THE IMPACT OF BUDGET DEFICITS ON ECONOMIC GROWTH IN SOUTH AFRICA

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ABSTRACT

The study examines the impact of budget deficits on economic growth in South Africa. The review of the results from theoretical and empirical studies has shown that budget deficits in the most have a negative impact on GDP growth. The Johansen cointegration test has shown evidence that there is cointegration between the GDP growth and its determinants. The tests indicated the presence of cointegration which led to the estimation of VECM. The measure for the long run relationship was between GDP growth and its determinants such as, budget deficits, domestic activities, government debt, and trade openness. The co-integration and vector error correction modelling techniques were applied to South African data between 1990 to 2012 period. This study at hand indicated that government budget deficits have a long run negative effect on economic growth, but the impact shown from the results of this study is very low.
DECLARATION

I, the undersigned Luzuko Threva Mrwebo, student number, 200500261, hereby declare that the dissertation is my own original work and that it has not been submitted, and will not be presented at any University for a similar or any other degree award.

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ACKNOWLEDGEMENTS

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DEDICATION

I dedicate this project to the God of heaven. Lord you were my comfort, strength throughout the year. It is true that, “Except the LORD build the house, they labour in vain that build it” Psalms 127:1

To my parents, your support was excellent to me. I will never forget you.

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CHAPTER 1: INTRODUCTION AND THE RESEARCH ISSUE

1.1. Introduction

Governments around the world, especially in emerging countries strive to attain stable and growing economies in order to improve the standard of living of their citizens. Economic growth has been regarded as fundamental focus by many economies globally, and policies are developed and employed to achieve sound growth. Government policies have to be formulated in a manner that will not depress the activities in the private sector. Policies such as tax restructuring, government expenditure and financing of government spending determine the stance of the fiscal policy as to whether budget deficits or surplus is anticipated to have a positive effect on growth of the economy.

Economists differ in their arguments concerning fiscal stance, especially with regard to budget deficits. Some macroeconomists have indicated a no-effect of budget deficits to economic growth, suggesting that effects and causality are objectively the results from changes in other macroeconomic factors such as investment, private savings, inflation, interest rates, net export, and exchange rates. On the other hand, other macroeconomists advocate the positive effects the budget deficits have on economic growth, suggesting that budget deficits characterised by public investment spending (such as infrastructural development projects) play a vital role for the growth of the country’s economy (Benos, 2009:17). Government expenditure may sometimes be unproductive to the economy, due to corruption within the spheres of government, fruitless expenditure, and lack of accountability and poor measurements of the state funds. Such a distortionary effect of government spending, as neoclassical economists would suggest arising from increases in government spending will “crowd out” private investment, followed by declining aggregate output and a rise in unemployment (Froyen, 2009:68).

South Africa as a developing nation has experienced almost a yearly budget deficit in the past 22 years, averaging at -3% of the GDP. Data from South African Reserve Bank shows that, in the past 22 years South African government managed to run budget surplus only in the year 2007 and 2008 (South African Reserve Bank, 2012). Jacobs, Schoeman, and van Heerden (2010:1)
argue that a budget deficit “is not an ideal measurement instrument for the situation in South Africa”. Lumengo (2012:2) states that, an expansionary fiscal policy which is characterised by widening budget deficits in South Africa is more likely to increase the interest rates in the long-run, due to the possible crowding out effect on private investments and the consequential harmful effect on economic activities in the long run. On the other hand, (Ocran, 2011) advocates that the South African government consumption expenditure has a significant positive effect on economic growth. Furthermore Budget Review (2011) suggests that budget deficits in South Africa for the past 10 years have affected the economy positively.

In the post-apartheid economic era, in South Africa a large portion of government spending focused more on social spending such as health and education. During the 2012/2013 budget speech, government policy put an emphasis on shifting focus from social expenditure to increase on infrastructure, employment and economic growth. Furthermore, Treasury has projected budget deficits and positive growth rate for the next 4 years. 2.7% growth is forecasted for the year 2012 with anticipated -4.3% budget deficits as a percentage of GDP. For the years 2013, 2014, and 2015, budget deficits of -4.5%, -4.4%, and -3% are projected, respectively and 3.6% and 4.2% growth rates are anticipated for the years 2013, 2014 respectively (National Treasury, 2011).

1.2. Statement of the Problem

There is a growing dialogue among macroeconomists, investors, trade unions and politicians in South Africa on budget deficits stance in relation to economic growth. In the post 1994 period to date, unlike the economic framework of the Apartheid government, more transparency and openness on policy formulations have been experienced. According to Faulkner and Loewald (2008:1), post-Apartheid government in South Africa operating with less political instability, has experienced “prudent fiscal policy and sound macroeconomic management”. At the same time, there have been increased budget deficits, high unemployment rates and low growth rates, which have been a cause of concern. The proponents of pro-budget deficit have argued that, budget deficits are vital for economic growth. This is because it is believed that increased government investment in infrastructure and other areas will “crowd in” or stimulate private investment. However, others such as businesses and investors have argued budget deficits have a negative
effect on the economy since it crowds out or reduces the funds available for private sector investment.

According to Ocran (2011) public financing in South Africa went through various changes over the past 40 years. This is evident on the post-1994 economic regime with the introduction of the medium term expenditure framework program (MTEF) which was undertaken by the government. The introduction of MTEF in the period between 1997 and 2000 was to play a vital part on the program of tax reforms and administration capacity improvements. To date fiscal policy performance in post-1994 South Africa has been varied. Furthermore, Ocran (2011) asserts that, debt in South Africa as a percentage of GDP has increased marginally over the past 40 years.

The increasing budget deficits stand and contrasting views with regards to the effects of these deficits warrants an investigation to determine whether budget deficits influence economic growth positively or negatively. There has been a gap in research on the impact of budget deficits in South Africa. Most studies, such as Snyder (2003), considered the crowding out effect of budget deficits. This study attempts to fill in the gap by researching on the impact of budget deficits on economic growth in South Africa. Whether budget deficits crowd in or out private investment, what is crucial is the final effect on growth; hence this study concentrates on the impact on growth.

1.3. Objectives of the study

The general objective of the study is to analyse and evaluate the impact of South African government budget deficits on economic growth. Specific objectives of this study are:

- To review the budget and growth trends in South Africa.
- To empirically ascertain effects of budget deficits on economic growth and extract policy recommendation.
1.4. **Hypothesis**

H₀: South African government budget deficits have a significant negative impact on economic growth.

H₁: South African government budget deficits have a positive impact on economic growth.

1.5. **Justification of the study**

Lack of adequate empirical studies investigating the effect of budget deficit on economic growth in South African economic context has motivated the necessity to research on this subject. The empirical results obtained in this study will serve as expansion and addition to the literature already existing, not merely an academic article. The results of the study will be important for policy makers in structuring and employing effective fiscal policies in the economy. Furthermore the findings will also necessitate further research on the impact of budget deficits on economic growth.

1.6. **Organisation of the study**

The rest of the study is organized as follows: Chapter 2 outlines economic overview of South Africa and budget deficits stance over the period of the study. Chapter 3 looks on literature review relating to budget deficits and economic growth; these include theoretical and empirical evidence. Chapter 4 looks at the research methodology and research methods. Chapter 5 presents the estimation and interpretation of results. Finally Chapter 6 provides a summary of findings of the study, and policy recommendations as well as areas for further research.
CHAPTER 2: OVERVIEW OF SOUTH AFRICAN ECONOMY AND TRENDS

2.1. Introduction

The purpose of this chapter is to provide a review of the South African economy and trends, starting with overview of economy in relation to budget deficits and economic growth. This is followed by a review of government revenue and expenditure, the effects of financing budget deficits in South Africa, budget deficits and unemployment rates, as well as countercyclical policy stance in response to 2008/2009 economic crises. A conclusion is set forth in the final section of the chapter.

2.2. Overview of South African Economy in relation to budget deficits and economic growth

The beginning of the new economic era in South Africa – that is post 1994 era, has placed the country into crucial transformations in the economy. It was necessary for the economic reformation in South Africa to occur as the country would be commencing to operate on an international level, with international trade activities being the pivotal connecting global phenomenon. The system of economic globalisation requires such commitments from any country in the world, since there is no longer an economy operating in isolation. Naido, Willcox, Makgetsi, and Stott (2008:4) affirm that in assessing the appropriateness of a particular economic policy approach, an analysis of the situation is required. In 1994, the South African economy was literally on its knees. The short term issues it faced were the after-effects of a severe drought in 1992, a global economic recession, political strife and economic policy uncertainty at home, a large budget deficit, almost no foreign exchange reserves (less than a week of import cover), a private sector creaking under high interest rates, inflation of about 15 per cent and massive outflows of currency. Furthermore, globalisation created pressures to reform fiscal policy institutions and budgetary systems, and also for policy convergence, including deficit reduction, tax reform to broaden the tax base, and the restructuring of public enterprises (Tania and Janine, 2008).
The South African economy has been regarded as one of the most competitive emerging economies on an international standard with sound financial system as compared to other emerging markets. World Economic Forum (2010) depicts South Africa’s competitiveness in the world economy (measured by World Economic Forum’s Global Competitiveness Index) as being ranked 45th in the period of 2009-2010. In the context of government budget deficits stance and economic growth the country in the past 18 years has experienced budget deficits averaging to an approximately -5% of the country’s GDP and an average of 3% economic growth. Unemployment rate has been the subject of discussion amongst political groups. The country has experienced a higher unemployment rate of 25.2% in the 2nd quarter of 2012. Khamfula (2004:34) asserts that the South African government is not doing enough to stimulate economic growth in the economy. Its fiscal and monetary policies have not produced desirable robust results. Furthermore, Jacobs et al (2010) argue that a budget deficit “is not an ideal measurement instrument for the situation in South Africa

Naido, et al (2008:8) assert that the implementation of Growth Employment and Redistribution strategy (GEAR) after 1994 was essentially a macroeconomic policy package, but it also had many aspects of microeconomic reform. The three main assumptions behind the macroeconomic elements of the GEAR strategy were:

· That the current account deficit was a binding constraint to faster growth
· That the low level of domestic savings was an obstacle to increasing the level of investment; and
· That government’s deficit and tax policies contributed to the low level of savings.

In solving the latter two problems, the GEAR strategy sought to reduce the level of taxation on the economy, reduce the budget deficit and increase the share of public spending on infrastructure. On the first and third score, South African government did not succeed. The tax to GDP ratio rose by about 2% of GDP during the period 1994 to 2000 despite reductions in tax rates. Furthermore, the share of general government spending on infrastructure declined from about 4% of GDP to about 2%. However, due to a higher tax to GDP ratio and a decrease in government expenditure, the deficit was reduced significantly over the period. This reduced interest costs, with a lag though, providing additional resources for government to spend, (Naido et al, 2008).
Kearney and Odusola (2011) assert that South African fiscal policy management towards the end of apartheid had been poor. The new government in 1994 inherited serious fiscal and other imbalances. The budget deficit in 1993/94 was equivalent to over 7% of GDP, and was still above 5% when determined macroeconomic stabilisation efforts began under the GEAR programme. The authorities had notable success in strengthening revenue collection – the independent Revenue Authority is seen as a model of effective government policy implementation – but government also succeeded in restraining expenditure growth between 1997 and 2003.

The GEAR policy comprised of a number of specific goals and core elements as outlined in tables 2.1 and 2.2 below, respectively.

**Table 0.1: GEAR Policy’s Specific Goals**

| 1) economic growth of 6% in the year 2000 | 5) ratio of gross domestic savings to GDP to a level of 21.5% in the year 2000 |
| 2) inflation limited to less than 10 %     | 6) improvement in income distribution                               |
| 3) employment growth above the increase in economically active population; an average 2.9 % | 7) relaxation of exchange controls                                   |
| 4) deficit on current account and balance of payments between 2 and 3% | 8) reduction of the budget deficit to below 4 % of GDP,           |

*Source: (Braude, 2003)*
Poon (2009:9) asserts that South Africa’s budget deficit, which registered -6.8% of GDP in 1994, was gradually reduced through both strengthened revenue collection measures and expenditure constraints. These were achieved mainly through a 1996 macroeconomic policy, Employment and Redistribution (GEAR) strategy, which placed fiscal restraint at the core of government priorities and stressed macroeconomic stability as a necessary condition for sustained development. Furthermore, Naido et al (2008:15) affirm that the Asian crisis undoubtedly had a major impact on economic outcomes and clouds any objective assessment of GEAR. GEAR was difficult to evaluate because there was no counterfactual to observe. As with any fiscal adjustment process, the act of reducing budget deficits was to reduce aggregate demand and therefore GDP growth. The positive effects of lower interest rates, higher savings, improved
credibility and falling debt service costs take time to impact positively on growth. Prior to the onset of economic crisis, by 2006-2007 the government budget was in surplus, which led major credit ratings agencies to upgrade South Africa’s sovereign rating several times since the mid-1990s. However, the global economic crisis has taken its toll on economic activity, with official estimates of government revenue falling short R60bn in the 2009/2010 budget year.

The Presidency (2007) shows that in the first decade of South Africa’s democracy, despite regular increases in GDP and some quite large increases in Foreign Direct Investment, a very low budget deficit and stable Consumer Price Index, income inequality nevertheless grew very rapidly. Only from about 2003, when there was a marked increase in social spending did income inequality begin to decline slightly. Moreover, The Presidency advocates that without active intervention to eliminate income inequality, even strong economic growth in the years leading to 2014 is only likely to be associated with declining inequality if anti-poverty social spending continues to proportionally increase.

African Economic Outlook (2012) shows that in the past years South African government has reduced “taxes, tariffs dropped, the fiscal deficit reined in, inflation curbed and exchange controls relaxed. Economic growth and prudent fiscal management have seen South Africa's budget deficit (the difference between the government's total expenditure and its total receipts, excluding borrowing) drop dramatically, from 5.1% of GDP in 1993/94 to 0.5% in 2005/06 - the second-lowest fiscal deficit in the country's history after the 0.1% reached during the gold boom in 1980. In 2006/07, the country posted its first ever budget surplus, of 0.3%.”

Medium Term Budget Policy Statement (2009) advocates that South African economy was mostly affected by sharp contractions emerged in the global economy. Furthermore the sustainable public finance has contributed positively in South African economy by enabling the government to respond from global and domestic economic shocks by stabilizing spending on public sector services to achieve more growth in the economy.

National Treasury (1996) advocates that when budget deficits reached an unsustainable 7.9% as percentage of GDP, and South African fiscal policy had been structured based on the following goals: cutting both the government budget deficit and dissaving; endeavor to combat the
increases in taxes; curb general government consumption expenditure; and strengthening the
general government contribution to gross domestic fixed investment.” Put in other words South
African fiscal policy was modelled to achieve the following: firstly by “ensuring that sufficient
resources are available for government to meet its public service commitments and to provide
support to the economy as it moves into its next growth phase. Secondly, by supporting
development programs and alleviating poverty through current expenditure and investments in
future capacity. Lastly through managing an orderly and gradual reduction of the budget deficit
towards a sustainable position in a manner that does not compromise the economic recovery.
Deficit reduction will result from a combination of automatic adjustments, as tax revenue
increases, and a moderation in the growth of government spending” (Medium Term Budget
Policy Statement, 2009).

According to The Presidency (2007) during the upswing, from 1999 through to 2005, the annual
economic growth rate averaged 3.5%. In the decade prior to 1994, economic growth averaged
less than 1% a year. According to the South African Reserve Bank, there was no sign of this
period of expansion coming to an end. Gross domestic product (GDP) growth was running at an
annualised 4.8% in the second quarter of 2005 (compared to 3.7% in 2004 and 2.8% in 2003).
The GDP in 2006 was nearly R1, 200 billion and Government expenditure R558 billion
(2006/7). However, even with an economy this size and an impressive growth rate this is much
less than the 6% growth that the Government has indicated is needed to halve unemployment and
poverty by 2014. Growth in employment is almost half of the anticipated 2.9% necessary to
halve unemployment.
FIGURE 0.1: BUDGET BALANCE IN THE PERIOD OF 1991-2012

Source: www.tradingeconomics.com

FIGURE 0.2: BDGET DEFICITS

Source: South African Reserve Bank (2012)

Figure 2.1 and 2.2 above illustrate budge balance trends (from 1991 to 2012), growth rates trends (form 1991 to 2011), respectively. It is evident that South Africa has been experiencing budget deficits and low economic growth rates in those periods. As Figure 2.1, it is apparent that in 2011 government budget balance was -4.80 % of GDP.
Moreover, it is apparent that the average of government deficits for the period depicted in Figure 2.1 is -3% of GDP. Furthermore, South African government had reached a low of -7.4% of GDP in year 1992 and recorded a high of 0.9% of GDP in 2007/2008 period. According to National Treasury (2012:927) surpluses grew from R582 million in 2008/09 to R703.8 million in 2011/12, as a result of higher volumes of sales and tariff increases. Furthermore, accumulated surpluses will be used to strengthen the country’s financial position and credit rating as it prepares to access the debt capital markets to raise finance for its capital programme. According to Hanival and Maia (2007:10) a strong economic growth in South Africa, improved tax collection and a widening fiscal base has allowed general government consumption spending to grow, in real terms, at an average rate of 0.5% p.a. over the period 1994 to 2005, accelerating to 3.1% in 2006 and 3.4% in 2007.

