DETERMINANTS OF ECONOMIC GROWTH IN SOUTH AFRICA: AN ECONOMIC ANALYSIS OF THE KEYNESIAN MACROECONOMIC MODEL

By

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DECLARATION

I, **Marida Nephertiti Nach (208028950),** hereby declare that the *thesis* for *Student qualification to be awarded* is my own work and that it has not previously been submitted for assessment or completion of any postgraduate qualification to another University or for another qualification.

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ABSTRACT

A country's performance is commonly measured by its Gross Domestic Product (GDP). The Gross Domestic Product in Developing Countries (DCs) can be seen confusing and unbalanced, with regular and unconditional falls and booms. This study aims at examining the factors that affect the Gross Domestic Product (GDP) of Developing Countries (DCs) whereby South Africa is being selected as a representative. An econometric analysis of the Keynesian model is adopted to test the South African Gross Domestic Product (GDP) over a decade (10 years). The methodology conducted uses quarterly time series data from the South African Reserve Bank (SARB) where the South African Gross Domestic Product (GDP) is modelled as a function of consumption expenditure, domestic investment, government spending and export/import of the country. This is in order to determine which of these factors best explain South African economic growth dynamics. The variables in the model are tested for stationary and the result shows that the variables become stationary at 1st difference, except for consumption which become stationary at 2nd difference. The Ordinary Least Squares (OLS) results confirm that consumption, investment, government spending and net export all have a positive impact on Gross Domestic Product (GDP). The findings suggest that the South African Gross Domestic Product is mainly influenced by consumption, followed by investment. In the recommendation context, the study recommends that South Africa should continue to maintain price stability while at the same time endeavour to attract more investment to the country. Moreover, Developing Countries need to maintain a fiscal discipline without necessarily losing sight of the international dynamics. For further areas of studies, the study recommends more analysis on macroeconomic policies that are comprehensive and can cover all aspects related to the Keynesian model of economic growth. Finally, it is necessary to remind that the findings and recommendations drawn from the study are limited to the concept of South Africa and are based only on the results from the empirical analysis conducted.

Keywords: Economic Growth, GDP variables, Keynesian Model, South Africa.

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LIST OF ACRONYMS/ABBREVIATIONS

ADF   Augmented Dickey-Fuller

AfDB   African Development Bank

D   Difference at 1st degree order

DCs   Developing Countries

DD   Difference at 2nd degree order

ECA   Economic Assessment

GDP   Gross Domestic Product

GEAR   Growth Employment and Redistribution

GNP   Gross National Product

H_0 Null Hypothesis

H_1 Alternative Hypothesis

IMF   International Monetary Fund

Log   Logarithm

NDP   National Development Programme

OECD   Organization for Economic Co-operation and Development

OLS   Ordinary Least Squares

RDP   Reconstruction and Development Programme

SA   South Africa

SARB   South African Reserve Bank

SSA	Sub-Sahara Africa
StatsSA	Statistics South Africa
TIPS	Trade and Industrial Policy Strategies
UNDP	United Nations of Development Programme
WDI	World Development Indicators

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CHAPTER 1

BACKGROUND TO THE STUDY

1.1   INTRODUCTION

Economic growth, no doubt, is the backbone of a country's development and its enhancement remains one of the major strategic and policy issues for the policymakers. Economic growth in a country depends on various factors such as the extent on the nature and quality of economic policies and other macroeconomic factors (Khamfula 2004: 7; Collier & Dollar 2001).

Significant research efforts have been devoted to understanding the effects of macroeconomic factors on the economic growth of in developing countries (Kargbo 2007: 2211). The growth rate of the Gross Domestic Product (GDP) in these countries seems to be affected by a number of factors in which some show an inverse relationship while other factors show a direct positive relationship (Kira 2013: 148). Globally, macroeconomic models have been used in the formulation of economic policies almost in every country (Kira 2013:149). Thus, fluctuations in countries'economic growth are major aspects of macroeconomic models (Kira 2013: 150).

In macroeconomics, the concept of determining the factors of economic growth can be approached from the supply side as well as from the demand side (Dutt 2006: 319; Avarnitidis, Petrakos & Pavleas 2010:59; Kira 2013:149). The four main categories of demand are: consumption spending (households), investment spending (firms), government spending (government) and exports (rest of the world) (Keynes 1936). This theory of economic growth is called the Keynesian theory of economic growth or the aggregate demand theory (Keynes 1936; Bhattarai 2005: 3; Dutt 2006: 319-322). Macroeconomic theories such as Keynesian have evolved over time to analyse fluctuations of the gross domestic product of economies. Thus, there is controversy about the causes, effects and remedies for the macroeconomic fluctuations in the short run as well as in the long-runin the literature of Keynesian economic theory (Bhattarai 2005: 1-3; Kira 2013: 149-150).

Sub-Saharan African (SSA) countries have made significant progress in order to improve their economies. However, the economic and social situation in most parts of the region remains fragile and vulnerable to internal and external shocks. These countries face major challenges such as

raising economic growth and integrating their economies into the world economy in order to tackle their developmental issues (Naude & Krgell 2006: 18; IMF 2000). Yet, their economic growth rates are said to still not be high enough to tackle the high levels of poverty and unemployment and enable them to catch up with other developed nations (Naude & Krgell 2006:18; Ndambiri, Ribo, Kubowon, Mairura, Nyangweso, Muiruri & Cherotwo 2012: 18; Nkurunziza & Bates 2004). However, the global recession of 2009 has slowed the progress of economic growth and development in many developing countries, African countries are not of exception (Naudé 2009: 10).

The demand-side policies play an essential part in of the world's economy, especially after the recession. Many developing countries' recovery such as South Africa is said to have been consumption based rather than production based. Although South Africa made a recovery from the 2009 recession, the growth rates are still viewed as slowing and employment remains below the pre-crisis level (South African Reserve Bank Working Paper 2013: 1-19). Like most developing countries, the main focus of policymakers in South Africa is to achieve not only high but also sustainable growth in order to reduce poverty and unemployment level. However, to achieve and maintain high economic growth rates, policymakers need to continuously identify what impact as well as how macroeconomic policies affect the economic growth in the country (Dewan & Hussein 2001: 4).

An investigation of the factors of fluctuations in an economy is important for designing appropriate policies for sustainable economic growth and tackling socio-economic developmental issues faced by a country. As known, many structural transformations have taken place since 1994 in South Africa. The South African economy has been through various phases. After the South Africa's transition in 1994, expectation of a significant turnaround in economic performance was created. The removal of trade and financial sanctions was expected to transform the country's economy performance. The events since 1994 did show an improved growth performance in South Africa. However, the improvement is said to have been modest on average in most cases, both by the international standards and standard of South Africa (Du Plessis & Smit 2006: 2; Rodrik 2008: 770). For example, from 2002 to 2008, South Africa grew at an average of 4.5 percent year-on-year, its fastest expansion since the establishment of democracy in 1994. Moreover, in recent years, successive governments have failed to address structural problems such as the widening gap

between rich and poor, low-skilled labour force, high unemployment rate, deteriorating infrastructure, high corruption, crime rates and persistent poverty. As a result, since the recession in 2009, South Africa growth has been sluggish and below African average.

Therefore, identifying factors that affect the growth rates of the economy of the country remains crucial to the South African policy debates. Numerous contributions have investigated both the changing structure of economic growth in South Africa, and addressed the impact of a number of its determinants (Fedderke & Romm 2006: 738). Thus, Because of uncertainty in the performance of macroeconomic variables in the country, it is necessary to continuously empirically research in the factors that cause the fluctuations in the economic growth rates in South Africa.

1.2   PROBLEM STATEMENT OF THE STUDY

Economic growth is the most important instrument for reducing poverty and improving the quality of life in developing countries, especially in sub-Saharan African countries. It is well known that Gross Domestic Product (GDP) is one of the determinants of a country's economic growth. According to the Keynesian economic growth model, fluctuations in any component of spending, Consumption, investment, government or net export should cause fluactions on the economic growth. Thus, any positive change in these components should lead to a positive change in economic growth.

South African economy recorded its fastest growth rates since the 1960s over the period 2004 to 2007, with real GDP growth averaging 5.2% per annum (South African Quarterly Economic Report Fourth Quarter 2012: 3). From a global perspective, this period was characterised by a booming commodities markets. Domestically, household consumption expenditure and fixed investment activity elevated economic growth substantially, with the export sector also providing considerable stimulus over the years 2005 to 2007. Rodrik (2008) emphasised that the improvement in South Africa's real growth performance from 1994 relative to the previous ten-year period was associated with a marked improvement in overall domestic expenditure (from 0.6% to 3.2% p.a.). This, in turn, was consisted primarily of increased expenditure on fixed investment (5.1% p.a.) and household goods and services (3.7% p.a.) (Rodrik 2008: 769-797).

Therefore, demand-side factors, such as changes in spending with shifts in consumers and business confidence and variations in exports and government expenditure are important determinants of fluctuations in economic growth rates. Thus, it is important to understand to what extend these demand-side macroeconomic variables affect the economic growth in South Africa.

1.3 OBJECTIVES TO THE STUDY

This section identifies the main as well as the secondary objectives of the study.

1.3.1 Primary Objective of the Study

This study aims at analysing the factors that affect the Gross Domestic Product (GDP) of Developing Countries whereby South Africa is chosen as a representative. This is in order to determine which Keynesian variables of GDP best explain the fluctuations in economic growth rates. In other words, the primary objective of the study is to determine the variables that most explain the variations in gross domestic product (GDP) using the Keynesian economic growth model. Furthermore, this study reviews the trends in the South African GDP, and uses econometric analysis to further analyse the impact of these macroeconomic variables on economic growth in South Africa.

1.3.2 Sub-Objectives

They secondary objectives of the study are to:

- Define the Keynesian macroeconomic identify of the Gross Domestic Product
- Examine the effect of the Keynesian macroeconomic variables on economic growth in South Africa
- Determine the flexibility of these variables on the South African economic growth while exploring the dynamics of economic growth of the country.
- Ascertain the relationship between the Keynesian Macroeconomic growth Variables and economic growth.
- Explore the contribution of the demand-side macroeconomic policies and strategies to promote growth economic in South Africa.

1.4   HYPOTHESES OF THE STUDY

The hypotheses to be tested are:

1.   Hypothesis 1:

H_0: the relationship between economic growth (GDP) and consumption (C) is statistically significant in South Africa.

H_1: the relationship between economic growth (GDP) and consumption (C) is not statistically significant in South Africa.

2.   Hypothesis 2:

H_0: the relationship between economic growth (GDP) and investment (I) is statistically significant in South Africa.

H_1: the relationship between economic growth (GDP) and investment (I) is not statistically significant in South Africa.

3.   Hypothesis 3:

H_0: the relationship between economic growth (GDP) and government expenditure (G) is statistically significant in South Africa.

H_1: the relationship between economic growth (GDP) and government expenditure is not statistically significant in South Africa

4.   Hypothesis 4:

H_0: the relationship between economic growth (GDP) and net export (X-M) is statistically significant in South Africa.

H_1: the relationship between economic growth (GDP) and net export (X-M) is not statistically significant in South Africa.

1.5   SIGNIFICANCE OF THE STUDY

Economic growth is the most important concept for all countries, particularly developing countries. Due to slow economic growth in the sub-Saharan region, the concept of economic growth still remains relevant and included in many debates.

The problem faced by economists regarding empirical growth, is that growth theories are not explicit enough about what demand-side variables of economic growth belong in the regression. One reason of this is that economic growth theory is not explicit whether demand-side factors of economic growth specifically matter for economic growth. In order to understand the key concept of economic growth, researchers keep focusing on identifying the factors affecting growth in an economy. One purpose of examining the aggregate expenditures model is to gain a deeper understanding of the spreading effects from a change in one or more components of aggregate demand. The Keynesian approach identifies consumption, investment, government expenditure and net export (export minus import) as the main macroeconomic determinants of GDP. Continued analysis reflects the extent of the effect of determinants of economic growth on building further on the existing knowledge and literature on what can be done to enhance economic growth.

The fluctuations in economic growth rise more uncertainty and issues on macroeconomic factors affecting the economic growth of South Africa. Identifying the macroeconomic factors that influence the GDP in South Africa will help to understand how macroeconomic policies are set and how resources are allocated to help improve growth and development in the country. Thus, this research will contribute to the understanding of the policy measures that will be effective in raising economic growth in the country. Additionally, there are a lot of studies that have taken a supply-side variables approach to economic growth, however, research on the demand-side determinants of growth have few examples. As a result, this study contributes to the literature.

1.6   RESEARCH METHODOLOGY OF THE STUDY

The determinants of economic growth framework require times series data. A Keynesian model is adopted to test the South African Gross Domestic Product. The study uses the Ordinary Least Squares analysis (OLS) through equation regression to determine which Keynesian macroeconomic variables best explain fluctuations in economic growth. The software package

EVIEWS 7 will be used to estimate the OLS model. The log Ordinary Least Squares (OLS) Model will be run to find the impact of the presumed factors of GDP in the South Africa's economy. The basic methodology consists of a linear regression analysis. The regression describes the relation between economic growth and it's prior explanatory variables whereby the South African GDP is modelled as a function of consumption, investment, government and net export. The model will be using quarterly data for over ten past years (the first quarter of 2004 to the fourth quarter of 2014).

The Keynesian economic growth model is presented as:

$$GDP = C + I + G + (X - M) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{(1.1)}$$

The regression model will be estimated in the form of logarithm as following:

$$\text{Log GDP} = \log \text{CONS} + \log \text{INV} + \log \text{GOV} + \text{NetEXP} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{(1.2)}$$

Where,

CONS represents Consumption; INV represents Private Investment; GOV represents Government spending and NetEXP represents net export (X minus M) variables.

1.7   DATA SOURCES

The primary sources of data in this research study are journals, articles and working papers from the internet and secondary sources of data are books and past lieteratues on the study.

The data modelled in this study derives from the South African Reserve Bank (SARB) database. Data for the variable are: GDP, representing economic growth, is the dependent variable. Consumption Expenditure, Private investment, government expenditure and net export are the independent variables. All variables are taken at their Rand values.

1.8   LIMITATION TO THE STUDY

One limitation to the study is based on the context that the study is focusing on demand-side macroeconomic factors as determinants of economic growth using the Keynesian approach. The second issue that may arise is the consideration of GDP as principal measure of economic growth

and the Kyenesian GDP growth detrminants as the main determinants of economic growth. Therefore, the study will be not addressing on all the possible macroeconomic factors affecting economic growth in developing country. Results and recommendations drawn in the study may be limited to the South Africa's concept, and based on the findings from empirical results conducted.

1.9   CONTRIBUTION TO THE EXISTING STUDIES

Economic activities have been driven by domestic expenditure in a structurally constrained economy. Several studies have been undertaken to investigate the relationship between the composition of demand-side factors and growth. However, neither theories nor empirics provide clear cut answers on how the composition of aggregate demand affects economic growth. Thus, this research contributes to the growing empirical literature on economic growth and Keynesian model by ascertaining the impact of the demand side macroeconomic determinants on economic growth in South Africa. Furthermore, the study is conducted to contribute in the literature on the relations between economic growth and macroeconomic variables.

1.10   SUMMARY

This study will analyse the relationship between demand-side macroeconomic variables and the GDP growth in the South Africa's economy. To achieve its objective, the study will use both simple flexibility, and econometric procedures to provide empirical evidence concerning the extent to which economic growth that has occurred in South Africa. Furthermore, the study will make use of the Ordinary least squares analysis (OLS) through a single equation regression to determine which macroeconomic variables best explain growth variations in the South Africa's economy.

The research carried out was to determine the impact of the Keynesian macroeconomic determinants of GDP on South Africa's economic growth. Increase in any of the variables of growth is expected to have a positive impact on economic growth rate.

This dissertation investigates the relationship between the dependent variable GDP rate as proxy for economic growth and the independent variables (consumption, investment, government expenditure and net exports) over the last ten years in South Africa.

1.11 ORGANISATION OF THE STUDY

Chapter one has provided the background to the research study. The problem statement, research methodology, as well as the objectives and significance of the study were also provided in the chapter.

The rest of the research study is outlined as follows:

Chapter two firstly discusses the economic growth concept and then presents an overview of the main theories of economic growth. These theories on economic growth provide a basic for understandings the importance of and identifying the different factors that may affect economic growth in a country.

Chapter three outline an overview of the structure of the South African economic, as well as the sources and dynamics of their impacts on the macroeconomic fluctuations. Furthermore, the chapter outlines a review of the macroeconomic performance in the South African economy by analysing the role of aggregate demand factors affecting macroeconomic fluctuations and volatility in the country's economic growth. Finally, the chapter present a review of the theories on the Keynesian macroeconomic variables of GDP growth.

Following the Chapter four which describes the econometric methodology used for the analysis of the study. It clearly defines the model specification as well as the estimation techniques. The chapter also provide a description of the data involved in the regression model.

Chapter five provides an analysis of the results by providing a presentation of empirically derived results, and the interpretation of the findings.

Finally, Chapter six presents a summary of the main findings, conclusion and recommendations. This is followed by the area of failure and suggestions for further research in the field.

The next chapter, chapter two, highlights the literature on the concept of economic growth and provides an overview of the economic growth theories.

