

**AN ANALYSIS OF THE IMPACT OF PUBLIC DEBT ON ECONOMIC  
GROWTH OF NAMIBIA**

**A THESIS SUBMITTED IN PARTIAL FULFILMENT**

**OF THE REQUIREMENTS FOR THE DEGREE OF**

**MASTER OF SCIENCE IN ECONOMICS**

**OF**

**THE UNIVERSITY OF NAMIBIA**

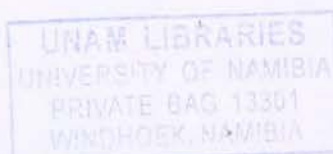
**BY**

**ALOSIA T IITULA**

**200907352**

**APRIL 2018**

**SUPERVISOR: Dr. OMU KAKUJAH**



## ABSTRACT

This paper examined the impact of public debt on economic growth of Namibia for the period 2003 to 2016 using quarterly time series data on GDP growth as a proxy for economic growth; external debt and domestic debt. Time series properties were tested for stationarity using the Augmented Dickey-Fuller test. Johannsen Cointegration test found no long run relationship among the variables under study. The study employed Toda-Yamamoto Granger causality tests following a VAR framework and results revealed a no causal relationship between public debt and GDP growth. The variance decomposition analysis shows that domestic debt exerts more pressure on GDP growth in Namibia. The findings of impulse response function show that the response of GDP growth to public debt was unstable. The study recommend that instead of borrowing, policy makers should develop and implement strategies that increase revenue for the government to fill the deficit gap. Government should only consider borrowing for very high priority projects that are well appraised and self-sustained that can contribute to economic growth, generating enough returns to upset the debt servicing. Lastly, effective and efficient utilization of public resources is needed to ensure that the future generation's welfare or economic production is not being mortgaged in continuous indebtedness.

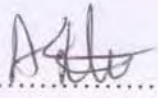
## DECLARATION

I, Alosia T litula, hereby declare that this study is my own work and is a true reflection of my own research, and that this work, or any part thereof has not been submitted for a degree at any other institution of higher learning.

No part of this thesis may be reproduced, stored in any retrieval system, or transmitted in any form, or by means (e.g. electronic, mechanical, photocopying, recording or otherwise) without the prior permission of the author, or The University of Namibia in that behalf.

I, Alosia T litula, grant The University of Namibia the right to reproduce this thesis in whole or in part, in any manner or format, which The University of Namibia may deem fit.

Alosia T litula  
Name of Student

  
Signature

01 April 2018  
Date



## TABLE OF CONTENT

ABSTRACT .....	ii
DECLARATION .....	iii
TABLE OF CONTENT .....	iv
ACRONYMS .....	x
ACKNOWLEDGEMENT .....	xi
DEDICATION .....	xii
CHAPTER ONE: INTRODUCTION .....	1
1.1 Orientation of the proposed study .....	1
1.2 Statement of the problem .....	4
1.3 Objectives of the study .....	5
1.4 Hypothesis .....	5
1.4 Significance of the study .....	5
1.5 Limitation of the study .....	5
1.6 Organization of the study .....	5
CHAPTER TWO: AN OVERVIEW OF NAMIBIA PUBLIC DEBT AND ECONOMIC GROWTH .....	7
2.1 Economic Development .....	7
2.2 Evolution of Namibia's public debt .....	9
2.3 Domestic and external debt .....	12

2.4 Public Debt Management .....	14
2.5 Conclusion.....	15
<b>CHAPTER THREE: LITERATURE REVIEW .....</b>	<b>16</b>
3.1 Theoretical Literature.....	16
3.1.1 Crowding out effect theory.....	16
3.1.2 Debt overhang theory.....	17
3.1.3 Ricardian equivalence theory.....	19
3.1.4 Neoclassical theory .....	19
3.1.5 The Keynesian theory .....	20
3.2 Empirical Literature .....	21
3.3 Summary .....	35
<b>CHAPTER FOUR: METHODOLOGY.....</b>	<b>36</b>
4.1 Research Design.....	36
4.2 Data sources.....	36
4.3 Measurement of variables .....	36
4.4 Theoretical framework and Model Specification.....	37
4.5 Data Analysis .....	39
4.3.1 Stationarity .....	39
4.3.2 Cointegration .....	40
4.3.3 Granger Causality (Toda-Yamamoto approach) .....	42



4.3.3 Variance Decomposition .....	44
4.3.4 Impulse Response Function .....	44
<b>CHAPTER FIVE: ANALYSIS AND DISCUSSION OF EMPIRICAL RESULTS .....</b>	<b>45</b>
5.1 Data Characteristics .....	45
5.2 Analysis of Unit Root Test .....	46
5.3 Cointegration Test .....	48
5.4 Lag length Selection .....	49
5.4 Diagnostic Tests .....	50
5.4.1 Autocorrelation: The Lagrange Multiplier (LM) Test .....	50
5.4.2. Normality test .....	50
5.4.3 Residual Heteroscedastic Test .....	51
5.4.4 Stability Test .....	52
5.5 Toda Yamamoto Granger Causality test results .....	53
5.6 Variance Decomposition Analysis .....	55
5.7 Impulse Response Analysis .....	57
5.8 Conclusion .....	59
<b>CHAPTER SIX: CONCLUTION AND RECCOMENDATION .....</b>	<b>60</b>
6.1 Conclusion .....	60
6.2 Policy Implications .....	61
6.3 Further research .....	62

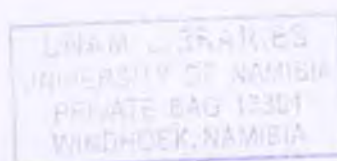


Table 2.1: Variable Description Indicators ..... 18

Table 2.2: Descriptive Statistics for Variables used in the study ..... 25

Table 2.3: Descriptive Stats at Levels ..... 34

Table 2.4: Unit Root Test at First Differences ..... 43

Table 2.5: Johansen Cointegration Test ..... 49

Table 2.6: Long-run Estimates ..... 57

Table 2.7: Short-Run Cointegration LM Test ..... 60

Table 2.8: Final Short-Run Test ..... 71

Table 2.9: Granger causality results ..... 72

Table 2.10: Toda-Yamamoto granger Causality Test Results ..... 73

Table 2.11: Variance-Covariance matrix of LNCPI ..... 75

## LIST OF TABLES

Table 2.1: Namibia Benchmark Indicators.....	14
Table 5.1: Descriptive Statistics for Variables used in the study .....	45
Table 5.2: Unit Root Tests at Levels.....	47
Table 5.3: Unit Root Tests at first difference.....	47
Table 5.4: Johansen Cointegration Test.....	49
Table 5.5: Lag Length Selection.....	50
Table 5.6: Serial Correlation LM Test .....	50
Table 5.7: Residual Normality test .....	51
Table 5.8: Heteroscedastic results.....	52
Table 5.9: Toda-Yamamoto granger Causality Test Results .....	53
Table 5.10: Variance Decomposition of LNGPR.....	55



## LIST OF FIGURES

Figure 2.1: Namibia Real GDP growth .....	8
Figure 2.2: Namibia total Government Debt .....	11
Figure 2.3: Total debt as % of GDP .....	12
Figure 2.4: Foreign debt and Domestic debt.....	13
Figure 3.1: The Debt Laffer Curve.....	18
Figure 5.1: Inverse Roots of AR Characteristic Polynomial .....	52
Figure 5.2: Impulse response for GDP growth.....	57

## ACRONYMS

<b>ADF</b>	Augmented Dickey Fuller
<b>ARDL</b>	Autoregressive Distributed Lag
<b>ECM</b>	Error Correction Method
<b>GDP</b>	Gross Domestic Product
<b>GNP</b>	Gross National Product
<b>IMF</b>	International Monetary Fund
<b>OLS</b>	Ordinary Lest Square
<b>SACU</b>	Southern African Customs Union
<b>VAR</b>	Vector Autoregressive
<b>VECM</b>	Vector Error Correction Model

## **ACKNOWLEDGEMENT**

Firstly, I thank God for each day blessings and strength to push through my entire programme.

I would like to express my sincere gratitude and deepest appreciation to my supervisor Dr. Omu Kakujaha-Matundu for his patience, guidance and endless support. Without his supervision, I could not had completed a thesis of this standard.

Lastly, my appreciation for Prof. Johannes P.S. Sheefeni for his guidance on Econometric analysis.



## DEDICATION

This thesis is dedicated to my grandmother Senia N Embula. I could not be where I am today without her support, motivation and sacrifices.

## CHAPTER ONE: INTRODUCTION

### 1.1 Orientation of the proposed study

Globally, most countries borrow because of their inability to generate enough resources which could be used for investments and economic growth inductive activities. Public borrowing is one of the significant instruments of resource deployment which divert the flow of resources into right channels, particularly in circumstance of a developing economy as they do not have sufficient resources for developmental purposes. Developing countries like Namibia face the challenge of budget deficit and borrowing is one of the options that government turn to leading to accumulated public debt stock. Soludo (2003) opined that countries mainly borrow to enable higher investment and consumption spending, finance transitory balance of payments deficits, lower nominal interest rates abroad, lack of domestic long-term credit and to circumvent hard budget constraints. This implies that economies borrow to boost economic growth and reduce poverty. An increase in economic growth improves the living standards of citizens and persistent improvements affect per capita income positively which is essential for reducing poverty.

Namibia as a developing country wish to mobilize enough capital resources to accelerate economic growth and improve the welfare of its people but the resources are not sufficient. Since independence, the government generates lower revenue from taxes and record high public expenditures which leads to government deficit. The deficit has been recorded in most years except for 2006/07 to 2008/09 financial year when the government of Namibia achieved a budget surplus (Bank of Namibia, 2008). Due to inability to generate enough resources and savings which could be used for investment



and economic growth inductive activities, the government resorts to borrowing to enable successful implementation of state programmes and projects.

Apart from borrowing, governments have an option of printing more money and increasing tax rates to generate more revenue. But Namibia mostly chooses not to compromise macroeconomic stability by printing more money and increasing taxes rates. Debt option is one of the available routes that government can explore to create and maintain macroeconomic stability. Governments mainly borrow to finance public goods that increase social welfare and promote economic growth. Debt is classified into two categories, reproductive debt and dead weight debt. When a loan is taken to enable the government to purchase some form of assets or to invest is said to be productive. However, debt undertaken to finance current expenditures are dead weight debts.

Government borrows either from domestic sources or from external sources creating domestic debt and external debt respectively. External debt is the loan borrowed from institutions, individuals and government of foreign countries. Interest on this debt must be paid in the currency in which the loan was made. According to Myles (1997, p.486)" the important features of such debt are that it is not in competition with physical capital as a savings instrument for the consumers of the issuing economy, but its servicing and repayment leads to a flow of resources out of the country". In contrast, domestic debt is the part of the total government debt in a country that is owed to lenders within the country. Government borrowing through domestic sources is vital in stimulating investment and private savings, as well as strengthening domestic financial markets, since it provides depth and liquidity to the markets. The disadvantage risks include



higher interest rates which might slow growth, the creation of inflationary pressure in an economy, and the possible crowding-out of the private sector.

Economic growth theory suggests that reasonable levels of borrowing by developing countries are likely to enhance economic growth (Pattillo, Ricci & Poirson, 2011). According to Al-Zeaud (2014) developing countries borrow to augment what they have because of dominance of small stock of capital; hence they are likely to have investment opportunities with rates of return higher than that of their counterpart developing countries. This can be effective as long as borrowed funds are appropriately utilized for productive investment and not lead to macroeconomic instability and other economic distortion.

There is contradicting views in the literature relating to whether foreign debt affects economic growth more than domestic debt or that both foreign debt and external debt influences a country's economic growth. Some researchers found a negative relationship between external debt and economic growth due to inefficient allocation of resources, while others concludes that there is positive effect of external debt on economic growth as external debt gives boost to the economy. Audu & Abula (2001) are of the view that it is only domestic debt that affects economic growth and not foreign debt. While Kasidi & Said (2013) in their study revealed that there is significant impact of external debt and debt services on GDP growth. Thus, there is a need to examine the impact of external debt and domestic debt in Namibia to enhance proper policy formulation by the government.

## **1.2 Statement of the problem**

Since Namibia got independence in 1990, there had been a rising level of public debt stock each year, which in the absence of appropriate measures might result to an ominous catastrophe. From 1993 to 2015, the proportion of total government debt to GDP averaged 20.88 percent which rose to 34 percent in the fourth quarter of 2005 (Bank of Namibia, 2015). In 2015/16 FY total government debt was N\$59.6 billion which is equivalent to 39.5 percent of GDP. At the end of 2015/16 financial year, foreign debt stock stood at N\$27.4 billion which is 18.2 percent of GDP while domestic debt stock was N\$32.1 billion which is 21.3 Percent of GDP (Bank of Namibia, 2016).

Borrowing with a purpose of investing in capital development project is justifiable; however borrowing for consumption purposes is an unsustainable exercise. Economic growth theory suggests that reasonable levels of borrowing by developing countries are likely to enhance economic growth (Pattillo et al., 2011). This can happen for as long as they use the borrowed resources for productive investments and do not suffer from macroeconomic instability, policies that distort economic incentives; growth should increase and allow for timely debt repayments (Patenio & Tan-Cruz, 2007). Increasing borrowing both internally and externally as is happening in Namibia can stifle economic growth for which it is meant to stimulate. Due to the escalating public debt growth rate and considering the priority of government to improve its citizen's living standard by the year 2030, it is important to investigate the impact of public debt on economic growth.

