	3,56	24,3	2,1	34,31	17,8
1995	11,2	3,6	15,3	3,7	62,21	20,9
1996	11,7	4,65	15,4	3,2	63,69	19,5
1997	10,9	4,45	15,8	3,9	63,55	19,8
1998	11,2	5,6	15,7	1,8	63,68	18,9
1999	10,6	6,2	16,5	0,1	62,93	19,6
2000	10,3	6,1	10,3	3,7	61,98	17,8
2001	10,1	8,5	10,1	3,7	62,32	16,7
2002	10,3	10,5	11,1	3,9	55,92	17,1
2003	12,6	7,5	17,4	2,4	60,32	16,8
2004	7,8	6,8	20,1	5,7	61,72	18,5
2005	6,7	6,3	13,2	5,5	61,73	18,3
2006	7,8	6,54	16,7	7,1	61,90	21,4
2007	8,7	7,3	25,3	4,7	61,08	22,5
2008	10,5	8,2	25,4	1,1	60,56	24,6
2009	6,7	10,2	10,4	-0,5	58,56	22,7
2010	6,5	7,56	4	3,4	58,95	20,9
2011	5,4	8,3	4,3	3	56,65	18,2
2012	5,4	8,6	8,7	2,1	63,65	20,9
2013	4,6	9,7	10,6	2,5	61,12	22,5
2014	5,6	10,5	8,9	3,1	59,75	22,1
2015	5,8	12,1	10,5	1,9	60,00	20,9
2016	6,3	15,1	10,3	0,4	59,71	20,7

2017	6,6	14,5	10,18	1,1	59,39	19,1
2018	6,9	14,6	9,7	0,7	59,80	19,5
2019	6,8	14,7	7,18	0,9	60,01	18,9

APPENDIX 3: A UNIT ROOT

ADF 1st Difference (intercept)

Null Hypothesis: D(LNECO_GROWTH) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on AIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.330368	0.0000
Test critical values:	1% level	-3.632900	
	5% level	-2.948404	
	10% level	-2.612874	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNECO_GROWTH) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on AIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.225880	0.0001
Test critical values:	1% level	-4.243644	
	5% level	-3.544284	
	10% level	-3.204699	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNECO_GROWTH) has a unit root
Exogenous: None
Lag Length: 1 (Automatic - based on AIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.378358	0.0000
Test critical values:	1% level	-2.632688	
	5% level	-1.950687	
	10% level	-1.611059	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNWORK_POP) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on AIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.596601	0.00107
Test critical values:	1% level	-3.632900	
	5% level	-2.948404	
	10% level	-2.612874	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNWORK_POP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on AIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.516578	0.0049
Test critical values:	1% level	-4.234972	
	5% level	-3.540328	
	10% level	-3.202445	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNWORK_POP) has a unit root
Exogenous: None
Lag Length: 1 (Automatic - based on AIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.589797	0.0011
Test critical values:	1% level	-2.632688	
	5% level	-1.950687	
	10% level	-1.611059	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNH_CAP_INDEX) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.613069	0.0000
Test critical values:	1% level	-3.626784	
	5% level	-2.945842	
	10% level	-2.611531	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNH_CAP_INDEX) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.986367	0.0001
Test critical values:	1% level	-4.243644	
	5% level	-3.544284	
	10% level	-3.204699	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNH_CAP_INDEX) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.644975	0.0000
Test critical values:	1% level	-2.630762	
	5% level	-1.950394	
	10% level	-1.611202	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNPRIV_INV) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.269263	0.0000
Test critical values:	1% level	-3.626784	
	5% level	-2.945842	
	10% level	-2.611531	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNPRIV_INV) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.203976	0.0001
Test critical values:	1% level	-4.234972	
	5% level	-3.540328	
	10% level	-3.202445	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNPRIV_INV) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.330251	0.0000
Test critical values:	1% level	-2.630762	
	5% level	-1.950394	
	10% level	-1.611202	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNPUB_INV) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.355811	0.0000
Test critical values:	1% level	-3.632900	
	5% level	-2.948404	
	10% level	-2.612874	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNPUB_INV) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.222734	0.0000
Test critical values:	1% level	-4.243644	
	5% level	-3.544284	
	10% level	-3.204699	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNPUB_INV) has a unit root
Exogenous: None
Lag Length: 1 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.486005	0.0000
Test critical values:	1% level	-2.632688	
	5% level	-1.950687	
	10% level	-1.611059	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LNPRIV_INV has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.585012	0.1051
Test critical values:	1% level	-3.621023	
	5% level	-2.943427	
	10% level	-2.610263	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LNPRIV_INV has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.577840	0.2919
Test critical values:	1% level	-4.226815	
	5% level	-3.536601	
	10% level	-3.200320	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LNPRIV_INV has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*

Augmented Dickey-Fuller test statistic		-0.365494	0.5461
Test critical values:	1% level	-2.628961	
	5% level	-1.950117	
	10% level	-1.611339	

*MacKinnon (1996) one-sided p-values.