CHAPTER 2

LITERATURE REVIEW

THE CONCEPT AND THEORIES OF ECONOMIC GROWTH

2.1   INTRODUCTION

This chapter deals with the concept of economic growth. The first part will present a review of the economic growth concept. The second part will discuss the main economic growth theories through focusing on each economic growth theory background as well as their main witnesses. Then a summary of the chapter will be provided at the end.

This following section describes what economic growth entails. It provides a discussion on the concept of economic growth. The assumption is that there is a uniquely correct, or at least a uniquely appropriate definition of economic growth.

2.2   THE CONCEPT OF ECONOMIC GROWTH

Economic growth continues to be one of the most relevant and exciting sub-areas of economics. The last decade has seen an explosion of research on factors of economic growth (Acemoglu 2012: 545–550; Haller 2012: 66). The economic growth is measured through the evolution of these main indicators (gross domestic product, national revenue, investments, aggregate demand, aggregate supply, inflation rate, unemployment rate) and gross domestic product (GDP) are said to be the most used indicators of the economic growth of a nation (Stefan 2012: 280-284; Haller 2012: 67).

There are many economic facts that emphasize all macroeconomic explanations of growth (Kira 2013: 148). Economic literature in macroeconomics has provide a wide range of evidence that demand side factors play an important role in the fluctuations of economic growth rates of a country (Dutt 2006: 319; Rodrik 2008). In the effort to tackle most socio-economic problems, most developing countries particularly in Africa, are undertaking domestic macroeconomic structural changes in order to improve their economies.

Economic growth has been used in conjunction with other terms such as development, modernization, westernization and industrialization. It is, in other words, a transition from a

simple, low-income economy to a modern, high- income economy (Haller 2012: 66). The scope of economic growth includes the process and policies by which a nation improves the economic, political, and social well-being of its people (Aron 2000: 104). However, in general, economic growth is described as an increasing real in gross domestic product (GDP) or real gross national product (GNP). Although economic growth is often measured by the rate of change of gross domestic product (GDP), it is also defined in terms of increase in per capita income, and attainment of a standard of living equivalent to that of developed countries (Aron 2000: 104; Haller 2012: 66; Mankiw 2014: 195; D'Alisa, Demaria & Kallis 2014: 103). Thus, economic growth also implies improvement in a variety of development indicators such as literacy rates, life expectancy, and poverty rates (World Bank 2012).

While it is impossible to uniquely define the concept of economic growth, simultaneously many definitions of economic development can coexist (Haller 2012: 66). Furthermore, economists use the term growth to describe the augmentation of the production over a long period of time, while in short-term, economists define growth as the expansion or recession of the business cycle of economy (Aron 2000: 104; Haller 2012: 66; Mankiw 2014: 195; D'Alisa, Demaria & Kallis 2014: 103). Thus, with economic growth defined as a change per capital gross domestic product (GDP) or other measure of aggregate income, it can be either positive or negative (Haller 2012: 66-67).

Literature on economic growth shows that GDP has been and still remains one of the popular measure of the economic performance of a country. Still in the same thought, Sabillion (2007) defined economic growth as an increase in the number of goods and services produced in an economy in a given time period, usually a year (Sabillion 2007). The author emphasized that for the majority of human history, economic growth has been so slow as to be non-existent in most countries. However, from approximately 1750, there was a great divergence which resulted in an exponential amount of growth in Great Britain, allowing the citizens of Western Europe to obtain previously unprecedented levels of wealth. Economists have largely debated over the causes of this growth and why Great Britain was the first to industrialize (Sabillion 2007).

Also, in 1377, the Arabian economic thinker Ibn Khaldun provided one of the earliest descriptions of economic growth in his Muqaddimah (known as Prolegomena in the Western world): When civilization (population) increases, the available labour again increases. In turn, luxury again increased in correspondence with the increasing profit, and the customs and needs of luxury

increase. Crafts are created to obtain luxury products. The value realized from them increases, and, as a result, profits are again (Ibn Khaldun 1377).

The above statements showed that since historical times, economic growth has been commonly measured using GDP. GDP is therefore seen as a measure of market activity, yet it is also commonly used as an indicator of quality of life too. However, using the Gross Domestic Product as measure of a country prosperity and development has many limitations which can make it less useful as a measure of a country's economic performance and especially as a measure of the standard of living of its society. For example: The global economic crisis took many by surprise because of the high performance of the world economy between 2004 and 2007. During this period, temporary profits in the financial industry, increasing debt levels, and the real estate bubble painted a false picture of true economic conditions. This highlights the fact that our current system of measurement is failing and steps should be taken to improve GDP as a measure of economic performance and social progress (Stiligitz, Sen., & Fitoussi 2010). Yet, despite its limitations, GDP is hard to replace because it provides one summarised figure, which is comparable between nations. Moreover, in a single number you get an idea of whether the economy is expanding or contracting.

Since GDP is used as a measure of a country's well-being, there needs to be a more incorporation of quality of life factors that go beyond measuring output. These factors include health, education, living standard, political status, social interaction and the environmental safety (Stiglitz *et al*. 2010). Moreover, the economist authors emphasise that in order to make GDP a more useful measure of economic growth, the focus need to be taken away from production into income and consumption, as material living standards are more closely associated with these measures. In addition to this, it is necessary to state that the indicator also reflect distribution of income. Particularly, measuring government-provided services, such as education, should be improved as these contribute a vital role in economic activity and benefit society greatly and integrately. Lastly, GDP could be improved through broadening income measures to non-market activities, by showing how people spend their time over years and across countries to give a better reflection of change (Stiglitz *et al*. 2010).

2.3 THEORIES OF ECONOMIC GROWTH

Economic Growth theories provide various explanations on the economic growth concept and have developed over time (Jovanovic 2001: 4089-4101; Kira 2013: 148). The field of macroeconomics is organised into many different schools of thought, with differing views on the economic growth. There are other variations of the following economic school of thoughts, but these are the basic concepts. These three economic growth theories over time have all attempted to answer the exact question which entails what economic growth is about. The first one is the Classical Economic Growth Theory or The Malthus, then Keynesian Economic Growth Theory and the Monetarist Economic Growth Theory.

This section of the chapter overviews the basics of each of these major schools of economic growth and mentions the main points of agreement as well as conflict among them. Moreover, the section attempts to contrast the fundamental assumptions under which these three economic theories operate.

2.3.1 The Classical Theory of Economic Growth

At the end of the 18th century and the beginning of the 19th century, economic changes influenced economic theories more than ever. Economic growth rates increased tremendously, and some philosophers of the time became the first economists. They developed what we know today as the classical economic growth theory, stating the way markets and economies behave (Reid 1989).

The classical theory of economic growth is a combination of economic work done by Adam Smith, David Ricardo, and Robert Malthus in the eighteenth and nineteenth centuries (Park 2006: 558). However, the philosophical foundation of classical economics was provided by John Locke's (1632–1704) conception of the natural order, while the economic foundation was based on Adam Smith's theory of self-interest and Jean-Baptiste Say's (1767–1832) law of the equality of market demand and supply. Adam Smith (1723-1790), considered 'Father of Economics' developed much of the theory about markets that it is regarded as standard theory. Adam Smith argues that it was market forces that ensured the production of the right goods and services (Adam Smith 1723-1790).

This would happen because producers would want to make profits by providing them. Without government intervention, thus forming laissez-faire environment, public well-being would increase the competitition of organized production to suit the public. This was the basis of the free market economy without Government Intervention (Reid 1989; Blanchard & Johnson 2014: 646). These concepts developed by Smith are so fundamental that they are still present in nearly all economics courses.

The Classical economic growth theory is stated that growth in real GDP rates is temporary and when real GDP per person rises above the subsistence level, a population explosion brings real GDP per person back to the subsistence level (Park 2006: 558). In others words, what Classical economic growth theory says is that the increase in real GDP per person will be temporary because prosperity will induce a population explosion. Thus, the population explosion will decrease real GDP per person. Contrary to the assumption of the classical theory, the historical evidence is that population growth rate is not tightly linked to income per person, and population growth does not drive incomes back down to subsistence levels. Furthermore, the theory states that every economy has a steady state GDP. Furthermore, for the Classical economists, any deviation off of that steady state is temporary and will eventually return to equilibrium. This is based on the concept that when there is a growth in GDP, population will increase. The increase in population has an adverse effect on GDP due to the higher demand on limited resources from a larger population. The GDP will eventually lower back to the steady state. When GDP deviates below the steady state, population will decrease and thus lower demand on the resources. In turn, the GDP will rise back to its steady state. Moreover, a characteristic feature of the classical approach is the view that production involves labour, produced means of production and natural resources (Blanchard & Johnson 2014: 644-645; Todaro & Smith 2009).

Therefore, the classical economists explain economic growth process in terms of technological progress and the population growth. In their view, technological progress (depending on capital accumulation) remains in lead for some time, but eventually falls when a fall in the profit rates prevent further accumulation of capital (Park 2006). Thus, according to the Classical economic growth, the main components of the classical theory of growth and stagnation are the production function, technological progress, investment, the determinants of profit, size of labour force and the wage system (Adam Smith 1723-1790). Therefore, according to the Classical Model, growth

in economic growth rates can be achieved by accumulating labour, capital and others factors of production. Since all these factors experience diminishing marginal returns, the economy can only achieve a steady equilibrium income through continuous increase in saving and investment but at the same time reduce population growth (Park 2006; Todaro & Smith 2009). However, a policy that helps to increase both savings and investment but at the same time reduce population growth is difficult to be implemented, especially in developing countries.

   a) The Production Function

Smith, Ricardo and Malthus all postulated the identical production function, which can be written as:

$$Y = f (K, L, N, S)…………………………………………………………………... (2.1)$$

This means that output depends on the stock of capital, labour force, land and the level of technology. In the generalized classical growth model Land is taken as the supply of known and economically useful resources and this seems like the right thing to do as it is not the amount of cultivable land and its fertility that determines the national output but the total supply of know and usable natural resources (Smith 1723-1790; Ricardo 1817).

Most of the other classical economists believe that the production function is linear and homogeneous, which implies that it has constant returns to scale meaning that on doubling the - quantities of all the factors of production output would double (Sowell 2006). Adam Smith (1723-1790), on the other hand, believed in increasing returns to scale on account of improved division of labour.

In case the term land is restricted to cultivable land only, the supply of which is a fixed amount, then the askable question to be answered would be as to how the output would respond to an increased supply of labour with a fixed supply of land (Sowell 2006). Furthermore, most classical economists believed that output would not show a uniform response to the increase in the quantity of land. The referred to four different responses of output which depended on the phase of the production, that is to say, increasing marginal returns (where an increase in the variable input results in an increase in the marginal product of the variable input),diminishing returns (when additional units of an input result in a smaller increase in output); diminishing average returns

(where the average output increases by less from additional units of an input used) and diminishing total returns (Reid 1989; Sowell 2006).

b) Technological Progress

Being a completely independent factor in their opinion (Classical Economists), technological progress is a capital absorbing and therefore, capital accumulation is a pre-requisite for a steady advance of technology. For this Capital Accumulation they stressed on savings and Investment as a primary factor. Putting this in equation form:

$$S = S (I)\text{……………………………………………………………………………………………. (2.2)}$$

c) Investment

Investment, in the classical model, refers to net investment, which is the net addition to the capital stock. For the classical economists profit was the sole motivator for all productive activity, and therefore, they believe that investment activity is dependent on the profit expectations of the entrepreneurs, which is largely influenced by the rate of profit. Stating the above in equation form, where R is profit and net investment, by definition, equals the increase in the capital stock, thus:

$$I = dK = I(R)\text{……………………………………………………………………………. (2.3)}$$

d) Limitations in the Classical Theory of Economic Growth

The Classical Model was popular before the Great Depression. It says that the economy is very free-flowing, and prices and wages freely adjust to the ups and downs of demand over time. In other words, when times are good, wages and prices quickly go up, and when times are bad, wages and prices freely adjust downward (Reid 1989; Blanchard & Johnson 2014: 644).

The classical economists knew the role of entrepreneurs in the process of production, yet they never assigned any important position to them in their system. Furthermore, contrary to what the classical economists has envisioned, Capital had become an important factor in agriculture and is now increasingly substituting land. This is prevented a fall in the rate of profits. Even in the industrial sector, growth caused by increasing returns has prevented profit rates from falling. Hence, investment activity has not slowed down. The classical economists were right to observe

the technical progress was greatly dependent on savings and investment, but the relationship they share is not as rigid as the one they have assumed in their model (Walter 1984)

The major assumption of this model is that the economy is always at full employment, meaning that everyone who wants to work is working and all resources are being fully used to their capacity. The thinking goes something like this: if competition is allowed to work, the economy will automatically gravitate toward full employment, or what economists call potential output.

Classical economists believe that the economy is self-correcting, which means that when a recession occurs, it needs no help from anyone. Therefore, the classical economic model is basically a mathematical-like equation explaining why employment remains full, or at least tends to. It does not explain all the realities and details of an economy, however, which can affect a labour market, the relationship between wages and employment, and unemployment (Blanchard & Johnson 2014: 644-645).

Contrary to the Classical economics, Keynesian economics embodies a certain degree of scepticism with respect to the ability of free markets to automatically restore lost economic equilibrium. Where classical economic models had tended to see the business cycle as being something like a see-saw that would always right itself, a proper analogy for Keynesian views of the business cycle, is that it is like an elevator that can go up, down, or be frozen in place (Blanchard & Johnson 2014: 644-645).

2.3.2 The Monetarist Theory of Economic Growth

The general monetarist view is that the rate of monetary expansion is the main determinant of total spending, commonly measured by gross national product (GNP). Changes in total spending, in turn, influence movements in output, employment, and the general price level. Following the short-run responses to a change in the rate of monetary growth, total spending and the price level grow at rates determined by the rate of increase in money, while output moves toward and resumes a long-run growth path. Such growth in output is influenced by the rate of monetary expansion. Instead, it is determined by growth in the economy's productive potential, which depends on growth of natural resources, capital stock, labour force, and productivity (Andersen & Carlson 1970: 7-21; Meltzer 1975: 191).

This school of thought, suggested by Milton Friedman, addresses the importance of stable monetary growth to control inflation and stimulate long-term growth. The Monetarist school of economics is stated to emphasise the importance of controlling the money supply to control inflation (Hahn 1980:1). Godley and Lavoie (2007) emphasised in their work that monetarist economists believe that the role of government is to control inflation by controlling the money supply. Their view is that the main causes of changes in aggregate output and the price level are fluctuations in the money supply. In the monetarist view of economics, the role of government is simply to use its monetary policy to control inflation and supply-side policies to make markets work better and reduce unemployment.(Hahn 1980:1-17; Godley & Lavoie 2007). Monetarists believe that markets are typically clear and that participants have rational expectations.

Monetarists are generally critical of expansionary fiscal policy arguing that it will cause just inflation or crowding out and therefore not help. Monetarism seems to be an economic theoretical challenge to Keynesian economics. Monetarists reject the Keynesian notion that governments can manage demand and that attempts to do so are destabilizing and likely to lead to inflation (Hahn 1980: 1-17). The challenge to the traditional Keynesian theory strengthened during the years of stagnation following the 1973 and 1979 oil shocks. Keynesian theory had no appropriate policy responses to the supply shocks. Inflation was high and rising through the 1970s and Friedman argued convincingly that the high rates of inflation were due to rapid increases in the money supply. He argued that the economy may be complicated, but stabilization policy does not have to be. The key to good policy was to control the supply of money. However, like the classical economic theorists, they believe that government should stay out of economic stabilization since, in their view, markets are competitive with a high degree of macroeconomic stability. Such policies as expansionary monetary policy will, in their view, only lead to price instability (Blanchard & Johnson 2014: 646-647).

a) The Quantity Theory of Money

The Short-Run

The equation of exchange is the building block for monetarist theory. It says that:

$M \times V = P \times Y$…………………………………………………………………………….... (2.4)

where M is the quantity of money, V is velocity of M, or the average number of times that the dollar turns over in a given year on the purchase of final goods and services, P is the price level, and Y is real output. Velocity (V) is the average number of times that the dollar turns over in a given year on the purchase of final goods and services. By assuming that velocity is stable, the equation of exchange is transformed into the quantity theory of money. As defined, the equation of exchange is said to always be true. Keynesians, Monetarists and all other economists accept this equation as valid (Hahn 1980: 1-17; Blanchard & Johnson 2014: 646-647).

The Long-Run

Monetarists argue that, in the long run, changes in the money supply only cause inflation. Because monetarists believe that markets are stable and work well, they believe that the economy is always near or quickly approaching full employment. Even if the economy is not at full employment, the consequence of GDP deviating substantially from its potential level is small. So in the long-run, the economy will be at Y (Hahn 1980: 1-17; Blanchard & Johnson 2014: 646-647).

Notice that M and P are the only variables in this equation that change in the long run. The implication is that changes in the money supply will only impact the price level, P. In the long run, changes in the money supply only cause inflation. Another implication is that the rate of growth of the money supply will equal the rate of growth of the price level (or inflation) in the long-run. If the money supply grows by five percent per year, the inflation rate will be about five percent per year (Hahn 1980: 1-17; Blanchard & Johnson 2014: 646-647).