Moreover, although many studies were conducted in other countries, there is no study done with the aim to establish the relationship between both external debt, domestic debt and economic growth in Namibia. Thus this study aims to address this dilemma.



### **1.3 Objectives of the study**

The objective of the study is to examine the relationship between public debt and economic growth in Namibia.

### **1.4 Hypothesis**

H<sub>0</sub>: There is no a relationship between public debt and economic growth

H<sub>1</sub>: There is a relationship between public debt and economic growth

### **1.4 Significance of the study**

The study empirically analyzes the impact of public debt on economic growth in Namibia; it is significant for individuals, government and academia. Individuals will be acquainted with information on why government borrows and the significance of public debt. To the government, the study provides recommendations that can assist policy makers in formulating policies toward public debt. Furthermore, there is limited research that looks at the impact of public debt on economic growth in Namibia; this study contributes to knowledge and literature to be referred to by other researches and also shed more light on the impact of external debt and domestic debt on economic growth.

### **1.5 Limitation of the study**

Debt data available is not sufficient to run a yearly regression analysis, as a result the study is compelled to use quarterly data. The unavailability of long time series of data may limit the outcomes because long time series of data offer more reliable findings.

### **1.6 Organization of the study**

This paper is organized in six chapters, chapter one presents the general introduction of the paper which consist of the problem statement, objective of the study, hypothesis,



significance and limitation of the study. Chapter two presents an overview of the Namibia public debt and economic growth. Chapter three reviews both the theoretical and empirical literatures on public debt and economic growth. Chapter four presents the methodology of the study. This includes the model specification, estimation techniques and data descriptions. The model estimation, discussion and presentation of results as well as diagnostic tests are also reported and analyzed in chapter five. Chapter six ends the study with conclusions and policy recommendations.

## CHAPTER TWO: AN OVERVIEW OF NAMIBIA PUBLIC DEBT AND ECONOMIC GROWTH

This chapter highlights the general overview of public debt and economic growth in Namibia. It describes the economic characteristic of Namibia, evolution of public debt and lastly, the debt management strategy.

### 2.1 Economic Development

Namibia attained its independence on the 21<sup>st</sup> March 1990. The key feature of Namibia's economy is the dominance of primary industries in the economy. Despite the significant progress that Namibia has made, after 27 years of independence Namibia still exports raw material and import finished goods. The economy rely significantly on four sectors which are mining, agriculture, fishery and tourism (Namibia Statistics Agency, 2016). Hence Namibia has the potential of boosting economic growth by developing its secondary industries in order to add value to raw material. In the process, employment prospects will be created reducing the high and unsustainable unemployment rate which is one of the major challenges facing the country and ultimately improving the trade balance.

Since independence, GDP growth rate has generally been positive though not stable except in 1993 and 2009 when the growth rate was very low as illustrated by Figure 2.1. The contraction of GDP in 1993 was a result of a severe drought that affected agricultural production and a sharp drop in diamond output stemming from weak diamond market (Ogbokor, 2015). While the 2009 low GDP growth was affected by world financial meltdown (Bank of Namibia, 2009). Despite a prolonged positive GDP



growth in Namibia, poverty is still a serious challenge due to high income inequality in the country.

**Figure 2.1: Namibia Real GDP growth**



**Source: Bank of Namibia( various annual reports)**

Figure 2.1 above depict real GDP growth from 1991 to 2018. The 2017 and 2018 figures are forecasts. The Namibian economy slowed down in 2016 with GDP growth recorded at 1%. The lower growth rate in 2016 are due to massive construction and projects that were affected by government financial crisis and also the contraction in mining sector. The government of Namibia faced financial challenges, including increasing debt levels which through fiscal consolidation, government is attempting to bring it down to sustainable levels. As a result, government was forced to cancel major projects in the country and most government tenders were not awarded throughout the year. According to Namibia Statistic Agency(2016), construction works done by the



government sector has slowed down to a growth of 6.3% in 2016 which is too low comparing to others years, for instance 31% recorded in 2015. Due to these shocks real GDP growth is estimated to increase to 2.9 percent and 3.8 percent in 2017 and 2018 respectively.

## **2.2 Evolution of Namibia's public debt**

Public debt which is referred also as nation debt or government debt is the total of a country debt which the government has borrowed from all sources. There are two types of national debt which are internal debt and external (foreign) debt. Domestic debt is the debt that the government incur by borrowing in its own currency from the residents of its own country. While external debt is funds borrowed from foreign lenders, which include private sources, other countries and financial international organizations.

According to Osewe (2013), public debt is one of the way to stimulate economic growth by injecting money from external investors (foreign debt) and distributing assets (internal debt) among those who has more than they can use at the moment and those who lack assets for developing economic initiative and other needs. However, apart from being trapped in debt, public borrowing might also hamper economic growth in the long run. Public debt may cause capital flight as investors anticipate increases in the tax burden through raising tax as the government try to collect more revenue to pay back debt.

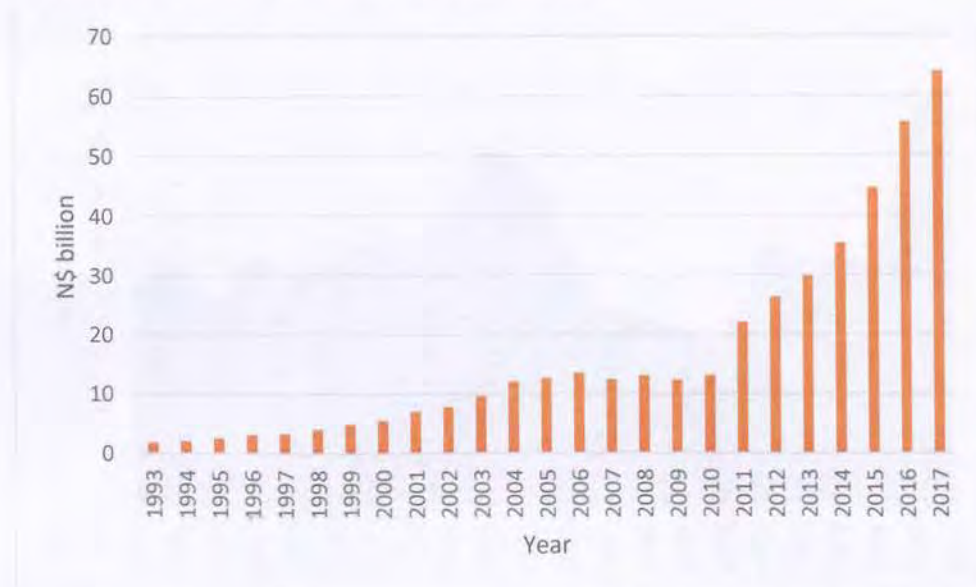
After independence, the Namibian economy was characterized by various challenges such as high unemployment rate, slow economic growth, high inequalities in income distribution and high poverty rate among others. As a result, fiscal's policy in the country targeted to resolve the inherited challenges by stimulating employment

creations, investment and improving living conditions of all Namibians. The expansionary fiscal policies placed pressure on the Namibian government to increase spending even though the government generated low revenues which resulted in consecutive budget deficit. Namibia only experienced its first budget surplus in 2006/07 and extended to 2007/08 financial year. According to Bank of Namibia (2008), this was a result of tighter public expenditures, improved tax administration and strong Southern African Customs Union (SACU) revenue. Due to shortage of resources, the government resort to borrowing, both domestically and internationally to fill the shortage. Therefore, this led to the buildup of national debt stock. For instance, public debt stood at N\$ 536 million in 1991, it increased more than a tenfold to N\$ 5 701.4 million by the end of 2000 and the buildup in debt has been rising for the past years, with total public debt reaching N\$ 64,538.7 million as of 31 December 2016 (Bank of Namibia, 2016).

The highest annual increase in government debt occurred between 2010 and 2011 when the national debt stock increased by about 98.8% from N\$ 12 968.7 million to N\$ 25 787.6 million as of end of 2011 as depicted in Figure 2.2. In 2011 the government of Namibia established the Targeted Intervention Programme for employment and Economic Growth (TIPEEG) program with the aim of creating employment and supporting strategic economic sectors as a result of the 2008 global and economic slowdown. Due to shortage of resource to support TIPEEG, the government of Namibia turned to both domestic and foreign borrowing in order to raise enough capital. It was during the same period the country issued a debt of US\$500 million Eurobond on the international capital market.



**Figure 2.2: Namibia total Government Debt**

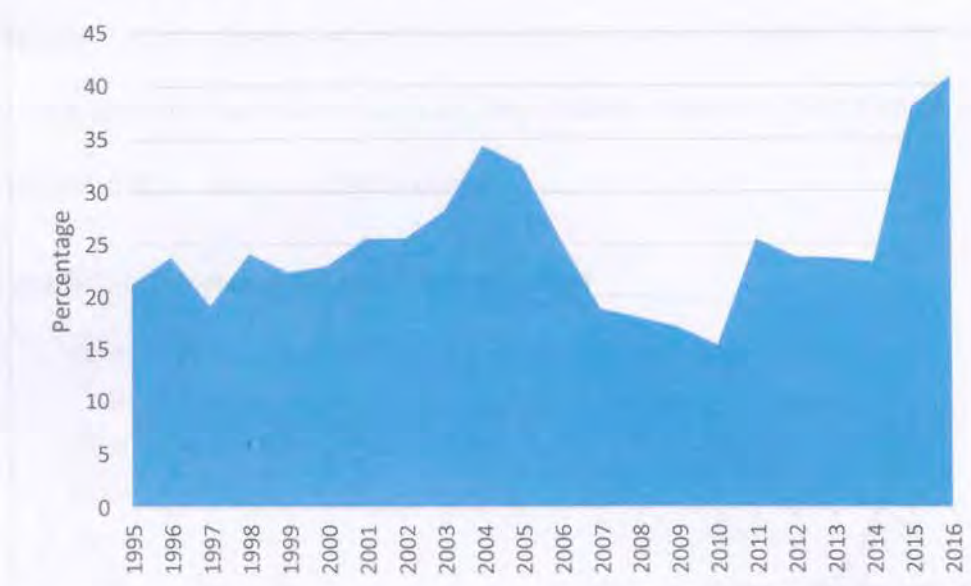


**Source: IMF Database, 2017**

Figure 2.3 below present the public debt as a percentage of GDP from 1995 to 2016. Since independence, just like total debt, the total debt as % of GDP has been increasing but generally low and below the set ceiling of 35 percent. However, since 2015 the total government debt as a percentage of GDP has increased to more than the set ceiling, it rose up to 40.7% as at 31 December 2016. The International Monetary Fund (IMF) warned Namibia to consider reducing public expenditures as it expect Namibia public debt to increase above 60 percent of GDP by 2021.



**Figure 2.3: Total debt as % of GDP**



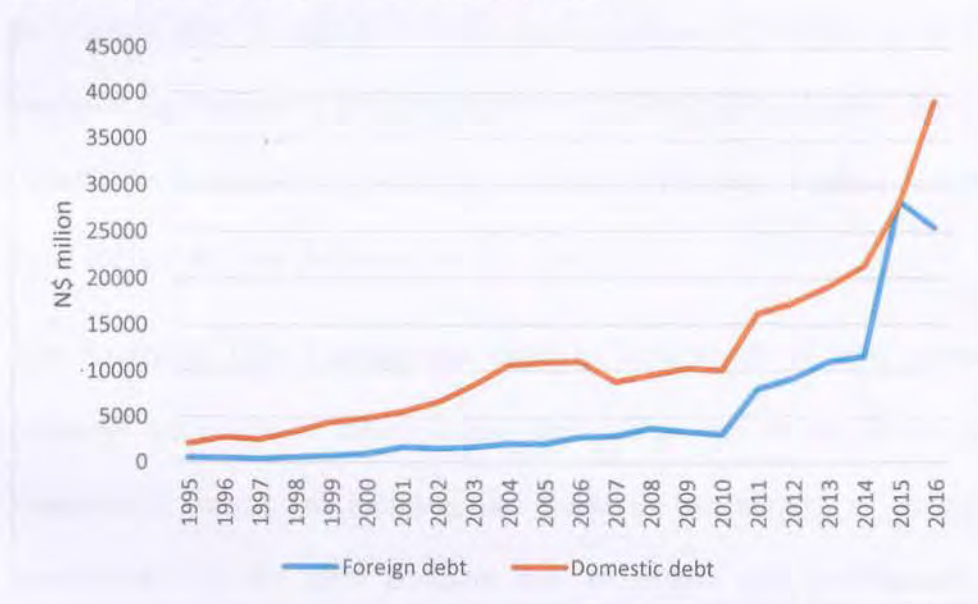
**Source: Bank of Namibia (various annual reports)**

### **2.3 Domestic and external debt**

Prior to Namibia independence in 1990, there were no bonds issued nor any form of supportive market infrastructure; hence the bond market was virtually non-existing. The financial market was dominated by foreign institution mainly South African that mobilized savings and deposits that were hardly reinvested in the Namibian economy. This resulted in Namibia being a net exporter of capital and relying heavily on imports of goods. Due to such scenario, Namibia was eager to develop its economy and also targeted to improve the financial markets. The government implemented a policy of funding its deficit by borrowing domestically as a way to facilitate developing the local financial market. Consequently, the country first National Development Plan (NDP1) that started from 1991 to 2000 focus was on the country financial systems. The objective was to maintain a stable, sound competitive and efficient financial system that facilitates economic development. And encourage high rates of savings and investments in

Namibia; and be a source of financial service provider to other Southern African regions. The government of Namibia has done a lot to strengthen the domestic financial market and the results are visible to date because domestic debt is more dominant than external debt as shown in figure below.

