AN EXAMINATION OF THE EFFECTS OF GOVERNMENT SPENDING ON INTEREST RATES AND TRADE BALANCE IN NAMIBIA

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Abstract

This paper aims to examine the effects of government expenditure on interest rates and trade balance in Namibia for the period, 1980 to 2018. An ARDL bounds cointegration technique and Vector Error Correction Model (VECM) were employed for the analysis. As a precondition, the time series data used in the study were tested for stationarity using ADF, PP, and KPSS unit roots tests. The assessment found government spending and trade balance data with integrated of order zero I(0). However, interest rates data found with integrated of order one I(1). The ARDL cointegration technique confirmed a long-run relationship among government spending, interest rates, and trade balance in Namibia. The outcomes generated by VECM discovered a negative and significant influence of government spending on both trade balance and interest rates. The results confirmed the presence of both twin deficits and the crowd-out hypothesis in Namibia. A further outcome generated by Granger causality establishes that government expenditure, interest rates, and net exports Granger cause each other. Except that trade balance does not Granger cause government expenditure in Namibia. In conclusion, the study warned that Namibia may face an economic crisis soon if the implementation of fiscal policy continues to be applied in an uncontrolled and unsustainable manner. Moreover, the study advised the Namibian government to enforce financial integrity in both public and private sectors to create a sustainable government expenditure with a significant positive government multiplier that creates sustainable domestic economic growth and economic development to ultimately cause an improvement in Namibia's trade balance.

Keywords: ARDL Cointegration Vector Error Correlation Model, ADF, PP, KPSS, Government Expenditure, Interest Rate, Trade Balance, Namibia

Table of Contents

List of Tables

List of Figures

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DEDICATION

This piece of work is devoted to my dearest grandmother and my Father for their endless encouragement for me to pursue postgraduate studies and continue learning. I also would like to use this opportunity to express my gratitude to my beloved parents for being responsible parents in my upbringing they nurtured me to become a grander man. I appreciate every effort they devoted to my education and welfare in trusting the kind and powerful Almighty God.

May Almighty God bless you all in abundance! "***Asante Sana****"!*

DECLARATION

I, Filippus Haihambo, hereby declare that this study is my work and is a true reflection of my research and that this work or any part thereof has not been submitted before for a degree at any other institution.

FILIPPUS HAIHAMBO	*FHaihambo*	30 OCTOBER 2019
Name of Student	**Signature**	**Date**

LIST OF ABBREVIATIONS AND/OR ACRONYMS

AD	Aggregate Demand
ADF	Augmented Dickey-Fuller Test
AIC	Akaike Information Criterion
AR	Autoregressive
ARDL BT	Autoregressive Distributed Lag Bounds Test
ARMA	Autoregressive Moving Average
AS	Aggregate Supply
BON	Bank of Namibia
BPM6	Balance of Payments and International Investment Position Manual Sixth Edition
CA	Current Account
CGE	Computable General Equilibrium
CMA	Common Monetary Area
CUSUM	Cumulative Sum of Recursive Residuals
CUSUMSQ	Cumulative Sum of Recursive Residuals of Squares
DSGE	Dynamic Stochastic General Equilibrium
ECM	Error Correction and Model
ECT	Error Correction Term
EU	European Union
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GE	Government Expenditure

GMM	Generalised Methods of Moments
HQ	Hannan-Quinn Information Criterion
IMF	International Monetary Fund
IRF	Impulse Response Function
IS	Investment and Savings
KPSS	Kwiatkowski-Phillips-Schmidt-Shin
LiR	Lending Interest Rate
MOF	Ministry of Finance
MPL	Marginal Productivity of Labour
MTEF	Medium-Term Expenditure Framework
NDP1	The First National Development Plan
NDP5	The Fith National Development Plan
NSA	Namibia Statistics Agency
NX	Net Exports (Trade Balance)
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
PP	Phillips-Perron
PPP	Public-Private Partnership
PSEMAS	Public Service Employees Medical Aid Scheme
SACU	Southern African Customs Union
SARB	South African Reserve Bank
SIC	Schwarz Information Criterion
SSA	Sub-Saharan Africa
SVAR	Structural Vector Autoregression

TB	Trade Balance (Net Exports)
TIPEEG	Targeted Intervention Programme for Employment and Economic Growth
UK	United Kingdom
UNCTAD	United Nations Conference on Trade and Development
USA	United States of America
VAR	Vector Autoregressive
VARMA	Vector Autoregressive Moving Average
VECM	Vector Error Correction Model
WB	World Bank

Chapter 1

Introduction and Background of the Study

1.1 Introduction

Government spending is among the most effective fiscal policy tools used for addressing various macroeconomic instabilities faced by economies. However, when it is not properly controlled it may likely create macroeconomic instability in an economy. Normally, a change in government spending may influence the economic activities of the economy which consequently may end up affecting the country's gross domestic product (GDP) (Mankiw, 2008).

Generally, government expenditure refers to all the money spent by the public sector through the acquisition of public goods and services such as education, healthcare, social protection, and defense. It is usually financed through tax collections by the government (government revenue) or through both domestic and international borrowings. Public spending enables governments to produce goods and services or to purchase goods and services that are needed for the government's economic fulfillment. Also, government spending is an enabler to address income inequality between the richer and the poorer in pursuit of social equality and improving the welfare of poor citizens (Wickens, 2008).

Shafuda (2015) described Namibia's government spending as a share of Gross Domestic Products (GDP) classified into four major categories as follows:

Expenditure on infrastructure development and public services - This category is often referred to as discretionary spending which largely refers to the cost of maintaining the political system and salaries for public employees & public office bearers, education

spending, fire services, police, and the criminal justice system; outlay on physical infrastructures such as roads, dams, port facilities, and transportation; the spending on science & technology, research, and development plus any other investments.

Expenditure on entitlement programs - This cover public expenditures on health care programs; pensions and retirement programs such as Government Institutions Pension Fund (GIPF), Public Service Employees Medical Aid Scheme (PSEMAS), and Social Security as well as welfare or social insurance programs, food stamps, vulnerable children‘s compensation, and old-age social grant.

Military expenditure - Includes all expenditures on military personnel, social services for personnel and their families, operations and maintenance, procurement, military research and development, military construction, as well as military aid expenditure.

Interest on the national public debt - This comprises coupon payments, interest payments on loans and treasury securities, and the principal repayment of debt.

The government expenditure can be financed through taxation, or by borrowing using debt instruments issued to the public, as well as by printing money (in effect, borrowing from the central bank). However, borrowing is deferred taxation because of the public debts including interest obligations to be repaid in the future. Another method of financing government spending is by printing money which generally creates inflation, eventually, imposes high tax due to the loss of real purchasing power of nominal money holdings as prices rise (Wickens, 2008).

Mankiw (2009) exemplified that government expenditure includes interest paid on government debt since the difference between the nominal interest rate and the real interest rate is the inflation rate. When government expenditure is greater than government revenue it is referred to as the government budget deficit. Continuous occurrences of budget deficit may increase government debt over time (Mankiw, 2008).

Generally, it is recognized that a country considered with a persistent fiscal deficit over time accumulates a high level of public debt that may increase pressure to use monetization to finance the deficit of government spending (Manuel, Eita, Naimhwaka & Nakusera, 2019). The high level of public debt is interconnected to economic uncertainty and instability. Besides, excessive public debt forces the government to adopt financially repressive policies to control inflation to meet the financial need by using seigniorage (monetization of deficit) and reduce government spending on interest paid on debt. This situation may implicate the effective conduct of monetary policy. It may also result in high spending and consequently high inflation, which can distort the main objective of monetary policy (Mweni et al 2016) as cited by (Manuel, Eita, Naimhwaka & Nakusera, 2019).

Usually, there exists a positive relationship between government spending on the interest rate, in such a way that a rise in debt-financed government spending, is likely to cause an upsurge in interest rate, then causes a crowding-out effect in private consumption and or investment. As borrowing increases, driven by increased government spending with a budget deficit, the government has to make higher interest rate payments to the government bondholders (individuals or institutions that lend government money). Alternatively, if the government has to reduce borrowings as a percentage of GDP, it has

to simultaneously increase taxes of the future government budget or simply by limiting the government outlays. Interest rate is defined as the cost of borrowing on financial or economic resources, it is closely related to the rate at which the government pays on its debts (Sachs & Larrain, 1993). Consequently, the aggregate demand in the economy may shrink in the process which leads to low output production as well as reduced economic activities within the economy. As a result net exports may decline which may deteriorate the trade balance.

In Namibia's case, monetary policy is effective in the hands of the South African monetary authorities, the South African Reserve Bank (SARB). Namibia belongs to the Common Monetary Area (CMA) along with South Africa, Swaziland, and Lesotho. Under the terms of the CMA, each member country's currency can be exchanged one-for-one with the South African Rand which can also be used as legal tender. Money can generally flow unhindered from one country to the other. At the same time, the controls regulating the flow of money into and out of the CMA region are the same. This arrangement implies that because South Africa's economy dominates the CMA members. The South African economy is measured forty times larger than Namibia's economy. Hence, interest rates and exchange rates are determined by the policies of the SARB. In practice, this means that when interest rates in South Africa change, interest rates in Namibia follow suit (Mudenda & Sherbourne, 2001).

Over the last three decades, trade openness has significantly evolved all over the globe. The Sub-Sahara Africa's (SSA) average trade ratio has increased from 37 percent in the period 1981 to 1990 to 51 percent in 1991 to 2000 and 63 percent in the period 2001 to 2013 as reported by (UNCTAD, 2016). Through trade openness, countries can work with

the process of globalization to find complementary activities such as education or job training, technology, and innovation which help economies to survive and develop (Fischer, 2003) as cited by (Pigka-Balanika, n.d). The trade openness of every country is normally facilitated through trade balance also known as net exports that fall under the current account section of the balance of payment, which records the country's transactions with the rest of the world. It is measured by the ratio of exports plus imports over GDP (UNCTAD, 2016). Although, trade openness is an ongoing process of greater economic interdependence among countries characterized by an increasing amount of cross-border trade in goods and services, the increasing volume of international financial flows, and increasing flows of human resources. It is categorized into three accounts (current, capital, and financial accounts) as explained in the Sixth Edition of the Balance of Payments and International Investment Position Manual (BPM6) (IMF, 2014).

However, openness to international trade reduces the effectiveness of fiscal policy for two reasons. Firstly, because the greater the marginal propensity to imports, the lower the significance of the government multiplier within the domestic economy. Secondly, as trade increases the degree of competition in the goods market tends to rise. Therefore, it reduces the probable price stickiness in the economy (Barry & Devereux, 1992).

Nevertheless, the impact of fiscal policy through government expenditure on aggregate demand and aggregate supply has been a focal discussion among the schools of economic thought. Larrain and Sachs (1993) discussed Keynesian's argument that an increase in government spending has the potential to raise aggregate demand in the economy. However, the demand for foreign goods may increase as a result of a rise in aggregate demand, which may cause the trade balance to deteriorate. Eventually, the trade deficits

will require the central bank to interfere by reducing the money supply in the economy to improve the trade balance. Subsequently, the interest rate tends to increase in the long run. As a result, an increase in government spending crowds out private spending partially in the short run. However, the crowding out is distributed on the reduced private consumption and reduced investment due to higher interest rates (Larrain & Sachs, 1993).

Also, Mankiw (2016) argued that the effect of expansionary fiscal policy on the trade balance and interest rates in the small open economy under a flexible exchange rates system. It is when the exchange rate is determined by market forces, however, it also fluctuates due to changes in economic conditions. Then the exchange rate should adjust to achieve simultaneous equilibrium in both the goods market and the money market. Thus if the government expenditure rises by reducing taxes as referred to as an expansionary fiscal policy to stimulate domestic economic activity, subsequently it raises aggregate demand which in turn causes the exchange rate to appreciate, while the level of income remains unchanged.

Contrary, Mankiw (2016) argued that in the closed economy, the expansionary fiscal policy raises income. However, the economic forces produce different outcomes on the small open economy with free capital mobility, the implications of capital flow on the domestic economy. In a small open economy, immediately as the interest rate starts to rise above the world interest rate, the capital rapidly flows into the domestic economy from abroad to take advantage of the higher return. As a result, the capital inflow pushes interest rates back to the world interest rates, it also has another effect, since foreign investors require to buy the domestic currency to invest in the domestic economy, the capital inflow increases the demand for domestic currency in the market for foreign-currency exchange,

which causes the domestic currency to appreciate. The appreciation of the domestic currency makes domestic goods more expensive relative to foreign goods, which consequently reduces the net exports. Hence, a fall in net exports offsets the effects of the expansionary fiscal policy on income (Mankiw, 2016).

1.2 Background of the Study

Before and after Namibia's independence, government expenditure has been the main fiscal policy mechanism used as a catalyst for implementing the country's national development programs aimed to address various social and economic challenges facing the economy. Also, it has been the substance for the country's infrastructure development as well as an enabler in the execution of the country's national development plans from the First National Development Plan (NDP1) until the current Fith National Development Plan (NDP5).

The government outlay has been increasing year on year to cater for the country's infrastructure developments, income redistributions as well as for the provision of essential public goods and services in various sectors such as health, education, defense, and security (Shafuda, 2015; Undji, 2018).

As of the 1990 period, Namibia has been associated with a high government expenditure compared to other African countries and upper-middle-income countries in the world. The total public expenditure as a share of GDP for Namibia has been valued at 35.0 percent from the year 2000. A threshold of such level to GDP is considered much more compared to an average government spending as a share of GDP for developing countries measured at 26.4 percent, while for low-income countries is valued at 20.8 percent and for middle-

income countries valued at 27.5 percent correspondingly (Kalenga, Zaruka & Biwa, 2001).

In addition, from the year 2010 to 2015 period, Namibia has experienced a continuous increase in government expenditure to cater for the implementation of national development programs and projects such as the Targeted Intervention Programme, for Employment and Economic Growth (TIPEEG) and Mass Housing and Land Servicing Program (MHLSP). Moreover, Namibia's government spending has been rising over years under review for the country's infrastructure development including the construction of Nekatar Dam, Oil storage facility, and the extension of Walvis Bay port which were mainly linked to an increase in Namibia's fiscal deficit over the years under review (Naimhwaka, Eita & Manuel, 2018).

However, over the previous fiscal years, Namibia's continuous increase in total public spending over the period under review has been characterized by an uninterrupted government budget deficit (government expenditure exceeded government revenues). Due to both revenue shortfall and expenditure outturn, it caused the budget deficit to increases to 6.9 percent in the 2016/17 financial year, compared to the budget deficit of 6.3 percent recorded in 2017/18. As a result, the country's public debts continue to grow, increased from N$74.4 billion in 2017/18 to N$ 87.5 billion which is equivalent to 46.3 percent of GDP by the end of the 2018/19 fiscal year (Ministry of Finance (MOF), 2018; Ministry of Finance, 2019).

During the 2016 fiscal year, the Namibian government has implemented a fiscal consolidation strategy. The plan was adopted to cut government spending aiming to

reduce escalating public debts while maintaining macroeconomic stability, and fostering long-term fiscal sustainability (MOF, 2016; MOF, 2017; MOF, 2018).

Remarkably, after the implementation of the fiscal consolidation strategy, the total government expenditure exceeded the government budget during the 2016/17 financial year stood at N$62.22 billion, which was 101.4 percent compared to the revised appropriation government budget of N$61.50 billion. Consequently, the government overspent in the 2016/17 financial year by N$2.9 billion caused the total government expenditure during the 2017/18 financial year to was adjusted to cater to the timely settlement of outstanding spending obligations of the 2016/17 financial year. Also, the adopted fiscal consolidation strategy was followed by poor economic performance across all sectors of the economy which led to a continuous contraction of economic growth from a robust economic performance valued at 6.1 percent noted in 2015 to 1.1 percent recorded in 2016. Namibia's economic growth further contracted to 0.9 percent in 2017.

Furthermore, the Namibia Statistics Agency (NSA) preliminary report has stated that in 2019 the economy contracted by 1.1 percent compared to a growth of 0.7 percent registered in 2018. In nominal terms, the GDP expanded slightly by 0.4 percent to N$178,677 million in 2019 from N$178,052 million recorded in 2018, (NSA, 2019). That was the weakest economic growth trend recorded over the entire period under review for Namibia (Ministry of Finance, 2016; Ministry of Finance, 2017; Ministry of finance, 2018; Ministry of finance, 2019).

The ultimate goal of the central bank in Namibia is to stimulate economic activities by maintaining stable prices to support sustainable economic growth and economic

development by adjusting the repo rate. It is considered the most effective monetary policy tool that influences Namibia's economic conditions (Bank of Namibia, 2008).

In April 2016 the central bank's monetary policy committee kept the repo rate unchanged at 7.0 percent until August 2017. The repo rate was then reduced by 25 basis points to 6.75 percent from August 2017 which remained unchanged until August 2019. The repo rate was further reduced by 25 basis points to 6.50 from August 2019. The reduction of repo rate was aimed to support the weak domestic economy to support the economic recovery from a continuous slowdown of 1.1 percent during 2016 the economic growth which further contracted by 0.9 percent and 0.1 percent in 2017 and 2018 respectively, (Ministry of Finance, 2018; Bank of Namibia (BON), 2019).

Over the past decades, Namibia and other African countries reflected the improvement in terms of trade and enhanced their exporting and importing capacity (UNCTAD, 2016). Remarkably, the increased role of international trade in African economies has been characterized by significant growth in trade by current account deficits in many countries on the continent.

However, the UNCTAD report enlightened on various concerns to African countries with perpetual current account deficits such as Namibia, that a persistent current trade deficit would upturn Africa's future debt burden that consequently makes the continent vulnerable to financial crises. Another concern drawn from experience has shown that growing current account deficits often portray disruptive economic trends such as sudden stops in capital flows, severe decreases in credit and spending, and sharp economic slowdowns, which generate high unemployment and poverty levels. Additionally, Africa's growing current account deficits are also of concern as a rule of thumb, current account

deficits that are above 5 percent of GDP are indicative of a long-run economic crisis of a country. Furthermore, growing current account deficits driven by high trade deficits pose challenges for employment and poverty reduction efforts particularly when the deficits are caused by rising imports of consumer goods that can be produced by domestic industries (UNCTAD, 2016).

Namibia's trade balance over the past ten-year period, 2008 to 2017 averaged a deficit of N$16,609 million, reaching an all-time high with a surplus of N$1,786 million in 2008. Differently, the low trade deficit of N$41,029 million was experienced in 2015. Moreover, Namibia continued to record an unfavorable trade balance in 2016 with a trade deficit amount of N$29,817 million, an indication that in 2016 the country spent N$29,817 million more on buying goods from the rest of the world than what it received from selling goods to the rest of the world. Nevertheless, the deficit recorded in 2016 dropped by 24.7 percent, which was the largest six-year drop since the deficit declined by 25.1 percent between 2009 and 2010. The N$29,817 million deficit was N$9,800 million lower when compared to a revised figure of the year 2015 when the trade deficit was estimated at N$39,617 million, which was the largest deficit recorded in the period under review since 1980. The narrowing of the trade deficit during 2016 was attributed to larger growth in exports compared to imports. Exports' revenue grew by 20.9 percent while expenditure on imports grew only by 2.5 percent, however, the growth in exports was not sufficient to offset the deficit. Thereafter, Namibia's trade deficit fell to a 52.4 percent annual improvement during 2018 representing an 18.3 percent annual improvement in the trade deficit which is ascribed to an increase in Namibia's exports according to (Namibia Statistics Agency (NSA), 2017; Ministry of Finance, 2018; Ministry of Finance, 2019).

The growth in exports was attributed to diamonds, copper ores, and fish while diamonds, vessels, and fodder were responsible for the slight growth in overall imports. Namibia's trade balance averaged to a deficit of N$13,871 million from 2007 to 2016, reaching a ten-year high with a surplus of N$997 million recorded in 2008 and a record low with a deficit of N$39,617 million registered in the preceding year (Namibia Statistics Agency, 2017).

Nevertheless, Namibia continues to be a net importer of goods and services as of 2013 to 2019 period. The country's trade deficits have been recorded during the period under review, the value of goods imported increased to N$76,783 million in 2019 from N$74,804 million in 2018. Similarly, imports of services increased by 7.2 percent to N$8,384 million in 2019 from N$7,820 million in 2018. Thus, the total imports of goods and services increased by 3.1 percent to N$85,167 million in 2019, (NSA, 2019).