Because monetarists believe that the money supply is the primary determinant of GDP in the short run, and of the price level in the long run, they think that control of the money supply should not be left to the discretion of central bankers. Moreover, Keynesians believe that velocity is inherently unstable and they do not believe that markets adjust quickly to return to potential output. Therefore, Keynesians attach little or even no significance to the Quantity Theory of Money. Monetarists seem not to be prone for government interventions and tend to trust free markets, and believe that fiscal policy is not helpful. Where it could be beneficial, monetary policy could do the job better. Monetarist economists emphasise that excessive government intervention only interferes in the workings of free markets and can lead to bloated bureaucracies, unnecessary social programs, and

large deficits. Automatic stabilizers are sufficient to stabilize the economy according to this view of economic growth (Meltzer 1975: 151).

Thus, Monetarist economics is Milton Friedman's direct criticism of Keynesian economics theory. Simply put, the difference between these economic theories is that monetarist economics involves the control of money in the economy, while Keynesian economics involves government intervention. Although Keynesians do not stress the importance of money growth as much as Monetarists, the focus on the long run is much less controversial (Hahn 1980: 1-17; Blanchard & Johnson 2014: 646-647).

2.3.3 The Keynesian Theory of Economic Growth

Keynesian economics is a theory suggested by John Maynard Keynes (1883-1946) in which government spending and taxation is used to stimulate the economy. His theory is that the government should actively intervene in the economy to manage the level of demand (Keynes 1936). This theory is also called fiscal policies or demand-side economics. It is argued that the key of Keynesian economics is the belief that the development process is served better by pursuing policies that enhance growth with existing obstacles than by simply trying to remove these obstacles in the hope that development will then occur (Keynes 1936). These policies are often known as demand management policies. Thus, there are three main elements involved in Keynesian economics: employment, government spending, and tax policy.

In the Keynesian perspective, government spending coordinated with lower taxes stimulates the economy. This stimulation creates jobs, thus lowering unemployment. Inflation is kept in check by higher output. The competing prices among the higher number of goods keep prices from becoming inflationary. According to the Keynesian theory, the more taxes government takes in from the higher number of workers keeps the government from going into deficit by its spending to stimulate the economy. Keynes (1936) observed that the economy is not always at full employment. In other words, the economy can be below or above its potential. During the Great Depression, unemployment was widespread, many businesses failed and the economy was operating at much less than its potential. Thus, sometimes the economy is strong and sometimes it's weak. This is exactly what the Keynesian model recognises. The economy may start out in a state of balance in which everyone is fully employed, but strong demand for products and services

temporarily pulls the economy above the full employment level. This is what economists call an expansion. When weaker demand temporarily pulls the economy below the full employment level, economists call that a recession. Furthermore, it is possible to identify a coherent Keynesian approach to growth built on three basic principles: the economic system may not tend to full employment; investment decisions are independent of saving decisions; the autonomous components of demand may affect the rate of growth of the economy (Cornwall & Cornwall 2002: 205). Therefore, effective demand plays a crucial role in affecting the growth path of the economy and therefore in pushing the economic system close to full employment, assigning to the demand side a crucial role in favouring economic growth (Dutt & Skott 2005).

The essential feature of Keynesian macroeconomics is the absence of continuous market clearing. Thus a Keynesian model is by definition a non-market clearing model, one in which prices fail to adjust rapidly enough to clear markets within some relatively short period of time.

Common to almost all Keynesian models is the prediction that in response to a decline in nominal demand, the aggregate price level will decline less than proportionately over a substantial time period, during which the actual price level is above the equilibrium price level consistent with the maintenance of the initial equilibrium level of real output (Keynes 1936).

a) Gross Domestic Product (GDP)

One of the most basic propositions in macroeconomics is that output fluctuations can be due to demand or to supply shocks, that is, fiscal or monetary policies on one hand, or productivity, labour supply, or structural reforms on the other. Keynesianism emphasises the role that fiscal policy can play in stabilising the economy. In particular Keynesian theory suggests that higher government spending in a recession can help the economy recover quicker. Keynesians say it is a mistake to wait for markets to clear like classical economic theory suggests (Keynes 1936).

At the core of demand side economics is the focus on aggregate demand. Aggregate demand is the combination of consumption of goods, industry investment in capital goods, government spending and net exports. When other elements of aggregate demand are weak, the government can mitigate their impact by increasing its spending. The government can intervene to generate demand for goods and services. An important assumption according to Keynes is that demand determines the level of national output (Keynes 1936). Keynesians' belief is that the main force affecting overall

economic activity and causing short-term fluctuations is consumer demand for goods and services. Demand side economics claims that economic activity is best boosted by increasing the buying power of the lower and middle classes, thus increasing the demand for goods and services (Bade & Parkin 2013: 168, 190, 534, 610, and 744).

Constructing a Keynesian model of economic growth requires combination of Consumption, investment, government spending and net export. Like any model, the model is constructed on many simplifying assumptions. The determinants work through the four aggregate expenditure, consumption expenditures, investment expenditures, government purchases, and net exports.

$$Y = C + I + G + (X - M) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (2.5)$$

C = Consumers expenditures on goods and services

I = Investment spending

G = Government expenditures

X = Exports of goods and services.

M = Imports of goods and services.

b) The Keynesian Demand-side Factors of Economic Growth

Consider now several specific determinants that work through each of the four broad expenditure categories:

Consumption: Household consumption expenditures, being from a rather large, rather diverse group, are influenced by a lot of things. Here is a short list:

Physical wealth is the material, tangible possessions of the household sector, especially durable goods like cars, furniture, and kitchen appliances. An increase in physical wealth generally reduces consumption expenditures. If consumers have recently purchased a lot of durable goods, then they have less need to buy more, with a subsequent decrease in consumption and aggregate demand (Mohr & Fourie 2008; Blanchard & Johnson 2014).

Financial wealth is money, stocks, bonds, mutual funds, bank accounts, and other documents that give consumers a claim to goods, resources, or productive assets. When consumers acquire more

financial wealth, they tend to spend more freely, with a subsequent increase in consumption and aggregate demand (Mohr & Fourie 2008; Blanchard & Johnson 2014).

Interest rates are another key consumption determinant. Because interest rates affect the cost of borrowing and because many durable goods are purchased with borrowed funds, higher interest rates reduce consumption and aggregate demand, and lower interest rates do the reverse.

Expectations of future economic conditions are also an important determinant. Households want to buy at the lowest price possible. If they expect that the price level will rise (that is, they expect rising inflation), then they are inclined to buy more today, causing consumption expenditures and aggregate demand to increase (Mohr & Fourie 2008; Blanchard & Johnson 2014).

Investment: Investment tends to be the most volatile of the four expenditure categories with a large assortment of influences. The first three determinants listed are comparable to consumption determinants (Mohr & Fourie 2008; Blanchard & Johnson 2014).

Interest rates work much the same for investment as for consumption. Investment expenditures for capital goods are usually financed with borrowed funds. If interest rates change, then the cost of borrowing changes and so too does the overall cost of the investment. Higher interest rates mean less investment and a decrease in aggregate demand (Mohr & Fourie 2008; Blanchard & Johnson 2014).

Physical wealth possessed by the business sector includes capital goods. This determinant works for investment expenditures much like that for consumption expenditures. In this case the physical wealth is capital, the object of investment. The business sector is less inclined to invest in capital goods, if it has recently accumulated a lot of capital goods through investment. A boost in the amount of capital is bound to cause (eventually) a decline in investment and aggregate demand (Mohr & Fourie 2008; Blanchard & Johnson 2014).

Expectations of future economic conditions is also an important determinant working through investment expenditures. If the business sector sees an improving economy on the horizon, with expectations of greater sales and profits, they are more inclined to expand investment now, in spite of current conditions. This, of course, boosts aggregate demand (Mohr & Fourie 2008; Blanchard & Johnson 2014).

Capital prices are another key determinant working through investment. Invoking the basic law of demand, if the price of capital increases, the business sector decreases the quantity of capital demanded. This results in a decrease in investment expenditures and aggregate demand (Mohr & Fourie 2008; Blanchard & Johnson 2014).

Technology is the last but not the least determinant affecting aggregate demand through investment. Technological advances enhance the need to invest in capital. A new technology requires new capital, different capital, capital to implement the technology. Technological advances invariably trigger an increase investment and aggregate demand (Mohr & Fourie 2008; Blanchard & Johnson 2014).

Government: The government sector plays by its own set of rules. In fact, they make the rules. But there is one unavoidable rule that the government sector must follow when government spends more (or less) on government purchases, aggregate demand increases (or decreases). If elected leaders decide to spend big bucks on the military, or education, or the space program, or highways, or any number of other worthwhile products, then government purchases increase and so does aggregate demand (Mohr & Fourie 2008; Blanchard and Johson 2014). Furthermore, the specific influences that might entice government to change its spending ways include the following:

Fiscal Policy: At the federal level, the desire to counter instability caused by other expenditures though fiscal policy is always a possibility. If aggregate demand decreases because of less spending from the household or business sectors, then the government sector is often inclined to spend more. Alternatively, if aggregate demand increases to the point of triggering inflation, then the government is likely to spend less (Mohr & Fourie 2008; Blanchard & Johnson 2014).

Politics: Political considerations are almost always bubbling near the surface of government spending. Perhaps the political winds blow in the direction of reducing the federal deficit. Such a force could decrease government purchases and aggregate demand. Or perhaps a rather vocal and financially powerful interest group convinces political leaders to spend more on worthy activities, like the space program, national defence, or environmental quality. This is bound to increase government purchases and aggregate demand (Mohr & Fourie 2008; Blanchard & Johnson 2014).

State and Local Taxes: At the state and local level, which accounts for about two-thirds of total government purchases, a key determinant is tax collections. A boost in state and local tax

collections, which usually happens when the economy is strong, causes state and local government purchases to increase. And when the economy is weak, tax collections fall, and so too do state and local government purchases (Mohr & Fourie 2008; Blanchard & Johnson 2014).

Net Exports: With the inherent diversity of the foreign sector (which includes well over a hundred distinct national governments, almost six billion people, and hundreds of thousands of assorted foreign businesses), a number of things can influence the net-export expenditure contribution to aggregate demand. But here is a handful (Mohr & Fourie 2008; Blanchard & Johnson 2014).

Global Prosperity: The health of foreign economies is one determinant. When other nations are in fine economic shape, their consumers tend to buy more goods, including more goods produced in the other countries. That means the domestic economy exports more to them and aggregate demand increases (Mohr & Fourie 2008; Blanchard & Johnson 2014).

Exchange Rates: Currency exchange rates are another determinant of net exports. An exchange rate is the price of one nation's currency in terms of another. When this rate changes, it affects the relative prices of exports and imports. When those relative prices change so do exports and imports and thus net exports and aggregate demand (Mohr & Fourie 2008; Blanchard & Johnson 2014).

Trade Barriers: The assortment of trade barriers, tariffs, restrictions, and subsidies that nations tend to use to gain a competitive advantage in the game of foreign trade are also a key determinant. Greater restrictions on imports tend to increase net exports and thus aggregate demand--at least in the short run. In the longer run, other nations tend to retaliate by imposing their own restrictions on the export side and that can reduced aggregate demand (Mohr & Fourie 2008; Blanchard & Johnson 2014).

According to most Keynesians, the Keynesian growth model can provide such a consistent framework when the possibility of persistent excess capacity is introduced into the model (Mohr & Fourie 2008; Blanchard & Johnson 2014). Specifically, much of development theory can be divided into the emphasis placed on three basic sources of economic growth. First, there are those theories that emphasize a lack of saving, which restricts growth, and thus propose mechanisms for augmenting saving. Second, theories emphasizing a shortage of investment and thus the existence of excess capacity. Third, there are theories emphasizing inadequate labour absorption and the

need to develop or employ labour by using capital saving technology (Mankiw 1991; Mohr & Fourie 2008; Blanchard & Johnson 2014).

2.4   SUMMARY

The concept of economic growth is central to the policy strategies of every country. Economic growth is usually characterized by a rise in the living standards of people. Gross domestic product (GDP) is known as the most commonly used indicator of a country's economic growth. However, GDP has many limitations.

As GDP is used as a measure of financial wellbeing, there is a need for improvement and for alternative measures to be sought, as human well-being incorporates various factors that are separate from physical and financial wealth. Yet the growth of most economies has been largely unsustainable, which raises questions. Thus, economic growth has been, is and will always be a permanent preoccupation of nations (developed and developing) and always present topic of scientific debates and the importance of aggregate demand forces are obvious: aggregate demand affects the short as well as long-run rate of growth.

Various theories have defined and identified factors that affect a country's economic growth. The Classical, Monetarist and Keynesian economic growth theories have provided policymakers with the basics of economic growth. However, these theories have evolved and many others theories have emerged.

This chapter has discussed the concept of economic growth and the main three basic theories of economic growth.the concept of economic growth. Firstly, it defined what economic growth is about and why it is important for countries. The main theoretical implication of the paper is to emphasise the role of elements of aggregate demand as determinants of long-run growth.

The next chapter discusses the trends on the South African economy.

CHAPTER 3

TRENDS OF THE SOUTH AFRICAN ECONOMIC GROWTH

THEORETICAL AND EMPIRICAL REVIEW

3.1   INTRODUCTION

In the previous chapter, the concept of economic growth has been defined and explained from various views and theories of economics. The main economic growth theories presented were classical, Keynesian and monetarist, with more emphasis on the Keynesian theory.

Many others economists such as Morh and Fourie (2008); Blanchard and Johnson (2014) have defined and explained the concept of economic growth from different perspectives. There is a consensus that the real gross domestic product (GDP) is the most commonly used tool to measure the economic growth of a country (Morh & Fourie 2008: 510; Blanchard & Johnson 2014: 50). As an indicator of the growth of an economy, higher GDP presents an expansion of growth of an economy and vice-versa and as such every country tries to maximise the growth rate of GDP (Divya & Devi 2014: 375).

In macroeconomics, gross domestic product (GDP) fluctuations represent a feature of behaviours of most economies. Therefore, it is important for policymakers to understand their patterns and causes in order to make macroeconomic policies decisions. For all countries, both developed and developing, one of the fundamental objectives of macroeconomic policy is economic stability. Thus, economic growth is important for every nation in the world and many countries have shown to be taking actions to be improving their economies. However, economic growth has shown to still be a challenge in most developing countries. This has been particularly because of the numerous political, socio-economic and developmental challenges (high unemployment, high poverty levels, low level of the standard of living) faced by these countries. Thus, lifting the most vulnerable in society out of poverty is set to be the main objective of the economic growth, especially most developing countries. Therefore, economic growth is set to be a main prerequisite for countries to alleviate poverty, unemployment and others socio-economic issues.

This chapter outlines the structure of the South African economy, as well as the sources and dynamics of the impacts of macroeconomic fluctuations. The first section will provide an analysis of the various elements of the economy of the country. This is followed by a highlight on the performance of the South African economy over the past decade. Furthermore, the chapter will present a structural review of macroeconomic performance in the South African economy by analysing the role of domestic factors on macroeconomic fluctuations potential causes of the level and volatility of this growth experience. Finally, the second section of the chapter will deal with the theoretical and empirical review on the Keynesian macroeconomic variables of GDP growth. A summary of the chapter will be provided.

3.2   STRUCTURE OF ECONOMIC GROWTH IN SOUTH AFRICA

The structure and characteristics of today South African economy have been affected by numerous economic policies and developments of the past (Working Paper 2013: 5; African Economic Growth Outlook 2014). Thus, assessing long-term trends of the South African economy can be useful for gaining an insight into development prospects and the benefits of future economic growth in South Africa. Therefore, understanding the underlying forces shaping economic growth and the trickle down of the benefits of this growth is a prerequisite for evaluating the fluctuations in the South African economic growth rates. It is necessary to emphasises that as many developing countries, the primary importance of high economic growth for South Africa is the emphasis on the correlation between growth and employment to address poverty and other socio-economic challenges. Thus, although economic growth is not the absolute answer to all developing countries' problems, it is inconceivable and certainly that their developmental challenges such high level of unemployment and poverty cannot be addressed without a drastic expansion of the economy (Van Der Berg 1989: 187).

South Africa is the second economy in term of gross domestic product in the African continent. It is known that until 2014, South Africa has the largest economy in Africa. With total real GDP of US$76 billion in 2002, it accounts for approximately 40% of all industrial output, 25% of gross domestic product (GDP), over half of generated electricity and 45% of mineral production in Africa. With a gross domestic product (GDP) of US$160.8 billion in 2003 and per capita income of $2600 in 2002 (Ndlela & Nkala 2003: 8; World Bank, 2002; AfDB 2004). Although South African economy performed badly in the early 1990s because during this period, the country

experienced negative growth South African economic performance improved significantly after the political reform in 1994. Measured against average standards of living as reflected in real GDP per capita, South Africa appears to have done quite well, with an increase of 33% since 1994. However, this is not the full picture. Firstly, South Africa does not compare favourably with its peers. According to the World Bank between 2008 and 2009 South Africa has the world's highest Gini coefficients at 0.7 in Africa (SARB 2013; Leibbrandt, Woodlard, Finn & Argent 2010). During the same period the GDP per capita of emerging markets and developing countries increased by 11.5% on average. Brazil, India, Indonesia and Turkey, for example, all fared much better than South Africa. Secondly, not all South Africans shared to the same extent in the increase in GDP per capita, as is evident in a relatively high GINI coefficient of between 0.6 and 0.7 depending on how it is calculated, and an unemployment rate of approximately 35% in terms of the wider definition in 2013 (StatsSA 2013). Furthermore, According to the NDP, a reduction in inequality will be achieved if South Africa's Gini coefficient falls from the current level of 0.7 to 0.6 by 2030 (NDP 2011).

