AN ANALYSIS OF THE IMPACT OF PUBLIC EXPENDITURE ON PRIVATE INVESTMENT IN NAMIBIA

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ABSTRACT

This study aimed to analyse the impact of public expenditure on private investment in Namibia from the period 1990 to 2020. In seeking to meet the objective of the study, an Autoregressive Distributed Lag (ARDL) model was estimated after the time-series properties of the variables used were tested. The bound test co-integration approach along with ECM was applied to achieve the objectives of the study. Results indicated that the real impact of government expenditure depends upon the type of expenditure under consideration and thus government expenditure can crowd either in or out private investment. The government expenditures on agriculture, health and transport were insignificant in the short run but showed a crowding-in (positive) impact on private investment. In addition, education expenditure along with gross domestic product expenditures show a crowding in (positive) impact on private investment in the short run. Moreover, analysis suggests that more priorities should be given to those expenditures that have complimentary impact on private investment rather than spending on expenditures that are substituting (hindering) private investment. In addition, the Namibian government should adopt consistent fiscal policy measures that can establish budget discipline, transparency and accountability aimed at increasing the standard of living by assuring an efficient public expenditure budget. Furthermore, the government should also increase expenditure on health, since it will enhance private investment through improved health status and labour productivity.

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LIST OF ABBREVIATIONS

AERC	African Economic Research Consortium
AGR	Agriculture
ADF	Augmented Dickey-Fuller
AR	Autoregressive
ARDL	Autoregressive Distributed Lag
BoN	Bank of Namibia
CMA	Common Monetary Area
CUSUM	Cumulative Sum of Recursive Residuals
ECM	Error Correction Model
EG	Economic Growth
EDU	Education
GDP	Gross Domestic Product
GFCF	Gross Fixed Capital Formation
H_0	Null hypothesis
H_1	Alternative hypothesis
HEA	Health

IMF	International Monetary Fund
LDCs	Low Developing Countries
MTEF	Medium-Term Expenditure Framework
NDP4	National Development Plan Four
NSA	Namibia Statistics Agency
PI	Private Investment
PP	Phillips and Perron
SACU	Southern African Customs Union
SVAR	Structural Vector Autoregressive
TC	Transport and Communication
UNAM	University of Namibia
VAR	Vector Autoregressive
VECM	Vector Error Correction Model
Y	National Income

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DEDICATION

I dedicate this thesis to my parents, Simon Nghipona and Rauha Nghole for having nurtured me into the courageous and optimistic person that I am today. May God bless you abundantly and grant you many more years. I would also like to dedicate this thesis to my daughter Elly Nghipona you are the reason why I am working this hard every day.

DECLARATION

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Jona Tuhafeni Nghipona

April 2023

Date

CHAPTER ONE

INTRODUCTION

1.1 Background

The purpose of this work was to analyse the impact of government expenditure on private investment in Namibia within an Autoregressive Distributed Lag (ARDL) framework. Before we dwell on the introduction, it is very important to understand the meaning of the following terms, public expenditure and private investment.

Public expenditure can be defined as an economic activity that is subject to public expenditure budgetary processes and it comprises both operational and development expenditures incurred by the government in a particular financial period (Iiyambo, 2019). On the other hand, Marcos (2019) defined private investment as the gross fixed capital formation promoted by the private sector and it is understood as the acquisition of a capital asset that is expected to generate profits and / or create value-add in the future.

Government/public expenditure is on the increase in almost every country, including Namibia as the government provides public goods and services through income distribution and resources allocation. As such, since independence, Namibia has made efforts to maintain fiscal prudence with the objective of attaining overall macro-economic stability and laying the foundations for sustainable economic development (Iiyambo, 2019). Additionally, Kandenge (2010) stated that the government introduced and implemented national development plans in order to revive and sustain

economic growth, create employment, reduce inequalities and eradicate poverty. However, despite such efforts, the economy continues to be confronted with enormous development challenges, necessitating significant levels of public spending on social and economic development programs, resulting in budget deficits and debt accumulation (Iiyambo, 2019).

To that end, the government believes that high and inclusive economic growth is necessary. As a result, the government has thus embarked on fiscal policy interventions and exploring ways to unlock cross-cutting constraints that limit private sector development and lists priority reforms to enhance the role of the private sector in diversifying Namibia's economy (World Bank, 2022). The overall aim is to encourage private-sector participation through direct investment (Ministry of Finance, 2017). In addition and notably, the government is the biggest employer and public investment has been a historical driver of growth in Namibia. However, World Bank (2016) highlighted that due to fiscal constraints, the Namibian government has limited capacity to create public sector jobs or undertake large public investments, implying that the private sector must play a more dominant role. Besides, Kustepeli (2005) argued that private investment is an important channel for the effectiveness of the fiscal policy in terms of increasing growth in the economy.

As a result, the government, according to Kandenge (2010), launched a divestiture and private equity participation in public enterprises program in 2001 to relieve the government's financial and administrative burdens while also giving the private sector greater roles in the nation's development process. Furthermore, Deloitte (2022) emphasized a variety of government interventions, including crowding-in private sector investment through the

implementation of a revised fiscal incentive regime, the new Investment Promotion Act, and diversification of financing sources with Public Private Partnerships in infrastructure development and service delivery.

Historically, economists have agreed that investment has a positive effect on economic growth, but they have not produced a consensus on whether public or private investment has a larger impact on economic activity and whether there is a link between the two (Erden & Holcombe 2006). Although the nexus between government expenditures and private investment has been investigated substantially in the literature, the impact of government expenditure on private investment is still a controversial issue.