**Figure 2.4: Foreign debt and Domestic debt**



**Source: Bank of Namibia (various annual reports)**

Figure 2.4 presents the level of external and domestic debt from 2010 to 2016 which shows that the Government of Namibia borrows more domestically than externally. Although external debt stock has been on the rise from the year 2010 to 2015. By end of the year 2016, external debt stock declined by 9.7 percent to about N\$ 25 419.8 million. The decline was a result of appreciation of the Namibia dollar against major currencies (Bank of Namibia, 2016).



## 2.4 Public Debt Management

To monitor borrowing, government of Namibia has introduced the Sovereign Debt Management Strategy (SDMS) as a debt policy which was approved by Cabinet in 2005 (Bank of Namibia, 2014). According to IMF & World Bank (2015) public debt management “is the process of establishing and executing strategy for managing the government debt in order to raise the required amount of funding at the lowest possible cost over the medium to long run, consistent with a prudent degree of risk”. The overall objective of Namibia debt policy is to minimize the cost of public borrowing with risk involved and develop the domestic debt market.

The Sovereign Debt Management contains an analysis of debt management which indicates the levels of future public debt which can be considered sustainable for Namibia. It consists of indicators that guide as benchmarks or ceiling to guide the management of the debt portfolio and to ensure that government borrowing is undertaken with an acceptable degree of risk. The Table below present the debt benchmark indicators.

**Table 2.1: Namibia Benchmark Indicators**

<b>Benchmark Indicator</b>	<b>Benchmark (%)</b>
Total debt / GDP	35%
Domestic debt / GDP	28%
Foreign debt / GDP	7%
Foreign debt (excl. Rand) / GDP	7%
Total debt Service / Revenue	10%
Total debt Service/ GDP	3%
Domestic debt / Total debt	80%
External debt / Total debt	20%
External debt (excl. Rand) / Total debt	20%
Debt falling due within 12 months	30%
Total Guarantees / GDP	10%

**Source: Bank of Namibia, 2014**



The current Sovereign Debt Management Strategy caps the total debt to GDP ratio at 35%, since 2015 to date, the % of total government is above the set threshold which is worrisome. This indicates that the government need to put measures in place to control the borrowing habits as it keep on growing as years goes on to ensure that sustainability is maintained. The accounting approach to fiscal sustainability conditions is that, in order to sustain the ratio of debt to GDP at a targeted level over the long-term, government debt should not grow faster than nominal GDP. This logically imply that the expenditure for which debt has been incurred, should positively contribute to GDP growth and thereby induce an equivalent increase in government revenue to service the debt.

## **2.5 Conclusion**

This chapter looks at the overview of public debt and economic growth in Namibia. Despite a positive GDP growth rate since Namibia got independent, poverty rate is still high in Namibia. This can be explained by high income inequality, whereby income circulate or is only shared by few citizens. The increase in government expenditure as a way of improving living standards increases budget deficit which force government to borrow and this lead to increases in public debt stock each year.

## CHAPTER THREE: LITERATURE REVIEW

This chapter review both theoretical and empirical literature of the relationship between public debt and economic growth as established by other scholars. Specifically, the study enumerates the theories on which the study is grounded before presenting empirical literature by various scholars seeking to establish the relationship between debt and growth.

### 3.1 Theoretical Literature

There are a number of theories related to public debt and economic growth. Prominent among them are the crowding-out effect theory, public choice theory, debt-overhang theory, Ricardian equivalency theory, the neo-classical theory and Keynesian theory. This section will expound on these theories with the aim of gaining deeper understanding of the relationship between public debt and economic growth.

#### 3.1.1 Crowding out effect theory

The issue of crowding out is a much debated topic in macroeconomics. According to Abdullahi, Abu and Hassan (2016) crowding out effects usually occurs due to excessive real interest charges while the terms of trade of an overly indebted country become worsen while foreign credit may no longer be available. In the classical view, public borrowing authority accumulates resources for its own use leaving private sector with lesser part while in the monetarist view, the expansion in the government expenditures after a relatively short transition period displace an equivalent magnitude of private expenditures (Khan & Gill, 2009).



With domestic borrowing, private investors compete with government in the bonds markets for limited amount of funds. When government borrows domestically, they use up the internal private savings that could have been available for private sector lending. If public expenditures increase without any changes in money supply, output, income and transaction demand for money increases as well. Given a constant supply of money, increase in debt and transaction demand for money in the market push domestic interest rate upward. The net implication of the crowding out theory is that expansion in the public sector certainly comes at the expenses of the private sector of the economy, unless the money supply is expanded during the process. However, external borrowing increases the available resources in the country for governments which increases private investment in the process. This can arise because the increase in public spending boosts demand for domestic goods (crowding-in effect).

### **3.1.2 Debt overhang theory**

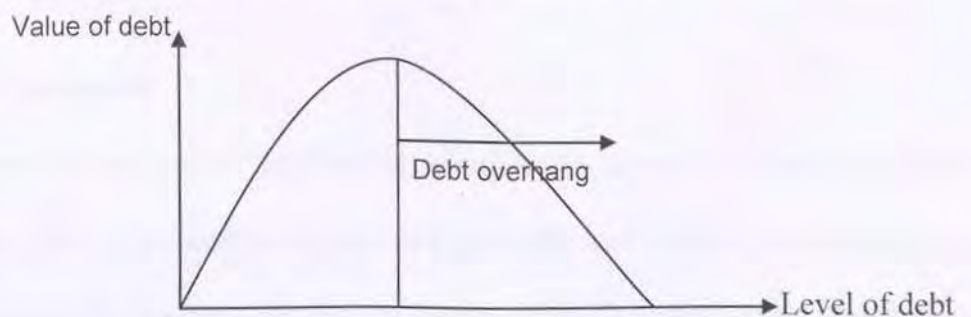
Debt overhang hypothesis is the central theory underlying the consequence of an excessive debt stock whereby the expected repayment of the external debt falls short of the contractual value of debt. The debt overhang paradox was first discussed as far back in 1977 by Myers based on companies decision of borrowing and later supported by Krugman in 1998 and Sachs in 1986; that linked it to debt situation and ability to meet servicing obligation (Sichula, 2012). Debt overhang theory argues that if government pays debt by taxing firms and households, increases in public debts leads to increase in expected future tax burden in the private sector. Debt overhang can act as a disincentive for current investment because funds that could be invested are channeled to debt servicing, moreover, prospective investor's fears that new entity might be heavily taxed



by government in an attempt to generate more revenue to service existing stock level. Lower level of investment negatively impacts the overall performance of any economy. However, debt overhang does not occur only when countries accumulate too much debt, it can also arise when countries' conditions change, making it difficult to manage and discharge its stock of debts (Abdullahi et al., 2016).

Figure 3.1 depicts the Debt Laffer Curve which postulates that larger debt stocks tend to be associated with lower probabilities of debt repayment. If it's likely that in the future debt will be larger than the country's repayment ability, expected debt-service cost discourages further domestic and foreign investment and hence affects economic growth. Prospective investors fear that the more a country produces, the more it will be highly taxed to service the external debt, and thus they will be less willing to incur costs today for the sake of increased output in the future. On the left side of the curve, which is upward sloping, it shows that increases in the face value of debt are associated with increases in expected debt repayment, while the right side, which is downward sloping, indicates that increases in debt reduce expected debt.

**Figure 3.1: The Debt Laffer curve**



**Source: Fekadu (2014)**

### **3.1.3 Ricardian equivalence theory**

Recently, some economist argues that government methods of financing expenditures either through tax or borrowing are not relevant (Belingher & Moroinanu, 2015; Afzal, 2012). The old view on debt financing associated with the British classical economist David Ricardo express that the behavior of households remains the same in both cases. Hence, in the Ricardian view, the public debt is considered equivalent to future taxes. The Ricardian equivalent theory states that households are forward looking and considers government debt in their consumption decision making. If government spending increases today or it is expected to increase in future, households reduce their consumption even if there is no change in current taxes. This is because households recognize that borrowed funds will be financed eventually by higher taxes in future which reduce after tax income in the long run. Any cut in taxes and borrowing does not produce aggregate wealth effect; thus an increase in public debt does not affect household consumption decisions and aggregate demands remains the same. The Ricardian equivalence theory is used as an argument against tax cuts and increases in government spending (debt financing) aimed to enhance aggregate demand in order to boost economic growth.

### **3.1.4 Neoclassical theory**

The Neoclassical theory states that debt has a positive influence on economic growth. This transpires if the funds borrowed is utilized optimally and increase investment in the respective country. If countries use the amount borrowed for productive investments, economic growth increases and allow appropriate debt repayment. On the other hand, the negative effect of debt on economic growth is explained by debt effect on



investment. Debts adversely affect growth by reducing the available resources for investment by debt servicing. Furthermore, Onogbosele & Ben (2016) states that public debt can act as an implicit tax on the resources generated by a country and create a burden on future generations which come in the form of a reduced flow of income from a lower stock of private capital. This can affect interest rates in the long run and lead to crowding out of private investments crucial for decreasing capital accumulation and increasing economic growth.

### **3.1.5 The Keynesian theory**

The Keynesian view fiscal policy as one of the best option that can accelerate economic growth in any economy since it acts in the interest of the general public as increases in public debt positively affects national income through multiplier effects. Keynesian theory link borrowing with deficit financing and encourage government to borrow for both investment and consumption in order to boost aggregate demand which further results in positive impact on output and employment investment expenditures because it induce investment to rise as well. His reasoning is that borrowing for consumption is desirable as borrowing for investment expenditures because it induce investment to rise as well. In Keynesian economics, the method by which government expenditures are financed, either by levying taxes or borrowing is considered to have a significant influence on aggregate demand. Decreasing tax revenues without cutting expenditures and rising public expenditures without increasing tax rates are assumed to stimulate total demand in the economy. Contrary, equivalent changes in expenditures and tax rate are thought to have smaller effect.

Additionally, Keynesian growth theory believes that the rate of economic growth is determined by the rate of investment and savings in the economy. When a country saving rate is low, this influences the country rate of investment which further affects economic growth. It's believed that countries with high debt focus on paying off debts with high interest charges and end up neglecting investment which positively affect growth.

### **3.2 Empirical Literature**

Although limited studies were done in Namibia with regard to public debt and economic growth, so many studies were done in other developed and developing countries. Here follows summaries of the studies that were done to assess the impact of external debt and or domestic debt on economic growth.

Matthew & Mordecai (2016) examined the impact of public debt on economic development of Nigeria using annual time series data from 1986 to 2014. The study employed the Augmented Dickey-Fuller test, Johansen co-integration test, Error Correction Method (ECM) and the Granger Causality test. The study used external debt stock, domestic debt stock, external debt servicing, domestic debt servicing and GDP per capita as variables. The Johansen co-integration test results revealed the presence of a long-run relationship among the variables. The ECM results show that external debt stock and external debt servicing have insignificant negative relationship with economic development in Nigeria. While domestic debt stock has a direct and significant relationship with economic development, domestic debt service payment was found to be significant but inversely related to economic development in Nigeria. The study recommended that the government should reduce the level of external debt it



accumulates overtime, but domestic debt accumulation would contribute significantly to the development of the economy.

Akram (2016) examined the consequences of public debt for economic growth and poverty in four selected South Asian countries, which are Bangladesh, India, Pakistan and Sri Lanka, for the period 1975 to 2010. The study developed an empirical model that incorporates the role of public debt into growth equations and extended to incorporate the effects of debt on poverty. The model was estimated by using standard panel data estimation methodology. The results revealed that though public debt has a negative impact on economic growth, neither public external debt nor external debt servicing has a significant relationship with income inequality, suggesting that public external debt is as good/bad for poor as it is for rich. Furthermore, domestic debt has a positive relationship with economic growth and a negative relationship with the GINI coefficient, indicating that domestic debt is pro-poor.

Owusu-Nantwi & Erickson (2016) conducted a study on public debt and economic growth in Ghana using Johansen cointegration and vector error correction model and time series data from 1970 to 2012. They found positive and statistically significant long run relationships between public debt and economic growth in Ghana. Further, in the short run a bidirectional Granger causality was found between public debt and economic growth. The study recommends that Ghana should consider borrowing for very high priority projects and programs that could positively contribute to the expansion of the economy.