Data tabulated from South Africa Reserve Bank (SARB 2015) is illustrated in Figure 3.1 to show the trends in South Africa's real GDP from the year 2004 to 2014. Few years before the 2009 recession and half decade after the 2009 global recession.

Figure 3.1: Real Gross Domestic Product (2004- 2014)
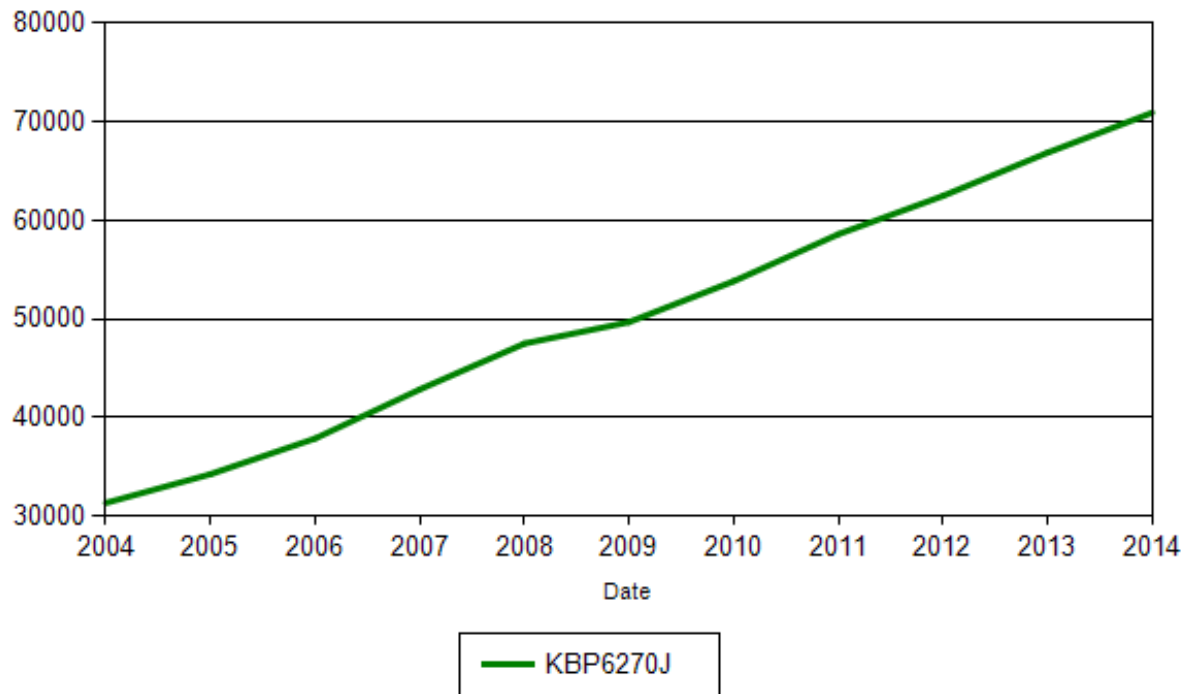
KBP6270J represents the South African Reserve Bank Code for Real GDP.

Source: SARB 2015

South Africa experienced an average growth rate of approximately 5 percent in real terms between 2004 and 2007. However, the period 2008 to 2012 only recorded average growth just above 2% (per cent); largely a result of the global economic recession (StatsSA 2015). According to preliminary estimates of real gross domestic product (GDP) released by Stats SA (2015). South Africa's economy grew by 1.5% in 2014 but down from 2.2% in 2013,

South Africa's reintegration into the world economy, which followed on the country's transition to democracy in 1994, caused the domestic economy to be more prone to international economic and financial developments than in the past (Ndlela & Nkala 2003: 11). South Africa has now an open economy, which means that the economy has a strong link with other economies in the world (Working Paper 2013: 3; Mohr & Fourie 2008: 88). Moreover, since its reform and opening up to the outside world, South Africa has been continually taken actions to improve its economic (GDP) growth rates. Moreover, South Africa's growth performance has strengthened substantially since

the end of apartheid in 1994. The South African government in 1994, adopted the Reconstruction and Development Programme, (RDP) which set the framework of the new government's economy and social policy. This followed in 1996 with the launch of the Growth, Employment, and Reconstruction (GEAR) programme, which defines policy instruments and objectives for five years in 2001 (Ndlela & Peter 2003: 267; RDP 1994; GEAR 1996). However, in spite of the fact of the implementation of these economic reform initiatives, the country has still not been able to achieve stable and sustained macroeconomic performance. Thus, although the economy has recorded positive growth in the post-independence period, this has been marginal and the effects of domestic and external shocks continue in result to fluctuations in most macroeconomic performances. This means that the problem of uneven, incompatible, and unsustainable economic and social development is still prominent as South Africa still faces the challenges of reducing inequality, unemployment, poverty and enhancing growth performance (Working Paper 2002: 267).

The table below presents the real GDP growth rates for the South African economy over the past decade. Furthermore, the table shows there have been fluctuations in the economy and that the economic growth rates have not been particularly stable.

Table 3.1: South African GDP growth rates (2004Q1-2014Q4)

Year	Gross Domestic Product (GDP) rates /Annum
2004	4.6
2005	5.3
2006	5.6
2007	5.5
2008	3.6
2009	-1.5
2010	3.1

2011	3.6
2012	2.5
2013	1.9
2014	1.4

Source: Adapted from AfDB, OECD & UNDP: African Economic Outlook, South Africa 2015.

The table above shows that economic growth has slowed noticeably in recent quarters for the reaeson of a combination of weak global growth, higher domestic inflation and a moderation in fiscal stimulus. In spite of the fact that GDP has recovered from the 2009 recession, the growth rate is at the present time slowing and employment remains below the pre-crisis level. South Africa was forecast to grow by 2.2% in 2013, rising to around 3% in 2014 (AfDB, OECD & UNDP: African Economic Outlook, South Africa 2015: 3). According to the African Economic Outlook the expected pickup in growth is highly dependent on increased infrastructural spending as well as an improvement in the world economy. But as the table above shows the expectation was not the case (AfDB, OECD & UNDP: African Economic Outlook, South Africa 2015).

It is evident that the trends that have been established in past tend to show its impact in the present South African economy. Furthermore, it is a consensus to say that economic growth is not achieved by agreement, but by creating favourable conditions for it to occur. Domestically, household consumption expenditure and fixed investment activity elevated economic growth substantially, with the export sector also providing considerable impetus over the years 2005 to 2007. The improvement in South Africa's real growth performance from 1994 relative to the previous ten-year period was associated with a marked improvement in overall domestic expenditure (from 0.6% to 3.2% p.a.) (SARB 2013). This, in turn, consisted primarily of increased expenditure on fixed investment (5.1% p.a.) and household goods and services (3.7% p.a.) (Ndlela & Nkala 2003: 8-10; Rodrik 2008: 769-797).

The figure below briefly shows the different sectors of the South African economy as well as their percentage contributions in 2013. In 2013. The finance and business, manufacturing and general government services sectors were the main leading sectors, with 21.5%, 15.2% and 13.7% contributions to GDP respectively (Statistic South Africa 2013).

Figure 3.2: South African Economic main sectors
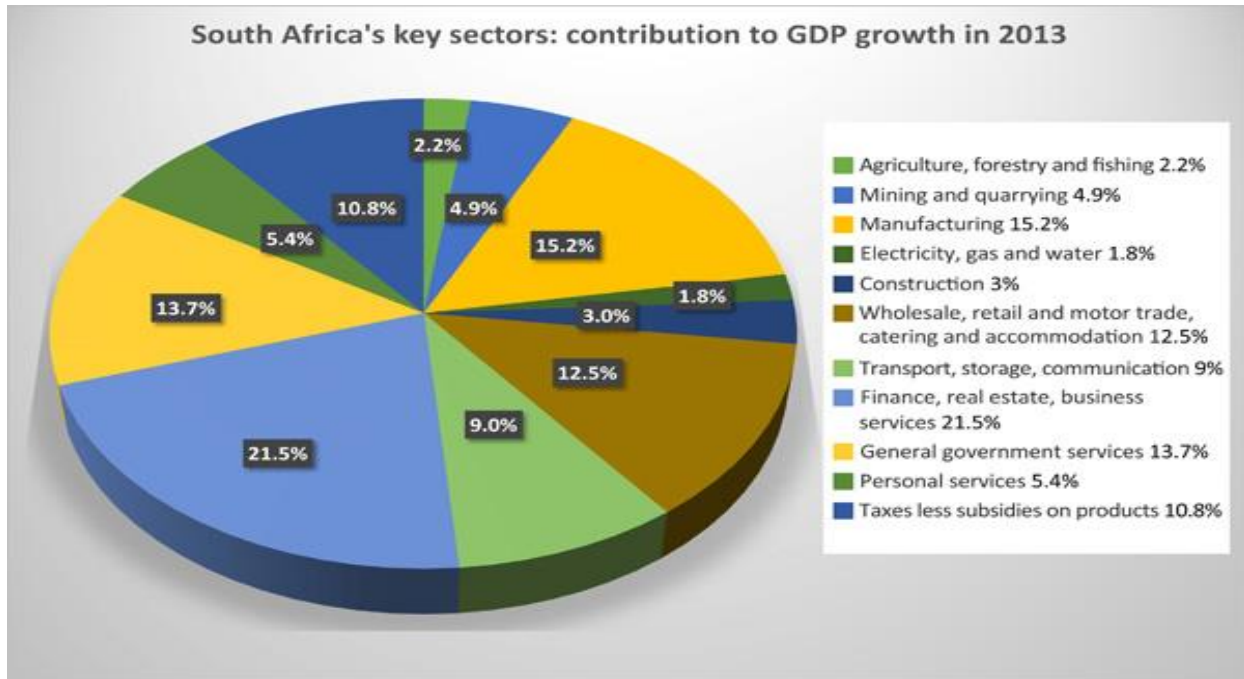
Source: Statistics South Africa 2013

The largest sector of the economy is services which accounts for around 73% of GDP. Within services, the most important are finance, real estate and business services which is at 21.6%; government services is currently at 17%; wholesale, retail and motor trade, catering and accommodation takes 15%; and transport, storage and communication (9.3%). Manufacturing accounts for 13.9%; mining and quarrying for around 8.3% and agriculture for only 2.6%. South South Africa's economy was traditionally rooted in the primary sectors; the result of a wealth of mineral resources and favourable agricultural conditions. But recent decades have seen a structural shift in output. Since the early 1990s, economic growth has been driven mainly by the tertiary sector, which includes wholesale and retail trade, tourism and communications. Now South Africa is moving towards becoming a knowledge-based economy, with a greater focus on technology, e-commerce and financial and other services. Among the key sectors that contribute to the gross domestic product and keep the economic engine running are manufacturing, retail, financial services, communications, mining, agriculture and tourism (StatsSA 2013).

3.3 SOURCES OF SOUTH AFRICAN ECONOMIC GROWTH

3.3.1 Demand-side

Despite the fact that South Africa is considered a low growth economy by emerging market standards, South Africa still leads the pack followed by other African economies such as Ghana, Keyna and Nigeria. In terms of the driving forces for economic growth, South Africa's economic growth primarily depends on the pull of investment and exports and lacks the stimulation of consumption demand, which is particularly problematic (AfDB, OECD, UNDP 2014: 5-11). Leke, Lund, Roxburgh and Wamelen (2010) emphasise that in Africa, in the past, in the four most advanced economies (Egypt, Morocco, Tunisia and South Africa), domestic consumption has been the largest contributor to economic growth and that these economies have the least volatile GDP growth (Leke, Lund, Roxburgh, & Wamelen 2010: 16). Therefore, demand-side factors, such as changes in spending with shifts in consumers and business confidence and variations in exports and government expenditure are have also been important.

Moreover, Short-run fluctuations in economic activity, particularly in investment spending have long-run effects in economic growth (Dutt 2006: 320). Net exports and real final consumption expenditure by households made the largest contributions to growth in real gross domestic product in the fourth quarter of 2014, adding 3.9 and 1.0 percentage. Growth in real final consumption expenditure by households accelerated further from an annualised rate of 1.1 percent in the third quarter of 2014 to 1.6 percent in the final quarter. The higher level of spending by consumers can be attributed to an increase in the disposable income of the household sector following a moderate rise in the compensation of employees over the period. Higher real outlays on all three goods-related categories more than offset a slower pace of increase in the expenditure on services points respectively (AfDB, OECD, UNDP 2014: 5-11).

3.3.2 Import Substitution

Although South Africa is an open developing economy. It is highly dependent on imported capital and intermediate goods. Thus, when spending in the economy increase, this results in an increase in imports (Mohr & Fourie 2008: 445).

Another growth strategy linked to balance of payments which affects the growth rate, is to reduce imports by manufacturing previously imported domestically. This has been called import substitution. This system has played a significant role in initial growth of manufacturing sector in South Africa. However, the import substitution has not reduced the country's dependence on imports. Capital and intermediate goods which are important are required to be able to manufacture locally, and South Africa's import consist mostly of capital and intermediate goods. However as the composition of import has changed, what happened it is that, the level of import has not been reduces. In fact, since the manufacturing sector required imported goods, South Africa's economy is becoming even more dependent on imports today (Mohr & Fourie 2008: 517).

3.4 KEYNESIAN MACROECONOMICS DETERMINANTS OF GDP

Economy growth requires an expansion of the production capacity of economy, as well as an expansion of the demand for the goods and services produced in the economy. Supply factors of economic growth are important and have been a great part of most research on the sources of economic growth (Smith, 2012: 544). However, for the supply potential to be realised, this will depend upon whether there is sufficient demand for goods and services that can be produces. In other words, there have to be a growing demand for goods and services productive to ensure economic growth (Mohr & Fourie 2008: 515-516; Blanchard & Johnson 2014: 161).

Four factors influence the growth of a country's economy from a demand perspective. These factors are consumption, investment, Government and international net exports. Therefore, to gain a better understanding of the different sources of growth it is important to examine the contributions of these four GDP components in the economic growth (Mohr & Fourie 2008).Therefore, it is important to understand to what extent these variables affect the GDP growth.

Theoretical and empirical papers have raised the issue of whether Keynesian macroeconomic factors and policies adopted by governments have a long-term effects on their countries economic growth rates (Garrison & Lee 1995: 303). The following section of the chapter presents an overview of the theoretical and empirical analysis of the fundamental Keynesian macroeconomic factors of GDP growth.

3.4.1 Theoretical Literature Review

In economics, most things produced are produced for sale and then sold. Therefore, measuring the total expenditure of money used to buy things is a way of measuring production. This is known as the expenditure method of calculating GDP. The components of GDP by expenditure are: GDP (Y) is the sum of consumption (C), investment (I), government spending (G) and net exports (X-M) (Coulibaly & Logan 2009: 276).

In macroeconomics, factors affecting economic growth vary from one country to another (Peitak 2014: 45; Divya & Devi 2014: 375). Most of the studies on economy growth approach growth from a supply-side. However, long-term economic projections are highly uncertain. It is important to identifying and analyse growth economic from the demand-side (Dutt 2006: 322, 332; Agalega1 & Antwi1 2013: 108). The Keynesian demand-side approach therefore identifies consumption, investment, government expenditure and net export (export minus import) as the main macroeconomic determinants of GDP.

In most theories of macroeconomic determinants of economic growth, the primary sources of output growth have been physical capital, labour and natural resources and technology given an aggregate production function of the real national output. Moreover, both theory and evidence support international trade and investment as promoters of growth (Hess 2013: 13-18). This is because these studies have taken a supply-side approach of economic growth. Keynesian economists believe that the primary factor driving economic activity and short-term fluctuations is the demand for goods and services (Keynes 1936). Thus, a central concern in traditional discussions of this issue have been based on Keynesian aggregate demand model. According to the Keynesians, Economic growth is caused by either of these two main factors: an increase in aggregate demand and an increase in aggregate supply (productive capacity). In the short-term, economic growth is caused by an increase in aggregate demand (AD) (Turnovsky & Fisher 1995: 748). If there is spare capacity in the economy then an increase in AD will cause a higher level of real GDP. Cornwall (1972) points out aggregate demand as the proximate source of growth of output. In that same line, Dutt (2006) emphasises that growth is driven entirely by demand-side factors. Therefore it is important to understand how these factors affect the aggregate demand. As Cornwalla and Cornwalla (2002) emphasise, first, lower interest rates reduce the cost of borrowing and encourages spending and investment. Second, increase wages increase disposable income and

encourages consumer spending. Third, increased government spending (G): meaning fall in value of money which makes exports cheaper and increases quantity of exports (X), increased consumer confidence, which encourages spending (C), lower income tax increases disposable income of consumers and increases consumer spending (C) (Dutt & Ros 2007: 75-99; Cornwalla & Cornwall 2002: 203- 229).

