

AN ASSESSMENT OF THE RELATIONSHIP BETWEEN BUDGET DEFICIT AND
ECONOMIC GROWTH IN NAMIBIA.

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ABSTRACT

The study provides an assessment of the relationship between budget deficit and economic growth in Namibia using time series quarterly secondary data covering the period, 1993 Q4 to 2015, Q4. The study employs the Auto Regressive Distributed Lag (ARDL) bounds test and estimates the coefficients of the variables from the unrestricted error correction model in examining the relationship between budget deficit and economic growth. The KPSS unit root test results show that real GDP, debt and budget deficits are integrated of order zero, $I(0)$, while investment is integrated of order one, $I(1)$ making the highest order of integration $I(1)$. The Toda Yamamoto Granger non-causality test results indicate evidence of bi-directional causality between real GDP growth and budget deficit and a unidirectional causality from real GDP growth to debt. The study also found a bi-directional causality between debt and budget deficit. Co-integration test results confirm a relationship between real GDP and the explanatory variables. The overall findings indicate that budget deficit negatively affects growth rate both in the short run and long run. This is in conformity with the neo-classical theory which holds that fiscal deficits lead to a fall in real GDP growth. Therefore, holding other variables constant, in the long run, an increase in the fiscal deficit by 1 percentage point of GDP is associated with a lower real GDP growth rate, by about 0.23 percentage points. The study therefore recommends that government expenditure be aligned with government revenue in Namibia to curb the budgetary gap.

DECLARATION

I, Natalia Ndamononghenda Amwaama, hereby declare that this study is a true reflection of my own research, and that this work, or part thereof has not been submitted for a degree in any other institution of higher education.

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DEDICATION

I dedicate this work to my husband, Mr. Martin Amwaama, to my son, Etuna Amwaama and to my future children. May this be an inspiration for my children to strive for greater things in life.

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CHAPTER ONE: INTRODUCTION

1.1. ORIENTATION OF THE PROPOSED STUDY

Like many developing countries, Namibia experienced persistent budget deficits and rising levels of government debt. The 2015/2016 financial year was filled with challenges that threatened global and domestic economic developments for most countries. These challenges include, financial crisis, increasing uncertainty in the global geopolitical environment, the impact of the commodity price crash, asset market volatility among others (International Monetary Fund, 2016). All these developments negatively impacted revenue performance at the same time affecting other key fiscal indicators such as low growth in most African countries. Low productivity growth and other challenges that emerged from the financial crisis continue to hamper economic growth especially for the developing countries (International Monetary Fund, 2016).

The global growth rate in 2015 stood at 3.1 percent while the GDP growth in the Sub-Saharan African region was moderate and stood at 3.3% percent. Economic performance remained challenging in 2015 for South Africa, Namibia`s main trading partner, with GDP of 1.3% in 2015 which is a decline from 2014 and is expected to weaken further. The sluggish growth was due to the depreciation of the South African rand by more than 30% between December 2014 and December 2015, slow growth in the global economy which depressed demand for commodities as well as low consumer and business confidence among others. As a percentage of GDP stood at -3.9% which is an increase from -3.6% in 2014 (Kumo, Chulu & Minsat, 2016).

More specifically for Namibia, severe drought effects, depreciation of the South African Rand, adverse global economic environment, the outbreak of foot and mouth disease, high demand for land from the landless against the limited supply of land compounded by sky rocketing prices for land remains as the challenges faced by the government during the 2015-16 financial year. These challenges negatively impacted the estimated revenue collection outturn of N\$19 billion lower than the initial estimate of N\$24 billion (Ministry of Finance, 2015/2016). Liquidity came under pressure due to weak market confidence and consequently a tight cash flow situation causing expenditure increase. As a result, economic growth had slowed down in 2016 to an estimated 0.1 percent from 6.1 percent in 2015.

Government's requirements have evolved greatly since independence. A significant portion of government funding over the recent fiscal years has been sourced from domestic markets at the expense of increased government spending relative to revenue growth. Total government debt as a percentage of Gross Domestic Product (GDP) increased to 37.5 percent at the end of 2015, which is above the government set ceilings of 35.0 percent (Bank of Namibia, 2015).

1.1.1. Economic growth

Economic growth is the increase in the inflation-adjusted market value of goods and services produced in a country in a year. The rate at which GDP changes in a particular period measured as a percentage rate of an increase in real gross domestic product usually in per capital terms also reflect economic growth. The change in the value of goods and services produced by a country can either be negative or positive when compared to data of the previous years. Sustainable economic growth and the control of fiscal deficits are crucial factors for all economies especially for the developing economies like Namibia. To attain these goals, developing countries vote for fiscal

expansion often resulting in budget deficits and inflation. Budget deficits are triggered by increases in government spending and or lower taxes. High government spending or budget deficits do not always result in negative impact on economic growth. Budget deficits could be viewed as either good or bad depending on their consequences. Fischer (1993) asserts that budget deficits serve as an indicator of a government that is losing control of its actions. Furthermore, Ball and Mankiw (1995) state that when a government runs a deficit, it accumulates debt that it must payback through future taxation. Such a policy shifts the burden of taxes.

1.1.2. Budget Deficit Financing

Budget is a useful tool in setting a country's developmental policies and as such a budget balance can be used as a macroeconomic policy instrument for stabilizing the economy. Fischer (1993) views budget balance as one of the most important macroeconomic factors that has an impact on economic growth. Siegal (1979) refers to the magnitude of government fiscal surplus or deficit as probably one of the most important statistics used to measure the impact of government fiscal policy on the economy. A budget deficit occurs when the government spends more money than it takes in, that is when government expenditure exceeds government revenue. Budget surplus on the other hand arises when government revenue exceeds government spending. Buhari (1994) describes fiscal deficits as the gap between the government's total spending and the sum of its revenue receipts and non-debts capital receipts. It represents the total amount of borrowed funds required by the government to completely meet its expenditure.

In Namibia, the focus areas of the budget are investments in the areas with potential to induce economic growth and sustainable development, poverty eradication, improvement of the social welfare, progress towards prosperity, improved delivery of timely, reliable and affordable services to the public (PriceWaterhouseCoopers, 2016/2017).

The government budget in Namibia is an itemized accounting of the payments received by the government and the payments made by the government. The Namibian budget allocates resources and funding strategies aimed at addressing structural challenges affecting development potential of the economy and improving the welfare of the Namibians (PriceWaterhouseCoopers, 2016/2017).

Budget can be financed through collection of taxes, government borrowing, donor funds and or printing of money. Oden (1991) asserts that donor funds are not a dominant source for government expenditure (as cited in Melber, 2005). Budget deficit financing in Namibia comes from two major sources that are; tax revenue and central government debt. Namibia generates most of its revenue from taxes such as; taxes on income and profits, property taxes, indirect taxes as well as taxes on international trade. Non-tax revenue comes from administrative fees and charges, fines and forfeitures, diamond royalties as well as dividends and profit shares (Ministry of Finance, 2015/2016). Central government debt consists of domestic and foreign debt stocks. Domestic debt stock consists of issue of treasury bills and government bonds while foreign debt stock consists of foreign loans, foreign loan repayments and currency variation (Ministry of Finance, 2015/2016). A significant portion of government debt over the recent fiscal years in Namibia has been sourced from domestic markets through the issue of treasury bills and government bonds (PriceWaterhouse Coopers, 2016/2017). However, domestic borrowing may have negative effects on economic growth. Budget deficits financed by selling of bonds to the private sector decreases bond prices and in turn pushes up interest rates. An increase in interest rate leads to a reduction in private investments crowding out the private sector.

The effect of budget deficit on economic growth is linked to the way the deficit is financed and excessive use of any mode of financing has adverse macroeconomic consequences on economic growth. Investigating the relationship between budget deficit and economic growth involves addressing the question of whether the government can continue operating under current fiscal policy without affecting the economy negatively in the long run. This study seeks to determine the exact impact of budget deficit on economic growth in Namibia. In doing so, the study will assess the direction of the relationship between the series with specific focus on the effects of budget deficit on investment.

1.1.3. Overview of the Namibian Economic Performance.

The structure of the Namibian economy is based on primary production, with primary exports accounting for over 50 percent of merchandise exports. Namibia's exports consist mainly of diamonds and other minerals, fish products and meat products. However, the prevailing drought conditions and the weak commodity prices contracted the primary sector contributing to the decline in the growth rate of real GDP from 6.31% in 2014 to 6.12% in 2015.

During the financial year 2015/16, fiscal policy has remained expansionary to stimulate growth. The total revenue collections amounted to N\$52 billion, with taxes on income and profit contributing the highest percentage of 37% of the revenue followed by taxes on international trade and transactions with 33%. The total expenditure outturn stood at N\$65 billion during the same financial year. As a percentage of GDP, total public expenditure was 43 percent, which was an insignificant increase from 42 percent recorded in the previous fiscal year. Most of the expenditure is allocated towards defense, health, education and debt servicing. Over the same period, revenue as a percentage of GDP was 35 percent.

The expansionary policy was followed by a deficit of 8.3 percent of GDP from 6.7 percent in the previous fiscal year. The gap between revenue and expenditure has to be closed via increased debt borrowing, resulting in high levels of indebtedness of 38 percent, a remarkable growth of 62 percent.

The adverse global economic environment has negatively impacted the estimated revenue collection which ultimately became lower than the initial estimate. The moderate growth in revenue was also impacted by a decline in SACU revenue by 4.4 percent from N\$18.1 billion in the previous financial year to N\$17.3 billion in the financial year 2015/2016. Lower commodity prices, drought effects as well as the outbreak of the Foot and Mouth disease also contributed to the decline in revenue. This is because, during the year under review, a budget of N\$4.02 billion was reallocated from the operational and development budget toward pressing policy priorities and unanticipated expenses (Ministry of Finance, 2015/2016).

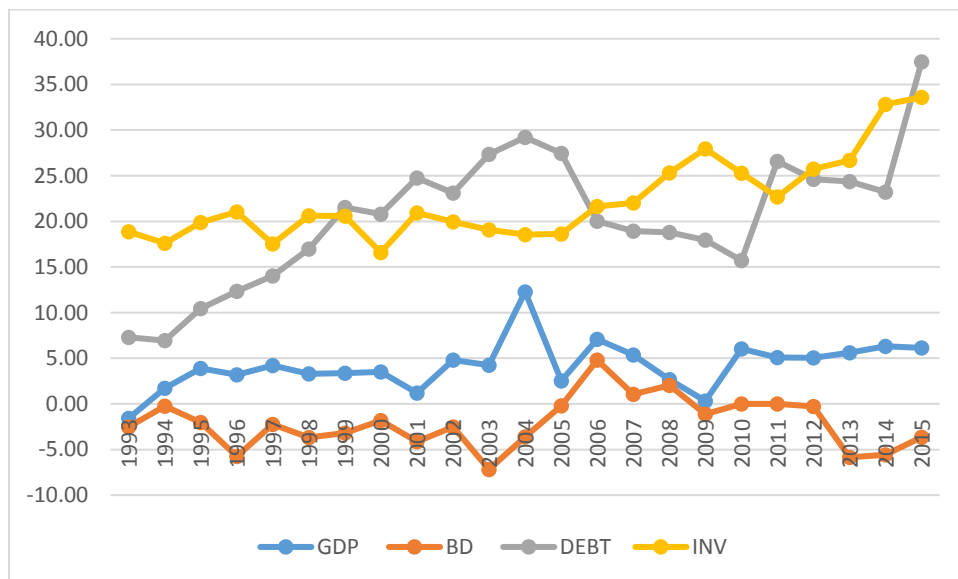


Figure 1: Namibia's budget deficit, debt and investment as a ratio of GDP.

Figure 1 shows GDP growth rate, budget deficit as a ratio of GDP, debt as a ratio of GDP and investment as a ratio of GDP. For the period 1993-2015, the government recorded budget surplus only in 2006, 2007 and 2008. Over the other years, Namibia has been experiencing budget deficits with expenditure priorities in education, defense and health and social services. This study uses budget deficit as a proxy of fiscal policy. According to Risti et al., (2013), budget deficit has an impact on all macroeconomic variables at the same time; macroeconomic indicators have an effect on budget deficit.

1.2. STATEMENT OF THE PROBLEM

Namibia has been experiencing continuous budget deficits and rising levels of debt over the years accompanied by a decline in sources of revenue. Namibia inherited a central debt after independence which also contributed to the rising levels of debt (Oden, 1991). The annual growth rate of GDP is 0.2% in 2016, which is a slowdown from 6.1% in 2015 (Bank of Namibia, 2016). Even though the economy is growing, there is a slow-down in the growth due to increased government spending relative to revenue (Bank of Namibia, 2016). The fact that the Namibian dollar is pegged to the South African rand at a rate of one to one also imposes restrictions on policy objectives such as the issue of budget financial restrictions according to Oden (1991).

The aim of the fiscal policy in Namibia is stimulating employment, investment, alleviating poverty and reducing inequalities in income distribution (Zaaruka, Ndove & Tjipe, 2004). This policy instrument according to Zaaruka et al. (2004) has put pressure on the government to increase spending which resulted in budget deficit and rising government debt.

The debt structure raises concerns regarding the medium to long-term sustainability of fiscal policy in Namibia. Increased borrowing leads to higher repayments because of higher interest rates and resources in the current period have to be set aside for servicing debts instead of investments in resources that could contribute to the long-term growth of the economy. The question of interest is whether the persistent fiscal deficit leads to economic growth in Namibia or not.

1.3. OBJECTIVES OF THE STUDY

The main objective of the study is to examine the relationship between budget deficit and economic growth in Namibia using quarterly time series data for the period 1993 Q1 to 2015 Q4. The specific objectives are as follows:

1. To assess if a long-run relationship exists between budget deficit and economic growth in Namibia.
2. To investigate the impact of budget deficit on economic growth; and
3. To evaluate if there is a causal relationship between budget deficit and economic growth.

1.4. HYPOTHESES OF THE STUDY

1. H_0 : There is no long-run relationship between budget deficit and economic growth.
 H_1 : There is a long-run relationship between budget deficit and economic growth.
2. H_0 : Budget deficit does not affect economic growth.
 H_1 : Budget deficit affects economic growth.
3. H_0 : There is no causal relationship between budget deficit and economic growth.
 H_1 : There is a causal relationship between budget deficit and economic growth.

1.5. SIGNIFICANCE OF THE STUDY

This study will help Namibian authorities in pursuit of the appropriate policy direction regarding the role of budget deficit in economic management. The results of this study could be useful for controlling what triggers the negative effects on economic growth in Namibia. Academically, other researchers can benefit in helping them enhance knowledge on budget deficit and economic growth in Namibia. Finally, this study will be useful for filling the gap in the literature.

1.6. LIMITATION OF THE STUDY

Several factors affect economic growth, but this study will look at budget deficit as the only factor determining economic growth. In addition, getting data for the same period for all the variables might be a challenge. The sources of data collection will be willing to allow the researcher to collect data for the research purposes only.

1.7 RESEARCH ETHICS

In this study, the researcher will not fabricate, falsify or misrepresent data and will acknowledge all data sources and report the data accurately. The data will be stored in a locked cabinet and destroyed after several years.

CHAPTER TWO: LITERATURE REVIEW

2.1 INTRODUCTION

Persistent budget deficits have increased researchers' interests in theories and evidence about fiscal policies. In this section, the study reviews the theoretical and empirical literature on the relationship between budget deficits and economic growth. The theories guiding this study concerning the economic effects of budget deficits are Neoclassical, Keynesian and Ricardian. Empirically, a vast body of research examines the relationship between budget deficits and economic growth with a host of economic variables and different techniques. According to Risti et al., (as cited in Eminer, 2015), most studies use budget deficit as it is the most reliable measurable indicator which impacts economic growth and also impacts all macro-economic variables, at the same time macroeconomic indicators affect budget deficit.

2.2 THEORETICAL LITERATURE

While Keynesian theory argues that there is a positive relationship between budget deficits and economic growth, the neo-classical school on the contrary argues for the opposite. Meanwhile, the Ricardian equivalence hypothesis claims that the relationship between the two variables is neutral. "It is remarkable that among these three schools of thought, one can find support for every conceivable normative position. Whether one thinks of deficit as good, bad or irrelevant therefore depends fundamentally on one's choice of paradigm. Certainly, no single paradigm corresponds exactly to reality" (Bernheim, 1989, p.56).

2.2.1. Keynesian View of Budget Deficits

Keynesian school of thought assumes the existence of unemployed resources as well as the existence of credit constrained individuals in the economy. Keynesian economists advocate that budget deficits produce positive impact by boosting economic growth. According to this school of thought, deficits need not crowd out private investment. This is because, assuming some economic resources are unemployed, an increased deficit spending leads to increases in aggregate demand, private investment and savings at a particular level of interest. Budget deficit accelerates capital accumulation and growth through increases in domestic production. Here, aggregate consumption is very sensitive to changes in disposable income because of the existence of a large number of myopic and liquidity constrained individuals (Bernheim, 1989).

Eisner (1986) adds on the Keynesian outlook on budget deficit which presupposes that government can and will “fine tune” fiscal policy. Eisner (1986) argues that efforts to reduce budget deficits may do more harm than good. He further states that deficits may actually stimulate aggregate savings and investments despite the fact that they raise interest rates.