Jebran, Ali, Hayat & Iqbal (2016) examined the effect of public debt on economic growth for Pakistan from 1972 to 2012. Autoregressive distributed lag (ARDL) bounds



testing procedure was employed to explore the long and the short run relationship between public debt and economic growth. The study examined the effect of public debt on both the Gross Domestic Product (GDP) and the Gross National Product (GNP) unlike most studies that focused only on one indicator of economic growth. The study found a significant negative effect of external debt on Gross Domestic Product (GDP) and Gross National Product (GNP) in the long run and in the short run. Moreover, debt servicing is inversely influencing Gross Domestic Product (GDP) and Gross National Product (GNP) in the short run. However, domestic debt is found to have no effect on economic growth. The study recommended government of Pakistan should minimize its dependence on borrowing as it adversely effects economic growth.

Onogbosele & Ben (2016), empirically analyzed the impact of domestic debt on economic growth of Nigeria using annual time series data for the period 1985 to 2014. They used Gross Domestic product (GDP), treasury bonds, development stocks, federal government of Nigeria bonds and interest rate as variables. The study employed the Augmented Dickey-Fuller (ADF) Unit Root test and the Vector Autoregression method of analysis. Multivariate Vector Autoregression model results revealed that domestic debt plays a significant role in the growth process of Nigerian economy based from the outcome of high  $R^2$  of 0.983616 and the statistically significant F-value of 102.0618 of the gross domestic product regression. Moreover, the variance decomposition analysis showed that government of Nigeria bonds put forth more pressure on the growth rate of gross domestic product in Nigeria. The outcome of the impulse response function supports the variance decomposition analysis. The study hence recommended that government should resort to acquiring funds majorly through federal government of



Nigeria bonds since the federal government of Nigeria bonds has a highly significant positive impact on economic growth.

Nwamaka, Chukwunulu & Werigbelegha (2016) conducted an empirical study on the relationship between domestic debt and performance of Nigerian economy using secondary data from 1987 to 2014; applying the Ordinary Least Square (OLS) model. They found a positive significant relationship between domestic debt and economic growth in Nigeria. The coefficient of determination between domestic debt and economic growth indicates that about 68% of the variation in gross domestic product can be explained by changes in domestic variables used in the study. This reveal that a good portion of gross domestic product trends in Nigeria can be explained by domestic variables. The study recommended the government of Nigeria to maintain a debt bank deposit ratio below 35 percent and resort to increase use of tax revenue to finance its projects as it is believed that tax revenue is far from optimum.

Rath & Sar (2016) examined the relationship between public debt and economic growth in India using annual time series data from 1950/51 to 2014/15 financial year. The study employed Johansen Cointegration, vector regressive model (VECM) and Granger causality. They found a long relationship between public debt and economic growth and through the VECM model they found an approximately 5 percent adjustment between public debt and economic growth. The study also reveals a bi directional causality between public debt and economic growth. This implies that both debt and economic growth depends on each other.

Bangladesh is one of the countries that have been relying heavily on public debt to finance its expenditures and balance of payment deficit since independence. Saifuddin



(2016) examined how public debt in Bangladesh may influence its economic growth using the yearly data from 1974 to 2014. The study used two models; Investment model and Growth model. The investment model was used to investigate the likely indirect effect of public debt on economic growth through its impact on investment. The growth model analyzed direct relationship between public debt and economic growth. Augmented Dickey-Fuller test has been used to diagnose whether time series data are non-stationary and then a TSLS regression conducted to estimate the two models. The study outcome revealed that public debt has a significant contribution to economic growth measured by GDP during the study period in Bangladesh. This doesn't happen only directly but also indirectly through its effect on investment because the public debt, *ceteris paribus*, induce investment over time and this, in turn, indirectly enhance economic growth. The estimate from the regression results indicate that public debt positively affects growth, if other determinants of growth remain unchanged. On average, 1 percent increase in public debt is associated with an increase in GDP of around 0.2 percent per annum.

Serrao (2016), examined the impact of public debt on the economic growth in advanced economies over a period of 1946 to 2009, using an econometric approach. He found an inverse relationship between public debt and economic growth in advanced economies and these relationships were found to be significant as well. Real GDP growth rate does not decline sharply even if the public debt-to-GDP ratio is lower than 220%. The public debt-to-GDP ratio elasticity of the real growth rate confirms that an increase of 1% in public debt/GDP category above 120% decreases the real GDP growth rate in 1.13%. The negative effect of public debt is only stronger on the real GDP growth rate in



advanced economies when the public debt-to-GDP ratio is above 220%. The study recommended that the governments should formulate new strategies for public debt management in advanced economies, considering their economic and financial performance.

Lee & Ng (2015) examined whether public debt contributed to the economic growth in Malaysia using data for the period 1991 to 2013 financial year. They further also analyzed whether other indicators of debt burden, such as budget deficit, budget expenditure, and external debt service and government consumption, have an impact on economic growth. The results of this study are consistent with the existing literature that found a negative association between public debt and economic growth. The results show that public debt over time has a negative impact on Gross Domestic Product (GDP) during the period under study. Furthermore, the study also found that the budget deficit, government consumption and external debt service are a decreasing function of GDP.

Bilan & Ihnatov (2015) scrutinized the relationship between public and economic growth for a panel of 33 European countries over the period 1990-2011. The main objective was to investigate if there is evidence of a quadratic relationship, both for the entire European countries group and for the developed and developing countries subgroups using a generalized model of economic growth. They sourced data from World Bank's World Development Indicators, International Monetary Fund's World Economic Outlook and Historical Public Debt datasets. They found the existence of a U inverted relationship, with a maximum debt threshold of about 94% of GDP. After this threshold public debt is estimated to negatively affect the economic growth rate, due to

higher interest rates, fear of public debt unsustainability and severe budgetary consolidation measures. Conversely, this threshold is found to be more than twice lower in developing European countries compared to the developed ones, as the former enjoy lower credibility, higher vulnerability to shocks and depend more on external capital transfers.

Blake (2015) analyzed the impact of public debt on economic growth in Jamaica using quarterly data from 1990 to 2014 by employing an autoregressive distribute-lag model which captures both short run and long run effects. The results of the models indicate that public debt has a nonlinear impact on economic growth. Moreover, the study concludes that the composition of debt matters. It concluded that total government debt and external debt negatively affects growth in excess of 100 percent and 55 percent of GDP, correspondingly.

Kaur & Kaur (2015), analyzed the empirical relationship between public debt and economic growth in India using annual data for 32 years from 1981/82 to 2012/13 financial year. To achieve this, they analyzed the trends in public debt, investment and GDP and also conducted Granger's causality test in order to examine the cause and effect relationship between economic growth and public debt. Additionally, multiple regression has been worked out to investigate the indirect relationship between economic growth and public debt. They found evidence of positive, but indirect relationship between public debt and economic growth via investment. The results indicate positive and statistically significant relationship between public debt and investment and similarly public debt effects the economic growth significantly.



Casin, Badurina & Sertic (2014) explored the long run and short run relationship between debt and economic activities in Central, Eastern and Southeast European countries using a pooled mean group estimator (PMG) for the period 2000 and 2011. Unit root and cointegration test was used prior to performing the dynamic panel analysis based on PMG estimator. The result of the paper show that both in the long run and short run debt has a negative influences on GDP growth leading to a conclusion that credible fiscal consolidation strategy in necessary combined with guidelines to promote lasting growth in order to reach debt stabilizing levels.

Ntskala (2014) investigated the effect of public debt on economic growth in Swaziland using annual time series data for 1988 to 2013. The objective was to examine the effect of both public external and domestic debt on economic growth by employing Ordinal Least Square OLS) method. The results revealed that there is no significant relationship between external debt and economic growth in Swaziland, while domestic debt was found to have a significant positive relationship with economic growth at 5 percent level of significance. The study recommends the government of Swaziland to spend the borrowed funds in economic activities.

A study that was done in Jordan by Al-Zeaud & Al-Awawdeh (2014) on the relationship between public debt and economic growth over the period 1990-2012 suggested that public debt and economic growth are integrated and that they have a positive relationship. Further, Granger causality test revealed that there is causality relationship from economic growth to debt; that is a unidirectional causation from economic growth to debt. This implies that a rise in economic activities demand more borrowing to augment development changes in the economy. The study recommend that the Jordan



government should consider borrowing domestically so that when the principal and interest amount is being paid back leads to crowding in effect which accelerate economic activities in the economy.

Fekadu (2014, empirically estimated the impact of external debt on economic growth in Ethiopia to determine the existence of a debt overhang and crowding out effects using time series data for the period 1983/84 to 2012/13 financial year. He used the Johansen Maximum Likelihood to test for a long-run relationship among the variables and Vector error correction model (VECM) to estimate the short-run impacts. The empirical result revealed the existence of long run relationship between real GDP and external debt. The results of the study tell that real GDP is affected negatively by the past stock of external debt and debt servicing and, positively by the current external debt inflows. It's an indication that the existence of debt overhang problem and crowding out effect exist in Ethiopian economy. Furthermore; the study indicate that exchange rate and inflation deter economic growth while, private investment and terms of trade have positive impact. The study advised that it is difficult to simultaneously achieve sustainable levels of economic growth and external debt if the government is not implementing strategies to pay attention on managing external debt.

Fatma & Zouhaier (2014), investigated the effect of debt on economic growth of sampled 19 developing countries using data for the period 19990 to 2011 with a dynamic panel data model. They further examined the contribution of debt on investment. The results revealed that external debt negatively affects economic growth and a negative relationship between external debt and investment of counties sampled.



Muinga (2014), investigated the relationship between external public indebtedness and economic growth in Kenya using annual time series data from 1970 to 2010. He used Augmented Dickey Fuller Unit Root test was used to ascertain stationarity and employed Ordinary Least Square (OLS) in the data analysis. The Gross Domestic Product (GDP) was used as the proxy for economic growth and the explanatory variables are capital, labour; interest payments on external debt, external public debt, debt service payments and inflation. The study revealed that external debt and interest payments on external debt payments contribute negatively to economic growth in Kenya. Capital formation and labour force have a significant positive contribution to economic growth. Moreover, the simulation results show that any percentage increase of external debt, *ceteris paribus*, will reduce the GDP hence slow economic growth. The study recommends that Kenya should consider revising the policies of debt management and pay more attention to the debt management profile particularly on the expenditure items and diversify the economy to generate more revenue and avoid external borrowing to the extent possible.

Matiti (2013) conducted a study to establish the relationship between public debt and economic growth in Kenya. The study used secondary data for 2002/2003-2011/2012 financial year collected from several sources obtained from the Kenya National Bureau of Statistics and the Central Bank of Kenya. To establish the relationship between public debt and economic development, the study conducted a multiple regression analysis. The study was based on Harrod-Domar growth model which gives insights into the dynamics of economies growth rate in terms of the level of saving and productivity of capital. He found that public debt greatly affects economic growth in Kenya up to



96.20% and domestic debt has moderate effects on economic growth. He further explained that domestic debt is characterized by higher interest rates compared with those on external debt, which is contracted mainly on concessional terms, and it is therefore expensive to maintain. The study recommend that the government should therefore develop a framework for recording and monitoring all contingent liabilities and also formulate and implement a policy for management of the contingent liabilities.

Wangari (2013) investigated the effects of domestic debt on economic growth in Kenya. The objective was to find out if government domestic borrowing has any effects on economic growth in Kenya in order to suggest policy aimed at debt management. He employed the Ordinary Least Squares Method (OLS) to analyze yearly data from 1981 to 2012. The Jacque Bera (JB) and the Augmented Dickey Fuller (ADF) tests were also used to investigate the properties of the macroeconomic time series in the interest of normality and unit root respectively. The Engel-Granger residual was used for Cointegration analysis and found evidence of cointegration at 10% level of significance. The study reveals that domestic debt for the period under study has a positive relationship and significant effect on economic growth. The study recommends that Kenya government should explore other options of financing budget deficit to avoid resulting to more domestic borrowing.

Atique & Malik (2012) examined the impact of domestic and external debt on economic growth in Pakistan using the Ordinary Least Square (OLS) approach to Cointegration, Unit Root Testing, Serial Correlation Testing, Heteroskedasticity and CUSUM test for stability. The findings suggested an inverse relationship between domestic debt and economic growth. And also the relationship between external debt and economic growth



was found to be inverse. Further, it concluded that external debt slows down economic growth more as compared to domestic debt amount.

Another study was done by Hassan and Akhter (2012) in Bangladesh that examined the effect of public debt burden on the economic growth. They sample data period used in the analysis was 1980 to 2011. The authors used a mixture of econometric techniques such as Augmented Dickey-Fuller (ADF) test, Johansen cointegration test, Error Correction Model (ECM) and Vector Error Correction Model (VECM). The results reveal that there is no significant negative relationship between external debt and economic growth. Furthermore; they also found domestic debt has a negative impact on growth with little statistical significance.

Rais & Anwar (2012) used simple OLS technique to analyses the impact of public debt and economic growth of Pakistan from 1972 to 2010. They found that both domestic debt and external debt negatively affect economic growth. They tried to explain that domestic debt negatively affect economic growth in Pakistan because it is mainly used for the purpose of consumption. Further, Pakistan mostly borrows from IMF and this might contribute to the negative effect of external debt. They advised that public debt is needed in some occasions such as natural disasters but government should use the borrowed resources efficiently and try to avoid this aid policy in future.