The various components of aggregate spending or demand can be used to distinguish between three sets of demand factors: domestic demand, which consists of consumption, investment and government spending, Export demand and import substitution. Thus, economic growth can be stimulated by rising domestic demand, export and reducing imports (Mohr & Fourie 2008: 517; Blanchard & Johnson 2014: 52). As Mohr and Fourie (2008: 517) state in the same line, the determinants of domestic demand are consumption (C) which is primarily a function of income (Y), investment spending (I) is a function of the expected profitability of investment projects, and government spending (G) is determined by government policy. Thus, in principle it is said it is always possible to increase demand by rising government expenditure (Blanchard & Johnson, 2014: 58). However, they emphasise that any expansion in demand should be matched by a rise in supply as this will result in inflation and unbalance of payments (Mohr & Fourie 2008: 517).

Consider now several specific determinants that work through each of the four broad expenditure categories. The determinants work through the four aggregate expenditure categories: consumption expenditures, investment expenditures, government purchases, and net exports.

a) Consumption (C)

According to the Keynesian, the determination of consumption expenditure is central to Keynesian macroeconomic theory (Keynes 1936). Pretorius and Knox (1995) stated Keynes based his theory of consumer behaviour on the observation that consumption increases when income increases (Pretorius & Knox 1995: 27). Furthermore, these authors emphasise that when analysing growth trends from the national accounts data, it is important to note that consumption, as defined in an economic sense, differs from consumption expenditure as measured in the national accounts. Consumption refers to benefits derived from expenditure on goods and services, whereas consumption expenditure is defined as the actual expenditure on goods and services, irrespective of whether such goods are really consumed in the accounting period (Pretorius & Knox 1995: 30).

Consumption is usually grouped and determined by various other factors. Household consumption expenditures, being from a rather large, rather diverse group, are depended of many factors, but the main one is surely income (Mohr & Fourie 2008: 412). Physical wealth which is the material, tangible possessions of the household sector also affect consumption. For example: An increase in physical wealth generally reduces consumption expenditures. If consumers have recently purchased a lot of durable goods, then they have less need to buy more, with a subsequent decrease in consumption and aggregate demand. Financial wealth is money, stocks, bonds, mutual funds, bank accounts, and other documents that give consumers a claim to goods, resources, or productive assets. This also is known to affect consumption. For instance, when consumers acquire more financial wealth, they tend to spend more freely, with a subsequent increase in consumption and aggregate demand.

Interest rates are another key consumption determinant. Because interest rates affect the cost of borrowing and because many durable goods are purchased with borrowed funds, higher interest rates reduce consumption and aggregate demand, and lower interest rates do the reverse. Moreover, expectations of future economic conditions are also an important determinant (Blanchard & Johnson 2014: 354). Households want to buy at the lowest possible price. Thus, if inflation is expected to rise, then households are inclined to buy more today, causing consumption expenditures and aggregate demand to increase (Mohr & Fourie 2008: 409, 412; Blanchard & Johnson 2014: 157-173, ,355, 581, 409-414).

In South Africa, two-thirds of the real growth in GDP comes from the growth in domestic demand and one-thirds from growth in foreign demand. Second, the contribution of investment is relatively low in SA and the contribution of consumption relatively high. Moreover, contribution of household and government consumption are higher, suggesting a low saving rate in SA. The ratio of final consumption expenditure by general government to GDP increased from 22.1% in the first quarter to 22.5% in the second quarter of 2013. Having increased at an annualised rate of 2.5% in the first quarter of 2013, growth in real gross fixed capital formation accelerated to 2.7% in the second quarter (IMF 2008: 21-25).

b) Investment (I)

Whereas consumption tends to be the largest component of total spending, investment is more variable and less predictable than consumption. Thus, Investment tends to be the most volatile of the four expenditure categories with a large assortment of influences (Nattrass, Wakeford & Muradzikwa 2002: 9; Mohr & Fourie 2008: 414; Blanchard & Johnson 2014: 425). The first three determinants listed are comparable to consumption determinants. Investment is the most fundamental determinant of economic growth identified by growth models (Fatás & Mihov 2009: 7).

In contrast to consumption, investment is not primarily a function of income as its level is usually independent of the level of income. This means that investment is a determinant of Income but not determined by income (Mohr & Fourie 2008: 414). The importance attached to investment by theories has led to an enormous amount of empirical studies examining the relationship between investment and economic growth. See for instance, Kormendi and Meguire 1985; De Long and Summers 1991; Levine and Renelt 1992; Mankiw 1992; Auerbach *et al*. 1994; Barro and Sala-I-Martin 1995; Sala-i-Martin 1997; Easterly 1997; Bond *et al*. 2001; Podrecca and Carmeci 2001. Nevertheless, findings are not conclusive (Petrakos, Arvanitidis & Pavleas 2007).

But if investment is not determined by income, this means that other factors affect the investment decisions in an economy. Therefore, here are some factors affecting investment according to Mohr and Fourie (2008: 414), Blanchard and Johnson (2014: 408). First factor affecting investment is the interest rate. Interest rates work much the same for investment as for consumption. Investment expenditures for capital goods are usually financed with borrowed funds. If interest rates change, then the cost of borrowing changes and so too does the overall cost of the investment. Higher interest rates mean less investment and a decrease in aggregate demand (Mohr & Fourie 208: 414). Then, there is physical wealth. Physical wealth possessed by the business sector includes capital goods. This determinant works for investment expenditures much like that for consumption expenditures. In this case the physical wealth is capital, the object of investment. The business sector is less inclined to invest in capital goods, if it has recently accumulated a lot of capital goods through investment. A boost in the amount of capital is bound to cause eventually a decline in investment and aggregate demand (Mohr & Fourie 2008: 414).

Capital prices are another key determinant working through investment. Invoking the basic law of demand, if the price of capital increases, the business sector decreases the quantity of capital demanded. This results in a decrease in investment expenditures and aggregate demand (Mohr & Fourie, 2008: 414). Moreover, expectations of future economic conditions is also an important determinant working through investment expenditures. If the business sector experiences an improving economy on the horizon, with expectations of greater sales and profits, they are more inclined to expand investment now, in spite of current conditions (Mohr & Fourie 2008: 414; Blanchard & Johnson 2014: 409-414). This is regarded to boost aggregate demand. Finally, there is technology. Technology is the last but not the least determinant affecting aggregate demand through investment. Technological advances enhance the need to invest in capital. A new technology requires new capital, different capital, capital to implement the technology. Technological advances invariably trigger an increase investment and aggregate demand (Blanchard & Johnson 2014: 307, 416).

In South Africa, investment levels are stated to be low. As the Trade and Industrial Policy Secretariat (TIPS 2000) states, despite the increasing recognition of the importance of investment there is relatively little analytical research available in South Africa on the determinants of investment behaviour, specifically at the sectoral level. Furthermore, Research has shown that increasing investment in itself is less important for sustainable growth than is the quality, type and composition of investment. The key question facing South Africa is what types of investment will induce the highest growth in the economy. An average investment to GDP ratio of 18.5% induced average annual growth of 1.6% during the 1980s while an investment ratio of 14.5% is associated with growth of 1.1% during the 1990s (TIPS 2000: 3).

c) Government Expenditure (G)

The government sector it said to play by its own set of rules. In fact, they make the rules. But there is one unavoidable rule that the government sector must follow when government spends more (or less) on government purchases, aggregate demand increases (or decreases). If elected leaders decide to spend big bucks on the military, or education, or the space program, or highways, or any number of other worthwhile products, then government purchases increase and so too does aggregate demand.

There are specific influences that might influence government spending. First of all, there is fiscal Policy. If aggregate demand decreases because of less spending from the household or business sectors, then the government sector is often inclined to spend more. Alternatively, if aggregate demand increases to the point of triggering inflation, then the government is likely to spend less (Mohr & Fourie 2008: 432). Then, there is politics. Political considerations are almost always bubbling near the surface of government spending. Such factors affect government expenditure as they may decrease government purchases and aggregate demand. Or perhaps a rather vocal and financially powerful interest group convinces political leaders to spend more on worthy activities, like the space program, national defence, or environmental quality. This is bound to increase government purchases and aggregate demand. And there is the state and local taxes. At the state and local level of total government purchases, a key determinant is tax collections. A boost in state and local tax collections, which usually happens when the economy is strong, causes state and local government purchases to increase. And when the economy is weak, tax collections fall, and so too do state and local government purchases (Mohr & Fourie 2008: 434).

d) Net Export (X-M)

Net export represents the sum of export and import of an economy. That is export and import are goods and services recorded in the current account of the balance of payment. Thus, net export can be regarded as the equivalent (theoretical) of the current account of the balance of payments (Mohr & Fourie 2008: 446). Therefore, if demand is said to be a fundamental determinant of investment and growth and an important component of aggregate demand is exports, then a high level of export demand is favourable to economic growth.

Exports are regarded as part of foreign demand that falls on domestic goods. They are said to be depended on higher foreign income and real exchange rate (Blanchard & Johnson 2014: 482). Moreover, With the inherent diversity of the foreign sector (which includes well over a hundred distinct national governments, almost six billion people, and hundreds of thousands of assorted foreign businesses), a number of things can influence the net-export expenditure contribution to aggregate demand. First of all there is the global prosperity. The level of foreign economies is one determinant. When other nations are in fine economic shape, their consumers tend to buy more goods, including more goods produced in the other countries. That means the domestic economy exports more to them and aggregate demand increases. Second, there is the exchange Rates.

Currency exchange rates are another determinant of net exports. An exchange rate is the price of one nation's currency in terms of another. When this rate changes, it affects the relative prices of exports and imports. When those relative prices change so to do exports and imports and thus net exports and aggregate demand (Blanchard & Johnson 2014: 482).

Finally the last but not the least is international trade. Trade (international) is an important factor in economic growth. Trade barriers then play an important role in export. The assortment of trade barriers, tariffs, restrictions, and subsidies that nations tend to use to gain a competitive advantage in the game of foreign trade are also a key determinant. Greater restrictions on imports tend to increase net exports and thus aggregate demand at least in the short run. In the longer run, other nations tend to retaliate by imposing their own restrictions on the export side and that can reduced aggregate demand (Blanchard & Johnson 2014: 482-487).

As emphasised earlier before, the relationship between domestic spending, domestic production and balance of payments is one of the crucial macroeconomic relationship in the South African economy (Mohr & Fourie 2008: 446). South Africa's economic growth has been based on the export of its natural resources (minerals and mineral products). An increase in exports raises the growth rate and relieves the balance of payments constraints. Thus, for most theories of economic growth nowadays, the promotion of exports is a better growth strategy than stimulating domestic demand (Mohr & Fourie 2008: 517; Coulibaly & Logan 2009: 276).

In the next section of the study a brief empirical literature review will be presented. This review is intended to show an analysis of previous work in the area of factors of economic growth according to the demand-side in developing countries and particularly in South Africa and the methods of analysis used.

3.4.2 Empirical Literature Review

Numerous empirical studies have shown that the Keynesian factors have impact economic growth through bringing fluctuations in GDP rates. The following section presents empirical literature to the study.

Kira (2013) examined the factors affecting GDP in developing country with Tanzania as a representative using the Keynesian model. Using GDP as a function of consumption, investment,

government and net export, the author found through the OLS results that the Tanzanian GDP is influenced that consumption (Kira 2013: 148-158)

Hossain and Mitra (2013) examined the dynamic causal relationships between economic growth and five determinants which are: trade openness, foreign aid, domestic investment, long-term external debt, government spending for a panel of 33 highly aid-dependent African countries for the period 1974-2009. A short-run bidirectional causality is found between economic growth and trade openness. Moreover, the authors found the long-run effects of trade openness, domestic investment and government spending on economic growth are significantly positive.

Turnovsky and Fisher (1995) discuss in their study the effect of government expenditure on growth, productivity, and overall economic welfare. A number of cross-country comparisons do not find a robust negative relationship between government size and economic growth. For example, Easterly & Rebelo (1993) find no concrete relation between government spending and growth. There is, indeed, a substantial theoretical as well as empirical literature on the relationship between economic growth and government variables.

The empirical literature suggest that trade stimulates economic growth. Therefore Export expansion and openness to foreign markets is viewed as a key determinant of economic growth. However, disagreements persist in the empirical literature regarding the causal direction of the effects of trade openness on economic growth. One of the most significant researches in this field is the study by Syeda and Shaikh (2013). These authors investigate the effects of macroeconomic variables on Gross Domestic Product (GDP) of the South Africa's economy.

Mehmood (2012) investigated the effect of selected factors (independent variables) on Gross Domestic Product (GDP) in Pakistan and Bangladesh economy and added in addition of the demand-side factors of GDP growth, foreign direct investment (inflows and outflows) and external debt stocks as determinants of GDP growth. The author found that factor such as gross national expenditures, external debts stock total, goods imports and exports have positive effect on the GDP of Bangladesh but the factor as final consumption expenditure has negative effect on the GDP of Bangladesh (Mehmood 2012: 11-22).

Damoense-Azevedo (2013) used the Engle-Grange two-step cointegration methodology to capture both short-run and long-run dynamic properties of the macroeconomics. The empirical findings

indicate that labour, domestic investment, prices and financial development play a pivotal role in the economic growth process of the Mauritian economy.

Mohammad Ali (2012) investigated the factors that stimulate and maintain economic growth. This study uses Time series to analyse the relationship between economic growth and the determinant factors. The determinant factors studied are consumption price index, stock market index, Gross domestic growth, Export and housing price index in Malaysia from the year 1997 to 2010.

Hossain and Mitra (2013) examined the short-run and long-run cointegrating and causal relationships between economic growth, domestic investment and government expenditure for a panel of 33 African countries using time-series data. They found that in the long-run, causal relationships from economic growth to trade openness, domestic investment and government spending are found to exist. The short-run flexibility of economic growth with regard to domestic investment is positive but insignificant, with regard to government spending the short-run effects are negative and insignificant. Moreover, According to Hossain and Mitra research (2013), most of the 33 African countries under their study have a very low human development index in their study. Based on the results of this study, for the policymakers, the implementation of a policy framework aimed at increasing government spending will expectedly raise economic grow (Hossain & Mitra 2013: 217-226)

Kaldor (1966: 114) argues that in the open economy the main aggregate demand factor that will fundamentally determine the growth of demand and therefore overall growth will emanate from outside the region, in other words, demand for exports is the key driver of regional growth. Roberts (2007:623) outlines, output growth is a positive linear function of the growth rate of real demand for exports. The last but not the least, in 1995 in their study, Pretorius and Knox (1995) found this their modelling that consumption expenditure is the most stable and largest component of domestic expenditure and tends to act as a stabilising force in the economy.

3.5   SUMMARY

This chapter has reviewed the structure of the South African, as well as the sources and dynamics of impacts of Keynesian macroeconomic fluctuations. The factors influencing the four components of the Keynesian GDP growth model were presented and explained. Furthermore, an analysis of the theoretical and empirical review on the four determinants of GDP have been presented.

An exploration of how the macroeconomic Keynesian (demand side) factors affecting economic growth in South Africa was established in the last part of the study. Therefore, consumption, investment, government expenditure and net-export were compared. These factors have proven to beof importance in measuring the gross domestic product (GDP) growth rates of a country and deterring mismanagement of economic growth..

The next chapter presents the research methodology, model specification and estimation techniques.

CHAPTER FOUR

RESEARCH METHODOLOGY, MODEL SPECIFICATION AND ESTIMATION TECHNIQUES

4.1   INTRODUCTION

Both the literature review on economic growth theories and existing empirical studies on the macroeconomic determinants of economic growth were discussed in chapter two and three respectively. This chapter outlines the methodology applied to analyse the effect of the Keynesian macroeconomic demand-side factors (consumption, investment, government expenditure, export and import) on the economic growth in South Africa.

This chapter describes the methodology conducted in this study. The first part of the chapter will describe the model and how the estimation has been applied. This is followed by the specification of the data used, definition of variables and expected results. The following part of the chapter describes the various tests including stationary, diagnostic testing and error correction that will be conducted. The last section outlines the summary of the chapter.

4.2   MODEL SPECIFICATION

The theoretical framework which underpins the methodology is based on the Keynesian macroeconomic growth model as discussed in chapter two. The model assumes that Consumption, investment, government expenditure, and net export (export minus import) as the determinants of the gross domestic product (GDP).

This study quantifies the relationship between economic growth and the presumed demand-side factors using South African quarterly data over the last ten years. The basic methodology consists of a linear regression analysis. The regression describes the relation between the GDP variables and prior values of the explanatory variables.

The dependent variables are the quarterly collected GDP over the past 10 years (the first quarter of 2004 to the fourth quarter 2014). In this model the function (GDP) is generated by following the Keynesian demand identity.