2.2.2. Neo -Classical View

The neo-classical school predicts forward looking individuals who plan their consumption over their lifecycles and assumes the economy to be at full employment. The standard neoclassical model has three central features each of which play an important role in determining the impact of budget deficits. Firstly, the consumption of each individual is determined as a solution to an inter-temporal optimization problem, where both borrowing and lending are permitted at the prevailing market rate of interest. Secondly it assumes individuals have finite lifespans and lastly the market

is assumed to clear in all periods. Neo-classical school states that budget deficits raise total lifetime consumption by shifting taxes to the following generation. Budget deficit leads to higher interest rates which discourage the issue of private bonds, private expenditure and private investments thereby increasing inflation and leading to a similar rise in current account shortfalls which eventually cripple the economic growth rate through resources crowding out. Neo-classical school suggests that budget deficits are growth retarding as persistent deficits crowd out private investment.

According to Bernheim (1989), from the neo classical perspective, an increase in debt financed deficits causes a rise in interest rates; higher interest rates reduce private investment thereby lowering output. On the other hand, tax financed government expenditure, shifting taxes to future generations will lead to fiscal deficits increasing current consumption. This implies a decrease in savings and a rise in interest rates so as to bring equilibrium in capital markets. Higher interest rates in turn crowd out private investment thereby retarding economic growth.

2.2.3. Ricardian Equivalence Perspective

The Ricardian view's base of argument is that there is no direct relationship between budget deficit and economic growth and assumes farsighted individuals with extremely long time horizons for evaluating the present value of taxes. This theory puts forward the view that budget deficits have no real effects on growth as they do not affect the overall level of demand in the economy. This is because a rise in government budget deficit financed through borrowing is in actual fact equivalent to a future rise in the tax burden. Lower taxes in the present are offset by higher taxes in the future. In this sense, budget deficits and taxation have equivalent effects on the economy.

The Ricardian School was first proposed by David Ricardo and was later advanced by Barro (1989). Barro (1989) has developed more refined distinctions, he argues that tax financed and debt financed budget deficits have equivalent effects on the economy. The theory puts forward that debt financed deficits will be repaid through increases in taxes. A deficit financed tax cut for a given path of government spending leads to higher future taxes that have the same present value as the initial cut. That is, a decrease in government saving (that is, current budget deficits) leads to an offsetting increase in desired private saving and to no change in the desired national savings. Since the desired national saving does not change, the real interest rate does also not rise in a closed economy to maintain balance between the desired national saving and investment demand. In an open economy, there would be no effect on the current account balance because desired private saving rises by enough to avoid having to borrow from abroad. Therefore, budget deficits would not cause current account deficits. He concludes that households would reflect the same response whether the government finances their deficits by loans or taxes.

2.2.4. Other major contributors to the theoretical debate

Several authors who also contributed to the debate on the economic impacts of budget deficit financing include Friedman (1972, 1978), Ball and Mankiw (1995), Yavas (1998) as well as Carlson and Spencer (1975). According to Friedman (1972), an expansionary fiscal action might be reflected as a rise in output, but the financing of the deficit would set in motion contractionary forces which could eventually offset the initial stimulative effect. A further study by Friedman (1978) states that the economic consequences of government budget deficits are usually alleged to be either inflationary (rising prices) or deflationary (in the sense of depressing investment and hence economic growth) or both. That is, debt financed deficits need not crowd out any private investments and may even crowd in some.

According to him, long term debt financing leads to incomplete crowding out while short term financing leads to crowding in. The same study also provides evidence that the consequences of bond financing for expansionary policy do not appear so damaging. Ball and Mankiw (1995) in their contribution maintained that debt financed deficits may force the government to raise taxes when the debt comes due. In other words, debt financed budget deficits can lead to an increase in taxes or reduction in government spending or transfer payments so as to free up funds to pay for the debt. The increase in taxes reduces household income which in turns reduces output, whereas the reduction in government spending reduces output.

As reported by Carlson and Spencer (1975) crowding out generally refers to the economic effects of expansionary fiscal actions. If an increase in government spending financed by either taxes or debt issuance to the public fails to stimulate total economic activity; this means the private sector is said to have been crowded out by government action. They continue to argue that increased government spending may increase aggregate demand temporarily, permanently or not at all. Similarly, Yavas (1998) shows that an increase in size of fiscal deficit will increase the steady-state level of output if the economy is at low steady-state (that is underdeveloped), and will decrease the steady-state level of output if the economy is at a high steady-state (that is developed). He argued that in the underdeveloped countries a significant portion of the deficits is directed to the building of the infrastructure of the economy and this type of expenditure will have a stimulating effect on private sector production. In contrast, developed countries already have most of their infrastructure built and a major part of their deficit spending is on welfare programs and various social services. Accordingly, the positive effect of spending on these programs on private output will not be as great as that of expenditures on infrastructure.

Ball and Mankiw (1995) suggest that budget deficits reduces national savings. A decline in national savings reduces the supply of loans available to private borrowers, which pushes up the interest rates (price of loans). Faced with higher interest rates, households and firms choose to reduce investment. In the long run, an economy's output is determined by its productive capacity, which in turn is partly determined by its stock of capital. When deficits reduce investment, the capital stock grows more slowly than it could have done (Ball and Mankiw (1995). If deficits continue for a decade or more, they can substantially reduce the economy's capacity to produce goods and services (Ball and Mankiw (1995).

Similarly, Fischer (1993) provides evidence that growth is negatively associated with inflation and large budget deficits. Inflation reduces growth by reducing investment and productivity growth while budget deficits also reduce both capital accumulation and productivity growth. He concludes that the effects of budget deficit on economic growth are crowding out capital and intertemporal shifts in the tax burden. Moreover, Berheim (1989) argues that an increase in government expenditure leads to an increase in aggregate demand which leads to the use of unnecessary resources leading to an increase in output. Budget deficits are not harmful to the economy and they can be a useful tool in fueling demand. Furthermore, Benos (2009) reports that budget deficit exerts an ambiguous impact on growth. He argues that a current budget surplus will finance future deficits through cuts in distortionary taxation or increases in productive spending; hence an increase in budget deficit will not impact economic growth.

2.3 EMPIRICAL LITERATURE

Empirically, a vast body of research examines the relationship between budget deficits and economic growth with a host of economic variables and different techniques. The rest of the chapter will be outlined as follows; firstly, empirical literature on Namibia will be discussed, followed by empirical evidence in support of the Keynesian view. Later, brief discussion on empirical evidence in support of the Neo-Classical view followed by empirical evidence in support of the Ricardian view and the summary will conclude.

2.3.2 Empirical literature on Namibia

There is very limited empirical literature on the effects of budget deficits on economic growth in Namibia. Bebi (2000) in his study on the impact of fiscal deficits and public debt on real interest rates and investment in Namibia discovered a statistically insignificant effect of domestic debt-GDP on lending rate, and significant fiscal deficit effect on interest rates.

Eita and Mbazima (2008), Nyambe and Kanyeumbo (2015) and Shafuda (2015) all contribute empirically to the debate on the relationship between government expenditure and or government revenue and economic growth in Namibia. Eita and Mbazima (2008) adopt the vector auto regression (VAR) technique in estimating the relationship between government revenue and government expenditure in Namibia with data covering the period 1977 to 2007. The study also examines the causal relationship between government revenue and government expenditure using the Granger causality to test whether government revenue causes government expenditure or whether the causality runs from government expenditure to government revenue, and if there is bidirectional causality.

The results indicate that there is a unidirectional causality running from government revenue to government expenditure. This suggests unsustainable fiscal imbalances (deficit) which can be mitigated by policies that stimulate government revenue.

Nyambe and Kanyeumbo (2015) 's study is premised on time series annual data for the period 1980 to 2011 with an objective of ascertaining the role that government expenditure, household expenditure and inflation plays in growing the Namibian economy. The paper invokes the use of a multiple regression model for the analysis. The results posit the existence of a positive relationship between government expenditure, and household expenditure and economic growth. However, inflation has a negative relationship with economic growth. Shafuda (2015) in his study on the relationship between government spending and economic growth used data for the period 1980-2012 with the use of the Granger causality test, co- integration test as well as the vector error correction model (VECM) tests. The results show that there is a unidirectional relationship between the two variables and that government spending has a significant positive impact on economic growth in Namibia. To the best knowledge of the researcher, there is no study that assessed the relationship between budget deficit and economic growth in Namibia. It is from this perspective that this study will be the first empirical study that specifically assesses the relationship between the two series.

2.3.3 Empirical evidence in support of the Keynesian view

Keynesian economists advocate that budget deficits produce positive impacts by boosting economic growth. Acaravci1 and Ozturk (2008) examine the general validity of twin deficits hypothesis for Turkey during the period 1987:Q1 to 2005:Q4. In their study, the Autoregressive Distribution Lag (ARDL) model and the bounds test for co-integration are used to assess the short-run and long-run dynamics between the twin deficits in Turkey.

The empirical analysis rejects the Ricardian Equivalence Hypothesis and supports the Keynesian view that there is a long-run relationship between budget deficit and current account imbalances. The empirical results also indicate that the direction of causality runs from the budget deficit to the current account deficit.

Afonso and Alegre (2008) test whether re-allocation of government budget items can enhance long-term GDP growth in a set of 27 European countries. They apply modern panel data techniques to the period 1970-2006 and use three alternative dependent variables in a growth regression: economic growth, total factor productivity and labour productivity using the ARDL approach. They detect a strong crowding effect associated with public investment, which has enhanced economic growth by boosting private investment.

Benos (2009) 's paper decomposes public spending and revenues into several sub-categories and estimates the impact of each of them on economic growth. The model is estimated using Ordinary Least Squares (OLS) and uses panel data for a period of 30 years covering 14 European Union countries. The main findings are: a) public expenditure on infrastructure exerts a positive impact on growth; b) government outlays on property rights protection have a positive effect on per capita growth; c) distortionary taxation depresses growth and d) government expenditure on human capital enhancing activities does not have a significant effect on per capita growth.

Odhiambao, Momanyi, Lucas and Aila (2012) estimate an econometric model using the OLS technique. They establish the extent to which fiscal deficits and economic growth are related and further investigate ways in which fiscal deficit have effects on the growth and development of the Kenyan economy. The study uses both exploratory and causal research designs and employ time series secondary data for a period of 38 years (1970-2007).

Time series properties of the data are examined by carrying out unit root test Augmented Dickey Fuller (ADF) test as well as Johansen co-integration test. The study found a positive relationship between budget deficit and economic growth.

Buscemi and Yallwe (2012) analyses the impact of fiscal deficits on economic growth focusing on three emerging countries; South Africa, China and India. They provide evidence that fiscal deficit are significant and positively correlated to economic growth and savings. Taylor et al., (2012) uses data covering the period 1961-2011 with co-integration analysis and the VAR framework in assessing the effects of budget deficits on economic growth in the United States of America. The findings reveal a strong positive effect of fiscal deficit on economic growth.

Murwirapachena, Maredza and Choga (2013) investigate the economic determinants of budget deficit in South Africa. They use time series data for a period of 30 years (1980-2010) and adopt the VAR technique to estimate the determinants of budget deficits in South Africa. Data is tested for stationarity using Dickey-Fuller (DF) and Augmented Dickey Fuller (ADF) unit root tests. The Johansen co-integration test and VECM technique are used to estimate the impact of selected macroeconomic variables on the dependent variable (budget deficit). Their results reveal that all the determinants have positive impact on budget deficit except foreign debt. In another empirical paper, Ramzan, Saleem and Butt (2013) explore the impact of budget deficit on economic growth in Pakistan using regression analysis to estimate the impact. Pearson correlation test is applied to check the relationship among independent variables (budget deficit, investment, inflation and domestic credit). Regression results show that the model is a good fit. The results also indicate that the correlation between inflation and investment is weak and correlation between credit and investment is also weak while correlation between budget deficit and investment is moderate.

In Ghana, Antwi, Zhao and Mills (2013) studied the consequential effects of budget deficit on economic growth by applying the annual time series data for the period 1960-2013. The ADF and PP test found that both government expenditure and revenue of Ghana are stationary and integrated of order one. The Granger causality test supports a bi-directional causation such that both expenditure and revenue of Ghana have temporal precedence over each other. The test for co-integration favors the sustainability of budget deficits of Ghana. Ahmad (2013) carries out an empirical study using time series data from 1971-2007 and employ the ADF test to check for the stationarity of the data and find all variables to be stationary at a 5% level of significance. The OLS results show that there is a positive but insignificant relationship between budget deficit and economic growth of Pakistan. The results of the Granger causality test show that there is a bi-directional causality between GDP and budget deficit.

Onwioduokit and Bassey (2014) use the ADF and Phillips-Perron (PP) unit root tests together with the Engle-Granger Two Step (EGTS) procedure. The key objective of their paper is to empirically estimate the level of fiscal deficit that is conducive to output growth in the Gambia between the period 1980 and 2009. The empirical results show, for example, that fiscal deficit affects the real economic growth positively and significantly with a lag of one year. Thus the results support the Keynesian assertion that fiscal deficits have positive impact on economic growth.

A further study by Umaru and Gatawa (2014) examine the impact of fiscal deficit and a disaggregated government expenditure on economic growth in Nigeria from 1970 to 2011 using an Auto Regressive Distributed Lagged (ARDL) approach. It further investigates the nature and direction of causality between economic growth and the explanatory variables using the pair wise Granger causality tests.

The results show that a unidirectional causality is found running from capital expenditure to economic growth, while there is no causality between recurrent expenditure and economic growth and also between fiscal deficit and economic growth. The ARDL estimation reveals that a percentage increase in fiscal deficit expands the national output by 10.05% while a 10% increase in government capital expenditure in Nigeria increases the growth rate of the economy by 62.21%. However, recurrent expenditure has no significant impact on economic growth. From the analyses, it has been empirically confirmed that deficit budget and capital expenditure in Nigeria are growth inducing. The study therefore recommends a sustainable and absorbable deficit budget which should be geared towards capital projects like infrastructural and human capital development to achieve sustainable growth and development.

Eminer (2015) uses time series secondary data for 28 years (1983-2010) to test the causal relationship between budget deficit and economic growth in the long run using the Granger causality test. The DF and ADF tests are used to test for stationarity of the variables. ARDL approach is also used to estimate the relation between all other variables. The findings are that budget deficit and all kinds of government expenditure are related with economic growth. The study found that productive expenditure causes economic growth in agreement with the Keynesian theory. Eminer (2015) thus concludes that high government spending or budget deficit does not always result in negative effects on economic growth. An increase in government spending will result in budget deficit but would have different effects on economic growth depending with the expenditure productivity.

Nayab (2015) also examines the impact of budget deficit on economic growth in Pakistan for the period 1976-2007 using the Johansen co-integration technique, VAR Granger causality test and VECM. The study concludes that budget deficit positively impacts growth and that the impact is significant. The VAR Granger causality test indicates that Gross Domestic Product (GDP) causes investment while investment causes deficit. However, there is no significant impact of budget deficit on economic growth of Pakistan. Magehema (2015) establishes the effect of budget deficit on economic development in East African Countries. The study uses quantitative data in form of secondary data from Tanzania, Kenya, Uganda, Rwanda and Burundi for a ten-year period covering 2004 to 2013. The study undertakes a correlation design and uses Analysis of Variance (ANOVA) to estimate the results of the correlation between the variables. The relationship between budget deficit and economic growth is found to be positive, that is, when budget deficit increases (decreases); economic development increases (decreases). In the same year, Fehiman (2015) uses time series secondary data for the period 1983-2010 to test the causal relationship of budget deficit and economic growth in the long run using the Granger causality test. The Dickey Fuller test is used for unit root testing and the ARDL model is used to estimate the relationship between all other variables. The findings are in line with the Keynesian view.

Aslam (2016), empirically tests the dynamic relationship between budget deficit and economic growth of Sri Lanka using annual time series data from 1959 to 2013. The Johansen co-integration technique and VECM are employed to test the relationship. The results indicate that budget deficit has a positive relationship with economic growth of Sri Lanka. In the same manner, Rath and Sar (2016) 's paper also uses VECM to identify the long run relationship between fiscal deficit and economic growth in Odisha over the period 1950-51 to 2014-15.

They also used the Johansen co-integration approach with other econometric methods such ADF and Phillips-Perron (PP) to test unit root as well as Granger causality to identify the direction of causality. They concluded a unidirectional causality that runs from fiscal deficit to economic growth both in the short run and long run. Further, fiscal deficit causes economic growth but not the reverse.

Duokit and Ekong (2016) provide evidence that budget deficit is positively related to economic growth of Sierra Leone. The study employs the Classical Ordinary Least Square (OLS) technique and Engle- Granger Two Step (EGTS) procedure in examining the effects of budget deficit on economic growth in Sierra Leone with time series data for a 30 year period. The ADF unit root test is used in order to check for stationarity of the variables.

A further study by Osoro (2016) examines the relationship between budget deficit and economic growth in Kenya. The study goes a step further and determines the level of budget deficit that is favourable to the economy of Kenya using time series data for the period 1980 to 2014 on STATA by employing Ordinary Least Squares (OLS) method of estimation. The results indicate a positive relationship between budget deficit and economic growth but as the budget deficit increases, the impact on growth decreases. The study identifies a budget deficit of approximately 4 per cent of Gross Domestic Product (GDP) as being optimal for the case of the Kenyan economy, beyond this level, the benefits obtained from the deficits start diminishing. This result supports the Keynesian view of budget deficit which advocates for deficit in stimulating the economy during recession periods. The study recommends financing of development expenditures through public private partnerships or off the balance sheet to create fiscal space.