As Figure 2.3 above shows, as recorded in quarterly, there is an evidence of budget balance fluctuations. In the first quarter of 1993 the country recorded a high of -11% deficits but in the last quarter of the same year deficits were reduced to low -3% deficits. In the period of 2006 – 2008 the country has experienced positive budget balances, and approximately -8% deficits in the first quarter of 2009, this was subsequent to the global financial crisis. This could be explained by fact that the government intervened by employing countercyclical fiscal policy to stabilise economic growth, meaning the government had increased the spending to stimulate
economic activities (WorldBank, 2011). In the period of 1995 and 1996 as depicted in figure 2.1 above budget deficit was -5.1 and -4.5% of GDP respectively. It was in this period when more of the budget was devoted in constructions of road and public facilities which may have been contributed to high growth rate and high budget deficits. A low growth rate was experienced in first quarter of 2009, a period when the world was hit by recession. Moreover, figure 2.1 shows that in the first quarter of 2009 high budget deficits was experienced, this was caused by increased in government spending to counteract economic recession. Nene (2012) affirms that the fiscal deficit declined from almost -8 per cent of GDP in the early 1990s, to a small budget surplus before the onset of the global crisis. This allowed South Africa’s gross debt ratio to decline sharply from 49.5 per cent of GDP in 1995/96 to a low of 27.1 per cent in 2008/09.

Department of Trade and Industry (2011) advocate that South African economy grew by 4.6% in the first quarter, followed by 2.8% in the second quarter, and 2.6% in the third quarter of 2010. According to the Reserve Bank Quarterly Bulletin of December 2010, the strong performance of the economy in the first quarter of 2010 may be attributed to strong performance of the mining and the manufacturing sectors. In the first quarter of 2010, the mining sector increased by 18.7%, an improvement of 11 percentage points when compared to its 2009 Q4 figure of 7.7%. The manufacturing sector also showed improvement of 7.8% in the first quarter of 2010, this improvement was however lower than the 2009 Q4 figure of 10.8%.

The budget deficits and economic growth trends from above figures provide information that during the years when the country had large budget deficits GDP growth was low. It is apparent that during 1992 GDP growth rate was negative (-2%) and budget deficit reached -3.9% of GDP (figure 2.1). Moreover, South African economy showed relatively stable growth from 1993-2002. But in the period 2003/2007 scored 6.89 times than the growth reported in 1998/2002. Furthermore, in 2010 the budget deficit amounted to -6.5% (in figure 2.1) and growth rate was below 2% that year, the same year South Africa was hosting soccer world cup. Khan (2012:1) asserts that the release of South Africa government Budget for 2012 has surprised markets by announcing much better-than-expected fiscal outcomes, and a faster pace of fiscal consolidation over the medium term. During Budget Speech 2012 improvement in corporate and personal taxes was announced. According to (Khan, 2012:1) the improved corporate tax and customs revenue
will help reduce the budget deficit to 4.8% of GDP, far better than projections of a deficit of 5.5% of GDP.

2.3. Government Revenue and expenditure

European Commission Delegation to South Africa (2008) advocate that over the past decade the government of South Africa has focused on controlling the deficit while striving to step up spending on social programs to combat inequality. The Central Bank has adopted fiscally conservative, but pragmatic policies, focusing on targeting inflation and liberalizing trade as a means to increase job growth and household income and foster economic growth. These conditions have provided macroeconomic conditions that are considerably more stable than has historically been the case. A number of key reforms have been to achieve and strengthen macroeconomic stability since 1994. Through such measures South Africa has thus achieved a level of macroeconomic stability not experienced for 40 years. For instance, the budget deficit has been reduced from 9.5% of gross domestic product (GDP) in 1993, to fractionally over 1% in 2003. Total public sector debt fell from over 60% of GDP in 1994 to barely over 50% of GDP in 2003. Public expenditure has remained at an overall sustainable level, with a budget deficit of less than 3% of GDP. This policy has also been successful in reducing inflation, which has come down to the target bracket of 3 to 6% per annum.

Budget Review (2011:51) showed that tax revenue which accounted for the large portion of the available government revenue had “become more sensitive to changes in the economic cycle since the tax base was restructured in early 1990s”. As a result, tax revenue tends to accelerate when the economy is doing well, and to slow sharply when the economy is underperforming. If revenue does not cover expenditure, borrowing is a short-term solution, but higher government expenditure as a share of GDP ultimately requires a growing tax base or higher tax rates. At the height of the recession in 2009/10, South African government revenue underperformed expectations by R60.6 billion. Over the medium term, tax revenue is expected to recover as the economy grows and the tax base broadens, World Economic Forum (2012). Furthermore, Medium Term Budget Policy Statement (2012) advocates that South African fiscal policy will
narrow the budget deficit from a projected 4.8 per cent of GDP in 2012/13 to 3.1 per cent of GDP in 2015/16, enabling government to rebuild fiscal space.

**FIGURE 0.4: REAL CONSOLIDATED GENERAL GOVERNMENT NON-INTEREST EXPENDITURE**

Source: *Medium Term Budget Policy Statement (2011)*

South African Reserve Bank (2011) reveals that in fiscal 2010/11 national government expenditure fell below budgeted projections, whereas revenue collections exceeded budgetary expectations; hence a lower deficit was recorded. Unaudited data indicated that national government spending amounted to R785 billion in fiscal 2010/11. The preliminary outcome was R12.6 billion less than the original budgetary provision in the Budget Review 2010 and R4.4 billion less than the revised estimate presented to Parliament by the Minister of Finance in 2011. This resulted in a year-on-year rate of increase in national government expenditure of 10.0 per cent in fiscal 2010/11. As a ratio of gross domestic product, national government expenditure amounted to 28.6 per cent in fiscal 2010/11, compared with 29.2 per cent recorded in the previous fiscal year.

According to National Treasury (2012:927) South African government expenditure grew from R4.4 billion in 2008/09 to R6.1 billion in 2011/12, at an annual average of 11.8 per cent, due mainly to labour costs increasing by 13.8 per cent in 2009/10. Over the medium term,
expenditure is projected to increase to R9 billion, at an average annual rate of 13.8 per cent. This increase will provide for growth in labour costs of approximately 10 per cent per annum over the Medium Term Expenditure Framework (MTEF) period.

**TABLE 0.3: CONSOLIDATED GOVERNMENT FISCAL FRAMEWORK, 2007/08 – 2013/14**

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Revenue</td>
<td>626 705</td>
<td>682 997</td>
<td>664 840</td>
<td>755 023</td>
<td>824 466</td>
<td>908 714</td>
<td>1 017 187</td>
</tr>
<tr>
<td>Percentage of GDP</td>
<td>30.1%</td>
<td>29.5%</td>
<td>27.2%</td>
<td>28.3%</td>
<td>28.3%</td>
<td>28.4%</td>
<td>28.8%</td>
</tr>
<tr>
<td>Expenditure</td>
<td>591 522</td>
<td>710 523</td>
<td>825 917</td>
<td>897 376</td>
<td>979 265</td>
<td>1 061 582</td>
<td>1 151 773</td>
</tr>
<tr>
<td>Percentage of GDP</td>
<td>28.5%</td>
<td>30.7%</td>
<td>33.8%</td>
<td>33.6%</td>
<td>33.6%</td>
<td>33.2%</td>
<td>32.6%</td>
</tr>
<tr>
<td>Budget balance</td>
<td>35 183</td>
<td>-27 526</td>
<td>-161 076</td>
<td>-142 353</td>
<td>-154 799</td>
<td>-152 868</td>
<td>-134 586</td>
</tr>
<tr>
<td>Percentage of GDP</td>
<td>1.7%</td>
<td>-1.2%</td>
<td>-6.6%</td>
<td>-5.3%</td>
<td>-5.3%</td>
<td>-4.8%</td>
<td>-3.8%</td>
</tr>
</tbody>
</table>

Gross domestic product: 2 078 822 2 312 965 2 442 593 2 666 894 2 914 862 3 201 299 3 536 002

*Source: Budget Review (2011:50)*

**FIGURE 0.5: GOVERNMENT REVENUE AND EXPENDITURE**

*Source: South African Reserve Bank (2012)*

Figure 2.5 above plots quarterly data of government revenue with government expenditure as the percentages of GDP. It is evident that government expenditure in most years has been exceeding the revenue; this does not include interest expenditure. As indicated in table 2.3 above and figure
2.6 below for the past three financial years 2007/8, 2008/9, 2009/2010 expenditure has exceeded revenue except 2007/08 fiscal year with budget surplus, this validated the trend on figure 2.3. Growth in expenditure has stimulated economic activity and has been strongly redistributive, contributing to GDP growth and improvements in welfare for all South Africans. The magnitude of this increase was made possible by prudent management of the fiscus, leading to reductions in the deficit, low debt levels and declining debt-service costs Medium Term Budget Policy Statement (2009:43). Furthermore, table 2.3 portrays projections of government revenue, expenditure, budget balance and gross domestic product for the financial 2012/13 and 2013/14.

According to Medium Term Budget Policy Statement (2009:43) growth in government consumption in 2008/09 and 2009/10 was driven by higher public-sector employment, larger salary increases and the introduction of occupation-specific salary dispensations, mainly in education and health. In a constrained fiscal environment these funding pressures are partially offset through slower growth in government employment, savings and reprioritisation of expenditure. The rapid increase in the wage bill in 2009/10 was a permanent cost to the fiscus that cannot be financed through borrowing. If future growth in the wage bill does not moderate, a permanent increase in tax revenue or lower expenditure on other items will be required.

**FIGURE 0.6: FISCAL POLICY STANCE**

*Source: WorldBank (2011:8)*
In its projection for the next coming financial years (National Treasury, 2012) shows that the main government budget, including state debt costs, provides for total expenditure of R969.4 billion in 2012/13, increasing to R1.1 trillion in 2013/14, remaining at the R1.1 trillion level in 2014/15. The budget will grow at an average annual nominal rate of 8.5 per cent over the medium term. Furthermore, non-interest expenditure comprises on average 90.5 per cent of total main Budget expenditure, growing at an average annual rate of 8.2 per cent over the 2012 MTEF period, compared to the rate of 8.5 per cent for the 2011 MTEF period. These budgeted estimates also provide for a contingency reserve set aside to deal with unanticipated events, amounting to R5.8 billion in 2012/13, R11.9 billion in 2013/14 and R24 billion in 2014/15.

**2.4. The effects of financing of budget deficits in South Africa**

According to Fischer, (1989:7); and Fourie and Burger (2009) there are four ways of financing the public sector budget deficit: by printing money (seigniorage), running down foreign exchange reserves, foreign borrowings and borrowing domestically. This can be illustrated in the following word equation:

\[
\text{Equation 2.1} \quad \text{Budget deficit} = \text{Money printing} + (\text{foreign reserve use} + \text{foreign borrowing}) + \text{domestic borrowing} \tag{2.1}
\]

Fischer, (1989:8) states that the parentheses around the foreign components stress the link between the budget deficit and the trade account, as depicted by the following word equation:

\[
\text{Equation 2.2} \quad \text{Budget deficit} = \text{(Saving - Investment)} + \text{(Current account deficit)} \tag{2.2}
\]

However, Fischer, (1989:8) affirms that this could also be positioned around (money printing + foreign reserve use), which is equal to domestic credit creation; which also emphasises that domestic credit creation is the substitute to borrowing. Money printing is associated with inflation; foreign reserve use is associated with the onset of exchange crises; foreign borrowing
is associated with an external debt crisis; and domestic borrowing is associated with higher real interest rates and possibly explosive debt dynamics. In addition, the author states that “the first approximation is however not the entire story, for there are important links between these problems: for instance between foreign exchange use and external debt crises; and between domestic borrowing and inflation.”

WorldBank (2011:8) shows that, regardless of the increased in public sector borrowing, the fiscal framework remains well within the bounds of sustainability (as illustrated in figure 2.6 above). In addition to that the sound fiscal position has been enabled by several years of budgetary discipline leading up to the global crisis that yielded low levels of public debt. It is advocated in the Medium Term Budget Policy Statement (2009) that higher borrowing in South Africa is, however, only a temporary solution. Over the medium term, the deficit will have to be reduced gradually. Failure to do so would mean that a higher proportion of public expenditure would go to service interest payments at the expense of social and economic priorities, or that government would have to raise taxes to meet rising interest costs. Slower growth in expenditure and a recovery in tax revenue due to higher economic growth are expected to support the fiscal recovery, with the budget deficit coming down to 4.2 per cent of GDP by 2012/13. Furthermore, strong growth in non-interest expenditure and a decline in budget revenue have resulted in a primary balance deficit. Over the medium term, the stabilisation of growth in non-interest expenditure and rising tax revenue will result in a narrowing of the primary balance deficit.

WorldBank (2011:9) advocates that the country’s deep and liquid domestic capital markets and ready access to international borrowing have provided added comfort. With the rising fiscal deficits and public sector borrowing requirement, projected to moderate over the Medium Term Expenditure Framework period, the net government debt stock to GDP ratio would increase to 39 percent by the end of the period and stabilize at roughly 40 percent of GDP in financial year 2015/16 (50 percent including contingent liabilities), well below the current global norms.
Figure 2.7 illustrates national government debt trends as the percentage of GDP. Khan (2012:1) affirms that public debt-to-GDP was once forecasted to hit the highest level at over 40%, but now 38.5% of GDP in financial year 2015 as projected. Furthermore, (Khan, 2012) asserts that despite a budget that will exceed R1 trillion for the first time ever (which is representing a
doubling of expenditure in real terms over the last decade), public spending growth has already moderated and Treasury is increasingly conscious of the mismatch between the pace of spending growth, and the extent of service delivery improvement in South Africa. Poon (2009) asserts that in terms of total foreign debt, foreign debt in South Africa was held at moderate levels. For South Africa, foreign debt was $35.2bn in 2007, only about 8% of GDP, but still representing 46.2% of exports of goods and services. This latter figure is already down substantially from the 1990s, when external debt accounted for 92.9% of exports in 1994. Budget Speech (2012) advocates that South Africa’s finances are in good health. A budget deficit of 4.6 per cent of GDP is projected in 2012/13. Therefore the government plans to reduce the deficit to 3 per cent of GDP in 2014/15, and public debt will stabilise at about 38 per cent of GDP.

2.5. Budget deficit and Unemployment rates

European Commission Delegation to South Africa (2008:12) advocates that unemployment in South Africa is very high, and of a structural nature due to the misallocation of resources in the Apartheid economy. New entrants to the labour market have increased to approximately 450,000 per year, and will rise to 600,000 per year over the next decade. The growth in unemployment reflects the long-term decline in employment generation since the 1960s, while labour supply has continued increasing at a relatively steady rate consistent with the annual population growth rate of 2.4%. Failure to generate significant employment reflects, inter alia, the asymmetry of the occupational structure and the unequal access to all levels of education. For the approximately 26 million of the adult population (age 15 and above), the South African economy provides just 9.6 million jobs. The official unemployment rate was 16.9% in 1995, 22.9% in 1997, and 26.7% in 2005.

Though South Africa has experienced major economic transformation, it has been burdened by high rate of unemployment, currently stands at 25.3%. (WorldBank, 2011:5) advocates that, Unemployment has been disturbingly unresponsive to the economic recovery as depicted in the figure 2.12). According to World Bank (2011) this lack of response mirrors the structural issues that keep unemployment high in South Africa as well as the lagged response of jobs creation to economic recovery in general. Young people and new entrants are the most vulnerable on the job
market. Although unemployment increased across the world after the global crisis struck, the magnitude of the increase has been far higher in South Africa than most other countries.