The deterioration of Namibia's trade balance was contributed by multiple factors that worsened the country's current account deficit including but not limited to the expansion in public expenditure, foreign direct investment (FDI), and private sector credit extension (Naimhwaka, Eita & Manuel, 2018). Moreover, the same study pointed out other factors that worsened Namibia's current account deficit such as an increase in Foreign Direct Investment (FDI) for both exploration and the commissioning of new mines such as Husab and B2Gold which resulted in huge increases in capital goods imports over the period 2010 to 2014, and the tax relief in 2013, as well as the increase in private sector credit extension, worsened the trade deficit.

Correspondingly, the depreciation of the local currency and the decline in commodity prices also negatively affected the current account balance. The cost of imports rose due

to the depreciation of the local currency during the period 2009 to 2016. Consequently, this resulted in an increased demand for imports, particularly vehicles, which worsened the trade deficit and ultimately worsened the deficit on the current account. Furthermore, increased outflows of investment income in the form of interest as well as dividend payments, a deterioration in the fiscal balance associated with a decline in Southern Africa Customs Union (SACU) receipts and a slower economy, and increasing public debt characterized this occurrence. The above factors conspired to fuel a persistent current account deficit in Namibia since 2009 (Naimhwaka, Eita & Manuel, 2018).

Nevertheless, government spending, interest rates, and trade balance are crucial macroeconomic variables in any economy for two reasons. Firstly, the trade balance in deficit negatively affects the country's balance of payment as the outflow tends to become export income affecting the current account which causes a devaluation of the currency and a budget deficit. Secondly, the interest rate is the key determinant of consumption and investments of every economy. Hence, an increase in interest rates may crowds out both domestic consumption and investments (Larrain & Sachs, 1993). Even though, both government spending and interest rates are the harmonizing fiscal and monetary tools used by Namibia in endeavors to boost economic activities to promote economic growth and economic development. The effect of government spending on interest rates and trade balance is not yet identified in Namibia.

Currently, Namibia reached the cross-road on executing fiscal policy, since the implementation of fiscal consolidation strategy by reducing government expenditure, in the endeavors to reduce public debts, and create a sustainable government expenditure as well as to maintain stable macroeconomic fundamentals. On the other hand, the country

is overcoming the trade deficit as well as the persistent economic contraction from 2016 until 2019. Furthermore, Namibia is overpowering several socio-economic challenges such as a high rate of unemployment, persistent drought, income inequality, and housing backlog that are among the prevailing challenges that require government intervention through government spending.

Although government spending is the main fiscal policy tool used for national development in Namibia, its multiplier effect within the economy remains unknown. Besides, Namibia is endowed with several natural resources with the potential to diversify the economic prospects and accelerate the production capacities and expand the manufacturing base of the economy which may improve the country's trade balance. Therefore, this study aims to examine the effects of government expenditure on the interest rate and trade balance in Namibia to cover the gap.

1.3 Problem Statement

The crowding-out hypothesis stated that debt-financed government expenditure may cause interest rates to increase which leads to an economic crisis (Gumus, 2003). The Keynesian theory argued that an increase in government spending or tax cut has the potential to raise the demand for foreign goods due to a rise in aggregate demand, it consequently causes the trade balance to deteriorate as well as rises interest rate in the economy (Larrain & Sachs, 1993).

The conclusion drawn from the empirical literature reviewed in the current study reveals that, so far many empirical studies have been carried out in endeavors to establish the effects of fiscal policy particularly the effect of government spending on various macroeconomic variables in small open economies, big open economies, developing and

developed economies. Among the empirical studies reviewed only three studies that practically investigated the influence of government expenditure on the trade balance and interest rates in Namibia. Fleermuys (2005) studied the determinants of the overall balance of payments using the monetary approach to the balance of payments in Namibia. While Eita and Gaomab II (2012) examined the effect of macroeconomic variables on the balance of payments in Namibia. Whereas Naimhwaka, Eita, and Manuel (2018) investigated the determinants and sustainability of Namibia's current account balance. Yet, none of these studies had fully examined the effects of government spending on interest rates and trade balance in Namibia. Also, the existing findings established from several studies differ. This implies that the direction of causality on the relationship among government expenditure and interest rates as well as the trade balance remain unidentified in Namibia. In light of the above, the current study investigates the impact of government spending on both interest rates and trade balance in Namibia.

1.4 Research Objectives

1.4.1 Main objective

To examine the effects of government expenditure on the interest rate and trade balance in Namibia.

1.4.2 Specific objectives

(i) To investigate the relationship between government expenditure and interest rate by clearly stating how that is associated with the crowding-out effect, especially in the case of increased government spending, and how that is a hindrance towards achieving economic stability in Namibia.

(ii) To examine the causal relationship between government expenditure and trade balance in Namibia, by clearly stating out how increased government consumption through increased imports over exports is associated to trade deficit and how the same hinders economic development, as well as how the Namibian economy can circumventing from a continuous twin- deficits and their effects.

1.5 Research Hypotheses

a) Ho: There is no cointegration between government expenditure and interest rate as well as the trade balance in Namibia.

b) Ho: There is no Granger causality between government expenditure and interest rate as well as the trade balance in Namibia.

1.6 The significance of the Study

Generally, the three variables under investigation (government expenditure, interest rates, and net exports (the trade balance) are interrelated for Namibia. Thus it is worth discovering their causality among each other. Also, government spending is the catalyst for providing public services such as health, security, and education it is also crucial for overcoming the unforeseen macroeconomic challenges such as natural disasters facing the country. On the other hand, the interest rate is the main tool for monetary policy used by the central bank of Namibia to influence the economic activities and the trade balance in Namibia. Hence, the results from this study will contribute effectively and significantly to Namibia's fiscal, monetary, trade, and industrial policy frameworks. The study findings will be a guiding tool and durable support to policymakers, investors, and individuals particularly to the fiscal policy and monetary policy authority on implementing informed policy actions concerning government spending, interest rates, and trade balance in

Namibia. Further, the empirical findings established from the current research serve to contribute to the existing empirical studies done as well as to the knowledge addition regarding the influences of fiscal policy on various policy frameworks such as fiscal policy, monetary policy as well as trade & development policies in Namibia. Furthermore, the outcome of this analysis will help to provide significant knowledge in the endeavors to maintain a sustainable government expenditure and improvement of Namibia's trade balance yet, keeping monetary policy tools effective for ensuring stable prices that promote adequate consumption, savings, and domestic investment as well as foreign investment to stimulate Namibia's economic growth and economic development.

1.7 Limitation of the Study

This study is limited in the sense that the time frame upon which the data is used solely runs from the period 1980 to 2018. The limited number of observations is mainly because before Namibia gaining its independence in 1990, there were no suitable available data. It is also worth mentioning that, the study used the lending interest rate data for South Africa from 1980 to 1990 because Namibia was part of South Africa's administration before Namibia attained her political independence in 1990.

Whereas, the measure of the trade balance is a limitation by itself as it is not available at disposal it is derived from the country's exports and imports data. Therefore, the difference between Namibia's exports and imports generates the country's trade balance. Thus, the measures of trade balance (net exports) are rough estimates at best. The lack of consensus in the way the term trade balance is defined makes it difficult to have a clear cut between the current account and trade balance. The researcher is however conscious of the fact that the estimations may be undermined due to these shortfalls. Nonetheless,

this setback is taken care of by converting the level data into growth rates and selecting the best regression estimation possible and as well as by running an appropriate methodological approach.

1.8 Delimitation of the Study

The study only examined the short-run and long-run relationship as well as the causality relationship between government spending, interest rate as well as trade balance for Namibia with an annual sample data covering the period from 1980 to 2018. Also, the analysis used the annual lending interest rate (prime rate) data as a representation of the interest rate variable. While the trade balance (net exports) data is derived through the annual total difference on the total value of exported goods and services minus the total value of imported goods and services as formulated by (Sachs & Larrain, 1993) for Namibia from 1980 to 2018. Whereas the government expenditure variable used the annual total government expenditure sample data as a proxy in the analysis. Moreover, the effect on private consumption and investment is captured by interest rate findings, for the reason that generally there is an inverse relationship between interest rates and private consumption as well as private investment.

Chapter 2

Literature Review

2.1 Introduction

The current chapter is comprised of two sections focusing on swotting both theoretical and empirical literature regarding the effect of government spending on interest rates as well as the trade balance. The first segment discussed several theoretical kinds of literature about the impact of government spending on both interest rates and trade balance such as the Keynesian and classical approaches of fiscal policy, the crowding-out hypothesis, twin deficit, the optimal government spending, and the Ricardian view of government spending as well as the New Keynesian & the Neo-classical theory of fiscal policy on interest rates and trade balance. The second section reviewed several empirical studies regarding the impact of fiscal policy or government spending on both interest rates and trade balance in both developed countries and developing countries including Namibia.

2.2 Theoretical Literature Reviews

2.2.1 Keynesian and classical approaches to fiscal policy

Larrain and Sachs (1993) used the Keynesian theory to explain the effects of an expansionary fiscal policy on interest rates and trade balance. Keynes (1936) as cited by Larrain and Sachs (1993) argued that an increase in government spending has the potential to raise aggregate demand in the economy. As a result, a rise in aggregate demand tends to increase the demand for foreign goods. Because of the above explained, the trade balance deteriorates due to an increase in demand for foreign goods. Over time the trade deficit necessitates the central bank's intervention to reduce money supply in the economy to improve the trade balance. Consequently, the intervention of the central bank increases

interest rates. Hence, an increase in government spending has the potential to crowd out private spending partially during the short run. However, over time the crowding out is distributed amongst reduced private consumption and reduced investment due to a rise in interest rates. Afterward, the aggregate demand returns to the equilibrium level, conversely, interest rates rise sharply in the long run as a result of the expansionary fiscal policy. The effect of expansionary fiscal policy over the long-run the crowding out is total since the increase in interest rate fully crowds out private consumption and investment (Larrain & Sachs, 1993).

Contrary, the classical macroeconomic model of Sargent (1979) has established the core alternative to the Keynesian model. The study by Palley (2012) discussed the key features of the classical model by reasoning that, aggregate output is equivalent to full employment output. The fiscal policy can affect aggregate demand (AD) however, aggregate demand cannot affect aggregate output. Therefore, any effects of fiscal policy are limited to drive on the price level (P) and interest rate (i). The classical model includes an aggregate production function ($y = f(n)$) and labor market with supply (L^s) and demand schedules. The demand schedule is the Marginal Product of Labor (MPL). The output is fixed at the full employment level, rendering the aggregate supply (AS) function vertical. The price level and interest rate adjust to ensure AD equals full-employment output (y^*). The level of labor exchange and production determines output and price in the classical model which involves determining nominal prices and interest rates consistent with the production and exchange decision. Hence, bond-financed tax cuts shift the IS schedule left and the AD schedule right then the price level and interest rate increase. Consequently, the nominal wage rises to leave the real wage unchanged, thus output is also unchanged. With output

fixed and unresponsive to changes in AD, expansionary fiscal policy has no impact on output and just drives up the price level and interest rate. However, since government expenditure will increase, private sector absorption (consumption and investment) will decrease so that fiscal policy changes the composition of output. This is the logic of the infamous treasury view of the 1930s rejecting expansionary fiscal policy – but that logic is conditional on the economy is at full employment output (Palley, 2012).

2.2.2 New Keynesian and New Classical approaches to fiscal policy

The new classical economists argued that expansionary fiscal policy is ineffective. After all, prices and wages adjust speedily to eliminate excess demand because prices will rise until the new equilibrium where the quantity supplied is equal to the quantity demanded. Also, the new classical economists believe that fiscal policy is ineffectual since people are rational and forward-looking, and they tend to be concerned about the government budget. People are aware that, after an increase in government spending eventually leads to an increase in taxes in the future, hence individuals prepare to pay high taxes by reducing their current spending accordingly. Due to the reduction in consumer spending, the aggregate demand never changes since an increase in government expenditure will eventually require the government to raise more taxes to pay off public debts. The rise in taxes becomes an additional tax burden on individuals, as a result, households tend to save extra to be ready for paying the future tax when the government raises the tax in the future. This means every dollar that the government spends requires consumers to reduce their spending by more than a dollar for saving to pay the taxes when they come due (hyper-rational view of the way people think about the future). The new classical economists conclude that an increase in government spending does not crowd out interest rates and

investment, people simply increase their savings to match the increase in government spending. Therefore, new classical economists believe that when people are rational and forward-looking then wages and prices can adjust freely to clear markets. Fiscal policy will not have any effect on both the short-run and long-run and the economy will always be at full employment, (Tomlinson, n.d).

Contrary, the New-Keynesian economists argued that an increase in government spending is a primary source of business-cycle instability which is the most important cause of recessions in the long run. The New-Keynesians reasoned that wages are sticky for several reasons. Firstly, due to that, the labor contracts are negotiated by labor unions where the wages have to stay constant over some time. Secondly, wages are sticky due to efficiency wage arguments because firms keep their wages fixed as they fear losing their productive workers. Besides, firms pay their workers better wages to afford good living standards since healthy and motivated workers tend to be productive workers. Therefore, wages are fixed due to a driven demand in the labor market, because wages do not change to clear the labor market as other prices in the goods market. An increase in aggregate demand due to an increase in government spending may cause a movement along the short-run aggregate supply curve but, it will not shift upwards until something else changes. It may not shift upward at all if the efficiency wage considerations are binding and if labor unions have set the wage constant in the short run, it may take a while before the adjustment process starts. Thus the New-Keynesians stated that an increase in aggregate demand subsequently may increases aggregate output when wages can adjust and that might take a long time or it may not ever occur if efficiency wage considerations are enforced (Tomlinson, n.d). Moreover, It is argued that debt-financed (deficit) government

expenditure leads to an increase in the long term interest rate which negatively influences investment by the public sector, this subsequently causes a decline in economic growth due to reduced availability of funds for investment in the private sector due to excessive government borrowing (Hassan & Nassar, 2015).

2.2.3 Government budget constraint

Romer (2008) discussed government budget constraint that, the present value of government expenditure must be less or equal to initial wealth plus the present value of government tax receipts (net of transfer payments). The government constraint is expressed as $T(\tau) = G(\tau)$. Where $T(\tau)$ signifies tax revenues at time τ, while $G(\tau)$ denotes the government expenditure, and $D(0)$ represents the government's initial real debt outstanding. Let $R(\tau)$ denote $\int_{T=0}^{\tau} r(\tau)\, d\tau$ where $r(\tau)$ is the real interest rate at time τ. Thus, the value of a unit of output at time τ discounted back to time 0 is $e^{-R(\tau)}$. With this notation, the government budget constraint is written as:

$$\int_{\tau=0}^{\infty} e^{-R(\tau)}\, G(\tau) d\tau \leq D(0) + \int_{\tau=0}^{\infty} e^{-R(\tau)}\, T(\tau) d\tau \qquad (2.1)$$

The government budget constraint could be permanently in debt or may increase continuously the amounts of public debts. Thus, the budget constraint that restricts the government is that the limit of the present value of government debt cannot be positive.

$$\lim_{s\to\infty} e^{-R(s)}\, D(s) \leq 0 \qquad (2.2)$$

The constraint (2.1) implies that even when the government never pays off its debt it can still satisfy the budget constraint. The discounted total government expenditure must be less than the discounted tax received adjusted for the present value of the debt. As long as the growth of the debt is less than the growth of taxation it is possible to contain the

government expenditure within the constraint. The growth of the debt must be less than that of the tax and interest otherwise it will not be sustainable.

However, the interest paid amount forms part of government expenditure on government debt. Expenditure should include only the real interest paid on the debt (rD), not the nominal interest paid (iD). Since the difference between the nominal interest rates (i) and the real interest rate (r) is the inflation rate (π), the budget deficit is overstated by πD. Hence, the government spending by borrowing does not account for inflation. As a result, the nominal debts rise at the rate of inflation (Mankiw, 2009).

2.2.4 The twin deficit hypothesis and Ricardian views of debt-financed government expenditure

Merza, Alawin, and Bashayreh (2012) explained the two main approaches of the Ricardian Equivalence and the Keynesian on the relationship between the current account and budget deficit:

The Ricardian view of government debt disputed the argument that a debt-financed tax cut government spending does not stimulate consumer consumption because it does not improve consumer welfare, but it only postpones taxes from present to future (Ricardo, 1987 and Mankiw, 2009). Henceforth, the Ricardian Equivalence denies any relationship between the budget deficit and the current account deficit. Hence national savings will not be affected. Since, the government budget deficit does not affect the current account deficit (Thomas & Abderrezak, 1988).

In contrast to the Ricardian approach, the Keynesian Proposition confirms the existence of a positive relationship between budget deficit and current account deficit. Particularly, the twin deficits hypothesis states that a budget deficit leads to a current account deficit.

Contrarily, a budget surplus will improve the current account deficit, while a budget deficit makes the government a net borrower (Alkswani, 2000) as cited by (Merza, Alawin & Bashayreh, 2012).

The economic thoughts regarding the connection between government budget deficit and current account balance may be traced from the national income identity as follows:

$$Y = C + I + G + (X - M) \quad (2.4)$$

Where Y is national income, C is private consumption, I is real investment spending in the economy such as spending on building, plant, and equipment, G is government expenditure on final goods and services, X is exports of goods and services, and M is imports of goods and services.

The current account (CA) is defined as $CA = (X - M) + F$ (2.5)

Where F stands for net income and transfer flows. Hence, in addition to the goods and services balance, the current account also includes the net income received from or paid abroad. For simplicity, it is assumed that net income from abroad is not a large component of the current account. Although it is worth mentioning that if the country has big foreign debt and high debt servicing payments, its income paid abroad should be a large negative item. The current account shows the size and direction of international borrowing.

When a country imports more than it exports, then it will have a trade deficit in the Current Account (CA), which is financed by borrowing from foreigners. Such borrowing may be done by the government or by the private sector. Therefore, a country with a current account deficit must be increasing its net foreign debt (or running down its net foreign wealth) by the amount of the deficit. A country with a trade deficit reflects that the country

is importing both the consumption and investment, thus it is likely to experience an economic crisis in the long run (Mukhtar, Zakaria & Ahmad, 2007).

2.2.5 The crowding-out hypothesis

The crowding-out hypothesis assumes that when the government borrows to finance the deficit of the government expenditure it leads to crowding out. The debt-financed government expenditure may cause interest rates to increase. Consequently, an increase in interest rates may reduce private investment. Therefore, the reduction in private investment is called partial crowding due to government deficit financing. It is partly because the amount of crowding out of a private investment is less than the amount of government debt issue ($-\Delta I < \Delta D$) because a rise in interest rate (rate of return on saving) increases saving hence, the increased portion of saving offsets corresponding amount of private investment reduction. Since saving is not a function of interest rate, the change in interest rate does not change saving, thus this leads to a complete crowding out effect (Gumus, 2003).

2.2.6 The optimal government expenditure

Wickens (2008) assumed that optimal government expenditure is equal to tax revenues ($g_t = T_t$). It is the optimal level that maximizes household utility as well as satisfies the budget constraint by only using the lump-sum taxes. Therefore, government debt is equal to zero.

2.2.7 The Neo-Classical Model of Fiscal Policy (The dynamic effects of government spending)

Barry and Devereux (1992) discussed the dynamic effects of government spending in the steady-state economy. The effective consumption level in the steady-state is formulated in the equation below:

$$C^* = f(K^*) - \delta K^* - (1-\alpha)g^* \quad (2.6)$$

Where C* represents consumption in the steady-state. f(K*) indicates the level of capital stock in the steady-state. δK^* denotes the depreciation of capital stock in the steady-state, and $(1-\alpha)g^*$ shows the change in government spending in the steady-state.

When the two countries can be compared identically in every way except for differences in the permanent level of government spending. Then the effective level of consumption in the steady-state must differ by the fraction $(1-\alpha)$ times the difference in permanent government spending. Thus, the effects of permanent increases in government spending may cause a decline in private consumption over the long run. This means that starting at the time (t) a (previously unanticipated) permanent fall in government spending of magnitude Δg took place. Then there would be an immediate rise in effective consumption equal to $(1-\alpha)\Delta g$, which does not affect interest rates or investment at all.

Hence, the unanticipated permanent change in government spending does not cause any dynamic effects on the economy. Because interest rates are determined by the marginal rate of substitution condition, by the growth rate of consumption. However, if the change in government spending is unexpected and permanent, it may cause a rise in permanent income. As a result, households can increase consumption in all periods by the same amount of a decline in government spending. Consequently, there will be no change in

the growth rate of consumption, and also there will be no change in interest rates. However, a temporary decline in government spending can cause an effect on interest rates.