Egbetunde (2012) investigated the direction of causality between public debt and economic growth in Nigeria between 1970 and 2010 using a Vector Autoregressive (VAR). The outcomes of the VAR model revealed that there is a bi-directional causality between external debt and economic growth as well as domestic debt and economic growth in Nigeria. The empirical evidence infers that improvement in economic

activities call for borrowing to enhance ongoing development in the economy. Leading to a conclusion that borrowing promotes economic growth in Nigeria.

Charles (2012) investigated the relationship between domestic debt and the growth of Nigerian economy using quarterly time series data between 1994 and 2008. The methodologies employed are the Ordinary Least Squares Method (OLS), Error Correction and Parsimonious models. The results revealed that the public domestic debt stock is far above a healthy threshold of 35% of bank deposits in the period under investigation. The study confirms that the level of domestic debt in Nigeria has a negative effect on economic growth. The study recommends that government should try to maintain a debt-bank deposit ratio below 35%; increase tax revenue to finance public project and also diverts from all projects that private sector can handle.

Emmanuel (2012) analyzed the impact of public debt on economic growth using Nigeria as a case study based on the perspective of the value impact and proportional impact. The study used annual time series data from 1975 to 2005. The value impact variables used include the external debt value, domestic debt value, total debt value and budget deficit figures. The proportional impact variables are ratios of the value impact to the gross domestic product (GDP). An augmented Cobb Douglas model was used and subsequently a dynamic version of the functional relationship was estimated using Co-integration technique to capture the long-run impact of debt variables on economic growth. The study revealed that the impact of public debt on economic growth is negative and moderately significant in the long-run but positive in the short run during the period under study.



Ogunmuyiwa (2011) examined the relationship between external debt and economic growth in developing countries using Nigeria as a case study. The study employed various econometrics techniques namely Augmented Dickey Fuller (ADF) test, Granger causality test, Johansen co-integration test and Vector Error Correction Method (VECM) using yearly time series data from 1970 to 2007. The study found that causality does not exist between external debt and economic growth. Moreover, causation between debt and growth was also found to be weak and insignificant in Nigeria during the used study period.

Kumar & Woo (2010) explored the impact of high public debt on long-run economic growth. Based on a panel of advanced and emerging economies, they considered a broad range of determinants of growth as well as numerous estimation issues including reverse causality and endogeneity. Moreover; the study also examined threshold effects, nonlinearities, and differences between advanced and emerging market economies. The experimental results revealed an inverse relationship between initial debt and subsequent growth, controlling for other determinants of growth. On average, a 10 percentage point increase in the initial debt-to-GDP ratio is associated with a slowdown in annual real per capita GDP growth of around 0.2 percentage points per year, with the impact likely to be smaller in advanced economies. Furthermore, they also found evidence of nonlinearity with higher levels of initial debt having a proportionately larger negative effect on subsequent growth.

Patenio and Tan-Cruz (2007) conducted a study to investigate the relationship between economic growth and external debt service payments of the Philippines using quarterly data time series from 1981 to 2005. The explanatory variables used are capital stock,

labor force, and human capital. The vector autoregressive model (VAR) was used to analyze the relationship between debt servicing and economic growth. The unit root tests revealed that the variables are were stationary. Results from the vector autoregressive (VAR) model shows that economic growth is not very much affected by external debt servicing. Additionally, it was found that debt servicing

In the Philippines is not that high for debt overhang to occur.

Zaaruka (2007) conducted a study on public debt and economic growth in Namibia focusing on the threshold effect using the framework of endogenous growth models which seeks to explain the non-linear effects of debt on growth. Empirical evidence indicates that the optimal level of public debt is about 38 percent of GDP and the impact of debt on economic growth in Namibia has a U-shaped pattern.

### **3.3 Summary**

In summary, the existing literature summarized above shows that in many of the studies there is a concave non-linear relationship .This shows that public debt may have a negative or positive or a U shaped pattern effect on economic growth.



## **CHAPTER FOUR: METHODOLOGY**

In the previous chapter, a literature review was done to explore the relationship between public debt and economic growth. The review demonstrates the relationship can run either way. This chapter describes the methodologies and data's that will be used to establish the relationship between debt and growth in Namibia. The chapter is divided into five sections. The first section is the research design followed by data sources in section two. Section three justify the measurement of variables. Section four discuss the theoretical framework and model specification and last section discuss data analysis.

### **4.1 Research Design**

This study adopts a quantitative approach as it involves Econometric modeling. Economics analytical tool EViews is used to process and analyze data.

### **4.2 Data sources**

The quarterly data used for the empirical analysis cover the period 2002/03Q1 to 2015/16Q4 financial year which add up to 56 observations. The choice of the starting period was constrained by the availability of data. Data for Gross Domestic Product (GDP) growth rate was collected from Namibia Statistic Agency, while external debt and domestic debt data from Bank of Namibia.

### **4.3 Measurement of variables**

#### **GDP growth rate**

The study use GDP growth rate as a proxy for economic growth, which is defined as the rate at which Gross Domestic Product (GDP) changes over time. GDP is considered a significant indicator of any economies progress. An increase in GDP shows that there is more value addition in the economy which results in higher income and aggregate spending. Which implies improvement of standard of living and increases in welfares of

all citizens due to increases in income and higher spending on various goods and services.

### **Domestic debt**

Domestic debt stock is the amount borrowed in its own currency from the residents of its own country. Domestic borrowing is significant in strengthening domestic financial market by stimulating investment and private savings. However, it might lead to high interest rate and crowding out of the private sector as borrowers compete for the available funds.

### **External debt**

External debt stock is funds borrowed from foreign lenders, which include private sources, other countries and international organizations. Interest on this type of debt is paid in the currency in which the loan was made. The important feature of external debt is that it's not in competition with physical capital as a saving instrument for the consumers of the issuing economy but its servicing and repayment leads to a flow of resources out of the country (Myles, 1997).

## **4.4 Theoretical framework and Model Specification**

One of the significant macroeconomic objective of any independent economy is to boost economic growth and improve the living standard of its people. Sustainable growth necessitates a given level of capital and investment. When it's not sufficient, the government resort to borrowing in order to raise capital for its investment purposes with the aim of accelerating economic growth rate of its economy.

The study adopt the Keynesian theory of public borrowing as used by Matthew and Mordecai (2016). The Keynesian view fiscal policy as one of the best option that can accelerate economic growth in any economy since it acts in the interest of the general



public as increases in public debt positively affects national income through multiple effects. This leads to multiple increases in output and employment. Given the national income model as follows:

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

Where  $Y$  = Total output,  $C$  = consumption,  $I$  = investment,  $G$  = government  $X$  = export and  $M$  = import level.

The change in output will be equal to the multiplier times the change in government expenditure:

$$\Delta Y = \frac{1(\Delta G)}{1-b} \quad (2)$$

$$\text{Where } \frac{1}{1-b} = K$$

$$\Delta Y = K \Delta G \quad (3)$$

$$\frac{\Delta Y}{\Delta G} = K \quad (4)$$

This means that the change in output all over change is government expenditure is equivalent to the multiplier. Implying that public borrowing can be used to influence economic performance.

Following a debt–growth model adopted by Elbadawi (1996) for developing countries, this study specify a model employed by Abera (2016) who did an analysis of external debt and economic growth in Ethiopia using A Vector Auto Regressive Approach.

Given the need for larger capital stock and lack of sufficient domestic resources and savings. It is believed that borrowing can affect economic growth directly through its effect on investment; although Abera (2016) argue that debt may still affect output growth even if investment levels remain unaffected. On the other hand, as public debt and cost of servicing rise, less resources is left to finance public projects which can lead

to fiscal deficit and further borrowing. There are various variables that affect GDP growth but not included in the specification as the purpose of the study is not to look at the determinants of GDP growth. The VAR model for this study, therefore, incorporates only three variables, GDP growth rate (GDP<sub>r</sub>), External debt (extdebt) and Domestic debt (domdebt).

The empirical model for this study can be expressed in general form as:

$$GDP_r = F(\text{extdebt}, \text{domdebt})$$

Therefore, a VAR (P) model for three dimensional vectors GDP<sub>r</sub> is given by:

$$GDP_{r_{1,t}} \cdot \alpha_{0,1} \cdot \beta_{11} GDP_{r_{t-1}} \dots \beta_{13} GDP_{r_{t-p}} \cdot \epsilon_{1,t} \tag{5}$$

$$GDP_{r_{2,t}} \cdot \alpha_{0,2} \cdot \beta_{21} GDP_{r_{t-1}} \dots \beta_{23} GDP_{r_{t-p}} \cdot \epsilon_{2,t} \tag{6}$$

$$GDP_{r_{3,t}} \cdot \alpha_{0,3} \cdot \beta_{31} GDP_{r_{t-1}} \dots \beta_{33} GDP_{r_{t-p}} \cdot \epsilon_{3,t} \tag{7}$$

This can be expressed in vector notation as:

$$GDP_{r_t} = \alpha + \beta GDP_{r_{t-p}} + \epsilon_t \tag{8}$$

## 4.5 Data Analysis

### 4.3.1 Stationarity

Since the study will use time series data; a unit root test will be conducted before estimation to ensure efficient estimates. Unit root testing is done to determine whether a series is stationary or non-stationary and establish their order of integration. A time series data is said to be stationary if the variance, covariance and mean are constant through time and the value of the covariance between the two time periods depends only on the distance or lag between the two periods and the actual time at which the covariance is computed; while series with parameters that changes over time are non-



stationary (Gujarati, 2003). Time series analysis assumes that the underlying time series is stationary. However the underlying time series may be non-stationary and this can lead to spurious regression (Gujarati, 2003).

Before any formal estimation it's always advisable to test the variables for unit roots to establish their order of integration. There are various tests to check for existence of a unit root but this study use the Augmented Dickey-Fuller (ADF) test. The aim is to determine whether the variables follow a non-stationary trend and are of the order 1 denoted as  $I(1)$  or whether the series are stationary, that is, of the order of 0 denoted as  $I(0)$ . ADF test is based on the estimate of the following regression:

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{i=1}^m \alpha_i \Delta Y_{t-1} + \varepsilon_t \quad (9)$$

Where  $Y_t$  denotes respective variables of interest,  $\Delta$  is the first difference operator,  $\varepsilon_t$  is a pure white noise error term and the rest are parameters to be estimated. The test uses a null hypothesis that the data are non-stationary and the alternative is that they are stationary.

$\delta = (\rho - 1)$  and  $-1 \leq \rho \leq 1$ . If  $\delta = 0$  then  $\rho = 1$  implying that there is a unit root problem or time series is non stationary but if  $\rho < 1$  then the underlying time series is stationary. In other words, if the Augmented Dickey Fuller test statistics in absolute terms is greater than the critical values, the null hypothesis of unit root is rejected.

### 4.3.2 Cointegration

Sindano (2009), defined cointegration as a long run relationships of variables that are linked to form an equilibrium relationship when the individual series themselves are non-stationary in their levels, but become stationary when differenced. According to

Asteriou & Hall (2011), the concept of cointegration was first initiated by Granger in 1981 and elaborate further by various authors such as Engle and Yoo (1987), Phillips and Ouliaris (1990), Stock and Watson (1988), Phillips (1987), and most recently by Johansen (1995). Cointegration test is a significant step essential to check for an empirical meaningful relationship between variables under study. It highlights the existence of a long run equilibrium to which system converges overtime. There are two tests commonly used in recent studies to check for cointegration which are the Engle-Granger and the Johansen procedures.

Engle-Granger method is based on the idea that the regression of nonstationary series on other series may produce spurious regression (Asterious & hall, 2011). If the unit root analysis reveals that the variables contain unit root, the possibility that the variables are not spurious still exist as long as the variables cointegrated. To test if the variables cointegrated, the least squares regression equation is estimated and the error term of the regression equation is subjected to unit root tests. If the error terms are stationary it implies that the variables under study are cointegrated and long run relationship exist.

The Johansen procedure does not rely on OLS estimation, it build cointegrated variables directly on maximum likelihood estimation. It's based on the relationship between the rank of a matrix and its characteristic roots. The Johansen co-integration approach has more advantageous than the Engle-Granger approach as it is a VAR based method and does not require concern whether the explanatory variables are exogenous or endogenous. Restrictions can be applied to the co-integration vector and it can as well be used for Granger testing to establish causality from explanatory variables to the dependent variables in the short run (Asterious & Hall, 2011).



The Johansen integration method involves two tests namely the trace test which is the likelihood ratio test for the hypothesis that there are at most co-integrating vectors and the Maximum Eigen Value. The null hypothesis is that there is no cointegration and the alternative hypothesis is that there is cointegration.

#### **4.3.3 Granger Causality (Toda-Yamamoto approach)**

In order to examine the casual relationship between variables, Granger Causality, Toda-Yamamoto approach is employed in the analysis as used in various studies such as Egbetunde (2012). Toda and Yamamoto approach is an extension of Granger causality that was developed in 1995. Toda-Yamamoto “estimate the standard VAR by the use of a Modified Wald test for restrictions on the parameters of the VAR ( $k$ ) model and then estimates a VAR with  $k+d_{max}$ , where  $k$  is the lag order of VAR and  $d_{max}$  is the maximal order of integration for the series in the model” (Hamdi & Sbia, 2013). This approach is considered better than the traditional Granger causality because it is valid irrespective whether the variables are  $I(0)$ ,  $I(1)$  or  $I(2)$ , no-cointegrated or cointegrated of any uninformed order (Wolde-Rufael, 2004).