2.6. Countercyclical fiscal policy stance, 2008/2009 economic crises

Budget Review (2011) shows that South Africa responded to the recession by sustaining social expenditure and continuing to invest in infrastructure, providing a stimulus to economic activity. In other words South African government’s response to the 2009 recession has led to a dramatic widening of the deficit (Medium Term Budget Policy Statement, 2012). When the country experienced a decline in revenue, government acted to raise its borrowing level in order to bring the fiscal position from a deficit of -1.2 per cent of GDP in 2008/09 to a deficit of -6.6 per cent of GDP in 2009/10. This was an appropriate response to the economic crisis. Budget Review (2011) further reveals that during recovery phase in the economy, South African government reduced the budget deficit and making consolidation in the fiscal position over the medium term, South Africa will be well placed to take advantage of growth opportunities. Furthermore, (National Treasury, 2012) advocate that growth in government spending alongside falling tax revenue during the economic crisis resulted in the budget deficit reaching 6.5 per cent of GDP in 2009/10. Since then, public spending growth has moderated, which together with a recovery in revenues will allow debt to be stabilised as a percentage of GDP by 2014/15. The budget deficit is expected to fall from 4.8 per cent of GDP in financial year 2011/12 to 3 per cent in 2014/15.

National Treasury (2012) reveals that the South African government has struck a careful balance between continued real growth in expenditure and the reduction of the future interest cost burden on the fiscus. The country makes borrowings mainly to invest in infrastructure that aids to improve the productive capacity of the economy. South Africa's pursuit of a countercyclical policy means that fiscal consolidation will be phased in without curtailment of core public services and in support of sustainable growth. Moreover, South African government has increased spending on social programmes and infrastructure during the economic downturn of 2008-2009. Doing this at a time when revenue was falling required a significant increase in borrowing and led to a higher budget deficit. The country managed to perform in the past because of careful management of the fiscus over the last 16 years and created fiscal space which
came in handy when the global crisis hit the country. National Treasury (2012) furthermore advocates that the current budget framework anticipates a narrowing of the deficit to 3% of GDP by 2013-14. This will ensure that the economy is best placed to take advantage of growth opportunities and that a rising share of public expenditure is not absorbed by rising interest payments.

Medium Term Budget Policy Statement (2012:23) advocates that South Africa’s fiscal response to the 2009 recession was strong by international comparison. This is reflected in the change in the budget balance. South Africa’s balance fell by about 6 per cent of GDP, from a budget surplus of 1.7 per cent of GDP in 2007/08 to a deficit of 4.2 per cent of GDP in 2011/12, reflecting strong spending growth in the face of lower revenue collection. The increase in South Africa’s debt-to-GDP ratio, albeit from a low base, was far greater than that of other emerging markets.

2.8. Conclusion

This chapter shows that South Africa has been experiencing large budget deficits from the period starting in 1990 to 2011. Only in 2007 and 2008 where the country experienced budget surplus of 0.6 and 0.9 as percentage of GDP respectively. On the other hand the country has been experiencing low GDP growth in the past 21 years; reason may be that most of the budget was devoted on social expenditure rather than investment. It is believed that country with huge budget deficits resulted from larger spending in social activities rather than fixed investment is likely to experience low growth rate. South African government is now shifting its spending from social expenditure to emphasise on infrastructure development in order to enhance growth and employment. During the Budget Speech the Minister of Finance announced that about R3.2 trillion will be allocated for infrastructure development for the next 9 years. The beginning of new democratic government, in the first 3 years deficits averaged to -4.6 % of GDP with fiscal budget emphasised on social development. The trends of budget deficits and GDP growth are not consistent, because there are years when the country would experience a rise budget deficits and growth rate would rise (in 2010) and years when fiscal deficits are small and GDP growth would
decline (in 2003). In other years budget deficit would be stable (from 2002 – 2003 at -1.4% both years) and growth decline in the following year.

The inconsistence fiscal deficits and GDP growth trends over the past years make it difficult to conclude if there is any relationship between the two variables. Chapter 5 on regression and interpretation will provide with more detailed statistic to draw some conclusion on the long run relationship between these variables. Furthermore this chapter shows that total investment (that is, private and public investment) has been decreasing starting from 1991 to 1999 and beginning of the 21st century total investment it started booming. This could be that new technology was being developed and more innovation in the private sector was made. Furthermore, in the country there is tendency of misusing the public funds. The element of wastefulness in public funds is apparent; this could be one of the factors influencing growth negatively.

On an international level the country is not performing badly. South Africa had been ranked high above most emerging markets and other developed nations. In areas of financial market development and business efficiency the country is ranked high. South African financial system is healthy and more efficient, even during the 2008/09 economic downturn it was not severely affected as compared to other industries such as manufacturing in the country.
CHAPTER 3: LITERATURE REVIEW

3.1. Introduction

Theories have emerged in pursuing to explain the impact of government budget deficits on economic growth. According to Bernheim (1989:55) the economics of budget deficits can be explained three schools of thoughts, which are Neoclassical, Keynesian, and Ricardian. In addition to the above theories, this study will consider the Monetarists and New-Keynesians as well. Furthermore the study will review the empirical literature on the subject and make assessment of the literature.

3.2. Keynesian theory

Keynesian approach derives some basic economic principles to mitigate unemployment and boost aggregate output. Keynesian system, advocates a positive support for government intervention in terms of increased government expenditure or reduction in taxes in the economy to stimulate aggregate demand, hence increase output level, and reduction in unemployment rate. According to Fischer (1989:3) Keynesians saw no need to balance the budget during periods of recession. The argument of the cyclically balanced budget, that the budget should be in balance on average over the business cycle, in surplus during booms and in deficit during recessions, was developed as a norm for fiscal behavior.

There are two basic assumptions that are proposed by Keynesian model (Frank and Bernanke, 2001:328):

- **Aggregate demand fluctuates** – Total planned spending in an economy depends on the prevailing level of real GDP as well as other factors. Changes in either real GDP or in other factors that affect total spending will cause aggregate demand to fluctuate.

- **In the short run, firms meet the demand for their products at present prices**- Firms do not respond to every change in the demand for their products by changing their prices; instead, they typically set a price for some period, and then meet the demand (meaning firms produce just enough to satisfy their customers) at the price.
According to Frank and Bernanke (2001:349) Keynesian model portrays that changes in government expenditure, and changes in the level of taxes or transfers can be used to change total demand and short run equilibrium output. On the sentiments of tax changes, Bernheim (1989:56) affirms that a Keynesian system advocates that, temporary tax reduction has an immediate and quantitatively significant impact on aggregate demand.

In the Keynesian theory, it is assumed that the economy is not operating at full employment, reason being that, some machines and workers are not utilised; this will therefore mean budget deficits as result of increase in government spending can increase the supply of output without a rise in the level of prices (Roubini and Backus, 1998). Furthermore, Roubini and Backus (1998) illustrate that Keynesian system and its sentiments is depicted by a horizontal aggregate supply function at the given price level that is fixed in the short-run, and the supply of output is fully elastic. In Keynesian model, level of output is determined by the demand for output that is by the aggregate demand for goods. Furthermore, since prices are sticky in the short-run and any arise in aggregate demand which is generated by an increase in money supply or government spending will not affect the price level in the short run, and instead, it will lead to an increase in the level of output. In other words, “during the short-run period in which prices are present, firms produce an amount that is equal to aggregate demand” (Frank and Bernanke, 2001:335).

Fischer (1989:3) advocate that there were enhancements on the view suggesting that there should be budget balanced over the business cycle, suggesting that balanced budget multiplier shows that the deficit is not an unambiguous measure of the impact of fiscal policy on aggregate demand; given the budget deficit, an equal increase in government spending and revenues increases aggregate demand. Furthermore, the author states that budget deficit is itself endogenous, affected by the state of the economy as well as affecting it. As a result, the concept of the full employment, or high employment, or structural deficit was developed.

Furthermore, Fischer (1989:5) asserts that the standard Keynesian analysis of the effect of fiscal policy has been affected by two significant theoretical developments, with the saving behaviour which is more sophisticated model. The model of saving behavior has surfaced from the lifecycle and permanent income theories of consumption. He further advocates that from then it has been implicitly taken that, saving rate as determined by the level of disposable income, and have not
focused on the link between the budget deficit and saving. Dem et al (2001:3) assert that Keynesians model argue that, a rapidly growth in money supply will cause the price level to rise continually at a high rate and there are no other factors that can generate high inflation.

Keynesian approach as an attack on the classical system provides grounds in support of some arguments which advocate the involvement of government in the economy, by stimulating aggregate demand. Since Keynesian approach cares about the short run effect, as stated above, government spending will not affect prices, but boost output. Keynes believed that long run is the sum of short runs, therefore dealing with short run the economy will stabilise and unemployment will abate (Froyen, 2009).

3.3. Ricardian theory of equivalence

Fischer (1989:5) citing Barro (1974) affirms that under a very specific set of assumptions, lump-sum changes in taxes would have no impact on consumer spending. Equivalently, a cut in taxes that increases disposable income would automatically be accompanied by an identical increase in saving. This therefore means that deficits and taxes are equivalent in their effects on consumption, and as asserted by Williamson (2005:268) this means that, the timing of taxes by the government is neutral in the sense that in equilibrium state any change in current taxes, will precisely counteract in present-value term by “an equal and opposite change in future taxes” and has no impact on the real interest rate or on the individual consumer’s consumption.

In other words Ricardian theory of equivalence advocate that there are times or conditions under which the size of government budget deficits are inappropriate, with that view budget deficits does not affect any significant macroeconomic variable or the economic welfare of any individual in the economy, (Williamson, 2005:237). This provides us with the definition of the Ricardian theorem as follows, “if current and future government spending are held constant, then a change in current taxes with an equal and opposite change in the present value of future taxes leaves the equilibrium real interest rate and the consumptions of individuals unchanged” (Williamson, 2005:268). Barro (1989:38) affirms that Ricardian approach suggest that for a
given path of government spending, a deficit-financed cut in current taxes leads to higher future taxes that have the same present value as the initial cut. These changes results from the government’s budget constraint, which equates total expenditures for current and future period to revenues from taxes or other sources and the net issue of interest-bearing public.

This can be illustrated by the following graph:

**FIGURE 0.1: RICARDIAN THEORY OF EQUIVALENCE GRAPH**

*Source: Williamson (2005)*

Figure 3.1 above portrays that a current tax cut with a future raise in taxes leaves the consumer’s lifetime budget constraint unchanged, and so the consumer’s optimal consumption bundle remains at Z. The endowment point shifts from X to Y, so that there is an increase in saving by the amount of the current tax cut. Put differently, an individual has an endowment at point X, but chooses the consumption at point Z. Suppose there is cut in taxes in the current period, such that $\Delta t < 0$ ($\Delta t$ is the changes in taxes). This mean that government has to $\Delta t$ more in period 1 in order to finance the huge current government budget deficit and taxes must increase for each individual by $-\Delta t (1+r)$ in the future to pay off the increased government debt, (Williamson, 2005:71).
According to (Williamson, 2005:71), Ricardian theory as depicted on Figure 3.1 it must therefore be noted in the above Figure 3.1 that the effect of this on the individual consumer is that life span wealth remains unaffected. Meaning the budget constraint is unaltered and the individual consumer will still maintain his or her bundle consumption at point Z in the diagram. The only change on diagram concerning individual consumption is that endowment shifts to point Y, depicting that the consumer has more disposable income in the current period. In essence, because any current taxes cut should be paid for with government borrowing, this implies higher taxes for consumers in the future to pay off accumulated government debt. Consequently, what individual consumers normally do to improve their lifetime wealth is to save all current tax cut to counteract higher future taxes. They behave in this manner when they have recognised that current tax is exactly equalised by higher future taxes.

(Ficher, 1989:6) put this differently, suggesting that individuals are rational and therefore the farsighted consumer will recognise that the government debt generated through deficit spending will eventually be paid off by increased taxes. So the present value of which is exactly equal to the present value of the reduction in taxes and taking into consideration the increase in future taxes; an individual saves the amount essential to pay the high future taxes. Furthermore the author asserts that the potential empirical importance of the Ricardian equivalence hypothesis cannot be inflated. If the Ricardian hypothesis holds, then budget deficits do not affect national saving, nor interest rates, nor the balance of payments, and nor does the method of financing of social security affect capital accumulation. The hypothesis implies that an increase in the budget deficit would, under certain circumstances, be accompanied by an increase in private saving- and that both investment and the trade balance would therefore be unaffected.

3.4. Neo-classical theory

Neoclassical model has a different assertion from the above theories, it predicts farsighted individuals planning consumption over individuals own life cycles. Therefore budget deficits may raise aggregate consumption by moving taxes to the next generations. If there is full employment of economic resources, an increase consumption is inevitably implying a decreased saving. Interest rates will then increase rise to balance the capital markets. Thus, persistent
deficits will "crowd out" private capital accumulation. Such movements caused by widening of budget deficit have detrimental effects on the economy (Bernheim, 1989:55).

In providing a clear consensus of the Neo-Classical theory (Fischer, 1989:4) explains the following identity equation:

\[
\text{Budget deficit} = (\text{Saving} - \text{Investment}) + (\text{Current account deficit})
\]  

According to Fischer (1989:4) in order to illustrate the usefulness of the above identity equation, suppose the economy is at full employment, and take the rate of saving as given. The above equation, the saving-investment identity, then implies the crowding-out problem: an increase in the budget deficit will result in either a reduction in investment or an increase in the current account deficit.

The above arguments provide the fundamental foundation of neoclassical argument against government intervention in the economy. Neoclassical approach advocates an economy which is self-adjusting, stating that, prices and money wage are perfectly flexible and therefore, the economy will self-adjust itself and return to its level of full employment should it deviates from the full employment equilibrium as a result of exogenous economic variables. Neoclassical approach, further indicate that, government spending, tax restructuring, and growth in quantity of money have no real effects on output and unemployment. Therefore, neo-classical theory assumes these variables as fixed, because they are viewed as only affecting demand side. Therefore budget deficits resulting from an increase in government spending have undesirable outcomes in the economy. Froyen (2009:83) affirms that, neo-classical system does not support budget deficits, advocating that, an economy which is exempt from government actions would properly operate through the activities in the private sector. In essence, private sector would stabilise without government taking part through government budget deficits and full employment would be attained.

Roubini and Backus (1998) state that any rise in money supply will necessarily increases an increases money balances, this then reduces the interest rate and leads to an increase in
investment and consumption, and these (investment and consumption) are two vital components of aggregate demand. Furthermore neoclassical approach, advocated that, any increase in aggregate demand induced by an increase in the money supply as part of financing budget deficits does not affect the level of output: it only leads to an increase in the price level.

3.5. New Keynesian Theory

According to Fourie and Burger (2009:449), new Keynesian theory has emerged to address the weakness of the old-Keynesian theory by including rational expectation in the modern version of the theory. This was achieved by introducing various wage and price rigidities, and the concept of asymmetric information to further explain why an economy is most likely to experience unemployment and instability in the short run. Furthermore, (Fourie and Burger, 2009) advocate that, unlike the old Keynesian paradigm, new-Keynesian approach agree with new classical theory which propose that in the long run the economy returns to a long-run equilibrium.

According to Fourie and Burger (2009:450) theories falls under the new Keynesian approach include: menu-cost argument, input-output argument, insider-outsider models, and efficiency wage models (the last two models are the labour market theories that are employed to describe unemployment on a macroeconomic level (Fourie and Burger, 2009:450)).

- Menu-cost argument explains that prices cannot adjust quickly in the face of higher input cost because of the cost of adjusting prices since it is expensive to print new menus.
- Input-output argument reveal that, even though a producer might know that a policy step will be inflationary, the complexity of the input-output chains in a modern industry means that the producer does not know how precisely the policy step will impact on his costs and therefore his prices. Hence the producer will wait until the higher costs are passed through to him through the input-output chain before he adjusts his prices.
- Insider-outsider models argue that those who are employed (the insiders) are able to erect barriers of entry to new entrants to the labour market (the outsiders). This means outsiders cannot compete with insiders by offering their labour services at a competitive wage. As such, the insiders are able to negotiate higher wages, which in turn means that companies will employ workers.
• Efficiency wage models argue that employers are willing to pay workers a higher wage if this will cause these workers to become more efficient. Employers will then need fewer workers to produce the same output.

These new-Keynesian models are not all applicable to different economic conditions in different countries, but rather they are significant to provide economists with variety of choices of possible explanations for short and medium-run deviations of employment and output from their long-term trend, Fourie and Burger (2009:450). By understanding the New Keynesian framework makes it possible and effective to explain the budget deficits (fiscal stance) and their effect on economic activities.