2.3.4 Empirical evidence in support of the Neo classical view

Neo classical school suggests that budget deficits are growth retarding as persistent deficits crowd out private investment. Huynh (2007) conducted his study on budget deficits and economic growth using data for the developing Asian countries over the period of 1990 to 2006 using OLS methodology. He concludes that there is negative impact of the budget deficit on the GDP growth of the country while simply analyzing the trends in Vietnam.

Afonso and Alegre (2008) tests whether reallocation of government budget items can enhance long-term GDP growth in a set of 27 European countries. They apply modern panel data techniques to the period 1970-2006 and uses three alternative dependent variables in a growth regression which are; economic growth, total factor productivity and labour productivity using ARDL approach. They further identify a negative impact of public consumption and social security contribution on economic growth and a positive impact on public investment

Obi and Nurudeen (2009) examines the effects of fiscal deficits and government debt on the interest rates in Nigeria by applying the VAR approach, ADF stationarity test and Granger causality test using data for the period 1981 to 2006. The results confirm a positive interest rate effect of fiscal deficits and debt. The authors concluded that deficit financing leads to huge debt stocks and tend to crowd out private sector investment by raising interest rates.

Korsu (2009) carries out an empirical study on the effects of budget deficit on external sector of Sierra Leone using aggregate annual data from 1971 to 2005. Equations for money supply, price level, real exchange rate and the overall balance of payments are estimated simultaneously using a three-stage least square (3-SLS) estimation technique. The estimated results indicate that fiscal restraint improves the external sector of Sierra Leone by reducing money supply and the price

level. The important contribution of Korsu (2009) 's paper rests on the simulation experiments. The results point to the need for fiscal restriction and improved revenue generation to meet the expenditure requirements of the government. In the same year, Gosh and Hendrik (2009) explore how the US budget deficit affects US economic growth. This paper applies time series data covering the period 1973-2004 to a simultaneous equation model to estimate the various direct and indirect effects of budget deficits on growth. The PP and KPSS unit root tests are used to detect the existence of unit root in variables. The econometric model is estimated by three stage least squares (3SLS) and the overall results confirm that growing budget deficits reduce economic growth, all other things equal.

In his contribution to the debate, Keho (2010) estimates the causality between budget deficits and economic growth in seven member countries of the West African Economic and Monetary Union (WAEMU). The study employs the Granger causality test developed by Toda and Yamato (1995). Annual time series data on real GDP growth, ratio of gross fixed capital formation and public deficit or surplus as a percentage of GDP are used. The empirical results are mixed across countries. Findings indicate a two-way causality in three countries (Benin, Burkina Faso and Mali), where deficits have adverse effects on growth. The study also finds a unidirectional causality running from deficit to growth in the case of Niger. In all cases where causality existed, the study finds that deficit retard economic growth rates.

Oladipo and Akinbobola (2011) investigate the nature and direction of causality between budget deficit and inflation and the economic implications of fiscal deficit financing. Secondary data covering 1970-2005 is used in this study on the variables; inflation rate, exchange rate, GDP and budget deficit. Granger causality pair wise test, ADF test and Johansen co-integration techniques are also used in data analyses. The results show that no causal relationship exists between inflation

and budget deficit, while the causal relationship from budget deficit to inflation was significant. This implies that a uni-directional causality from budget deficit to inflation exist in Nigeria. Furthermore, the results showed that budget deficit affects inflation directly and indirectly through fluctuations in the exchange rate in the Nigerian economy.

Fatima, Ahmed and Rehman (2011) analyses the impact of government fiscal deficit on investment and economic growth using time series of thirty years stretching between 1980 and 2009. Unit root tests of DF and ADF are used to check the stationarity of the data and results show that all series strongly reject the unit root null hypothesis at 5 percent significance level. The two-stage least squares method (2-SLS) is used to estimate the model. The paper concludes that fiscal deficit affects economic growth of the country very adversely. The authors believe that fiscal deficit has seriously undermined the growth objectives thereby adversely impacting physical and social infrastructure in the country. Avila (2011) on the other hand, analyzed the relationship between fiscal deficit, macroeconomic uncertainty and growth in Argentina for the period 1915-2006 using Granger causality test and co-integration with regression analysis. The study concluded that the deficit, possibility through the volatility in relative prices it generates, is a significant restriction on per capita income growth in Argentina.

Anayochukwu (2012) investigates the causal relationship between inflation and fiscal deficits in Nigeria, covering the period 1970-2009. This is carried out by way of developing an estimation model of inflation and fiscal deficit. The variables are subjected to the unit root test using ADF and PP tests. The estimation technique used is the autoregressive distributed lag model and Granger causality test. The study finds that fiscal deficit causes inflation and also confirms a significant negative relationship between growth, fiscal deficit and inflation.

Ezeabasili, Tsegba and Ezi-Herbert (2012) carried out an empirical study on the effects of fiscal deficits on the Nigerian economic growth using time series data covering the period 1970 to 2006. Co-integration and structural methods are used and fiscal deficits are found to adversely affect economic growth. In Pakistan, Fatima et al. (2012) employ time series data considering the period 1978-2009 using regression analysis, OLS technique and unit root test and explored a negative impact of budget deficit on economic growth.

Awe and Shina (2012), in their study analyses whether budget deficit is inflationary or not in Nigeria using time series data within the period 1980-2009. The study employs the PP and Kwiatkowski, Phillips, Schmidt and Shin (KPSS) unit root tests to determine the time series characteristics of the variables, VECM technique to examine the correlation between the two macroeconomic variables and Granger causality to establish the direction of the causality. The results indicate a positive relationship between budget deficit and inflation rate as well as a uni-directional causality from budget deficit to inflation in Nigeria.

Binh and Hai (2013), using ARDL, investigates the impact of budget deficit on economic development in Vietnam with quarterly time series data from 2003 Q1 to 2012 Q4. ADF unit root tests are applied and the causal relationship is tested using Granger causality test. Budget deficit is found to have negative but insignificant effects on economic growth rate. Meanwhile, government expenditure has significant influence on economic growth; in which productive expenditure is proven to be positively related to economic growth and nonproductive expenditures are detrimental to the growth of the economy. The paper then concludes that there is a long run causality running from budget deficit and government expenditure to economic growth.

Asogwa and Chetachukwu (2013) show the crowding out effects of budget deficits on private investment in Nigeria. It evaluates private investment and budget deficits by adopting an analysis framework that employs the OLS and Granger causality test. The analysis confirms that budget deficits crowd out private investments and the results of Granger causality shows that there exists bidirectional causality between budget deficits and private investments in Nigeria.

Awe and Funlayo (2014) also investigates the short and long term implications of budget deficit on economic growth in Nigeria. The sample study comprises of time-series data covering the period 1980-2011. Regression analysis is conducted to ascertain and affirm the impact of budget deficit on the economic growth in Nigeria. The results from the OLS regression analysis indicate that a negative relationship exists between budget deficit and economic growth. Johansen co-integration technique is used to investigate the long term effects of budget deficit. The results indicate a significant long-run relationship between budget deficit and economic growth in Nigeria. The error correction model revealed that budget deficit shows a negative relationship with gross domestic product while gross capital formation (investment) shows a positive relationship with GDP. The study recommends that budget deficit should be financed appropriately to help promote economic growth in the nation.

In another empirical paper, Lwanga and Mawejje (2014) studies the macroeconomic effects of budget deficits in Uganda for the period 1999 to 2011. They adopt the VECM technique, pairwise Granger causality test and variance decomposition techniques and determine the stationarity properties using ADF and PP tests. Results confirm that the variables under study are co-integrated and thus have a long run relationship.

Results based on the VECM reveal unidirectional causal relationships running from budget deficits (BD) to current account balance (CAB), inflation to BD and BD to lending interest rates, but the results show no causal relationship between budget deficit and GDP in Uganda. The pairwise Granger causality test results reveal unidirectional causal relationships running from budget deficit to current account, BD to GDP, inflation to BD, and a bi-directional causal relationship between the current account balance and GDP. The results from the study clearly show that budget deficits in Uganda are responsible for widening current account deficits and raising interest rates.

Brima and Mansaray-Pearce (2015) 's study presents an investigation into the relationship between budget deficit and few macroeconomic variables in Sierra Leone using time series data for a period of 34 years (1980-2014). The study follows an econometric approach to derive the long run and short run relationships in which the Johansen's test of co-integration, VECM model and the Granger causality test techniques were employed. Results from the long run relationship shows that exchange rate, gross domestic product and money supply have a negative and significant relationship with budget deficit whereas interest rate and inflation have a positive one, though interest rate is insignificant in the long run. Results from the Granger causality test confirms causal link between exchange rate, gross domestic product, inflation, money supply and budget deficit.

In their study, Dlamini and Amanja (2015) applies the Autoregressive Distribution Lag (ARDL) approach and other econometric tests such as Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) for unit root in investigating the nature of the relationship between fiscal deficits and economic growth in the Kingdom of Swaziland using time series secondary data from 1981-2013.

The findings indicate that fiscal deficit and government recurrent expenditure negatively affect economic growth whereas government investment and inflation have a positive effect on growth. The study recommends that Swaziland reduces reliance on SACU revenues by enhancing revenue generating capacity in order to finance its expenditure adequately and help increase the multiplier effect that further generates output hence economic growth.

A panel study by Navatram and Mayandy (2016) examines the impact of fiscal deficit on economic growth in selected South Asian countries, namely, Bangladesh, India, Nepal, Pakistan and Sri Lanka using time series annual data over the period 1980 to 2014. Their paper uses co-integration analysis, error correction modeling and Granger causality test under a Vector Auto Regression (VAR) framework. The ADF and PP unit roots show that the variables are integrated of order 1. The overall results from the study confirm that fiscal deficit has a negative impact on economic growth in the South Asian countries considered in this study except Nepal, which confirmed a positive impact. The results also highlight that the direction of causality for the SAARC countries is mixed where fiscal deficit causes economic growth for Bangladesh, Nepal and Pakistan, but the reverse is true for India and Sri Lanka.

In Ghana, Nkrumah, Orkoh and Owusu (2016) in their paper, combine Auto Regressive Distributed Lag (ARDL) approach with trend analysis to assess the relationship between budget deficit and economic growth from 2000 to 2015 using quarterly data. The trend analysis reveals that since 2000, years of high budget deficit are usually followed by years of low economic growth and vice versa. The same phenomenon was also observed between 2012 and 2015. Unit roots test was first conducted in order to examine the stationarity properties of the variables in the study. The results from the ADF and PP unit roots tests indicates that all the variables of interest are integrated of order one ($I(1)$) variables.

The pairwise Granger causality test reveals a bi-directional causality between budget deficit and economic growth in Ghana. The econometric results show a significantly negative effect of budget deficits on economic growth. Thus, a 100 percent increase in budget deficit in the long run would lead to a 3 percent decrease in real GDP, holding all other factors constant. The results confirm the Neoclassical proposition that high budget deficit does not necessarily translate into economic growth. Finally, their paper recommends that government must ensure strong fiscal discipline.

Zuze (2016) also examines the relationship between fiscal deficit and economic growth in Zimbabwe for the period 1980-2015 using the VAR estimation method coupled with variance decomposition and impulse response functions. Granger causality test was also employed to determine the direction of the causality between the series. The variables are tested for unit root using the ADF test. The ADF test results reveal that both budget deficit and economic growth are integrated of order one. The regression results reveal that there is a negative relationship between budget deficit and economic growth in Zimbabwe. The results from this study confirm that the fiscal deficit-economic growth relationship is a one-way relationship. While fiscal deficit matters for economic growth, the reverse is not equally true.

An analysis in the study by Mohanty (not dated) finds that there is negative and significant relationship between fiscal deficit and economic growth in the long run in India. The study examines the relationship between fiscal deficit and economic growth in India by covering the time period from 1970-71 and 2011-12. Johansen co-integration test, Granger causality test, ADF unit root and VECM techniques were adopted in order to examine the objectives.

2.3.5 Empirical evidence in support of the Ricardian equivalence

The Ricardian theory puts forward the view that budget deficits have no real effects on growth as they do not affect the overall level of demand in the economy. Thus, there is no direct relationship between economic growth and budget deficit. In his contribution to the debate, Keho (2010) estimates the causality between budget deficits and economic growth in seven member countries of the West African Economic and Monetary Union (WAEMU). The study employs the Granger causality test developed by Toda and Yamato (1995). Annual time series data on real GDP growth, ratio of gross fixed capital formation and public deficit or surplus as a percentage of GDP are used in the estimation. The empirical results are mixed across countries. In three cases (Cote de Ivoire, Senegal and Togo) the author found no causality evidence between fiscal deficits and growth.

Dalyop (2010), uses OLS and data covering the period 1982-2008, examines the effectiveness of fiscal deficits on the growth rate of the real GDP. The study employs both theoretical and empirical approaches to determine the effectiveness of fiscal deficits in expanding the level of economic activity in Nigeria. The study concludes that fiscal deficits have little effect on the level of economic activity in Nigeria.

Rahman (2012) investigates the relationship between budget deficit and economic growth from Malaysia's perspective using the ARDL approach in analyzing the long run relationship between all series. Time series data on four variables; real GDP, government debt, productive and non-productive expenditure is used in the data analysis. The findings reveal no existence of a long run relationship between budget deficit and economic growth of Malaysia. However, productive expenditure has a positive long-run relationship with economic growth.

Bayat, Kayhan and Senturk (2012), in their study, apply the conventional Toda-Yamamoto (1995) linear Granger type causality test and Hacker and Hatemi-J (2005, 2006) bootstrap process-based Toda-Yamamoto linear Granger type causality test to investigate the causality between budget deficits and its ratio to gross domestic product and interest rate in the Turkish economy during years between 2006 and 2011. The study also uses the KPSS test developed by Kwiatkowski et al. (1992) as well as DF-GLS test developed by Elliot, Rothenberg and Stock (1996) for unit root testing. Results show that there is no causal relation between budget deficits and nominal interest rates. Another empirical paper by Van and Sudhipongpracha (2015) presents evidence that government budget deficit had no direct effects on the Vietnam's economic productivity using panel data for the period 1989 to 2011. Instead, the article discovered that foreign direct investment (FDI) played an important role in Vietnam's economic productivity over the same period while real interest rates adversely affect growth. The research methods employed in the article used descriptive statistics and panel data econometrics.

2.4. SUMMARY

The theoretical conclusions regarding the relationship between budget deficits and economic growth are argumentative. While Keynesian theory argues that there is a positive relationship, the neo classical on the contrary argues for a negative relationship. Meanwhile, the Ricardian equivalence hypothesis claims that the relationship between the two series is neutral. The effects of budget deficit on economic growth are linked to the way the deficit is financed. From an empirical point of view, many studies indicate that the relationship between budget deficits and economic growth exists, however the findings regarding the nature of the relationship between the two series varies among researchers. Some researchers find that budget deficits do harm to economic growth, while others report to the contrary. Apart from that, several researchers found that budget deficits have no real effects on growth whereas few researchers found mixed results. The existing evidence is thus difficult to interpret. According to Bernheim (1989), measurements of budget deficit are problematic and results are very sensitive to the adjustments that one actually makes. However, from the reviewed literature, it can be deduced that differences in terms of opinions and analyses arise mainly due to various factors such as time dimension, types of countries, types of government administration and the method of analysis as well as the extent of the budget deficits according to Briotti (2005). In short, these conflicting results underscore the usefulness of the data for country specific studies because there is no clear indication that studies with the same methods yield the same results or studies done in the same country give the same results, therefore the debate remains inconclusive.

CHAPTER THREE: ANALYTICAL FRAMEWORK METHODOLOGY

3.1 INTRODUCTION

The research design is quantitative and it is concerned with finding and elaborating the relationship between budget deficit and economic growth in Namibia. Statistical software E-views is used to process the data. Secondary quarterly data covering the period 1993 to 2015 is obtained from the Bank of Namibia, Ministry of Finance as well as Namibia Statistics Agency from the website and personally collected. The study uses data on the following variables, GDP, budget deficit and control variables of debt, inflation and gross fixed capital formation. The methodology involves regressing the dependent variable (GDP) on the explanatory variable.

3.2 DATA SOURCES AND ESTIMATION PROCEDURES

The study presents an empirical investigation into the relationship between budget deficit and economic growth in Namibia using time series quarterly statistical data for the period 1993Q4-2015Q4, with 92 observations. The sample size was selected based on the availability of budget deficit data. The secondary data used is obtained from the Bank of Namibia, Ministry of Finance, World Bank as well as Namibia Statistics Agency. The study also uses data on the variables, GDP and budget deficit as well as Control variables of debt and Gross Fixed Capital Formation. This is because the effects of budget deficit on economic growth are linked to the way the deficit is financed. The methodology involves regressing economic growth on the explanatory variables through the following procedures; testing for stationary properties of the variables using KPSS test of Kwiatkowski et al., (1992), followed by ARDL co-integration procedure suggested by Pesaran et al (2001) to check for the existence of co-integrating and long run relationships. The Toda-Yamamoto (1995) is employed to assess if there is a causal relationship between the variables.