To test the casual relationships, the following model is specified:

$$GDPr = f(PUB) \tag{10}$$

Where GDPr is GDP growth rate and PUB is Public debt.

Public borrowing is further specified as:

$$PUB = (EXTDebt, DOMDebt) \tag{11}$$

In order to test for causality between public debt and economic growth following Toda-Yamamoto approach, the study estimates the following VAR model:

$$LNGDP_r_t = \alpha_1 + \sum_{i=1}^{h+d} \beta_{1i} LNGDP_r_{t-i} + \sum_{j=1}^{l+d} \gamma_{1j} LNPNUB_{t-j} + \epsilon_{1t} \quad (12)$$

$$LNPNUB_t = \alpha_2 + \sum_{i=1}^{h+d} \beta_{2i} LNPNUB_{t-i} + \sum_{j=1}^{l+d} \gamma_{2j} LNGDP_r_{t-j} + \epsilon_{2t} \quad (13)$$

Where  $h$  and  $l$  are the optimal lag length of  $GDP_r_t$  and  $PUB_t$ ,  $d$  is the maximum order of integration order of the variables in the system. Furthermore,  $\epsilon_{1t}$  and  $\epsilon_{2t}$  are error terms that are assumed to be white noise with zero mean, constant variance and no autocorrelation.

The hypotheses in this test are:

$H_0$ : PUB does not Granger cause GDP<sub>r</sub>

$H_1$ : PUB does Granger cause GDP<sub>r</sub>

And

$H_0$ : GDP<sub>r</sub> does not Granger cause PUB

$H_1$ : GDP<sub>r</sub> does Granger cause PUB

If the study fails to reject the null hypothesis and reject the alternative hypothesis, then it can be concluded that GDP<sub>r</sub> changes are Granger caused by a change in PUB. Unidirectional causality occurs between two variables if none of the null hypothesis of equation neither 3 nor 4 is rejected. If both null hypotheses are rejected, Bidirectional



causality exists and no causality exist if neither null hypothesis of equation 3 nor 4 is rejected.

#### **4.3.3 Variance Decomposition**

Variance decomposition reveals how much a certain variable changes under the impact of its own shock and that of other variables (Enders, 2003). It helps in identifying the degree to which one variable influences others. The study use variance decomposition to break down and establish the degree to which public debt influences other variables in the system and vice versa. VAR model have forecast error and the error in forecasting can be attributed to the present and past values of the variables in the system.

#### **4.3.4 Impulse Response Function**

Impulse response function measures the time profile effect of shocks at a given point in time on the expected values of variables in a dynamic system (Shin & Pesaran, 2003). According to Sims (2005), the analysis of systems response to random impulse is one of the best descriptive devices for understanding the inherent system dynamics. The random innovations are positive residuals of one standard deviation unit in each equation in the VAR model. The study conducts an impulse response analysis to track the time path of the effects of public debt on economic growth rate. The idea is to estimate the response of one variable in the system due to its own shock and for other variables.

## CHAPTER FIVE: ANALYSIS AND DISCUSSION OF EMPIRICAL RESULTS

This chapter presents empirical analysis, regression results and their interpretations. It includes data descriptive statistics, results from unit root tests, diagnostics tests, Toda-Yamamoto Granger causality, variance decomposition and impulse response function. In brief, the chapter presents empirical estimation results and economic interpretation to analyze the validity of the relationship.

### 5.1 Data Characteristics

The quarterly time series data for the period 2002/03 to 2015/16 Financial Year was collected from Bank of Namibia and Namibia Statistic Agency. Data was collected for three variables which are external debt (EXTDEBT), domestic debt (DOMDEBT) and Gross Domestic Product growth rate (GDPR). The study uses GDP growth rate as a proxy for economic growth; GDP growth rate was derived using GDP figures at market prices.

**Table 5.1: Descriptive Statistics for Variables used in the study**

	GDPR	EXTDEBT	DOMDEBT
Mean	4.892857	5682.271	13234.65
Median	5.75	3096.45	10631.3
Maximum	15.3	28331.3	32113
Minimum	-6.1	1212.3	6246.2
Std. Dev.	4.966428	5746.311	6050.358
Skewness	-0.282412	2.246541	1.24288
Kurtosis	2.740903	8.692432	3.816513
Jarque-Bera	0.901031	122.7137	15.9733
Probability	0.637299	0	0.00034
Sum	274	318207.2	741140.6
Sum Sq. Dev.	1356.597	1.82E+09	2.01E+09
Observations	56	56	56



Table 5.1 above describes the basic characteristics of the real data for the variables. Descriptive statistics give different insights about the nature of the sample data and they form an important basis for every quantity data analysis.

From the data presented in Table 5.1, the mean for GDP growth rate over the period covered by the data averaged 4.89 per cent with a standard deviation of 4.97 and values ranging from a minimum of -6.1 to a maximum of 15.3. External debt mean average is 5,682.27 million with a standard deviation of 5,746.31 million with real values ranging between 1,212.3 million to 28331.3. As for domestic debt, the average mean is 13,234.65 million with a standard deviation of 6,050.36 million and values ranging in the range of 6,246.20 and 32,113. This is an indication that the government of Namibia borrows more from domestic sources than it does externally.

## **5.2 Analysis of Unit Root Test**

As already introduced in Chapter 3, Augmented Dickey-Fuller (ADF) test is conducted to establish the stationarity properties of the variables under study. The test uses a null hypothesis that the data are non-stationary and the alternative is that they are stationary. All variables are tested for stationarity. The results of the unit root test of the variables at levels are presented in Table 5.2.

**Table 5.2: Unit Root Tests at Levels**

Variable	ADF Statistics test	Critical Value at 5%	Probability	Conclusion
LNGDPR	-5.53	-3.52	0	Stationary
LNEXTDEBT	-1.45	-3.49	0.83	Non-stationary
LNDOMDEBT	-1.11	-3.5	0.92	Non-stationary

The null hypothesis of unit root at levels for GDP growth rate is rejected meaning that the variable is stationary and integrated of order zero, I (0). However, the ADF unit root test results above show that at levels, the null hypothesis of unit root for external debt and domestic debt cannot be rejected implying that they are non-stationary at level. Thus the variables were further tested in first difference and the results are shown in Table 5.3 below:

**Table 5.3: Unit Root Tests at first difference**

Variable	ADF Statistics test	Critical Value at 5%	Probability	Conclusion
LNGDPR	-9.24	-3.54	0	Stationary
LNEXTDEBT	-7.31	-3.5	0	Stationary
LNDOMDEBT	-4.04	-3.5	0.01	Stationary

The unit root test results at first difference shows that the null hypothesis is rejected for external debt and domestic debt meaning that the two variables are stationary and



integrated of order one. In each case, whenever the Augmented Dickey Fuller test statistics in absolute terms is greater than the critical values at 5%, the null hypothesis of unit root is rejected. The unit root test results reveal that GDP growth is integrated of order zero, I (0); while external debt and domestic debt is integrated of order one, I (1). The Johansen cointegration test will be employed to identify the long run relationship between variables under study.

### **5.3 Cointegration Test**

The Johansen cointegration test is used to test the long run relationship between the variables under study. The null hypothesis is that there is no cointegration and the alternative hypothesis is that there is cointegration. The cointegration results are depicted in Table 5.4; the table is divided into two parts, the first part reports the results from the trace test statistics, while the second reports the results of the maximum Eigenvalue statistics and their associated critical values. The test statistics help evaluate the null hypothesis of  $\dot{y} = 0$  against the alternatives. The probabilities of no cointegration are 0.09 and 0.15 which are greater than 0.05. Moreover, at 5% level, based on both the maximum and trace test statistics, the test fail to reject the null hypothesis of  $\dot{y} = 0$  which show that the model has no cointegrating Vectors. This reveals that there is no long run relationship between GDP growth, external debt and domestic debt in Namibia during the period under consideration. Given this result, the unrestricted VAR model is adopted for analytical purposes.

**Table 5.4: Johansen Cointegration Test**

Hypothesized Number of Cointegration Equation	Trace Test			Maximum Eigenvalue Test		
	Trace Statistic	Critical value(0.05 )	Probabilit y	Maximum Eigenvalue Statistics	Critical value(0.05)	Probability
$\dot{y} = 0$	27.51	29.80	0.09	17.41	21.13	0.15
$\dot{y} \leq 1$	10.10	15.49	0.27	9.89	14.26	0.22
$\dot{y} \leq 2$	0.21	3.84	0.64	0.21	3.84	0.64

#### 5.4 Lag length Selection

Toda Yamamoto Granger Causality test also requires determining the optimal lag length to ensure no serial correlation from the residuals. Since all the three variables under study are not cointegrated, the Unrestricted VAR model is used for selecting the optimal lag length. Built on the sequential modified Likelihood ratio (LR) test statistic at 5% level, Final Prediction error (FPD), Schwarts information criteria (SC), Akaike Information Criterion (AIC) and Hannan-Quinn (HQ) criterion. Lag length is selected based on Akaike Information Criterion (AIC) value, the lower the AIC value the better the model. Hence, Table 6 below suggests that the appropriate optimal lag length is 2.



**Table 5.5: Lag Length Selection**

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-55.42029	NA	0.008699	3.769051	3.907824	3.814288
1	37.64518	162.1140	3.85e-05	-1.654528	-1.099436*	-1.473581
2	49.21859	17.92013*	3.33e-05*	-1.820554*	-0.849144	-1.503899*
3	56.63065	10.04214	3.87e-05	-1.718106	-0.330377	-1.265741

\* indicates lag order selected by the criterion

#### 5.4 Diagnostic Tests

To ensure that the results obtained meet the standard classical linear regression assumptions, it is always convenient to carry out diagnostic tests to detect any possible spurious results.

##### 5.4.1 Autocorrelation: The Lagrange Multiplier (LM) Test

The LM test for autocorrelation in the VAR model, it test the null hypothesis of which there is no serial correlation at a given lag length. The results is presented In Table 5.6 below which shows that the corresponding probability at the selected lag length is greater that the value of 0.05, hence failed to reject the null hypothesis of no serial correlation. There is no serial correlations problem at the selected lag length.

**Table 5.6: Serial Correlation LM Test**

Lags	LM Statistics	Probability
1	12.22	0.20
2	5.40	0.80

##### 5.4.2. Normality test

The test for normality relies on the skewness and kurtosis of the residuals. The corresponding probabilities value for Skewness, Kurtosis and Jarque-Bera are 0.87, 0.62 and 0.87 respectively. Since the p values are greater than 0.05, we fail to reject the null

hypothesis meaning the residual of the VAR Model are normal distributed. The results for VAR residual normality tests are shown in table 5.7 below.

**Table 5.7: Residual Normality test**

Component	Skewness	Chi-sq	df	Prob.
1	-0.375358	0.493129	1	0.4825
2	0.252198	0.222613	1	0.6371
3	-0.060347	0.012746	1	0.9101
Joint		0.728488	3	0.8665

Component	Kurtosis	Chi-sq	df	Prob.
1	2.460778	0.254416	1	0.6140
2	1.732790	1.405094	1	0.2359
3	3.365215	0.116709	1	0.7326
Joint		1.776219	3	0.6201

Component	Jarque-Bera	df	Prob.
1	0.747544	2	0.6881
2	1.627708	2	0.4431
3	0.129455	2	0.9373
Joint	2.504707	6	0.8679

#### 5.4.3 Residual Heteroscedastic Test

The Heteroscedastic test was run by regressing each cross product of the residuals on the cross products of the regressors and the null hypothesis is that there is no heteroscedastic. The test results are presented below which shows that there is no heteroskedastic among the residuals of the VAR model in terms of cross terms. The p values is greater than 0.05, hence the residuals are homoscedastic.



**Table 5.8: Heteroscedastic results**

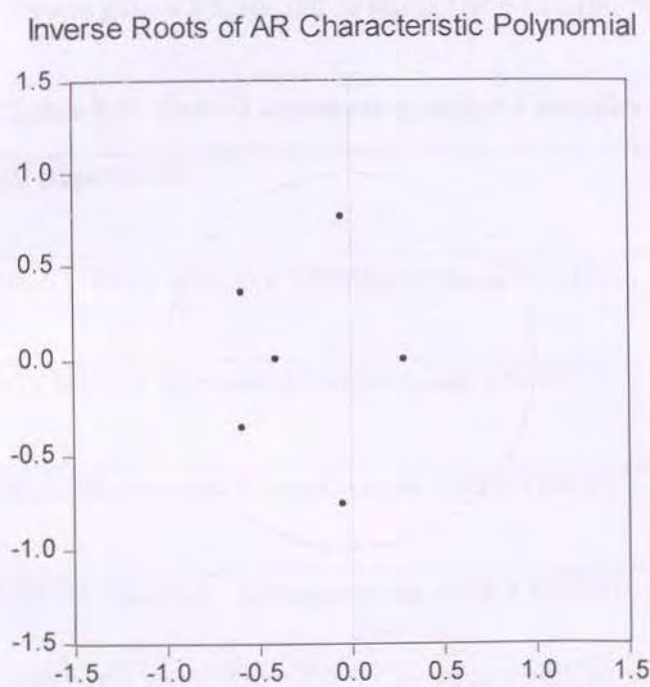
Joint test:

Chi-sq	df	Prob.
172.6834	162	0.2684

#### 5.4.4 Stability Test

Stability test is conducted to determine whether the VAR model is suitable for analysis. For the VAR model to satisfy the stability, all roots should lie inside the circle at the chosen lag length. The figure below shows that no root lies outside the unit circle, hence the VAR model is stable.