According to Lozano (2008:6) in the New Keynesian model, output is consumed entirely by households while the role of private investment and that of government expenditure are ignored. Nevertheless, public expenditure shocks can be included feasibly into the model in the same way the productivity shock is introduced. Specifically, the effects of fiscal policy on the real economy will depend on agents’ expectations about the current and future level of spending by government.

3.6. Monetarist Theory/ New classical theory

Monetarist theory explains the effect of money supply on inflation. According to Meltzer (1993:1) monetarists have no position on the budget deficits. The monetarists were mainly concerned about the relationship between money supply and its effect on inflation. (Meltzer, 1993) asserts that, government budget deficits have an impact on inflation only if they (budget deficits) are financed by money intended to pay government expenditure. Inflation is one of the fundamental economic variables that have potential of harming economic activities, domestic activities as well as international trade. In the context of South African economy it crucial to take note of such effects when structuring the fiscal budget stance. Inflation is bad for the growth of the economy; therefore large budget deficits financed through printing money is detrimental to growth.
Rahman (2012:54) states that few researchers are in agreement with the proposition of new classical economies. New Classical model suggest that there is negative relationship between budget deficit and economic growth. Usually, in order to finance budget deficit government has to borrow money internally or externally. An increase in the demand of the loanable funds by the government will distort the level of private investment due to an increase in the interest rate. The decline in the private investment will definitely reduce the level of economic growth.

Meltzer (1993:1) affirms that, the widening of budget deficits need to be reduced because in the future it will result in an increase in money supply and produce inflation. Furthermore, budget deficit can be the source of a problem if it is financed by inflation, if it, rises continuously relative to income, also if it absorbs saving into wasteful spending. One of the arguments disputing government involvement suggests that people are consuming not investing. This is comes from the arguments stating persistent deficits through rise in government spending has tendency of discouraging investment and increase only consumption. The consensus of monetarists is that, society should be concerned about the biasness in the tax system, in the laws, in regulations, and in spending by government that incline aggregate spending toward consumption and against investment. The only solution is to increase efficiency in any activity, by so doing will be worthy having “whether the budget is in deficit or surplus” (Meltzer, 1993:2). The implementation of Parliamentary Infrastructure Co-ordination Commission (PICC) initiative will be pivotal for increasing efficiency, which is, shifting from social spending to investment spending.

Monetarism and new classical theories hold similar consensus concerning the stance of fiscal policy and its effect on the economy. Monetarist/New Classical approach emerge from view of distrusting of government in stabilising the economy. According to Fourie and Burger (2009:451) these approaches stress the medium and most dominantly the longer term result of the model, in contrast to New Keynesian which stresses short run results and challenges faced by the economy. The contrasting views on these models have fundamental principles and implication for the choices of priorities, especially for policy makers (both monetary and fiscal policies).
3.7.1 Budget deficits and economic growth

Cheng (2003) investigated the causal relationship between economic fluctuations and growth, an empirical study of the Malaysian economy with a quarterly data from 1975:Q1 to 2002:Q4. Findings show that there were positive relationship between macroeconomic fluctuations in capital formation and money supply on economic growth, but a negative relationship between shocks in budget deficit and economic growth, (Cheng, 2003:65). Furthermore, the findings suggest that during commodity crisis in the 1980s in Malaysia was contributed by high government budget deficits, which also limited the effectiveness of the monetary and fiscal policy to manage economic performance. Moreover, (Cheng, 2003:67) assert that when Malaysian government applied austerity measures (cutting its budget deficit) during the crisis period in 1987 to 1990 it resulted to positive economic growth.

According to Cheng (2003:67) the outcome of his study suggest or implied that during crisis period the government should intervene by introducing shocks in the money supply, meaning to raise money supply to stimulate economic growth. This action is justified because high degree of fluctuation in the money supply leads to higher growth. Furthermore, the author states that this conclusion should not be applied to budget deficits, because excessive volatility in the budget deficit would curtail economic growth.

Snyder (2003) conducted a study to ascertain whether federal budget deficits cause crowding out, to determine the impacts of deficits on investment, consumption and output. Vector error correction model (VECM) was employed to determine the predictive power of shocks to taxes, government spending, and deficits on investment, consumption, output and interest rates (Synder, 2003:1). On the findings shows that budget deficits have a strong influence on investment behavior and GDP, and budget shocks explain a close to two thirds of the innovations in private investment and GDP. This advocates that budget deficits do cause crowding out of private investment and a reduction in future GDP. Furthermore other finding suggests that taxes have a much larger impact on investment and GDP then government spending, (Synder, 2003:5) Moreover, the results show that government budget deficits cause increases in long-term interest rates. Moreover, budget deficits, and more specifically increases in taxes, appear to cause
crowding out, the over debt level appears to have very little to no impact on investment or GDP, (Synder, 2003:6).

The research findings of the study by (Benos, 2009) on the Fiscal Policy and Economic Growth an empirical evidence from EU countries shows that some types of public spending and taxation affect growth. Specifically, government expenditures on infrastructure (economic affairs and general public services) and property rights protection (defense, public order-safety) exert a positive impact on per capita growth. On the other hand, government expenditures on human capital enhancing activities (education, health, housing-community amenities, environment protection, and recreation-culture-religion) and social protection do not have a significant effect on growth. Finally, distortionary taxation depresses growth. However, the growth impact of budget deficit is ambiguous (Benos, 2009:16).

The findings of the study on Budget Deficits and Economic Growth by Keho (2010) in West African Economic and Monetary Union (WAEMU) show different results for different countries, in some countries there was no evidence of causality between budget deficits and growth, on other countries there is an evidence of causality between budget deficits and growth. According to Keho (2010:103) the findings on the study indicate two-way causality in three countries, revealing that budget deficits having unfavourable effects on economic growth. Overall, these results also give support to the WAEMU budgetary rule aiming at limiting the size of budget deficits as a requirement for sustainable growth and real convergence.

Fatima, Ahmed, and Rehman (2011:503) indicate that, coefficient of fiscal deficits in Pakistan shows a negative and significant impact on economic growth. Furthermore Fatima, et al (2011:503) cites Vit (1999) proving that budget deficits create undesirable effects in the economic growth such as, high level of inflation, current account deficits, highly indebted economy and economic growth is affected adversely. It is evident from Fatima, et al (2011) that “the fiscal deficit itself showed a negative and significant impact on investment”. Therefore the decline in investment lowers output/economic growth. Economic growth is therefore affected by budget deficits indirectly via investment.
Georgantopoulos and Tsamis (2011:156) in their study of The Macroeconomic Effects of Budget Deficits in Greece: A VAR-VECM Approach, assert that every country always strives to achieve high growth rates, balanced budget, high employment rates and low inflation. However, few countries are able to strike a balance between microeconomic and macroeconomic objectives. Furthermore, Georgantopoulos and Tsamis (2011:156) advocate that, monetisation of budget deficits plays a vital role in causing inflation especially in the emerging economies. They state that, government budget deficits have negative tendency of deteriorating loanable funds, hence pushing up interest rates and crowd out private investment. This sentiment concurs with the premise posed by neoclassical approach.

Georgantopoulos and Tsamis (2011:156) have found that, budget deficits also affect, current account balances, and there are short run effects of budget deficits on exchange rates, this therefore lead to an uncertainty on the future. Furthermore, they indicated that studies on the subject of budget deficits are showing that, large budget deficits in both developed and developing economies have adversely affected economic growth, irrespective of different findings. They concluded by stating that “Inflationary conditions could worsen through printing more money; crowding out effect, which leads to an excessive issue of government bonds, since they constitute a substantial part of money supply. Therefore, higher budget deficits could aggravate the inflationary conditions in the economy, contributing to the presence of a depreciated domestic currency.” (Georgantopoulos and Tsamis, 2011:156)

A study conducted by Oladipo and Akinbobola (2011) examined the relative causal relationship between budget deficit and inflation as well as the economic implication of fiscal deficit financing in Nigeria. One the findings of the study shows that fiscal deficit, GDP and exchange rate have causal effect on inflation. However a strong unidirectional causality was evident between fiscal deficits and inflation with the causality running from fiscal deficit to inflation at 5% level of significant. Moreover, the findings show that there was an evident of unidirectional causality between GDP and fiscal deficit; this runs from GDP to fiscal deficit at 10% significant level. Also a unidirectional causality was found between GDP and inflation rate, which runs from GDP to inflation at 10% significant level. (Oladipo and Akinbobola, 2011:6).
The study by Fatima, Ahmed, and Rehman (2012:206) of the effects of budget deficits on economic growth in Pakistan, shows that budget deficits have a significant and negative impact on the economic growth of the economy with $\beta_3 = -0.11$, and $p = 0.0017$ at 1% level of significance. The results from their study indicate that 1% increase in budget deficit leads in 0.11 times decrease in the GDP. Investment has a role that contributes to the decline in GDP as result of increase in budget deficits, since government spending has tendency of rising real interest rates.

Fatima, et al (2012:206) assert, that distortionary effect of budget deficits on the economic growth results from lack of resources by governments to meet their expenses in the long run, and governments savings as well as revenues are efficient to meet incurred expenses. In essence, if government fails to properly forecast its expenditure and revenues, will lead to undesirable outcomes on economic growth Fatima, et al (2012:203)

A study made by Rahman (2012:57), presents an analysis of the relationship between budget deficit and economic growth in Malaysian economic context using quarterly data from 2000 to 2011, it was found that “there is a significant long-run relationship between productive expenditures and economic growth in Malaysia. It was found that both variables were positively related to each other. On the other hand the author suggests that there is no such evidence that can provide the existence of long-run relationship between budget deficit and economic growth. Similar conclusion can be derived for estimating long-run relationship between non-productive expenditures and economic growth.”

Rahman (2012:57) furthermore states that the “major reason might be due to the size of the budget deficit for Malaysia, which is relatively small as compared to the level of GDP. The size is still under control and manageable. As a developing country that aimed to be a developed country by 2020, there is a need for the government to increase national income, per capita income as well to improve the quality of life. Hence, the productive expenditures spent by the Malaysian government for the specified purposes did help in increasing the GDP growth of Malaysia. At this point, the excessive spending made by the government did not give harm to the economic condition.
Apart from that, if there is any shock to the Malaysian economy, the changes in the level of economic growth and productive expenditures will help the economy to converge to the state of equilibrium at a faster rate.” The study has concluded that in the long run relationship budget deficits has no role in restoring the economic conditions into equilibrium status

3.7.2. Budget deficit and inflation

Selah (2003) conducted a survey on the relationship between budget deficit and economic performance from different studies on various countries. The study used the ISLM model, the budget deficit and trade deficit models, the budget deficit and economic growth model, and the budget deficit and multivariable model. He concluded that some of these studies showed that cross-section analysis cannot capture the country specific nature of the government spending and growth relationship, (Selah, 2003:40). Furthermore, according to Selah (2003) some studies indicated that “budget deficit financed through monetisation and a rising money supply could lead to inflation. However, the inflationary effect of government deficits depends upon the means by which the deficit is financed and the impact of that on aggregate demand”. On the other hand the empirical results investigating the relationship between government budget deficit and trade deficits are ambiguous. Some studies indicated an inconclusive finding on the relationship between budget deficit and exchange rate. However, a major conclusion showed a strong evidence in both emerging economies and developed nations, that effects of budget deficits on exchange rates depends on the way of funding the deficits, whether through taxation or through money growth. Moreover, most studies supported the sentiment by Keynesian model that there is a positive relationship between government budget deficit and interest rates in most countries (Selah, 2003:40).

The study conducted by Lozano (2008) on Budget Deficit, Money Growth and Inflation for Colombian Case has provided some evidence regarding the effect of budget deficits on money growth and Inflation. The results point to a close long–term relationship between inflation and money supply with the long-term coefficient is 0.96 for the shorter period. The value of coefficient is lower as it was expected by the author with the narrowest and the broadest
definition of the monetary aggregate (0.88 and 0.76, respectively), (Lozano, 2008:21). With regard to the role of the fiscal deficit, the VEC estimates provide evidence that a one percentage point increase in the fiscal deficit (as a share of GDP) leads an increase of almost 0.46 percentage points in the M1 growth rate. Furthermore, the causal long-term relationship between budget deficit, money growth and inflation could differ depending on the degree of independence of the central bank and the type of monetary-policy regime. (Lozano, 2008:21).

Cheah and Baharom (2011:195) conducted a study ascertaining the “long-run relationship between budget deficits and inflation in thirteen Asian developing countries, namely; Indonesia, Malaysia, the Philippines, Myanmar, Singapore, Thailand, India, South Korea, Pakistan, Sri Lanka, Taiwan, Nepal and Bangladesh.” The authors employed annual data for the period 1950 – 1999 and also applied cointegration and the error-correction model approach to conduct the long-run and short-run Granger causality tests. The following are the results of this study:

- The empirical results suggest that all variables – budget deficits, money supply and inflation are integrated of order one, or I(1) processes;
- The ECM model that was in the study estimated indicated that there is existence of a long-run relationship between inflation and budget deficits (with the presence of money supply as a third variable);
- The analytical checking tests suggest that there is no evidence of non-normality of the residuals, autocorrelation, and heteroscedasticity. This evidence supports the robustness of the estimated models in this study; and
- Finally, based on the empirical evident, we can conclude that budget deficits are inflationary in the selected Asian developing countries covered in the study.

### 3.7.3. Budget deficit and current accounts

Hahemzadeh and Wilson (2006) conducted a study on the Dynamics of Current Account and Budget Deficits in some of the Middle East and North Africa countries. They applied vector auto-regression model (VAR) to ascertain an innovations in government budget deficit (current account balance) on a nation’s trade deficit (budget balance). Findings from their study suggest that the correlation between the budget deficits and current account deficits is both complex and
ambiguous. They stated that “the dynamic relationship between the two deficits is subject to change depending on the underlying tax system, trade patterns and barriers, the exchange rate and a complex host of internal and international forces that help to shape a country’s economic status in the global setting” Hahemzadeh and Wilson (2006:119).

Ng (2011:1) examines the causal relationship between trade and budget deficits for Argentina. According to Ng (2011) “though there is plenty of evidence to support the relationship between both the budget and trade deficits, there is no consensus as to the directionality of the relationship between the two. The study used a vector autoregressive (VAR) model that is based upon a Keynesian Open economy model. In an open economy, gross domestic product, Y, is the sum of private consumption expenditures, C, gross private domestic investment expenditures, I, government expenditures and net exports, NX”

According to Ng (2011:12) regressions that were tested for Granger Causality was conducted through the use of two different models. “First Granger causality was tested to determine if Budget Deficit could be used to accurately predict Trade Deficit. The second model was to test if Granger causality existed in the reverse direction, i.e. if Trade Deficit was Granger-causal to Budget Deficit. The results of the first test concluded that $\chi^2 = 0.64$, with $p = 0.4220$, and second test determined that $\chi^2 = 0.93$, with $p = 0.3338$. This means that at a 5% significance level, there is no causal relationship between trade and budget deficit in either direction of the relationship Ng (2011:10). However, there was no determinable Granger-causal relationship between budget data and trade deficit data” (Ng, 2011:12)

3.7.4. Budget deficits and economic growth in South Africa

On the study on Fiscal Policy and Economic Growth in South Africa, Ocran (2011) employed vector autoregression model models to estimate individually the effects of government consumption and investment expenditure, deficit and tax receipts on economic growth respectively. On the analysis, the period 1990 to 2004 was covered using quarterly data. Findings on this study depicts that government consumption expenditure has a significant positive effect
on economic growth. This finding concurs with Keynesian system. Furthermore, the paper shows that, “gross fixed capital formation from government also has a positive impact on output growth but the size of the impact is less than that attained by consumption expenditure. Tax receipts also have a positive effect on output growth. However, the size of the deficit seems to have no significant impact on growth outcomes” Ocran (2011).

Burger, Stuart, Jooste, and Cuevas paper (2011) investigated and estimated fiscal reaction functions to study how the South African government has historically reacted to its debt position by. Their study “remained agnostic about the statistical properties of the debt/GDP ratio and primary balance/GDP ratio, by catering for the possibility of stationary data, non-linear data and non-stationary data. This was done by employing a variety of techniques, including OLS, VAR, GMM, TAR, State-Space modelling and VECM” (Burger et al, 2011:23).

Burger et al (2011: 23) found that, with the possible exception of a few short periods (the late 1950s, early 1960s and the mid-1990s) the South African government tended to run fiscal balances in excess of those required simply to stabilise debt (in the absence of other shocks). These were periods, especially the last one, during which slow economic growth or elevated funding costs put upward pressure on the debt trajectory. Indeed, concern over rising interest costs is often cited as the main reason for the debt reduction programme of the late 1990s.

