

AN INVESTIGATION OF THE IMPACT OF FISCAL POLICY ON ECONOMIC
GROWTH IN NAMIBIA

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTER OF SCIENCE IN ECONOMICS
OF

THE UNIVERSITY OF NAMIBIA

BY

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APRIL 2025

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ABSTRACT

This study analyzed the impact of fiscal policy on economic growth in Namibia, using annual time series data from 1990 to 2022. The study employed the Autoregressive Distributed Lag (ARDL) estimation technique to examine the long-run relationship between fiscal policy variables and economic growth, along with the Granger causality Wald test to investigate the direction of causality between government expenditure and economic growth. The economic variables analyzed included real gross domestic product (RGDP), government expenditure (GE), budget deficit (BD), trade openness (TOPEN), and inflation (INF). The empirical findings revealed a significant positive impact of government expenditure on economic growth in both the short and long run. While trade openness had a positive long-run impact, it also showed a negative short-run effect on economic growth. The budget deficit exhibited an insignificant negative long-run impact on growth, and inflation was not found to be a strong determinant. Furthermore, the study found no causal relationship between government expenditure and economic growth, indicating the absence of Granger causality in either direction. Based on these findings, it is recommended that the government focuses on enhancing the effectiveness of the Medium-Term Fiscal Consolidation Strategy, which was initiated in 2017 by the Ministry of Finance and Public Enterprises to address fiscal imbalances and rising public debt, aiming to reduce the budget deficit, stabilize debt levels, and promote sustainable economic growth.

Keywords: Government expenditure, Inflation Budget deficit, Economic growth, Namibia, ARDL, long and short run and Granger causality.

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LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|----------|---|
| AIC | Akaike Information Criterion |
| R & D | Research and Development |
| ARDL | Autoregressive Distributed Lag |
| ASEAN | Association of Southeast Asian Nations |
| BD | Budget Deficit |
| BGP | Balanced Growth Path |
| BON | Bank of Namibia |
| CEMAC | Central African Economic and Monetary Community |
| CLRM | Classical Linear Regression Model |
| COVID-19 | Coronavirus Disease 2019 |
| CUSUM | Cumulative Sum |
| CUSUMSQ | Cumulative sum of squares |
| ECM | Error Correction Mode |
| EX | Exports |
| FY | Fiscal Year |
| GDP | Gross Domestic Product |
| GE | Government Expenditure |
| IM | Imports |
| IMF | International Monetary Fund |
| INF | Inflation |
| JB | Jarque-Bera test |
| LM | LM: LM test (Lagrange Multiplier test) |

| | |
|-------|--|
| MOF | Ministry of Finance |
| MTDP | Medium-Term Development Plan |
| NSA | Namibia Statistics Agency |
| OLS | Ordinary Least Squares |
| PP | Phillips Perron |
| PRC | People's Republic of China |
| PVAR | Panel Vector Autoregression |
| RET | Ricardian Equivalence Theorem |
| RGDP | Real Gross Domestic Product |
| SACU | Southern African Customs Union |
| SADC | Southern African Development Community |
| SBC | Schwarz Bayesian Criterion |
| TOPEN | Trade Openness |
| TTR | Total Tax Revenue |
| VAR | Vector Autoregression |
| VAT | Value-Added Tax |
| VIF | Variance Inflation Factor |

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to everyone who contributed to the completion of this thesis. Their love, support, guidance, and encouragement have been invaluable throughout this journey. I am also deeply grateful to my supervisor, Dr. Ronald Chifamba, for the insights provided, encouragement, and expertise during the process of drafting this thesis. His unwavering guidance, valuable feedback, and continuous support that were crucial in improving and shaping the direction of this study. Thank you for teaching me to be a confident and independent researcher and for not spoon feeding me. Furthermore, I am grateful to my family and friends for their understanding, patience, and encouragement during the difficulties encountered in the course of this research journey. Their firm belief in me was a constant source of motivation. Finally, I would like to express my profound gratitude to the almighty for granting me the strength, wisdom, and perseverance to complete this study. Thank you all for being a part of this endeavor and for helping me turn this vision into reality.

DEDICATION

This research is dedicated to my parents, whose solid love, support, and encouragement was the driving force behind my academic journey. Their belief in my abilities and their constant motivation inspired me to pursue excellence and overcome challenges. Thank you for implanting in me the value of education and for always being there to celebrate my achievements and provide comfort during times of uncertainties. Your sacrifices and guidance have shaped me into the person I am today. To the almighty, I offer my deepest gratitude for the blessings and guidance bestowed upon me throughout this study. Your divine wisdom enlightened my path and strengthened my resolve to contribute meaningfully to the world of knowledge.

DECLARATIONS

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

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Wilhelmina Tuyakula Nangobe

W Nangobe

APRIL 2025

Name of Student

Signature

Date

CHAPTER 1: INTRODUCTION

1.1 Introduction

This chapter introduces the study by outlining its motivation, objectives, significance, and scope, including its limitations and delimitations. Section 1.1 presents the background of the study, setting the context that motivates the research. Section 1.2 articulates the problem statement, focusing on Namibia's persistent budget deficits and rising public debt, which constitute the core issues addressed by the study. Section 1.3 defines the objectives of the research, while Section 1.4 outlines the corresponding hypotheses. Section 1.5 discusses the significance of the study, emphasizing its relevance for policymakers and its potential impact on fiscal policy formulation. Section 1.6 depicts the study's limitations by identifying the potential constraints, and Section 1.7 clarifies the delimitations, thereby specifying the scope of the research. Finally, Section 1.8 provides an overview of the organization of the study, outlining the structure of the subsequent chapters.

1.2 Background of the Study

Fiscal policy is a major tool for economic stabilization and development in both developed and less developed countries (Babalola, 2015). This pertains to the way a government modulates its expenditure and tax rates to impact the economy. In pursuit of socio-economic development, developing countries often experience continuous budget-related challenges. The COVID-19 pandemic has further highlighted the importance of effective fiscal measures to support vulnerable groups and stabilize financial systems and stimulating economic activities. According to Nakale, Sikanda and Mabuku (2015),

governments typically use fiscal policy to promote strong and sustainable growth and reduce poverty. At the time of independence in 1990, the Namibian economy grew above 7 % both in 1991 and 1992 before it registered negative decline of 1.6% in 1993. Namibia's fiscal policy stand at a crossroad. The country faces a challenging situation regarding fiscal policy, as the government must navigate the delicate task of balancing macroeconomic stabilization through fiscal consolidation while simultaneously stimulating aggregate demand to meet economic growth objectives, all while ensuring long-term fiscal sustainability.

The nation is grappling with a persistent fiscal imbalance, characterized by rising public debt, unsustainable government spending, and persistent budget deficits. Since its independence in 1990, the country has continuously experienced budget deficits, which worsened in recent years due to a combination of global and domestic challenges. The fiscal deficit began to widen significantly following the global financial crisis of 2008, leading to excessive borrowing to finance public spending. By the 2016/17 fiscal year, Namibia's public debt had risen to approximately 50% of its gross domestic product (GDP) (Bank of Namibia, 2019).

During 2010–15, Namibia witnessed a phase of exceptional economic expansion. However, this period was accompanied by macro-economic imbalances due to an increase in public debt and international reserves below adequate levels (International Monetary Fund, 2019). As stated by Ali and Ahamed (2010), the efficacy of fiscal policy in

improving economic conditions in the long run is a controversial issue and needs further investigation.

1.3 Problem Statement

Namibia faces a significant problem of fiscal imbalance caused by rising public debt, unsustainable government spending, and recurring budget deficits. The economy has been experiencing a budget deficit since its independence in 1990. Over the last few years, the fiscal deficit has widened further reaching critical levels of 50% of the gross domestic product (GDP), particularly from 2009/10 to 2016/17 fiscal year (BON, 2019). As a result, economic experts have been pressuring the government to evaluate its fiscal position, spending levels and core strategies to strike a balance between stabilizing public debt and supporting the economy, calling for additional fiscal stimulus to grow the economy and alleviate poverty (IMF, 2019).

Numerous studies have explored the relationship between fiscal policy and economic growth in Namibia. Kaakunga (2006) examined the impact of fiscal policy on economic growth, while Sakaria (2019) investigated the implications of budget deficits on economic performance. More recently, Shikomba, Elias, and Ruttanawijit (2021) analyzed the role of government expenditures in driving economic growth. While these studies provide valuable contributions to literature, they mainly emphasize historical trends and broad fiscal indicators, offering limited insight into the specific mechanisms through which fiscal policy influences economic dynamics.

In contrast, my study identifies a unique aspect not previously addressed in Namibian research, the presence of multicollinearity between government expenditure and tax revenue. This finding distinguishes my work by highlighting the intricate interplay between these fiscal variables, thereby providing a deeper understanding of the complexities inherent in Namibia's fiscal policy framework. By uncovering this relationship, my research offers novel insights that can inform effective policy interventions aimed at fostering sustainable economic growth.

According to the Ministry of Finance, (2021), Namibia's GDP growth began to decelerate in 2015, marking a growth rate of 4.5%, a significant shift from the robust 6.1% growth observed in 2014, followed by a 1.0% decline in 2017. In response to an expanding deficit and a sharp upsurge in debt, the government implemented a fiscal consolidation policy in 2015/2016. This initiative reduced the expenditure, from 42.8% of the GDP in 2015/16 to 37.6% in 2019/20. However, despite these measures, economic growth continued to decline, leading to elevated levels of deficit and debt. The debt stock surged from N\$59.8 billion in 2015/16 to N\$100.4 billion in 2019/20.