The model is presented as:

Equation: GDP = C + I + G + (X-M)……………………………………………………….. (4.1)

Where,

C: Consumption

I: Domestic Investment

G: Government Expenditure

X: Export

M: Import

The underlying model is modified by employing GDP growth as the dependent variable as a function of consumption expenditure, domestic investment with fixed capital formation used a proxy (INV), government expenditure (GOV), and net export (NetEx) which is the sum of exports minus imports

The regression model will be estimate of the form:

$GDP_t = f(CONS_t, INV_t, GOV_t, NetEX_t)$…………………………………………………. (4.2)

Where:

GDP_t = Gross Domestic Product in year t

$CONS_t$ = Consumption Expenditure in year t

INV_t = Domestic Investment in year t

GOV_t = Government Expenditure in year t

$NetEX_t$ = Net Export (X-M) in year t

The model to be estimated is expressed in logarithms as follows:

$Log\ GDP_t = C + Log(\beta_0 + \beta_1 CONS_t + \beta_2 INV_t + \beta_3 GOV_t) + \beta_4 NetEX_t + \varepsilon_t)$……………..... (4.3)

Where: C is the constant and β_1, $\beta_2\beta_3$ and $\beta_4$are the coefficients to be estimated or the partially elasticity of the GDP and ε_t is the error term representing the influence of the omitted variables in the construction of the data.

4.3   DEFINITION OF VARIABLES

This section provides a description of each component of the gross domestic product and their justification in estimating their effect on economic growth. The aim is to use proxies that have been used in most factors economic growth, particularly in South Africa.

The standard measure of the log of GDP is used to measure market size. This adapted from most literature on economic growth using gross domestic product as proxy for economic growth.

The final consumption expenditure by the households is used a basis for consumption expenditure (CONS). This is normally the largest GDP component in the economy, consisting of private (household final consumption expenditure) in the economy, also called Personal Consumption expenditure (PCE). These personal expenditures fall under one of the following categories: durable goods, non-durable goods, and services. This is adapted from authors such as

Nwabueze Joy Chioma (2009) who investigated the causal relationship between gross domestic product and personal consumption expenditure in Nigeria. Sakib-Bin-Amin (2011) also used the final consumption expenditure as proxy of consumption expenditure in his study on the causal relationship between consumption expenditure and economic growth in Bangladesh.

The gross fixed capital formation (GFCF) is used to measure the private investment (IVN). This includes, for instance, private business enterprises investment, but does not include exchanges of existing assets. Spending by households (not government) on new houses is also included in investment. The Gross fixed capital formation GFCF) refers to the net increase in physical assets (investment minus disposals) within the measurement period.

Government Expenditure (GOV) is the national total expenditure. It does include any transfer payments, such as social security or unemployment benefits. The final expenditure by the national government is used as the proxy for the government expenditure. This has been adapted from most studies on the relationship between government spending and economic growth in South Africa.

Example: Nicholas M Odhiambo (2015) on his study on the government expenditure and economic growth in South Africa.

The net export (NetEX) present exports minus imports. X (exports) represents gross exports. GDP captures the amount a country produces, including goods and services produced for other nations' consumption, therefore exports are added. M (imports) represents gross imports. Imports are subtracted since imported goods will be included in the terms G, I, or C, and must be deducted to avoid counting foreign supply as domestic.

According to the Keynesian model, an injection in any of the GDP variables (C, I, G, net export) is supposed to result to an increase in GDP, thus it is expected of all variables to have a positive coefficients sign.

Table 4.1 below presents a summary of the variables used in the model, their description and the expected sign of their prior coefficients.

Table 4.1: Variables description and expected prior

Variables	Description of variables	Expected
LGDP	Log of the GDP	+ (positive)
LCONS	Log of Consumption	+ (positive)
LINV	Log of Investment	+ (positive)
LGOV	Log of Government Spending	+ (positive)
NetEXP	Net Export (X-M)	+ (positive)

Source: Own table of expected prior: adapted from empirical literature

4.4 DATA SOURCES

The study employs quarterly data in all its variables, collected in millions of Rand (R). The data used for empirical analysis cover the period from 2004, first quarter to 2014 fourth quarter. The Quarterly time series data are sourced from the South African Reserve Bank (SARB). All Time series used in the study are available at constant prices with based year at 2010, all seasonally adjusted at annual rate. The SARB is the main source for consistency. The data is presented as: KBP6006Drepresents the Gross domestic product at market prices (GDP), KBP6007D is the Final

consumption expenditure by households. In other words it is Total personal consumption expenditure (PCE), KBP6109Dis the Gross fixed capital formation (Investment); KBP4601E is the Total expenditure by the national government and KBP6013D represents the Exports of goods and services; and KBP6014D: Imports of goods and services.

4.5   ESTIMATION TECHNIQUES

To determine whether this relationship linear or non-linear, this study adopted the ordinary least squares method (OLS). This method is used to estimate economic relations, because it gives the best linear unbiased estimator, based on the theoretical framework of this method, which estimates the economic growth equation on the independent variables mentioned above. Therefore, the Ordinary least squares analysis (OLS) is used through a regression equation to determine which Keynesian macroeconomic variables best explain variations in GDP in the South Africa's economy. A software package Eviews 7 will be used to estimate OLS model. The log Ordinary Least Squares (OLS) Model will be run to find the flexibility of the presumed Keynesian factors of GDP growth in the South Africa's economy concept

The study uses E-views software to make analysis of how variables affect economic growth. This analysis, therefore, includes stationary tests, as the first step, to ascertain properties of the time series data used; an Augmented Dickey Fuller approach to estimate long-run elasticity of these variables and the last step of the analysis is to establish the short run behaviours of the series.

4.5.1   Stationary Test/Unit Root Test

The study uses time series data which is prone to non-stationary. Time series data is stationary if its statistical properties do not depend on time. This means that the stationary variable has the same mean and variance for every time period and they do not depend on time lag.

Non-stationary regressions systems have serious problem. Among these problems is the fact that the t-ratios and the adjusted R-squares tend to be overestimated. Therefore, this test will be done using the Augmented Dickey-Fuller (ADF) Test in order to examine the time-series properties of the data. The Augmented Dickey-Fuller test removes all the structural effects in the time series.

4.5.2 Ordinary Least Squares Model (OLS)

Ordinary least-squares (OLS) regression is a generalized linear modelling technique that may be used to model a single response variable which has been recorded on at least an interval scale. The technique may be applied to single or multiple explanatory variables and also categorical explanatory variables.

4.5.3 The Diagnostic Tests/Tests of hypothesis

This study runs the Ordinary Least Squares model to test the relationships in the gross domestic product (GDP) equation.

The following summarises diagnostics tests for this linear regression.

a) Normality

Normality of residuals is only required for valid hypothesis testing, that is, the normality assumption assure that the p-values for the t-tests and F-test will be valid. Jarque-bera is conducted here to test for normal distribution of residuals.

b) Serial Correlation

This group of test whether the regression residuals are not autocorrelated. They assume that observations are ordered by time. The study uses the Durbin-Watson test value to test for no autocorrelation among the variables.

c) Heteroscedasticity

One of the main assumptions of the OLS regression is the homogeneity of variance of the residuals. If the variance of the residuals is non-constant then the residual variance is said to be heteroscedastic. For these tests the null hypothesis is that all observations have the same error variance, i.e. errors are homoscedastic. The tests differ in which kind of heteroscedasticity is considered as alternative hypothesis. They also vary in the power of the test for different types of heteroscedasticity. In this study, the heteroscedasticity used is the Lagrange Multiplier heteroscedasticity by Breush-Pagan.

d) Stability test

The uses the stability test to test for Structural Change and Parameter Stability. This test tests whether all or some regression coefficient are constant over the entire data sample.

e) Wald test

All these should not be able to reject hypothesis (H_0). It is advisable to check for structural break through running recursive residuals test throughout the Wald test to see the joint significant of the explanatory variables.

4.6 SUMMARY

This chapter has presented the methodology, variable analysis and the estimation techniques in the quest to analyse the effects of the demand-side Keynesian macroeconomic factors of economic growth namely: consumption, investment, government and net exports on the economic growth in South Africa perspective. The OLS framework is highlightes as the estimation method used in the study. The chapter ended with a description of the diagnostic tests to be conducted.

The content of this chapter has provided a basis for the actual estimations of the study which will be portrayed chapter five.

Consequentially, the next chapter provides the empirical findings of the demand-side factors of economic growth in South Africa.

CHAPTER 5

EMPIRICAL ANALYSIS AND INTERPRETATION OF RESULTS

5.1   INTRODUCTION

This chapter provides an overview of the econometric analysis conducted, together with a presentation of the regression analysis results. As mentioned previously, the primary focus of this empirical analysis is to determine the impact of the Keynesian macroeconomic demand-side variables and which of these variables (consumption, investment, government spending and export-import) best explains the variations in South African economic growth.

The chapter is divided into three sections. The first section deals with the empirical findings which presents the results of the stationary/unit root test, the second section presents the results of the ordinary least square (OLS) conducted, then the diagnostics tests results. The last section deals the interpretations of the regression results, then follows the summary of the chapter.

5.2   EMPIRICAL RESULTS AND INTERPRETATIONS

This section is divided into two sub-sections. The first section presents stationarity tests or unit root test, the second provides the results of the ordinary least squares (OLS) regression and the third section deals with the results of the diagnostic tests.

5.2.1   Stationary/unit root test results

The first procedure was to test whether the time series used in this study is stationary. In the study, one formal stationary test was conducted. Augmented Dickey Fuller (ADF) (Dickey & Fuller 1981) a test is used to identify the number of times needed for a variable to be differenced to make it stationary. This allows for checks for structural breaks that may bias the root test. Furthermore, the ADF tests the null hypothesis of the unit root. The null hypothesis of a unit root is rejected in favour of the stationary alternative in case the test statistic is not significant compared to the critical value. The ADF unit root test specifies the null and alternative hypothesis as follows:

H_0: Unit root (non-stationary)

H_1: No unit root (stationary)

The general decision rule is that if the test computed P-value is greater than the five percent (5%) level of significance, then the null hypothesis is not rejected. In other words the time series is not non-stationary. Then it is required to continue testing until the null hypothesis is rejected and come out with the conclusion that the time series contain no unit root. That is the time series is stationary.

During this study, at first, variables was tested at level with intercept, trend and intercept and then none using Eviews7 package unit root test of stationary. The ADF test uses a Schwarz criterion for maximum lag length of nine, intercept and at 5 percent critical value. The following tables below present the results of each variables tested first at level, then at difference with intercept, trend and intercept and none (intercept and trend). First is table 5.1. This table below shows the results of the ADF test as the model specified for these specific GDP variables.

LGDP

Table 5.1: ADF Test LGDP Probability at Level

LGDP	Probability (P-value)
Intercept	0.2731
Trend and Intercept	0.3719
None (intercept and trend)	0.9964

Source: SARB Data 2015.

Table 5.1 shows that the P-values of LGDP are greater than the 5% level of significant. Then according to the rule of hypothesis, the null hypothesis cannot be rejected. Thus the LGDP contains a unit root. Therefore, the ADF must continue to be carried on now at 1st Difference until the null hypothesis of non-stationary can be rejected.

The following table 5.2 presents the results of the P-value of LGDP at 1st Difference conducted as the model specifies.

Table 5.2: ADF Test LGDP probability at 1st Difference

D (LGDP)	P-value
Intercept	0.0138
Trend and Intercept	0.0297
None (trend and intercept)	0.0253

D = differentiated at 1st degree

Source: SARB Data 2015.

As table 5.2 shows, the P-values of DLGDP at intercept, trend and intercept and none, are all lower than the 5% level of significance. Then, now the null hypothesis that LGDP has a unit root can be rejected. As a result, it can be concluded that LGDP is stationary.

LCONS

The following table below represents the results of ADF unit root test of LCONS conducted at level.

Table 5.3: ADF unit root/stationary test of LCONS Probability at level

LCONS	P-value
Intercept	0.4976
Trend & Intercept	0.1506
None (trend and intercept)	0.9431

Source: SARB Data 2015.

Table 5.3 shows that at level, LCONS is non-stationary as the P-values of ADF are all greater than the 5% level of significance. Thus, the null hypothesis cannot be rejected yet. The next following table represents the ADF results of LCONS now run at 1st Difference.

Table 5.4: ADF test of LCONS Probability at 1st Difference

D (LCONS)	P-value
Intercept	0.2024
Trend & Intercept	0.4230
None (trend and intercept)	0.0595

Source: SARB Data 2015.

The results of ADF unit root test of LCONS shows that the null hypothesis still cannot be rejected as only one P-value is significant at 5% level of significance, not all of them. The rule sets that all the P-values must be significant in order for the null hypothesis to be rejected. Then, the test of ADF must now be carried on at 2nd Difference which the results are shows in table 5.5.

Table 5.5: ADF test of LCONS Probability at 2nd Difference

DD (LCONS)	P-value
Intercept	0.0000
Trend & Intercept	0.0000
None (trend and intercept)	0.0000

Source: SARB Data 2015.

DD is the differentiated at second degree difference. from the table 5.5, it can be seen that the P-values of the DD (LCONS) are significant, meaning they are lower than the 5% level of significance. Thus, it can be concluded that LCONS is now stationary.

LINV

The following table shows the ADF unit root test results of probability values of LINV at level.

Table 5.6: ADF test of LINV Probability at level

LINV	P-value
Intercept	0.1251
Trend & Intercept	0.3444
None (trend and intercept)	0.9283

Source: SARB Data 2015.

As table 5.6 shows, the null hypothesis cannot be rejected as the resulted value are greater than 0.005 (5%) level of significance. Then the test is run again at 1st difference as shown in table 5.7.

Table 5.7: ADF test of LINV at 1st Difference

D(LINV)	P-value
Intercept	0.0029
Trend and Intercept	0.0101
None (trend and intercept)	0.003

Source: SARB Data 2015.

Table 5.7 shows the results of ADF LINV at 1st Difference. From the P-value results, which are all lower than the 5% level of significance, the null hypothesis can now be rejected. Thus, it can be concluded that LINV is stationary.

LGOV

The table below represents the results of the ADF unit root test of LGOV at Level.

Table 5.8: ADF test of LGOV Probability at level

LGOV	P-value
Intercept	0.6045
Trend & Intercept	0.0000
None (trend and intercept)	0.4920

Source: SARB data 2015.

The results of the table 5.8 above shows that the null hypothesis of LGOV at Level cannot be rejected as the P-values resulted from the ADF Unit root test show that the values are greater than 0.005 level of significance. Then, the test is re-run at 1st Difference and the results are shown in table 5.9 below.

Table 5.9: ADF test of LGOV Probability values at 1st Difference

D (LGOV)	P-value
Intercept	0.0000
Trend & Intercept	0.0000
None (trend and intercept)	0.0000

Source: SARB data 2015.

As table 5.9 shows, at 5% level of significance, the null hypothesis of unit root can be rejected as the P-values of D (LGOV) are lower than 0.05. Thus, LGOV is now stationary.

NetEXP

The same procedure was conducted for the variable NetEXP. NetEXP has not been logged because of the negative values it contains. According to the rule of logarithms, it is impossible to log negative numbers. This means that NetEXP has been taken at it is in order to differentiate.

Table 5.10: ADF test of NetEXP Probability at level

NetEXP	P-value
Intercept	0.6191
Trend & Intercept	0.0287
None (trend and intercept)	0.0619

Source: SARB data 2015.

Form the table 5.10 above, it can be read that the P-values are high than the 5% level of significance. Thus, the null hypothesis cannot be rejected. The same test is then run again at 1st Difference. The results of P-values at 1st Difference are shown in the following table 5.11.

Table 5.11: ADF test of NetEXP Probability at 1st Difference

DNetEXP	P-value
Intercept	0.0000
Trend & Intercept	0.0000
None (trend and intercept)	0.0000

Source: SARB data 2015.

Table 5.11 shows the results of P-values of DNetEXP 1st Difference. The P-values of NetEXP at 1St Difference are lower than 0.05. Thus, the null hypothesis is rejected in favour of the alternative that NetEXP is stationary.

To conclude this section, it can be said that from the ADF unit root test at level, all the variables were not stationary. All the variables (LGDP, LINV, LGOV and NetEXP) became stationary at 1st degree difference, except of LCONS which only became stationary at 2nd degree difference. Further results of the ADF unit root test of all the variables at each steps of staitionary are illustrated in the Appendix 5 (a) which presents the results of ADF test for each variable run from intercept, trend and intercept, then no trend and intercept.

The next sub-section of the second section of this chapter presents the results from the ordinary least squares (OLS) regression.

5.2.2   Regression Results

Once all the variables have been differentiated, the next step is to run the OLS regression in order to determine the significant impact of the explanatory variables on GDP and which variables among the Keynesian macroeconomic variables best explain economic growth in South Africa.

The following table presents the results of the OLS regression. It provides the values of the variables' coefficients, standard error, t-statistic and the probability (P-value), as well as the constant statistic values.

Table 5.12: OLS Regression Results

Variable	Coefficient	Standard error	t-statistic	P-value
Constant	0.002807	0.000790	3.555809	0.0012
DLGDP	1.00	-	-	-
DDLCONS	0.468820	0.07254	6.399887	0.0000
DLINV	0.057551	0.022649	2.540962	0.0159
DLGOV (-5)	0.003096	0.001250	2.477417	0.0185

DNETEX	6.08^{-08}	1.84^{08}	3.308972	0.0023
R-squared	0.741233			
Adjusted R-squared	0.709868			
S.E. of regression	0.003604			
F-statistic	23.63202			
Prob (F-statistic)	0.000000			
Durbin-Watson stat	1.509521			

Source: SARB data (2004Q1-2014Q4) 2015.