Buscemi and Yallwe (2012) researched on Fiscal Deficit, National Saving and Sustainability of Economic Growth in Emerging Economies: A Dynamic GMM Panel Data Approach. Their study focused in three emerging economies, India, China and South Africa. One of the findings of the study shows that all of the three countries are in deficit for more than two decades. According to Buscemi and Yallwe (2012:131) Indian economy experienced the highest fiscal deficit than China and South Africa. The authors state that the average data of per capita growth rate of GDP for China paramount than the other two countries. Moreover, China’s per capita growth rate of GDP revealed 6.97 percent in a period 1988-1992 and increased to 10.25 and 11.02 in a period 1993-1997 and 2003-2007 respectively. However, the growth in period 1998-2002 decreased by 2.87 from the previous five year period. Furthermore, they assert that this decrease can be the results of the increase average fiscal deficit by 60% from the previous

A study conducted by Lumengo (2012) which used quarterly data from 3rd quarter of 1970 to the 3rd quarter of 2008 to ascertain the relationship between the long-term interest rate and budget deficits within the framework of multivariate cointegration in South Africa. The study applied the Augmented Dickey-Fuller (ADF) methodology in testing the null hypothesis of unit root on the time series data. Findings from the stationarity test showed that all the series are I (1) at the 99% level of confidence and that pave the way for applying Johansen’s cointegration test to assess the relationship between the different variables of interest. Lumengo (2012:3955) affirm that given the “fact that the monetary authority controls the short-term interest rates and thus the short end of the yield curve, a study on how budget deficit (fiscal authority) affects the long-term interest rate should provide insights into how the monetary-fiscal mix can twist the yield curve for the benefit of the economy.”

Lumengo (2012) has found out that the impact of budget deficit on the long-term interest rate was less under the inflation perfect foresight hypothesis than under the adaptive expectation. The reason for this was undoubtedly due to a possible attempt by economic agents to mitigate the effect of budget deficit on future generations, as predicted by the Ricardian Equivalence hypothesis. Nonetheless, the full Ricardian hypothesis did not hold in South Africa, given the positive reaction of budget deficit to long-term interest rate. Therefore the systematic variation to the budget deficit in South Africa had a positive effect on long-term interest rates.

Another finding on the research shows that “systematic and surprise changes to budget deficit influenced positively the long-term interest rates in South Africa should have implications for the
extent of the expansionary fiscal policy, characterised by high budget deficits, on economic activities.” (Lumengo, 2012:3960). Furthermore, economic decisions was mainly depended on longer yields the observed positive response of the long-term interest rate to changes in budget deficit indicated the possibility of a crowding-out effect in South Africa. In fact, an expansionary fiscal policy in South Africa, characterised by an increase in budget deficit, is likely to increase the long-term interest rate, and, thus, depress private investment and economic activities in the long term, (Lumengo, 2012:3960).

Another finding shows that response of the long-term interest rates to shocks to budget deficit exceeds the response of the short-term interest rate to the same shocks. This shows the tendency of the budget deficit to influence long-term interest rates rather than short-term interest rates. The positive response of the long-term interest rate to systematic and surprise changes to budget deficit indicated that the reaction of the long-term interest rate to changes in budget deficit is invariant in relation to the type of fiscal regime in South Africa. (Lumengo, 2012:3961). Moreover the study shows that a discretionary fiscal regime was characterised by unexpected changes in fiscal variables, while in a fiscal rule regime the changes in fiscal variables are anticipated. This means that long-term interest rates reacted positively to changes in budget deficit, whether these changes were anticipated or unanticipated.

Budget Review (2012:48), indicate that South Africa has used countercyclical fiscal policy to stimulate economic growth and create more jobs. Furthermore, during stable economy, to counteract inflationary pressures and minimise cost of financing in future, South African government ensures that it improves budget deficit to build “fiscal space”. The beforehand build-up of “fiscal space” had provided South African government a competitive edge, to allow budget deficits to decline in order to fund expenditure and stimulate economic activities.

**3.8. Assessment of the study**

Different sentiments emerged from the different theories on the subject of the effect of government budget deficits on economic growth. This is evident in the proposition by Keynesian system, advocating a positive effect that budget deficits has on economic growth, Ricardian
theory of equivalence suggesting that budget deficits is neutral to economic growth or economic activities. Neoclassical approach advocates negative effects that budget deficits have on economic growth, stating that budget deficits crowd out private investment. The empirical studies mostly support the arguments posed by neoclassical system, having indicated negative effects of budget deficits on economic growth in many countries. For South Africa, the available evidence does not firmly suggest that budget deficits have strong effects on growth.
CHAPTER 4: RESEARCH METHODOLOGY

4.1. Introduction

Chapter three discussed the literature on the impact of government budget deficits on economic growth. Other studies explained the impact of fiscal deficits on economic growth through interest rates, inflation and current account balance. This chapter will specify the model that will be utilized in the study and discuss the econometrics methods to be utilised to investigate the impact of budget deficits on economic growth in South Africa and establish the long run relationship between government budget deficits and economic growth.

4.2. Model Specification and definition of variables

In investigating the main research problem, this study estimates budget deficits effects on economic growth using Vector Error Correction Model (VECM). VECM will be employed to identify the estimated impact of budget deficits on economic growth. Furthermore, the two statistical properties are required of the variables used in the VEC model: non-stationary and cointegrated. A time series is non-stationary, if its mean and variance are time–dependent, which is very common in the economic variables. If the variables have a common stochastic trend, which means they move together in the long-term, they are cointegrated. The VECM model is one of the most recommended specifications for analyzing variables of that nature, since it offers more and better information compared to other data generation processes. Since most time series data on economic finance are not stationary at level, the study employs VECM approach, which was used by Synder (2003), and Ocran (2011).

Growth model as discussed in Ocran (2011) work will be employed, for it was employed to explain South African fiscal policy impact on growth. Ocran (2011) adopted the model from the work of Kneller et al (1999). The model is of the following type:
where, \( y_t \) is the growth rate of output, \( X_{jt} \) is a vector of fiscal variables, \( Y_{lt} \) vector of non-fiscal variables and \( \varepsilon_{lt} \) white noise error terms. Assuming that all elements of the budget are included, in that case there is a balanced budget.

Based on equation 4.1 above, the functional specification of the model and econometric model to be applied in the study to show the effect of budget deficits on economic growth is depicted in the following functional model:

\[
GDP = f(DA, BD, GDT, OPEN)
\]

and expressed in log form becomes:

\[
\log GDP = \beta_0 + \beta_1 \log DA_t + \beta_2 \log BD_t + \beta_3 \log GDT_t + \beta_4 \log OPEN_t + \mu_t
\]

The variables employed in this study will be explained below; this ensures that misinterpretation of the empirical results is avoided. We have converted the variable into log form in order to obtain elasticity coefficients so that the impact of outliers are minimised significantly.

where,

\( \log GDP \) denotes economic growth at time \( t \)

\( \log DA \) denotes domestic activities (private consumption and private investment) at time \( t \)

\( \log BD \) denotes budget deficits which is the difference between total government revenue and expenditure at time \( t \)

\( \log GDT \) represents government debt
\( \log \text{OPEN} \) represents trade openness

\( \mu_t \) disturbance term, and “\( t \)” denotes time and \( \beta_1, \beta_2, \beta_3, \beta_4 \), are the parameters which quantify the effect of each of these explanatory variables on dependent variable (GDP).

A positive relationship between domestic activities (private consumption and private investment) and economic growth is expected, mainly due to the accelerator and multiplier effects of increased consumption and investments. Buscemi and Yallwe (2012), and Agostino, Dunne and Pieroni (2012) citing Fischer (1993) affirm that, “large budget deficits and growth are negatively correlated, because inflation and distorted foreign exchange markets, which occurred as a result of fiscal deficit would affect the economy adversely.” For budget deficits to have a negative impact on long term economic growth, thus a negative sign is expected for the coefficient of budget deficits (BD). Government debt is expected to have negative impact on economic growth. This is because financing long term debt also widens government deficits, slows down in government activities and thereby compromises on growth.

4.3. Data sources

The data of the variables are readily available on South Africa Reserve Bank, Organisation for Economic Co-operation and Development (OECD) statistics websites. The study investigates the impact of budget deficits on economic growth on the 1990 to 2011 period. Since this provides the study with fewer observations, and to increase the number of observation, quarterly data will be used in order to minimise misleading findings and conclusion on the long-relationship between budget deficits and economic growth.

4.4. Review of estimation techniques for the study

According to Choga (2008) there are various methods to estimate parameters, ranging from classical regression methods to cointegration based techniques. Classical regression method is based on the assumption that variables to be employed in a regression model are stationary. Moreover “most economic series are non-stationary in their levels such that estimations based on
this technique will be meaningless. Therefore, this section reviews the techniques employed to test for stationarity and cointegration” Choga (2008)

4.4.1. Unit root tests

In estimating the impact of government budget deficits on economic growth in South Africa, the above macroeconomic model will be employed (equation 4.3). The variables in the model are subject to stationarity tests. These tests are credible for the models proposed in this study, because if data is non-stationary, regression could be spurious and that can lead to misleading conclusions about the null hypotheses. When there is evidence of non-stationarity in the time series data the first step to take is to difference the time series before it becomes stationary. When this has been accomplished the time series will be integrated of order \(d\), written in the following format \(I(d)\). \(I(0)\) series shows that the time series is stationary and \(I(1)\) and \(I(2)\) indicates that the variables contain one unit root and two unit roots respectively. Therefore \(I(1)\) and \(I(2)\) have to differenced once and twice to reach stationarity status, respectively, (Choga, 2008).

4.4.1.1. Dickey-Fuller and the Augmented Dickey-Fuller Tests

According to Gujarati (1995:718) “alternative test of stationarity that has recently become popular is unit root test.” ADF-test allows for series with a deterministic component. It also makes it possible to include a high number of lags, which is useful for high frequency series. The null-hypothesis (Ho) denotes the presence of a unit root in each variable. When \(H_0\) is rejected, the variables are stationary Lozano (2008:12).

When running regression Dickey and Fuller it takes the form:

\[ Y_t = \rho Y_{t-1} + u_t \] 

If it is found that \(\rho = 1\), then we can say that the stochastic variable \(Y_t\) has a unit root, a time series that has a unit root is known as a random walk. The main objective of the Dickey-Fuller test is to ascertain the null hypothesis that \(\rho = 1\).
Gujarati (2002:819) states that “most tests of the Dickey–Fuller type have low power, that is, they tend to accept the null of unit root more frequently than is warranted. Therefore, these may find a unit root even when none exists. Power depends on the time span of the data more than mere size of the sample. In addition, the Dickey-Fuller test is weak in its ability to detect a false null hypothesis.” Farhan and Akram (2011:66) assert that, “The ARDL approach has certain econometrics benefits over other approaches. Integration of all the variables at same order i.e. I(1) is not required and ARDL is equally applicable even if the variables are stationary at I(1) and/or I(0). Moreover, its output is reliable even in case of small sample size.”

4.4.1.2. Phillips-Perron (1988) unit root test

According to Tripathy (2011) “Phillips and Perron (1988) developed a number of unit root tests that have become popular in the analysis of financial time series. The Phillips-Perron (PP) unit root tests differ from the ADF tests mainly in how they deal with serial correlation and heteroskedasticity in the errors. In particular, where the ADF tests use a parametric autoregression to approximate the ARMA structure of the errors in the test regression, the PP tests ignore any serial correlation in the test regression.” The test regression for the PP tests is as follows:

\[
\Delta y_t = \beta' D_t + \pi y_{t-1} + u_t
\]

where \(u_t\) is I(0) and may be heteroskedastic. The PP tests will therefore correct for any serial correlation and heteroskedasticity in the errors \(u_t\) of the regression test by directly adjusting the test statistics \(t_{\pi=0}\) and \(T_\pi\). These modified statistics, denoted \(Z_t\) and \(Z_\pi\), are given by

\[
Z_t = \left(\frac{\delta^2}{\lambda^2}\right)^{1/2} \cdot T_{\pi=0} - \frac{1}{2} \left(\frac{\lambda^2 - \delta^2}{\lambda^2}\right) \cdot \frac{T \cdot SE (\pi)}{\delta^2}
\]

\[
Z_\pi = T_{\pi} - \frac{1}{2} \frac{T^2 \cdot SE (\pi)}{\lambda^2} \cdot \left(\lambda^2 - \delta^2\right)
\]
4.4.2. Cointegration and vector error correction modelling (VECM)

Cointegration tests crucial in determining the order of integration, whether the variables are cointegrated or not. Gujarati (2002: 830) suggests that “cointegration of two or more times series suggest that there is a long-run or equilibrium relationship between them. The economic interpretation of cointegration is that if two or more series are linked to form an equilibrium relationship spanning the long-run, then even though the series themselves may be non-stationary, they will move closely together over time and their difference will be stationary.” Furthermore, “their long-run relationship is the equilibrium to which the system converges overtime, and the disturbance term can be interpreted as the disequilibrium error or the distance that the system is away from equilibrium at time t” Gujarati (2002).

Engle and Granger (1987) proposed a four step procedure to determine if two $I(1)$ variables are cointegrated of order $(1, 1)$. The first step is to pretest the variables for their order of integration. Cointegration necessitates that two variables be integrated of the same order. Thus, the first step in the analysis is to pretest each variable to determine its order of integration. The second step is to estimate the long run equilibrium relationship.

Only variables integrated of the same order may be cointegrated, and the unit root tests will help us determine which variables are integrated of order one, or $I(1)$. The choice of lag lengths may be decided using Sim’s likelihood ratio test. However, for simplicity, in this article we will use the multivariate forms of the Akaike information criterion (AIC) and Schwartz Bayesian criterion (SBC), where $AIC = T \ln(\text{residual sum of squares}) + 2n$ and $SBC = T \ln(\text{residual sum of squares}) + n \ln(T)$. The AIC and SBC are model selection criteria developed for maximum likelihood estimation techniques. In minimizing the AIC and SBC, we minimize the natural logarithm of the residual sum of squares adjusted for sample size, $T$, and the number of parameters included, $n$. 
4.4.2.1. Pantula principle

According to Xu and Sun (2010) generally, the graph of the vector $y_t$ is plotted to establish the deterministic component. However, the plots of the data would not provide enough information about the selection of models. For that reason Johansen suggested the need to test the joint hypothesis of both the rank order and the deterministic components (Sjö, 2010). This method is called Pantula principle. All three models are estimated and the results are presented from the most restrictive alternative (like $r = 0$ and Model 2) to the least restrictive alternative (i.e. $r = n-1$ and Model 4). The process of Pantula principle is to move from the most restrictive model to the least restrictive model and then to compare the trace test statistic to its critical value at each stage. The accomplishment of the Pantula test is when the null hypothesis is accepted at the first time.

Put in other words, Sjö (2011:8) affirms that according to the Pantula principle the different versions of Dickey-Fuller test should be set up in the correct order. Start with the estimated model that includes a constant and a trend. If a unit root is rejected here it is possible to stop. Asymptotically it can be shown that the series does not have a unit root. If it is not possible to reject, continue to a model with a constant. If a unit root is rejected it is possible to stop testing. If the null of a unit root is not rejected it is possible to continue to model three and exclude the constant. The latter is seldom a good strategy if the variable is obviously non-stationary. Since the outcomes of the tests are sensitive to the order of augmentation and deviations from normally white noise residuals, standard procedure is to show the results of the first two tests.

4.4.2.2. Johansen test

In the Johansen testing there are two test statistics; the maximum eigenvalue and trace statistics. The trace statistic tests the null hypothesis: there are at most $r$ cointegrating relations against the alternative of $m$ cointegrating relations” (i.e., the series are stationary), $r = 0, 1, \ldots, m - 1$.