These issues hinder the government's ability to invest in key areas like healthcare and infrastructure, while also increasing vulnerability to external shocks. The growing debt, which reached 68.6% of GDP in 2021, is problematic because it can lead to long-term negative effects such as slower economic growth and reduced investor confidence (BON, 2021). Addressing this is crucial for sustainable growth and economic stability.

1.4 Objectives of the Study

The main objective of this study was to investigate the impact of fiscal policy on economic growth in Namibia. The specific objectives sought to:

- i. Assess whether there existed a long-run relationship between fiscal policy and economic growth.
- ii. Assess whether there existed a short-run relationship between fiscal policy and economic growth.
- iii. Determine the direction of causality between government expenditure and economic growth.

1.5 Hypothesis of the Study

Based on the aforementioned specific objectives the following hypotheses were tested:

- i. H_0 : There is no long-run relationship between fiscal policy and economic growth.
 H_1 : There is a long-run relationship between fiscal policy and economic growth.
- ii. H_0 : There is no short-run relationship between fiscal policy and economic growth.
 H_1 : There is a short-run relationship between fiscal policy and economic growth.

iii. H_0 : Government expenditure does not Granger causes economic growth in Namibia.

H_1 : Government expenditure Granger causes economic growth in Namibia.

1.6 Significance of the Study

The study contributes to existing literature and knowledge by investigating the impact of fiscal policy on economic growth in Namibia over the past few decades. In other words, the study aimed to fill the gap of empirical studies in Namibia on the area of fiscal policy which has received limited scholarly attention. The main beneficiaries of the study are the government, central banks and policy makers.

1.7 Limitations of the Study

The author acknowledges that the study did not incorporate the full range of the fiscal policy variables due to multicollinearity issues detected amongst the independent variables, particularly between the independent variables of government expenditure and tax revenue. As such, tax revenue was dropped because during economic downturns, governments may increase expenditures to stimulate the economy, which could be financed through higher tax collections. As a result, the budget deficit, inflation and trade openness were included as control variables in the study, given their relevance to fiscal sustainability and economic performance.

1.8 Delimitations of the Study

Due to availability of data, the study was based on 32 observations, covering a period between 1990 till 2022. The relatively short timeframe may restrict the ability to generalize the findings, particularly in relation to long-term trends or fluctuations that could emerge beyond the study period. These constraints may also introduce biases and reduce the robustness of the conclusions.

1.9 Organisation of the Study

The remainder of the study is organized as follows: Chapter Two provides an overview of Namibia's fiscal policy developments and economic performance. Chapter Three presents a comprehensive review of relevant literature on the relationship between fiscal policy and economic growth. Chapter Four outlines the research methodology employed in the study. Chapter Five discusses the results and data analysis, including estimation and regression outcomes. Finally, Chapter Six presents the study's conclusions and policy recommendations.

**CHAPTER 2: OVERVIEW OF NAMIBIA’S FISCAL POLICY
DEVELOPMENTS AND ECONOMIC PERFORMANCE**

2.1 Introduction

This chapter provides an overview of Namibia’s fiscal policy developments and economic performance for a selected period of 2016-2021. It begins by summarizing trends in GDP growth and fiscal aggregates over recent years. The discussion then examines key elements such as government revenue, total expenditure, and budget deficits, highlighting the effects of fiscal consolidation efforts and external shocks like the COVID-19 pandemic. Finally, the chapter sets the context for the study by outlining the major fiscal challenges and policy responses that have shaped Namibia’s economic landscape.

Table 2.1: Trends of fiscal aggregates

| Indicator | 2016-17 | 2017-18 | 2018-19 | 2019-20 | 2020-21 |
|-----------------------|----------------|----------------|----------------|----------------|----------------|
| | Actual | Actual | Actual | Actual | Actual |
| GDP | 161,173 | 173,944 | 180,940 | 179,126 | 178,123 |
| Revenue | 50,865 | 58,659 | 55,882 | 58,425 | 57,838 |
| % of GDP | 31.60% | 33.70% | 30.90% | 32.60% | 32.50% |
| Expenditure | 62,228 | 67,523 | 65,108 | 67,343 | 72,035 |
| % of GDP | 38.60% | 38.80% | 36.00% | 37.60% | 40.40% |
| Budget Deficit | -11,363 | -8,864 | -9,226 | -8,919 | -14,197 |
| % of GDP | -7.10% | -5.10% | -5.10% | -8.00% | -8.70% |
| Debt | 69,896 | 74,468 | 87,533 | 100,400 | 110,608 |
| % of GDP | 43.40% | 42.80% | 48.40% | 56.00% | 62.10% |

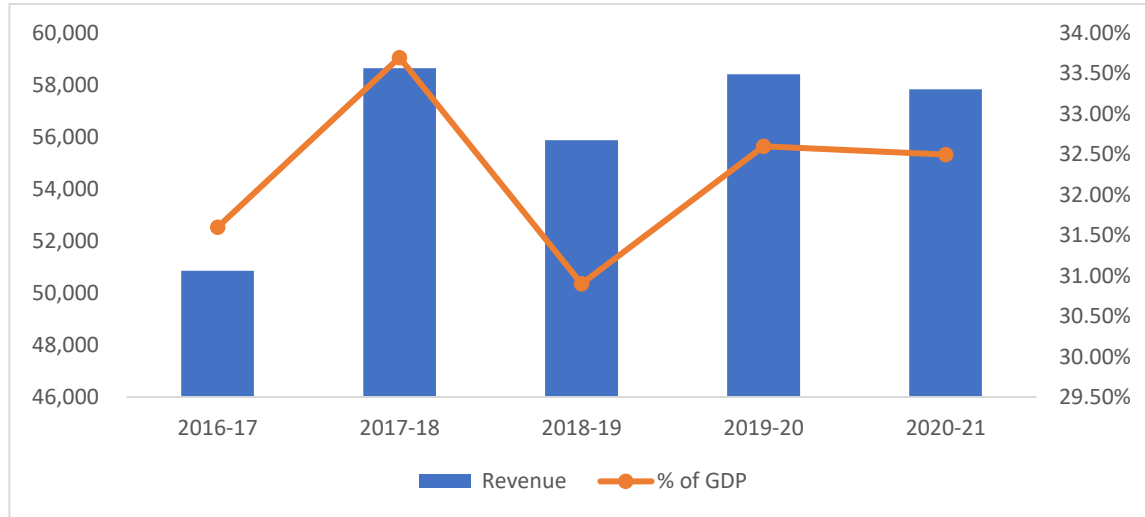
Source: Ministry of Finance 2020/21

The Namibian GDP started to slow in 2015, when it recorded a growth of 4.5% compared to a strong growth of 6.1% in 2014 and declined by 1.0% in 2017. Although GDP growth recovered slightly by 1.1% in 2018, economic activity contracted again by 1.6% in 2019. In response to increasing deficits and a significant rise in debt levels, the government initiated a fiscal consolidation policy in 2015/2016. This policy aimed to reduce government spending, which had accounted for 42.8% of GDP in 2015/16, to 37.6% of GDP by 2019/20. Despite these efforts, revenue continued to decline, resulting in persistently high deficit levels and an expanding debt burden. The total debt stock surged from N\$59.8 billion in 2015/16 to N\$100.4 billion by 2019/20.

Furthermore, the onset of the COVID-19 pandemic at the start of FY2020/21 resulted in a reversal of the progress achieved through the fiscal consolidation policy, pushing the economy into the deepest recession in its history. Despite a gradual decline, revenue declined from N\$58.4 billion in FY2019/20 to an estimated N\$51.4 billion in the FY2020/21 Budget, a figure that has since been adjusted to approximately N\$55.2 billion in the FY2020/21 Mid-Year Budget Review Policy Statement.

2.2 Analysis of actual fiscal outturns for 2016/2017 to 2020/2021

Figure 2.1: Government revenue, FY2016-17 to FY2020-21

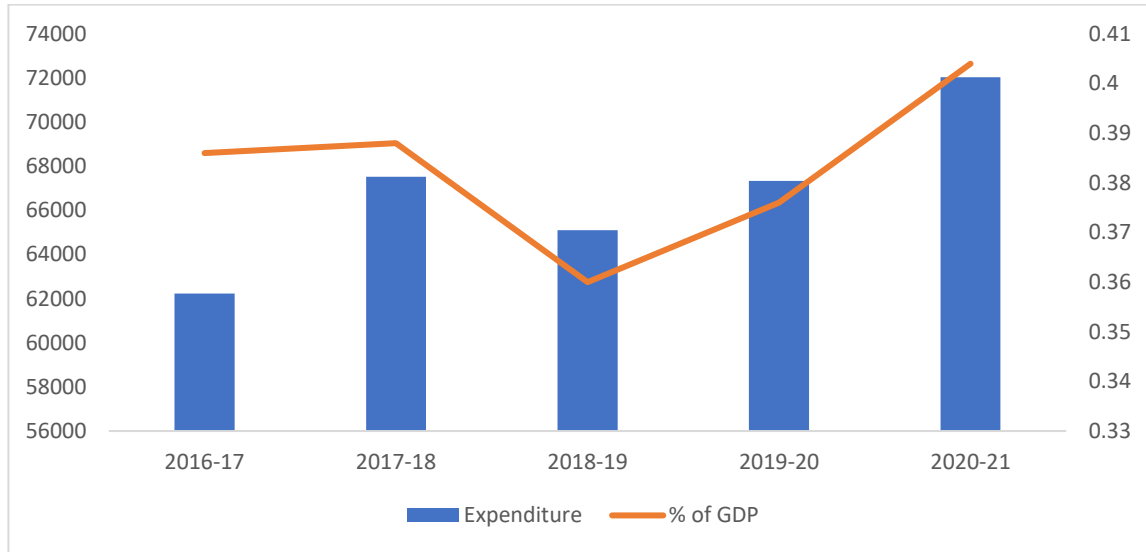


Source: Ministry of Finance 2020/21

2.2.1 Government Revenue

Total revenue and grants for FY2020/21 amounted to N\$57.8 billion, representing a 1% decrease compared to N\$58.4 billion realized in FY2019/120. The revenue categories that recorded a decrease were income tax on individuals that decreased by 2.7%, VAT fell by 24.9%, other taxes on income and profits shrank by 23.2%, withholding tax on interest decreased by 18.1%, while other taxes income category fell by 10.6%. In contrast, there was notable growth in the tax on international trade (SACU), which increased from N\$18.9 billion to N\$22.3 billion.