The results of the OLS regression that, the model has a R^2 (coefficient of determination) equals to 0.741233, an Adjusted R^2 is equal to 0.709868, the standard error (S.E.) of regression value of 0.003604. Then, the F-statistic is equal to 23.63202, and the Durbin-Watson Stat value is 1.509521.

The multiple correlation coefficients (R^2) explains the percentage of the variation in the dependant variable. In general, the higher the R-squared, the better the model fits your data. As the OLS regression results shows, the model coefficient of determination (R^2) is 0.741233. This value means that 74.1233 % of the variation in GDP is explained by the independent variables. The F value and Prob (F) statistics test the overall significance of the regression model. They test the null hypothesis that all of the regression coefficients are equal to zero.

Moreover, the value of Prob (F) is the probability that the null hypothesis for the full model is true (that all of the regression coefficients are zero). The model has F-test and probability value of 23.63202 and 0.000 respectively. The p-value of 0.0000 implies that there is zero percentage chance that the model coefficients are equal to zero, thus the null hypothesis is rejected. And it can be concluded that the results of the coefficients are statistically significant.

Notably, the results showed a value of 0.003604 for the Standard errors (S.E) of the regression. Standard error measures the accuracy with which a sample represents a population. The smaller the standard error, the more precise the estimation of the regression. Since the model standard error is lower than the 0.05 level of significance, it can be concluded that the estimations of the regression are reliable.

The Durbin-Watson test value of this regression is 1.509521. This test indicates the likelihood that the deviation (error) values for the regression have a first-order auto-regression component. As indicated in chapter four, the value of this test help to figure out whether there is serial correlation among variables. As a guide, it is required to have a value of Durbin-Watson Statistic between 1 and 4. A value closer to 1 indicates positive serial correlation. A value closer to 4 indicates negative serial correlation and a value of 2 indicates that there is no serial correlation. As the result shows, the Durbin-Watson value can be round to 2. Thus, it can be concluded that the model does not have signs of serial correlation among its variables.

The result of the values of coefficients of the explanatory variables on GDP as shown in table 5.11The following equation presents the results of the regression, indicating the value of the constant and the sign and values of the coefficients of the explanatory variables of GDP.

Equation 5.1:

DLGDP= 0.002807 + 0.468820 DLCONS + 0.057551 DLINV + 0.003096 DLGOV (-5) +

6.08^{-08} DNetEXP…………………………………………………………………….... (5.1)

Equation 5.1 shows that the coefficients of the explanatory variables are all positive as expected from the Keynesian model. The D (LGOV) needed to be lag at five interval which is approximate a year and a quarter, as a year have four quarter. And any injection of government into the economy will take time before the impact can be seen. Further results of the OLS regression are illustrated under appendix 5 (b).

Before interpreting the coefficients of the OLS regression results, it is necessary to consider the statistic proprieties of the model. The model was tested for normality, heteroscedasticity, stability test, test of recursive residuals and Wald test.

5.2.3 Diagnostic Tests Results

The diagnostic tests run for this study include: the Normality test, the Heteroscedasticity test, the Stability test, and finally the Wald test. The diagnostic tests permit to test the fitness of the model. The following table 5.13 presents the results of the diagnostic tests carried.

Table 5.13 Summary of the Diagnostic Tests Results

Test	Null Hypothesis	t/F-Statistic	Probability
Jarque-Bera	Residuals are normally distributed	0.237325	0.888108
Heteroscedasticity	No Heteroscedasticity	2.015596	0.1151
Stability (Ramsey)	There is normal distribution	0.963741	0.3424
Wald	No joint significance	22.46803	0.0000

Source: SARB data (2004q1-2014q4) 2015.

   a) *Residual* Normality *Test*

Normality tests are used to determine if a data set is well-modelled by a normal distribution and to compute how likely it is for a random variable underlying the data set to be normally distributed. Normality tests of this study were conducted using the Jacque-Bera test.

The Jarque-Bera test is a goodness-of-fit test of whether sample data have the skewness and kurtosis matching a normal distribution. Furthermore, the result of the normality test is presented in the following figure.

Figure 5.1: Normality test results

Series: Residuals	
Sample 2005Q3 2014Q4	
Observations 38	
Mean	2.28e-19
Median	0.000344
Maximum	0.008095
Minimum	-0.008810
Std. Dev.	0.003403
Skewness	-0.184304
Kurtosis	3.118396
Jarque-Bera	0.237325
Probability	0.888108
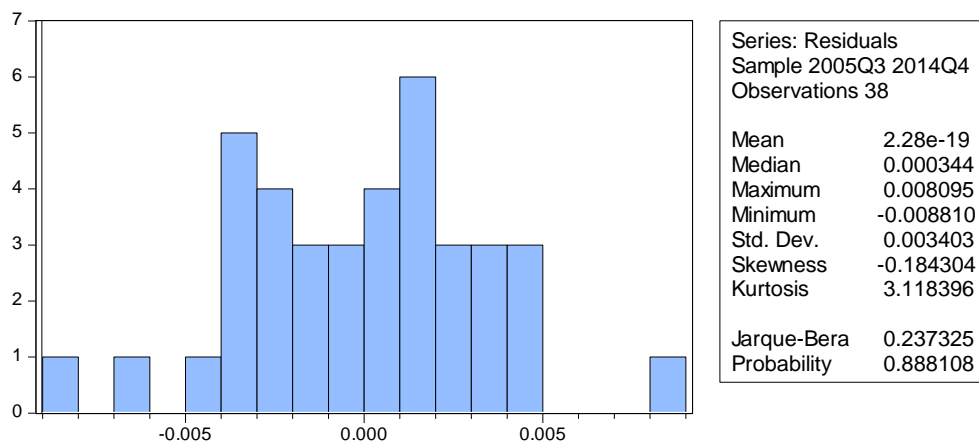
Source: SARB data (2004Q1-2014Q4).

Normality test results of the regression shows that Jarque-Bera has a t-statistic value of 0.237325 and a probability value 0.888108. When the P-value (probability) for the test is small (smaller than 0.05 confidence level, for example), the residuals are not normally distributed, indicating your model is biased. Or if the P-value equals zero, this indicates that the null hypothesis of the normal distribution is rejected. In this study, the probability value is greater than 0.05 indicates that the null hypothesis cannot be rejected. Thus, in conclusion, it can be said that the observed data is consistent with the assumption that the null hypothesis is true. Therefore, this means that null hypothesis of normally distribution is accepted and it can be said that the series are normally distributed.

b) *Heteroscedasticity*

This test allows to test for a range of specifications of heteroscedasticity in the residuals of the equation. Ordinary least squares estimates are consistent in the presence of heteroscedasticity. This test was conducted through the Breusch-Pagan-Godfrey test.

The test result of heteroscedasticity shows that probability values of the heteroscedasticity test are 0.1151, 0.1134 and 0.2022 for F, Chi-square (1) and Chi-square (2) respectively and with F-statistic value of 2.015596. The probability values are all lower than the F- statistic value.This indicates that heteroscedasticity was not a problem among the variables. This implies that the model has no misspecification and its results can be reliable.

The results Breusch-Pagan-Godfrey of Heteroscedasticity test is presented in the table 5.14 below.

Table 5.14: Heteroscedasticity test results

Heteroscedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	2.015596	Prob. F(4,33)	0.1151
Obs*R-squared	7.461100	Prob. Chi-Square(4)	0.1134
Scaled explained SS	5.959923	Prob. Chi-Square(4)	0.2022

Source: SARB data (2004Q1-2014Q4).

Further results of the heteroscedasticity are illustrated under appendix 5 (c).

c) *Stability Test*

The stability test was conducted using the Ramsey RESET test. The RESET stands for Regression Specification Error Test. The values of the results of the stability test are presented in the table below.

Table 5.15: Ramsey RESET test of stability

Ramsey RESET Test			
Omitted Variables: Squares of fitted values			
	Value	Df	Probability
t-statistic	0.963741	32	0.3424
F-statistic	0.928797	(1, 32)	0.3424

Source: SARB data (2004Q1-2014Q4) 2015.

The results indicate a t-statistic value of 0.963741 with the probability value of 0.3424 and F-statistic value of 0.928797 with a probability of 0.3424. The test result shows that the dependent variable in the model is stable.

d) *Wald Test*

The Wald test permits to test the joint significance of explanatory variables in a statistical model. If for a particular explanatory variable, or group of explanatory variables, the Wald test is significant, then it would be concluded that the parameters associated with these variables are not zero, so that the variables should be included in the model. Therefore this test is not mandatory but however advisable. The table below presents the results of the statistic value of the Wald test.

The result of the P-value of the Wald test is statistically significant at 5% level of significance. This test helped to sort out the autocorrelation of the residuals. Thus, since the P-value of the Wald test is statistically significant, then the null hypothesis (H_0) of no joint significance is accepted and

it can be said that there is no joint significance among explanatory variables.Further results of the Wald test are illustrated in the appendix (d).

Table 5.16 Wald test results

Test Statistic	Value	Df	Probability
F-statistic	22.46803	(4, 33)	0.0000
Chi-square	89.87214	4	0.0000

Source: SARB data (2004Q1-2014Q4) 2015.

Having done the diagnostics, the following step is to interpret the explanatory variables coefficients and their corresponding impact to the economic growth in the country of research.

5.3   INTERPRETATIONS

In the equation 5.1 above, the individual coefficients of the equilibrium relationship for GDP show that CONS, INV, GOV and NetEXP all have positive impacts on GDP. All these explanatory variables are statistically significant in explaining GDP, since they t-values are greater than 2 and more specifically, their P-values are statistically significant as they are all smaller than the 5% level of significance.

This section discusses each coefficient and the impact of each variable on GDP and their implications on economic growth.

5.3.1   Economic growth and Consumption Expenditure

The results show that there is a positive relationship between consumption and gross domestic product (GDP). Consumption has the expected positive sign and is statistically significant at 5%. The coefficient value for DLCONS is 0.468820 which is significant as the P-value is 0.0000 and the t-value is 6.399887. The result indicates that 1% increase in consumption leads to 46.8820% increase in GDP. This outcome is consistent with the empirical literature discussed in chapter 3 on the Keynesian model of economic growth. As GDP is the measure of economic growth, increase

in consumption results to an increase in aggregate demand, which lead to an increase in output demand and economic growth.

The study by Pretorius and Knox (1995) shows that consumption expenditure is the most stable and largest component of domestic expenditure and tends to act as a stabilising force in the economy. This is consistent with the results, as this model of economic growth shows that consumption is the variable that best explained the variation of the GDP in South Africa from 2004-2014. However, as empirical theories have presented, not every theory agrees with the Keynesian theory of economic growth. Other empirical results have found a negative relationship between consumption and GDP. But this is not consistent with the Keynesian model of economic growth. In this model the results of a positive coefficient of consumption are statistically consistent with the Keynesian model.

5.3.2 Economic Growth and Investment

Results show that domestic private investment is also found to positively related to GDP. The coefficient sign of investment is positive and its value is 0.057551 with a t-value of 2.540962 and the probability value of 0.0159. This is statistically significant at 5% level of significance. With a positive coefficient of 0.057551, this means that 1 % increase in domestic private investment results with 5.7551% increase in GDP. The model result shows that investment is the second variable that best explains fluctuations in South Africa GDP. Since GDP is a measure of economic growth, then increase in investment which result in an increase in GDP, leads to increasing economic growth.

The result is in consistency with the Keynesian model and other theories of economic growth. In 2009, Arvanitidis, Pavleas and Petrakos (2009) found in their study that, investment is the most fundamental determinant of economic dynamism. Investment in theory is stated to be one of the main factors to boost the economy in South Africa. However, the coefficient value is significantly low because of the low saving in South Africa, as stated in most theories.

5.3.3 Economic Growth and Government Spending

According to the Keynesian theory, an increase in government expenditure leads to an increase in economic growth through fiscal policy. Thus, as the Keynesian theory states government has a

positive impact on economic growth. As the Keynesian model specifies, the coefficient of the Government expenditures is expected to be positive.

The results show the coefficient of government spending has a positive sign and its value is coefficient is 0.003096. The probability value is 0.0185 with is lower than 5%. Then, DLGOV coefficient is statistically significant. This means that a percentage change in government expenditure is represented by a 0.3096 percentage change in GDP.

Despite the fact this is relatively low compared to what is stated in the theory, it is still statistically significant with 0.0185 probability at 5% level of significance. The LGOV was lag at five in order to express its impact. Theory shows that when government injects money into the economy, the effect is not immediately reflected in the economy. The five lags represent a year and a quarter as there are four quarter in a year. The coefficient of LGOV was negative up to the five lag which was making the model wrong as it will be against the Keynesian theory.

According to Hossain and Mitra research (2013), most of the 33 African countries under their study have a very low human development index in their study. Based on the results of this study, for the policymakers, the implementation of a policy framework aimed at increasing government spending will expectedly raise economic grow (Hossain & Mitra 2013: 217-226). Hence, a positive relationship with GDP ensues.

5.3.4 Economic Growth and Net Export

According to theory in the literature review in chapter three, export is stated to produce a positive impact and import a negative effect in the economy. The result of this model has confirmed this. Due to the negative values contained in NetEXP variable, the variable could not be a log. However, it has been differentiated. The negative variable occurs because of subtracting export and import in order to get the net export.

Once again, the result of the regression confirms with the Keynesian theory of economic growth. The coefficient of net export has a positive which is in accordance with the Keynesian model. It is statistically significant at 5% percent level of significance with a probability value of 0.002. The results of the model show that this coefficient value is low. But it is still significant. The low value

of the coefficient confirms the theory that South Africa import is weighting out the export. This means that South Africa imports more than it exports.

This result is consistent with the theories in chapter 3 that export is positively related to economic growth as well as and import. In chapter 3 statistics found that a high import with a low export lead to a negative balance of payments which lead to a negative effect on economic growth. Since net export is characterised by an open trade economy, this can only result to a positive impact on economic growth of a country.

Empirics show that ,by an increase in exports raises the growth rate and relieves the balance of payments constraints. Thus, for most theories of economic growth nowadays, the promotion of exports is a better growth strategy than stimulating domestic demand (Mohr & Fourie 2008: 517; Coulibaly & Logan 2009: 276). Furthermore, Kaldor (1966: 114) argues in his research that in the open economy the main aggregate demand factor that will fundamentally determine the growth of demand and therefore overall growth is export rgwoth, in other words, demand for exports is the key driver of economic growth. In the same line, Roberts (2007: 623) outlines, output growth is a positive linear function of the growth rate of real demand for exports.

The results of the coefficients of the explanatory variables of the model are statistically significant and therefore consistent with the Keynesian theory model of economic growth.

5.4   SUMMARY

In summary, this chapter has analysed the Keynesian model of determinants of economic growth using the OLS regression model. It was divided into three sub-sections.

The first section presented the ADF stationary test results. The unit root of ADF test results found that the variables became stationary at the 1st difference at the exception of consumption which became stationary at the 2nd difference. Thus, this means that all the variables were integrated at 1st order and 2nd order degree of integration.

The Ordinary Least Squares (OLS) regression was presented in the second section. The findings indicated that all the coefficients of the variables were statistically significant. All the coefficients have a positive sign, which is consistent with the theoretical and empirical literature on Keynesian model of economic growth to a large extent. This means that consumption expenditure,

investment, government expenditure and net export are all positively related to the dependent variable gross domestic product (GDP). According to the overall findings, the results of the regression analysis were as expected. The results of the coefficients of explanatory variables were expected to be positive and that was the case. However, findings indicate that the Keynesian factors of GDP are not the only variables affecting economic growth. The variations in GDP rates were explained by about 73 percent of the explanatory variables. However, the results indicate that consumption and investment are both main variables to explain variations in GDP in South Africa. Thus, the OLS regression results provided evidence consumption and investment are the two variables that best explain fluctuations in South Africa's GDP.

The subsequent section three of the chapter respectively presented the diagnostic tests results.Diagnostic tests revealed the suitability of the model. There was no misspecification while the errors are normally distributed and there is no sign of autocorrelation of the residuals.

Therefore, the results of the research are reliable and compelling to the conclusions on the economic growth and the Keynesian determinants of economic growth.

The next chapter provides the conclusion to the study, the summary of implications and policy recommendations.

CHAPTER 6

CONCLUSION, IMPLICATIONS, RECOMMENDATIONS, AND LIMITATIONS

6.1 INTRODUCTION

This study focused on testing the validity of the Keynesian demand-factors of economic growth. The findings showed that after applying the methodology, the results are consistent with the Keynesian stance of demand-side factors as policy tool for policy makers to impact economic growth.

This chapter provides a conclusion drawn from the results of the study. Furthermore, it presents implications, recommendations and limitations. The first section provides a brief summary of each chapter of the dissertation. Secondly follows a discussion on the implications of the findings. Lastly recommendations, limitations of the study and further areas of investigation are also noted towards the end of the chapter.

6.2 SUMMARY OF THE CHAPTERS AND MAIN FINDINGS

The aim of this study was to examine the Keynesian aggregate demand macroeconomic growth determinants in the South Africa.This was in order to determine their impact on economic growth of the country and identify which of the variables best explains the fluctuations in the country's GDP. In doing so, the study conducted an econometric analysis by modelling the GDP as a function of consumption, private investment, government expenditure and net export using the ordinary least squares (OLS) regression model on quarterly time series data.