According to Hjalmarsson and Österholm (2007) the “maximum eigenvalue statistics test the null hypothesis: there are $r$ cointegrating relations against the alternative: there are $r +1$
cointegrating relations. Johansen cointegration test’s methodology takes its starting point in the vector autoregression (VAR) of order $p$ given by

$$y_t = \mu + A_1 y_{t-1} + \ldots + A_p y_{t-p} + \epsilon_t$$

where “$y_t$ is an $n \times 1$ vector of variables that are integrated of order one – commonly denoted $I(1)$ – and $\epsilon_t$ is an $n \times 1$ vector of innovations” Hjalmarsson and Österholm (2007). VAR can now be written as follows:

$$\Delta y_t = \mu + \Pi y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + \epsilon_t$$

where,

$$\Pi = \sum_{i=1}^{p} A_i - I \text{ and } \Gamma_i = - \sum_{j=i+1}^{p} A_j$$

Furthermore, Hjalmarsson and Österholm (2007) assert that “if the coefficient matrix $\Pi$ has reduced rank $r < n$, then there exist $nxr$ matrices $\alpha$ and $\beta$ each with rank $r$ such that $\Pi = \alpha \beta' \text{ and } \beta'y_t$ is stationary. $r$ is the number of cointegrating relationships, the elements of $\alpha$ are known as the adjustment parameters in the vector error correction model and each column of $\beta$ is a cointegrating vector. It can be shown that for a given $r$, the maximum likelihood estimator of $\beta$ defines the combination of $y_{t-1}$ that yields the $r$ largest canonical correlations of $\Delta y_t$ with $y_{t-1}$ after correcting for lagged differences and deterministic variables when present. Furthermore, Hjalmarsson and Österholm (2007) advocate that the Johansen test suggests two different likelihood ratio tests of the significance of these canonical correlations and thereby the reduced rank of the $\Pi$ matrix: the trace test and maximum eigenvalue test, shown in equations (4) and (5) respectively.”

$$J_{trace} = -T \sum_{i=r+1}^{n} \ln (1 - \lambda_i)$$

$$J_{max} = -T \ln (1 - \lambda_i)$$
Where $T$ is the “sample size and $\lambda_i$ is the $i$th largest canonical correlation. The trace test tests the null hypothesis of $r$ cointegrating vectors against the alternative hypothesis of $n$ cointegrating vectors. The maximum eigenvalue test, on the other hand, tests the null hypothesis of $r$ cointegrating vectors against the alternative hypothesis of $r +1$ cointegrating vectors” (Hjalmarsson and Österholm, 2007).

**4.4.3. Impulse response function (IRF) and variance decomposition (VDC)**

In this study IRF and VDC will be employed to ascertain the dynamic relationship between budget deficits and economic growth. “That is to evaluate the dynamic interactions and strength of causal relations among variables in the system” (Duasa, 2009:27). Brooks (2008:301) affirms the importance of ordering the variables when calculating impulse responses and variance decompositions. The reason for the importance of ordering of the variables is that the impulse responses refer to a unit shock to the errors of one VAR equation alone.” Furthermore, Brooks (2008) states that the error terms of all other equations in the VAR system are held constant, however, this is not realistic since the error terms are likely to be correlated across equations to some extent. Thus, with an assumption that they are wholly independent would therefore result to system dynamics being misrepresented. Practically, the errors will contain a common element that cannot be linked with the single variable.

**4.4.3.1. Impulse response**

Brooks (20008:290) states that “impulse response traces out the responsiveness of the dependent variables in the VAR to shocks to each of the variables.” Put differently, “the method traces the effect of a one-time shock to one of the innovations on current and future values of the endogenous variables” (Landa and Wojcik 2007). Therefore a unit root shock is applied for each variable in different equations and over time the knock on effects on the VAR system is distinguished. Meaning, if in the system there are $t$ variables, the system will generate $t^2$ impulse responses. In practice this is attained by modeling the VAR model as a vector moving average and if the system is consistent the shock should progressively die away (Landa and Wojcik 2007)
4.4.3.2. Variance decomposition

According to Brooks (2008:300) variance decomposition “offers a slightly different method for examining VAR system dynamics. It gives the proportion of the movements in the dependent variables that are due to their ‘own’ shocks, versus shocks to the other variables, or this technique determines how much of the forecast error variance for any variable in a system, is explained by innovations to each explanatory variable, over a series of time horizons. Thus, from the VDC we can measure the relative importance of budget deficits, domestic activities (private consumption and private investment), and government debt dynamics in relation to fluctuation to GDP.

4.4.4. Diagnostic Checks

“Diagnostic checks test the stochastic properties of the model, such as residual autocorrelation, heteroskedasticity and normality, among others” (Tiwati, 2012). This section is vital for the analysis of the impact of budget deficits on the economy as it confirms parameter estimation outcomes achieved by the estimated model.

4.4.4.1. Heteroscedasticity

Brooks (2008) affirms that “there are number of formal statistical tests for heteroscedasticity, such popular test is the White’s (1980) general test for heteroscedasticity. The test is useful because it has a number of assumptions such as that it assumes that the regression model estimated is of the standard linear. After running the regression, the residuals are obtained and then test is run by regressing each product of the residuals on the cross products of the regressors and testing the joint significance of the regression. The null hypothesis for the White test is homoskedasticity and if we fail to reject the null hypothesis then we have homoskedasticity. If we reject the null hypothesis, then we have heteroscedasticity.”

Chicheke (2009) asserts that Heteroskedasticity arises if different error terms do not have identical variances, so that the diagonal elements of the covariance matrix are not identical. The error terms are mutually uncorrelated while the variance of $\mu_i$ may vary over the observations.
The consequence of using the usual testing procedures despite the heteroskedasticity is that the conclusions we draw or the inferences we make may be very misleading (Gujarati, 2003:399). In this study we employ the White test. The general white test of heteroskedasticity does not rely on the normality assumption and is easy to implement (Gujarati, 2003:413). The basis of this test is to check whether there is any systematic relation between the squared residuals and the explanatory variables (Mukherjee at al.1998:261). It tests the null hypothesis that there is no heteroskedasticity in which the test statistic should not be significant in the absence of heteroskedasticity and misspecification

4.4.4.2. Residual normality test

The residual normality test used in this study is the multivariate extension of the Jarque-Bera normality test, which compares the third and fourth moments of the residuals to those from the normal distribution. The Bera-Jarque test statistic asymptotically, follows a\(X^2\) under the null hypothesis that the distribution of the series is symmetric. The normality test is used to find out whether the random variable is normally distributed or not. This test is applied to residuals from a linear regression model. If they are not normally distributed, the residuals should not be used in Z tests or any other tests derived from the normal distribution such as F-tests and the chi-square test.

4.4.4.3. Autocorrelation LM tests

Brooks (2008) states that for the auxiliary regression Lagrange Multiplier (LM) test centers around the \(R^2\) value. \(R^2\) value will only be relevantly significant in the equation when there is statistically significance in one or more coefficients in the equation. On the other hand the \(R^2\) value will be low if there is no significance in any of the variables. Therefore, Lagrange Multiplier test functions by attaining \(R^2\) value from the auxiliary regression and the obtained \(R^2\) value is multiplied by number of observations, T. This is shown below:

\[TR^2 \approx \chi^2 (m)\]
4.4.5. Granger Causality Test

After establishing order of integration it is crucial to employ Granger causality test to determine long run relationship between economic growth and independent variables employed in the model; furthermore, to test direction of causality between economic growth and with same variables. Foresti (2006) affirms the following three different types of conditions in which Granger causality test can be applied:

- In a simple Granger causality test there are two variables and their lags
- In a multivariable Granger causality test more than two variables are included, because it is supposed that more than one variable can influence the results
- Finally, Granger causality can also be tested in a VAR framework; in this case the multivariate model is extended in order to test for the simultaneity of all included variables.

The empirical findings tabled in this research are calculated within a multivariable Granger causality tested in a VAR framework, thus will be examining whether the lags of one variable can be included in another equation. Testing for the direction of causation between GDP and budget deficits, and the Likelihood Ratio (LR) will be employed. The LR test statistic is chosen to select the appropriate number of lags in cross section restrictions. The LR has a Chi-square ($\chi^2$) distribution with degrees of freedom equal to the number of restrictions in the system of equations. The LR is specified as follows:

\[
LR = (T-c) \left( \log I_\Sigma u - \log I_\Sigma r \right)
\]

Where $\Sigma_r$ and $\Sigma_u$ are the variance matrices of the unrestricted and restricted system of equations respectively, and $c$ is the maximum number of regressors in the longest unrestricted equation.

In determining causality between GDP and budget deficits, three alternative Granger causality models can be specified on both bi-variate models types: VAR in levels, VAR in first differences
and the ECM. The appropriate Granger-causality alternative models that best fit the bi-variate models developed will be used, resting upon the results of unit roots and co-integration tests. The parameters of budget deficits in the GDP equation will be tested that they are jointly equal to zero using the Seemingly Unrelated Regression (SUR) under the three types of VAR models. Furthermore, it will also be tested that the parameters of GDP in the budget deficits equation are jointly equal to zero.

4.5. Conclusion

This chapter specified the variables that would potentially transmit the impact of government budget deficits on economic growth and explained the approach to be used in obtaining the regression results for the study. Dickey–Fuller and the Augmented–Dickey Fuller for unit root test were also used. Furthermore, the Johansen cointegration technique was used because it has valued advantages compared to other techniques, e.g. the Engle-Granger. To authenticate the outcomes of parameter estimations which would be achieved by the model, diagnostic checks will be conducted, this includes, residual normality test, heteroskedacity, autocorrelation Lagrange Multiplier to see whether the residual passes all these diagnostic checks.
CHAPTER 5: PRESENTATION AND ANALYSIS OF THE EMPIRICAL RESULTS

5.1. Introduction

This chapter presents the interpretation of results to give answers to the general objective of this study which was posed in chapter one. The general objective is to analyse and evaluate the impact of South African government budget deficits on economic growth in South Africa. The unit roots tests results and the graphical analysis for the variables would be presented firstly. To determine long run relationship between budget deficits and economic growth, co-integration test among the variables is conducted. Granger causality will be tested and where there is a presence of one co-integration among the variables, vector error correlation model (VECM) will be estimated, if not VAR will be conducted. The econometric package utilised in this study is E-views version 8.

The following section is divided into four sub-sections. The first section presents the results of stationarity/unit root tests, the second presents and discusses the co-integration test results; the third section discusses the long run relationship. On the forth section diagnostic checks will be conducted.

5.2. Unit root/ Stationarity test results

In this section we present unit root tests results, to determine whether the time series are stationary or non-stationary. Two tests will be employed in this study, which are 1) informal tests for stationarity in the form of graphical analysis. A graphical analysis is the visual plot of the time series which is fundamentally important as the first step in the analysis of any time series before pursuing any formal tests. Graphical analysis is crucial, because it allows for detection of any data capturing errors and checking of structural breaks and drifts that may bias the unit root tests and gives an idea of the trends and stationarity of the data set, and 2) Formal tests to be employed are Augmented Dickey Fuller (ADF) and Phillip Peron tests to identify the order of integration, that is, the number of times the variables need to be differenced arrive at stationary level. ADF and PP are used simultaneously because the use of one test may not be fully reliable.
It has been discovered that Phillip-Peron test is more reliable than the augmented Dickey-Fuller test in finite samples. The following figures plot all the variables employed in the model of this study.

5.2.1. Informal Unit Root Tests

FIGURE 0.1: STATIONARITY TESTS – GRAPHICAL ANALYSIS AT LEVEL

Source: Author’s own computation using EViews 8

Graphical analysis as depicted above shows that all variables have a present of unit root at level. Budget deficits as represented by BD seem to be stationary though the amplitude is wide and the variable is fluctuating away from the mean of zero.
Stationarity graphs after 1\textsuperscript{st} differencing

The visual plot below shows the differencing of variables to arrive at stationarity. The differencing has been conducted to solve the unit root problem, as shown below the variables were differenced once to become stationary, meaning the variables are integrated of order one I(1).

**FIGURE 0.2: STATIONARITY TESTS – GRAPHICAL ANALYSIS AT FIRST DIFFERENCE**

![Differenced Graphs](image)

*Source: Author’s own computation using EViews 8*

Checking stationarity only by graphical analysis is not enough and we cannot draw a conclusion based on the informal analyses to suggest that the variables are stationary at 1\textsuperscript{st} difference. For that reason, we therefore conduct formal tests. These tests as mentioned above are Augmented Dickey-Fuller (ADF) test and Philips Peron test (PP).
Choga (2008) states that both “ADF and PP tests test the null hypothesis of a unit root. In the event where a test statistic is highly negative than critical value, null hypothesis is therefore rejected. Therefore, a rejection of the null hypothesis means that the series do not have a unit root.

In the study at hand the results were carried out with no constant and trend, with constant but no trend, with both trend and constant. The unit root using constant and trend shows that all series become stationary after 1st differencing.

5.2.2. Formal Unit Root tests

**TABLE 0.1: UNIT ROOT TESTS 1990Q1 – 2012Q4 AT LEVELS AND FIRST DIFFERENCES (Δ)**

<table>
<thead>
<tr>
<th>Test</th>
<th>Augmented Dickey - Fuller (ADF)</th>
<th>Phillips Peron (PP)</th>
<th>Order of Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intercept</td>
<td>Trend and intercept</td>
<td>None</td>
</tr>
<tr>
<td>LGDP</td>
<td>0.432</td>
<td>-3.274*</td>
<td>2.869***</td>
</tr>
<tr>
<td>ΔLGDP</td>
<td>-4.016***</td>
<td>-4.115***</td>
<td>-2.714***</td>
</tr>
<tr>
<td>LBD</td>
<td>-1.479</td>
<td>-1.366</td>
<td>-0.378</td>
</tr>
<tr>
<td>ΔLBD</td>
<td>-3.936***</td>
<td>-4.216***</td>
<td>-3.914***</td>
</tr>
<tr>
<td>LDA</td>
<td>0.381</td>
<td>-2.474</td>
<td>3.019***</td>
</tr>
<tr>
<td>ΔLDA</td>
<td>-6.837***</td>
<td>-6.926***</td>
<td>-5.901***</td>
</tr>
<tr>
<td>LGDT</td>
<td>-2.408</td>
<td>-2.562</td>
<td>1.369</td>
</tr>
<tr>
<td>ΔLGDT</td>
<td>-7.841***</td>
<td>-7.803***</td>
<td>-7.679***</td>
</tr>
<tr>
<td>LOPEN</td>
<td>0.017</td>
<td>-2.196</td>
<td>1.093</td>
</tr>
<tr>
<td>ΔLOPEN</td>
<td>-10.674***</td>
<td>-11.053***</td>
<td>-10.596***</td>
</tr>
<tr>
<td>Critical value 1%</td>
<td>-3.50</td>
<td>-4.06</td>
<td>-2.59</td>
</tr>
<tr>
<td>Critical value 5%</td>
<td>-2.89</td>
<td>-3.46</td>
<td>-1.94</td>
</tr>
<tr>
<td>Critical value 10%</td>
<td>-2.58</td>
<td>-3.16</td>
<td>-1.61</td>
</tr>
</tbody>
</table>

*** represents a stationary variable at 1% significance level  
** represents a stationary variable at 5% significance level  
* represents a stationary variable at 10% significance level

Source: Author’s own computation using EViews 8

The above table and graphical analysis presents the stationarity tests for the variables to be employed in the regression analysis. Augmented Dickey-Fuller and Phillips Peron results were obtained based on these values to test the null hypothesis of a unit root. The results in Table 5.1
above show that LGDP is only stationary at level where there is trend and intercept and none at 1% level significant respectively in both ADF and PP tests. BD is stationary at level under PP test only where there is no constant and a trend at 1% significant level. Unit root results indicates that DA in both APF and PP is only stationary at level where there is no trend and intercept at 1% level significant on the other hand LGDT and LOPEN are not stationary at level in all forms.

Variables are stationary when they are 1\textsuperscript{st} differenced in both ADF and PP at 1% significant level, except $\Delta$GDP being stationary at 5% significant level in PP tests where there is no constant and trend.

The ADF and PP results are more in line with the graphical analysis. We therefore conclude that all of the series are 1\textsuperscript{st} differenced 1(1) meaning the variables are integrated of the same order. For this reason the same order of integration in these variables at 1\textsuperscript{st} difference we then move to conduct the co integration tests in the following section.