Moreover, Sinevičienė (2015) emphasized that the impact of government expenditure policy on private investment is a particularly relevant issue because private investment is one of the main long-run growth drivers. However, the author further pointed out those unambiguous conclusions cannot be provided on the impact of government's expenditure on private investment because government expenditure can crowd in or crowd out private investment in developed and developing countries. World Bank and International Monetary Fund (IMF) introduced structural adjustment programmes, which according to Hermes and Lensink (2001), prompt the need for governments to reduce budget deficits to stimulate private initiatives. The reduced role of government in the economy signifies the programmes described in the fiscal policy changes. The reduction of the role of government in the economy of Low Development Countries (LDCs) is a key element of the Washington consensus, which aims at increasing the role of the market mechanism.

In addition, Hermes and Lensink (2001) further asserted that the World Bank and IMF stressed that reducing the role of the government will reduce barriers to private initiatives and thus will stimulate investment activities, which ultimately leads to higher economic growth. On the other hand, another reason to focus on private investment is that other studies have shown that changes in fiscal policy have affected private investment to explain disproportionate shares of the change in the economic growth of countries.

Moreover, Makuyana and Odhiambo (2016) stressed that the resultant effect on economic growth depends on which channel dominates, given the influence of these different channels of public expenditure on private investment. Subsequently, if the positive effect of a public expenditure increase dominates the negative effect of reduced private investment, the economic growth rate will accelerate and vice versa. Thus, for policymakers in developing countries concerned with sustained high economic growth rates, it is not only growing the aggregate level of investment that matters but also how it is split between public and private components (Makuyana & Odhiambo 2016). Furthermore, Blejer and Khan (1984) affirmed that it is true for developing countries where a high level of investment is a prerequisite for sustained economic growth.

The Namibian economy has contracted by 0.8% in 2017 because of continued fiscal consolidation and reduced investment in the mining sector weakened internal demand. Moreover, the World Bank (2022) country private sector diagnostic report stated that the economy contracted further by 0.9 percent in 2019, and it contracted by 8.5 percent in 2020 due to continued fiscal consolidation and external shocks resulting from commodity demand and price volatility, drought, as well as rising debt that limited public investment. As a

result, the economy faces increasing challenges as more fiscal consolidation efforts are required to contain debt, while structural reforms are required to diversify the economy away from agriculture and mining and into new higher-value job-creation sectors.

Similarly, Tsibouris, et al (2006) state that countries that have implemented fiscal consolidations usually notice a contraction in the short term but can lead to a limited loss of GDP over the medium term while in the short run; the impact is driven by a contraction of aggregate demand. This contraction may reflect lower government spending as well as lower private demand once taxes increase. In addition, fiscal consolidations can have a negative medium-term impact on growth to the extent that they may lower public investment in infrastructure and human capital.

On the contrary, fiscal consolidations can also have a positive impact on growth. According to Gupta, et al. (2005) fiscal consolidation can induce lower interest rate spreads by strengthening confidence and lowering debt levels and in return induce crowding in private consumption and investment, which affects GDP positively. Moreover, with fiscal consolidation, a country can witness a positive outcome when associated with cuts in unproductive spending (Gupta, et al. 2005).

It is also important to note that the impact of public expenditure on private investment may differ according to the economy size and openness too (Sinevičienė, 2015). The author urges that with small open economies, growth tends to have higher volatility, as small open economies are more vulnerable to external economic shocks. Whereas Maravalle and Claeys (2012) noted that

higher growth, volatility is the consequence of pursuing pro-cyclical fiscal policies in small open economies. On the other hand, in large open economies, economic policy decisions generate externs to the other countries; the effects of the interaction among the economies are greater if the degree of openness and economic integration is greater. Therefore, not only economic openness will cause a country to be more vulnerable when facing external shocks, but also its inability to compete with other countries (Roldán, et al. 2013).

Finally, in all organised societies, there should be a role assigned to the government. The government should perform those functions that, if left to the private sector, would not be performed at all or would be performed in an unsatisfactory manner. In public economics, the budget is one of the most important roles of the government. Through the budget, the government implements or promotes its objectives. Governments typically use fiscal policy to promote strong economic growth and reduce poverty. Government spending is therefore often used to fill gaps between private savings and investment. Its main aim is to build basic infrastructures necessary for enabling the environment and productive industrial sector, which determine the international competitiveness of economies.

From the above discussion, it is obvious that the impact of government expenditure on private investment is an important issue for any country. Therefore, government expenditure is deemed a vital tool to improve and attract private investment, both in developed and developing countries. In addition, government expenditure can provide the foundation for investment and perhaps enhance growth in any country. However, in many developing countries, there is still a large deficit of infrastructure found in the power sector,

transportation, health, education human capital development etc. It is thus against this background that this study analyses the impact of government expenditure on private investment.

1.2 Problem statement

Namibia continues to be confronted by pressing socioeconomic development challenges such as inequality, high unemployment levels and poverty despite the implementation of several measures to curb those challenges (Iiyambo, 2019). Furthermore, in order to increase the country's competitiveness in crowding in private investment, the country implemented various policies such as the Namibia Investment Promotion Act and the Fourth National Development Plan (NDP4), which increased investment in critical infrastructure development in the transport, energy, water, and housing sectors (Macroeconomic Working Group 2013).