Figure 2.2: Total Expenditure

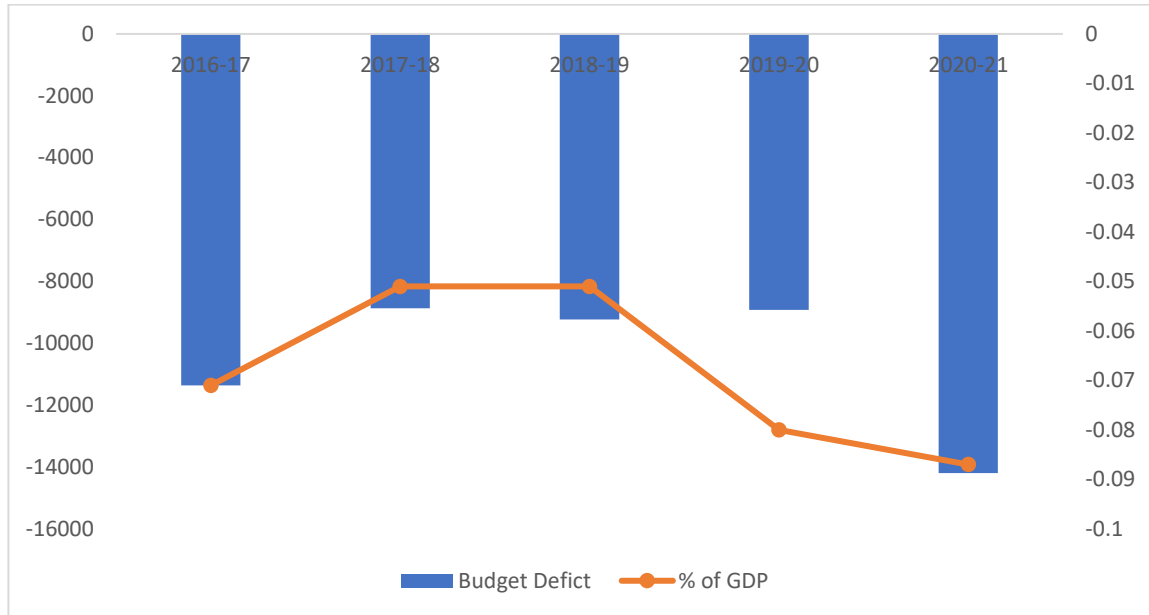


Source: Ministry of Finance 2020/21

2.2.2 Total Expenditure

Total expenditure for FY2020/21 was recorded at N\$72.0 billion, representing an increase of 7.0% compared to FY2019/20. The increase in expenditure is accounted for by increases of 30.3% in goods and other services categories, compared to the previous year mainly due to high spending needs to fund COVID-19-19 related activities.

Figure 2.3: Budget Deficit



Source: Ministry of Finance 2020/21

2.2.3 Budget Deficit

The decrease in revenue and accompanying increase in expenditure led to an increase in budget deficit from 5.0% to 8.0%. Total debt stock rose from N\$100.4 billion in FY2019/20 to N\$110.6 billion in FY2020/21. As a percentage of GDP, total debt stock increased from 56.0% to 62.1%.

2.3 Summary

Namibia's fiscal journey over the past decade has been characterized by efforts to control rising deficits and debt, which were ultimately challenged by structural revenue declines and external shocks like the COVID-19 pandemic. This chapter underscores the need for more robust fiscal strategies to ensure sustainable economic growth and stability.

CHAPTER 3: LITERATURE REVIEW

3.1 Introduction

Section 3.2 presents different theories that underlie the study. Section 3.3 covers existing empirical studies conducted in different countries, using different methodologies and time periods. Section 3.4 summarizes the chapter.

3.2 Theoretical Review

Historically, various schools of thought have debated the effectiveness of fiscal policy. These include, the Keynesian theory of fiscal policy, Ricardian Equivalence Theorem (RET) and Fiscal Policy in an Endogenous Growth Model. These different schools of thought are discussed below.

3.2.1 Keynesian Theory of Fiscal Policy

The Keynesian theory developed by British economist, John Maynard Keynes, in 1936 during the great depression advocated for increased government expenditure and lower taxes to stimulate aggregate demand and pull the economy out of a depression. Conversely, during periods of high inflation and excessive demand, the government should reduce its spending and/or increase taxes to control inflation. According to Keynes (1936), an injection of government spending eventually leads to added business activity and even more spending. Keynesian theorists argue that economies do not stabilize themselves very quickly and require active government intervention that boosts short-term demand in the economy. Furthermore, this framework is closely linked to economic growth, as the multiplier effect of government spending can set off a chain reaction,

spurring increased production, job creation, and higher income levels, that ultimately fosters sustained long-term growth.

3.2.2 Ricardian Equivalence Theorem

Contrary to the Keynesian approach, the Ricardian Equivalence Theorem (RET) pioneered by Ricardo (1817) opposed government intervention in the economy through fiscal policy as it suggested that the government cannot achieve anything different from the free operation of market forces (Buchanan, 1976). In addition, RET, which is sometimes known as debt neutrality suggests that fiscal stimuli which are defined in terms of deficit-financed public spending hikes or tax cuts will lead to a crowding out of private consumption, thereby decreasing the effectiveness of fiscal policy in boosting economic activity. It stipulates that a person's consumption is determined by the present value of his/her after-tax income. Consequently, the Ricardian Equivalence states that a government cannot stimulate consumer spending, since people assume that whatever is gained in the present will be offset by higher taxes due in the future. Thus, the underlying idea behind Ricardo's theory is that no matter how a government chooses to increase spending, whether by debt financing or tax financing, the outcome is the same and demand remains unchanged (Hayo & Neumeier, 2017).

3.2.3 Fiscal Policy in an Endogenous Growth Model

Endogenous growth models are a class of economic models that emphasize the role of internal factors, such as investment in research and development (R&D), human capital accumulation, and technological progress, in driving long-run economic growth (Jones,

1995). The endogenous growth model is concerned with the existence of a long run steady state (or Balanced Growth Path (BGP)) for combinations of tax rates and rules for government spending. A BGP, often referred to as a steady-state equilibrium, describes a situation in which an economy is growing at a stable and sustainable rate. In this state, various economic variables, such as output, consumption, investment, and population, are all growing at consistent rates, and there are no immediate pressures or forces pushing the economy to accelerate or decelerate its growth.

In other words, fiscal policy in an endogenous growth model refers to the use of government spending, taxation, and other policy tools that influence the long-term rate of economic growth. Fiscal policy is influenced by the scale of the economy, measured by its population and investment in transport and communication is consistently correlated with growth while the effects of taxation are difficult to isolate empirically (Easterly & Rebelo, 1993).

3.3 Empirical Review

Various studies examining the relationship between fiscal policy and economic growth have produced mixed results. For instance, Kaakunga (2006), analysed the impact of fiscal policy on economic growth in Namibia using the framework of endogenous growth models and discovered that capital expenditure, tax revenue, and terms of trade positively affect economic growth while the share of private consumption in GDP, fiscal deficit, the share of total public debt in GDP and current expenditure relates negatively to the growth of output in Namibia. Mugableh (2019) and Tendengu, Kapingura, and Tsegaye (2022)

utilized the autoregressive distributed lag and vector error correction models to examine the impact of fiscal policy tools on economic growth. Mugableh (2019) results revealed that general government expenditures have long-run positive impact on economic growth and total tax rates have long-run negative impact on economic growth in Jordan.

In the same vein, Tendengu, Kapingura, and Tsegaye (2022) empirical results revealed that there is a positive relationship between fiscal policy instruments (public sector expenditure, public consumption spending, and taxation) and economic growth. Tilahun (2022) explores the link between various components of fiscal policy on Ethiopia's economic growth using annual data for 35 years using time series techniques and the ARDL model. The study employed the autoregressive distributed lag estimation technique. Results from the bound tests showed that there was a long-run relationship between the variables (economic growth; government expenditure; public investment and private investment).

On contrary, Symoom (2018), Shikomba, Elias and Ruttanawijit (2021) and Alzyadat and Al-nsour (2021) found mixed and context specific effects of fiscal policy on economic growth. Symoom's (2018) analysis of selected South Asian countries revealed that both government expenditure and tax revenue have no significant impact on real GDP growth. However, real investment is strongly positively correlated with real GDP growth in these countries. Moreover, using time-series data of Namibia's economy from 1991 to 2019 and the vector auto-regression model, Shikomba, Elias and Ruttanawijit (2021) study revealed that there is a positive long-run relationship between government expenditure and

economic growth in Namibia. However, the study also indicates that government expenditures may have a weak influence on Gross Domestic Product, as evidenced by variance decomposition analysis.