5.3. Co-integration test

Sjo (2011:12) states that once the variables have been classified as integrated of order say I(0), I(1), or I(2) it is possible to set up meaningful models that lead to stationary relations among the variables, and where in the end standard inference becomes possible. The criterion for stationarity among non-stationary variables is called co-trending, and among integrated variables the term is co-integration. Testing for co-integration is a necessary step to build empirically meaningful relationships. If variables have different trends they cannot stay in fixed long-run relations to each other, implying that you cannot model them and when integrated variables are involved there is usually no valid base for inference based on standard distributions.
5.3.1. Co-integration test results

i) Order of integration

The unit root tests results shown in table 5.1 suggest that in all the methods for employed (formal and informal tests) the variables are integrated of order one. Co-integration explains the existence of an equilibrium or stationarity relationship among two or more times series each of which is individually non-stationary. The benefit of the co-integration approach is that it allows one to integrate the long and short-run relationship between variables within a unified framework. The study has established the order of integration in all the variables, once it has been established that the variables are integrated of the same order, the next step is to determine whether there exists a long-run equilibrium relationship among them. The co-integration of the results is represented by Vector Error Correction Model by firstly determining the optimum number of lag lengths. The following section discusses the lag length selection.

ii) Lag Length selection

The choice for the lag order for the VAR was made using the information criteria approach such as the Schwarz and Akaike information criteria as well as the Likelihood Ratio (LR) test amongst others, augmented by theoretical priors. Johansen’s co integration approach has been criticized for being sensitive to the lag length chosen therefore important that a consistent procedure is used to choose the lag length for both the co integration analysis and the error correction model. When the lag lengths chosen by all information criteria are the same, this lag length will be used for both the co integration analysis and error correction model. Below is a table that shows the results of the lag length selection criteria. The results produced by lag length selection criterion shows that LR selected 4 lags, FPE, AIC, HQ and SC criteria chose 2 lags. Therefore in this study we use 2 lags based on the fact that the majority of the criterions have selected the same lag length (lag 2). Thus the optimal lag for the model is (2) terms.
### TABLE 0.2: VAR LAG ORDER SELECTION CRETERIA

<table>
<thead>
<tr>
<th>Lag</th>
<th>LogL</th>
<th>LR</th>
<th>FPE</th>
<th>AIC</th>
<th>SC</th>
<th>HQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>-580.7337</td>
<td>NA</td>
<td>0.784006</td>
<td>13.94604</td>
<td>14.09073</td>
<td>14.00421</td>
</tr>
<tr>
<td>1</td>
<td>-42.56556</td>
<td>999.4552</td>
<td>3.88e-06</td>
<td>1.727751</td>
<td>2.595900</td>
<td>2.076740</td>
</tr>
<tr>
<td>2</td>
<td>12.98741</td>
<td>96.55636</td>
<td>1.89e-06*</td>
<td>1.00300*</td>
<td>2.591906*</td>
<td>1.640112*</td>
</tr>
<tr>
<td>3</td>
<td>30.21018</td>
<td>27.88448</td>
<td>2.31e-06</td>
<td>1.185472</td>
<td>3.500536</td>
<td>2.116108</td>
</tr>
<tr>
<td>4</td>
<td>60.14817</td>
<td>44.90699*</td>
<td>2.11e-06</td>
<td>1.067901</td>
<td>4.106422</td>
<td>2.289361</td>
</tr>
<tr>
<td>5</td>
<td>75.17968</td>
<td>20.75780</td>
<td>2.82e-06</td>
<td>1.305246</td>
<td>5.067224</td>
<td>2.817529</td>
</tr>
<tr>
<td>6</td>
<td>92.84016</td>
<td>22.28584</td>
<td>3.63e-06</td>
<td>1.479996</td>
<td>5.965432</td>
<td>3.283104</td>
</tr>
<tr>
<td>7</td>
<td>112.1635</td>
<td>22.08379</td>
<td>4.65e-06</td>
<td>1.615155</td>
<td>6.824048</td>
<td>3.709086</td>
</tr>
<tr>
<td>8</td>
<td>143.6384</td>
<td>32.22434</td>
<td>4.67e-06</td>
<td>1.460990</td>
<td>7.393341</td>
<td>3.845745</td>
</tr>
</tbody>
</table>

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Source: Author’s own computation using EViews 8

iii) Deterministic trend assumption (Pantula test)

The study applied Pantula Principle test in order to draw conclusions on deterministic trend that best suits the analysis of the time series data employed in the model of this study. Asteriou and Hall (2007) states that Pantula principle is applied to “decide which of the three models to choose in testing for cointegration”.

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Note: The table shows the lag order selection criteria for a Vector Autoregression (VAR) model. The criteria evaluated include Log Likelihood (LogL), Lagrange Multiplier (LR) test statistic, Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SC), and Hannan-Quinn Information Criterion (HQ). The asterisk (*) indicates the lag order selected by the criterion.
iii) Deterministic trend assumption (Pantula test)

**TABLE 0.3: PANTULA PRINCIPLE**

<table>
<thead>
<tr>
<th>R</th>
<th>n-r</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Trace test statistic</td>
<td>Critical value</td>
<td>Trace test statistic</td>
</tr>
<tr>
<td>0</td>
<td>3</td>
<td>117.290</td>
<td>76.973</td>
<td>98.018</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>54.732</td>
<td>54.079</td>
<td><strong>35.674</strong>*</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>27.991</td>
<td>35.193</td>
<td>16.169</td>
</tr>
</tbody>
</table>

*Source: Author’s own computation using EViews 8*

The results above show that Pantula test has selected model 3, and therefore Johansen co-integration test will be conducted under the assumption of intercepts and no trends. Following the results above that suggest there are 1 co-integration vectors and no deterministic trend in the levels of the data. In the following section we conduct Johansen co-integration test based on the results presented by Pantula test, by employing model 3.

**5.3.2. Johansen co-integration test**

To conduct Johansen test all time-series variables must be integrated of the same order. The results of unit root testing above support that we can employ Johansen test. Below are the results from Johansen co-integration, both Trace and Max eigenvalue tests indicates there is co-integration between the variables at 5% significant level.
### TABLE 0.4: JOHANSEN CO-INTEGRATION RANK TEST RESULTS

<table>
<thead>
<tr>
<th>Hypothesized No. of CE(s)</th>
<th>Eigenvalue</th>
<th>Trace Statistic</th>
<th>0.05 Critical Value</th>
<th>Prob.**</th>
</tr>
</thead>
<tbody>
<tr>
<td>None *</td>
<td>0.503661</td>
<td>98.01844</td>
<td>69.81889</td>
<td>0.0001</td>
</tr>
<tr>
<td>At most 1</td>
<td>0.196804</td>
<td>35.67425</td>
<td>47.85613</td>
<td>0.4129</td>
</tr>
<tr>
<td>At most 2</td>
<td>0.115141</td>
<td>16.16934</td>
<td>29.79707</td>
<td>0.7004</td>
</tr>
<tr>
<td>At most 3</td>
<td>0.057284</td>
<td>5.282262</td>
<td>15.49471</td>
<td>0.7781</td>
</tr>
<tr>
<td>At most 4</td>
<td>0.000361</td>
<td>0.032116</td>
<td>3.841466</td>
<td>0.8577</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Hypothesized No. of CE(s)</th>
<th>Eigenvalue</th>
<th>Max-Eigen Statistic</th>
<th>0.05 Critical Value</th>
<th>Prob.**</th>
</tr>
</thead>
<tbody>
<tr>
<td>None *</td>
<td>0.503661</td>
<td>62.34418</td>
<td>33.87687</td>
<td>0.0000</td>
</tr>
<tr>
<td>At most 1</td>
<td>0.196804</td>
<td>19.50491</td>
<td>27.58434</td>
<td>0.3764</td>
</tr>
<tr>
<td>At most 2</td>
<td>0.115141</td>
<td>10.88708</td>
<td>21.13162</td>
<td>0.6586</td>
</tr>
<tr>
<td>At most 3</td>
<td>0.057284</td>
<td>5.250146</td>
<td>14.26460</td>
<td>0.7100</td>
</tr>
<tr>
<td>At most 4</td>
<td>0.000361</td>
<td>0.032116</td>
<td>3.841466</td>
<td>0.8577</td>
</tr>
</tbody>
</table>

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

Source: Author’s own computation using EViews 8

Following the determination of the correct integrating model, the next step is to estimate the Johansen co-integration rank test. The top part of Table 5.4 above presents the Johansen co-integration test based on the trace test, while the bottom part presents the results of this test based on the maximum eigenvalue test. Starting with the trace test, the null hypothesis of no co-integrating vectors is rejected, since the test statistic of about 98.01844 is greater than the 5 per cent critical value of approximately 69.81889. Therefore the null hypothesis that there is at most 1 co-integrating vector cannot be rejected, since the test statistic of approximately 35.67425 is now less than the 5 per cent critical value of about 47.85613. The trace test, therefore, indicates at least 1 co-integrating relationship (vector) at the 5 per cent level of significance. The maximum eigenvalue form of the Johansen test also rejects the null hypothesis of no co-integration at the same level as the trace statistic, thus it corroborates the trace statistic results.
The two tests, therefore, suggests that there are at least 1 co-integrating relationship in the real exchange rate model. Thus, accordingly at least 1 co-integrating vector is assumed based on the supporting rank tests.

**FIGURE 0.3: CO-INTEGRATION GRAPH**

![Cointegrating relation 1](image)

*Source: Author’s own computation using EViews 8*

After establishing the existence of the long run relationship between gross domestic product, budget deficits, domestic activities (DA [private consumption and private investment]), and national government debt, the short run and long run dynamics can now be established through the Vector error correction model (VECM), i.e. to determine the long and short run determinants of the gross domestic product. It other words, when the variables are found co-integrated then only we can run VECM or restricted VAR model.

### 5.3.3. Vector Error Correction Model

The presence of cointegration between variables indicates that there is a long run relationship between the variables under consideration. In other words, this will further allow us to distinguish the long and short run effects of variables in order to establish the extent of influence that budget deficits, domestic activities, government debt and trade openness have on gross domestic product. Asari et al (2011:53) states that “when variables are in log form and one co-
integration vector is estimated, the coefficients can be interpreted as long run elasticities.” Table 5.5 presents VECM results for long run relationship.

**TABLE 0.5: LONG RUN RELATIONSHIP VECM RESULTS**

<table>
<thead>
<tr>
<th>CointegratingEq:</th>
<th>CointEq1</th>
</tr>
</thead>
<tbody>
<tr>
<td>LGDP(-1)</td>
<td>1.000000</td>
</tr>
<tr>
<td>BD(-1)</td>
<td>-1.39E-05</td>
</tr>
<tr>
<td></td>
<td>(1.6E-06)</td>
</tr>
<tr>
<td></td>
<td>[ -8.91966]</td>
</tr>
<tr>
<td>LDA(-1)</td>
<td>-1.984200</td>
</tr>
<tr>
<td></td>
<td>(0.25591)</td>
</tr>
<tr>
<td></td>
<td>[-7.75350]</td>
</tr>
<tr>
<td>LGDT(-1)</td>
<td>0.346688</td>
</tr>
<tr>
<td></td>
<td>(0.17432)</td>
</tr>
<tr>
<td></td>
<td>[ 1.98881]</td>
</tr>
<tr>
<td>LOPEN(-1)</td>
<td>3.414023</td>
</tr>
<tr>
<td></td>
<td>(0.67310)</td>
</tr>
<tr>
<td></td>
<td>[ 5.07206]</td>
</tr>
<tr>
<td>C</td>
<td>-6.994642</td>
</tr>
</tbody>
</table>

*Source: Author’s own computation using EViews 8*

**Long run relationships**

The results produced by VECM clearly indicate a presence of error correction. The results are in line with what we have expected for the key variable of concern which is budget deficits. In the previous chapter we indicated that we expect budget deficits to have negative effect to GDP but the effect is significantly low with -1.39E-05 co-efficient. Findings in chapter 3 have indicated that budget deficits have a strong influence on investment behaviour and GDP, and budget shocks explain a close to two thirds of the innovations in private investment and GDP. This advocates that budget deficits do cause crowding out of private investment and a reduction in future GDP.
Results shows that government debt a component of fiscal policy is impacting the GDP positively with 0.346688 co-efficient, this result is the opposite of what we expected, only in a short is the government debt meets our expectations, the reason is that if government debt is utilised productively, over the long run it could positively impact growth. According to the results, DA (domestic activities) in the period under consideration has impacted GDP negatively significantly. Private consumption an element of domestic activities has large weight on GDP, about 60% of GDP and South African private consumption mostly comes from the low-income earners and this group is not consuming durable goods.

**TABLE 0.6: SHORT RUN RELATIONSHIP ERROR CORRECTION RESULTS**

<table>
<thead>
<tr>
<th>Error Correction:</th>
<th>D(LGDP)</th>
<th>D(BD)</th>
<th>D(LDA)</th>
<th>D(LGDT)</th>
<th>D(LOPEN)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-0.006058</td>
<td>84935.01</td>
<td>-0.004142</td>
<td>-0.075747</td>
<td>-0.015573</td>
</tr>
<tr>
<td></td>
<td>(0.00269)</td>
<td>(16656.7)</td>
<td>(0.00619)</td>
<td>(0.01995)</td>
<td>(0.01279)</td>
</tr>
<tr>
<td>CointEq1</td>
<td>[-2.24806]</td>
<td>[5.09915]</td>
<td>[-0.66959]</td>
<td>[-3.79772]</td>
<td>[-1.21758]</td>
</tr>
</tbody>
</table>

*Source: Author’s own computation using EViews 8*

**Short run relationship**

The error correction term measures the speed of the adjustment in returning the disequilibrium in the model to its equilibrium. The speed of adjustment is indicated by the coefficient of D(LGDP) which acts as the error correction term. For the study at this means that error correction shows that any disequilibrium in the GDP model will be corrected every quarter as the study chose quarterly frequency. The coefficient of D(LGDP) is -0.0061, this shows that the speed of adjustment is approximately 0.06%, meaning if there is deviation from equilibrium only, 0.061% is corrected in one year as the variable moves towards restoring equilibrium whenever there is disturbance. This speed of adjustment is statistically significant with an absolute t-value of -2.24806. The fact that there is low speed of adjustment by gross domestic product implies that there are other factors impacting the economic growth other than the variables employed in the study, such as interest rates, foreign direct investment, inflation, etc.
5.4. Diagnostic checks for VECMs

To check if there are no problems in the residuals, the study has employed diagnostic tests, meaning to check if the model is efficient or not. This therefore helps to find out if the parameter estimates in the model are not biased. The GDP model was subjected to various diagnostics tests. The GDP model was tested for normality, serial correlation, heteroskedasticity. Results from the diagnostic tests performed in this study are presented in Table 5.7, 5.8, and 5.9 below.

**FIGURE 0.4: AR ROOTS GRAPH**

```
Inverse Roots of AR Characteristic Polynomial

Source: Author’s own computation using EViews 8
```

Figure 5.4 above shows the AR test. According Sela (2004:5), an AR(p) model is stationary if and only if the largest (in modulus) root, $\theta$, of $zp = a_1zp-1+...+a_pz+a_p$, has modulus less than one. (That is, all roots have modulus less than one - all roots lie within the unit circle.) If any root lies outside the unit circle, then the process is explosive. If at least one root is on the unit circle and all other roots are inside, then the process has a unit root; that is, the differences (first, second, or more, depending on the number of unit roots) are stationary but the process itself is not mean-reverting. In the AR (1) case, this simply tests whether $|a|$ is greater than, less than, or
equal to one. In this study Figure 5.4 depicts that all roots lie inside the unit circle, therefore the VAR model is stable.

**TABLE 0.7: LANGRANGE MULTIPLIER TEST RESULTS**

<table>
<thead>
<tr>
<th>Lags</th>
<th>LM-Stat</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>54.64583</td>
<td>0.6254</td>
</tr>
<tr>
<td>2</td>
<td>40.24916</td>
<td>0.0275</td>
</tr>
<tr>
<td>3</td>
<td>17.46288</td>
<td>0.8643</td>
</tr>
<tr>
<td>4</td>
<td>33.81498</td>
<td>0.1119</td>
</tr>
<tr>
<td>5</td>
<td>17.24287</td>
<td>0.8728</td>
</tr>
<tr>
<td>6</td>
<td>32.02446</td>
<td>0.1573</td>
</tr>
<tr>
<td>7</td>
<td>26.27732</td>
<td>0.3929</td>
</tr>
<tr>
<td>8</td>
<td>31.78448</td>
<td>0.1643</td>
</tr>
<tr>
<td>9</td>
<td>21.56242</td>
<td>0.6609</td>
</tr>
<tr>
<td>10</td>
<td>25.18455</td>
<td>0.4521</td>
</tr>
<tr>
<td>11</td>
<td>23.69491</td>
<td>0.5371</td>
</tr>
<tr>
<td>12</td>
<td>40.58131</td>
<td>0.0254</td>
</tr>
</tbody>
</table>

Probs from chi-square with 25 df.