3.3. THEORETICAL FRAMEWORK

The study adopts the work of Onwioduokit and Bassey (2014) and Osoro (2016) which arises from the Keynesian framework. In the Keynesian framework, the desired aggregate demand relationship in the goods market is specified as follows:

$$Y = C + I + G + (X - M) \dots\dots\dots (1)$$

With the following behavioural equations:

$$C = a + bY^d, b > 0$$

$$Y^d = Y - T$$

$$I = \delta + \gamma i, \gamma < 0$$

$$G = \bar{G}$$

$$X = s + \sigma e, \sigma > 0$$

$$M = m + \phi Y^d, \phi > 0$$

Where Y = output; C = consumption; I = investment; G = government spending which is assumed to be exogenous; X = exports; M = imports; Y^d = disposable income; T is the tax revenue; i is the interest rate; e = exchange rate.

In equilibrium, after substituting the behavioral equations into equation (1), output will be given as follows:

$$\bar{Y} = \frac{A}{\theta} + \frac{1}{\theta} (\gamma i + \sigma e + G - (b - \phi)T) \dots\dots\dots (2)$$

Where $\theta = 1 - b + \phi$ $A = a + \delta + s - m$

From equation (2), increasing taxes reduces output, while increased government spending increases output.

Budget deficit (BD) is given by

$$BD = G - T \approx G - (b - \phi)T \dots\dots\dots (3)$$

Budget deficit occurs when government expenditure exceeds government revenue. This is the excess of government expenditure over its revenue. Supposing that the government derives its total income from taxes sources, then budget deficit is $G - T$. Assuming that individuals do not spend all their income, the total revenue that could be generated from consumption expenditure is therefore $(b - \phi) T$. Thus, subtracting this from government expenditure will give the budget balance.

Substituting equation (3) into (2) gives

$$\bar{Y} = \frac{A}{\theta} + \frac{1}{\theta} (\gamma i + \sigma e + BD) \dots\dots\dots (4)$$

Given the fact that Namibia is a small-open economy with no ability to influence international prices the model is then extended to incorporate the money sector as well as the external sector. In an open economy, the money market can be represented by the following equations:

$$\text{Money Demand Function: } \frac{M^D}{P} = kY + \lambda i \quad k > 0, \lambda < 0 \dots\dots\dots (5)$$

$$\text{Money Supply Function: } \frac{M^S}{P} = m_1 \frac{B}{P} + m_2 i, \quad m_1, m_2 > 0 \dots\dots\dots (6)$$

$$\text{At equilibrium, } M^D = M^S \dots\dots\dots (7)$$

Where P is the general price level, B represents the international reserves held by the central bank.

M_1, M_2, k, λ are coefficients. From equation (5) and (6), the LM schedule can be specified as:

$$\text{LM Schedule: } i = \psi \frac{B}{P} + \phi Y, \quad \psi < 0, \phi > 0 \dots\dots\dots (8)$$

Given the importance of the external sector in Namibia, the influence of the sector is incorporated through the balance of payments schedule, given as

$$\text{BP Schedule: } B = A_2 - \theta_0 Y + \theta_1 e + \theta_2 i, \quad \theta_0, \theta_1, \theta_2 > 0 \dots\dots\dots (9)$$

Where A_2 is the aggregate of exogenous components in the net export function and $\theta_0, \theta_1, \theta_2$ are coefficients.

Substituting equation (8) into (4) gives

$$Y = A_2 + \beta_1 \frac{B}{P} + \beta_2 Y + \sigma e + BD \dots\dots\dots (10)$$

$$\text{Where } \beta_1 = \frac{\psi Y}{\theta} \text{ and } \beta_2 = \frac{(\phi Y)}{\theta}$$

Substituting equation (9) into (10) gives:

$$Y = A_1 + \frac{B_1}{P} (A_2 - \theta_0 Y + \theta_1 e + \theta_2 i) + \beta_2 Y + \sigma e + BD \dots\dots\dots (11)$$

Isolating like terms and re-arranging equation (11) gives:

$$Y = C + \frac{1}{P} (\alpha_1 e + \alpha_2 i) + \alpha_3 e + \alpha_4 BD \dots\dots\dots (12)$$

Where,

$$1 + \beta_1 \theta_0 - \beta_2 = \phi, \quad C = \frac{A_1 \beta_1 A_2}{\phi}, \quad \frac{\beta_1 \theta_1}{\phi}, \quad \alpha_2 = \frac{\beta_1 \theta_1}{\phi}, \quad \alpha_3 = \frac{\sigma}{\phi}, \quad \alpha_4 = \frac{1}{\phi}$$

Recasting the second term on the right- hand side of equation (12) gives

$$Y = C + \alpha_1 e + \alpha_2 i + \alpha_3 e - \pi + \alpha_4 BD \dots\dots\dots (12B)$$

Where π is the rate of inflation. If $\lambda = \alpha_1 + \alpha_3$, given that the equilibrium output is positively related to budget deficit in equation (12) and that fact that output is influenced by its own past lag in time series, the above equation (12B) can be re-written as:

$$Y_t = c + \varpi Y_{t-1} + \alpha_2 i_t + \lambda e_t + \alpha_4 BD_t - \varphi \pi \dots\dots\dots (13)$$

Recasting (13) gives

$$Y_t = c + \delta_1 i_t + \delta_2 e_t + \delta_3 BD_t + \delta_4 \pi \dots\dots\dots (14)$$

Where $Y_t = Y_t - Y_{t-1}$ which captures the change in the growth rate of real GDP and $\delta_1, \delta_4 < 0$.

Equation (14) gives the long-run positive relationship between output growth and budget deficit.

3.4. SPECIFICATION OF THE EMPIRICAL MODEL

To empirically analyse the long-run relationships and dynamic interactions among variables, this study adapts the model used by Rahman (2012). The model is estimated using bounds testing (ARDL co-integration procedure). From the theoretical framework, the mathematical expression of the model is as follows:

$$Y = F(DEBT, BD, INV) \dots\dots\dots (15)$$

Where,

Y = GDP Growth rate

Debt = Debt

BD = Budget deficit

INV = Gross Fixed Capital Formation

The long run relationship between budget deficit and economic growth can be specified as:

$$Y_t = \beta_0 + \beta_1 DEBT_t + \beta_2 BD_t + \beta_3 INV_t + \varepsilon_t \dots\dots\dots (16)$$

Where: β_0 - is the constant

$\beta_1 < 0, \beta_2 < 0, \beta_3 > 0$, are the respective coefficients of the independent variables, ε_t is the stochastic error and T is the time trend over the period of the analysis. Investment and debt are the control variables.

3.5. DESCRIPTION OF VARIABLES

The key variables in the empirical model are defined as follows:

Dependent variable

Y_t = real GDP growth rate.

Real GDP growth rate is defined as the total value of all goods and services produced in Namibia in at (2010) constant prices. This measurement is consistent with other previous studies, such as those of Onwioduokit and Bassey (2014), Duokit and Ekong (2016), Odhiambo et al., (2013) and Rahman (2012).

Independent variables

$DEBT_t$ = Debt to GDP ratio, where debt is the total central government data including both foreign and domestic debt stocks. Debt is expected to negatively affect economic growth because debt financed deficits can lead to increases in taxes or reduction in government spending which in turn reduces output.

BD_t = is the fiscal deficit, measured as a ratio of GDP. Budget deficit is the total revenue collected excluding grants minus total public expenditure. Fiscal deficits are expected to negatively affect economic growth because of the deficit financing which can be either be debt financed or through collection of taxes.

INV_t = Gross fixed capital formation as a ratio of GDP as a proxy for growth in capital stock. Investments are expected to positively affect economic growth because increases in government spending (budget deficits) directed towards investments will have stimulating effects on economic growth.

All the explanatory variables are measured as ratios of GDP. Studies such as Obi and Nurudeen (2009), Duokit and Ekong (2016), Onwioduokit and Bassey (2014) and Murwirapachena et al., (2013) have used the same variables.

3.6 KPSS APPROACH TO UNIT ROOT TESTING

Gujarati (2014) suggests that it is important to test for stationarity in time series data to ensure that the mean, variance and auto co-variance (at various lags) are time invariant, that is, constant overtime. In order to check for stationarity of variables, this study uses KPSS unit root test developed by Kwiatkowski et al. (1992). This technique is more powerful compared to the standard unit root tests such as Dickey-Fuller tests. According to Kwiatkowski et al. 1992, standard unit root tests are not very powerful against relevant alternatives as they fail to reject the null hypothesis of a unit root for many economic time series. Several authors [see De Jong, Nankervis, Savin and Whiteman; (1989) and Diebold and Rudebusch (1990) as well as Gujarati (2014) among others] also confirm and provide evidence that many or most standard unit root tests may find a unit root even when none exists.

The KPSS technique tests the null hypothesis of stationary against the alternative of a unit root. This technique presents a statistical test of the hypothesis of stationarity, either around a level or around a deterministic linear trend making allowance for error autocorrelation. Failing to reject the null means there is stationary, whereas rejecting the null means the alternative is true and the process has unit root. Even though the ARDL method does not require for pre-testing of variables for unit root, unit root testing is still necessary in order to ensure that none of the variables to be used in the model are integrated of order 2 or beyond. This is because in the presence of $I(2)$, the computed F statistic is not valid as the bounds test is based on the assumptions that variables are $I(0)$ or $I(1)$. It is against this background that this study performs the KPSS unit root test. Studies such as Bayat, Kayhan and Senturk (2012) and Awe and Shina (2012) also uses the KPSS unit root tests.

3.7 BOUNDS TEST APPROACH TO CO-INTEGRATION TEST ANALYSIS

There are several tests for co-integration. This paper adopts the co-integration procedure suggested by Pesaran et al. (2001). The chosen methodology, which is based on the estimation of an unrestricted error correction model (UECM), is adopted for the following three reasons:

Firstly, the bounds test procedure involves a single equation setup, making it simple to implement and interpret dynamics as opposed to Johansen (1990) co- integration technique. Secondly, it does not require the pre testing of variables included in the model for non- stationarity unlike other techniques such as Johansen (1990) approach. It can be used irrespective of whether the explanatory variables are integrated of order zero $I(0)$ or one $I(1)$.

Thirdly, the test is more efficient in finite sample data sizes unlike the Engle-Granger (1987) approach which suffers from small sample bias. However, it has to be pointed out that in the presence of $I(2)$, the computed F- statistic will not be valid thus making the procedure invalid.

The auto regressive distributed lag (ARDL) method involves two stages; firstly, the estimated model will be used as a basis for applying the bounds test. This test is conducted by comparing the F-statistic of the unrestricted error model (as shown in the equation below) with the corresponding critical value bounds from the critical table of Pesaran et al. (2001). This test is done in conjunction with ordinary least square (OLS) method and Wald test.

The test consists of estimating the following unrestricted error- correction model:

$$\Delta Y_t = \beta_0 + \sum_{i=1}^p \beta_{1i} \Delta Y_{t-i} + \sum_{i=0}^{q1} \beta_{2i} \Delta DEBT_{t-i} + \sum_{i=0}^{q2} \beta_{3i} \Delta BD_{t-i} + \sum_{i=0}^{q3} \beta_{4i} \Delta INV_{t-i} + \delta_0 Y_{t-1} + \delta_1 DEBT_{t-1} + \delta_2 BD_{t-1} + \delta_3 INV_{t-1} + \varepsilon_t \dots \dots \dots (16)$$

Here,

Δ denotes the first difference operator

ε_t the random error term t is the time period.

β_0 is the constant.

β_{1i} is the coefficient of the dependent variable lagged from one.

β_2 to β_4 are the coefficients of the independent variable lagged from zero.

T is the time trend over the period of the analysis.

δ_0 to δ_3 are the coefficients of the level lagged value of the variables.

The appropriate values for the maximum lags are; p , q_1 , q_2 and q_3 will be determined using the Akaike information criterion (AIC) as it is a consistent model selector. The ranges of summation are from 1 to p , 0 to q_1 , 0 to q_2 and 0 to q_3 respectively.

The null hypothesis of the F test can be defined as no long run relationship between all the series, that is, $H_0: \delta_0 = \delta_1 = \delta_2 = \delta_3 = 0$; against the alternative $H_1: \delta_0 \neq 0 \text{ or } \delta_1 \neq 0 \text{ or } \delta_2 \neq 0 \text{ or } \delta_3 \neq 0$. Pesaran et al., (2001) supply bounds on the critical values for the asymptotic distribution of the F statistic, which gives lower and upper bounds of the critical values. In each case, the lower bound is based on the assumption that all of the variables are $I(0)$, and the upper bound is based on the assumption that all of the variables are $I(1)$. The critical values for rejecting the null hypothesis will therefore be from the critical table of Pesaran et al. (2001) with the formula, $(k+1)$. If the computed F-Statistic exceeds the upper bound, the null hypothesis of no co-integration is rejected. If the F statistic is lower than the lower critical bound, then the null hypothesis cannot be rejected. If the F-statistic lies between the lower and upper bounds, the test becomes inconclusive. Lastly, once the series is proved to have a long run relationship, the coefficients of the relationship are estimated from the unrestricted error correction model. ARDL allows for simultaneous estimation for both short run and long run relationship in the presence of a mixture of stationary and non-stationary series. However, the mixture of the series must not go beyond one. Studies such as, Ziramba (2011), Acaravcil and Ozturk (2008), Binh and Hai (2013), Rahman (2012), Eminer (2015), have used the ARDL approach to co-integration over other co-integration methods.

3.8. THE TODA- YAMAMOTO APPROACH TO GRANGER CAUSALITY

Gujarati (1995), claims that the existence of a relationship between variables does not prove direction of the influence. He continues to say that, however, in regression analysis involving time series when two or more variables are co-integrated, then there must be Granger causality between them either one way or in both directions. The Granger causality test developed by Granger (1969) is the most common way to test for causality between two variables. According to Granger (1969) a variable is said to granger cause another variable if past and present values of the variable can help predict values of another variable. The traditional Granger (1969) causality test uses the simple F-test statistic making it easy to carry out and be able to apply in many kinds of empirical studies. The weakness of the test is that it suffers from specification bias and spurious regressions (non-stationarity problem) (Gujarati, 2014).

To test whether budget deficit causes economic growth in Namibia and vice versa, this paper applies the Toda Yamamoto (1995) 's modified Wald test procedure. The use of a simple traditional Granger causality test is not sufficient if variables are $I(2)$ and co-integrated. The Toda Yamamoto technique does not require pre-testing for co-integration as it can be applied regardless of whether the series is $I(0)$, $I(1)$ or $I(2)$, that is non co-integrated or co- integrated of any arbitrary order. This technique thus makes Granger (1969) causality easier by avoiding potential bias associated with unit roots and co-integration tests.

Their procedure involves finding the maximum order of integration d_{max} of the series, then specifying a well behaved k^{th} optimal lag order vector autoregressive model in levels and finally intentionally over fits the underlying model with additional d_{max} order of integration.

To undertake Toda and Yamamoto`s version of the Granger non causality test, we represent the model in the following VAR system:

$$\begin{aligned}
 Y_t = & \delta_0 + \sum_{i=1}^k \delta_{1i} Y_{t-i} + \sum_{j=k+1}^{d \max} \delta_{2j} Y_{t-j} \\
 & + \sum_{i=1}^k \gamma_{1i} DEBT_{t-i} + \sum_{j=k+1}^{d \max} \gamma_{2j} DEBT_{t-j} + \sum_{i=1}^k \alpha_{1i} BD_{t-i} + \sum_{j=k+1}^{d \max} \alpha_{2j} BD_{t-j} + \sum_{i=1}^k \phi_{1i} INV_{t-i} + \sum_{j=k+1}^{d \max} \phi_{2j} INV_{t-j} + \varepsilon_1
 \end{aligned}
 \dots\dots (17)$$

$$\begin{aligned}
 BD_t = & \beta_0 + \sum_{i=1}^k \beta_{1i} BD_{t-i} \\
 & + \sum_{j=k+1}^{d \max} \beta_{2j} BD_{t-j} \\
 & + \sum_{i=1}^k \varphi_{1i} DEBT_{t-i} + \sum_{j=k+1}^{d \max} \varphi_{2j} DEBT_{t-j} + \sum_{i=1}^k \theta_{1i} INV_{t-i} + \sum_{j=k+1}^{d \max} \theta_{2j} INV_{t-j} + \sum_{i=1}^k \sigma_{1i} Y_{t-i} + \sum_{j=k+1}^{d \max} \sigma_{2j} Y_{t-j} + \varepsilon_3
 \end{aligned}
 \dots\dots (18)$$

Where ε_1 and ε_3 are error terms that are assumed to be white noise, k is the optimal number of lags and $dmax$ is the highest order of integration. The model is estimated using Seemingly Unrelated Regression (SUR). The maximum lag length will be determined using the Akaike Information Criterion (AIC). The Toda Yamamoto procedure utilizes a Modified Wald (MWALD) Test. The MWALD test statistic has an asymptotic property when the VAR ($k+d \max$) is estimated. It follows a Chi-square distribution.

With the optimal lags lag length determined, Granger non causality tests based upon equation (17) and (18) can be formulated as: Budget deficit, BD, Granger causes GDP growth rate, Y, if

$H_0: \alpha_{11} = \alpha_{12} = \alpha_{13} \dots = \alpha_{1k} = 0$, is rejected against the alternative H_1 : not H_0 ;

Similarly, GDP growth rate, Y Granger causes a budget deficit, BD, if

$H_0^c: \sigma_{11} = \sigma_{12} = \sigma_{13} = \dots = \sigma_{1k} = 0$, is rejected against an alternative

H_1^c : not H_0^c ,

In each case, failing to reject the null hypothesis means that no causal relationship exists between budget deficit and economic growth. Studies such as, Ziramba (2008), Bayat, Kayhan and Senturk (2012), Keho (2010), among others used the Toda Yamamoto Granger causality test over other conventional causality tests such as the traditional Granger (1969) causality test.