The model further assumed that, since the capital is fixed, hence, the aggregate output is also constant. Nevertheless, the interest rate is determined by the intertemporal marginal rate of substitution with a constant aggregate consumption up to a given level of government spending (Barry & Devereux, 1992).

2.2.8 Wagner's Law

Wagner's classical theory developed in (1883) argued that, due to social, administrative, and welfare issues which increases in need and complexity as an economy develops. As a result, the growth in public expenditure is inescapable for an advancing economy. Because it is directly linked to economic growth, hence, the direction of causation is from GNP to the share of government expenditure (Kumar, Webber & Fargher, n.d). Also, Wagner's (1883) Law predicts that government expenditure can increase at a faster rate than the growth of GNP. Moreover, Wagner, (1890) suggested that government expenditure is an endogenous factor or an outcome, not a cause of economic development. Therefore, as the economy develops, the share of GNP is devoted to government expenditure which tends to increase over time (Shafuda, 2015).

2.3 Empirical Literature Reviews

2.3.1 Empirical literature reviews on the impact of government spending on interest rates

Manny (2015) explored how fiscal policy shocks can change critical macroeconomic variables for Greece using the VAR method. The investigation illustrated how a shock in government spending has the desired Neo-Keynesian effects, but only in the short term. The analysis discovers that an unexpected increase in tax revenue has the most profound long-term effect in decreasing the country's unemployment rate while giving a long-term, permanent push on exports. The analysis concluded that increasing efficiency in tax collection and not necessarily tax rates can be a major catalyst for Greece, a country with chronic tax evasion and tax avoidance issues. The study concluded that the effects of government spending on both interest rates and trade balance can be well explained by how government expenditure is financed. The study recommended closer measures should be put in place to make sure that the government expenditure does not exceed the revenue from taxation and borrowed funds, which otherwise leads to a trade balance deficit or increment in the interest rate and therefore crowding out the effect on private consumption and investment.

Hassan and Nassar (2015) conducted a time series analysis using data on government spending, debt, and long-term interest rate to determine whether government spending or the public debt has any significant effect on interest rate in the US, England, France, Germany, and Japan. In the time series model, a 10-year bond rate (a commonly used measure of the long-term interest rate) was the dependent variable and unemployment rate, inflation rate, GDP, and (deficit, percent deficit, debt, or percent debt) as the

independent variables. The unemployment rate, inflation, and GDP were used as control variables for deficit spending and debt. On the other hand, the unemployment rate and inflation rate were the control variables when the percent deficit or percent debt of the GDP was used in the model. The results reported that there is no effect of deficit spending, percent deficit, debt, or percent debt on interest rate in the long run among the five countries under study. The study findings have supported the argument that government borrowing has no crowding effect in the sense that it does not lead to reduced availability of funds for lending and its consequence of higher long-term interest rates. This empirical study has shown analysis that is different from all the literature reviewed as per the relationship between government spending and interest rate and trade balance respectively, which necessitate the specific objectives of this study.

The paper by Unal (2011) characterizes the dynamic effects of net tax and government spending shocks on prices, interest rate, GDP, and its private components in four Organisation for Economic Co-operation and Development (OECD) countries using a structural VAR approach. The study reported that private investment is crowded out both by taxation and government spending in the United Kingdom (UK) and the United States of America (USA) as consistent with the neo-classical model. The results for France and partially for Canada indicated that there are opposite effects of tax and spending increases on private investment in line with Keynesian theory. Moreover, the study reveals that private consumption is crowded in by government spending for all countries except the UK. However, private consumption was found crowded out by taxation in all countries except France. The first result of the study agreed with the Keynesian model, while the latter results of the study were in line with the neo-classical theory of fiscal policy. As

consumers are forward-looking as per the New Keynesian and Classical Economists, a current cut in government expenditure with a simultaneous cut in taxation does not necessarily yield an alternative improvement in welfare as funds must be saved to compensate the future increment on taxation and government expenditure. Increased government expenditure, though it solves up macroeconomic instability, it causes a crowding-out effect on both private consumption and investment as per the above detail.

Lastly, Barro (1987) studied the temporary changes in government spending with the British data from the early 1700s through World War I. The study revealed a temporary increase, which appeared mainly as wartime spending, raised long-term interest rates, but significantly increased the growth rates of money and prices only during suspensions of the gold standard (1797-1821 and 1914-1918). Also, the study discovered that the temporary changes in military spending bulk of budget deficits; over a sample of more than 200 years. Moreover, the study found only two major non-war deficits associated with compensation payments to slave-owners in 1835-36 and the other with a dispute over the income tax in 1909-10. The study showed that interest rates did not react much to the exogenous deficits.

2.3.2 Empirical literature reviews on the impact of government spending on trade balance (net exports)

Shen, Yang, and Zanna (2014) empirically analyzed the effects of government spending in low-income countries with a dynamic stochastic general equilibrium model. The study found that limited capital mobility in the private sector determines the government financing sources between domestic or external influence the spending effects. Moreover, the study established that external financing through borrowing or aid relieves causes the

crowding-out effect in private consumption and investment, but the traded output can respond quite negatively due to a much-appreciated real exchange rate. Furthermore, the study reported that in a country with limited capital mobility, the existence of the twin-deficit hypothesis depends on the extent to which fiscal deficits are financed externally. The investigation concluded that capital scarcity in low-income countries implies a high rate of return to public capital, but the low investment efficiency can substantially decrease the public investment multipliers. This study brings us to the conclusion that nations with limited private capital mobility force governments to borrow funds outside their border to finance public expenditure, which normally comes with increased interest rates, this is one of the contributing factors to the increased government deficit.

Furthermore, Beetsma, Giuliodori, and Klaassen (2007) investigated the consequences of an increase in government spending on trade balances and budget deficits in the European Union, using a panel VAR approach. The study used annual data of 14 European Union countries over the period 1970 to 2004. According to the baseline estimate, a one-percent of GDP increase in government spending produces a 1.2% impact, respectively 1.6% peak rise in GDP. Rising imports and falling exports are responsible for a fall in the trade balance by 0.5% of GDP on impact and a maximum fall of 0.8% of GDP. Besides, the spending increase produces a 0.7% of GDP impact (and peak) budget deficit, thereby pointing to the potential relevance of the twin deficits hypothesis.

Muller (2004) investigated the dynamic effects of government spending on foreign trade with a Structural Vector Autoregression framework using the USA's time series data for the post-Bretton-Wood period. The study found that the nominal exchange rate depreciates, the terms of trade appreciate, and the trade balance increase significantly after

a temporary increase in government spending. Moreover, the study applied a New-Keynesian general equilibrium model to rationalize these effects. The results revealed that the low elasticity of substitution between home and foreign goods is necessary for the trade balance to improve after an increase in public spending. Also, an accommodating monetary policy is found to diminish the effects of public spending on foreign trade.

Apart from the studies done by Barro (1987), Pashourtidou, Savva, and Syrichas (2014) originated that, interest rates do not react much due to the exogenous deficits or the fiscal consolidation such as government expenditure reduction or an increase in government revenue can cause a rise in interest rates. But, a large contraction in output is driven by negative responses of investment, private consumption, and employment. Also, the study findings of Hassan and Nassar (2015) supported the argument that government borrowing has no crowding effect because it does not reduce the availability of funds for lending it also does not increase interest rates in the long run.

On the other hand, the findings of reviewed empirical studies established similar results that, a rise in government spending may worsen the trade balance. Among the reviewed studies in this regard includes the investigation of the USA done by Muller (2004), the empirical analysis for the European Union (EU) countries led by Beetsma, Giuliodori, and Klaassen (2007). Another research done for small open economies was conducted by Clancy, Jacquinot, and Lozej (2014), as well as the study for low-income countries, which was carried out by Shen, Yang, and Zanna (2014). Furthermore, Naimhwaka, Eita, and Manuel (2018) conducted a study in this respect concerning Namibia. The results of all these reviewed studies agreed with the Keynesian views regarding the impact of government spending on trade balance as described by (Larrain & Sachs, 1993).

The empirical literature review revealed the gap that, there are few empirical kinds of research carried out so far to examine how government spending affects interest rates and trade balance of which Namibia is not exempted. Among the studies reviewed, none has investigated how government spending affects both interest rates and trade balance in Namibia, thus the necessity of this study.

2.4 Conclusion

Based on the reviewed empirical studies regarding the effect of government spending on interest rates as well as trade balance indicated that government spending may influence interest rates and trade balance differently through various channels in different economies. Moreover, the causality relationship can run from both sides in different periods as well as in different countries. Thus, it implies that the existing empirical studies cannot adequately give a clear indication of the relationship between government spending and interest rates as well as the trade balance in Namibia, also none of the empirical studies was focused on the Namibian economy. Due to the disagreements and uncorrelated results of the reviewed empirical studies regarding the influence of government spending on interest rates and trade balance, it is not clear whether the fiscal policies adopted by the Namibian government may are not effective to achieve the intended objectives of placing Namibia's fiscal policy in a sustainable and economic growth path. Due to the unknown effect of fiscal policy on the trade balance and interest rates in Namibia, the government plans to use fiscal consolidation as a tool to achieve various objectives that may be a mere gamble, which may yield adverse outcomes. Therefore, the current study aims to establish the effects of government expenditure on both interest rate, and trade balance specifically in Namibia, by examining the relationship

and causality among the variables under study to cover the existing fundamental knowledge gap.

Chapter 3

Research Methodology

3.1 Introduction

The current chapter is made up of three parts. An initial section defines the research design and procedures that describe the specifications on the nature of the research, the data sources, and sample data used in the research. While the second section outlines the data analysis process such as model specification, the methods of estimation. Lastly, the third section explains the research ethics applied in the study.

3.2 Research Design and Procedure

The study applied the quantitative approach using the time series data with an econometric methodology adopting the Vector Error Correction Model (VECM) using Eviews7 for model estimations and diagnostic tests to analyze the effect of government expenditure on interest rates and trade balance in Namibia.

3.2.1 Description of the used Sample Data

The study used the annual time series sample data for the period from 1980 to 2018 on Namibia's total government expenditure, lending interest rates, and trade balance (net exports). The analysis used the annual prime lending interest rate data as a representation of the interest rate variable. The trade balance (net exports) variable sample data s derived by a difference in the annual value of exported goods and services minus the total values of imported goods and services by the Namibian economy. While the government expenditure variable used the annual total government expenditure sample data as a proxy in the analysis.

The trade balance data is derived through the annual total difference on the total value of exported goods and services minus the total value of imported goods and services for Namibia from 1980 to 2018. The data of the variables used in the study were all sourced from the World Bank (WB). Since Namibia's monetary conditions and interest rate adjustments are anchored to that of South Africa. Correspondingly, before independence, Namibia was part of South Africa, according to (African Economic Outlook, 2002). Therefore, the lending interest rates data from 1980 to 1990 used in the study were obtained from the lending interest rates data of South Africa.

The sample data used for the present study covers the period from 1980 to 2018 hence, it would adequately allow reflecting the development patterns for all the three variables under investigation (government spending, interest rates as well as trade balance) through different political environments both before and after Namibia's independence. Moreover, the sample data of such a sample period could make it possible to reflect on the influence of an individual's political leadership on government spending in Namibia. For the reason that, after independence so far the country is governed by three presidents through a democratic election succession process of which the first presidency started with Dr. Sam Shafiishuna Nujoma from 1990 to 2005 followed by his successor Dr. Lukas Hifikepunye Pohamba from 2005 to 2015 then he was succeeded by the current president His Excellency Dr. Godfrey Hage Geingob who also completed his first five years' term as from 2015 to 2019 and he is re-elected for the second five years' term as a president of the Republic of Namibia until 2025.

3.3 Data Analysis

This section confers the estimation techniques and model specifications adopted by the current research.

3.2.1 Economic framework and model specification.

The study used the annual time series sample data for the period from 1980 to 2018 on Namibia's total government expenditure, lending interest rates, and trade balance (net exports). The analysis used the annual prime lending interest rate data as a representation of the interest rate variable. While the government expenditure variable used the annual total government expenditure sample data as a proxy in the analysis. government spending in the current study.

A government outlay associated with a budget deficit is defined by the rate of change on the stock of public debt. The rate of change in the stock of real public debt equals the difference between government expenditure and tax revenues, plus the real interest on government debts is expressed as:

$$\dot{D}(\tau) = [G(\tau) - T(\tau)] + r(\tau)\, D(\tau) \qquad (3.1)$$

Where $r(\tau)$ represents the real interest rate at time τ. The term in brackets on the right-hand side of the equation is referred to as the primary deficit. It is considered primary rather than a total deficit because it is regarded as a better way of measuring how fiscal policy at a given time contributes to the government budget constraint (Romer, 2008).

The methodology adopted by the current analysis to derive the sample annual data for trade balance (net exports) variable used in the study as described by Sachs and Larrain (1993) that, the country's trade balance is measured as the value of exports minus the

value of imports. Because exports are equal to total output minus the portion of it that is consumed domestically. Thus, the trade balance can be expressed as:

$$TB = X - IM = Q - A_d - IM = Q - A \quad (3.2)$$

The equation above implies that trade balance equals total domestic output minus total domestic absorption (Sachs & Larrain, 1993). The total domestic absorption is expressed with the following equation:

$$A = A_d + IM \quad (3.3)$$

Where A signifies the total domestic absorption (consumption) which is comprised up of domestic goods and services which is represented by A_d as well as the absorption of imported goods and services denoted as IM.

A country may absorb more or less than it produces, this is made possible by importing goods or services the country is consuming from the rest of the world while the country can also export goods and services which it has produced to the rest of the world (Sachs & Larrain, 1993).

The current analysis used the annual lending interest rate (prime rate) which is also known as the effective yearly rate of interest (R) is the rate of interest when the interest is added over n times during the year at the rate $\frac{r}{n}$ per period expressed as:

$$R = (1+\frac{r}{n})^n - 1 \quad (3.4)$$

Where r is the rate of interest, for a given $r > 0$, it is increasing in n (Sydsaeter, Hammond, Storm & Carvajal, 2016). The interest rate is defined as the terms at which money or goods today can be traded off for money or goods at a future date, it is also described as the price of borrowing money or a return on money saved or invested. It is the interest rate at which commercial banks borrow to the private sector such as individuals or businesses (Sachs &

Larrain, 1993). Generally, commercial banks borrow from the central bank for two main reasons: First to maintain the cash reserves as required by the central banks, the second reason is to obtain funds that commercial banks lend to the private sector (households and firms) (Sachs & Larrain, 1993).

Differently, an interest rate which the central bank borrows to commercial banks is called the discount rate or repo rate, commercial banks borrow from the central bank through the process referred to as the discount window (Sachs & Larrain, 1993).

The repo rate is a significant monetary policy instrument that the central bank usually adjusts by raising or lowering the discount rate to influence the money supply and the amount of credit available in the economy for government, businesses, and individuals to borrow for investment and consumption as well as the amount to be saved. Ceteris Paribus, a higher rate of interest reduces the incentive to borrow and increases the incentive to save in the economy (Mudenda & Sherbourne, 2001).

Furthermore, Sachs & Larrain, (1993) explained that the repo rate is a significant monetary policy instrument that the central bank can adjust by raising or lowering the discount rate to influence the money supply and the amount of credit available in the economy for government, businesses, and individuals to borrow for investment and consumption as well as the amount to be saved. As a result, an increase in discount rate immediately increases the lending interest rates, other things being equal, a higher rate of interest reduces the incentive to borrow and increases the incentive to save in the economy (Mudenda & Sherbourne, 2001).

3.3.2 Estimation Techniques

The estimation procedure commenced with converting the raw data from monetary values into a growth rate format. Subsequently, the data used in the study were tested for unit root (stationarity testing) to identify the properties of time series data and establish the univariate characteristics of data as well as to discover the order of integration. The second step carried out in the study was the estimation of the appropriate lag length selection to be applied in the study. Due to the estimated multivariate model of the study, also cointegration test was conducted to establish the long-run relationship among variables under investigation. The third step estimated the VECM model and afterward, the VECM results produced the Impulse Response Function (IRF), as well as the Granger causality tests. Lastly, the estimation process closed off with the diagnostic tests to identify and ensure the validity and stability of the estimated results.

a) Unit Root Tests

A stationary time series data is defined as one with a constant mean, constant variance, and constant autocovariance for each given lag. The Augmented Dickey-Fuller, Phillips-Perrons, and Kwiatkowski-Phillips-Schmidt-Shin tests were applied for the unit root test to identify the time series property of the data. The testing of stationarity is necessary when dealing with time-series data to mitigate spurious regressions and meaningless results. The use of non-stationary data can lead to spurious regressions if the two stationary variables are generated as independent random series when one of the variables is regressed on the other. Therefore, the t-ratio of the slope coefficient is expected to be significantly different from zero, and the value of R^2 is expected to be very low. This implies that the variables are uncorrelated. However, if two variables are trending over

time, regression of one on the other could have a high R^2 even if the two are unrelated. Hence, if the standard regression techniques are applied to non-stationary data, the result of the regression is characterized as good under standard measures (significant coefficient estimates and a high R^2), but insignificant, such a model would be termed a 'spurious regression'. If the variables employed in a regression model are not stationary, then it can be proved that the standard assumptions for asymptotic analysis will not be valid. In other words, the usual t-ratios will not follow a t-distribution, and the F-statistic will not follow an F-distribution (Brooks, 2008).

Usually, most economic researchers carry out the Augmented Dickey-Fuller (ADF) and the Philips-Perrons (PP) test for a unit root. However, both the ADF and PP tests are known to under-rejecting the null hypothesis of unit roots because it has a lower power. The improvements in unit root tests have led to other additional refined tests, such as the DF-G, Ng Peron, Kwiatkowski-Phillips-Schmidt-Shin (KPSS), and Clemente-Montanes-Reyes (1998), which work best when the sample size is small. Given the limitations, the study has used the ADF, PP, and KPSS test for the robustness reassurance check for unit root, since it is enhanced compared to the Augmented Dickey-Fuller (ADF) and the Philips-Perrons (PP) test. Under ADF and PP tests, the null hypothesis of a unit root is rejected when the computed t-statistics value is greater than the t-critical values. Further, the p-value can also help guide the decision of whether the data is stationary or not. When the p-value is less than 0.05 level of significance implies a rejection of the null hypothesis.

On the other hand, the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test work differently from ADF and PP tests, by rejecting the null hypothesis, the computed t-statistics value

should be smaller than the t-critical value. Also, the KPSS does not provide a p-value. The hypothesis under the KPSS test are as follow:

H_0: Variable is stationary (no unit root)

b) Lag Length Selection

Prior, embarking with both the ARDL and the VECM analysis, it is vital to determine the appropriate optimal lag length of the VECM model. The lag length selection is important for VECM specification because choosing too few lags can result in misspecification, on the other hand, choosing too many lags may result in unnecessary loss of degrees of freedom. Thus, the appropriate lag length should be selected using statistical tests, which include the modified measures (Nkoro & Uko, 2016).

Before estimating the Autoregressive Distributed Lag Model (ARDL) or Bound Testing (ARDL BT) results to conduct the cointegration test. The ARDL approach requires the following pre-conditions to be satisfied, initially, it is necessary to ascertain the optimum numbers of lag by using the various information criteria; such as the Akaike Information Criterion (AIC), Schwarz (Bayesian) Criterion (SC), or Hannan-Quinn Criterion (HQC). The selected optimum lag length should be applied before carrying out the unit root test. This requirement ensured the choice of the best long-run equation model, it is necessary to have a standard error term that is normally distributed (Nkoro & Uko, 2016) as cited by (Undji, 2018).

c) Cointegration Test

A third check carried out for the study is the cointegration testing, to identify the long-run relationship among variables under study. This procedure is necessary to determine whether there is an empirically significant relationship among the examined variables. If

variables have different trend processes, they cannot stay in a fixed long-run relationship with each other. Meaning that there is no valid base for inference based on standard distributions. The concept of cointegration among variables can be defined in simple words as two or more variables are said to be co-integrated if they share a stability trend, in the long run, this means that they have a long-run equilibrium. The cointegration test was introduced as a significant link between the non-stationarity process and the concept of long-run equilibrium (Granger, 1981). Engle and Granger (1987) further formalized this concept by introducing a simple test for the existence of long-run equilibrium relationships as cited by (Undji, 2018). The decision to use Vector Autoregressive or Vector Error Correction Model (VECM) is determined by the following conditions: If the cointegration test discovers the long-run relationship among the variables, then the adjustment of the short-run to the long-run equilibrium is obtained through the vector error correction model (VECM). On the other hand, if the long-run relationship is not found among the variables, thus a VAR model specification should be estimated. Generally, the cointegration test can be applied in several ways, depending on the nature of the equation under test. The current study applied the Autoregressive Distributed Lag Model (ARDL) or bound cointegration technique as discussed below.

d) Autoregressive Distributed Lag Model or Bound cointegration Test (ARDL BT)

The study has adopted the Autoregressive Distributed Lag Model (ARDL) or Bound cointegration technique developed by (Pesaran & Shin, 1999) and (Pesaran, Shin, & Smith, 2001). The ARDL cointegration technique identifies the long-run relationship between the variables under study.