Furthermore, an extensive body of literature has emerged to investigate the nexus between fiscal policy and long-run economic growth. Other researchers who have examined the relationship between fiscal policy and economic growth include Makhoba and Kaseeram (2022); Muyaba (2016); Milanzi (2015) and Tang, Liu, and Cheung (2013)

Makhoba and Kaseeram (2022) estimated a panel vector autoregressive (PVAR) approach to establish the impact of fiscal policy on economic growth in Southern African Developing Communities (SADC) over the period 2000–2018. The results provide empirical evidence of a positive response to GDP growth due to shocks in government expenditure, employment, and public debt while gross capital formation had a negative effect. Further, Gjuvis and Eric (2020) investigated the growth effects of fiscal policy in developing countries over the period 1980–2014. The empirical evidence is based on a Pooled Mean Group approach. With the panel of dependent natural resources countries that all are members of a Central African Economic and Monetary Community (CEMAC), the results show that fiscal policy measured as budget deficit has a positive and significant effect on growth in the short run while it has a statistically significant positive effect on economic growth in the long run. The results of a short-run country effect analysis show the effectiveness of fiscal policy in all the countries of the union with an important effect in Equatorial Guinea and the less effect in Cameroon.

Moreover, Muyaba (2016) studied the relationship between fiscal policies and economic growth in Zambia from 1991 to 2015. The study employed the Autoregressive Distribution Lag (ARDL) and the Pairwise Granger Causality test to measure directional relationship that exists between public expenditure and economic growth. Empirical findings revealed that there is a positive and significant relationship between public expenditure and economic growth in Zambia both in the short-run and the long-run. Further, the Granger causality test demonstrated a unidirectional causality from public expenditure to economic growth.

Milanzi (2015) investigated the impact of fiscal policy on economic growth in Malawi using time series data from the year 1981 to 2014. The study used VAR model to capture the linear interdependence among multiple time series. The findings of this study demonstrated that a suitable budget structure promotes economic growth over the short and long term. It has been emphasized that because the nation's reliance on agriculture is growing unstable due to climate change, the deficit gap can only be bridged if the country expands its sources of income. The primary sources of revenue for the government must be energy, industrial development, mining, and tourism, even though the prognosis for 2016–2017 shows a decline of between 4% and 2%, respectively.

Tung (2008) investigated the impact of fiscal deficit on the economic growth of Vietnam by employing the Error Correction model with quarterly data spanning from 2003 to 2016. The empirical findings revealed a cointegration relationship between fiscal deficit and economic growth in Vietnam, indicating negative effects of fiscal deficit on economic

growth in both the short and long run. In particular, the correlation analysis has confirmed that fiscal deficit can hurt not only the gross output but also private investments, foreign direct investments, and net exports.

3.4 Summary

The Keynesian theory of fiscal policy, Ricardian Equivalence Theorem (RET) and the fiscal policy in an Endogenous Growth Model were found to be the most applied theories to explain the impact of fiscal policy on economic growth. Various studies on the nexus between fiscal policy and economic growth in other parts of the world have yield mixed results. However, while existing literature provides valuable insights into the fiscal policy-economic growth nexus, the current study diverged from the cited literature by adopting a more specific focus, refraining from the inclusion of taxation as one of the fiscal policy tools. This was due to the multicollinearity problem revealed between government expenditure and total tax revenue in Namibia. This unique finding underscores the study's contribution to the discourse on fiscal policy's impact on economic growth in Namibia. The next chapter discusses the methodological techniques employed to examine the impact of fiscal policy variables on economic growth in Namibia.

CHAPTER 4: RESEARCH METHODOLOGY

4.1 Introduction

This chapter presents and discusses the methodology techniques employed to examine the impact of fiscal policy on economic growth in Namibia. The chapter is further divided into six sections. Section 4.2 presents the research design, section 4.3 stipulates the data and sources of data, section 4.4 provides the definitions and justification of the variables of the study, section 4.5 presents model specification, section 4.6 presents the estimation techniques, section 4.7 presents the diagnostic tests conducted to examine the underlying dynamics and section 4.8 addresses the research ethics.

4.2 Research Design

The study employed a quantitative research design and econometric modelling to examine the impact of fiscal policy on economic growth in Namibia.

4.3 Data and Sources

The study utilized secondary annual time series data covering the period 1990-2022. The data used in the study were sourced from Namibia Statistics Agency (NSA), Ministry of Finance (MOF) and Bank of Namibia (BON). Specifically, data on Real Gross Domestic Product (RGDP), Inflation (INF) and Trade Openness (TOPEN) were sourced from the Namibia Statistics Agency, while Government Expenditure (GE) was obtained from the Bank of Namibia. Additionally, data on the Budget Deficit (BD) were retrieved from the Ministry of Finance.

4.4 Variables Definitions and Justification

The study used five variables to analyse the relationship between fiscal policy and economic growth in Namibia. Real Gross Domestic Product (RGDP) as the dependent variable served as a proxy for economic growth. RGDP is an inflation-adjusted metric that captures the total value of goods and services produced in the economy. Economic growth, in this context, occurs when an economy's productive capacity expands, leading to the production of more goods and services. For the study, RGDP was converted into growth rates, as these rates help highlight periods of economic expansion, contraction, or stagnation, crucial for understanding economic cycles and long-term trends.

The independent variable of the study is Government Expenditure (GE), which refers to the actual total share of the current expenditure in the total government expenditure. Furthermore, the study employed two control independent variables which are Budget Deficit (BD) and Trade Openness (TOPEN). Budget Deficit (BD) is captured by the overall deficit which is the difference between public revenue and public expenditure. Trade Openness (TOPEN) refers to the extent to which a country engages in international trade with other nations. It is a measure of how freely a country allows the movement of goods and services across its borders. It is measured as the ratio of exports plus imports over GDP, $[(EX+IM)/GDP] * 100$, where EX represents exports, which are the goods and services a country sells to other countries, generating income from international trade and IM represents imports, which are the goods and services a country purchases from other countries, resulting in expenditures on international trade. Inflation (INF) measures the rate at which the general level of prices for goods and services is rising, eroding

purchasing power. Lastly, all the variables are measured in millions (N\$) and rescaled during analysis. Lastly, all the variables are measured in millions (N\$) and rescaled during analysis.

Furthermore, the study's a priori expectations anticipate that government expenditure will positively impact economic growth by stimulating aggregate demand and productivity. Conversely, a budget deficit is expected to have a negative effect, as it may lead to rising debt and reduced private investment. Trade openness is predicted to support economic growth by enhancing market access, technology transfer, and efficiency. Inflation is expected to have a negative effect on economic growth, as rising prices can reduce consumer purchasing power and increase production costs.

4.5 Model Specification

The study employs a quantitative design to analyze the impact of fiscal policy on economic growth in Namibia. The dynamic panel data model utilized is adapted from Bond (2002), which offers a comprehensive framework for analyzing microeconomic data through autoregressive dynamics and explanatory variables. The model is expressed as follows:

$$\ln RGDP_t = c_0 + \sum_{i=1}^p \beta_i \ln RGDP_{t-i} + \sum_{j=0}^k \delta_j \ln GE_{t-j} + \sum_{m=1}^q \sum_{l=0}^r \alpha_{ml} X_{m,t-1} + \varepsilon_t \dots (1)$$

Where, \ln represents the natural log transformation used to capture elasticity and growth effects in the model, c_0 is the intercept, p, k and r denotes the maximum lag length order based on the starting points indicated by the subscripts i, j and l . On the other hand, l

indicates how far back in time the variable X_m is lagged, from period $t - l$, m represents the control variables in X, which include Budget Deficit (BD), Inflation (INF) and Trade Openness (TOPEN). Control variables are held constant or restricted in analysis, as they are not the primary focus of the study's objectives. Moreover, these variables serve the purpose of controlling the potential influence of other factors on the dependent variable. β, δ and α are the slope coefficients for Real Gross Domestic Product (RGDP), Government Expenditure (GE), Budget Deficit (BD), Inflation (INF) and Trade openness (TOPEN), respectively. While t designates the time trend and ε_t is the random disturbance error term. Subsequently, to determine the long run relationship amongst the variables the study employed an unconstrained error correction version of the ARDL bound co-integration model specified as follows in equation (2).

$$\begin{aligned} \Delta \ln RGDP_t = & c_0 + \pi \ln RGDP_{t-1} + \sum_{j=1}^k \pi_j \ln GE_{t-1} + \sum_{m=1}^q \sum_{l=1}^r \pi_{ml} X_{t-1} \\ & + \sum_{i=1}^p \beta_i \Delta \ln RGDP_{t-1} + \sum_{j=1}^k \gamma_j \Delta \ln GE_{t-1} + \sum_{m=1}^q \sum_{l=1}^r \omega_{ml} \Delta X_{m,t-1} \\ & + \varepsilon_t \dots (2) \end{aligned}$$

Where π are the short-run dynamics of the model, β, γ and ω represents the long run coefficients and Δ denotes the first difference operator while ε_t is residual term. Once the long-run relationship is established, long-run and short run coefficients of the proposed ARDL model are then estimated. The F-statistics are carried out on the joint null hypothesis that the coefficients of the lagged variables are zero. The hypothesis that the

coefficients of the lag level variables are zero is to be tested. Therefore, the null hypothesis of non-existence of the long-run relationship is defined by:

$$H_0: \pi_y = \pi_j = \pi_{ml} = 0 \text{ (null, the long run relationship does not exist)}$$

$$H_1: \pi_y \neq \pi_j \neq \pi_{ml} \neq 0 \text{ (alternative, the long run relationship exist)}$$

Here, π_γ denotes the short-run coefficients associated with the dependent variable (Y) in the model. The null hypothesis (H_0) posits that these short-run dynamics, along with the long-run coefficients (π_j and π_{ml}), are equal to zero, indicating no long-run relationship among the variables. Conversely, the alternative hypothesis (H_1) suggests that these coefficients are not equal to zero, implying that the variables in equation (2) exhibit a long run relationship. Failure to reject the null hypothesis implies that there is no co-integration, in other words no long run relationship exists amongst the variables.