3.9. LONG RUN MODEL

With the empirical evidence of co-integration among the variables, the long run relationship between economic growth and the explanatory variables will be estimated using the ARDL approach with ARDL specification selected based on Akaike information criterion (AIC). Enders (1995) suggests that the optimal lag is selected based on the lowest values of AIC.

The model to be estimated is:

$$\ln Y_t = \beta_0 + \sum_{i=1}^p \beta_i \ln Y_{t-i} + \sum_{i=0}^{q_1} \sigma_i \ln BD_{t-i} + \sum_{i=0}^{q_2} \gamma_i \ln BD_{t-i} + \sum_{i=0}^{q_3} \alpha_i \ln INV_{t-i} + \varepsilon_t \dots\dots\dots(19)$$

3.10. SHORT RUN MODEL

The short run dynamic coefficients are estimated by an Error Correction Model (ECM) associated with the long run estimates as follows:

$$\Delta \ln Y_t = \beta_0 + \sum_{i=1}^p \partial_i \Delta \ln Y_{t-i} + \sum_{i=0}^{q_1} \varphi_i \Delta \ln BD_{t-i} + \sum_{i=0}^{q_2} \theta_i \Delta \ln DEBT_{t-i} + \sum_{i=0}^{q_3} \delta_i \Delta \ln INV_{t-i} + \emptyset Ec_{t-1} + \varepsilon_t \dots\dots\dots(20)$$

Where, β_0 is a drift component, $\varphi_i, \theta_i, \delta_i, \partial_1$ are the short-term dynamic co-efficients and $\emptyset$ is the speed of adjustment.

3.11 DIAGNOSTIC TEST

In order to determine the goodness of the fit of the ARDL models, diagnostics will be conducted. Diagnostics tests whether the model does not suffer from problems associated with non-normality of errors, serially correlated errors, heteroscedasticity and functional form misspecification. Gujarati (2004) asserts that homoscedasticity and non-serial correlation assumptions are critical for the valid interpretation of regression estimates in OLS. The Breusch- Godfrey LM test and Breusch-Pagan-Godfrey tests will be used to test for serial correlation and heteroscedasticity among residuals. Ramsey test will be used to test for model specification. Jarque- Bera test will be used to test for normality distribution in the residuals. Finally, CUSUM and CUSUMQ will be used to test for stability of the model.

3.12. SUMMARY

The methodology involved regressing the dependent variable(GDP) on the explanatory variables through the following procedures: testing for stationary properties of the variables using KPSS test of Kwiatkowski et al. (1992), followed by ARDL co-integration procedure suggested by Pesaran et al (2001) in check for the existence of co-integrating and long run relationships. Finally, a Granger causality test developed by Toda- Yamamoto (1995) was employed to assess if there is a causal relationship between the series. To empirically analyse the long-run relationships and dynamic interactions among variables, this study adopted the work of Onwioduokit and Bassey (2014) and Osoro (2016). The analysis and empirical results will be discussed in the next chapter.

CHAPTER FOUR: DATA ANALYSIS AND EMPIRICAL RESULTS

4.1 INTRODUCTION

The impact of the budget deficit on economic growth is assessed through the estimation of a long run model using ARDL. This paper adopts the co-integration procedure suggested by Pesaran et al. (2001) and the chosen methodology is based on the estimation of an unrestricted error correction model (UECM).

4.2 MULTIVARIATE PROPERTIES

	Y	BD	DEBT	INV
Mean	4.201999	-3.653872	19.87255	22.06725
Median	3.975439	-3.568697	20.88799	20.57903
Maximum	12.26955	2.506565	37.48803	33.57844
Minimum	-1.579539	-9.593067	4.414105	16.58277
Std. Dev.	2.204107	2.694903	6.926325	4.200277
Skewness	0.472626	0.059727	-0.355258	1.178149
Kurtosis	4.834134	2.335617	2.702968	3.623222
Jarque-Bera	16.32061	1.746753	2.273404	22.77210
Probability	0.000286	0.417539	0.320876	0.000011
Sum	386.5839	-336.1563	1828.275	2030.187
Sum Sq. Dev.	442.0860	660.8876	4365.632	1605.452
Observations	92	92	92	92

Table 1: Descriptive statistics summary.

The Jarque-Bera test was conducted to investigate whether the variables follow a normal distribution. A null hypothesis of normality was tested against the alternative of unit root. The results show that both real GDP and investment have probabilities of 0.000 are not normally distributed (Table 1). The study however fails to reject the null hypothesis for budget deficit (0.418) and debt (0.321), thus, implying that budget deficit and debt are normally distributed since their probability value is above 1 percent.

4.3. OPTIMUM LAG SELECTION CRITERIA

Prior to the bounds test, optimum lag selection was carried out to determine the number of lags to be included in the model. Hence, Akaike information criterion (AIC) and Hannan Quinn (HQ) information criterion indicate 6 maximum lag length at 1 per-cent level of significance, while the Schwarz (SC) information criterion indicate 2 maximum lag length as per Table 2. For this research work however, the AIC will be adopted.

Lag	Log L	LR	FPE	AIC	SC	HQ
0	-879.8772	NA	9934.600	20.55528	20.66944	20.60123
1	-380.7367	940.2413	0.131135	9.319459	9.890237	9.549171
2	-271.0983	196.3294	0.014897	7.141820	8.169221*	7.555301
3	-266.5012	7.804240	0.019543	7.407006	8.891029	8.004256
4	-255.8899	17.02754	0.022414	7.532323	9.472969	8.313343
5	-203.7227	78.85731	0.009853	6.691226	9.088496	7.656016
6	-152.3593	72.86439*	0.004455*	5.868821*	8.722713	7.017381*

*Indicates lag order selected by the criterion

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

Table 2: Optimum lag selection criteria table

4.4. DIAGNOSTIC TEST RESULTS

The Durbin Watson (DW) statistic establishes whether there exists auto-correlation in the estimated model. A DW statistic of 2 is recommended (Gujarati, 2014). The DW in the equation model is 2.06 (Figure 14 and 15), implying that there is no auto-correlation in the model. The probability values of the Breusch-Pagan Godfrey test results imply that there is homoscedasticity among residuals in the model. The Ramsey reset test results provide evidence that the model is stable as the null hypothesis is not rejected at 5 percent level of significance. In the same manner, Jarque -Bera statistics confirm that the residuals are normally distributed at 5 percent level.

TEST	T-STATISTIC	PROBABILITY
Breusch-Pagan-Godfrey	2.356	0.077
Ramsey RESET test	1.849	0.099
Jarque Bera test	5.788	0.055

Table 3: Diagnostic test results

The stability of the coefficients was also tested using the cumulative sum (CUSUM) and the CUSUM of squares (CUSUMQ) of recursive residuals. The results are presented in the graphs below.

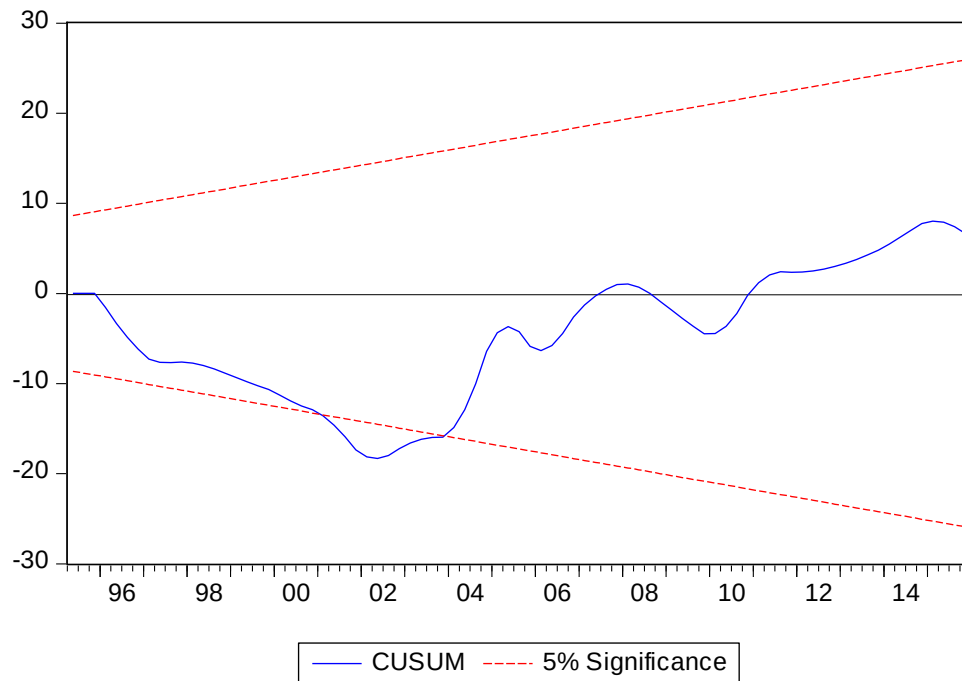


Figure 2 (a): CUSUM

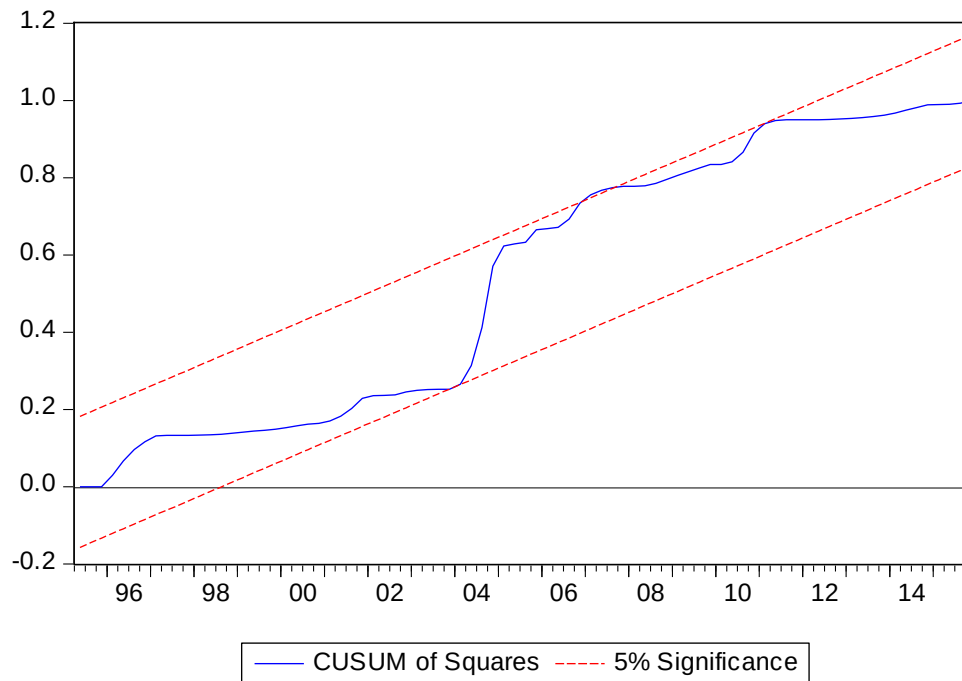


Figure 2(b): CUSUMQ

The results from the CUSUM graph indicate instability around 2002 in the model, while the results from the CUSUMQ graph indicate that there is stability of the coefficients as the plot fall within the critical band of 5 percent confidence interval.

4.5. STATIONARITY TEST

	Kwiatkowski-Phillips-Schmidt-Shin			
Variable	Y	DEBT	BD	INV
Level, Intercept	0.490 (0.739)	0.727 (0.739)	0.103 (0.739)	0.988 (0.739)***
Level, Trend and Intercept	0.089 (0.216)	0.202 (0.216)	0.108 (0.216)	0.237 (0.216)***
First difference, Intercept	0.039 (0.739)	0.153 (0.739)	0.106 (0.739)	0.222 (0.739)
First difference, Trend and Intercept	0.033(0.216)	0.157 (0.216)	0.061 (0.216)	0.050 (0.216)

Note: The numbers in the parentheses are the 1% critical values.

Table 4: Unit root test results.

A stationary series is characterized by a time invariant mean and a time invariant variance. The time series properties of the data were analysed using KPSS unit root tests and the results are reported in Table 4. The KPSS technique tests the null hypothesis of stationary against the alternative of a unit root. The null hypothesis of stationarity could not be rejected in levels (intercept & trend and intercept) for the variables: GDP growth rate, debt and budget deficit. This therefore means that the variables, GDP growth rate, debt and budget deficit are integrated of order

zero, $I(0)$. For investment, the null hypothesis of stationarity is rejected in all levels; however, for the first difference at 1 percent level of significance, the null hypothesis of stationarity could not be rejected. The study therefore concludes that the variable, INV is non stationary at levels and stationarity at the first difference making it integrated of order 1, $I(1)$. Thus, the highest of order of integration (d_{max}) is therefore equal to one.

4.6 CO INTEGRATION TEST RESULTS

The results of the KPSS unit root test confirms that the computed F-statistic is valid as none of the variables $I(2)$. The Schwarz Aikake Information Criterion was employed in selecting the lag length for co integration which say the optimal lag length is two ($m = 6$). The parsimonious model based on equation (8) was subjected to diagnostic tests to access the univariate properties of the residuals for the model. From the parsimonious model, the F statistic was computed using the

formula,
$$F = \frac{(R^2_{UR} - R^2_R)/m}{(1 - R^2_{ur})/(n - k)}$$

Where m = number of restrictions (or omitted variables), n = number of observations, and k = number of parameters in the unrestricted model (Gujarati, 2014). The study calculated the F-test of 3.947 to test for the joint significance of $\delta_0, \delta_1, \delta_2$ and δ_3 in equation 3 by comparing the F-statistic to the critical values given in Table 5.

	10%		5%		1%	
F-test	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
Case III	2.72	3.77	3.23	4.35	4.29	5.61

Number of regressors = 3 ($k+1$).

Table 5: Critical values Table

The critical values in Table 5 were obtained from Pesaran et al. (2001) Table CI (iii) Case III: Unrestricted intercept and no trend. The null hypothesis of no co integration is rejected because the computed F-statistic exceeds the upper bound at the 10 percent level of significance. This confirms the relationship between debt and GDP growth rate, budget deficit and GDP growth rate as well as investment and GDP growth rate.

4.7. GRANGER CAUSALITY TEST

Cause	Effect	Test Statistic	Probability	Inference from →to
BD	Y	22.031	0.001	BD→Y
Y	BD	19.777	0.003	Y→BD
DEBT	Y	7.017	0.319	
Y	DEBT	13.995	0.030	Y→DEBT
INV	Y	4.578	0.599	
Y	INV	3.813	0.702	
DEBT	BD	45.712	0.000	DEBT→BD
BD	DEBT	28.187	0.000	BD→DEBT
INV	BD	3.337	0.766	
BD	INV	4.047	0.6704	

Table 6: Toda-Yamamoto Granger causality test results

The causal relationships between each explanatory variables and GDP growth rate were estimated using the Toda Yamamoto Granger causality test. The Toda Yamamoto Granger non causality Wald test results obtained from the estimation of a seemingly unrelated regression of the level VAR model outlined in equations (17) and (18) are presented in table 6. The null hypothesis of no Granger causality was tested. The results suggest that the null hypothesis of no Granger causality is rejected in both directions between real GDP growth and budget deficit. Thus, there is evidence of bidirectional between the two variables. This finding is in line with that of Ahmad (2013). For debt and real GDP growth, there is a unidirectional causality from real GDP growth to debt. Finally, for investment and real GDP growth, there is no evidence of causality in either direction. The study found a bi-directional causality between debt and budget deficit and no evidence of causality in either direction between investment and budget deficit.

4.8. LONG RUN MODEL RESULTS.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BD	-0.234	0.123	-1.894	0.063
DEBT	-0.116	0.082	-1.425	0.159
INV	-0.222	0.104	-2.129	0.037
C	-0.232	0.353	-0.655	0.514

Table 7: Estimated long run coefficients, ARDL (6, 6, 5, 1).

The coefficient of determination (R^2) of 0.966 means that budget deficit, debt and investment explain about 96.57% of the variations in GDP growth rate. The remaining variations are captured by the error term and can be attributed to other factors not included in the model. The results show that the coefficient of the ratio of budget deficit to GDP is negative and it is statistically significant at 10 percent level of significance. This shows that, holding other variables constant, an increase in budget deficit by 1 percentage point of GDP is associated with a lower economic growth rate by about 0.23 percentage points. This finding is in agreement with those of Mohanty (not dated), Brima and Mansaray-Pearce (2015) and Zuze (2016), Binh and Hai (2013), Anayochukwu (2012), as well as Avila (2011), who all established that higher budget deficits lead to lower GDP growth rates. This is also in conformity with the neo-classical theory which holds that fiscal deficits lead to a fall in real GDP growth rate. The ratio of debt to GDP also carries a negative co-efficient of 0.116 which is statistically insignificant. The investment to GDP ratio is also negatively related to GDP and is statistically significant at 10 per-cent level. This means that in the long run, an increase in gross fixed capital formation by 1 percentage point of GDP is associated with a lower economic growth rate by about 0.22 percentage points.