The ARDL bounds testing cointegration technique is an advanced approach used to establish whether there exists a long-run relationship amongst the variables. Harris and Sollis (2003) as cited by Belloumi, (n.d) discussed the three advantages of ARDL cointegration techniques compared to other cointegration techniques. Firstly, the ARDL does not require all the variables under study to be integrated of the same order and it can be applied when the underlying variables are integrated of order one, order zero, or marginally integrated. The second benefit is that the ARDL cointegration test is relatively more efficient in the case of small and finite sample data sizes. The third advantage is that by applying the ARDL cointegration technique the estimation obtains an unbiased estimate of the long-run model.

An ARDL model is formed up of short-run and long-run lagged independent variables including the lagged dependent variables.

The ARDL Bound Testing cointegration technique is specified as follows:

$$\Delta LiR_t = \delta_0 + \sum_{i=1}^{n} \mu_{1i}\, \Delta LiR_{t-1} + \sum_{i=1}^{n} \mu_{2i}\, \Delta NX_{t-1} + \sum_{i=1}^{n} \mu_{3i} \Delta GE_{t-1} + \gamma_1 LiR_{t-1} + \gamma_2 NX_{t-1} + \gamma_3 GE_{t-1} + v_t \quad (3.5)$$

$$\Delta NX_t = \delta_0 + \sum_{i=1}^{n} \mu_{1i}\, \Delta LiR_{t-1} + \sum_{i=1}^{n} \mu_{2i}\, \Delta NX_{t-1} + \sum_{i=1}^{n} \mu_{3i} \Delta GE_{t-1} + \gamma_1 LiR_{t-1} + \gamma_2 NX_{t-1} + \gamma_3 GE_{t-1} + v_t \quad (3.6)$$

Equations 3.1 and 3.2 above represent the ARDL model for Namibia's lending interest rates as well as the trade balance (net exports) respectively. As depicted in equation 3.1 and 3.2, the δ_0 represents the intercepts coefficients, the μ_i indicates the short-run parameters, while γ_i represents the long-run coefficients, whereas Δ indicates the differenced(stationary) variables. Also, the GE symbolizes the government expenditure

variable, on the other hand, the LiR denotes the lending interest rate variable and the NX signifies the trade balance (net exports variable).

The long-run coefficients (γi) in both equations 3.1 and 3.2 were used to test for cointegration among the variables under study.

The null hypothesis of no cointegration among the variables under study by using the long-run coefficients of the ARDL Bound cointegration test is formulated as follows:

H_0: $\gamma_1 = \gamma_2 = \gamma_3 = 0$

The technique used the Wald or F-statistics to test for the joint significance of long-run coefficients (γ_1, γ_2 and γ_3). However, before applying the ARDL bound testing cointegration the initial pre-conditions by finding the optimum numbers of lag should be determined by various information criteria, such as the Akaike Information Criterion (AIC), Schwarz (Bayesian) Criterion (SC), or Hannan-Quinn Criterion (HQC). This requirement ensured the choice of the best long-run equation model and it was necessary to have a standard error term, which is normally distributed, without any econometric problems such as serial correlation, homoscedastic (Nkoro & Uko, 2016). The decision rule of the ARDL cointegration approach assessment compares the F-statistic with Pesaran and Nayaran's upper bounds as well as the lower bounds. If the calculated F-statistic lies above the upper level of the bound, the null hypothesis is rejected, supporting the cointegration relationship in the long run. If the calculated F-statistic lies below the lower level of the bound, the null hypothesis cannot be rejected, indicating the lack of cointegration. If the calculated F-statistic falls between the bounds, the test becomes

inconclusive and, in this case, the error-correction term in the ARDL model is used to determine the existence of cointegration, (Erdem, Şentürk & Şimşek, 2011).

If the null hypothesis is not rejected it means that there is no cointegration, alternatively, if the null hypothesis is rejected, it indicates that the variables in the equation are cointegrated.

Furthermore, the study used the ARDL methodology to estimate the long-run results. Utkulu (n.d) supported Saikkonen (1991) that, ARDL model is an asymptotically efficient estimator and straightforward to compute using the OLS without any initial estimation. The proposed methodology for estimating long-run models use the following simplified version structure of the Saikkonen (1991) method:

$$C_t = \beta_0 + \beta_1 Y_t + \beta_2 \Delta Y_{t-1} + \beta_3 \Delta Y_{t+1} + e_t \quad (3.7)$$

Where C_t indicates the dependent variable of the long-run regression, β_0 signifies the intercept coefficients, while $\beta_1 Y_t$ denotes the parameters and time series independent nonstationary variables in the model. Whereas $\beta_2 \Delta Y_{t-1}$ signifies the parameters and the independent stationary variables in the past period. However, $\beta_3 \Delta Y_{t+1}$ represents the parameters and expected independent stationary variables in the next period.

A time-domain correction is reached by adding ΔY_{t-1} and ΔY_{t+1} to the classical Engle-Granger type static long-run regression ($C_t = \beta Y_t + u_t$) where Δ is the first-difference operator. The differenced variables are necessary to remove the asymptotic inefficiency of the OLS estimator by using all the stationary data in the system to explain the short-run dynamics of the cointegration regression. Hence,

stationary variables reduce the relevant error covariance matrix of the cointegration regression and thereby improving the asymptotic efficiency (Saikkonen, 1991).

e) Specification of the Vector Error Correction Model

Since the cointegration results revealed a long-run relationship among the variables under review, a vector error correction methodology (VECM) was adopted to analyze the research objectives by estimating and generating the regression results and all the investigations required for the study. The VECM model is regarded as a reliable procedure for examining the effects among variables understudy for three main motives. Firstly, it is an effective model for forecasting economic time series. Secondly, it is a useful technique for designing and evaluating economic models. The third advantage of using the VECM model is that it is an effective tool for evaluating the impact of alternative economic policy actions (Sims, 1980a) as alluded by (Chritiano, 2012). It is also a rich dynamic structure and dynamic interactions between variables under study by using the impulse response analysis or forecast error variance decompositions. Moreover, the VECM approach treats all observed variables as prior endogenous which avoid simultaneity problem among variables associated with the simultaneous equations' models (Sims, 1980) as cited in (Mills & Patterson, 2007).

Furthermore, Brooks (2008) outlined the advantages of using a VECM model, it is flexible and easy for application. The model can also be extended to encompass moving average errors, which can be transformed into a multivariate version of an ARMA model, known as a VARMA. Another advantage is that, instead of having only two variables, the system can be expanded to include more variables, of which each variable has an equation. The

additional useful facet of the VECM model is the compactness with which the notation can be expressed.

The vector error correction model is shown by the following system of equations:

$$\Delta y_t = \pi y_{t-k} + \Gamma_1 \Delta y_{t-1} + \Gamma_2 \Delta y_{t-2} + \cdots + \Gamma_{k-1} \Delta y_{t-(k-1)} + u_t \quad (3.8)$$

Where $\pi = (\sum_{i=1}^{k} \beta_i) - I_g$ and $\Gamma_i = (\sum_{j=1}^{i} \beta_j) - I_g$, the VECM contains g variables in I(0) and I(1) on the right side of the equation, and k−1 represents the lags of dependent variables (differences), each with Γ coefficient matrix attached to it. Most of the cointegration techniques can be affected by the lag length employed in the VECM. Hence, it is useful to select the appropriate lag length. It is denoted as a long-run coefficient matrix ($\pi = \alpha\beta'$) the matrix β gives the cointegrating vectors, while α gives the amount of each cointegrating vector entering each equation of the VECM, which is also known as the adjustment parameters. Since in equilibrium, all the Δy_{t-i} will be zero, and setting the error terms, u_t, to their expected value of zero will leave $\pi y_{t-k} = 0$. Hence, it is possible to write out the separate equations for each variable Δy_t. It is also common to 'normalize' on a particular variable so that the coefficient on that variable in the cointegrating vector is one (Brooks, 2008). Moreover, the vector Δy_t contains the differenced endogenous variables, which are government expenditure (GE), interest rate (Lir), and trade balance (TB). The Γs represent the coefficients for intercepts and differenced lagged variables in the equations. Furthermore Δ, y_{t-1}, Δy_{t-2} and Δy_{t-k} symbolizes the column vectors of differenced lagged variables involved in the equations. Lastly u_t represents the column vector of correlated error terms.

The VAR or VECM model was among the methods applied by various reviewed empirical studies such as the study done by Naimhwaka, Eita, and Manuel (2018) to assess the

sustainability of the current account and the main macroeconomic determinants of the current account in Namibia. A similar model was applied by Manny (2015) to explore how fiscal policy shocks can change the key macroeconomic variables for Greece. Morever, Beetsma, Giuliodori, and Klaassen (2007) used the Vector Autoregressive to investigate the effects of an increase in government spending on trade balances and budget deficits in the European Union countries.

f) Impulse Response Function

Impulse response functions are used to examines the relations among variables in a vector autoregressive model. It represents the responses of variables to shocks hitting the system. It is often not clear, however, which shocks are relevant for studying specific economic problems. Therefore structural information has to be used to specify meaningful shocks. Structural vector autoregressive models and the estimation of impulse responses are discussed and extensions to models with cointegrated variables or nonlinear features are considered (Lütkepohl, 2008). In addition, Brooks, (2008) explained that the impulse response function measures the responsiveness of the dependent variables in the VECM to shocks from each of the variables in the model or the response of the endogenous variables to one standard deviation shock or a change to one of the disturbance terms in the system. A shock to a variable is transmitted to all the endogenous variables through the dynamic structure of the VECM. Thus, for each variable from each equation separately, a unit shock is applied to the error, and the effects upon the VECM system over time are noted. The impulse response function can be applied to a system of more than two variables in a system, the impulse responses of all variables in the system can be generated. This is achieved in practice by expressing the VECM model as a Vector

Moving Average (VMA). Provided that the system is stable, the shock may gradually fade away (Brooks, 2008).

Runkle (1987) as cited by Giannini (1992) argued that both impulse responses and variance decompositions are notoriously difficult to interpret accurately. He argues that confidence bands around the impulse responses and variance decompositions should always be constructed. However, he further states that, even then, the confidence intervals are typically so wide that sharp inferences are impossible.

g) VEC Granger Causality

Whenever the long-run relationship was found on the variables under analysis, the Granger causality testing should be optimally constructed from the error correction model (ECM). Since the value of cointegrating ranks (r) is known for the estimated models, usually the first half of the null hypothesis is referred to as short-run non-causality while the second half of the null hypothesis is known as 'long-run non-causality. Therefore, the Granger causality testing in VECM methodology is formulated as follow:

$$Y_t = \alpha_0 + \varphi_1 Y_{t-1} \beta_1 X_{t-1} + \epsilon_t \quad (3.9)$$

This model implies that the value of X for the last period has explanatory power for the current value of Y. The coefficient β_1 is a measure of the influence of X_{t-1} on Y_t . If β_1 = 0, then past values of X do not affect Y and there is no way that X could Granger cause Y. Hence, if β_1 = 0, implies that X does not Granger cause Y.

Toda and Phillips (1993, 1994) as cited by Mills (2003) described the identification of econometric simultaneous equations framework requires a priori partitioning of the variables into endogenous and exogenous categories given that $\boldsymbol{z_t} = (\boldsymbol{p_t'}, \boldsymbol{q_t'}, \boldsymbol{r_t'})'$, where

the dimensions of the three vectors are $n_{1,}n_{2,}, and\ n_3 = n - n_1 - n_2$, while **Φ** and **A** = $\boldsymbol{\beta\alpha'}$ are partitioned conformably. Hence, the null hypothesis that variable **p** does not Granger cause variable **y** can be formulated as follows:

Ho: $\Phi_{1,12} = \cdots = \Phi_{m-1,12} = 0,\ A_{12} = 0$ (3.10)

Where $\Phi_{i,12}$ and A_{12} are appropriate $n_1 \times n_2$ submatrices of Φ_i and A, respectively. Cointegration is found when $A_{12} = \beta_1\alpha_2'$ where β_1 and α_2 are conformable partitions of β and α, standard Wald tests of causality constructed using an unrestricted estimate of **A** are only distributed asymptotically as χ^2 if α_2 is of rank n_2. If this rank condition fails, the limit distribution involves a mixture of a χ^2 and a non-standard distribution that involves nuisance parameters (Sims, Stock & Watson, 1990) as cited by (Mills, 2003).

The standard Wald statistic for testing the null hypothesis may only have an asymptotically valid χ^2 distribution if either the rank of α_2 is n_2.or the rank of β_1 is n_1. The statistic will be asymptotically distributed as $\chi^2_{n_1 n_2\, m}$ (Toda & Phillips, 1993, theorem 3) as illustrated by (Markellos & Mills, 2008).

h) Diagnostic Tests

The study applied different diagnostic tests to confirm the unbiasedness and overall significance of generated results as well as the stability of the estimated models. Hence the study has conducted stability tests such as the Multicollinearity test, Ramsey reset test, serial correlation tests, and Heteroscedasticity test to certify the reliability of the findings established by the study.

3.4 Research Ethics

This study adhered to all ethical conduct of honest reporting. Hence, all the existing sources of information used in the study were acknowledged correctly. Moreover, the right data used were acquired from reliable institutions and were never distorted neither fabricated nor falsified in any manner. Furthermore, the estimation and analysis of results were done appropriately to avoid spurious and biased results.

Chapter 4

Data Analysis, Results Estimation, and Discussion

The current unit focused on the estimation of models and diagnostic tests, interpretation, analysis, and discussion of results as well as the confirmatory assessments carried out in the subsequent order.

4.1 Unit Root Tests

Table 1 below presents the estimated results of the stationarity assessment. It is generally known that economic variables which are non-stationary can generate spurious results if not resolved.

Table 1: Unit Root Tests

Augmented Dickey-Fuller test statistic					
Variables	**Model Specification**	**Levels**	**1st Difference**	**2nd Difference**	**Order of Integration**
Government Expenditure	Intercept	-7.23 **			I(0)
	Trend & Intercept	-7.05 **			
Interest Rates	Intercept	-1.91	-5.23 **		I(1)
	Trend & Intercept	-3.88 ** *	-5.17 **		
Trade Balance	Intercept	-5.93 **			I(0)
	Trend & Intercept	-5.89 **			
Phillips-Perron test statistic					
Variables	**Model Specification**	**Levels**	**1st Difference**	**2nd Difference**	**Order of Integration**
	Intercept	-8.03 **			I(0)

Government	Trend &	-8.00 **			
Expenditure	Intercept				
Interest	Intercept	-1.97	-6.86 **		I(1)
Rates	Trend &	-4.00 ** *	-7.51 **		
	Intercept				
Trade	Intercept	-6.75 **			I(0)
Balance	Trend &	-6.75 **			
	Intercept				

Kwiatkowski-Phillips-Schmidt-Shin

Variables	**Model Specification**	**Levels**	**1st Difference**	**2nd Difference**	**Order of Integration**
Government	Intercept	0.16 **			I(0)
Expenditure	Trend &	0.10 **			
	Intercept				
Interest	Intercept	0.60 ***	0.33 **	0.50 ***	I(1)
Rates	Trend &	0.18 ***	0.16 ***	0.50	
	Intercept				
Trade	Intercept	0.14 **			I(0)
Balance	Trend &	0.10 **			
	Intercept				

Sources: *Author's compilation using Eviews7.*

*Note: *, **, and ***, denotes rejection of a unit root null hypothesis at critical values of 10%, 5%, and 1% respectively for both the ADF test and PP test. In cases, if a variable is stationary in all levels, ** is chosen. However, note: *, **, and ***, denotes accepting of the null hypothesis at critical values of 10%, 5%, and 1% respectively for the KPSS test. In instances whereby, a variable is stationary in all levels, ** is chosen.*

The Augmented Dickey-Fuller test results reflected that government spending and trade balance variables are stationary in levels, at both intercept and trend & intercept at all

levels of significance simultaneously. However, the interest rates variable is stationary in levels but only at trend & intercept at 5 percent and 10 percent levels of significance. It thus becomes stationary after the first difference at both intercept and trend & intercept at all levels of significance. Therefore, the ADF test results imply that the data for government spending and trade balance are integrated of order zero I(0) while the lending interest rates variable is integrated of order one I(1) respectively.

Similarly, the Phillips-Perron unit root methodology established that the government spending and trade balance data are stationary in levels at intercept and trend & intercept at all levels of significance simultaneously. Nonetheless, the interest rates data is stationary in levels only at trend & intercept at 5 percent and 10 percent confidence interval. Then interest rates become stationary after the first difference at both intercept and trend & intercept at all levels of significance. Thus, the Phillips-Perron unit root test results concluded that the data for government spending and trade balance variables under study are integrated of order zero I(0) while the data for interest rates variable is integrated of order one I(1).

Also, the Kwiatkowski-Phillips-Schmidt-Shin stationary test has shown that all variables are stationary in levels. However, only the data for government spending and trade balance variables are stationary in levels at both model specifications as well as at all levels of significance. Differently, the KPSS unit root technique outcomes established that interest rates data is stationary at levels, first difference, and second difference at different levels of significance respectively.

A KPSS test is regarded as a powerful tool for testing unit root, however, the results derived with KPSS were consistent with ADF and PP stationary test results. Hence, univariate time series characteristics of data for the variables under study were determined based on the common results recognized by the three-unit root methods. Therefore, the examination presented that the data for government spending and trade balance are integrated of order zero I(0) while the data for interest rates is integrated of order one I(1).

4.2 Lag Length Selection

Table 2: VAR Lag Order Selection Criteria Test

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-429.12	NA	10628021	24.69	24.83	24.74
1	-397.41	56.17*	2911997.*	23.39*	23.93*	23.58*
2	-389.83	12.12	3201068.	23.48	24.41	23.80
3	-383.60	8.91	3873723.	23.63	24.97	24.09

* indicates lag order selected by the criterion

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

Sources: *Author's compilation using Eviews7.*

The result in Table 4 above indicates that all criteria (LR, FPE, AIC, SC, and HQ) selected a VAR system with a maximum lag of 1. Hence, the study finds it justifiable and robustly safe to use Vector Auto Regression Estimates with 1 lag as the appropriate optimum lag should be applied in all the subsequent estimations as suggested by different conditions in this section.

4.3 Cointegration Tests

The null hypothesis states that there is no long-run relationship (cointegration) among the variables under study. On the other hand, the alternative hypothesis claims that there is a long-run (cointegration) among the variables under study.

4.3.1 ARDL Bound cointegration test

Since the variables under study are integrated of order zero and order one, the ARDL cointegration technique is appropriate to be applied for the long-run relationship assessment.

Table 3: ARDL Bound Cointegration Test

Variables	**F-statistics**		**Decision**	
F[LiR(-1), GE(-1), NX(-1)]		3.55	There is cointegration	
F[NX(-1), GE(-1), LiR(-1)]		8.35	There is cointegration	
	Pesaran		**Narayan**	
Critical Value	**Lower Bound**	**Upper Bound**	**Lower Bound**	**Upper Bound**
1%	2.73	3.9	3.02	4.35
5%	2.17	3.21	2.34	3.46
10%	1.92	2.89	2.02	3.05

***Source**: Author's compilation using Eviews7.*

Note: The, critical values obtained from Narayan (2005) are for 80 observations; Case II is for restricted constant and no trend (k=7).