In addition, negative economic activities and lower revenues, mostly from the mining sector and SACU as recorded in 2012/13 and 2015/16 led to temporary financial problems for the budget for the following financial year (World Bank, 2016). Furthermore, the World Bank (2016) poverty outlook report explained that in the absence of interest from the private financial institutions in bidding for government-issued debt instruments, the state-owned pension fund (Government Institutions Pensions Fund) became the largest bidder in the government auctions and consequently, limiting space for further fiscal expansion persisted.

Thus according to the Ministry of Finance (2017), fiscal consolidation continued in the subsequent year, in 2017, by aligning expenditure closer to revenue, aimed at reducing public debt growth to a sustainable level. Following the fiscal consolidation review, the provisionally projected budget deficit of more than 8 per cent of GDP was reduced by 2 per cent (Ministry of Finance, 2017). Budget cuts have been exacted mostly on capital expenditures, and in the absence of larger private investment projects.

However, it is important to note that the budget continues to support service delivery by realigning public expenditure to key national development priorities. It is therefore a challenge when country facing issues related to debt reduction through cutting expenditures while also attempting to carry out the Government's mandate towards socio-economic development. As a result, the government is forced to make difficult decisions in order to strike a favourable balance that will yield optimal results (National Planning Commission 2018).

On the other hand, over the past few decades, crowding-out/-in effects across countries have been focused on and have attracted several theoretical and empirical studies due to their importance in the literature. However, most of these studies (Sinevičienė (2015); Kuştepeli (2005); Pamba (2022), presented mixed results; changing from country to country, from period to period, and using various methods such as VAR analysis, panel data analysis, SVAR analysis, and VECM. What seems further from previous studies is that even if the methods used in the studies are equal, their effects are different.

With the conflicting opinions in the literature regarding public expenditure, it is not clear whether the Namibian government should set a public expenditure

limit or keep its expenditure as high as possible. Although these studies have provided valuable insights, they underwritten little attention to the differential impacts of various forms of government spending on private investment especially in developing countries like Namibia. In addition, there are limited studies done to establish the impact of public expenditure on private investment in Namibia. For example, one study comparing similar is by Kandenge (2010) analysing the impact of public and private investment on economic growth over the period 1970 to 2005. The study used the endogenous growth model framework and employed the cointegration and error correction model. Thus, the question of whether government expenditure leads to an increase or decrease in private investment in Namibia is yet not pure. This study, therefore, seeks to address this question and will differ by employing the Autoregressive Distributed Lag (ARDL) model covering the period 1990 to 2020.

1.3 Objectives of the study

The general objective of the study will be to determine the impact of public expenditure on private investment in Namibia over the period 1990 to 2020. The general objective is divided into two specific objectives:

1. To establish whether public expenditure affects private investment in Namibia.
2. To examine the long-run relationship between public expenditure and private investment in Namibia.

1.4 Research hypothesis

To achieve research objectives, the researcher conducted data analysis in order to test the following hypotheses:

H_0: Public expenditure has no impact on private investment in Namibia.

H_1: Public expenditure has an impact on private investment in Namibia.

H_0: There is no long-run relationship between public expenditure and private investment in Namibia.

H_1: There is a long-run relationship between public expenditure and private investment in Namibia.

1.5 Justification of the study

The study contributes to the existing literature on the impact of public expenditure on private investment in Namibia. Moreover, the study is going to be beneficial to policymakers in aiding them in determining which policies to adopt for improving the development and growth of the Namibian economy. The results of this research can be used as reference by the government of Namibia to know the direction of private investment in the country and which components of government expenditure crowds in and out private investment. By reviewing the results of this study, the government will be able to make the right decision regarding government expenditure.

1.6 Limitations of the study

The study is based in Namibia thus, the study will not be generalised to other countries because of resources and time constraints. In addition, the study is limited to secondary data obtained from the Namibian Statistics Agency (NSA), Ministry of Finance (MoF) budget books and the World Bank website.

1.7 Delimitation of the study

The study analysed the impact of government expenditure on private investment in Namibia for the period 1990 to 2020. In addition, the study only

focused on some government expenditure variables such as those that were deemed relevant in explaining fluctuations in private investment.

1.8 Outline of the study

This study is presented in six chapters. Chapter one discussed the introduction of the study. Particularly, the chapter shed light on the background, introduction, and problem statement, objectives of the study, research hypothesis, and justification of the study, limitations and delimitation of the study. Chapter two provides an overview of government expenditure and private investment in Namibia. Chapter three surveys the literature review entailing both theoretical and empirical literature. Chapter four outlined the research methods undertaken in the study. Chapter five contains the results and a discussion of the tests employed in the study. Finally, chapter six covers the conclusion, policy recommendations and further research areas of the study.

CHAPTER TWO

OVERVIEW OF PUBLIC EXPENDITURE AND PRIVATE INVESTMENT IN NAMIBIA

2.1 Introduction

This chapter gives an overview of public expenditure and private investment in Namibia. It further discussed how public expenditure and private investment have happened in Namibia's economic economy.

2.2 Public Expenditure

Since independence, the government sector has played a dominant role in the economy in an attempt to consolidate and revive it after nearly 75 years under the control of the South African regime. Given Namibia's membership in the Common Monetary Area (CMA) and the fixed exchange rate regime, there is limited scope for an independent monetary policy. Thus, fiscal policy has been the key instrument of macroeconomic management. The objectives of fiscal policy since independence have focused on stimulating employment and investment and easing the burden of poverty. However, this policy approach has put pressure on the government to increase spending, which has led to a growing fiscal deficit (Bank of Namibia 2001).