4.9. SHORT RUN MODEL RESULTS

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(BD)	-0.318651	0.103470	-3.079658	0.0029
D(DEBT)	-0.004390	0.052461	-0.083676	0.9335
D(INV)	-0.280021	0.101666	-2.754312	0.0074
ECM (-1)	-0.101941	0.038613	-2.640065	0.0101
C	0.033060	0.051843	0.637696	0.5256

Table 8: Estimated short run coefficient, ARDL (5, 5, 0, 1).

The co-efficient of determination of 0.796, indicates that budget deficit, debt and investment explain about 79.6% of the variations in GDP. The remaining variations are captured by the error term and can be attributed to other factors not included in the model. Table 8 shows the results of the short-run dynamic coefficients obtained from the Error Correction Model (ECM) equation. The coefficient of the error correction term measures the speed of adjustment to obtain equilibrium in the event of shocks to the system. Here the ECM coefficient is -0.102, which means about 10% deviations from equilibrium (disequilibrium in previous year) can be adjusted in the current quarter. The results indicate that all the explanatory variables maintained their negative signs in the short run. The co-efficient of budget deficit to GDP ratio has maintained a negative sign of -0.319 and is statistically significant at 5 percent level of significance. This indicates that an increase in budget deficit has a significant negative impact on real GDP growth rate in the short run. Investment to GDP ratio is also negatively and significantly related to growth rate in the short run. Budget deficit and Investment have proven to be significant variables that play a great role in determining growth both in the short run and in the long run. Furthermore, the ratio of debt to GDP carries a negative sign in the short run and it shows insignificant impacts on GDP growth rate.

4.10. SUMMARY

The impact of the budget deficit on economic growth is assessed through the estimation of a long run model using ARDL. The findings obtained from the study shows that short run results are consistent with the results from the long run for budget deficits, debt and investment. Both results indicate that budget deficit has a negative impact on economic growth and statistically significant at 5% level. Budget deficit has proved to be a significant variable that plays a great role in determining growth both in the short run and in the long run. At 10 percent significance level, debt negatively and insignificantly affects GDP growth rate in both periods, while investment is negatively and significantly related to real GDP growth rate both in the short run and long run. The computed F-statistic (3.947) of the bounds test exceeds the upper bound (3.77) at the 10 percent level of significance. This confirms the relationship between debt and real GDP, budget deficit and real GDP as well as investment and real GDP. The Toda Yamamoto Granger non causality Wald test results obtained from the estimation of a seemingly unrelated regression of the level VAR model indicate that there is evidence of a bi-directional causality running from budget deficit to real GDP and from real GDP to budget deficit. For debt and real GDP, there is a reverse causality from real GDP to debt. Finally, for investment and real GDP, there is no evidence of causality in either direction. The study also found a bi-directional causality between debt and budget deficit and no evidence of causality in either direction between investment and budget deficit. Therefore, real GDP causes debt while debt causes budget deficit.

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

The main objective of the study is examining the relationship between budget deficit and economic growth in Namibia using quarterly time series data for the period 1993Q1 to 2015 Q4. The study employs the Auto Regressive Distributed lag (ARDL) bounds test and estimates the co-efficients of the variables from the unrestricted error correction model in examining the relationship between budget deficits and economic growth. The computed F-statistic (3.947) of the bounds test exceeds the upper bound (3.77) at the 10 percent level of significance. This confirms the long run relationship between budget deficit and economic growth in Namibia.

The empirical findings obtained from the study shows that short run results are consistent with the results from the long run for budget deficits. The results indicate that budget deficit has a negative impact on economic growth in agreement with the neo-classical theory and is statistically significant at 5% level. Budget deficit has proven to be a significant variable that plays a great role in determining growth both in the short run and in the long run. At 10 percent significance level, budget deficit negatively and significantly affects GDP growth rate in both periods. The Toda Yamamoto Granger non causality Wald test was used to evaluate if there is a causal relationship between budget deficit and economic growth in Namibia. The results obtained from the estimation of a seemingly unrelated regression of the level VAR model indicate that there is evidence of a bi-directional causality running from budget deficit to real GDP and from real GDP to budget deficit. For debt and real GDP, there is a reverse causality from real GDP to debt. Finally, for investment and real GDP, there is no evidence of causality in either direction. The study also found a bi-directional causality between debt and budget deficit and no evidence of causality in either direction between investment and budget deficit. Therefore, real GDP causes debt while debt causes budget deficit.

5.1 CONCLUSION

Overall, this study found a long-run relationship between budget deficit and economic growth in Namibia and there is also a quick adjustment in GDP growth rate when budget deficit changes. It is evident that fiscal deficit affects economic growth negatively in Namibia. Therefore, holding other variables constant, in the long run, an increase in the fiscal deficit by 1 percentage point of GDP is associated with a lower real GDP growth rate, by about 0.23 percentage points. This is in conformity with the neo-classical theory which holds that fiscal deficits lead to a fall in real GDP growth. This negative effect on economic growth can be attributed by poor processes of revenue collection in Namibia, high public expenditure and the fact that the budgetary gap is financed through domestic borrowings in Namibia.

5.2 RECOMMENDATIONS

The findings of this study yield important implications that could be used by policy makers in tackling budget deficit in Namibia.

Firstly, the findings indicate that budget deficit negatively and significantly affects economic growth in Namibia. The authorities should concentrate more on reducing budget deficit. In doing this, expenditure should be re-aligned from the non-productive sectors to investments in more productive and profitable sectors that will enhance productivity contribute to faster economic growth in the long run.

Secondly, the study found a bi-directional causality between economic growth and budget deficit. It is impossible for economic growth to be motivated without causing budget deficits. Hence, along with any action to increase economic growth, it is crucial for government to strictly control the level of the deficit.

The study also found that real GDP growth causes debt while debt causes budget deficit. While debt matters for economic growth, it should also be controlled as most of debt is sourced from domestic borrowings and in the long run, debt and investment negatively affect real GDP growth rate in Namibia by crowding out private investment.

Lastly, the study suggests that government revenue be aligned with government expenditure, this can eliminate the budgetary gap, meaning that budget deficit will be zero. This can be done by improving the tax system in Namibia or removing tax exemptions to increase tax revenue or by reducing government expenditure as much as they can.

5.3. FURTHER RESEARCH

The study invites further research to investigate the relationship between budget deficit and other macroeconomic variables such as exchange rate, inflation, interest rates or money supply in Namibia. Simultaneous equation models consisting of two equations can also be used to investigate the relationship between budget deficits and other macroeconomic variables; this is because they incorporate both direct and indirect effects of fiscal deficits on other macroeconomic variables. The study also calls for future research using other economic techniques such as VECM, different sample size or qualitative research designs such as experiments in determining the policy implications of budget deficits. Finally, several other factors affect economic growth such as consumption, investment, government spending and net exports. Future research can therefore be done in examining the relationship between the economic growth and any of these variables or a simultaneous effect of these variables on economic growth.

CHAPTER SIX: REFERENCE LIST

- Acaravci1, A., & Ozturk, I. (2008). Twin deficits phenomenon: Empirical evidence from the ARDL bounds test approach for Turkey. *Bulletin of Statistics & Economics*, 2 (8), 57-64.
- Afonso, A., & Alegre, J.G. (2008). Economic growth and budgetary components. A panel assessment for the European Union. *European Central Bank Working Paper*, 848, 1-54.
- Ahmad, N. (2013). The role of budget deficit in the economic growth of Pakistan. *Global Journal of Management and Business Research*, 13 (5), 1-4.
- Anayochukwu, O.B. (2012). Fiscal deficits and inflation in Nigeria: The causality approach. *International Journal of Scientific & technology research*, 1 (8), 6-12.
- Antwi, S., Zhao, X., & Mills, E.F.E.A. (2013). Consequential effects of budget deficit on economic growth: Empirical evidence from Ghana. *International Journal of Economics and Finance*, 3 (5), 90-101. doi: 10.5539/ijef.v5n3p90
- Aslam, A.L.M. (2016). Budget deficit and economic growth in Sri Lanka: An econometric dynamic analysis. *World Scientific News*, 46, 176-188.
- Asogwa, F.O., & Chetachukwu, O.I. (2013). The crowding out effects of budget deficits on private investment in Nigeria. *European Journal of Business and Management*, 5(20).161-165.
- Avila, J.C. (2011). Fiscal deficit, Macro-Uncertainty, and growth in Argentina.1-12. Retrieved from <http://www.ucema.edu.ar/publicaciones/download/documentos/456.pdf>

- Awe, A.A., & Shina, O.S. (2012). The nexus between budget deficit and inflation in the Nigerian economy. *Research Journal of Finance and Accounting*, 3 (10), 78-92.
- Awe, A.A, & Funlayo, A. K (2014). The short and long run implication of budget deficit on economic growth in Nigeria. *10* (5),doi:10.3968/4517.
- Ball, L., & Mankiw, N.G. (1975). What do budget deficits do? *Harvard Institute of Economic Research Working papers*. 1740: 95-119.
- Bank of Namibia . (2015). *Annual Report*. Retrieved from <http://www.bon.com.na>
- Bank of Namibia Publication. (2016). *Economic Outlook*. Retrieved from <http://www.bon.com.na>
- Barro, R.J. (1989). The Ricardian equivalence to budget deficits. *The Journal of Economic Perspectives*, 3. (2), 37-55.
- Bayat, T., Kayhan, S., & Senturk, M. (2012). Budget deficits and interest rates: An empirical analysis for Turkey. *Eurasian Journal of Business and Economics*, 5 (9), 119-128.
- Bebi, H. (2000). The impact of fiscal deficits and public debt on real interest rate and investment in Namibia. NEPRU Research Report, 74.
- Benos, N. (2009). Fiscal policy and economic growth: Empirical evidence from EU countries. University of Ioannina.1-26
- Bernheim, B.D. (1989). A neo classical perspective on budget deficits. *The Journal of Economic Perspectives*, 3. (2), 55-73.
- Binh, D.T., & Hai, H.D. (2013). The relationship between budget deficit and economic growth in Vietnam. Hanoi University.1-16.doi: 10.13140/2.1.4538.6245

- Brima, S., & Mansaray-Pearce, E.A. (2015). Deficit and macroeconomic variables in Sierra Leone: An econometric approach. *Journal of Economics and Sustainable Development*, 6 (4), 38-51.
- Briotti, G. (2005). Economic reactions to public finance consolidation: A survey of the literature. *European Central Bank occasional paper*, 38.
- Buscemi, A., & Yallwe, A.H. (2012). “Fiscal deficit, national savings and sustainability of economic growth in emerging countries: A dynamic GMM panel data approach.” *International Journal of Economics and Financial Issue*, 2(2), 126 – 140.
- Carlson, K.M. & Spencer, R.W. (1975). Crowding out and its critics. Federal Reserve Bank of St. Luis.1-17. Retrieved from: <https://www.utm.edu>
- Dalyop, G.T. (2010). Fiscal deficit and growth of domestic output in Nigeria, *Jos Journal of Economics*, 4 (1), 153-173.
- De Jong, D.N., Nankervis, J.C., Savin, N.E., &Whiteman, G.H. (1989). Integration versus trend stationarity in macroeconomic time series, working paper no. 89. Department of Economics. University of Iowa, Iowa city, IA
- Diebold, F.X., & Rudebusch, G.D. (1991). On the power of Dickey- Fuller tests against fractional alternatives. *Economic letter* 35, 155-160
- Dlamini, X. S. & Amanja D.M. (2015). The relationship between fiscal deficit and economic growth in Swaziland. *Economics and Finance Review*. 4(5),72-82.

- Duokit, E.O., & Ekong, C.N. (2016). Budget deficit and economic growth in Sierra Leone: An empirical re - Examination. *Journal of Business and Human Resource Management*, 2 (1), 1-17.
- Eminer, F. (2015). The impact of budget deficits on economic growth in North Cyprus. *West East Institute: International Academic Conference Proceedings*, 228-235.
- Enders, W. (1995). *Applied Econometric Time Series*. New York. Wiles
- Engle, R. F., & Granger, C. W. J. (1987). Co integration and Error Correction: Representation and Testing. *Econometrica*, 55, 251-276.
- Eisner, R. (1986). How real is the federal deficit? *The free press New York*. 1986
- Eita, J.H., & Mbazima, D. (2008). The causal relationship between government revenue and expenditure in Namibia. *Munich Personal REPEC Archive*, 9154, 1-17.
- Ezeabasili, V.N., Tsegba, I.N., & Ezi-Herbert, W. (2012). Economic growth and fiscal deficit. *Economics and Finance Review*, 2(6), 85-96.
- Fatima, G., Ahmed, A.M., & Rehman, W. U. (2011). Fiscal deficit and economic growth: An analysis of Pakistan's economy. *International Journal of Trade, Economics and Finance*, 2 (6), 501-504.
- Fatima, G., Ahmed, A.M., & Rehman, W.U. (2012). Consequential effects of budget deficit on economic growth of Pakistan. *International Journal of Business and Social Science*, 3(7), 203-208.
- Fehiman, E. (2015). The impact of fiscal deficits on economic growth in North Cyprus. *The 2015 West East Institute - International Academic Conference Proceedings*, 228 -235.

- Fischer, S. (1993). The role of macroeconomic factors in growth. *National Bureau of Economics and Research Working Paper*, 4565, 1-36.
- Friedman, B.M. (1972). Comments on the critics. *Journal of Political economy*, 80 (5), 906-950.
- Friedman, B.M. (1978). Crowding out or crowding in? The economic consequences of financing government deficits. *National Bureau of Economics and Research Working Paper*, 284, 1-76.
- Gosh, R. & Hendrik, V.B. (2009). Budget deficit and US economic growth, *Economics Bulletin*, 29 (14), 3015-3030.
- Granger, C. W. J. (1980). Some properties of time series data and their use in econometric model specification. *Journal of Econometrics*, 121-130.
- Gujarati, D.N (2014). Basic Econometrics: 3rd Edition. McGraw Hill Inc.
- Huynh, N.D. (2007). Budget deficit and economic growth in developing countries: The case of Vietnam. *Kansai Institute for Social and Economic Research*.
- International Monetary Fund Publications. (2016). World economic outlook. Retrieved from www.imf.org
- Johansen, S. & Juselius, K (1990). Maximum likelihood, estimation and inference on co integration with application to the demand for money. *Oxford Bulletin of Economics and Statistics*, 52 (2), 169-210.
- Keho, Y. (2010). “Budget deficits and economic growth: Causality evidence and policy implications for WAEMU Countries”, *European Journal of Economics, Finance and Administrative Sciences*, 18, 99-104.

- Korsu, R. D. (2009). Fiscal Deficit and the External Sector Performance of Sierra Leone: A Simulation, *West African Journal of Monetary and Economic Integration*, 9 (1), 51-73.
- Kumo, W. L., Chulu, O. & Minsat, A. (2016). African economic outlook: South Africa. Retrieved from www.africaneconomicoutlook.org
- Kwiatkowski, D., Phillips, P.C.B., Schmidt, P., & Shin, Y. (1992). Testing the null hypothesis of stationarity against the alternative of a unit root test. *Journal of Econometrics*, 54,159-178.
- Lwanga, M.M., & Mawejje, J. (2014). Macroeconomic effects of budget deficits in Uganda: A VAR-VECM approach. *Economic Policy Research Centre*.117, 1-27.
- Magahema, T.J. (2015). The effect of budget deficit on economic development in East African countries. Unpublished Master's thesis. University of Nairobi. Retrieved from <http://erepository.unonbi.ac>
- Ministry of Finance. (2015/2016) Accountability report for the 3015/2016 financial year.
- Ministry of Finance. (2017/2018). Budget statement for the 2017/2018 financial year.
- Mohanty, R.K. (n.d.). Fiscal deficit - Economic growth nexus in India: A cointegration analysis (Doctoral dissertation, Jawaharlal Nehru University, New Delhi, India). Retrieved from <http://punjabiversity.ac.in>
- Murwirapachena, G., Maredza, A., & Choga, I. (2013). The economic determinants of budget deficits in South Africa. *Mediterranean Journal of Social Sciences*, 4 (13), 561-569. doi:10.5901/mjss.2013.v4n13p561.