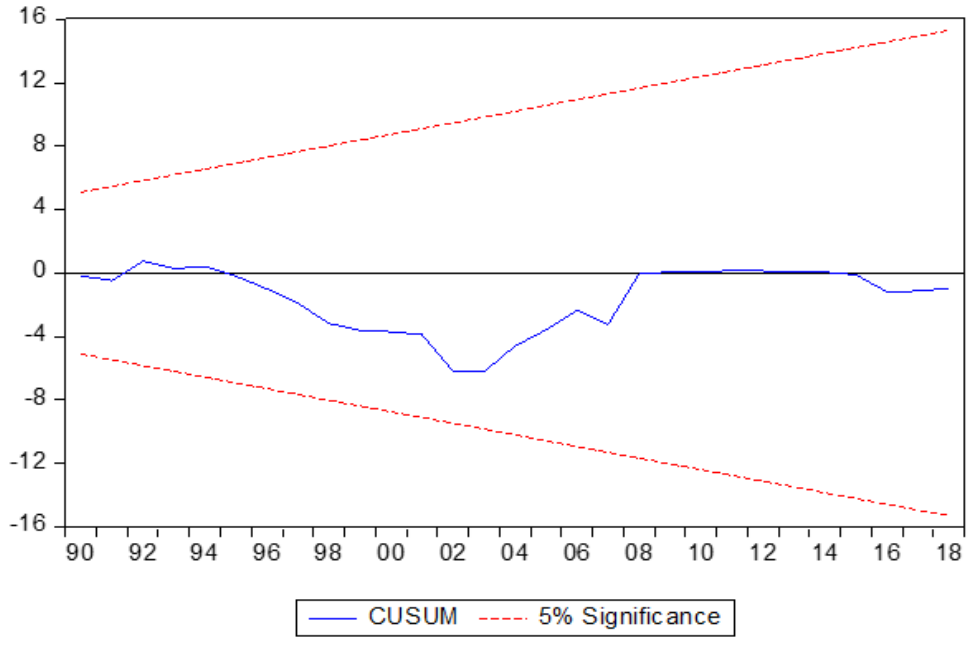
The Wald test F-probability values are less when compared with critical values at a 0.05 level of significance. Moreover, the F-statistic of 8.35 and 3.55 are greater than both Pesaran and Nayaran upper bound values at 5% and 10% levels of significance. Thus, the null hypotheses of no cointegration are rejected and a conclusion can be drawn that government expenditure, interest rates, and trade balance variables bear a long-run

relationship in Namibia. The result of this assessment serves as the answer to the first specific research objective of the study.

4.4 Stability Tests

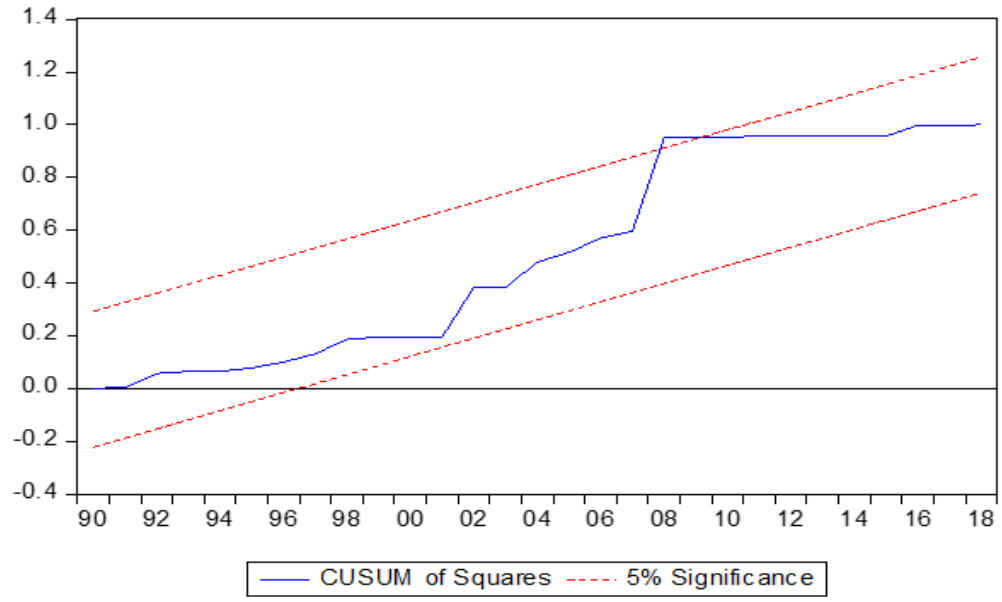
To conclude, the stability test of the ARDL BT long-run parameters combined with the short-run dynamics for the equations is assessed to decide whether the parameters in the estimated interest rates and trade balance models are stable. The study applied the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of recursive residuals of squares (CUSUMSQ) to test for the model's stability as shown in Figure 1 to Figure 4 below.

Figure 1: Trade Balance – CUSUM



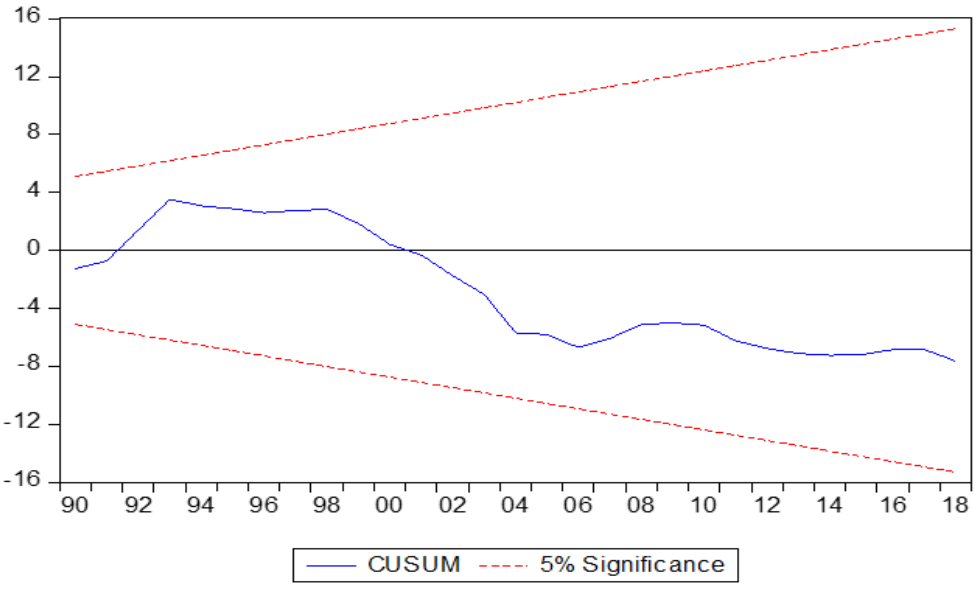
***Source**: Author's compilation using Eviews7.*

Figure 2: Trade Balance CUSUMQ



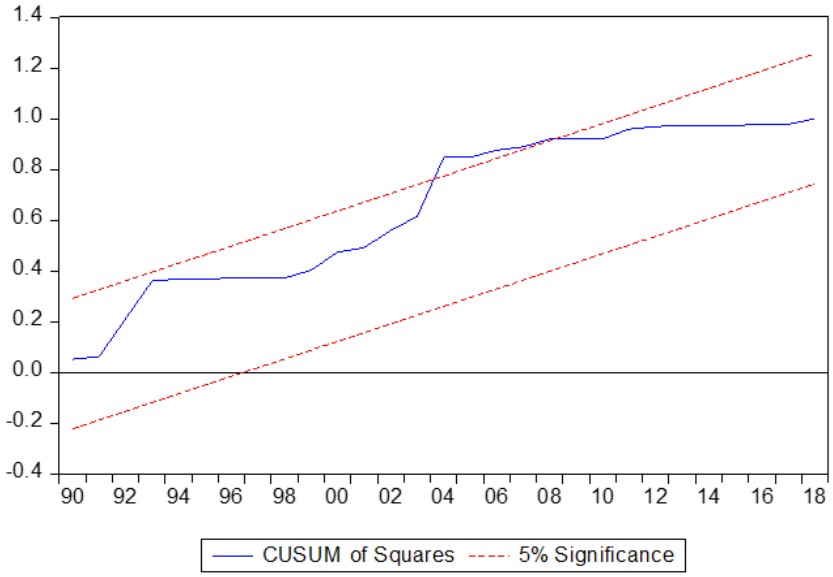
***Source**: Author's compilation using Eviews7.*

Figure 3: Interest rates – CUSUM



***Source**: Author's compilation using Eviews7.*

Figure 4: Interest rates – CUSUMQ



***Source**: Author's compilation using Eviews7.*

Figure 1, 2, 3 and 4 above presents the stability tests for the ARDL estimated models using both CUSUM as well as CUSUM of squares as plotted using government spending, interest rates, and trade balance long-run variables as drawn through the ARDL BT model estimates. As observed in the figures above, the CUSUMs and CUSUM squares of interest rates and trade balance are within the critical bounds at a 5 percent level of significance. However, the CUSUM of squares for interest rates and trade balance revealed deviated slightly beyond the critical bounds from 2003 to 2009 as well as 2007 to 2009 reflected out of bounds at a 5 percent level of significance. This infers that the estimated models are correctly specified and stable.

4.5 Vector Error Correction Estimates

The ECT corrects the disequilibrium that happens in the current period by adjusting the situation to a steady state (Brooks, 2008). An ECT value greater than -1 but less than 0 ($-1<ECT_t<0$) implies that the system is converging to equilibrium and the estimated model

is stable. However, in macroeconomic analysis, the coefficient of ECT is generally low, because of the long memory of time series variables, a statistically significant ECT coefficient with a value less than -1 implies that the system corrects more than 100%. The convergency should be within 100 percent under the assumption of theoretical consistency, therefore the value being less than -1 should be interpreted as a specification error (Brooks, 2008).

The vector error correction is estimated because the ARDL bound cointegration test results revealed a long-run relationship among the variables under study. Hence the VECM results in Tables 6 and 7 below provide an answer for the first specific research objective regarding the relationship of government spending on both trade balance as well as interest rates in Namibia.

Table 4: Short-run Vector Error Correction Model (VECM) Estimates

Short-Run Cointegration Equations (VECM):		**D(LIR)**	**D(NX)**
VECM	Coefficient	-0.00	-1.54
	Standard Error	(0.00)	(0.37)
	t-tatistics	[-2.06]	[-4.18]
D[GE(-1)]	Coefficient	-0.20	-19.66
	Standard Error	(0.10)	(8.32)
	t-statistics	[-2.04]	[-2.36]

***Source**: Author's compilation using Eviews7.*

Table 6 above presents the VECM short-run estimated equations for both trade balance and interest rates in Namibia. The estimates of the short-run cointegration equations reflect that the Error Correction Terms (ECT) for both interest rates and trade balance coefficients pronounced negative and significant values of -0.00 and -1.54 respectively.

Similarly, the coefficients of government spending on both interest rates and trade balance reflect negative and significant values. The findings show that during the short-run an

annual one percent increase in government spending may cause the trade balance and interest rates to decline by 19. 66 percent and 0.19 percent respectively.

The ECT results conclude that the annual rate of adjustments on the trade balance and interest rate due to any disequilibrium state, is measured at 153.92 percent, and 0.29 percent respectively.

Since the values of the coefficient of adjustment for trade balance are less than negative-one (-1) the results reflect to be consistent with the economic theory. The results for trade balance infers that the divergence from equilibrium takes a short period to be corrected. Hence, some impacts of the shocks on the trade balance can be temporal. The finding suggests that, not every shock on the trade balance in the short-run results in a new equilibrium.

On the other hand, the values of adjustment for interest rate coefficients are greater than negative-one (-1). This concludes that the shocks on interest rates during the short run may result in a new equilibrium. The results, therefore, disagree with the economic theory, implying that the deviations from equilibrium may take a long period to correct which may lead to some of the effects of the shocks being permanent.

Table 5: Long-run Vector Error Correction Model (VECM) Estimates

Cointegrating Eq:	**CointEq1**	**Cointegrating Eq:**	**CointEq1**
Interest rates (-1)	1.00	Trade Balance (-1)	1.00
Government Eexpenditur (-1)	-84.41	Government Eexpenditur (-1)	-27.60
	(20.21)		(5.86)
	[4.18]		[-4.79]
Trade Balance (-1)	3.06	Interest rates (-1)	0.33
	(0.48)		(3.09)

	[6.39]		[0.11]
R-squared	0.38	**R-squared**	0.62
Adj. R-squared	0.22	**Adj. R-squared**	0.53
Sum sq. resids	113.83	**Sum sq. resids**	828802.90
S.E. equation	2.05	**S.E. equation**	175.20
F-statistic	2.39	**F-statistic**	6.55
Log likelihood	-70.30	**Log likelihood**	-225.93
Akaike AIC	4.47	**Akaike AIC**	13.47
Schwarz SC	4.83	**Schwarz SC**	13.72
Mean dependent	-0.19	**Mean dependent**	-0.66
S.D. dependent	2.33	**S.D. dependent**	256.42

VEC Residual Serial Correlation LM Tests

Lags	LM-Stat	Prob
1	9.17	0.42
2	10.38	0.32
3	14.39	0.11
4	3.20	0.96
5	1.43	1.00
6	7.47	0.59
7	3.01	0.96
8	4.99	0.84
9	2.57	0.98
10	5.62	0.78
11	17.19	0.05
12	7.44	0.59

Probs from chi-square with 9 df.

Source*: Author's compilation using Eviews7*

Where standard errors are in (), while t-statistics are in [ ]

The estimated VECM results present the long-run relationship of government spending on both interest rates as well as trade balance are formally stated as follows:

$$\Delta Lir = -84.41\ GE\ (-1) + 3.06\ NX\ (-1) \qquad (4.1)$$

$$\Delta NX = -27.60\ GE\ (-1) + 0.33\ LIR\ (-1) \quad (4.2)$$

The equations 4.1 and 4.2 above display the VECM long-run estimated results which reflect a negative and significant relationship between government spending and both interest rates and trade balance in Namibia during the long-run period.

The findings describe that an annual one percent increase in government expenditure may cause a decline in interest rates and net exports by 84.41 percent and 27.59 percent respectively over the long run in Namibia.

Implications of a negative relationship between government outlay and interest rates during both the short-run and long-run are a result of interest rate which is under the control of monetary policy in Namibia. Moreover, the study findings imply that the monetary policy influences effectively low-interest rates during both the short-run and long-run in Namibia to encourage domestic investments and domestic consumption. Because it is cheaper to borrow due to low-interest rates during both the short-run and long-run.

Besides, the association of an inverse relationship between government spending on interest rates infers that government spending creates a crowding-out situation in the economy. Since Namibia's government expenditure is regularly associated with a budget deficit which is funded through borrowed funds of which more than 60 percent of government borrowing is sourced within the domestic financial market (Ministry of finance, 2019). Consequently, a large amount of Government debt issued into the economy, such as the domestic funding of large budget deficits in 2015 (net issuance of N$6.8 billion worth of domestic debt) and 2016 (net issuance of N$11.1 billion worth of

domestic debt), created a huge competition for the limited capital available in the country after a large amount of Government debt was issued into the economy (Deloitte, 2018). It thus mops up a large portion of the liquidity available in the financial market. As a result, an increase in government spending affects both private investments and private consumption inversely in a phenomenon known as “crowding out”. Therefore, the results imply that debt-financed government spending sourced within the domestic financial market may reduce available funds to cater to private investments and consumption in the economy. Since a decline in interest rates mean a low return on investments for the invested resources or borrowed financial resources.

Another implication regarding the negative relationship of government spending on both interest rates and net exports can be attributed to the reason that, a long-term impact of low-interest rates is relatively small on the economy. Due to the high dependence of Namibia on importing, almost every good for both consumption or production. Hence an increase in government expenditure or a decline in interest rates in Namibia does not increase the consumption of locally produced goods.

Additionally, for the reason that investors and individuals prefer to hold government bonds because it is less risky and profitable compared to investing in private investments which are associated with low returns and multiple systematic risks such as market risks and operations (business) risks. Consequently, due to limited capital funds in the financial market as required by both the public sector and private sector the financial market tends to borrow more funds to the government to finance the government spending for the reason that, individuals and investors are rational they prefer to invest more in government bonds. As a result, private investment may attract limited funds due to the low returns on

investment as a result of a decrease in interest rates and a high-risk exposure in the market while the government bonds are more profitable since the bond prices tend to increase when interest rates decline. Consequently, such investment decisions may dwindle private investments in the economy. As a result, it discourages private investment in the economy. Therefore, an increase in debt-financed government spending may affect both domestic private investments as well as consumption inversely, since low private investment creates low output in the economy.

Although, Namibia's expansive monetary policy tends to be significant in the short term as well as over the long term. Nevertheless, Namibia's expansive monetary policy is showing to be less effective because the stimulus is subjected to several leakages. Several different factors such as the majority of the credit issued in the local economy are issued to individuals with access to banking and credit facilities. As a result, the marginal dollar of credit extended is often utilized for unproductive purposes on purchases of imported luxury goods. Therefore, the results conclude that low-interest rates in Namibia lead to an increase in credit extension which consequently tends to increase the consumption of imported goods, most notably vehicles, consumer electronics, and furniture. As a result, this deteriorates the country's trade balance.

On the other hand, the association of an inverse relation of government outlays on net exports is because Namibia imports almost every goods for both consumption or as inputs for production such as machinery as well as specialized equipment. Thus, a large amount of government expenditure tends to leave the country immediately for buying a huge volume of imported goods. This consequently deteriorates the country's trade balance during both the short-run and long-run periods.

Furthermore, the verdict supports the reviewed crowding-out hypothesis as discussed by Gumus (2003) that, when the government borrows to finance the budget deficit it leads to crowding out in both private investments as well as private consumption within the domestic economy due to an increase in interest rates. Although in the case of Namibia the interest rates are low, the funds may not be available due to excessive borrowing for financing government expenditure within the domestic financial market. Since government bonds are viewed to be more attractive and risk-free security assets compared to other investments which are associated with various risks such as market risks, credit risks, and economic risks.

Contrary, the results disagree with the Neo-classical theory which argued that, in an economy where unanticipated permanent changes in government spending do not cause any dynamic effects on the economy as a result of an increase in government spending. Because, in the long run, a decline in government spending may cause a permanent increase in private consumption. Hence, a change in government spending does not affect interest rates or investment at all (Barry & Devereux, 1992). However, the results reflected that government expenditure significantly affects interest rates in Namibia.

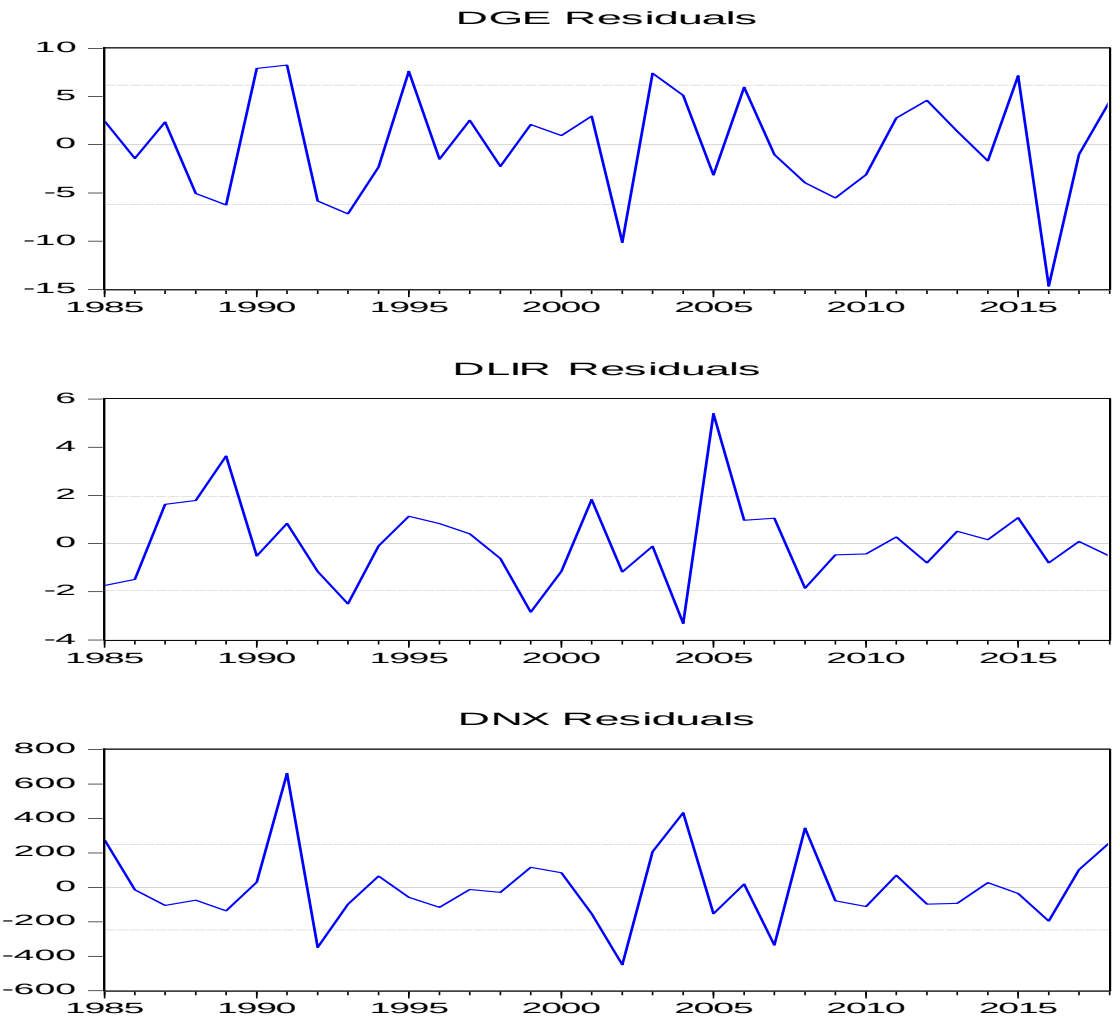
The study findings on the effect of government spending on trade balance have disagreed with the Ricardian Equivalence which claimed that a government budget deficit does not affect the current account deficit (trade deficit) there is no relationship between the fiscal budget deficit and current account deficit, (Thomas & Abderrezak, 1988). However, the study conclusion in this regard agreed with the Keynesian proposition on the twin deficits hypothesis which stated that there is a positive relationship between fiscal deficit and current account deficit. Meaning that an economy experiencing a continuous government

budget deficit leads to a trade deficit. Hence the empirical findings are in coincidence with Namibia's both fiscal deficit and trade deficit over the period under review that an increase in government expenditure with a budget deficit may influence net exports to weaken during the short run.