Namibia has recorded a massive growth in total expenditure since independence. The total of public expenditure has more than doubled from N$2 103.4 million in 1990/91 to N$4 556.8 million in 1995/96 and doubled further to N$8 650.9 million in 2000/01. Recurrent expenditure contributed the most as it has more than doubled from N$1720. 1 million in 1990/91 to N$3925. 3 million in 1995/96 before rising gradually to N$7586. 7 million in 2000/01.

As a share of total expenditure, recurrent expenditure accounted for between 81.7 per cent to 87.6 per cent between the period 1990/91 and 2000/01. Personnel costs, which mainly include salaries, remained a major component of recurrent expenditure during the period under review. On the other hand, capital expenditure doubled from N$383. 3 in 1990/91 to N$631. 5 million in 1995/96 and slowed slightly to N$1064. 2 million in 2000/01 (Zaaruka & Biwa 2001). The rise in current expenditure was mainly due to salary increases for public service employees and the recapitalisation of Air Namibia. Thus, increasing the wage bill of the government significantly. Furthermore, a considerable increase in the cost of the Public Service Medical Aid Scheme, and provisions made for the newly introduced Early Retirement Scheme aimed at reducing the size of the Public Service, added to the high growth in current expenditure.

The development budget has been trying to reflect the government s sectoral priorities since independence. An effort has been made to strike a balance between spending on social sectors and infrastructure on the one hand, and spending on productive sectors, on the other. The government continues to concentrate a large share of its resources on the social sectors (Zaaruka & Biwa 2001).

Furthermore, government expenditure outturn for the period 2007/8 to 2009/10 averaged N$21. 4 billion, or 29.2 per cent of GDP, which was within the public expenditure limit of 30 per cent of GDP over the MTEF. During the 2009/10 financial year, expenditure amounted to N$24. 9 billion. This resulted in the expenditure-to-GDP ratio increasing from 29.5 per cent in 2008/9 to 31.1 per cent in 2009/10. This increase in the expenditure-to-GDP ratio came about as

a result of the government adopting the expansionary fiscal policy in 2008/09 in response to the economic crisis (Ministry of Finance 2011).

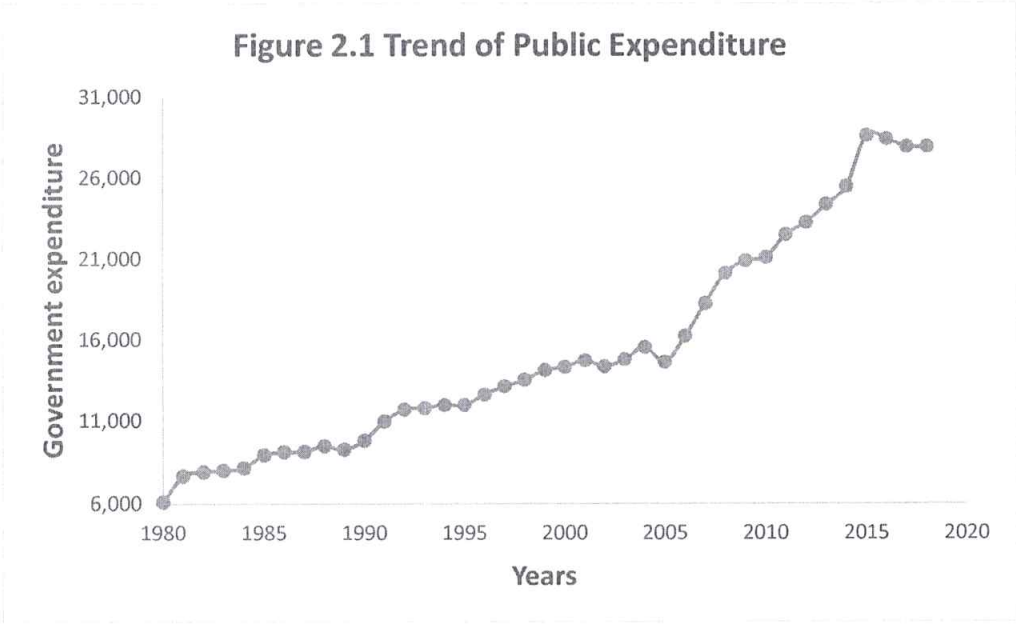
During the 2012/13 financial year, total expenditure execution stood at 95.5 per cent, recording a total amount spent at N$38. 14 billion, out of the total budget of N$39. 92 billion. The expenditure outturn for 2012/13 amounted to 36.5 per cent of GDP, which was also within the 40 per cent benchmark limit. Operational budget expenditure stood at N$32. 57 billion, out of N$33. 63 billion allocated, with a corresponding execution rate of 96.9 per cent. In addition, the TIPEEG dispensation entered the third and final year of implementation during 2013/14. Out of the N$14. 5 billion allocated under this programme for the three years, a total amount of N$11. 0 billion was spent by the end of the fourth quarter of 2013/14, resulting in an estimated total budget execution rate of 76.6 per cent of the programme. TIPEEG set out to create about 104,000 jobs, both permanent and temporary. Subsequently, by the fourth quarter of 2013/14, an estimated 83,315 jobs had been created (Ministry of Finance 2014).