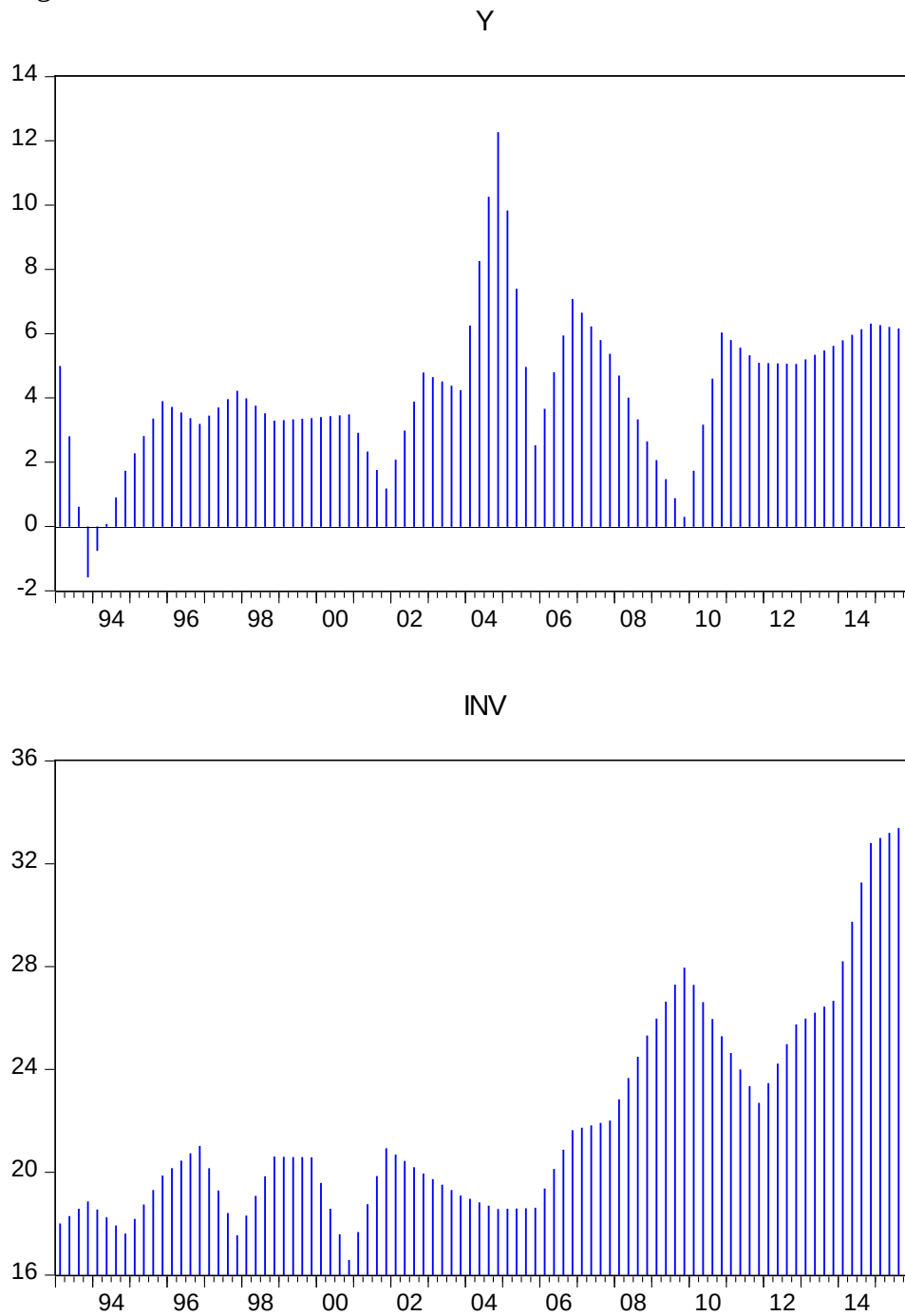
- Navaratnam, R., & Mayandy, K. (2016). Causal nexus between fiscal deficit and economic growth: Empirical evidence from South Asia. *International Journal for Innovation Education and Research*. 4(8), 1-19.
- Nayab, H. (2015). The relationship between budget deficit and economic growth of Pakistan. *Journal of Economics and Sustainable Development*, 6 (11), 85-90.
- Nkrumah, K.O., Orkoh, E. & Owusu, A.M. (2016). Exploring the budget deficit- Economic growth nexus: New evidence from Ghana, *Journal for the Advanced of the developing Economics*, 5(1), 1-16.
- Nyambe, J.M & Kanyeumbo, J.N. (2015). Government and household expenditure components, inflation and their impact on economic growth in Namibia. *European Journal of Business, Economics and Accountancy*, 3 (4), 1-6.
- Obi, B., & Nurudeen, A. (2009). Do fiscal deficit raise interest rates in Nigeria? A vector autoregression approach. *Journal of Applied Quantitative Methods*, 4(3), 307-316.
- Odén, B. (1991). Namibia `s economic links to South Africa. *Current African Issues*, 14, 1-43. Nordiska Afrikainstitutet.
- Odhiambo, O.S., Monyani, G., Othuon, L., & Aila, F.O. (2013). The relationship between Fiscal deficits and economic growth in Kenya. An empirical investigation. *Greener Journal of Social Sciences*, 3(6), 306-323.
- Oladipo, S.O., & Akinbobola, T.O. (2011). Budget deficit and inflation in Nigeria: A causal relationship. *Journal of emerging trends in economics and management sciences*, 2(1), 1-8.

- Onwioduokit, E. A., & Bassey, G.E. (2014). Fiscal deficit and economic growth in the Gambia: A search for threshold. *Developing Country Studies*, 4 (19), 162-181.
- Osoro, S. (2016). Effects of budget deficit on economic growth in Kenya. Unpublished Master of Arts in Economics thesis. University of Nairobi, Kenya.
- Pesaran, M.H., Shin, Y., & Smith, R.J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16, 289-326.
- PricewaterhouseCoopers Publications. (2016/2017). Budget overview. Retrieved from www.pwc.com.na
- Rahman, N.H.A. (2012). The relationship between budget deficit and economic growth from Malaysia `s perspective: An ARDL approach. *International Conference on Economics, Business Innovation*, 38, 54-58.
- Ramzan, M., Saleem, S., & Butt, I.M. (2013). Budget deficit and economic growth: A case study of Pakistan. *Interdisciplinary Journal of Contemporary Research in Business*, 5 (1), 911-926.
- Rath, S.S., & Sar, A.K. (2016). Causal nexus between fiscal deficit and economic growth in Odisha: An empirical investigation. *Journal of Applied Finance & Banking*, 6 (3), 69-75.
- Shafuda, C.P.P. (2015). An examination of the relationship between government spending and economic growth in Namibia. Unpublished MBA thesis. University of Namibia. Retrieved from <http://www.edu.na>
- Siegal, A. (1979). Inflation Induced Distortions in Government and Private Sector. *Working Papers*, in Onwioduokit.

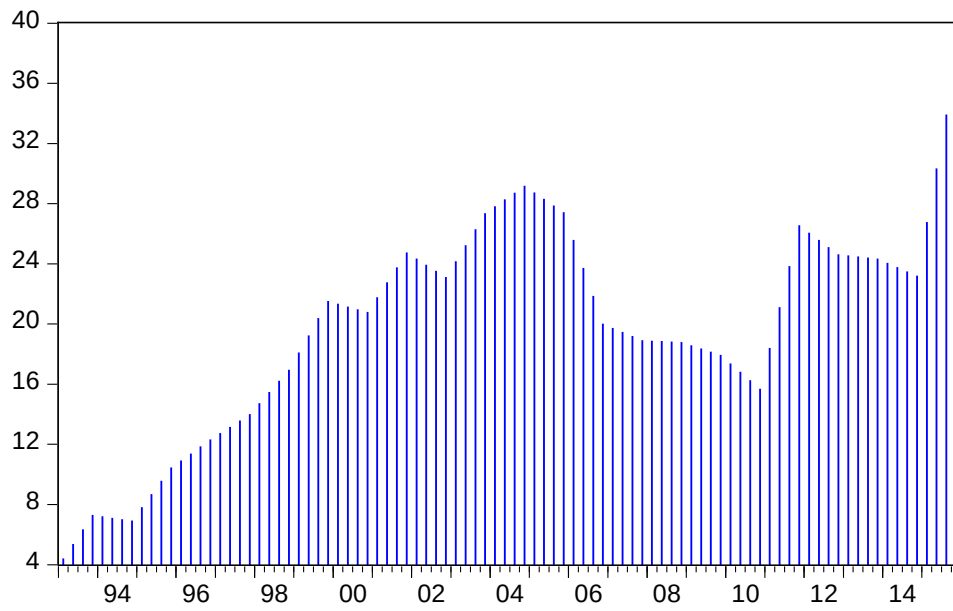
- Taylor, L., Proano, C.R., Laura de, C. & Barbosa, N. (2012). Fiscal deficit, economic growth and government debt in the USA. *Cambridge Journal of Economics*, 36 (1), 189-204.
- Toda, H.Y., & Yamamoto, T. (1995). Statistical inferences in vector autoregressions with possibility integrated processes. *Journal of Econometrics*, 66, 225-250.
- Umaru, A.D, & Gatawa, U. (2014). Fiscal deficit and economic growth in Nigeria (1970-2011): A disaggregated Approach. *JORIA*, 12 (1),1-9.
- Van, V. B., & Sudhipongpracha, T. (2015). Exploring government budget deficit and economic growth: Evidence from Vietnam`s economic miracle, *Asian Affairs: An American Review*, 42 (3), 127-148. doi: 10.1080/00927678.2015.1048629
- Wosowei, E. (2013). Fiscal Deficits and Macroeconomic Aggregates in Nigeria. *Arabian Journal of Business and Management Review Vol. 2*.
- Yavas, A. (1998). Does too much government investment retard economic development of a country, *Journal of Economic Studies*, 25 (4), 216-308.
- Zaaruka, B.B., Ndove, T., & Tjipe, T. (2004). Central government debt sustainability. A working paper of the Bank of Namibia.
- Ziramba, E. (2008). Wagner s law: An econometric test for South Africa. *South African Journal of Economics*, 76 (4), 596-605.
- Ziramba, E. (2011). Export- led growth in South Africa: Evidence from the components of exports. *Studies in Economic and Econometrics*, 35(1), 1-13.
- Zuze, M. (2016). Fiscal deficit- Economic growth nexus in Zimbabwe: A vector auto regression analysis. *International Journal of Innovative Research and Development*, 5 (6), 380-386.

APPENDICES

Figure 3.a-d: Plot of time series



DEBT



BD

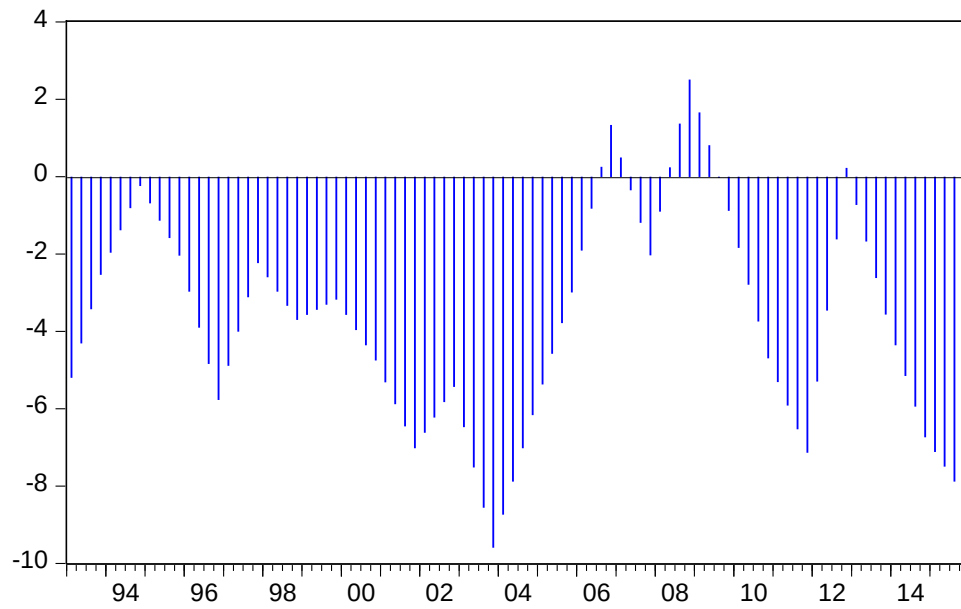


Figure 4: Namibia`s annual GDP growth rate.

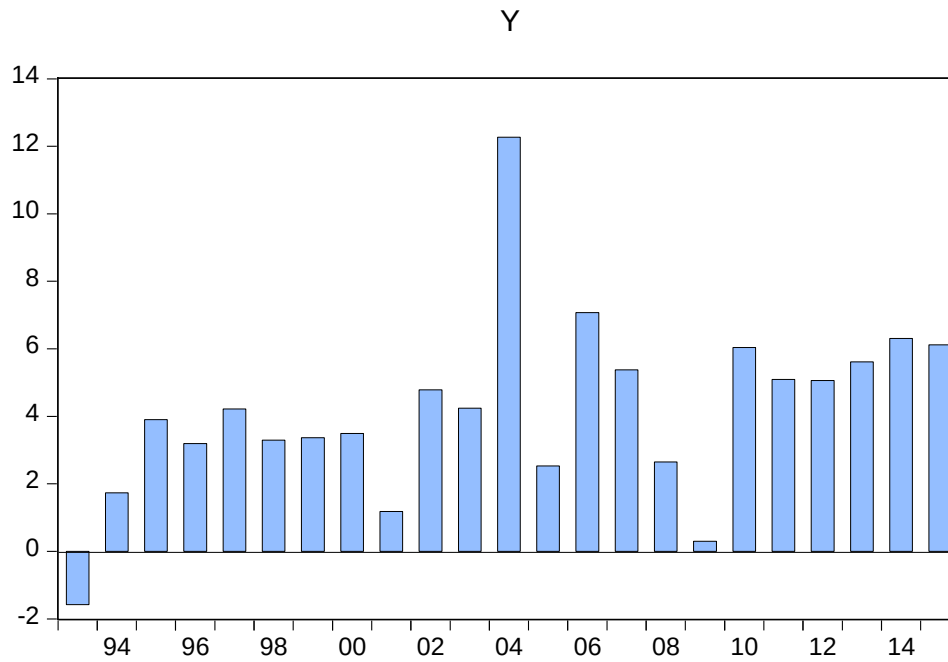


Figure 5: Namibia`s annual budget balance.

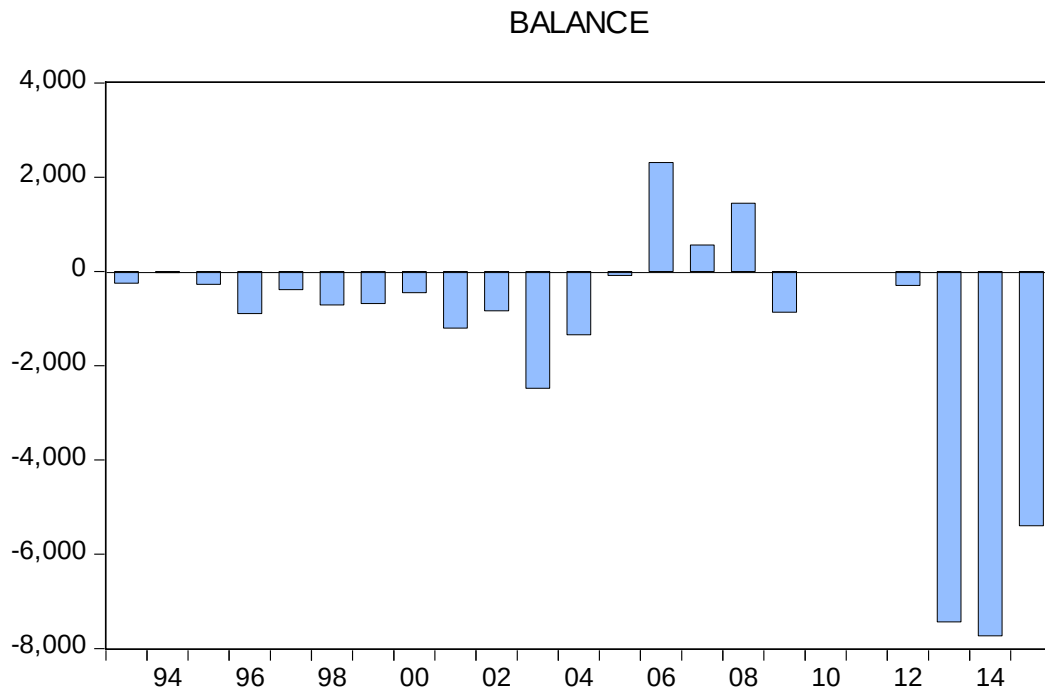
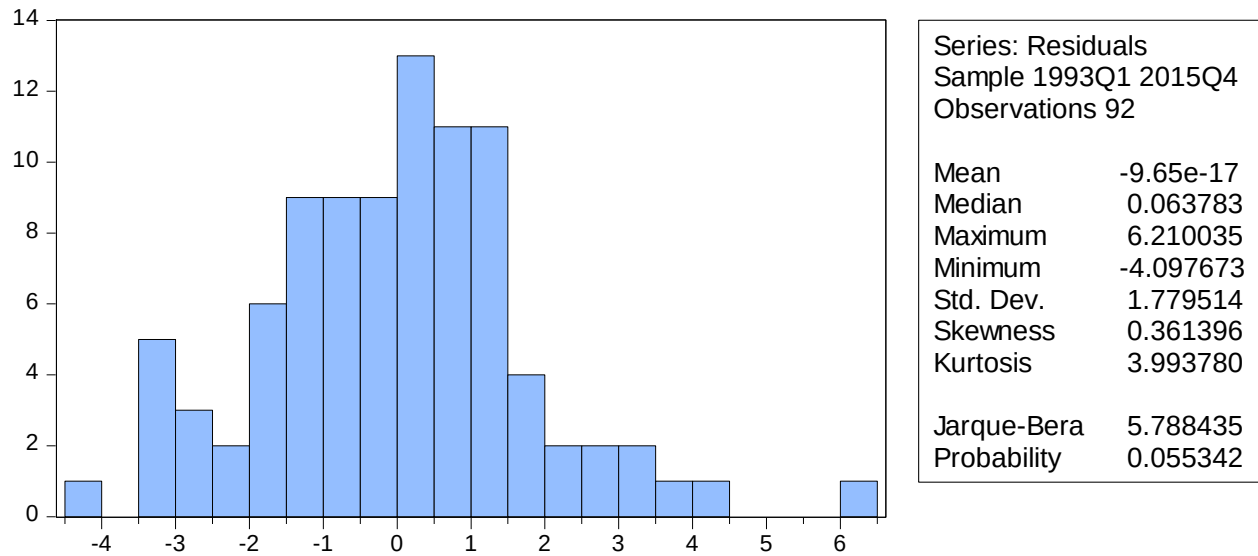