The treatise contains six chapters. Chapter one introduced the research topic, stated the problem of the study as well as the mains objectives of the research.

Chapter two discussed the main theories of economic growth. The theories discussed included the Classical, Keynesian and monetarist theories. These theories on economic growth provided a basic for understandings the importance of the different factors that affect economic growth. Moreover, Theories on economic growth helped in identifying the major factors causing fluctuations in gross domestic product (GDP).

Chapter three reviewed the structure of South African economic, as well as the sources and dynamics of their impacts on the macroeconomic fluctuations. Furthermore, it provided a review of the macroeconomic performance in the South African economy by analysing the role of domestic demand factors causing macroeconomic fluctuations and volatility in the country's economic growth experience. Finally, chapter three dealt with the theoretical and empirical reviews on the Keynesian macroeconomic variables of GDP growth. The main theoretical and empirical implication of these theories was to emphasize the role of aggregate demand on economic growth.

Chapter four described the research methodology, presented the model specification and the estimation techniques. The Keynesian determinants of the gross domestic product (GDP) are identified to be consumption (C), investment (I), government (G) and net export (X-M). The model conducted the ordinary least squares regression using quarterly time series. The model employed the Augmented Dickey Fuller test to test for stationary. Diagnostic tests were done an these included: the residuals normality test, the heteroscedasticity through the Breusch-Pagan-Godley test, the stability through Ramsey RESET test and the Wald test to check the joint coefficient of the explanatory variables.

Chapter five provided a presentation of the results and interpretations of the empirical analysis. This chapter examines the impact of the explanatory variables on economic growth. Moreover, the chapter analysed the statistical properties of the date using appropriate tests. The formal test of Augmented Dickey Fuller conducted has showed that all the variables were non-stationary at level. After being differenced, all variables became stationary at 1st degree order, except for consumption which only became stationary at 2nd difference. After testing for stationary, it was necessary to figure out whether the coefficients of the constant and explanatory variables were statistically significant and if the model is consistent with the Keynesian theory of economic growth. The results showed a R^2 value of 0.741233. This means that about 74% of the variations in the dependent variables are explained by the explanatory variables. The results showed that the coefficients all had a positive sign and were all statistically significant. Thus, all the explanatory variables are positively related to the dependent variables GDP. The model was subjected to a number of diagnostic tests. All the tests suggested a consistent and fit model.

Empirical analysis showed that consumption has a positive sign that was expected and therefore is significant and supported by the theories on Keynesian model of growth. The positive sign of its coefficient means that increase in consumption will lead to a positive effect on the gross domestic product. This means that 1% increase in consumption will lead to 46.8820% increase in gross domestic product.

The investment was found to be the second best variable to explain growth variation in GDP. The coefficient value of investment variable is a positive 0.057551. This means that an increase in domestic investment by 1% will lead to an increase in gross domestic product by 0.57551%.

Government and net export are also suggested to be positively related to the gross domestic product as expected and are consistent according to the Keynesian model. The coefficient value were statistically significant, however have a relatively low impact. This means that although government and net export affect the variations in gross domestic product, their impact is significantly small as compared to the empirical theories.

6.3   IMPLICATIONS AND RECOMMENDATIONS

The findings suggest that consumption is the Keynesian variable that best explains variations in GDP in South Africa, this is followed by investment, then government spending and net export.

After taking into consideration the results, the findings confirm that the Keynesian demand-side factors of economic growth (consumption, investment, government spending and net export) all have a positive effect on the gross domestic product, meaning the findings showed that the variables used to test the impact on economic growth are positively related.

Furthermore, the study shows that the increase in the economy of South Africa over the past decade was mainly caused by the demand factors of economy growth. In South Africa, both export and import increase the gross domestic product (GDP). The country's gross national expenditure has a positive effect on the GDP. Further, the domestic private investment and the final consumption expenditure has a significant positive effect on GDP, and turned out to be the variables that have high significant impact on GDP. Finally, this means that empirical results imply that economic growth policy in South Africa will have to pay more role to the aggregate demand.

In this regard, the study generally recommends macroeconomic policies that are comprehensive and can cover all aspects related to the Keynesian macroeconomic model. Similarly, the government needs continue maintaining price stability while simultaneously endeavouring to attract more to investment to South Africa. Moreover, the government needs to continue maintaining a fiscal disciple without necessary losing sight of the international dynamics.

In a more specific notes, the policy recommendations that could be made from this study are:

Firstly, human resource expenditure should be more prioritized, assuming economic growth is the ultimate goal for the South African economic. Since the increase in consumption expenditure will lead to increase in gross domestic product, the government of South Africa needs to increase investment in state and local spending, increase productivity, diversify the economic and improve industrialization of the enterprises in order to have various consumer goods and services. This could only increase labor force, increase export which is also positively related to GDP and reduce import as a large amount of consumption and investment spending are spent on imported goods. If these are done appropriately, then, the economy will grow and overall welfare of the population will be improved as the economic growth is of utmost importance for any country.

Secondly, as an investment is positively related to the gross domestic product, from the findings, it can be suggested that domestic investment could be strengthened in order to achieve a high level of economic growth.

Thirdly, Government plays an important role in every economy. Shrinking the government's size should be a major goal for policy makers. The economic will surely perform better and this will boost the overall prosperity of the country.

Fourthly, although net export has a lower significance influence on economic growth in the short-run, exports has been shown in theories and empirics to have an influence in the long-run. Therefore, measures that will ensure export promotion should be adopted. Further, effort should be directed towards policies that will enhance economic such as import substitution industrialization, in order to impact more on the exports.

As the study indicated, this research was conducted in the concept of the South African economy.Implications and recommendations may be limited. Therefore, caution may be carried while implementing these policy recommendations due to limitations of this study.

The next section provides some limitations of the study that may occur as well as areas for further study.

6.4   LIMITATIONS OF THE STUDY AND AREAS OF FURTHER RESEARCH

Firstly, the number of observations used are only for a period of a decade (10 years). The limitation may insure further investigation using additional observation and explanatory variables where available and some approaches that will mitigate this limitation. Moreover, gross domestic product is not the only represent of economic growth and contains itself limitations,when measuring economic growth of the country.

Furthermore, demand-side factors are not the only factors cause changes in gross domestic product and are not sufficient in explaining economic growth. These factors are themselves affected by various others domestic factors such interest rates, exchange rates, political factors as empirical and theoretical literature stated.. Other factors such as supply-side factors do also have an impact on economic growth.

Due to the lack of empirical literature on the demand-side factors of economic growth, economic growth suggests the need for further research for more conclusive evidence. Although the results of this study may have limited policy implications, they are useful in the sense that they enhance the current literature in the area of economic growth concept and its determinants and encourage further extended research on the topic.

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APPENDICES

A.5 (a) Augmented Dickey-Fuller Test Results of the Variables

DGDP

Null Hypothesis: D(LGDP) has a unit root				
Lag Length: 0 (Automatic - based on SIC, maxlag=9)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-2.248471	0.0253
Test critical values:	1% level		-2.621185	
	5% level		-1.948886	
	10% level		-1.611932	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LGDP,2)				
Sample (adjusted): 2004Q3 2014Q4				
Included observations: 42 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGDP(-1))	-0.208593	0.092771	-2.248471	0.0300

DDCONS

Null Hypothesis: D(LCONS,2) has a unit root				
Exogenous: Constant, Linear Trend				
Lag Length: 0 (Automatic - based on SIC, maxlag=9)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-6.917618	0.0000
Test critical values:	1% level		-4.198503	
	5% level		-3.523623	
	10% level		-3.192902	
*MacKinnon (1996) one-sided p-values.				

Augmented Dickey-Fuller Test Equation				
Independent Variable: D(LCONS,3)				
Sample (adjusted): 2004Q4 2014Q4				
Included observations: 41 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LCONS(-1),2)	-1.115287	0.161224	-6.917618	0.0000

DINV

Null Hypothesis: D(LINV) has a unit root				
Exogenous: Constant				
Lag Length: 0 (Automatic - based on SIC, maxlag=9)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-4.051351	0.0029
Test critical values:	1% level		-3.596616	
	5% level		-2.933158	
	10% level		-2.604867	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
independent Variable: D(LINV,2)				
Sample (adjusted): 2004Q3 2014Q4				
Included observations: 42 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LINV(-1))	-0.572486	0.141308	-4.051351	0.0002

DGOV

Null Hypothesis: D(LGOV) has a unit root				
Exogenous: Constant, Linear Trend				
Lag Length: 1 (Automatic - based on SIC, maxlag=9)				
			t-Statistic	Prob.*

Augmented Dickey-Fuller test statistic			-9.627685	0.0000
Test critical values:	1% level		-4.198503	
	5% level		-3.523623	
	10% level		-3.192902	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Independent Variable: D(LGOV,2)				
Sample (adjusted): 2004Q4 2014Q4				
Included observations: 41 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGOV(-1))	-2.497826	0.259442	-9.627685	0.0000

DNetEXP

Null Hypothesis: D(NETEXP) has a unit root				
Exogenous: Constant				
Lag Length: 1 (Automatic - based on SIC, maxlag=9)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-7.297593	0.0000
Test critical values:	1% level		-3.600987	
	5% level		-2.935001	
	10% level		-2.605836	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(NETEXP,2)				
Sample (adjusted): 2004Q4 2014Q4				
Included observations: 41 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(NETEXP(-1))	-1.950331	0.267257	-7.297593	0.0000

A.5 (b) Ordinary Least Squares Regression Results

Dependent Variable: D(LGDP)				
Method: Least Squares				
Sample (adjusted): 2005Q3 2014Q4				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.002807	0.000790	3.555809	0.0012
D(LCONS)	0.468820	0.073254	6.399887	0.0000
D(LINV)	0.057551	0.022649	2.540962	0.0159
D(LGOV(-5))	0.003096	0.001250	2.477417	0.0185
D(NETEXP)	6.08E-08	1.84E-08	3.308972	0.0023
R-squared	0.741233	Mean dependent var		0.006783
Adjusted R-squared	0.709868	S.D. dependent var		0.006691
S.E. of regression	0.003604	Akaike info criterion		-8.291547
Sum squared resid	0.000429	Schwarz criterion		-8.076075
Log likelihood	162.5394	Hannan-Quinn criter.		-8.214883
F-statistic	23.63202	Durbin-Watson stat		1.509521
Prob(F-statistic)	0.000000			

A.5 (c) Heteroscedasticity Test Results

| Heteroscedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	2.015596	Prob. F(4,33)	0.1151
Obs*R-squared	7.461100	Prob. Chi-Square(4)	0.1134
Scaled explained SS	5.959923	Prob. Chi-Square(4)	0.2022

A.5 (d) Stability Test Results

F-test summary:				
	The sum of Sq.	df	Mean Squares	
Test SSR	1.21E-05	1	1.21E-05	
Restricted SSR	0.000429	33	1.30E-05	
Unrestricted SSR	0.000417	32	1.30E-05	
Unrestricted SSR	0.000417	32	1.30E-05	
LR test summary:				
	Value	df		
Restricted LogL	162.5394	33		
Unrestricted LogL	163.0830	32		

A.5 (e) Recursive Residuals Coefficients Test Results
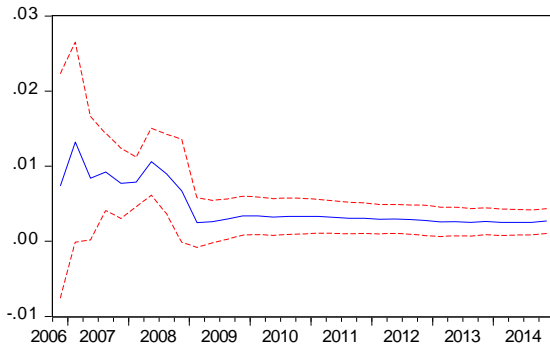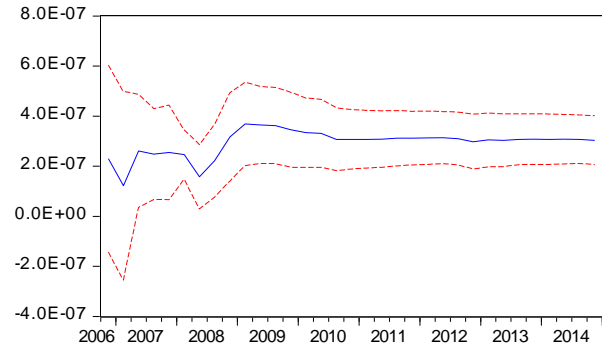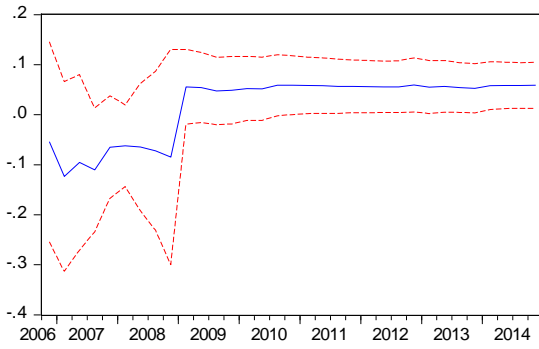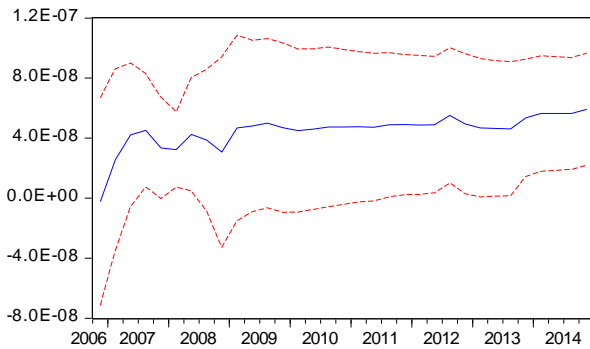
A.5 (f) Wald Test Results

Wald Test:			
Equation: Untitled			
Test Statistic	Value	df	Probability
F-statistic	22.46803	(4, 33)	0.0000
Chi-square	89.87214	4	0.0000
Null Hypothesis: C(2)=0,C(3)=0,C(4)=0,C(5)=0			
Null Hypothesis Summary:			
Normalized Restriction (= 0)	Value	Std. Err.	
C(2)	3.03E-07	4.91E-08	
C(3)	0.058689	0.023072	
C(4)	0.003119	0.001274	
C(5)	5.92E-08	1.87E-08	
Restrictions are linear in coefficients.			

A.5 (g) Raw Data used in the Regression Analysis

Observations	GDP	CONS	INV	GOV	NETEXP
2004Q1	2193636	1251374	257048	9.8	128161
2004Q2	2224290	1276166	266577	15.8	118480
2004Q3	2260660	1300327	275996	7.8	127917
2004Q4	2284801	1320508	286471	13.2	143007
2005Q1	2308029	1335777	291664	12.4	119495
2005Q2	2349448	1352468	301729	14.3	143936
2005Q3	2381486	1373441	312075	11.2	131425
2005Q4	2397433	1402464	323341	13.4	115342
2006Q1	2439551	1438215	326876	13.6	80714
2006Q2	2474200	1468886	331017	10.2	67637

2006Q3	2508372	1500390	344136	13.3	96869
2006Q4	2543057	1536209	352399	19.8	35204
2007Q1	2584351	1557014	361635	9.0	86592
2007Q2	2605530	1574688	367242	17.5	27575
2007Q3	2636065	1591772	371205	14.0	42010
2007Q4	2673414	1607634	370342	15.1	101083
2008Q1	2684648	1603260	385975	15.0	26869
2008Q2	2717424	1604756	395294	7.5	57492
2008Q3	2723918	1603176	405908	21.7	57804
2008Q4	2708410	1596588	417667	23.4	78683
2009Q1	2666281	1575712	369604	12.3	30127
2009Q2	2657131	1559797	353662	23.9	60498
2009Q3	2663293	1555670	337764	8.5	74696
2009Q4	2681051	1550581	336658	13.5	38911
2010Q1	2712661	1579432	336672	9.3	50199
2010Q2	2729279	1600848	342479	8.2	51003
2010Q3	2759874	1637071	342652	12.1	17623
2010Q4	2790218	1669993	344269	10.2	17639
2011Q1	2815899	1683046	354869	9.3	1512
2011Q2	2830810	1697448	358297	9.3	6483
2011Q3	2838222	1706072	361584	14.1	-13456
2011Q4	2860213	1717462	370230	8.8	-38411
2012Q1	2872040	1730548	374220	21.1	-39343
2012Q2	2898241	1746846	375937	7.8	-40160
2012Q3	2906902	1767674	380231	9.5	-83659
2012Q4	2919809	1789204	383684	9.4	-78222
2013Q1	2929698	1797424	393928	7.3	-49326
2013Q2	2956391	1805781	405867	10.6	-78059
2013Q3	2965232	1813738	418218	6.9	-54705
2013Q4	3002235	1821425	418635	9.1	27182

2014Q1	2990491	1826113	401520	7.9	-12342
2014Q2	2994060	1830875	391566	6.8	-15431
2014Q3	3009502	1836093	392718	10.5	-23667
2014Q4	3040251	1843463	394404	6.5	5056