**Figure 5.1: Inverse Roots of AR Characteristic Polynomial**



### 5.5 Toda Yamamoto Granger Causality test results

The first step of the Dynamic Granger Causality requires testing for unit root in order to determine the maximal order of integration order of all variables in the system. The Augmented Dickey Fuller (ADF) test results indicate that GDP growth rate is  $I(0)$ , external debt being  $I(1)$  and  $I(1)$  for domestic debt; hence the maximum order of integration,  $d_{\max}$  for the variables in the system is 1. The second stage includes the determination of the optimal lag length ( $p$ ) which is found to be 2, and proceed to use the modified procedure to test VAR ( $k$ ) model for causality; the optimal lag length is  $k = p + d_{\max} = 3$ .

The null hypothesis of no granger causality is tested and the rule is that if the probability between two variables is less than 5% the null hypotheses is rejected. If  $p$  values is greater than 0.05, we fail to reject the null hypothesis, hence accept the null hypothesis.

**Table 5.9: Toda-Yamamoto granger Causality Test Results**

Null hypothesis	Chi-sq	P
LNEXTDEBT does not Granger cause LNGDPR	1.28	0.73
LNDOMEBT does not Granger cause LNGDPR	1.41	0.70
LNGDPR does not Granger cause LNEXTDEBT	2.51	0.47
LNDOM does not Granger cause LNEXTDEBT	8.63	0.03
LNGDPR does not Granger cause LNDOMDEBT	7.00	0.07
LNEXTDEBT does not Granger cause LNDOMDEBT	8.54	0.04



The results fail to reject the null hypothesis that external debt does not cause GDP growth rate as the probability value of 0.73 is more than 0.05. This implies that external debt does not cause GDP growth. The null hypothesis that domestic debt does not cause GDP growth is not rejected as the probability value of 0.70 is greater than 0.05, meaning domestic debt does not cause GDP growth as well. GDP growth does not cause external debt null hypothesis probability value is 0.47 which is greater than 0.05, hence the test fail to reject the null hypothesis which means that GDP growth does not cause external debt.

The null hypothesis that domestic debt does not Granger cause external debt is rejected since the probability value of 0.03 is less than 0.05. Hence accepting the alternative hypothesis that domestic debt Granger causes external debt. GDP growth does not Granger cause domestic debt null hypothesis probability value is 0.07 which is greater than 0.07, hence the test failed to rejected the null hypothesis, implying that GDP growth does not cause domestic debt. Lastly, the results shows that the null hypothesis external debt does not Granger cause domestic debt is rejected, thus accepting the alternative hypothesis that external debt does Granger cause domestic debt.

The focus of the study is to establish the relationship between public debt, both external and domestic debt and economic growth which is explained by GDP growth rate.

Based on Toda-Yamamoto granger Causality Test results, the probability of the null hypothesis on the relationship between external debt, domestic debt and GDP growth rate are greater than 0.05 which shows that both null hypothesis are not rejected. Hence, there is no causal relationship between external debt and GDP growth and also between

domestic debt and GDP growth. Therefore, it can be concluded that public debt and GDP growth do not have a causal relationship. This result is against most public debt theory, however similar results were found by Wibowo (2017) and Zaaruka (2007). The results suggest that for the period under consideration, Namibia public debt did not impact directly on the level of economic growth. This can be a result of Namibian government that borrow to finance deficit and consumption but not for very high priority projects that are well appraised and self-sustained that can contribute to economic growth and help with paying back principal amounts and debt servicing.

### 5.6 Variance Decomposition Analysis

Variance decomposition tells how a random variable changes under the effect of its own shock and the shock of other variables. It reveals how much of a change in a variable is a result of its shock and how much results are due to other variables. The regression result of variance decomposition of GDP growth is displayed below in table 5.10.

**Table 5.10: Variance Decomposition of LNGPR**

Period	S.E.	LNGDPR	LNEXTDEBT	LNDOMDEBT
1	0.95	100	0	0
2	0.95	98.96	0.62	0.42
3	1.05	89.07	4.31	6.61
4	1.49	67.84	4.22	27.94
5	1.58	60.47	3.80	35.73
6	1.68	63.75	3.81	32.44
7	1.69	63.64	3.78	32.58
8	2.00	69.13	2.70	28.17
9	2.31	67.84	2.71	29.45
10	2.33	66.53	3.38	30.09



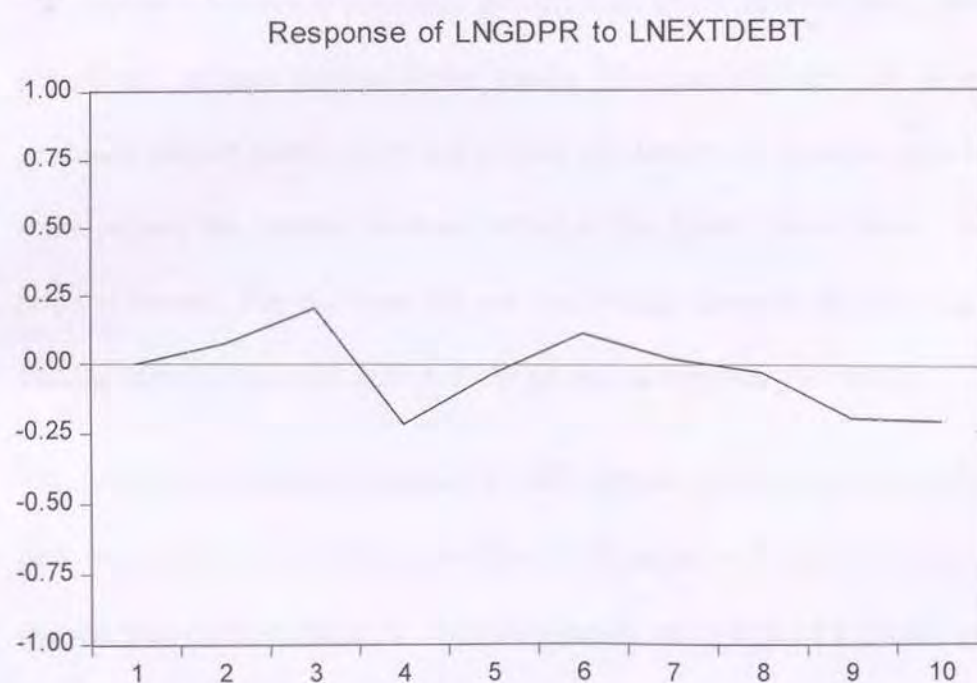
Table 5.10 presents variance decomposition for each variable in the model over a 10-quarter forecast horizon. The results show that consistently, GDP growth itself accounted for most of the changes that occurred with respect to GDP growth for the entire period under consideration. The variance decomposition for GDP growth rate illustrate that in period 1, 100 percent of the forecast error of this variable in question is to the variable itself. This deviation decreases to around 66.53 percent in the tenth period. The deviation in GDP growth rate explained by the variation in external debt is zero in the first period, 3.80 percent in the fifth period and only rises to around 3.38 percent in the tenth period. The deviation in GDP growth rate explained by the variation in domestic debt is also at zero in the first period, 35.73 percent in the fifth period and rises to around 30.09 in the tenth period.

In the eighth period for instance, GDP growth variance explained by the variable itself amounted to 69.3%, while the remaining 30.87% is explained by external debt and domestic debt. Of which 2.70% is by external debt and 28.17% by domestic debt. From this observation, it can be concluded that, the contribution of public debt to GDP growth is likely to increase. Additionally, although both external debt and domestic debt shocks looks insignificant to economic growth, the results show that domestic debt contribution to economic growth is higher than that of external debt. Namibia heavily relies on borrowing within the economy and it is a good indication that the results show that changes in GDP growth are dominated by domestic debt over the forecast horizon. This can be explained by crowding in effect, whereby when the principal and interest amount are paid back, the amount circulate in the domestic economy which further accelerate economic activities in the country.

## 5.7 Impulse Response Analysis

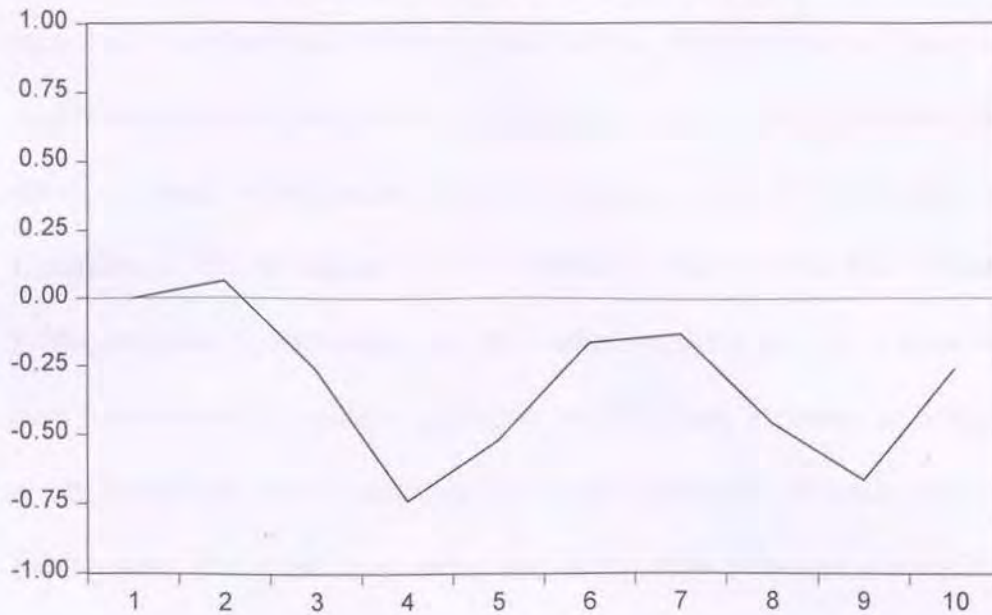
Impulse response function is a shock to a VAR system, it describe how shocks to one variable impact another variable after a certain period. Figure 5.2 exhibit the generalized asymptotic impulse response function which shows the dynamic response of GDP growth to external debt and domestic debt. The horizontal axis presents the ten quarters following the shock while vertical axis measures the quarterly impact of the shock on each endogenous variable. The interpretation of impulse response function provides evidence of what happens to the one variable if you cause a short-run shock to the other.

**Figure 5.2: Impulse response for GDP growth**





Response of LNGDPR to LNDOMDEBT



The impulse response of economic growth to structural innovations in external debt does not show a definite pattern of the shocks. The reaction starts off as positive but fall gradually around quarter four and picked up slowly and become negative again. After some period, the reaction does not return to the initial steady state, a new equilibrium point is formed. The reactions die out immediately towards the zero line which implies that the effect of external debt on GDP growth is temporary in nature.

The generalized impulse response of GDP growth to structural innovations in domestic debt was positive in the first period but fall to negative in the subsequent periods. After, the reaction does not return to the initial steady state, instead it finds a new equilibrium level. It take some time before the reaction die out towards the zero line, this suggest that the effect of domestic debt to GDP growth is permanent in nature. However, there is no clear cut pattern as the reaction was initially positive but fell to negative area.

Overall, both figures does not show a definite pattern of the shocks, sometimes the response is negative and positive in some period. Which reveal that there is no statistical significant impact of public debt to GDP growth rate. This is consistent with the result obtained from cointegration analysis and also reflects some kind of Ricardian Equivalence. Which suggest that for Namibia, intertemporal shift between taxes and public spending by borrowing does not matter. Implying any cut in taxes and borrowing does not necessarily produce aggregate wealth effect; increases in public debt do not affect household consumption decisions and aggregate demands remains the same. Furthermore, this could also mean that public debt influence economic performance depending on how the resources are utilized. The public choice theory suggests that if the borrowed funds by a country are utilized in the most effective manner in productive investment purposes, borrowing surely add value to economic growth (Atique & Malik, 2012).

## **5.8 Conclusion**

This chapter focused on the results from the econometric analysis adopted in the study and provided economic interpretation of the results obtained. The study found that the variables are integrated of  $I(0)$  and  $I(1)$ . No long run relationships was found from Cointegration test and the VAR estimates of Toda-Yamamoto Granger causality test reveal a no causal relationship of variables during the period under study.



## CHAPTER SIX: CONCLUSION AND RECCOMENDATION

This chapter provides the summary and conclusion of the study based on the results obtained in chapter five. The chapter also provides policy recommendations and areas needed for further research.

### 6.1 Conclusion

The objective of this study was to investigate the impact of public debt on economic growth of Namibia using quarterly time series data from 2003 to 2016. The data was extracted from Bank of Namibia database, IMF data base and Namibia Statics Agency. The study employed the Augmented Dickey Fuller (ADF) test to test the presence of unit root among variables. The results of the unit root test showed that variable GDP growth is stationary at levels while external debt and domestic debt became stationary in their first difference.