Additionally, total expenditure outturn for the financial year 2013/14 amounted to N$46. 7 billion, out of N$47. 6 billion budgeted expenditures, representing a budget execution rate of 98.2 per cent. At 37.4 per cent of the revised GDP, this level of expenditure is below, but near to the 40 per cent benchmark. This expenditure outturn is 22.7 per cent higher than N$38. 1 billion spent in the previous fiscal year, marking a significant fiscal expansion concerning a corresponding increase in revenue of 10.3 per cent over the same period. Going forward, the budgeted government expenditure of N$60. 2 billion for the financial year 2014/15 marked a further fiscal expansion of 26.5 per cent,

following an expansion of 22.7 per cent in the previous fiscal year. Moreover, there was a need to moderate the pace of expenditure increases by gradually phasing in new expenditure commitments over the medium-term to prevent excess procyclicality, and to bring expenditure growth more in line with projected revenue increases. Finally, the 2016/17 financial year was the first that saw an actual nominal decrease in total government expenditure compared to the previous years. Government expenditure has then increased again in the 2017/18 financial year, by slightly more than a billion to N$62. 5 billion (Ministry of Finance 2018).

Figure 2.1: Public Expenditure

Figure 2.1 below depicts the trend of government expenditure for the period between 1980 and 2018 as summarized at constant 2010 prices in N$ millions;



Source: *Author's compilation of Namibia Statistics Agency database*

2.3 Private Investment

Private investment is usually proxied by gross fixed capital formation (GFCF) in the national accounts and therefore depicts how private investment has been performing in the country. However, this is not only the case in Namibia but other countries such as Cameroon also use the capital formation to proxy private investment as used in the study of Forgha and Mbella (2013).

Namibia's private investment has been increasing due to the rich mineral deposits in the country such as diamond, copper, uranium and gold being the major and attracting investors from abroad. Since the early 1990s, private investment has contributed significantly to the average GDP growth, which has been higher than in the previous decade, due to the opening of two new diamond mines and the extension of the limits of Namibia's coastal waters.

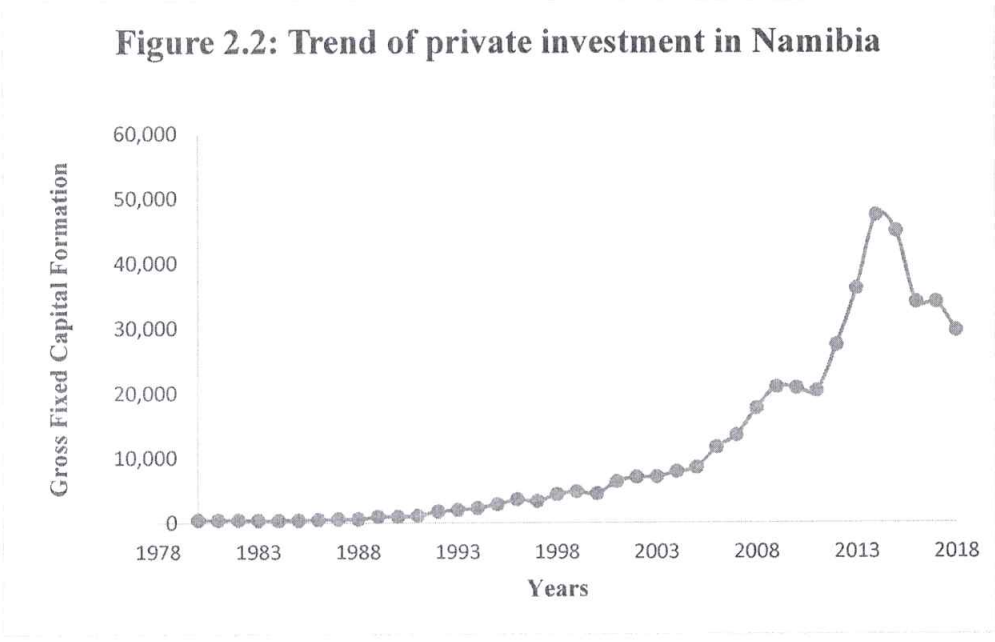
According to the country's private sector diagnostic report, Namibia's domestic private sector has been confronted with a number of structural challenges, such as lack of access to land, affordable finance, a high cost of doing business, and state-owned enterprise dominance, which effectively crowds out private participation and contributes to inefficiencies in key sectors of the economy (World Bank 2022). Therefore, for the period of 2000-2009, the ratio of Gross Fixed Capital Formation (GFCF) to GDP was low, implying that the country was a net exporter of capital. Moreover, as such, the ratio of GFCF to GDP overtook the ratio of gross savings to GDP. This can be attributed to a decline in public savings mainly emanating from the decline in

SACU receipts during the period under consideration. In 2011, the ratio of GFCF stood at 21.0 per cent (Namibia Statistics Agency 2012).

In 2013, Gross Fixed Capital Formation (investment) has consistently outperformed savings with a growth rate of 13.5 per cent. This is a reflection of inflows of investment from abroad into the economy of Namibia. The average ratio of investment to GDP over the period 2007 to 2015 was 26.9 per cent compare to the average ratio of investment to GDP over the period 2007 to 2017, which was at 25.5 per cent. Overall, the Gross fixed capital formation has been declining as from 2014 to 2018 with the year 2018 marked one of the lowest investment ratios to GDP (Namibia Statistics Agency 2018).

Figure 2.2: Private investment

Namibia's private investment is classified in terms of Gross Fixed Capital Formation for the period between 1980 and 2018 as summarized in the form of the N$ millions in figure 2.2 below;



Source: *Author's compilation from Namibia Statistics Agency database*

The behaviour noted above depicts how private investment has increased since independence until mid-year 2015/16 when Namibia introduced a fiscal consolidation programme.