In conclusion, the overall results are consistent with some reviewed Keynesian theories such as of twin-deficits hypothesis also with the reviewed empirical studies done by Beetsma, Giuliodori, and Klaassen (2007); Clancy, Jacquinot, and Lozej (2014) as well as of Naimhwaka, Eita and Manuel (2018) that an expansionary fiscal policy which is debt-financed may consequently contribute to the country's twin deficit which also worsens the country's trade balance. Besides, the results reveal the effects of government spending on interest rates consistent with the reviewed Neo-Classical theory on the dynamic effects of government spending in the steady-state economy, which was equally confirmed in the studies done by Shen, Yang, and Zanna (2014); Unal (2011) that were reviewed during the current analysis. This Infers that interest rates tend to crowds out private consumption and private investment in the economy when the government spending increase. Conversely, the empirical results contradicted the empirical findings for Hassan and Nassar (2015) that government expenditure does not influence interest rates in the economy.

Table 5 above also presents the LM test results on VEC residual serial correlation. Since the majority of probability values are greater than the 0.05 percent level of significance. Thus, the null hypothesis is accepted, it implies that there is no serial correlation at lag order h. Hence, the absence of serial correlation confirmed earlier on is further attested by the Breusch-Godfrey LM test.

Figure 5: The Graphical Trend of the Residuals



***Source**: Author's compilation using Eviews7.*

Figure 5 above shows the trend of plotted residuals of each series, the residual trend of government spending indicates to be unstable at the interval range of -5 to 10 from 1985 until the 2001 period. Subsequently, the government spending residuals diverged away from the stability level between the range of -15 to 10 as from 2002 to 2018 period.

On the other hand, the residual trend of interest rates diverged widely within the interval of -4 to 4 from 1985 to 2003. Subsequently, the residual trend of interest rates fluctuates further between the range of -4 to 6 from 2004 until the 2005 period. Thereafter the interest rates residuals stabilized within the range of -2 and 2 from 2006 to 2018.

Differently, the residual drift of trade balance swings widely measured between the range of -800 to 800 far apart from the stability level from 1985 to 1992. However, the residuals of trade balance converge towards 0 from 1993 until 2001 in a range between -200 to 200. From 2002 to 2008 the trade balance residuals deviated away from the stability line within the interval of -400 to 400. Afterward, the residual declined towards stability within the range -200 to 200 from 2009 to 2018.

4.6 A VEC Granger Causality/Block Exogeneity Wald Tests

The long-run relationship among the variables (cointegration) suggests the existence of Granger causality, nevertheless, the direction of the causality relationship is not identified. Therefore, the study further investigates the direction of the relationship among the variables under study using the Granger Causality/Block Exogeneity Wald tests approach. The null hypotheses of the pair-wise Granger causality among the variables under study state that, the variables do not Granger-cause each other.

The results produced from this assessment serve as the answer to the second research objective of the study regarding the Granger causality between government expenditure, interest rates, and trade balance in Namibia.

Table 6: VEC Granger Causality/Block Exogeneity Wald Test

Dependent variable: D(DLIR)			
Excluded	**Chi-sq**	**df**	**Prob.**
D(DGE)	15.39	2	0.00
D(DNX)	11.41	2	0.00
All	17.09	4	0.00
Dependent variable: D(DGE)			
Excluded	**Chi-sq**	**df**	**Prob.**
D(DLIR)	12.86	2	0.00
D(DNX)	3.74	2	0.15
All	20.50	4	0.00
Dependent variable: D(DNX)			

Excluded	Chi-sq	df	Prob.
D(DLIR)	5.57	2	0.06
D(DGE)	7.53	2	0.02
All	11.72	4	0.02

***Source**: Author's compilation using Eviews7.*

Table: 8 above displays the results on the causality between variables under study, the results predictably reveal great evidence of lead-lag interactions between the series. Since the tri-variate VECM was estimated. The three panels are displayed, with one for each dependent variable in the system.

The estimation established a bidirectional causality between trade balance and interest rates as well as the bidirectional causality between government spending and interest rates in Namibia.

The analysis found that interest rates and net exports Granger cause each other, similarly, the causality test reflects that government spending and interest rates Granger cause each other. Therefore, the null hypothesis of the research hypotheses in this regard is rejected.

Differently, the investigation established a unidirectional causality between trade balance and government expenditure. The results indicate government spending Granger causes trade balance in Namibia. Then, the research hypothesis is rejected in this respect. although trade balance does not Granger cause government expenditure in Namibia. This finding consequently confirms the acceptance of the null hypothesis that trade balance does not Granger cause government spending in Namibia. Hence, the overall results conclude that the movements in government spending appear to lead to those of interest rates and those of the trade balance in Namibia. These results serve as an answer to the second objective of the study.

The implications produced by Granger causality outcomes infers that government outlays lead to interest rates. This is because Namibia's public spending is debt-financed of which more than 60 percent of public debts are financed through the domestic financial market which is determined by interest rates for the reason that interest rate is the cost of borrowing on the borrowed funds to finance the deficits of government expenditure. It also implies that government spending in Namibia has a significant impact to influence both domestic consumption and domestic investment of the Namibian economy.

Moreover, the results transpire that Namibia's trade balance may be influenced by a change in government spending and interest rates Namibia for two reasons Firstly, Namibia imports almost every goods and service for both public and private consumption, as a result, the trade balance deteriorates drastically over the years under review.

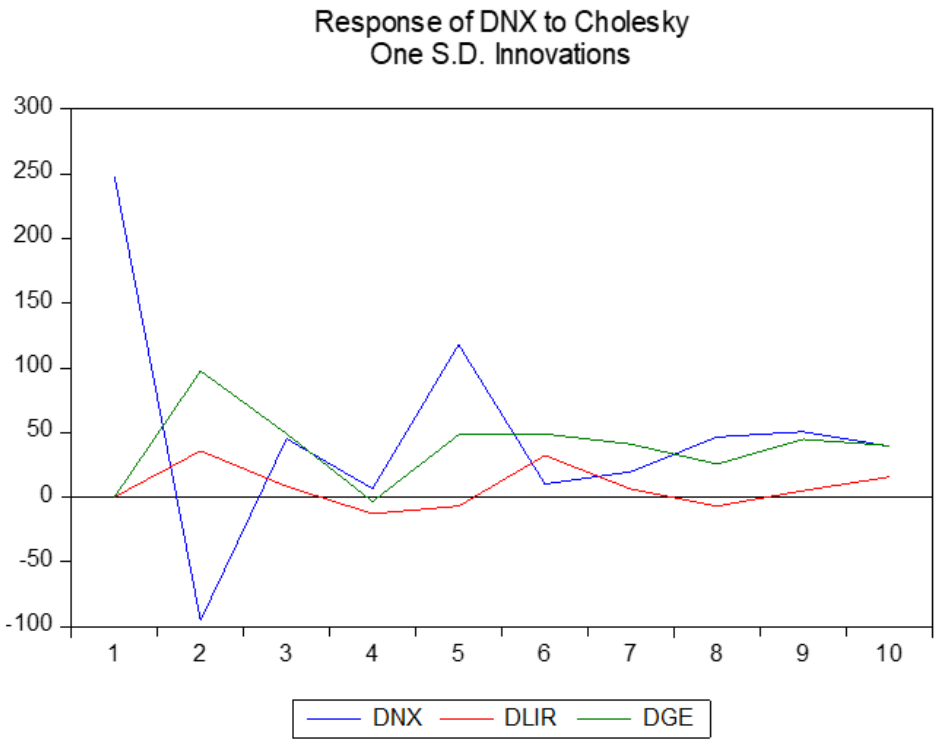
Secondly, given the reason that trade balance is an exogenous macroeconomic variable for small open economies such as Namibia, the monetary authority usually intervenes by adjusting interest rates to counteract the demand for unproductive commodities of imported goods to improve the country's trade deficit. Hence, the results suggest that the interest rate is the appropriate effective monetary policy measure for Namibia to stabilize the country's trade balance.

The implication of why trade balance does not Granger cause government spending can be because Namibia usually experiences some trade deficits because the country imports over 80 percent of the consumer goods and services. On the other hand, Namibia exports a few goods and services to the rest of the world. Thus, Namibia's trade balance may not have a significant influence on the government expenditure due to the limited taxes that

the government receives from net exports as a result of exporting more mineral resources in a raw form as well as a few processed goods and services. The results of the current study agree with the empirical evidence by Muller (2004) that the low elasticity of substitution between home and foreign goods plays an important role in the trade balance to improve after an increase in public spending. The study verdicts similarly supported Muller's (2004) conclusions that the economy with an effective monetary policy such as Namibia was found to diminish the impacts of public spending on the trade balance through the adjustments of interest rates as usually conducted by the monetary policy authority in Namibia.

4.7 The Impulse Response Function

Figure 6: Impulse Response to Net Exports



***Source**: Author's compilation using Eviews7*

The assessment reflects that a one standard deviation innovation shock on net exports causes itself to decline sharply by 150 below the equilibrium point during the first period. However, the trade balance increases suddenly from -100 to 50 positively above the equilibrium level in the second period. Then followed by a continuous fluctuation in the range of 0 to 150 from the third to the sixth periods toward above the stability level. After the sixth period to the tenth period, the trade balance rises steadily for two periods then it declined slightly above the equilibrium level but moving towards the stability level in the range of 0 to 50.

Differently, the outcome reveals that a one standard deviation innovation shock on government outlay may cause the trade balance to deviates unfavorably in the short-run from the initial period until the fourth period within the range of 0 to 100. Subsequently, from the fourth period to the tenth period the net exports fluctuate slightly above the equilibrium level in the range of 0 to 50, converging to the equilibrium level.

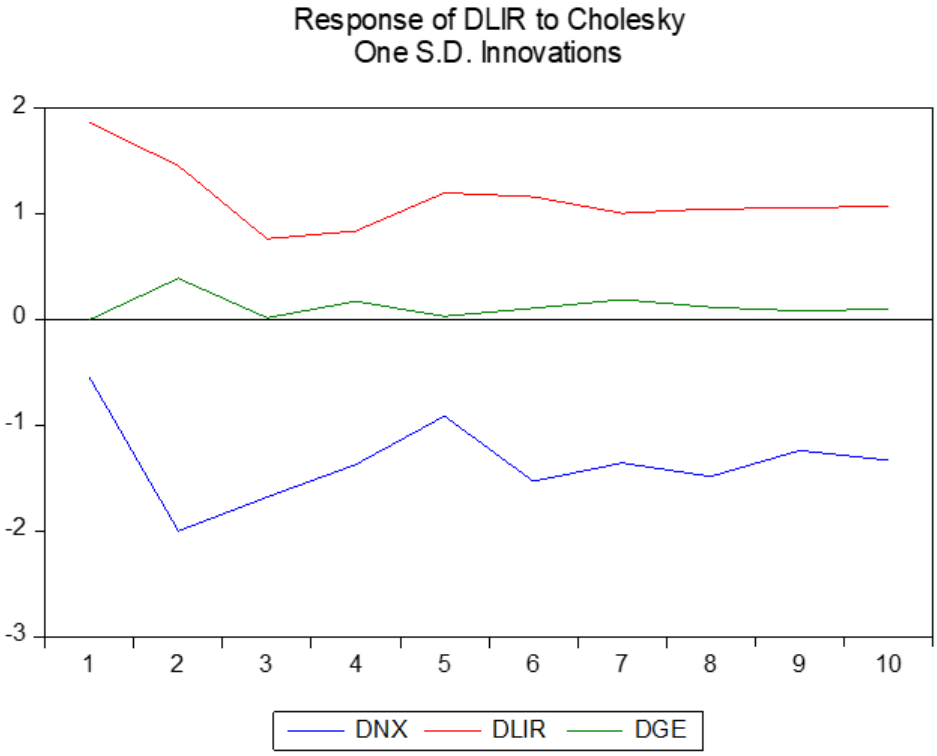
Similarly, a one standard deviation innovation shock on interest rates will result in a slight increase in net exports over the equilibrium level in the first period. Subsequently, the net export slightly plummets continuously above the equilibrium level from the second period to the fourth period below the equilibrium point. Thereafter from the fourth period towards the tenth period the trend on net exports swings between the range of -50 to 50 converging towards the stability level.

Hence the results conclude that Namibia's trade balance reacts to changes in government expenditure, interest rates, and trade balance itself with immediate effect. However, the trade balance causes itself to plunge harshly negatively below the stability level during

the short-run. Nevertheless, the response of the trade balance due to the shocks from interest rates, government expenditure, and trade balance itself tends to converge positively towards the stability level in the long run.

The results differ with Keynes (1936) as cited by Larrain and Sachs (1993) that an increment in government expenditure can affect the trade balance to weaken in both the short-run and long-run. The study originates that trade balance is positively influenced by government spending in Namibia. Also, the results interpret that trade balance tends to become stable after the intervention of monetary policy with adjustment of interest rates subsequently causes the trade balance to stabilize in the long run.

Figure 7: Impulse Response on Interest rates



***Source**: Author's compilation using Eviews7.*

The results illustrate that one standard deviation innovation shock on government spending causes a positive temporary fluctuation on interest rates converging above the equilibrium level during both the short-run and long-run. Thus, the results predict that a change in government expenditure in Namibia may cause some slight positive temporary instabilities on interest rates during both the short-run and long run. Hence, the findings fully correspond with the trend of Namibia's interest rates for the period under review that portrays a decline and stable interest rates in Namibia. Moreover, the outcome affirms the crucial role played by the central bank on monetary policy using interest rates to influence economic activities and promote economic growth to realize economic development.

Similarly, one standard deviation innovation shock on interest rates may cause a positive permanent fluctuation on interest rates diverging above the stability level. The results suggest that the influence of interest rates in Namibia by itself is permanent. The results depict that interest rates fluctuate above the equilibrium line during both the short-run and long-run.

Differently, one standard deviation innovation shock on trade balance may cause a permanent negative fluctuation on interest rates diverging below the equilibrium line during both the short-run and long-run. Hence, the results infer that a change in the trade balance may cause the immediate permanent negative impact on interest rates below the equilibrium level during both the short-run and long-run.

4.8 Diagnostic Tests

The diagnostic checks are necessary to ensure that the model employed in the study is fit and reliable thus, the diagnostic scrutiny is significant to be carried out including the

following diagnostic tests. To test for heteroscedasticity, the White Heteroscedasticity test was employed. Besides the Ramsey Reset test was another test conducted during the analysis that checked whether there was an error regarding the overall model specification. Thus, table 7 to 10 and figure 8 below illustrate the diagnostic tests results as follows:

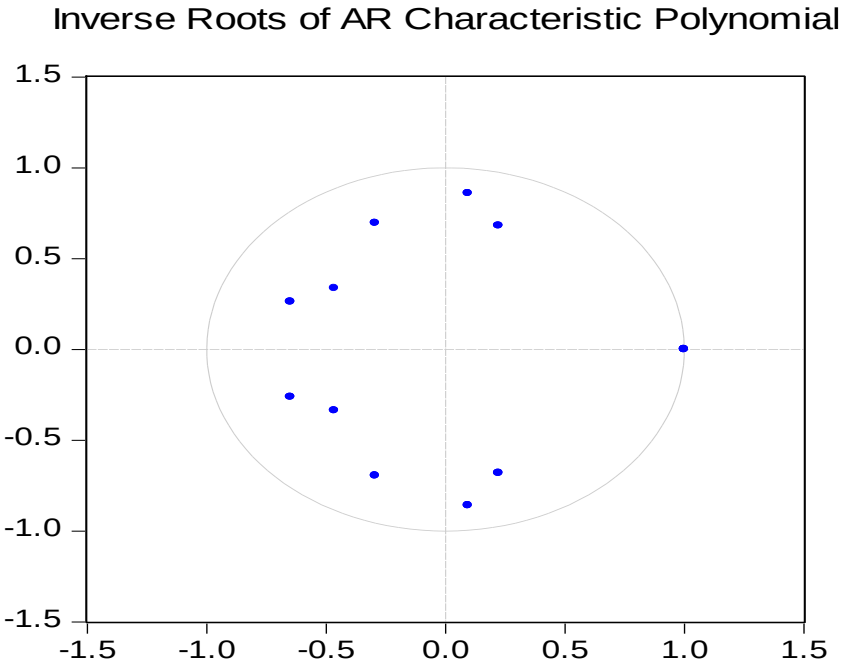
Table 7: VEC Residual Heteroskedasticity Test

Chi-sq	**df**	**Prob.**
137.87	120	0.13

***Source**: Author's compilation using Eviews7.*

The results in the table above illustrate that the VECM model has passed the diagnostic test because the residuals are homoscedastic. Since the probability value is greater than the 0.05 level of significance, a conclusion can be drawn that there is no specification error of heteroscedasticity in the general model.

Figure 8: Unit Roots Residuals



***Source**: Author's compilation using Eviews7.*

Error! Reference source not found. above displays the stability condition for the Vector E rror Correction Model, which depicts that no unit root lies outside the unit circle. This denotes the VECM stability condition satisfies the rule of thumb which is requiring the roots and modulus value to fall between the ranges of -1 to 1 respectively.

Table 8: VEC Residual Normality Test

Component	**Skewness**	**Chi-sq**	**df**	**Prob.**
1	-0.00	7.21	1	0.99
2	-0.12	0.08	1	0.78
3	0.07	0.03	1	0.86
Joint		0.11	3	0.99
Component	**Kurtosis**	**Chi-sq**	**df**	**Prob.**
1	2.89	0.02	1	0.90
2	2.98	0.00	1	0.99
3	3.63	0.54	1	0.46
Joint		0.56	3	0.91
Component	**Jarque-Bera**	**df**	**Prob.**	
1	0.02	2	0.99	
2	0.08	2	0.96	
3	0.57	2	0.75	
Joint	0.67	6	1.00	

***Source**: Author's compilation using Eviews7.*

Residuals are normally distributed if the probability value of the chi-square test is greater than the 0.05 level of significance. Since the probability values of the chi-square test are

greater than 0.05 critical values, the results conclude that the residuals are normally distributed.

Table 9: Ramsey Reset Test

Ramsey Reset Test	**Value**	**Df**	**Probability**
t-statistic	0.76	34	0.45
F-statistic	0.57	(1, 34)	0.45
Likelihood ratio	0.63	1	0.43

***Source**: Author's compilation using Eviews7.*

The Ramsey reset test results presented in the table above confirmed that the estimated models with government expenditure, interest rates, and trade balance variables are well fitted. It implies that there were no other important variables excluded in the current study, thus the results are unbiased it thus establishes consistent coefficients on the variables under study.

The correlation matrix reflects the correlation coefficients between the range –1 to 1 it measures how two variables are related. A correlation coefficient of value closer to 1 such as for indicates a strong positive linear correlation between two variables. Whereas, a correlation coefficient value closer to –1 shows a strong negative linear correlation between two variables. Nonetheless, if the correlation coefficient is close to zero this implies weak or no evidence of any relationship.