Cointegration analysis was conducted and the results showed that there are no long run relationships among the variables; hence the paper examined the direction of causality between public debt and economic growth in Namibia within the context of VAR framework. The main findings of the study obtained from Toda-Yamamoto Granger causality tests revealed that there is no causal relationship between public debt and economic growth. The result indicates that for the period under consideration, Namibia public debt had no influence on the country GDP growth rate.

Furthermore, variance decomposition and impulse response analysis was also conducted. Results from Variance Decomposition analysis reveal that domestic debt contribution to economic performance outweighs external debt. Changes in GDP growth are dominated



by domestic debt, implying domestic debt exert more pressure on GDP growth in Namibia during the forecast period. Impulse response analysis results do not reveal a definite pattern of the shocks. Sometimes the response is negative and positive in some period. Which indicate that there is no statistical significant impact of public debt to GDP growth rate during the study period.

Overall, the paper findings of the study can be linked to various practices happening in the country. Namibia is one of the countries that borrow to finance budget deficit, hence most resources borrowed are utilized for consumption purposes. As stipulated by the Public Choice Theory, democratic institutions through the behavior of politicians and bureaucrats lead to higher level of unnecessary public expenditures because they are mainly motivated by self-interest gains; this lead to higher budget deficit and increases in public debts. Such borrowing behavior adds to the debt burden without contributing significantly to economic growth. Corruption is also one of the issues that the country is facing; portion of public resources (including the borrowed) that are meant for public projects are diverted to private investment. Such funds are than used for importation of luxury vehicles and other goods, and hence does not contribute to economic growth.

## **6.2 Policy Implications**

Based on the findings, the study recommends ways that policymakers and advisors could consider in public debt management to ensure borrowing yield positive results for Namibia economic performance. Firstly, instead of borrowing, policy makers should develop and implement strategies that increase revenue for the government to fill the deficit gap. Thus Namibia should expedite the creation of an independent revenue authority which will boost tax administration and collection. Secondly, since Namibia is



a developing country, Namibia should only consider borrowing for very high priority projects that are well appraised and self-sustained that can contribute to economic growth, generating enough returns to upset the debt servicing. Lastly, effective and efficient utilization of public resources is needed to ensure that the future generation's welfare or economic production is not being mortgaged in continuous indebtedness.

### **6.3 Further research**

The study used quarterly data due to a shortage of annual data for the regression with 56 observations. Long time series data offer more reliable findings, the writer calls for future research using longer sampling time frame. Additionally, the study used Toda Granger causality approach. Since this is the first study that examined the impact of both external debt and domestic debt on economic growth in Namibia, future research using a different methodology is invited in order to compare the results. Lastly, this study focused on external debt and domestic debt, and recommends that future studies focus on debt repayment burden.

## REFERENCES

- Abera, G. (2016). *An empirical analysis of external debt and economic Growth in Ethiopia: A Vector Auto Regressive (VAR) Approach*. Retrieved from <https://www.eaecon.org/>
- Abdullahi, M. M., Abu, N. A. B., & Hassan, S. B. (2016). Debt Overhang versus Crowding Out Effects: Understanding the Impact of External Debts on Capital Formation in Theory. *International Journal of Economics and Financial Issues*, 6(1), 271-278.
- Akram, N. (2016). Public debt and pro-poor economic growth evidence from South Asian countries. *Economic Research-Ekonomska Istraživanja*, 29(1), 746-757.
- Altayligil, Y. B., & Akkay, R. C. (2013). The Effect of the Domestic Debt on the Financial Development: A Case Study for Turkey. *International Journal of Economics and Finance*, 5(5), 64.
- Al-Zeaud, H. A. (2014). Public debt and economic growth: An empirical assessment. *European Scientific Journal*, 10(4).
- Al-Zeaud, H. A., & Al-Awawdeh, W. M. (2014). The Causality between Debt and Economic Growth Evidence from Jordan. *Interdisciplinary Journal of Contemporary Research in Business*, 6(5), 59.
- Asterious, D., & Hall, S. (2011). *Applied Econometrics*. 2nd Ed. New York: Palgrave Macmillan.



- Atique, R., & Malik, K. (2012). Impact of domestic and external debt on the economic growth of Pakistan. *World Applied Sciences Journal*, 20(1), 120-129.
- Audu, I., & Abula, M. (2001). Domestic debt and the Nigerian economy. *Current Research Journal of Economic Theory*, 2(1), 22-26.
- Bank of Namibia. (2016). 2016 Annual Report. Retrieved from <https://www.bon.com.na/Publications/Annual-Reports.aspx>
- Bank of Namibia. (2009). 2009 Annual Report. Retrieved from <https://www.bon.com.na/Publications/Annual-Reports.aspx>
- Bank of Namibia. (2008). 2008 Annual Report. Retrieved from <https://www.bon.com.na/Publications/Annual-Reports.aspx>
- Bank of Namibia. (2014). 2013/14 Debt Management Report. Retrieved from <https://www.bon.com.na/Bank/Financial-Markets/Public-debt-management/Debt-Report.aspx>
- Belingher, D., & Moroianu, N. (2015). Empirical evidence on the Ricardian equivalence in Romania. *Theoretical and Applied Economics*, 22(2), 163-170.
- Bilan, I., & Ihnatov, I. (2015). Public debt and economic growth: a two-sided story. *International Journal of Economic Sciences*, 4(2), 24-39.
- Black, P., Calitz, E., & Steenekamp, T. (2013). *Public Economics*. Cape Town, South Africa: Oxford University Press Southern Africa Pty Limited.

- Blake, T. (2015). *Investigating the Impact of Public Debt on Economic Growth in Jamaica*. Working paper of Fiscal and Economic Program Monitoring Department Bank of Jamaica, Jamaica.
- Boboye, L., & Ojo, M. (2012). Effect of external debt on economic growth and development of Nigeria. *International Journal of Business and Social Science*, 3(12).
- Charles, O. (2012). Domestic debt and the growth of Nigerian economy. *Research journal of finance and accounting*, 3(5), 45-56.
- Čeh Časni, A., Badurina, A.A, A., & Sertic, M. B. (2014). Public debt and growth: Evidence from Central, Eastern and Southeastern European countries. *Journal of Economics and Business*, 32(1), 35-51.
- Emmanuel, O. O. (2012). An empirical analysis of the impact of public debt on economic growth: Evidence from Nigeria 1975-2005. *Canadian Social Science*, 8(4), 154- 161.
- Enders, W. (2003). *Applied Econometric Time Series*. New York: John Wiles & Sons
- Fatma, M., & Zouhaier, H. (2014). Debt and economic growth. *International Journal of and Financial Issues*, 4 (2), 440-447.
- Gujarati, D.N. (2003). *Basic Econometrics*. New York: McGraw-Hill/Irwin.
- Hamdi, H., & Sbia, R. (2013). Examining government revenues, government spending and economic growth in GCC countries. *Journal of Applied Business Research*, 29(3), 737- 742.



- Hassan, H., & Akhter, T. (2012). Impact of public debt burden on economic growth: Evidence from Bangladesh. *Journal of Finance and Banking*, 10(1).
- IMF & World Bank. (2015). *Revised guidelines for public debt management*.
- Egbetunde, T. (2012). Public debt and economic growth in Nigeria: Evidence from granger causality. *American Journal of Economics*, 2(6), 101-106.
- Fekadu, M. (2014). *The Impact of External Debt on Economic Growth in Ethiopia*. (Unpublished master's thesis). Addis Abba University, Ethiopia.
- Jebran, K., Ali, A., Hayat, U., & Iqbal, A. (2016). Public debt and economic growth in Pakistan: A reassessment. *Pakistan Business Review*, 18(2), 307-324.
- Kasidi, F., & Said, A. M. (2013). Impact of external debt on economic growth: A case study of Tanzania. *Advances in Management and Applied Economics*, 3(4), 59.
- Kaur, A., & Kaur, B. (2015). The effects of public debt on economic growth and gross investment in India: An empirical evidence. *Pacific Business Review International*, 8(1).
- Khan, R. E. A., & Gill, A. R. (2009). *Crowding Out Effect of Public Borrowing: A Case Study of Pakistan* (MPRA Paper No.16292). Retrieved from <http://mpra.ub.uni-muenchen.de/16292/>
- Kumar, M., & Woo, J. (2010). *Public debt and growth*. (IMF Working Paper No.10/174). Retrieved from <https://www.imf.org/en/Publications/WP/Issues/2016/12/31/Public-Debt-and-Growth-24080>

- Lee, S. P., & Ng, Y. L. (2015). Public debt and economic growth in Malaysia. *Asian Economic and Financial Review*, 5(1), 119-126.
- Matiti, C. (2013). The relationship between public debt and economic growth in Kenya. *International Journal of Social Sciences and Project Planning Management*, 1(1), 65-86.
- Matthew, A., & Mordecai, B. D. (2016). The Impact of Public Debt on Economic Development of Nigeria. *Asia Research Journal of Arts and Social Sciences*, 1(1), 1-16.
- Muinga, R.M (2014). *External public debt and economic growth in Kenya*. (Unpublished master's thesis). University of Nairobi, Kenya.
- Myles, G. (1997). *Public Economics*. New York, USA: Cambridge University Press.
- Namibia Statistics Agency (2016). *Preliminary Annual National Accounts*. Retrieved from [http://cms.my.na/assets/documents/Preliminary\\_National\\_Accounts\\_20161.pdf](http://cms.my.na/assets/documents/Preliminary_National_Accounts_20161.pdf)
- Ntshakala, P.L. (2014). Effects of public debt on economic growth in Swaziland. *International Journal of Business and Commerce*, 5(1), 01-24.
- Nwamaka, I. M., Chukwunulu, J. I., & Werigbelegha, A.P. (2016). Domestic debt and the performance of Nigerian economy (1987-2014): An empirical investigation. *European Journal of Research and Reflection in Management Sciences*, 4(3).



- Ogbokor, C. A. (2015). *Foreign trade and economic growth in Namibia: A time series analysis*. (Unpublished Doctoral dissertation). North-West University, South Africa.
- Ogunmuyiwa, M. S. (2011). Does external debt promote economic growth in Nigeria? *Current Research Journal of Economic Theory*, 3(1), 29-35.
- Onogbosele, D. O., & Ben, M. D. (2016). The impact of domestic debt on economic growth of Nigeria. *Asian Research of Arts & Social Sciences*, 1(3), 1-13.
- Osewe, V.O. (2013). *Effect of external debt and inflation on economic growth in Kenya*. (Unpublished master's thesis). KCA University, Kenya.
- Owusu-Nantwi, V., & Erickson, C. (2016). Public Debt and Economic Growth in Ghana. *African Development Review*, 28(1), 116-126.
- Pattillo, C., Poirson, H., & Ricci, L. A. (2011). External debt and growth. *Review of Economics and Institutions*, 2(3), 30.
- Patenio, J. A. S., & Tan-Cruz, A. (2007, October). *Economic growth and external debt servicing of the Philippines: 1981-2005*. Paper presented at the 10th National Convention on Statistics. Retrieved from <http://nap.psa.gov.ph/ncs/10thNCS/papers/contributed%20papers/cps-02/cps02-02.pdf>
- Rais, S. I., & Anwar, T. (2012). Public debt and economic growth in Pakistan: A time series analysis from 1972 to 2010. *Academic research international*, 2(1), 535.

- Rath, S. S., & Sar, A. K. (2016). Long run relationship between public debt and economic growth: Empirical evidence from Odisha. *Journal of Harmonized Research in Management*, 2(1), 89-97.
- Saifuddin, M. (2016). Public Debt and Economic Growth: Evidence from Bangladesh. *Global Journal of Management and Business Research*, 16(5).
- Serrão, A. (2016). Impact of Public Debt on Economic Growth in Advanced Economies. *International Journal of Managerial Studies and Research*, 4(2), 70-76.
- Shin, Y., & Pesaran, M. (2003). The impacts of external debt on economic growth in transition economies. *Chinese Business Review*, 11(5), 491-499.
- Sichula, M. (2012). Debt overhang and economic growth in HIPC countries: The case of Southern African development community (SADC). *International Journal of Economics and Finance*, 4(10), 82.
- Sindano, A.N. (2009). *The direction of causal relationship between financial development and economic growth in Namibia* (Unpublished master's thesis). University of Namibia, Namibia.
- Soludo, C. C. (2003). *Debt, poverty and inequality*. (N.Okonjo-Iweala, C.C.Soludo & M.Muhtar, Eds.). Nigeria: Africa World Press.
- Wangari, M. M. (2013). *Effect of domestic debt on economic growth in Kenya* (Unpublished master's thesis Paper). University of Nairobi, Kenya.
- Wibowo, M. G. (2017). Public Debt and Economic Growth in the South East Asian countries. *Signifikan: Jurnal Ilmu Ekonomi*, 6(1), 177-188.



Wolde-Rufael, Y. (2004). Disaggregated industrial energy consumption and GDP: The case of Shanghai, 1952–1999. *Energy economics*, 26(1), 69-75.

Zaaruka, B.P (2007). *Technical paper: Public debt and economic growth in Namibia: The threshold effect*. Retrieved from <http://mefmi.org/>