Despite the substantial in increase in government fiscal operations in recent years aimed to achieving increases private investments, Namibia showed that the rate of growth of private investment been decidedly unimpressive (Ministry of Finance, 2015).

2.4 Summary

The chapter provided an overview of public expenditure and private investment in Namibia for the period 1990 to 2020. Based on the statistic provided above, there has been a rapid growth in total expenditure since the country attained its independence. Such growth is due to the government's commitment to alleviating poverty, provide social services, which includes health, education, social security etc. Recurrent expenditure contributed the most to total expenditure, and the increase in current expenditure was primarily due to the high wage bills for public sector employees, as the public sector is Namibia's largest employer. Furthermore, government expenditure (29% to GDP) rapidly increased during 2007/8 to 2009/10 because of the government adopting the expansionary fiscal policy in 2008/09 in response to the economic crisis (Ministry of Finance 2011).

On the other hand, the evolution of private investment since 2001 has been on the rise (albeit slowly), following the trend of public expenditure, which clearly reflects the idea that government investment policies contributed to the

creation of investment opportunities for the private sector in Namibia. As a result, private investment in Namibia increased between 2005 and 2018. The country's rich mineral deposits, such as diamond, copper, uranium, and gold, have contributed to this growth, attracting investors primarily from abroad. Nonetheless, the domestic private sector faces a number of structural challenges, such as a lack of access to land, affordable finance, and a high cost of doing business, and state-owned enterprise dominance, which effectively crowds out private participation and contributes to inefficiencies in key sectors of the economy. As a result, the question of whether government-spending leads to an increase or decrease in private investment in Namibia is valid and merits further consideration.

CHAPTER THREE

LITERATURE REVIEW

3.1 Introduction

The theoretical and empirical literature of public expenditure on private investment is reviewed in this chapter. The first section reviews the theoretical literature on public expenditure on private investment. The subsequent section reviews the previous empirical studies on public expenditure on private investment. The final section deals with an overview of the empirical literature.

3.2 Theoretical Literature

The impact of public expenditure on private investment remains a controversial issue and there have been several schools of thought that had attempted to explain this impact. The views are between two schools of thought, namely the neoclassical economists and the Keynesian economists. However, there is also a third view based on the Ricardian Equivalence Theorem.

The neoclassical loanable funds theory explains that the balancing of savings and investment will be solved by the interest rate mechanism. O'Hara (2011) explained that, in case of an increase in government spending, interest rates have to increase to bring the capital market into equilibrium, reducing private investment. Therefore, neoclassical theory argues that public investment crowds out private investment when the state increases its investment in any economy through public debt and rising taxes (Sinevicien, 2015). In addition, Tendengu, Kapingura, and Tsegaye (2022) advocate for the neoclassical view that an increase in government expenditure and a decrease in tax would increase the demand for money. Assuming that the money supply is fixed by

the Reserve Bank, this would increase the interest rate and crowd out private investment. Therefore, a fall in private investment could have a multiple negative effect on output and hinder economic growth (Tendengu et al (2022).

In contrast to the neoclassical view, Keynes (1936) as cited by Majunder (2007) argue that an increase in government expenditure leads to an increase in interest rate, which translate into an increase in investment. In addition, the Keynesian theory favours government spending to promote the growth of private investment and economic growth. Moreover, Sinevicien (2015) also affirmed that according to the standard Keynesian model, an increase in government spending increases total demand and, as a result, total investment. Keynes (1936) argued that government spending has a multiplier effect on the economy. Moreover, the Keynesian position is that not only an additional amount of government spending raises national income by the original amount spent by the government, but that this would have a multiplier effect of several amounts. The theory further stated that an increase in household consumption raises the demand for the firm's products. Based on the above explained, the increased demand for the firm's products is a signal to firms to raise production. Therefore, the firms would increase their investment demand for capital goods. Therefore, Keynes and their associate are of the view that public expenditure crowds in private investment.

The Ricardian Equivalence Theorem argues that the budget deficit in any current period will be equal to the present value of future taxation that would be required to finance the budget deficit. Therefore, individuals increase their savings as a household spending decision considers their future tax liabilities. This extra saving will increase the national saving and hence, offset any

increase in the interest rate. Thereby leaving private investment unchanged. This implies that budget deficits are irrelevant to financial decisions without any crowding out or crowding in effect, of fiscal spending (Mahmoudzadeh et al. 2013).

3.3 Empirical Literature review

In response to these theoretical controversies, several studies that attempted to assess the impact of public expenditures on private investment have found mixed results in support of one theory or the other.

Wang (2005) investigated the relationship between government expenditures and private investment in Canada during the period 1961 to 2000. The study adopted the cointegration and error-correction framework. The empirical results show that government expenditures on education and health have positive effects whereas government expenditures on capital and infrastructure have negative effects on private investment. The other expenditure categories, including government expenditure on the protection of persons and property, expenditure on debt charges, and expenditure on government and social services have no significant effects on private investment.