Table 10: Covariance Analysis: Ordinary

Covariance Analysis: Ordinary Covariance Correlation Probability	**GE**	**LIR**	**NE**
GE	29.32		

	1.00		
LIR	1.28	20.12	
	0.05	1.00	
	0.75	-----	
NX	-1.25	4.13	1.92
	-0.01	0.66	1.00
	0.92	*0.00*	-----

***Source**: Author's compilation using Eviews7.*

The results presented in table 10 above reveal a weak positive but insignificant association of government spending associated with interest rates in Namibia measured at 0.05 On the other hand, the analysis discovered a weak negative but insignificant relationship between government spending and trade balance of -0.01. Moreover, the analysis found a strong positive and significant association between trade balance and interest rates assessed at 0.66. hence this concludes that there is no concern of multicollinearity problems among the variables under study.

Chapter 5

Conclusion, Recommendations, and Areas for Further Research

5.1 Summary of the results

The study was carried out to analyze the effect of government spending on interest rates and trade balance in Namibia. The empirical results revealed that government expenditure influences both trade balance (net exports) and interest rates negatively and significantly during short-run and long periods in Namibia.

The outcome regarding the relationship between government spending and interest rates can be due to the reason that Namibia's government expenditure is characterized by a continuous budget deficit which is debt-financed. As a result, the government raises funds for government spending by borrowing within the domestic financial market. Consequently, it reduces both domestic private investments and the private consumption of local products. On the other hand, the established negative and significant relationship between government spending and trade balance can be attributed to the reason that Namibia imports almost every goods and service for both private and public consumption and investment. Thus, an increase in government spending may cause the demand for foreign goods and services to an upturn, which may cause Namibia's trade balance to weaken in the process, leading to a trade balance deficit, as imports will excess exports, hence the negative relationship between increased government expenditure and trade balance.

Also, the Granger causality outcomes conclude both bidirectional and unidirectional causality between the variables under investigation. The analysis discovered that interest

rates and net exports Granger cause each other. Similarly, the causality test outcomes designate that government spending and interest rates Granger cause each other in Namibia. Hence the null hypotheses in these concerns were rejected. However, the investigation established a unidirectional causality between trade balance and government expenditure. The results indicate that government spending Granger causes trade balance, the null hypothesis in this regard was rejected. Whereas the null hypothesis was accepted since the results shown that trade balance does not Granger cause government expenditure in Namibia. Therefore, the overall results conclude that the movements in government spending appear to lead to those of interest rates and those of the trade balance in Namibia. These results provide an answer to the second research objective.

The implications emanating from the Granger causality outcomes infers that government outlays lead interest rates because Namibia's public spending is characterized by a budget deficit which usually is debt-financed of which more than 60 percent of public debts are usually financed through the domestic financial market. This suggests that the government deficit in Namibia has the potential to cause interest rate risk and liquidity risk in the domestic economy which affects bond prices directly and the values of shares indirectly. As a result, domestic consumption is depressed, as a result, the trade deficit may increase. A debt-financed government spending in Namibia directs a negative significant impact on both domestic consumption and domestic investment. However, due to continuous government borrowing in the domestic financial market to finance a persistent government budget deficit creates a crowding out and liquidity problem in the domestic economy. The impact of government multiplier as a result of a change in government expenditure in Namibia has a significant effect on the imports compared to the limited or

little effect it creates within the domestic economy since the country's consumption and investment rely more on foreign goods.

On the other hand, the Granger causality results transpired that Namibia's trade balance may be influenced by a change in government spending and interest rates due to the two reasons. Firstly, Namibia is an import-based economy, as a result, the trade balance deteriorates drastically over the years under review because the multiplier effect of both government and private consumption impacts more on the country's trade balance. Secondly, given the reason that trade balance is an exogenous macroeconomic variable for small open economies such as Namibia, the country's monetary policy usually adjusts interest rates to influence the households' behaviors in the economy on consuming imported luxury goods and services, a move that causes interest rates to change. The monetary authority usually intervenes by adjusting interest rates to counteract the demand for unproductive imported goods to improve the country's trade deficit. Hence, the results suggest that the interest rate is the appropriate and effective monetary policy measure for Namibia to stabilizes the country's trade balance.

Differently, the implication of why trade balance does not Granger cause government spending can be because Namibia usually experiences a continuous trade deficit year on year because the country's dependence on imports is over 80 percent of the consumer goods and services. On the other hand, Namibia exports a few goods and services to the rest of the world. Thus Namibia's trade balance may not have a significant influence on government expenditure due to the limited government tax revenues generated from the country's net exports. Namibia's exports are associated with a high volume of mineral

resources in their raw forms such as timber woods, uranium yellow cakes, diamonds & gold, and few finished goods.

5.2 Conclusion

The study examined the influences of government spending on interest rates and trade balance in Namibia covering the period from 1980 to 2018. The study applied the ARDL bounds cointegration test and the Vector Error Correction Model to establish the results. The initial procedures embraced by the study started with unit root techniques using ADF, PP, and KPSS to determine the time series properties (order of integration) of the variables under study. The stationarity test results found the data for both government spending and trade balance are integrated of order zero I(0) while interest rates data is found to be integrated of order one I(1). Then, the lag length criteria test was conducted, to establish the appropriate lag length suitable for the estimated models in the study. All criterions involved in the assessment AIC, HQ, FPE, LR, and SC suggested the study use a lag of 1. Thus, the study applied 1 lag in both the estimated VECM and the ARDL respectively. Afterward, the research has applied the ARDL cointegration technique that discovered a long-run relationship between government expenditure, trade balance, and interest rates in Namibia. Subsequently, the estimated VECM results found the coefficients of the Error Correction Terms (ECT) of both trade balance and interest rates established a negative and significant relationship in the short-run. Correspondingly, the VECM estimation derived a negative and significant long-run relationship of the government spending influences on both interest rates and trade balance in Namibia. Furthermore, the Granger causality outcomes concluded both bidirectional and unidirectional causality among the variables under research. The analysis ascertains that interest rates and net exports (the

trade balance) Granger causes each other, similarly, the causality test reflects that government spending and interest rates Granger cause each other in Namibia. However, the investigation established a unidirectional causality between trade balance and government expenditure. The exploration discovered that government spending Granger cause trade balance however, trade balance does not Granger cause government expenditure in Namibia. Lastly, the assessment of diagnostic tests affirmed the goodness of fit on the estimated models as well as the overall significance and the unbiasedness of the estimated results. Also, the error terms of the VECM shows normally distributed.

5.3 Policy Recommendations

The investigation examined the effects of government spending mutually on interest rates and trade balance in Namibia. The study found that Namibia has been experiencing a joint government budget deficit, trade deficits as well as a continuous decline in interest rates over the period under review. The investigation discovered a negative long-run and significant association of government expenditure on both interest rates and trade balance in Namibia. The paper concluded that a continuous increase in twin-deficits (government expenditure with a budget deficit and trade deficits) in Namibia should be considered a challenge of great concern by all stakeholders in the Namibian economy. Because a persistent twin deficit in the economy is associated with crowds out domestic private investments which affects the country's production capacity and the level of output may decline as a result of reduced consumption of locally produced goods. Hence, these may cause a long-term economic crisis in the economy such as a decline in economic activities which leads to a continuous economic growth contraction, a high rate of unemployment, and an increase in poverty due to a decline in household income. Besides, Namibia is an

import-based economy, hence the country's trade deficit exposes the country to external shocks, which eventually may equally cause a prolonged economic crisis onto Namibia's economy.

A negative relationship found between government spending and trade balance as well as unidirectional causality originates that government expenditure Granger causes trade balance to conclude that the government multiplier has little impact on the domestic economy.

It is thus, against this background the study proposed the following policy actions that Namibia should consider to implement and promotion of sustainable fiscal policies to achieve sustainable economic growth and economic development with an improved trade balance and stable interest rates in Namibia.

i) Namibia's fiscal policy currently stands at crossroads of inadequate tax revenue collection, it is also characterized by a high and increasing public debt. On the other hand, the country is faced with various socio-economic challenges which require government intervention through government expenditures. Therefore, policymakers should consider embracing the optimal government spending by using only lump-sum taxes without borrowing for operational government spending to avoid a high public debt that may become unaffordable soon. Alternatively, Namibia should embrace the PPPs approach in the provision of required infrastructure development to ensure efficient, effective, and economical private investment within the local economy.

ii) An association of continuous twin-deficits in Namibia of a government budget deficit and trade deficit signifies the potential to cause both liquidity problems and interest rate risk in the local economy these consequently may cause a low

level of domestic private investment and ultimately reduces business and economic activities, and a decline in consumption of locally produced goods. Thus, Namibia should manage the fiscal policy effectively in a viable and beneficial approach by reducing the government budget deficit while expanding the domestic production capacity through domestic private investment to maximize both economic activities and gross domestic products. This eventually raises the consumption of local products and further increases the country's output. Consequently, the multiplier effect becomes effective within the domestic economy for Namibia to become an export-based economy which eventually improves the country's trade balance.

iii) Namibia's fiscal policy should further seek to develop sustainable government spending which influences the domestic economy by allocating government expenditures on economic sectors and facilities with a permanent impact on increasing domestic economic activities. Hence, government outlays should be allocated adequately into infrastructure development facilities with infinite potential returns and sustainability to diversify Namibia's economy such as by establishing sufficient power plants and water facilities to boost the country's likely sustainable economic sectors such as agriculture, fishing, and manufacturing. As a result, the development of the country's production capacity will enable Namibia to upgrade into an economy of multiple differentiated products with a higher content of skilled labor, technology, and innovation. These are required actions that should be implemented to boost the country's GDP, trade, and financial inflows as well as stimulates economic

diversification and job creation these eventually improve significantly the government tax revenues for sustainable government expenditure.

iv) Equally, significant Namibia should re-evaluate the economic values of various natural resources in the country's diverse economic sectors especially in sustainable sectors such as agricultural, fishing, and tourism sectors should be reinforced to maximize the economic potentials and production capacity with a sufficient supply of inputs for manufacturing through the process of the value chain and value addition. Such efforts would allow the country to produce multiple types of finished products for domestic consumption and exports to the rest of the world. This would change Namibia into an export-based economy which in turn improves the country's trade balance and create a sustainable current account as aspired in the national vision 2030.

v) Namibia's economy has diverse economic sectors with vast potentials. Hence, the government should do more and better in internalizing strategies and spearheading investment policies, human resources & enterprise development to promote innovation, entrepreneurship, and production of local products for import substitution while boosting exports to return the country's trade balance into equilibrium. As a result, this will stabilize the economy through the value chain and value addition that will strengthen Namibia's manufacturing-based economy which ultimately ensures a maintainable economic growth and development of the country.

vi) The solutions to the research objectives imply that Namibia's monetary policy plays a significant role to counterpoise the impact of government spending on weakening the trade balance in Namibia. Thus the monetary authority should

continue steadily to intervene whenever required to significantly influence the adopted plans especially when the policies adopted comprise the three decisive macroeconomic variables under study.

vii) The economic crisis as a result of a continuous increase in government debts spent on unproductive and untraceable activities should be discouraged. Hence, the policymakers together with fiscal and monetary authorities in Namibia should embrace financial integrity and always applies the financial risk management measures as well as enforce the principles of accountability and Good Governance to ensure that the borrowed funds are spent in a sustainable and accountable manner that is beneficial to the country's future generations.

viii) The amount of money that Namibia has been losing annually through endless events associated with mismanagement, plundering, dishonesty, and self-enrichment in different sectors of the economy such as fishing, mining, public and State-Owned Enterprises is incalculable. These practices have proven that Namibia had adequate government spending for socio-economic development with ample financial resources the country had if it were well managed. Therefore, every sector should organize public conferences & discourses to discuss and address existing problems in all sectors of the economy as well as the appraisal of resources would help to ensure rational and fact-based decisions regarding the economic values of the country's natural resources and adopt the best approaches for the country's economic structural transformation to ensure optimal compensation by any investor accessing Namibia's natural resources in every sector.

5.4 Limitations and areas for future research

The foremost limitation linked with this study is related to data for the period between 1980 to 2018. Generally, in studies that apply the VECM methodology, it is recommended to use quarterly time series data for analysis. However, for some variables used in the study, their quarterly data are not readily available for Namibia. Therefore, the current study used annual data. As such, if the quarterly data become available in the future, it would be exciting to compare the results of the same study that uses quarterly data with the results established by the present analysis. Another limitation of this study is that it only used the ARDL technique and VECM methodology. An additional restraint of this study is based on the cointegration results which revealed a long-run relationship among the variables. Therefore, VAR has two options, the unrestricted VAR and the VECM approach. Since there is cointegration among variables the study used the VECM approach and it only focused on investigating the relationship and the causality, and the response of net exports/trade balance and interest rates from government spending. Due to the study's objective limitations, the responses of government spending were not looked at. In line with this, more could be discovered, and comparisons could be done should different methodologies have been used. Therefore, further researches in this area should be done using different methodologies such as Computable General Equilibrium (CGE), Dynamic Stochastic General Equilibrium (DSGE), or Generalised Methods of Moments (GMM), and other improved econometric techniques to compare with the results of the current study. Further researches should focus on the effects of government expenditure on other macroeconomic variables which are essential such as Wagner's law, as well as the investigation of public debt management in Namibia, should be conducted to fill the

knowledge gap which may contribute immeasurably to both fiscal and monetary policy formulation and execution in Namibia.

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Appendices

Appendix 1

Annual Time Series Data Used in the Study

The raw data in levels (values) of the variables used in the study.

Years	Government Spending	Interest Rates	Exports	Imports
1980	6 120 225 285.89	9.5	17357975628	13858429448
1981	7 667 386 823.28	14	15666113413	15957260911
1982	7 904 510 261.58	19.33333333	15202512930	14175176031
1983	8 003 059 295.01	16.66666667	13479279069	12312237680
1984	8 155 382 409.88	22.33333333	13732932029	12462469291
1985	8 926 104 440.54	21.5	17302263721	12850838477
1986	9 110 766 541.62	14.33333333	19340500907	13642240363
1987	9 132 462 149.67	12.5	17565057897	15419727173
1988	9 477 672 381.89	15.33333333	16764940877	14859108739
1989	9 257 129 611.85	19.83333333	16985820953	14635056671
1990	9 812 555 471.71	21	15110383292	14398058311
1991	10 968 568 200.00	23.36333333	19465086800	14907019300
1992	11 703 372 100.00	20.2125	20695543500	15710137900
1993	11 785 122 700.00	18.02083333	22910933500	15555914300
1994	11 970 774 700.00	17.05333333	22172456600	16138116600
1995	12 293 496 800.00	18.50833333	24286856000	17611782500
1996	12 612 359 200.00	19.16	24957677800	20379704800
1997	13 121 412 400.00	20.17916667	24283111000	21078698100
1998	13 525 040 400.00	20.71916667	24113894200	22691327500
1999	14 130 092 100.00	18.48416667	25183784900	23007715600
2000	14 309 518 900.00	15.27833333	24972015800	21809627700
2001	14 725 576 500.00	14.53166667	24305249800	24922053000
2002	14 346 314 600.00	13.8375	28251279000	26455020100
2003	14 796 287 800.00	14.70083333	30751552700	29234384400
2004	15 531 477 900.00	11.38916667	32404518700	26325823300
2005	14 612 147 900.00	10.61	32135564400	26569528400
2006	16 216 804 400.00	11.18083333	37067006300	30905841500
2007	18 255 465 700.00	12.88416667	39430004800	40861497100
2008	20 124 175 400.00	13.73666667	37712824000	48490382900
2009	20 897 146 400.00	11.11833333	38385375800	55820898300
2010	21 107 476 500.00	9.72	39447123100	50101545400
2011	22 515 841 900.00	8.73	38147514700	49736367000

2012	23 250 935 800.00	8.651875	38531168400	59486482500
2013	24 370 714 800.00	8.289166667	39609703100	63587191400
2014	25 493 130 900.00	8.699166667	39421464800	74759617200
2015	28 613 037 100.00	9.324166667	39282859400	83944992200
2016	28 400 880 859.38	9.866932593	42305355469	79539367188
2017	27 929 498 046.88	10.04370422	39125199219	67249148438
2018	27 926 515 625.00	10.142176	45076218750	70506179688

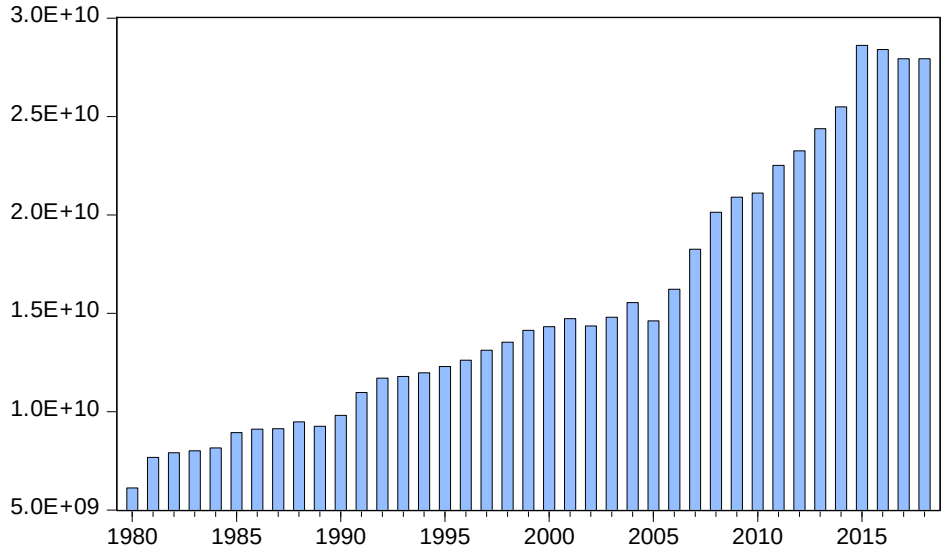
***Source**: Author's compilation using Eviews 7.*

Appendix 2

Discussion and Analysis of the Variables Under Study

The analysis and discussion for Namibia's government spending, lending Interest rates, and trade balance from 1980 to 2018.

An overview of Namibia's government expenditure for the period under investigation 1980 to 2018



***Source**: Author's compilation using Eviews7.*

The chart above displays the positive growth trend of Namibia's general government expenditure from the year 1980 to 2018. From 1980 until 1990, the growth of government outlay has been increasing faintly. After Namibia attained its political independence, government spending has risen ascetically from 1990 to 2005. Biwa, Kalenga and Zaaruka, (2001) clarified that, during the first ten years after independence, the government spends more on the community and social sectors such as education and health. The highest share of the budget was allocated to education. Education's share of the total budget increased from 19.8% in 1991/92 to 26.5% in 1996/97 then declined after reached 21.3% by 2001/02. Nevertheless, the ratio was still high compared to other SADC countries, the fact that it has decreased in recent years is a matter of concern, as it is

generally accepted that human capital is a key ingredient in economic development. Besides, the Africa Competitiveness analysis of government spending by function reveals that the share taken up by economic services in total expenditure for Namibia declined from 19.8% in 1991/92 to a mere 10% in 2001/02. This was because many of the major investment projects in this sector were completed towards the end of the first decade of the country's independence. Furthermore, the outsourcing of some government department services also contributed to the decline in the share of economic services. On the other hand, the share of general government services rose from 27.4% in 1991/92 to 33.3% in 2001/02, indicating the government's support to the private sector. Since independence, Namibia's budget deficit on public expenditure has grown by 3.9 percent on average annually. Among the factors contributing to the high budget deficit was a high and steady increase of the public sector wage bill, increased transfers to public enterprises and statutory bodies, as well as an inefficient expenditure control system as discussed by (Biwa, Kalenga & Zaaruka, 2001).