*Source: Author’s own computation using EViews 8*

**TABLE 0.8: HETEROSKEDASTICITY**

<table>
<thead>
<tr>
<th>Joint test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-sq</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>336.8610</td>
</tr>
</tbody>
</table>

*Source: Author’s own computation using EViews 8*

**TABLE 0.9: RESIDUAL NORMALITY TEST**

<table>
<thead>
<tr>
<th>Null Hypothesis: residuals are multivariate normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-sq</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td>Skewness</td>
</tr>
<tr>
<td>Kurtosis</td>
</tr>
<tr>
<td>Jarque-Bera</td>
</tr>
</tbody>
</table>

*Source: Author’s own computation using EViews 8*
Table 5.7 depicts the results for serial correlation which has produced a LM statistic of 12.144 with the probability of 0.6254. The LM results therefore suggest that we cannot reject the null hypothesis of no serial correlation. Table 5.8 depicts the results of White Heteroskedasticity, and the p-value recorded by this test is 0.3855 which by implication shows that null of homoscedastic residuals cannot be rejected. For that reason we conclude that there is no indication of heteroskedasticity. Results for residual normality firmly depicting solid conclusion for credibility of the model, with all the probabilities in Skewness, Kurtosis and Jarque-Bera are greater than 5%, therefore we fail to reject the null hypothesis of a normal distribution.

The test results from these diagnostic tests show that the model was well specified. All of the diagnostic tests support the statistical appropriateness of the equation. There is no serial correlation and no misspecification. Furthermore, diagnostic tests have shown that the residuals are normally distributed and the parameters are stable.

### 5.4.1. Impulse response analysis

In most cases VECM model does not capture the wealth of information of the dynamic effects on the short run parameter estimates. Impulse response is employed to reveal this wealth of information on dynamic effects in both static studies and those dynamic studies that do not apply these techniques. Figure 5.5 below shows the results from the impulse response analysis performed on the VECM model.
FIGURE 0.5: IMPULSE RESPONSE OF GDP TO ITS INDEPENDENTS

Response to Cholesky One S.D. Innovations

Response of LGDP to LGDP

Response of LGDP to BD

Response of LGDP to LDA

Response of LGDP to LGDT

Response of LGDP to LOPEN

Source: Author’s own computation using EViews 8

The impulse response functions depict the dynamic response of the Gross Domestic Product (GDP) to a one-period standard deviation shock to the innovations of the system and also show the directions and persistence response to each of the shocks over a 10 quarter period. For the most part, the impulse response functions have the expected pattern and confirm the results from the short run relationship analysis. It is evident from the results that shocks to all the variables are significant but not persistent. The results shows the response of GDP an dependent variable
to itself, the graph shows that, the first 2 quarter GDP rises sharply and from the 3rd quarter it 
starts to increase at a declining rate and finally stabilises from 6th quarter to the 10th quarter. A 
shock to BD has appreciating effect of GDP but remains steady over the period. A one period 
standard deviation shock to DA, GDT, and Trade Openness has depreciating effect on GDP on 
an -0.26%, -0.13% and -0.13 average of the period respectively. All variables being analysed 
exhibit persistent and less significant impact on GDP.

5.4.2. Variance decomposition

Variance decomposition analysis provides a means of determining the relative importance of 
shocks in explaining variations in the variable of interest. In the context of this study, it therefore 
provides a way of determining the relative importance of shocks to each of the determinants of 
the gross domestic product in explaining variations in the GDP. The results of the variance 
decomposition analysis are presented in figure 5.6 and table 5.10 below, and these show the 
proportion of the forecast error variance in the gross domestic product explained by its own 
innovations and innovations in its determinants.
FIGURE 0.6: VARIANCE DECOMPOSITION

Variance Decomposition

Source: Author’s own computation using EViews 8
TABLE 0.10: VARIANCE DECOMPOSITION

<table>
<thead>
<tr>
<th>Period</th>
<th>S.E.</th>
<th>LGDP</th>
<th>BD</th>
<th>LDA</th>
<th>LGDT</th>
<th>LOPEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.004914</td>
<td>100.0000</td>
<td>0.00000</td>
<td>0.00000</td>
<td>0.00000</td>
<td>0.00000</td>
</tr>
<tr>
<td>2</td>
<td>0.010121</td>
<td>97.67003</td>
<td>1.09953</td>
<td>0.019435</td>
<td>1.056947</td>
<td>0.154052</td>
</tr>
<tr>
<td>3</td>
<td>0.015385</td>
<td>96.08424</td>
<td>1.758756</td>
<td>0.258958</td>
<td>1.718558</td>
<td>0.179484</td>
</tr>
<tr>
<td>4</td>
<td>0.020232</td>
<td>94.91483</td>
<td>2.287759</td>
<td>0.588134</td>
<td>1.914005</td>
<td>0.295275</td>
</tr>
<tr>
<td>5</td>
<td>0.024543</td>
<td>94.14417</td>
<td>2.671275</td>
<td>0.835826</td>
<td>1.927379</td>
<td>0.421348</td>
</tr>
<tr>
<td>6</td>
<td>0.028313</td>
<td>93.62213</td>
<td>2.960850</td>
<td>1.009099</td>
<td>1.905856</td>
<td>0.502062</td>
</tr>
<tr>
<td>7</td>
<td>0.031623</td>
<td>93.20741</td>
<td>3.221832</td>
<td>1.135786</td>
<td>1.880583</td>
<td>0.554385</td>
</tr>
<tr>
<td>8</td>
<td>0.034565</td>
<td>92.86197</td>
<td>3.457075</td>
<td>1.230656</td>
<td>1.851078</td>
<td>0.599217</td>
</tr>
<tr>
<td>9</td>
<td>0.037214</td>
<td>92.59856</td>
<td>3.641844</td>
<td>1.302487</td>
<td>1.819624</td>
<td>0.637481</td>
</tr>
<tr>
<td>10</td>
<td>0.039632</td>
<td>92.40672</td>
<td>3.780030</td>
<td>1.356445</td>
<td>1.791305</td>
<td>0.665504</td>
</tr>
</tbody>
</table>

*Source: Author’s own computation using EViews 8*

The results indicate that the predominant sources of variations in GDP forecast errors is its own shocks, which account for between 92 and 100 per cent of the forecast errors in GDP over a 10 quarter horizon. For the 4th quarter ahead forecast error variance, GDP itself explains about 94% of its variations while the rest of other variables explain the 5%, with BD explaining 2.3%, 0.58% explained by DA, 1.91% and 0.29% explained by GDT and OPEN. However, after the 6th quarter GDP explain 92% variation and the independent variables explain the remaining 7%. This implies that, on the 10 quarter horizon GDP is explained mostly by itself rather than by its determinants.

### 5.5. Chapter Summary

In conclusion, this chapter analysed the relationship between GDP and its determinants. Stationarity tests were conducted for the time series data employed in this study, which is both formal and informal test for stationarity. The Johansen cointegration test provided evidence that there is cointegration between the GDP and its determinants. The tests indicated the presence of cointegration which led to the estimation of VECM. The measure for the long run relationship was between GDP and its determinants such as budget deficits, domestic activities, government debt, and trade openness. Furthermore diagnostic checks for VECM model were conducted to check if there are no problems in the residuals; the study has employed diagnostic tests, meaning to check if the model is efficient or not. This helps to find out if the parameter estimates in the
model are not biased. The test results from these diagnostic tests depict that the model is reasonably well specified. All of the diagnostic tests support the statistical appropriateness of the equation. The results indicate a negative relationship between budget deficits and GDP, but the effect has been significantly very low.
CHAPTER 6: SUMMARY, POLICY IMPLICATIONS AND RECOMMENDATIONS

6.1. Summary and Conclusions

This chapter attempts to present conclusions and give policy implications and recommendations based on the results obtained in chapter 5. The study at hand investigated the impact of the government budget deficits on economic growth in South Africa in the period 1990Q1-2012Q4.

The first chapter presented the aim of this study which was to determine the impact of government budget deficits on economic growth in South Africa. Chapter two of this study gave an overview of the South African economy in relation to long run trends of budget deficits and economic growth. Chapter 3 outlined the analysis of theoretical and empirical literature. In chapter 4, methodology to this study was discussed and explanation of variables employed in the model was conducted. Chapter 5 presented analysis and interpretation of results. Diagnostic checks for VECM model was conducted as well in chapter 5, to check if there are no problems in the residuals, the study has employed diagnostic tests, meaning to check if the model is efficient or not. This helps to find out if the parameter estimates in the model are not biased. The test results from these diagnostic tests depict that the model is reasonably well specified. All of the diagnostic tests support the statistical appropriateness of the equation.

Based on an extensive review of literature on the effects of budget deficits on economic growth and on data availability, an empirical model that links economic growth and its potential determinants was specified. It has been shown that South Africa has been experiencing large budget deficits from the period starting in 1990 to 2012, and in the same period, only in 2007 and 2008 the country experienced budget surplus of 0.6 and 0.9 as percentage of GDP respectively. On the other hand the country has been experiencing low GDP growth in the past 21 years; and the reason is that, most of the budget was devoted on social expenditure rather than investment. It is believed that a country with huge budget deficits resulting from larger spending in social activities rather than fixed investment is likely to experience low growth rate. The South African government is now shifting its spending from social expenditure to emphasise on infrastructure development in order to enhance growth and employment. During the Budget Speech the
Minister of Finance announced that about R3.2 trillion will be allocated for infrastructure development for the next 9 years. The beginning of new democratic government, in the first 3 years deficits averaged to -4.6 % of GDP with fiscal budget emphasised on social development. The trends of budget deficits and GDP growth are not consistent, because there are years where the country would experience a rise budget deficits and growth rate would rise (in 2010) and years when fiscal deficits are small and GDP growth would decline (in 2003). In other years budget deficit would be stable (from 2002 – 2003 at -1.4% both years) and growth decline in the following year.

The variables employed in the model of this study included GDP [gross domestic product], BD [budget deficits], GDT [government debt], DA [domestic activities (private consumption and private investment)], and OPEN [trade openness]. We have employed Johansen co integration and error correction methodology as these methods have advantages over other techniques. Furthermore, stationarity on the time series data was checked by using both formal and informal tests. The results from the formal and informal tests indicated that the time series were integrated of the same order and all the variables were stationary after being differenced once. The evidence of one co integrating relationship was established by the Johansen co integration test and this allowed for the estimation of VECMs which provided parameter estimates for the long run relationships.

Different sentiments were shown from various schools of thoughts in regard to the impact of budget deficits on economic growth. Keynesian system, advocating a positive effect that budget deficits has on economic growth, Ricardian theory of equivalence suggesting that budget deficits is neutral to economic growth or economic activities. Neoclassical approach advocates negative effects that budget deficits have on economic growth, stating that budget deficits crowd out private investment. The empirical studies mostly support the arguments posed by neoclassical system, having indicated negative effects of budget deficits on economic growth in many countries. For South Africa, the available evidence does not firmly suggest that budget deficits have strong effects on growth.
The results in chapter 5 have indicated that budget deficits have long run negative impact to economic growth in South Africa, but the effect is significantly low with -1.39E-05 co-efficient. Regarding the speed of adjustment for GDP, the coefficient of D(LGDP) is -0.0061, this shows that the speed of adjustment is approximately 0.06%, meaning if there is deviation from equilibrium only, 0.061% is corrected in one year as the variable moves towards restoring equilibrium whenever there is disturbance. We stated that the speed of adjustment is statistically significant with an absolute t-value of -2.24806. The fact that there is low speed of adjustment by gross domestic product implies that there are other factors impacting the economic growth other than the variables employed in the study, such as interest rates, foreign direct investment, inflation, etc.

In the context of the South African economy, budget deficits had insignificantly contributed on the sluggish economic growth in the past 18 year. These results agree with other studies in emerging countries conducted by Cheng (2003) and Keho (2010). This implies that government intervention in the South African economy in the form of expansionary fiscal policy had little impact in growing the economy. The South African economy had the capacity to outperform the 3% average GDP growth, but the biggest threat to the effectiveness of the government is political differences.

Furthermore, a moderate government debt pre-2008/2009 financial crisis had a significant role in stabilizing the economy of South Africa. Based on the results in chapter 5, government debt positively impacted the economy. We stated that, if government debt is utilised productively, over the long run it could positively impact growth. Therefore, the South African government should reduce budget deficits to level below 4% from the historical average of 5% and maintain sovereign debt of 25% -30% as percentage of GDP. This will leave the government with small burden on interest payment.

6.2. Recommendations and Policy Implications

South African economy has been faced with very critical economic policy challenges. GEAR policy which was implemented in post 1994 failed to produce long term desired outcomes, such
as reducing unemployment rate, eradicating poverty, eliminating inequality and producing high economic growth rate. The transition and structural changes in various economies around the world towards economic globalisation did not accommodate the GEAR policy in South Africa as was expected. Furthermore, National Treasury (2013) suggests that economic and fiscal outlook has weakened in recent months, stating that "economic growth has been revised down since the 2013 Budget, leading to lower revenue projections. Commodity export prices, which supported buoyant revenue growth over the past decade, have retreated from their high levels, with lower prices during the first nine months of 2013. Historically low bond yields, in part the outcome of monetary policy interventions by the US Federal Reserve, have started to rise, putting additional pressure on interest costs, and reliance on foreign investors to finance the budget deficit has increased."

This study makes a contribution to the policy dilemma by examining the effect of key determinants of South African GDP. As mentioned in the previous chapter, budget deficits have long term negative effect on South African economic growth, government debt has been massively high post 2008/09 financial crisis as the government intervened to boost domestic economic demand. We conclude based on the results in chapter 5, that government debt if employed efficiently will produce positive results for the economy. On the other hand if high growth rate is not being achieved, high debt as a % of GDP will become a burden to the overall economy.

Goldman Sachs’s recent report “Two decades of Freedom” highlighted significant structure of the South African economy in the last 2 decades. One of the key points alluded in the Goldman Sachs’s report which this study has outlined in the previous chapters as the major challenge which characterised the South African economy is the fact that:

- Economic growth over the years showed significant improvement growing 2.5x over the period to around $400bn in 2013, however this growth rate lagged the desired 7% annual GDP growth. On the other hand South African unemployment rate remain at high levels, 24.7% in the third quarter of 2013.

Adding to what has characterised South Africa over the past 20 years, is the fact that:
• “Social welfare monthly cash grants are now afforded to over 16 million people in need, which corresponds to the number of people living below $2/day poverty line in South Africa, at an annual current cost to the fiscus of over $10bn” Goldman Sachs (2013)

Given the state of the South African economy alluded above, it will take another 2 decades to get things right. Uncertainty in the political landscape of the country is hurting the health of the South African economy. We recommend the continuity of the stance taken by Finance Minister in the 2013 Medium term budget policy statement which indicates that over the medium term government will: Achieve 4.2% fiscal deficit target by 2013/14 and “reduce the deficit substantially to level off the public debt trajectory.” Continue financing real increases in spending to boost the social wage, and ensure that wage bill for the government remains sustainable.

We believe that South Africa has a quality policy at hand, National Development Path (NDP). The biggest mountain in implementation of the NDP policy is political unrest, especially in the labour force. The government needs to monitor the labour sector closely, by improving labour regulation. Furthermore, the national government needs to monitor provincial and local government expenditures. A strict, proper and adequate annual expenditure review should be put in place in the lower government spheres to determine how the committed funds have been distributed and utilised. We believe that corruption in both government and private sector through the tender system damages potential growth and these factors are detrimental to investor confidence. Goldman Sachs (2013) shows that “governance and accountability and human resource management are cause of concern in the government departments, as they achieve a 60% and 73% failure rate respectively.”

We further recommend that NDP policy should accommodate small, medium enterprises SMEs). Balkenhol and Evans-Klock (2007:7) affirm that legislative framework in South Africa needs to be revised so as to guarantee that adequate flow of finance to SMEs is certainly available. For example, the interest rate ceiling imposed by the Usury Act could restrict access to finance for entrepreneurs. SMEs can play a fundamental role in South Africa in terms of employment generation, income growth, and elevate economic growth. The points suggested above, if
factored effectively in the current economic policy, the country would experience significant reduction in budget deficits and reap sustainable growth. If the government is not cognisant of the high corruption and if this in not addressed properly, the country’s budget deficit will be stuck in the 4% levels.

6.3. Limitations of the study and areas for further research

The study has incorporated all possible factors influencing economic growth, including budget deficits. One of the variables left out from the model is interest rates which influence savings and investment. However, this variable could not be included since this would result in multicollinearity with private investment. It is assumed that the effect of interest rates on growth will be reflected in investment demand. However the study remains significant in the South African context.
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## APPENDICES

### A1: DATA

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Standard errors in ( ) & t-statistics in [ ]

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TO WHOM IT MAY CONCERN

LETTER OF ATTESTATION

I, Dr. K. E. Monyai, hereby certify that I received and edited the Masters Dissertation of Luzuko Mrwebo, pages 1-130.

Director/ Editor/ Educator

Dr. K. E. Monyai (Ph D)

PARLONS LA LANGUE – LET US SPEAK THE LANGUAGE cc

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Date:25 November 2013