Kandenge (2010) examined the impact of public and private investment on economic growth in Namibia using the framework of an endogenous growth model. The study employed the cointegration and error correction modelling approaches covering the period 1970-2005 years. The study revealed a short-run and long run relationship between public and private investment and economic growth in Namibia. Moreover, the study shows that public investments in infrastructure boost private production profitability and

encourage private investment, whereas non-infrastructure projects in areas where the public sector competes with private firms may have the opposite effect. Furthermore, the study emphasized that, most importantly, private investment plays a catalytic role in the economy because it is through private investment that production is expanded and new job opportunities are created. It creates and expands economic income, which in turn generates governments required revenue to expand access to basic needs and public investment in infrastructure development, and services, thereby assisting in the improvement of the economy's productive capacity.Laopodis (2010) studied the effects of government spending on private investment. This paper investigated the effects of military and non-military public expenditures on gross private investment using data from four emerging European countries namely, Greece, Ireland, Portugal and Spain. The cointegration and the error correction models were used for the analysis of the data. The results indicate that, in some cases, public capital spending stimulates investment, while in others, it depresses it. Moreover, the results provisionally show that defence spending does not influence private investment, adding to the current controversy over the economic effects of military spending.

Basar, et al. (2011) in their study aimed at investigating the crowding-out impact of government spending on private investment in Turkey using the Johansen-Juselius cointegration analysis for the period of 1987: Q1-2007: Q3. The results obtained indicated that total government spending and transfer payments had positive effects on private investments following the crowding-in hypothesis, while government investment spending crowded out private investment in Turkey.

Caballero and López (2012) assessed the impact of fiscal variables on private investment by comparing some Latin American economies to other advanced economies for the period 1990-to 2008. The study used two dynamic panel designs in which it brought together countries with similar characteristics and levels of development. In a panel model, it included Mexico, Brazil, Chile, Colombia and Uruguay, while in the second one; the countries were the U.S., Canada, Spain, Korea, Ireland and Japan. The study used the investment function in both panels using a wide range of variables, including those associated with fiscal policy. The results indicated that governments through higher spending could stimulate the economy even when they fund spending with higher taxes. In Latin America, where income concentration is enormous, a proposal to stimulate the economy through higher government spending financed by a progressive income tax is even more justified.

Forge and Mbella (2013) studied the relationship between public expenditure and private investment in Cameroon and the nature of their causality by using secondary data from 1980 to 2012. The Vector Autoregressive estimation method was used to analyse the data. The results were that public spending piled insignificant amounts of private investment.

Another study by Ifeakachukwu (2013) examined the relationship between components of public spending and private investment in Nigeria for the period 1981 to 2010 using the error correction model procedure. The study found that the components of public expenditure have a different impact on private investment, both long-term and short-term. Specifically, recurring and public final consumption spending had a positive effect (crowd effect) on private

investment, while capital spending had a negative effect (crowd effect) on private investment (Ifeakachukwu, et al. 2013).

Mahmoudzadeh, et al. (2013) evaluated the effect of disaggregated fiscal spending (consumption, capital formation and budget deficit) on private investment in both developed and developing countries in their paper using panel data from 2000 through 2009. The results indicate that the elasticity of private investment concerning government capital formation expenditure is positive in both groups (crowd in effect), but this complementary effect is greater than in the developed countries. Similarly, the elasticity of private investment vis-à-vis government consumption spending is significantly negative in both groups (eviction effect), but this substitution effect is greater in developed countries. Furthermore, the effect of budget deficits on private investment in developing countries is negative, while this effect is positive in developing countries.

Njuru, et al. (2014) in their study to determine the impact of public spending on private investment using the time series 1963 to 2012. Research findings indicate recurrent and development expenditures have increased private investment. The reforms of public expenditure discourage the activities of private investors. The study adopted the VAR technique and concluded that there was a need for government to reallocate funds towards a project that is valuable to the private sector and eschew those that contend with or crowd it out.

Another study aimed to analyse the effect of government spending on private investment in Turkey, evaluating the existence of eviction/eviction effects for

the period 1975-2011. Unlike other studies, the paper used a revised version of David A. Aschauer's (1989) model, which shows the effects of each component of government spending in the Turkish budget system. The findings of the paper showed that government current transfer spending, government, current spending, and government interest spending crowd out private investment, whereas government capital spending crowds in private investment (Şen & Kaya 2014).

Sinevičienė (2015) examined the relationship between government spending and private investment in small open economies. The study employed the cross-correlations and Granger causality tests using data from Bulgaria, Estonia, Latvia, Lithuania and Slovenia from 1996-2012. The research results shows that the impact of government expenditure increase in private investment is very weak, but the negative impact of government expenditure increase in private investment dominates, except in the case of Bulgaria; whereas the impact of private investment increase in government expenditure is very different in analysed countries.

Bello, et al. (n.d.) Survey on the extent to which public expenditure attracts or excludes private investment in Nigeria. The analysis made use of Nigerian annual data for the period of 34-years. The paper focuses on disaggregating capital and recurrent federal expenditures and examining their distinct effect on private investment. This document used multiple regression analyses. The study suggested that effective macroeconomic management should be provided to cushion the negative effect of increasing inflation on private investment.

Dash (2016) estimated the impact of public investment on private investment in India from 1970-to 2013 and adopted the ARDL procedure by Pesaran and Shin (1999) and Pesaran, Shin, and Smith (2001). The study incorporated the endogenously determined structural break. The results of this study reveal that public infrastructure (represented by kilometres of roads per capita) have a positive effect on private investment in the short run. However, this complementarity may disappear if public investment projects are not of good quality and/or financing of these public projects have an adverse effect on the availability of bank credit or lending rate. Therefore, the results concluded that public investment crowds out private investment.