The actual impact of X through ω , should be done considering the size and orders associated with the dependent variable $Y = RGDP$ through β . The cumulative impact of ω is weighed by using long run multiplier and an approximation to this long-run multiplier, would involve a non-linear transformation to get a long-run coefficient. The study adapted and modified the following non-linear long-run multiplier general form equation by (Blackburne & Frank, 2007) to compute the weighted long-run multipliers:

$$\theta = \frac{\sum_{l=0}^r \alpha_{ml}}{1 - \sum_{i=1}^p \beta_i} \dots \dots \dots (3)$$

Where θ is the long-run multiplier of the variable x, which in this case is GE, TOPEN, INF and BD. Further, $\sum_{l=0}^r \alpha_{ml}$ is the sum of the coefficient α associated with the independent variables (and its lags) is divided by 1 minus the sums of the autoregressive β coefficients. The upper numerator corresponds to the Long-Run Propensity of x towards y, which is the sums of the coefficients. The denominator represents the weight associated with the response of the autoregressive structure.

Moreover, the study aimed to determine the direction of causality between government expenditure and economic growth in Namibia. A variable x is said to Granger-cause a variable y if, given the past values of y, past values of x are useful for predicting y. A common method for testing Granger causality is to regress y on its own lagged values and on lagged values of x and test the null hypothesis that the estimated coefficients on the lagged values of x are jointly zero. Failure to reject the null hypothesis is equivalent to failing to reject the hypothesis that x does not Granger-cause y.

Following Granger (1969), Bwire and Nampewo (2014) the causal relationship between the variables is specified as follows:

$$\ln RGDP_t = \alpha_0 + \sum_{i=1}^n \alpha_{1i} \ln RGDP_{t-i} + \sum_{i=1}^n \alpha_{2i} \ln GE_{t-i} + \varepsilon_{1t} \dots \dots \dots (4)$$

$$\ln GE_t = \delta_0 + \sum_{i=1}^n \delta_{1i} \ln RGDP_{t-i} + \sum_{i=1}^n \delta_{2i} \ln GE_{t-i} + \varepsilon_{2t} \dots \dots \dots (5)$$

Where α_0 , and δ_0 are the estimated parameters and ε_t 's are the serially uncorrelated error terms. Variable $\ln RGDP_t$ is said to Granger cause variable $\ln GE_t$ if the past values of

$\ln RGDP_t$ have predictive power for the current value of $\ln GE_t$, conditional on the past returns of $\ln GE_t$. Below, are four cases prior to expectations according to (Granger, 1969):

- i. Unidirectional causality from regressors to regress and in equations (4) and (5) is indicated if the estimated coefficients on the lagged regressors are statistically different from zero as a group and the set of estimated coefficients on the lagged regress and is not statistically different from zero.
- ii. Conversely, unidirectional causality from regress and to regressors exists if the set of lagged coefficients in equations (4) to (5) are not statistically different from zero and the set of the lagged regressor coefficients are statistically different from zero.
- iii. Feedback, or bilateral causality, is suggested when the sets of coefficients are statistically significantly different from zero in all regressions.
- iv. Independence is suggested when variables coefficients are not statistically significant in all the regressions. In this case there is no Granger causality in any direction.

4.6 Estimation Techniques

The first step in examining the long run relationship between the variables is to test whether the variables are stationary or non-stationary. Therefore, the variables RGDP, GE, BD, INF and TOPEN were tested using one of the most widely applied unit root test, Phillips-Perron proposed Phillips and Perron (1988) to determine the order of integration, by testing for the null hypothesis $H_0: \phi = 1$ (i.e., has unit root and non-stationary) against the alternative hypothesis which is $H_1: \phi < 1$ (i.e., has no unit root and is stationary). The

Phillips-Perron test is considered more robust than the Dickey-Fuller test, particularly when dealing with time series data that may have mild autocorrelation and heteroskedasticity. The Phillips-Perron test also allows for the use of different lag lengths and can be applied to both small and large sample sizes (Phillips & Perron, 1988).

The selection of the appropriate lag length is crucial in time series analysis, as it ensures the validity and robustness of the estimated model. For this research, the optimal lag length will be determined using STATA, which provides various lag selection criteria, including the Akaike Information Criterion (AIC), Schwarz Bayesian Criterion (SBC), and Hannan-Quinn Criterion (HQC). These criteria help in balancing model complexity and goodness of fit by penalizing excessive lags that may lead to overfitting. The general approach follows the standard lag selection procedure, where for a given autoregressive distributed lag (ARDL) model, the optimal lag length p is chosen by minimizing the respective information criteria:

$$AIC = 2\ln(L) + 2k \dots\dots\dots (6)$$

$$BIC = 2\ln(L) + k\ln(T) \dots\dots\dots (7)$$

where L represents the likelihood function, k is the number of estimated parameters, and T is the sample size (Gujarati & Porter, 2009; Wooldridge, 2016). The study will select the lag length that minimizes these criteria to ensure model efficiency and avoid unnecessary loss of degrees of freedom.

Furthermore, to test for the long run relationship between fiscal policy and economic growth in Namibia, the study employed the Autoregressive Distributed Lag model (ARDL) bounds test, popularised by Pesaran and Shin (1999). The ARDL bounds test is advantageous when working with variables of different orders, i.e., $I(0)$ $I(0)$ $I(0)$, $I(1)$ $I(1)$ $I(1)$, or a combination of both and, it is more robust when there is a single long run relationship between the underlying variables in a small and finite sample data size which is the case for this study (Pesaran & Shin, 1999). Moreover, the Granger-causality approach is employed to establish the direction of causality between fiscal policy variables and economic growth, which evaluates whether one variable can predict another (Granger, 1969).

4.7 Diagnostic Tests

Diagnostic tests are essential tools in econometrics and statistical analysis as they assess the adequacy of a model and identify potential issues, such as serial correlation, heteroskedasticity, or normality violations, that could affect the validity of the results (Brooks, 2008). Consequently, to ensure the validity and robustness of the ARDL model and other linear regression models the following diagnostic tests were conducted:

1. Normality Test - Jarque-Bera Test: This test assesses whether the residuals are normally distributed. The null hypothesis assumes that the residuals follow a normal distribution. If the p-value is less than the significance level (usually 0.05), the null hypothesis is rejected, indicating a departure from normality.

2. Serial Correlation Test - Breusch–Godfrey LM Test: This test checks for the presence of serial correlation in the residuals. The null hypothesis is that there is no serial correlation. If the p-value is less than 0.05, the null hypothesis is rejected, suggesting the presence of serial correlation in the model.
3. Heteroskedasticity Test - Breusch-Pagan / Cook-Weisberg Test: This test evaluates whether the variance of the residuals is constant (homoskedasticity). The null hypothesis assumes homoskedasticity, meaning that the variance is constant across all levels of the independent variables. If the p-value is less than 0.05, the null hypothesis is rejected, indicating heteroskedasticity.
4. Parameter Stability Test - Cumulative Sum (CUSUM) Test: The CUSUM test detects structural breaks or instability in the parameters over time, which is vital for ensuring the reliability of the model's estimates (Brown, et al., 1975). A significant deviation from the baseline in the CUSUM plot, typically crossing the critical bounds, leads to the rejection of the null hypothesis, suggesting parameter instability. Additionally, the CUSUM of squares (CUSUMSQ) test was conducted to further check for parameter stability over time.

These tests help identify potential issues or violations of the underlying assumptions, thereby ensuring that the results are reliable and trustworthy. If any of the tests indicate a violation, corrective measures, such as model adjustments or variable transformations, would be considered to maintain the integrity of the results.

4.8 Research Ethics

The study maintained professional integrity by accurately acknowledging all data sources and the work of other authors. No alterations were made to the results, ensuring that the study reflects the original work of the author.

CHAPTER 5: RESULTS AND DATA ANALYSIS

5.1 Introduction

This chapter presents the results of empirical data analysis, including the interpretation and discussion of the study findings. It covers the results from the descriptive statistics, Pearson correlation matrix, variance inflation factor (VIF) test, unit root (stationarity) test, ARDL bounds test for cointegration, short-run and long-run ARDL regression results, Granger causality tests, and diagnostic tests.

Table 5.1: Descriptive statistics test results

| Variable | observations | Mean | Std.Dev. | Min | Max |
|-----------------|---------------------|-------------|-----------------|------------|------------|
| LNRGDP | 33 | 11.43 | 0.37 | 10.81 | 11.89 |
| LNGE | 33 | 10.13 | 0.36 | 9.52 | 10.62 |
| LNBD | 33 | 9.08 | 0.99 | 4.96 | 9.73 |
| INF | 33 | 7.27 | 3.31 | 2.21 | 17.87 |
| LNTOPEN | 33 | 4.49 | 0.09 | 4.28 | 4.71 |

5.2 Descriptive statistics test results

As presented in Table 5.1, descriptive statistics provide an overview of the dataset, highlighting key characteristics such as central tendency and variability. This study comprises 33 observations for the log-transformed variables Real Gross Domestic Product (LNRGDP), Government Expenditure (LNGE), Budget Deficit (LNBD), and Trade

Openness (LNTOPEN), alongside Inflation (INF), which is measured in percentage terms. Real Gross Domestic Product (LNRGDP) has a mean of 11.43 (SD = 0.37), ranging from 10.81 to 11.89, indicating low variability in economic output. Government Expenditure (LNGE) exhibits a mean of 10.13 (SD = 0.36), with values between 9.52 and 10.62, reflecting stability in public spending. Budget Deficit (LNBD) shows the highest variability (SD = 0.99), with a mean of 9.08 and values spanning 4.96 to 9.73, suggesting significant fiscal fluctuations. Trade Openness (LNTOPEN) remains stable, with a mean of 4.49 (SD = 0.09) and values ranging from 4.28 to 4.71, indicating a consistent level of economic integration with global markets. Inflation (INF), which is not log-transformed, has a mean of 7.27% (SD = 3.31%), with values ranging from 2.21% to 17.87%, indicating substantial inflationary variability. These statistics provide a foundation for further empirical analysis.