APPENDIX 4: JOHANSEN COINTAGRATION

Date: 08/26/21 Time: 14:23
Sample (adjusted): 1984 2019
Included observations: 36 after adjustments
Trend assumption: Linear deterministic trend
Series: LNECO_GROWTH LNH_CAP_INDEX LNPRIV_INV LNPUB_INV LNWORK_POP
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.624347	86.62174	69.81889	0.0013
At most 1 *	0.496977	51.37453	47.85613	0.0225
At most 2	0.344190	26.63820	29.79707	0.1108
At most 3	0.235049	11.45039	15.49471	0.1853
At most 4	0.048887	1.804406	3.841465	0.1792

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.624347	35.24721	33.87687	0.0341
At most 1	0.496977	24.73633	27.58434	0.1110
At most 2	0.344190	15.18781	21.13162	0.2760
At most 3	0.235049	9.645984	14.26460	0.2362
At most 4	0.048887	1.804406	3.841465	0.1792

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

APPENDIX 5: ERROR CORRELATION MODEL

EViews - [Equation: UNTITLED Workfile: SHELIA::Untitled\]

File Edit Object View Proc Quick Options Add-ins Window Help

View Proc Object Print Name Freeze Estimate Forecast Stats Resids

Dependent Variable: EC_GROWTH
Method: Least Squares
Date: 02/20/20 Time: 16:19
Sample: 1982 2019
Included observations: 38

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.595467	0.054376	10.95763	0.0000
PUB__INV	1.456231	0.455532	3.19678	0.0032
PRIV_INV	2.732162	0.864832	3.15929	0.0134
WORK_POP	0.321564	0.231451	1.38933	0.3124
H_CAP_INDEX	-0,453675	0.365743	-1.24041	0.2136

R-squared	0.592837	Mean dependent var	2.463158
Adjusted R-squared	0.591201	S.D. dependent var	2.208634
S.E. of regression	2.087467	Akaike info criterion	4.431859
Sum squared resid	143.7981	Schwarz criterion	4.647331
Log likelihood	-79.20532	Hannan-Quinn criter.	4.508522
F-statistic	2.105004	Durbin-Watson stat	0.968434
Prob(F-statistic)	0.102428		

APPENDIX 6: VECTOR ERROR CORRELATION MODEL

EViews - [Var: UNTITLED Workfile: SHELIA::Untitled\]

File Edit Object View Proc Quick Options Add-ins Window Help

View Proc Object Print Name Freeze Estimate Forecast Stats Impulse Resids Zoom

Vector Error Correction Estimates
Date: 02/20/20 Time: 16:04
Sample (adjusted): 1985 2019
Included observations: 35 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
EC_GROWTH(-1)	1.000000
H_CAP_INDEX(-1)	1.01231 (0.25143) [3.19181]
PRIV_INV(-1)	2.54123 (0.78541) [3.2356]
PUB__INV(-1)	1.32143 (0.41412) [3.1918]
WORK_POP(-1)	-1.11212 (0.95871) [-1.16021]
C	4.654376

APPENDIX 7: LAG SELECTION CRITERIA

VAR Lag Order Selection Criteria
Endogenous variables: LNECO_GROWTH LNH_CAP_INDEX LNPRIV_INV LNPUB_INV LNWORK_POP
Exogenous variables: C
Date: 08/26/21 Time: 15:00
Sample: 1982 2019
Included observations: 35

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-4.126787	NA	1.16e-06	0.521531	0.743723	0.598232
1	67.96272	119.4626*	8.00e-08*	-2.169298*	-0.836143*	-1.709093*
2	87.95969	27.42442	1.17e-07	-1.883411	0.560707	-1.039702
3	104.2678	17.70591	2.48e-07	-1.386730	2.168351	-0.159516

* 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

APPENDIX 8: OLS

Dependent Variable: LNECO_GROWTH
Method: Least Squares
Date: 08/26/21 Time: 14:36
Sample: 1982 2019
Included observations: 38

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.637156	3.312367	-0.494255	0.6244
LNH_CAP_INDEX	-0.081229	0.675331	-0.120281	0.9050
LNPRIV_INV	0.696266	1.110619	0.626917	0.5350
LNPUB_INV	0.030226	1.296461	0.023314	0.9815
LNWORK_POP	-0.134981	0.297779	-0.453291	0.6533

R-squared	0.019610	Mean dependent var	0.747561
Adjusted R-squared	-0.099226	S.D. dependent var	0.867069
S.E. of regression	0.909070	Akaike info criterion	2.769289
Sum squared resid	27.27145	Schwarz criterion	2.984761
Log likelihood	-47.61649	Hannan-Quinn criter.	2.845952
F-statistic	0.165015	Durbin-Watson stat	1.489766
Prob(F-statistic)	0.954613		