Figure 6: Normality Test



Appendix Table 1: Ramsey Reset Test

Ramsey RESET Test

Equation: UNTITLED

Specification: Y BD DEBT INV C

Omitted Variables: Powers of fitted values from 2 to 7

	Value	df	Probability
F-statistic	1.849113	(6, 82)	0.0997
Likelihood ratio	11.67459	6	0.0696

Appendix Table 2: Unit root test for GDP growth rate

LEVEL: INTERCEPT

Null Hypothesis: Y is stationary

Exogenous: Constant

Bandwidth: 6 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.490134
Asymptotic critical values*: 1% level	0.739000
5% level	0.463000
10% level	0.347000

LEVEL: TREND AND INTERCEPT

Null Hypothesis: Y is stationary

Exogenous: Constant, Linear Trend

Bandwidth: 6 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.085671
Asymptotic critical values*: 1% level	0.216000
5% level	0.146000
10% level	0.119000

1st DIFFERENCE: INTERCEPT

Null Hypothesis: D(Y) is stationary

Exogenous: Constant

Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.039166
Asymptotic critical values*: 1% level	0.739000
5% level	0.463000
10% level	0.347000

1ST DIFFERENCE: TREND AND INTERCEPT

Null Hypothesis: D(Y) is stationary

Exogenous: Constant, Linear Trend

Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.032837
Asymptotic critical values*: 1% level	0.216000
5% level	0.146000
10% level	0.119000

Appendix Table 3: Unit root test for the ratio of budget deficit to GDP

LEVEL: INTERCEPT

Null Hypothesis: BD is stationary

Exogenous: Constant

Bandwidth: 6 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.103448
Asymptotic critical values*: 1% level	0.739000
5% level	0.463000
10% level	0.347000

LEVEL: TREND AND INTERCEPT

Null Hypothesis: BD is stationary

Exogenous: Constant, Linear Trend

Bandwidth: 6 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.108269
Asymptotic critical values*: 1% level	0.216000
5% level	0.146000
10% level	0.119000

1st DIFFERENCE: INTERCEPT

Null Hypothesis: D(BD) is stationary

Exogenous: Constant

Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.106265
Asymptotic critical values*: 1% level	0.739000
5% level	0.463000
10% level	0.347000

1ST DIFFERENCE: TREND AND INTERCEPT

Null Hypothesis: D(BD) is stationary

Exogenous: Constant, Linear Trend

Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.061192
Asymptotic critical values*: 1% level	0.216000
5% level	0.146000
10% level	0.119000

Appendix Table 4: Unit root test for the ratio of debt to GDP

LEVEL: INTERCEPT

Null Hypothesis: DEBT is stationary

Exogenous: Constant

Bandwidth: 7 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.727477
Asymptotic critical values*: 1% level	0.739000
5% level	0.463000
10% level	0.347000

LEVEL: TREND AND INTERCEPT

Null Hypothesis: DEBT is stationary

Exogenous: Constant, Linear Trend

Bandwidth: 7 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.202432
Asymptotic critical values*: 1% level	0.216000
5% level	0.146000
10% level	0.119000

1ST DIFFERENCE: INTERCEPT

Null Hypothesis: D(DEBT) is stationary

Exogenous: Constant

Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.153084
Asymptotic critical values*: 1% level	0.739000
5% level	0.463000
10% level	0.347000

1ST DIFFERENCE: TREND AND INTERCEPT

Null Hypothesis: D(DEBT) is stationary

Exogenous: Constant, Linear Trend

Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.157334
Asymptotic critical values*: 1% level	0.216000
5% level	0.146000
10% level	0.119000

Appendix Table 5: Unit root test for the ratio of investment to GDP

LEVEL AND INTERCEPT

Null Hypothesis: INV is stationary

Exogenous: Constant

Bandwidth: 7 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.988459
Asymptotic critical values*: 1% level	0.739000
5% level	0.463000
10% level	0.347000

LEVEL: TREND AND INTERCEPT

Null Hypothesis: INV is stationary

Exogenous: Constant, Linear Trend

Bandwidth: 6 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.237299
Asymptotic critical values*: 1% level	0.216000
5% level	0.146000
10% level	0.119000

1ST DIFFERENCE: INTERCEPT

Null Hypothesis: D(INV) is stationary

Exogenous: Constant

Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.222360
Asymptotic critical values*: 1% level	0.739000
5% level	0.463000
10% level	0.347000

1ST DIFFERENCE: TREND AND INTERCEPT

Null Hypothesis: D(INV) is stationary

Exogenous: Constant, Linear Trend

Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.049605
Asymptotic critical values*: 1% level	0.216000
5% level	0.146000
10% level	0.119000

Appendix Table 6: Serial Correlation

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	54.65146	Prob. F(6,82)
Obs*R-squared	73.59590	Prob. Chi-Square(6)

Appendix Table 7: Heteroscedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	2.355967	Prob. F(3,88)	0.0773
Obs*R-squared	6.839816	Prob. Chi-Square(3)	0.0772
Scaled explained SS	9.367508	Prob. Chi-Square(3)	0.0248

Appendix Table 8: Parsimonius results for the bounds test

Dependent Variable: D(Y)

Method: Least Squares

Date: 04/20/17 Time: 00:21

Sample (adjusted): 1994Q4 2015Q4

Included observations: 85 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(BD)	-0.249900	0.122357	-2.042387	0.0452
D(DEBT)	-0.094367	0.066095	-1.427738	0.1582
D(INV)	-0.304183	0.116227	-2.617154	0.0110
Y(-1)	-0.153957	0.053240	-2.891783	0.0052
BD(-1)	-0.122844	0.048919	-2.511158	0.0145
DEBT(-1)	-0.010877	0.018124	-0.600151	0.5505
INV(-1)	0.050380	0.023803	2.116537	0.0381
D(Y(-1))	0.785897	0.106227	7.398313	0.0000
D(BD(-1))	0.386802	0.134662	2.872389	0.0055
D(INV(-1))	0.162324	0.109299	1.485142	0.1423
D(Y(-2))	0.115759	0.087500	1.322955	0.1905
D(BD(-2))	0.159232	0.112596	1.414184	0.1621
D(Y(-4))	-0.633117	0.098756	-6.410890	0.0000
D(BD(-4))	-0.304729	0.104018	-2.929571	0.0047
D(DEBT(-4))	-0.143331	0.079206	-1.809596	0.0750
D(INV(-4))	-0.126689	0.099725	-1.270381	0.2085
D(Y(-5))	0.568856	0.102615	5.543611	0.0000
D(BD(-5))	0.341143	0.122623	2.782045	0.0071
D(BD(-6))	0.115198	0.102222	1.126942	0.2639
C	-0.523420	0.410059	-1.276452	0.2063
R-squared	0.822358	Mean dependent var	0.061337	
Adjusted R-squared	0.770432	S.D. dependent var	0.876030	
S.E. of regression	0.419734	Akaike info criterion	1.303935	
Sum squared resid	11.45151	Schwarz criterion	1.878677	
Log likelihood	-35.41725	Hannan-Quinn criter.	1.535112	
F-statistic	15.83707	Durbin-Watson stat	2.148005	
Prob(F-statistic)	0.000000			

Appendix Table 9: Parsimonious ECM specification of the model.

Dependent Variable: D(Y)

Method: Least Squares

Date: 04/26/17 Time: 14:53

Sample (adjusted): 1994Q3 2015Q4

Included observations: 86 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(BD)	-0.318651	0.103470	-3.079658	0.0029
D(DEBT)	-0.004390	0.052461	-0.083676	0.9335
D(INV)	-0.280021	0.101666	-2.754312	0.0074
ECT	-0.101941	0.038613	-2.640065	0.0101
D(Y(-1))	0.853951	0.090758	9.409139	0.0000
D(BD(-1))	0.321967	0.110431	2.915537	0.0047
D(INV(-1))	0.187629	0.102891	1.823569	0.0723
D(Y(-4))	-0.640172	0.088896	-7.201372	0.0000
D(BD(-4))	-0.387922	0.095333	-4.069108	0.0001
D(Y(-5))	0.562019	0.094653	5.937669	0.0000
D(BD(-5))	0.360194	0.094863	3.796995	0.0003
C	0.033060	0.051843	0.637696	0.5256
R-squared	0.796079	Mean dependent var	0.070244	
Adjusted R-squared	0.765766	S.D. dependent var	0.874770	
S.E. of regression	0.423369	Akaike info criterion	1.247642	
Sum squared resid	13.26385	Schwarz criterion	1.590109	
Log likelihood	-41.64859	Hannan-Quinn criter.	1.385469	
F-statistic	26.26225	Durbin-Watson stat	2.062344	
Prob(F-statistic)	0.000000			

Appendix Table 10: Parsimonious specification of the long run model

Dependent Variable: Y

Method: Least Squares

Date: 04/20/17 Time: 01:35

Sample (adjusted): 1994Q3 2015Q4

Included observations: 86 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BD	-0.233633	0.123355	-1.893987	0.0625
DEBT	-0.116128	0.081517	-1.424577	0.1589
INV	-0.221608	0.104087	-2.129059	0.0369
Y(-1)	1.661124	0.091611	18.13238	0.0000
BD(-1)	0.553561	0.211832	2.613202	0.0111
INV(-1)	0.415001	0.188450	2.202188	0.0311
Y(-2)	-0.762030	0.117031	-6.511352	0.0000
BD(-2)	-0.362407	0.149936	-2.417077	0.0184
Y(-4)	-0.685721	0.112991	-6.068814	0.0000
BD(-4)	-0.432347	0.141915	-3.046530	0.0033
Y(-5)	1.203106	0.162804	7.389890	0.0000
BD(-5)	0.781268	0.185617	4.209035	0.0001
Y(-6)	-0.595856	0.105614	-5.641803	0.0000
BD(-6)	-0.407558	0.100252	-4.065355	0.0001
DEBT(-1)	0.126051	0.096643	1.304290	0.1966
INV(-2)	-0.159515	0.107789	-1.479884	0.1436
DEBT(-4)	-0.187303	0.108459	-1.726943	0.0888
DEBT(-5)	0.177143	0.090630	1.954568	0.0548
C	-0.231606	0.353339	-0.655478	0.5144
R-squared	0.965816	Mean dependent var	4.423555	
Adjusted R-squared	0.956632	S.D. dependent var	2.021637	
S.E. of regression	0.421004	Akaike info criterion	1.299859	
Sum squared resid	11.87540	Schwarz criterion	1.842099	
Log likelihood	-36.89394	Hannan-Quinn criter.	1.518085	
F-statistic	105.1656	Durbin-Watson stat	2.057104	

Appendix Table 11: Causality test results

Budget deficit does not granger cause real GDP

Wald Test:

System: SYS01

Test Statistic	Value	df	Probability
Chi-square	22.03145	6	0.0012

Null

 $C(8)=0, C(9)=0, C(10)=0, C(11)=0, C(12)=0, C(13)=0$

Hypothesis:

Debt does not granger cause real GDP

Wald Test:

System: SYS01

Test Statistic	Value	df	Probability
Chi-square	7.016550	6	0.3193

Null

 $C(15)=0, C(16)=0, C(17)=0, C(18)=0, C(19)=0, C(20)=0$

Hypothesis:

Investment does not granger cause real GDP

Wald Test:

System: SYS01

Test Statistic	Value	df	Probability
Chi-square	4.577552	6	0.5990

Null

 $C(22)=0, C(23)=0, C(24)=0, C(25)=0, C(26)=0, C(27)=0$

Hypothesis:

Real GDP does not granger cause budget deficit

Wald Test:
System: SYS01

Test Statistic	Value	df	Probability
Chi-square	19.77666	6	0.0030

Null Hypothesis:
C(30)=0,C(31)=0,C(32)=0,C(33)=0,C(34)=
0,C(35)=0

Real GDP does not granger cause debt

Wald Test:
System: SYS01

Test Statistic	Value	df	Probability
Chi-square	13.99537	6	0.0297

Null Hypothesis:
C(59)=0,C(60)=0,C(61)=0,C(62)=0,C(63)=
0,C(64)=0

Real GDP does not granger cause investment

Wald Test:
System: SYS01

Test Statistic	Value	df	Probability
Chi-square	3.813069	6	0.7020

Null Hypothesis:
C(88)=0,C(89)=0,C(90)=0,C(91)=0,C(92)=
0,C(93)=0

Debt does not granger cause budget deficit

Wald Test:

System: SYS01

Test Statistic	Value	df	Probability
Chi-square	45.71174	6	0.0000

Null Hypothesis:
 $C(44)=0, C(45)=0, C(46)=0, C(47)=0, C(48)=0, C(49)=0$

Investment does not granger cause budget deficit

Wald Test:

System: SYS01

Test Statistic	Value	df	Probability
Chi-square	3.337397	6	0.7655

Null Hypothesis:
 $C(51)=0, C(52)=0, C(53)=0, C(54)=0, C(55)=0, C(56)=0$

Budget deficit does not granger cause debt

Wald Test:

System: SYS01

Test Statistic	Value	df	Probability
Chi-square	28.18712	6	0.0001

Null Hypothesis:
 $C(66)=0, C(67)=0, C(68)=0, C(69)=0, C(70)=0, C(71)=0$

Budget deficit does not granger cause investment.

Wald Test:

System: SYS01

Test Statistic	Value	df	Probability
Chi-square	4.046628	6	0.6704

Null

Hypothesis:

$C(95)=0, C(96)=0, C(97)=0, C(98)=0, C(99)=0, C(100)=0$

Appendix 12: Seemingly unrelated regression of the level VAR model

$$Y = C(1)*Y(-1) + C(2)*Y(-2) + C(3)*Y(-3) + C(4)*Y(-4) + C(5)*Y(-5) + C(6)*Y(-6) + C(7)*Y(-7) + C(8)*BD(-1) + C(9)*BD(-2) + C(10)*BD(-3) + C(11)*BD(-4) + C(12)*BD(-5) + C(13)*BD(-6) + C(14)*BD(-7) + C(15)*DEBT(-1) + C(16)*DEBT(-2) + C(17)*DEBT(-3) + C(18)*DEBT(-4) + C(19)*DEBT(-5) + C(20)*DEBT(-6) + C(21)*DEBT(-7) + C(22)*INV(-1) + C(23)*INV(-2) + C(24)*INV(-3) + C(25)*INV(-4) + C(26)*INV(-5) + C(27)*INV(-6) + C(28)*INV(-7) + C(29)$$

$$BD = C(30)*Y(-1) + C(31)*Y(-2) + C(32)*Y(-3) + C(33)*Y(-4) + C(34)*Y(-5) + C(35)*Y(-6) + C(36)*Y(-7) + C(37)*BD(-1) + C(38)*BD(-2) + C(39)*BD(-3) + C(40)*BD(-4) + C(41)*BD(-5) + C(42)*BD(-6) + C(43)*BD(-7) + C(44)*DEBT(-1) + C(45)*DEBT(-2) + C(46)*DEBT(-3) + C(47)*DEBT(-4) + C(48)*DEBT(-5) + C(49)*DEBT(-6) + C(50)*DEBT(-7) + C(51)*INV(-1) + C(52)*INV(-2) + C(53)*INV(-3) + C(54)*INV(-4) + C(55)*INV(-5) + C(56)*INV(-6) + C(57)*INV(-7) + C(58)$$

$$DEBT = C(59)*Y(-1) + C(60)*Y(-2) + C(61)*Y(-3) + C(62)*Y(-4) + C(63)*Y(-5) + C(64)*Y(-6) + C(65)*Y(-7) + C(66)*BD(-1) + C(67)*BD(-2) + C(68)*BD(-3) + C(69)*BD(-4) + C(70)*BD(-5) + C(71)*BD(-6) + C(72)*BD(-7) + C(73)*DEBT(-1) + C(74)*DEBT(-2) + C(75)*DEBT(-3) + C(76)*DEBT(-4) + C(77)*DEBT(-5) + C(78)*DEBT(-6) + C(79)*DEBT(-7) + C(80)*INV(-1) + C(81)*INV(-2) + C(82)*INV(-3) + C(83)*INV(-4) + C(84)*INV(-5) + C(85)*INV(-6) + C(86)*INV(-7) + C(87)$$

$$INV = C(88)*Y(-1) + C(89)*Y(-2) + C(90)*Y(-3) + C(91)*Y(-4) + C(92)*Y(-5) + C(93)*Y(-6) + C(94)*Y(-7) + C(95)*BD(-1) + C(96)*BD(-2) + C(97)*BD(-3) + C(98)*BD(-4) + C(99)*BD(-5) + C(100)*BD(-6) + C(101)*BD(-7) + C(102)*DEBT(-1) + C(103)*DEBT(-2) + C(104)*DEBT(-3) + C(105)*DEBT(-4) + C(106)*DEBT(-5) + C(107)*DEBT(-6) + C(108)*DEBT(-7) + C(109)*INV(-1) + C(110)*INV(-2) + C(111)*INV(-3) + C(112)*INV(-4) + C(113)*INV(-5) + C(114)*INV(-6) + C(115)*INV(-7) + C(116)$$