Table 5.2: Pearson correlation matrix test results

| Variable | LNRGDP | LNGE | LNBD | INF | LNTOPEN |
|-----------------|---------------|-------------|-------------|------------|----------------|
| LNRGDP | 1.0000 | | | | |
| LNGE | 0.9847 | 1.0000 | | | |
| LNBD | -0.5785 | -0.6508 | 1.0000 | | |
| INF | -0.7211 | -0.6748 | 0.4900 | 1.0000 | |
| LNTOPEN | 0.7894 | 0.8083 | -0.3644 | -0.4436 | 1.0000 |

5.3 Pearson correlation matrix test results

Table 5.2 illustrates the statistical relationships among Real Gross Domestic Product (LNRGDP), Government Expenditure (LNGE), Budget Deficit (LNBD), Trade Openness (LNTOPEN), and Inflation (INF), which is measured in percentage terms. Real Gross Domestic Product (LNRGDP) is strongly correlated with Government Expenditure (LNGE) (0.9847) and Trade Openness (LNTOPEN) (0.7894), suggesting that increased public spending and greater economic integration contribute positively to economic growth. Conversely, Budget Deficit (LNBD) (-0.5785) and Inflation (INF) (-0.7211) are negatively correlated with Real Gross Domestic Product (LNRGDP), indicating that higher fiscal deficits and inflation may constrain economic performance. Similarly, Government Expenditure (LNGE) negatively correlates with Budget Deficit (LNBD) (-0.6508) and Inflation (INF) (-0.6748), suggesting that higher government spending is linked to lower fiscal deficits and inflationary pressures. Budget Deficit (LNBD) and Inflation (INF) show a moderate positive correlation (0.4900), indicating that fiscal imbalances may contribute to rising price levels. Additionally, Trade Openness (LNTOPEN) is negatively correlated with Inflation (INF) (-0.4436), implying that greater economic openness may help reduce inflation.

To further ensure the reliability of the regression results, a Variance Inflation Factor (VIF) test was carried out to measure how much of the variance of an estimated regression coefficient increased due to multicollinearity.

Table 5.3: Variance Inflation Factor test results

| VIF Test Results | | |
|---------------------------------------|--------------|--------------|
| Variable | VIF | 1/VIF |
| LNGE | 45.63 | 0.02 |
| LNTTR | 42.40 | 0.02 |
| LNTOPEN | 3.48 | 0.29 |
| INF | 2.83 | 0.35 |
| LNBD | 2.60 | 0.38 |
| VIF | 19.39 | |
| VIF Test Results without LNTTR | | |
| LNGE | 6.59 | 0.15 |
| LNTOPEN | 3.48 | 0.29 |
| LNBD | 2.00 | 0.50 |
| INF | 1.94 | 0.51 |
| VIF | 3.50 | |

5.4 Variance Inflation Factor test results

The VIF test results presented in Table 5.3 above reveal that LNGE and LNTTR had high VIF values, exceeding 10, with LNGE having a VIF of 45.63 and LNTTR at 42.40. This further implies a significant degree of multicollinearity between government expenditure (LNGE) and total tax revenue (LNTTR) in Namibia. Additionally, the mean VIF value of 19.39, which is greater than 10, suggests a high overall level of multicollinearity among the variables. To address this, LNTTR was omitted from the model, resulting in a mean

VIF value of 3.50. The revised model showed that the remaining variables, including LNGE (6.59), LNTOPEN (3.48), LNBD (2.00), and INF (1.94), all had acceptable VIF values, indicating a moderate level of multicollinearity. This reduction in multicollinearity is a positive sign for the regression analysis, as it improves the reliability of the results.

5.5 Unit root test results

To establish the presence of unit root and the sequence of integration of the series, all the variables were subjected to stationarity testing using Phillips-Perron (PP) unit root test specifying the inclusion of an intercept and trend for all the variables, RGDP, GE, TOPEN, INF and BD. Furthermore, all the variables, except inflation, were transformed into their natural logarithmic forms. As highlighted in much of the economic literature, log transformation serves two primary functions: first, to calculate well-defined growth rates by taking the differences of logarithms, and second, to reduce heteroskedasticity. The optimal lag length of 1 was chosen for all variables based on the Akaike Information Criterion (AIC) and the Schwarz Bayesian Criterion (SBIC).

Table 5.4: Phillips-Perron (PP) unit root test results

| Name of Variable | Model Specification | Levels | | First Difference | | Order of Integration |
|------------------|---------------------|-----------------|---------------|------------------|---------------|----------------------|
| | | Test Statistics | p-value | Test Statistics | p-value | |
| LNRGDP | Intercept and Trend | (0.749) | 0.9697 | (3.901) | 0.0121 *** | I (1) |
| LNGE | Intercept and Trend | (1.753) | 0.7269 | (4.173) | 0.0049 ** | I (1) |
| LNTOPEN | Intercept and Trend | (3.706) | 0.0220* ** | (4.548) | 0.0013 | I (0) |
| INF | Intercept and Trend | (4.191) | 0.0046* ** | (7.504) | 0.0000 | I (0) |
| LNBD | Intercept and Trend | (3.595) | 0.0302* ** | (3.967) | 0.0098 | I (0) |

Source: Authors' computation using STATA. Note: ***, **, and * denotes rejection of a unit root null hypothesis at 1%, 5%, and 10% level of significance level, respectively.

The unit root test results as depicted in Table 5.4 above revealed that Trade Openness (TOPEN), Inflation (INF) and Budget Deficit (BD) were stationary at levels I (0) while the growth rates of Real Gross Domestic Product (RGDP) and Government Expenditure (GE) became stationary after taking their first differences I (1). Hence, the null hypothesis of unit root and non-stationary could be rejected for all variables. As a result, the study thus concluded that all the time series were found stationary at different levels.

Subsequently, the ARDL co-integration test was deemed necessary in this case to examine whether a long-run equilibrium relationship exists amongst the variables.

5.6 ARDL bounds test for cointegration results

Upon finding out that the variables were integrated of order I (0) and I (1) and none of them were integrated of order two I (2), the bound's testing procedure was considered appropriate to test for the presence of long-run relationship among variables. The results are presented in Table 5.5 below.

Table 5.5: ARDL bounds test for cointegration results

| Hypothesis | F-statistic | 5% Critical level | |
|------------------------------------|-------------|-------------------|-------------|
| $H_0 = \text{No Cointegration}$ | 6.052 | Lower Bound | Upper bound |
| $H_1 \neq H_0 \text{ is not true}$ | | 3.380 | 4.815 |

As depicted in Table 5.5 further detailed in Appendix B, the computed F-statistic of 6.052 exceeds the critical value of the upper bound (4.815) at the 5% level of significance. Hence, the ARDL bounds test results confirms the existence of a long run relationship between the growth rate of Real Gross Domestic Product (RGDP), growth rate of Government Expenditure (GE), Trade Openness (TOPEN), Inflation (INF) and Budget Deficit (BD) in Namibia. Therefore, the null hypothesis of no cointegration is rejected. Given the findings of this study it can be concluded that there was evidence of a long run relationship among the variables. The appropriate number of lags for the ARDL model

(4, 1, 0, 1, 3) was determined using the automation option in Stata, which proposed 4 as the maximum lag length for the model.

Table 5.6: Short run ARDL (4 1 0 1 3) regression results

| Dependent variable: LNRGDP | | | |
|-------------------------------------|-----------------------------|---------------------|----------------|
| Variables | Long-run multipliers | t-statistics | p-value |
| LNGE | 1.938 | 2.77 | 0.011* |
| LNTOPEN | (88.37752) | (0.70) | 0.489 |
| INF | (7.737) | (0.04) | 0.972 |
| LNBD | 1809.986 | 1.75 | 0.094 |
| ECM (-1) | (0.984) | (4.70) | 0.000 |
| C | 1305.48 | 0.70 | 0.490 |
| <i>R-squared = 0.8871</i> | | | |
| <i>Adj R-squared = 0.7822</i> | | | |
| <i>Brackets () = Negative value</i> | | | |

Source: Authors' computation using STATA. Note: ***, **, and * denotes rejection of a unit root null hypothesis at 1%, 5%, and 10% level of significance level, respectively.

5.7 Short run ARDL Error Correction Model regression results

The short-run ARDL model regression results presented in Table 5.6, obtained from the estimation of equation two, revealed a statistically significant short-run relationship

between government expenditure and economic growth in Namibia at the 5% significance level. That is, a 1% increase in government expenditure is expected to lead to a 1.938% increase in economic growth in the short run, *ceteris paribus*. These findings directly address Objective (ii), which aims to assess whether a short-run relationship exists between fiscal policy and economic growth. The results confirm that fiscal policy, particularly government expenditure, has an immediate and statistically significant impact on economic growth in Namibia.

Additionally, the study found no significant relationship between trade openness and economic growth in the short run, as the coefficient for trade openness was negative and statistically insignificant. The study also examined the relationships between Inflation (INF) and the Budget Deficit (BD) and economic growth in the short run. However, the results revealed no significant relationship between inflation and economic growth, as the coefficient for inflation was both negative and statistically insignificant. Similarly, the budget deficit had a positive but statistically insignificant effect on economic growth in the short run, with a p-value of 0.094, which is above the 10% significance level.