Similarly, the steeper growth in government spending has been rising sharply from 2005 until 2018. Consequently, the increase in the budget deficit during that period was required for many macroeconomic challenges facing the country such as the high rate of unemployment, drought, and various infrastructure development essential in the economy. The budget deficit experienced was mainly caused by a decline in SACU revenue which has been the main source of revenue of Namibia's government expenditure, also an increase in government expenditure to stimulate the economic activities in the private sector (African Economic Outlook, 2002). The fiscal outcomes for the first roll-out of the consolidation program, reflected mixed results, the speed of fiscal correction proving

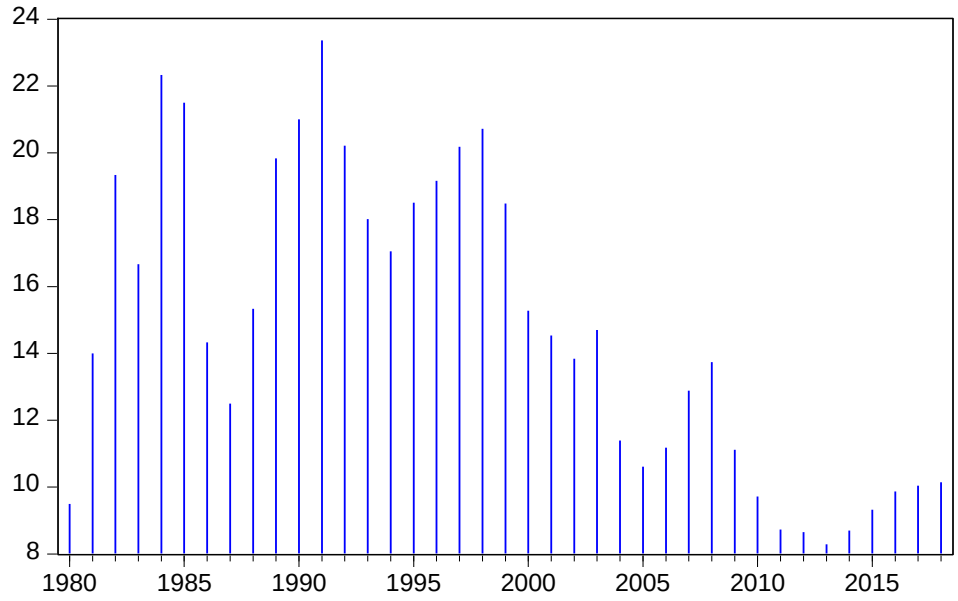
faster and sharper in its effect on service delivery. With the budget deficit relatively higher than anticipated and a build-up of the stock of spending arrears, causing a further drag on economic activity and eroding the effectiveness of the fiscal consolidation effort. The steep expenditure correction proved difficult to implement in the first roll-out of the fiscal consolidation program and requires recalibration to balance between the intended consolidation, impact on growth, and the provision of basic services. Total expenditure (including statutory) outturn for FY2017/18 stood at N$67.70 billion, this is about 102 percent relative to the revised appropriation of N$66.05 billion. Personnel expenditure constitutes 43.1 percent of total expenditure and 52.0 percent of non-interest operational expenditure. Development expenditure amounts to 8.5 percent of overall expenditure, while operational spending, including statutory expenditure, amounts to 91.5 percent of total expenditure (Mid-year budget review, 2018).

According to the government's accountability reports for 2015/16, 2016/17, and 2017/18 financial year the total expenditure outturn stood at N$62.0 billion from a total budget ceiling of N$63.2 billion, representing an execution rate of 98.1 percent, in comparison with a 98.3 percent execution rate in 2014/15 fiscal year on a budget of N$57.7 billion. As a percentage of GDP, the total public expenditure was 43.3 percent, which increased significantly from 41.6 percent recorded in the previous fiscal year. These levels have also exceeded the fiscal cap of 40 percent of GDP. Over the same period, revenue as a percentage of GDP remained flat, the level of the budget deficit increased significantly to 8.3 percent of GDP from 6.2 percent in the previous fiscal year. Consequently, the gap between government revenue and government expenditure has to be closed via increased debt borrowing, resulting in a high level of indebtedness of 40.1 percent, a remarkable

growth of 66.3 percent. During the year under review, a budget of N$4.02 billion was reallocated from the operational and development budget towards pressing policy priorities and unanticipated expenses. As a result, the total expenditure outturn for the 2016/17 fiscal year (excluding statutory) was N$57.87 billion compared to a total budget ceiling of N$57.82 billion, the budget implementation rate was 100.09 percent as compared to 98.1 percent of a budget of N$63.2 billion in 2015/16 financial year, the public expenditure reached 36 percent of GDP in 2015/16 fiscal year, below the fiscal control of 40 percent of GDP.

Similarly, during the 2017/18 financial year, the total expenditure outturn (excluding Interest Payments) amounted to N$62 billion against the budget of N$61.5 billion, representing an execution rate of 101 percent. This represents a 7.1 percent growth from N$57.8 billion expended in the 2016/17 fiscal year. As a percentage of GDP, total government expenditure recorded 36 percent, below the fiscal cap of 40 percent of GDP. The expenditure outturn is a function of the operational as well as development budget (Ministry of finance, 2016; Ministry of finance, 2017; Ministry of finance, 2018).

The lending interest rate trend in Namibia for the period under review from 1980 until 2018

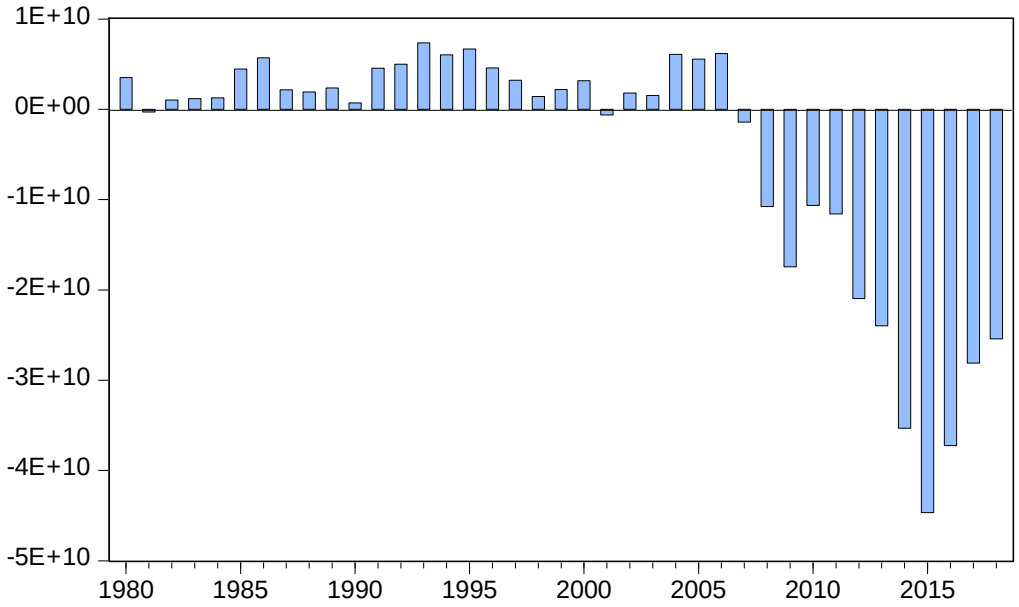


***Source**: Data obtained from the World Bank and Bank of Namibia by the Author's compilation using Eviews7.*

The graph overhead illustrates Namibia's annual lending interest rates trend for the period from 1980 until 2018. During the first decade under review, the lending interest rates were at 16.5 percent on average. The highest lending interest rates were recorded in 1984 at 22 percent while the lowest lending interest rates were initially experienced during 1980 measured at 9.5 percent. Throughout the second decade under review from 1990 to 1999 after independence, the lending interest rates increased to 19.6 on average, the least and highest lending interest rates of 17 percent, and 23 percent were experienced in 1994 and 1991 respectively. During the third decade under analysis from the year 2000 to the year 2009, the lending interest rates plummeted to 12.9 percent on average. Nevertheless, the lowest and uppermost lending interest rates were at 10.6 percent in 2005 and 15 percent in 2000. From 2010 to 2017 the lending interest rates dropped slightly to 9.16 percent on average, similarly, the lowest landing interest rates declined marginally to 8.2 percent in

2013 also the highest lending interest rates noted during the last eight years under review was at 10.6 percent noted in 2017 followed by 10.5 percent recorded during 2018 (Bank of Namibia, 2019; Ministry of Finance, 2019).

An overview of Namibia's trade balance for the period from 1980 to 2018



***Source**: Data obtained from the World Bank by the Author's compilation using Eviews7.*

In the first two decades from 1980 to 1990 and from 1990 to 2000, Namibia's trade balance has been characterized by a trade surplus. However, in the year 2001, Namibia's trade balance conceded a trade deficit. Thereafter, Namibia's trade balance was favorable from 2002 to 2006. On the contrary, as from 2007 to 2017 Namibia's net exports have been experiencing a trade deficit. Namibia Statistics Agency (2017) reported that from 2008 to 2017 Namibia's trade balance recorded an average trade deficit of N$16,609 million. The country's net exports reached an all-time high with a trade surplus of N $1,786 million in 2008 and the lowest trade deficit of N$41,029 million was recorded in 2015.

Namibia continued to record an unfavorable trade balance, in 2016 the trade deficit amount of N$29,817 million. An indication that the country has spent N$29,817 million

more on buying goods from the rest of the world, than what it received from selling goods to the rest of the world. The trade deficit recorded in 2016 dropped by 24.7 percent, which was the largest in six-years drops since the country recorded a trade deficit declined by 25.1 percent between 2009 and 2010. The N$29,817 million deficit was N$9,800 million lower when compared to a revised figure of the year 2015 in which the deficit was estimated to be N$39,617 million, it was the largest deficit recorded in the past ten years since 2007. The narrowing deficit can be attributed to larger growth in exports compared to imports.

The exports' revenue grew by 20.9 percent while expenditure on imports grew only by 2.5 percent, however, the growth in exports was not sufficient to offset the deficit. The growth in exports was attributed to diamonds, copper ores, and fish while diamonds, vessels, and fodder were responsible for the slight growth in overall imports. Namibia's trade balance averaged a deficit of N$13,871 million for the period from 2007 till 2016, reaching a ten-year high with a surplus of N$997 million recorded in 2008 and a record low with a deficit of N$39,617 million registered in the preceding year. In 2017, Namibia continued to record an unfavorable trade balance, with 2017 recording a deficit amounting to N$24,449 million. During 2017, Namibia spent N$24,449 million more on imported goods than what it received from exporting goods to the rest of the world. By comparison, the N$24,449 million deficit is equivalent to five months in which Namibia imported goods and exported absolutely nothing. The 2017 deficit narrowed by 18 percent, this is a second consecutive decline after recording a 27 percent decline in 2016. The deficit plunged to N$24,449 million compared to a revised figure of last year it stood at N$29.996 million (Namibia Statistics Agency, 2017).

In 2017, the largest Namibia's trade deficits were recorded with South Africa of N$34,031 million, Bulgaria made up N$5,816 million, Zambia with the amount of N$1,715 million, Peru accounted for N$1,551 million, India represented with an amount of N$1,549 million, and China responsible of N$1,234 million. The largest surpluses were recorded with Switzerland of N$6,225 million, Belgium contribution of N$2,968 million, Botswana contributed the value of N$2,957 million, Spain is responsible for N$2,533 billion, France is accounted for N$1,960 million, and Norway attributed the amount of N$1,703 million (Namibia Statistics Agency, 2017). Furthermore, according to the 2018 Mid-Year Budget Review and Medium-Term Budget Policy Statement, Namibia's exports increased notably on an annual basis, by 21.9 percent to N$13.6 billion. during the second quarter of 2018, compared to the corresponding quarter of 2017. Notable increases in merchandise exports came from most major export categories, particularly rough diamonds, other mineral products (main uranium), manufactured products, and re-exports. Merchandise imports fell by 3.8 percent annually, to N$16.4 billion in the second quarter of 2018. The fall in merchandise imports was due to a reduction in expenditure on some of the major import categories, especially mineral fuels and oils, and consumer goods. There was, however, a 1.4 percent annual increase in imports for vehicles, aircraft, and vessels during the same period. On a net basis, the trade deficit (covering goods only) fell to N$2.8 billion in the second quarter of 2018, from N$5.9 billion in the second quarter of 2017. This equates to a 52.4 percent annual improvement in the merchandise trade deficit, which is attributable to an increase in exports and a fall in imports over the review period (Ministry of Finance, 2018).

Appendix 3

The ARDL and Wald Test Estimates

Dependent Variable: DLIR
Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.715482	1.375032	1.974851	0.0579
DNX(-1)	0.001173	0.002100	0.558513	0.5808
DLIR(-1)	0.113792	0.165638	0.686991	0.4975
DGE(-1)	0.122741	0.069665	1.761884	0.0886
GE(-1)	-0.199318	0.114454	-1.741470	0.0922
LIR(-1)	-0.135431	0.083494	-1.622039	0.1156
NX(-1)	-0.004127	0.003058	-1.349786	0.1875

R-squared	0.294559	Mean dependent var	-0.255310
Adjusted R-squared	0.148606	S.D. dependent var	2.332774
S.E. of regression	2.152475	Akaike info criterion	4.543779
Sum squared resid	134.3613	Schwarz criterion	4.851686
Log likelihood	-74.78803	Hannan-Quinn criter.	4.651247
F-statistic	2.018173	Durbin-Watson stat	1.637754
Prob(F-statistic)	0.095365		

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	3.551542	(3, 29)	0.0264
Chi-square	10.65462	3	0.0137

Null Hypothesis: C(5)=C(6)=C(7)=0
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(5)	-0.199318	0.114454
C(6)	-0.135431	0.083494
C(7)	-0.004127	0.003058

Restrictions are linear in coefficients.
Source*: Author's compilation using Eviews7.*

Dependent Variable: DNX
Method: Least Squares
Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-42.99528	110.2792	-0.389877	0.6995
DNX(-1)	0.055741	0.168416	0.330974	0.7430
DLIR(-1)	12.13767	13.28433	0.913684	0.3684
DGE(-1)	0.452857	5.587181	0.081053	0.9360
GE(-1)	13.92402	9.179334	1.516887	0.1401
LIR(-1)	2.047009	6.696325	0.305691	0.7620
NX(-1)	-1.224818	0.245231	-4.994545	0.0000

R-squared	0.646936	Mean dependent var	12.31330
Adjusted R-squared	0.573888	S.D. dependent var	264.4581
S.E. of regression	172.6310	Akaike info criterion	13.31286
Sum squared resid	864242.4	Schwarz criterion	13.62076
Log likelihood	-232.6314	Hannan-Quinn criter.	13.42032
F-statistic	8.856337	Durbin-Watson stat	2.363019
Prob(F-statistic)	0.000016		

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	8.351525	(3, 29)	0.0004
Chi-square	25.05457	3	0.0000

Null Hypothesis: C(5)=C(6)=C(7)=0
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(5)	13.92402	9.179334
C(6)	2.047009	6.696325
C(7)	-1.224818	0.245231

Restrictions are linear in coefficients.
Source*: Author's compilation using Eviews7.*

ARDL Long-run Estimates

ΔNX = 13.92GE (-1) -1.22NX (-1) +2.05Lir (-1)

The results derived from an ARDL model replicate that both government spending, and interest rates of the previous year impact positively the trade balance over the long run in Namibia. On the other hand, the ARDL results portrayed that net exports for the previous year influence the trade balance negatively during the long run in Namibia. The results infer that a one percent increase in government spending, interest rates, and the previous year's net exports cause net exports to improve by 14%, 2.04% respectively over the long run in Namibia. Differently, an increase in the trade balance for the previous period by 1 percent may cause the trade balance to weaken by 1.22 percent in the long run in Namibia.

ΔLir = -0.199 (-1) -0.00NX(-1) -0.13Lir(-1)

Also, the results confirmed that government expenditure, as well as the interest rates for the past year and net exports for the last period, influences interest rates negatively over the long run in Namibia. Meaning that a one percent increase in government spending, interest rates, or net exports for the past period may result in interest rates declining by 0.19 percent, 0.13 percent, and 0.004 percent separately over the long run in Namibia.

Appendix 4

Vector Error Correction Estimated Models

Vector Error Correction Estimates
Date: 09/23/19 Time: 06:37
Sample (adjusted): 1984 2018
Included observations: 35 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LIR(-1)	1.000000
GE(-1)	-84.41050 (20.2139) [-4.17586]
NX(-1)	3.058578 (0.47869) [6.38946]
C	196.0987

Error Correction:	D(LIR)	D(GE)	D(NX)
CointEq1	-0.002907 (0.00141) [-2.05852]	0.003774 (0.00328) [1.14996]	-0.503242 (0.12049) [-4.17678]
D(LIR(-1))	0.249408 (0.16085) [1.55060]	1.120378 (0.37388) [2.99664]	25.39775 (13.7249) [1.85049]
D(LIR(-2))	-0.154901 (0.16068) [-0.96402]	-0.106491 (0.37350) [-0.28512]	3.185903 (13.7109) [0.23236]
D(GE(-1))	-0.199152 (0.09748) [-2.04292]	-0.282788 (0.22659) [-1.24799]	-19.66401 (8.31818) [-2.36398]
D(GE(-2))	-0.182595 (0.06122) [-2.98284]	-0.200587 (0.14229) [-1.40970]	-4.517685 (5.22342) [-0.86489]
D(NX(-1))	0.002806	-0.013434	0.162810

	(0.00301)	(0.00700)	(0.25678)
	[0.93245]	[-1.92051]	[0.63403]
D(NX(-2))	0.001244	-0.007264	0.080809
	(0.00206)	(0.00478)	(0.17536)
	[0.60520]	[-1.52060]	[0.46083]
C	-0.338905	0.244800	-1.778147
	(0.36060)	(0.83820)	(30.7700)
	[-0.93982]	[0.29205]	[-0.05779]
R-squared	0.382977	0.466657	0.629286
Adj. R-squared	0.223008	0.328383	0.533175
Sum sq. resids	113.8306	615.0272	828802.9
S.E. equation	2.053278	4.772712	175.2039
F-statistic	2.394067	3.374872	6.547494
Log likelihood	-70.30171	-99.82342	-225.9297
Akaike AIC	4.474384	6.161338	13.36741
Schwarz SC	4.829892	6.516846	13.72292
Mean dependent	-0.186414	-0.035926	-0.662220
S.D. dependent	2.329374	5.823774	256.4288
Determinant resid covariance (dof adj.)		1950726.	
Determinant resid covariance		895536.8	
Log likelihood		-388.8292	
Akaike information criterion		23.76167	
Schwarz criterion		24.96151	

***Source**: Author's compilation using Eviews7.*

Vector Error Correction Estimates
Date: 09/23/19 Time: 06:41
Sample (adjusted): 1984 2018
Included observations: 35 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
NX(-1)	1.000000
GE(-1)	-27.59795
	(5.75610)
	[-4.79456]
LIR(-1)	0.326949
	(3.09403)

	[0.10567]		
C	64.11434		
Error Correction:	D(NX)	D(GE)	D(LIR)
CointEq1	-1.539206	0.011544	-0.008890
	(0.36851)	(0.01004)	(0.00432)
	[-4.17678]	[1.14996]	[-2.05852]
D(NX(-1))	0.162810	-0.013434	0.002806
	(0.25678)	(0.00700)	(0.00301)
	[0.63403]	[-1.92051]	[0.93245]
D(NX(-2))	0.080809	-0.007264	0.001244
	(0.17536)	(0.00478)	(0.00206)
	[0.46083]	[-1.52060]	[0.60520]
D(GE(-1))	-19.66401	-0.282788	-0.199152
	(8.31818)	(0.22659)	(0.09748)
	[-2.36398]	[-1.24799]	[-2.04292]
D(GE(-2))	-4.517685	-0.200587	-0.182595
	(5.22342)	(0.14229)	(0.06122)
	[-0.86489]	[-1.40970]	[-2.98284]
D(LIR(-1))	25.39775	1.120378	0.249408
	(13.7249)	(0.37388)	(0.16085)
	[1.85049]	[2.99664]	[1.55060]
D(LIR(-2))	3.185903	-0.106491	-0.154901
	(13.7109)	(0.37350)	(0.16068)
	[0.23236]	[-0.28512]	[-0.96402]
C	-1.778147	0.244800	-0.338905
	(30.7700)	(0.83820)	(0.36060)
	[-0.05779]	[0.29205]	[-0.93982]
R-squared	0.629286	0.466657	0.382977
Adj. R-squared	0.533175	0.328383	0.223008
Sum sq. resids	828802.9	615.0272	113.8306
S.E. equation	175.2039	4.772712	2.053278
F-statistic	6.547494	3.374872	2.394067
Log likelihood	-225.9297	-99.82342	-70.30171
Akaike AIC	13.36741	6.161338	4.474384
Schwarz SC	13.72292	6.516846	4.829892
Mean dependent	-0.662220	-0.035926	-0.186414

S.D. dependent	256.4288	5.823774	2.329374
Determinant resid covariance (dof adj.)		1950726.	
Determinant resid covariance		895536.8	
Log likelihood		-388.8292	
Akaike information criterion		23.76167	
Schwarz criterion		24.96151	

***Source**: Author's compilation using Eviews7.*