These findings suggest that while inflation and the budget deficit may have some effect on economic growth in Namibia, their impact in the short run is not statistically significant, and therefore, they do not play a major role in explaining short-term economic growth fluctuations in this model.

The error correction term (ECM) is highly significant and indicates that any deviation from long-run equilibrium is rapidly corrected, with economic growth adjusting back towards equilibrium at a rate of 98.4%. The computed adjusted R-squared value of 0.7822 implies that about 78.22% of the variations in the growth rate of real gross domestic product are explained by the independent variables.

Table 5.7: Long run ARDL (4 1 0 1 3) results

| Dependent variable: LNRGDP | | | |
|-------------------------------------|-----------------------------|---------------------|----------------|
| Variables | Long-run multipliers | t-statistics | p-value |
| LNGE | 1.536 | 2.45 | 0.021* |
| LNTOPEN | 98.017 | 0.84 | 0.408 |
| INF | (24.246) | (0.11) | 0.916 |
| LNBD | 509.756 | 0.55 | 0.585 |
| C | 1305.48 | 0.70 | 0.490 |
| <i>R-squared = 0.8871</i> | | | |
| <i>Adj R-squared = 0.7822</i> | | | |
| <i>Brackets () = Negative value</i> | | | |

Source: Authors' computation using STATA. Note: ***, **, and * denotes rejection of a unit root null hypothesis at 1%, 5%, and 10% level of significance level, respectively.

5.8 Long run ARDL regression results

Having established the existence of a long-run relationship among the variables, the study proceeded to estimate the extended-term marginal impact of the independent variables on the dependent variable. The long run empirical results in Table 5.7 computed through the estimation of equation three revealed that government expenditure has a significant positive impact on the level of economic growth in Namibia. This is shown by the long-run multiplier for the growth rate of government expenditure which is statistically significant with a value of 1.54 at 5% significance level. That is, in the long run a 1% increase in the growth rate of government expenditure will increase the growth rate of real gross domestic products by 1.54% *ceteris paribus*. This finding is consistent with the prior expectations of the study, which anticipated a positive relationship between. Equally, this finding coincides with the findings by Kaakunga (2006), Shikomba et al. (2021) and Mugableh (2019) and affirms to Keynes's theory of fiscal stimulus, which indicates that an injection of government spending promotes economic growth.

However, the study also found that Trade Openness (LNTOPEN) did not have a statistically significant long-run effect on economic growth, as indicated by the positive but insignificant multiplier (98.017) and a t-statistic of 0.84 with a p-value of 0.408. Similarly, Inflation (INF) and the Budget Deficit (LNBD) also did not show any significant long-run impact on economic growth, with coefficients of 24.246 and 509.756, respectively, both statistically insignificant (p-values of 0.916 and 0.585). These results suggest that while government expenditure is a significant driver of long-run economic

growth in Namibia, trade openness, inflation, and the budget deficit do not play a major role in influencing economic growth over time in this model.

Additionally, these findings directly address Objective (i), which aims to assess whether a long-run relationship exists between fiscal policy and economic growth. The significant long-run impact of government expenditure on economic growth confirms the presence of such a relationship, suggesting that fiscal policy plays a crucial role in shaping Namibia’s economic performance over time.

5.9 Granger Causality – Wald tests results

Table 5.8: Granger causality results

| Equation | Test statistics | | Null Hypotheses | Decision |
|----------|-----------------|-------------|---|------------------------------------|
| | Chi-square | Probability | | |
| D_LNRGDP | 0.614 | 0.433 | Economic growth does not Granger cause government expenditure | Fail to reject the null hypothesis |
| D_LNGE | 2.212 | 0.137 | Government expenditure does not Granger cause economic growth | Fail to reject the null hypothesis |

Source: Authors’ computation using STATA.

The results of Granger Causality are presented in Table 5.8. The results revealed that the coefficients on the two lags of LNGE that appear in the equation for LNRGDP are jointly

zero meaning the null hypothesis that economic growth does not Granger cause government expenditure cannot be rejected. This is because there is a 0.43 probability of rejecting the null hypothesis when it is true. Similarly, the null hypothesis that government expenditure does not Granger cause economic growth cannot be rejected as the coefficients on the two lags of LNRGDP in the equation for LNGE are jointly zero. The decision of the null hypothesis rejection when it is true is supported by the probability of 0.14 which is greater than 5% significance level. These results satisfy the fourth case of Granger Causality, Independence Causality, which suggests that coefficients are not statistically significant in all the regressions. In this case there is no Granger causality in any direction.

These findings directly address Objective (iii), which aims to determine the direction of causality between government expenditure and economic growth. The absence of Granger causality suggests that changes in government expenditure do not immediately translate into changes in economic growth, nor does economic growth lead to adjustments in government expenditure within the studied period.

Moreover, the results are in contradiction with the results obtained in the long run and short run ARDL models. This contradiction is worth exploring further. While the ARDL results suggest that government expenditure influences growth, the absence of Granger causality may imply that changes in government expenditure do not immediately lead to changes in economic growth or vice versa. The relationship between government expenditure and economic growth is a topic that has been studied extensively, and

research findings can vary depending on the context, data, methodology, and country-specific factors. While some studies might find a positive or negative relationship between government expenditure and economic growth, others might find no statistically significant causation between the two variables. These empirical findings confirm predictions derived from the Ricardian Equivalence Theorem (RET), which plays a key role in macro-economic theory. RET suggests that fiscal stimuli, that is, deficit-financed public spending hikes or tax cuts, will lead to a crowding out of private consumption, thus decreasing the effectiveness of fiscal policy in boosting economic activity. Other studies, such as Hayo & Neumeier (2017), also found no clear Granger causality between fiscal variables and economic growth, suggesting that the relationship may not be linear or immediate.

5.10 Diagnostic test results

Table 5.9: Diagnostic test results

| Test | Null hypothesis | Pro > chi2 | Conclusion |
|---|--|------------|--|
| Normality Test- Jarque Bera | Residuals are normally distributed | 0.012** | Residuals are normally distributed |
| Serial Correlation Test- Breusch–Godfrey LM | There is no autocorrelation in residuals | 0.5098 ** | The is no serial correlation (autocorrelation) |

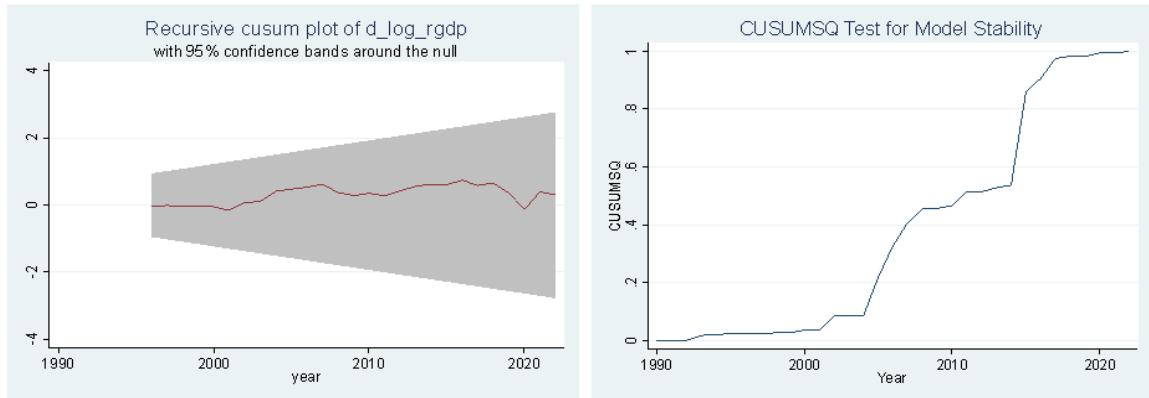
| | | | |
|---|---|--------|----------------------------------|
| Heteroskedasticity Test- Breusch-Pagan / Cook- Weisberg | Constant variance (there is no heteroskedasticity) | 0.0017 | Residuals are heteroskedastic |
|---|---|--------|----------------------------------|

*Source: Authors' computation using STATA. Note: ***, **, and * denotes rejection of a unit root null hypothesis at 1%, 5%, and 10% level of significance level, respectively*

The model was subjected to several diagnostic tests, including normality, serial correlation, heteroskedasticity, and parameter stability. The results of these tests are summarized in Table 5.9. To test for normality, the Jarque-Bera test was employed. The results indicated that the residuals are normally distributed, as the p-value of 0.012 is significant at the 5% significance level. This confirms that the data do not deviate from a normal distribution. Further, the Breusch-Godfrey Serial LM test for autocorrelation with lag 1 revealed that there is no serial correlation in the residuals, with a p-value of 0.5098, which is greater than the 5% significance level. Therefore, the null hypothesis of no serial correlation could not be rejected, implying that the model's residuals do not exhibit significant autocorrelation.

However, the Breusch-Pagan/Cook-Weisberg test for heteroskedasticity indicated the presence of heteroskedasticity, as the p-value of 0.0017 is less than the 5% significance level. This suggests that the variance of the residuals is not constant across different levels of the independent variables, leading to the rejection of the null hypothesis of constant variance. The issue of heteroskedasticity has been addressed by Phillips-Perron unit root test which considers potential autocorrelation and heteroskedasticity in the residuals.

Figure 5.1: CUSUM and CUSUMSQ test plots



Source: Authors' computation using STATA

Moreover, the cumulative sum (CUSUM) test for parameter stability was conducted to assess whether there is evidence of structural breaks or changes in the model. As displayed in Figure 5.1, the CUSUM test revealed that the model exhibits no structural breaks in the estimated parameters over time. This suggests that the relationship between the independent variables and the dependent variable has remained stable, and the model's coefficients have not experienced significant changes. Furthermore, as depicted in Figure 5.1, the CUSUM test results confirmed that the model's assumptions hold at a 5% significance level, as the cumulative sum remains within the critical bounds.

However, the cumulative sum of squares (CUSUMSQ) test, which evaluates the stability of the variance of residuals, indicates potential structural breaks in the model. As shown in Figure [Y], the CUSUMSQ test exhibits an upward trend, suggesting variance instability over time. This implies that the variance of the residuals is not constant, indicating possible heteroskedasticity or structural changes in the dataset. Consequently,

additional diagnostic tests, such as the heteroskedasticity test, were conducted to further assess these concerns.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 Summary

The study investigated the impact of fiscal policy on economic growth in Namibia, utilizing time series data from 1990 to 2022. The ARDL bounds test and Granger causality test were employed to explore the relationships among government expenditure, trade openness, budget deficit, inflation, and economic growth.

The research objectives were successfully achieved, as the study examined both the short-run and long-run effects of fiscal policy variables on economic growth. Initial analysis revealed high multicollinearity between government expenditure and total tax revenue, leading to the exclusion of total tax revenue to improve model reliability. Unit root tests confirmed that the variables were stationary at different levels, specifically $I(0)$ and $I(1)$, allowing the ARDL co-integration test to identify a long-run relationship among real GDP, government expenditure, trade openness, budget deficit, and inflation.

The findings indicated that government expenditure had a significant positive impact on economic growth in both the short and long run. Trade openness exhibited a positive long-run impact but a negative short-run effect, while the budget deficit demonstrated an insignificant negative long-run impact on economic growth. Inflation showed substantial variability and was not a strong determinant of economic growth in either the short or long run. Despite evidence of long- and short-run relationships between government expenditure and economic growth, the Granger causality test revealed no causal link between these two variables. This contradiction highlights the need for further exploration

of factors influencing the relationship between government expenditure and economic growth.

6.2 Policy Recommendations

Based on the study findings, the following policy recommendations are proposed:

1. Enhancing Fiscal Discipline

The government should enforce strong fiscal discipline to reduce budget deficits while ensuring that public spending is directed towards sectors that yield high economic returns. Allocating resources efficiently can help mitigate the negative effects of the budget deficit on economic growth.

2. Strengthening the Medium-Term Fiscal Consolidation Strategy

The implementation of the government's planned fiscal consolidation strategy should be reinforced to ensure debt sustainability. This strategy should focus on reducing unnecessary expenditures, improving revenue collection efficiency, and promoting policies that enhance long-term economic stability.

3. Public Debt Management

Fiscal policies should be aimed at reducing public debt to sustainable levels, considering Namibia's economic structure and revenue volatility. A well-defined debt management

strategy should be developed to ensure that borrowing remains within manageable limits and does not hinder long-term growth prospects.

4. Diversifying Fiscal Deficit Financing Mechanisms

The government should explore diverse sources of deficit financing to minimize macroeconomic risks. Excessive reliance on external borrowing could lead to rising debt service costs, while domestic financing through bond issuance should be structured carefully to avoid crowding out private sector investment.

5. Promoting Trade Openness Policies

Given the mixed short-run and long-run effects of trade openness, policymakers should implement measures that enhance Namibia's global trade competitiveness. Trade policies should be structured to balance immediate economic stability with long-term growth benefits.

6.3 Further Research

Given the complexities of fiscal policy and economic growth dynamics, further research is recommended in the following areas:

1. Effectiveness of Fiscal Consolidation Measures

Future studies should explore the determinants of successful fiscal consolidation in Namibia, assessing the optimal size and pace of adjustment to improve economic stability.

2. Alternative Measures of Economic Growth

Research should consider alternative proxies for economic growth beyond real GDP, such as employment growth and productivity measures, to provide a more comprehensive analysis of fiscal policy impacts.

3. Sectoral Impact of Government Expenditure

A sectoral analysis of government expenditure could provide insights into which areas of public spending contribute most effectively to economic growth, guiding more targeted fiscal policies. By addressing these areas, future research can provide deeper insights into fiscal policy dynamics and offer more refined policy recommendations for sustainable economic development in Namibia.

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APPENDICES

Appendix A: Ethical Clearance Certificate



ETHICAL CLEARANCE CERTIFICATE

Ethical Clearance Reference Number: DEC FOC/20/06/12 **Date:** 20/06/2024

This Ethical Clearance Certificate is issued by the University of Namibia Ethics Committee (REC) in accordance with the University of Namibia's Research Ethics Policy and Guidelines. Ethical approval is given in respect of undertakings contained in the Research Project outlined below. This Certificate is issued on the recommendations of the ethical evaluation done by the ethics committee.

Title of Project: AN INVESTIGATION OF THE IMPACT OF FISCAL POLICY ON ECONOMIC GROWTH IN NAMIBIA

Student: WILHELMINA T. NANGOBE

Student Number: 201505742

Supervisor(s): Dr. RONALD CHIFAMBA

Centre for Research Services

Take note of the following:

1. Any significant changes in the conditions or undertakings outlined in the approved Proposal must be communicated to the ethics committee. An application to make amendments may be necessary.
2. Any breaches of ethical undertakings or practices that have an impact on ethical conduct of the research must be reported to the ethics committee
3. The Principal Researcher must report issues of ethical compliance to the ethics committee (through the Chairperson) at the end of the Project or as may be requested by the ethics committee
4. The ethics committee retains the right to:
 - i) Withdraw or amend this Ethical Clearance if any unethical practices (as outlined in the Research Ethics Policy) have been detected or suspected,
 - ii) Request for an ethical compliance report at any point during the course of the research.

The ethics committee wishes you the best in your research.

A handwritten signature in black ink, appearing to read "Precious Mushendami".

Precious Mushendami (Decentralized Research Ethics Committee)

A handwritten signature in black ink, appearing to read "Davis Mumbengegwi".

Prof. Davis Mumbengegwi (Head, Multidisciplinary Research)

Appendix B: Raw Data

| Year | Real Gross Domestic Product (RGDP) <i>N\$ millions</i> | Government Expenditure (GE) <i>N\$ millions</i> | Budget Deficit (BD) <i>N\$ millions</i> | Inflation (INF) (%) | Trade Openness (TOPEN) (%) |
|------|---|--|--|------------------------|-------------------------------|
| 1990 | 49415 | 13635 | -72 | 12 | 72 |
| 1991 | 53450 | 15241 | -189 | 12 | 78 |
| 1992 | 57293 | 16262 | -435 | 18 | 77 |
| 1993 | 56388 | 16376 | -333 | 9 | 83 |
| 1994 | 57363 | 16634 | -195 | 11 | 81 |
| 1995 | 59600 | 17082 | -476 | 10 | 85 |
| 1996 | 61502 | 17525 | -891 | 8 | 89 |
| 1997 | 64097 | 18233 | -439 | 9 | 85 |
| 1998 | 66207 | 18794 | -749 | 6 | 85 |
| 1999 | 68438 | 19634 | -681 | 9 | 85 |
| 2000 | 70828 | 19884 | -358 | 9 | 79 |
| 2001 | 71662 | 20462 | -1204 | 9 | 82 |
| 2002 | 75094 | 19935 | -837 | 11 | 87 |
| 2003 | 78277 | 20560 | -2478 | 7 | 92 |
| 2004 | 87882 | 21582 | -1067 | 4 | 81 |

| | | | | | |
|------|--------|-------|--------|---|-----|
| 2005 | 90104 | 20304 | -82 | 2 | 79 |
| 2006 | 96478 | 22534 | 721 | 5 | 85 |
| 2007 | 101662 | 25367 | -1252 | 7 | 94 |
| 2008 | 104356 | 27963 | 1757 | 9 | 98 |
| 2009 | 104665 | 29037 | -663 | 9 | 106 |
| 2010 | 110986 | 29330 | -3879 | 5 | 95 |
| 2011 | 116637 | 31287 | -6430 | 5 | 89 |
| 2012 | 122541 | 32308 | -115 | 7 | 94 |
| 2013 | 129421 | 33864 | -4375 | 6 | 93 |
| 2014 | 137641 | 35424 | -8774 | 5 | 96 |
| 2015 | 146019 | 39759 | -12423 | 3 | 97 |
| 2016 | 146068 | 40186 | -11402 | 7 | 99 |
| 2017 | 144568 | 39349 | -9107 | 6 | 95 |
| 2018 | 146100 | 39252 | -9226 | 4 | 100 |
| 2019 | 144874 | 39823 | -8918 | 4 | 95 |
| 2020 | 133137 | 39962 | -14197 | 2 | 87 |
| 2021 | 137830 | 40564 | -14857 | 4 | 95 |
| 2022 | 144115 | 40851 | -10628 | 6 | 111 |

Source: Namibia Statistics Agency, Bank of Namibia, Ministry of Finance

Appendix C: ARDL Bounds Test Results

| ARDL Bounds Test Results | | | | | | | | | |
|---------------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-------|
| Level of Significance | | 10% | | 5% | | 1% | | p-value | |
| Bounds | | I (0) | I (1) | I (0) | I (1) | I (0) | I (1) | I (0) | I (1) |
| F-statistics | 6.052 | 2.758 | 4.011 | 3.380 | 4.815 | 4.906 | 6.776 | 0.003 | 0.018 |
| t-statistics | -4.580 | -2.562 | -3.671 | -2.929 | -4.105 | -3.692 | -5.004 | 0.001 | 0.022 |

Source: Authors' computation using STATA.