Adeyemi, et al. (2018) examined the impact of government capital expenditure on private investment in sub-Saharan Africa, for a period of 1980 to 2015. The study adopted the flexible theory of investment and employed panel data analysis mainly static panel models of fixed effect and Random effect regression. The findings revealed that government capital expenditure has an insignificant positive effect on private investment among the selected countries of Sub-Saharan Africa. However, variables like debt stock and tax revenue have a significant positive impact on private investment among the selected countries of SSA. The findings of this study also showed that official development assistance, inflation and interest rates have an insignificant negative effect on private investment.

Olaifa and Benjamin (2019) analyzed the relationship between government capital spending and private investment in Nigeria from 1981 to 2016. The long-run impact of government capital expenditure on private sector investment was investigated using co-integration regression, and the direction

of causality between government capital expenditure and private investment was examined using the T-Y causality test. The Co-integration regression results revealed that government capital expenditure on physical assets, defence, and internal security in Nigeria crowds out private sector investment. Whereas government capital expenditure on human capital and public debt servicing boost Nigeria's private sector investment. Lastly, the T-Y causality test results revealed a bidirectional direction causality between government capital expenditure and private sector investment.

Jacques (2020) analyzed the impact of public expenditure and the quality of institutions on private investment in CEMAC countries. The study employed the dynamic spatial random effect model and annual data for the period 2002 to 2018. According to the findings, public spending and quality institutions have a positive impact on private investment and therefore constitute a lubricant for private investment.

Pamba (2022) explored the link between public and private investment in South Africa over the period of 1980 to 2020, testing the crowding in or crowding out hypothesis. The study employed the error correction and vector error correction model (VECM) techniques using annual time series data. Moreover, private investment was divided into credit to the private sector (CPS) and foreign direct investment (FDI). According to the findings of the ECM, public investment has a negative relationship with private investment (as measured by credit to the private sector and foreign direct investment). The conclusion implies that in South Africa, public investment crowds out private investment support the assumption of neoclassical economists.

3.4 Summary

From the above theoretical views, it concludes that the neoclassical school of thought advocates that private investment be dampened by an increase in government spending. On the other hand, an increase in the government spending stimulates private investment according to the Keynesian theory. Whereas, based on the available empirical literature analysed above on the impact of public expenditure and private investment, public expenditure can either overrun or crowd out private investment through various channels. In addition, some studies have found that the impact of public expenditure has a different impact on private investment both in the long run and the short run as well as in different countries.

Thus, the reviewed literature should not be used as a proxy for Namibia as it will not give a clear indication of the impact of public expenditure on private investment due to the different nature of Namibia. This paper, therefore, attempts to examine this impact in the Namibian context.

CHAPTER FOUR

RESEARCH METHODS

4.1 Introduction

In the previous chapter, a literature review was done to explore the impact between government spending and private investment. The review shows that the impact can crowd in or out private investment. In chapter four the research method used in the study are described. This chapter provides a framework for the research design, procedure and data analysis that was employed in this study and further discusses the methodology used to examine the impact of public expenditure on private investment in Namibia.

4.2 Research design

To examine the impact of public expenditure on private investment, the study is of a quantitative nature. The study adopted a model similar to that used in a study by Rahman, et al. (2015) with slight modifications to suit the Namibia economy. The study was conducted using time series data of government expenditure, private investment and real GDP per capita and used a fiscal dataset comprised of 30 yearly observations, covering the period from 1990 to 2020. The sample size was selected based on data availability for both variables of interest.

4.3 Estimation Procedure

The study employed a time-series annual data set whereby secondary data was used to model the impact of public expenditure on private investment in Namibia. Firstly, data were transformed into natural logarithmic to eliminate extreme variability in the variables and this was done for all the variables.

Moreover, data were subjected to the unit root test by utilizing the Augmented Dickey-Fuller (ADF) in checking for the stationarity of the variables. For the ADF test, the following equation was estimated:

$$\Delta Y_t = \partial + bY_{t-1} + \sum_{i=1}^{k} b\Delta Y_{t-1} + e_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where Y_t represents the variables of interest. Δ is the difference operator, and a and b are the estimated parameters. Variable is said to be integrated at level {I(0)} if the ADF test statistic is greater than the critical value at 5 percent level otherwise, the variable is integrated of order d {I(d)} when d represents the number of times the variable is differenced before it becomes stationary.

Following the determination of the order of integration (stationarity), a cointegration test was performed to determine whether there was a possible long-term relationship between the variables and subsequently, estimated the long-run estimation. Furthermore, as Gujarati and Sangeetha (2007) emphasize, the co-integration test can be viewed as a pre-test to avoid spurious results. However, prior to that, the study determined the optimal lag length of the variables. Finally, the model was estimated using the Error Correction Model (ECM) within the Autoregressive Distributive Lag (ARDL) framework to capture the short-run effects.

4.4 Model specification

The study adopted a model similar to that used in a study by Rahman, et al. (2015) to test for the impact of government expenditure on private investment which is as follows:

$$\boldsymbol{PI = f(AGR, CS, DEF, DS, EDU, HEA, INF, MFG, TC,)} \ldots\ldots\ldots\ldots\ldots (2)$$

Taking the natural logarithm of the variables, equation 1 is expressed in stochastic form as follows:

$$\boldsymbol{lnPI = \beta_0 + \beta_1 lnAGR + \beta_2 lnEDU + \beta_3 lnHEA + \beta_4 lnTC + + \beta_5 lnY + \mu} \ldots\ldots (3)$$

Where private investment **(PI)** is the dependent variable and on the other side of the equal sign are public expenditure components all measured as a share of total public expenditure in Namibian dollars (N$) as the independent variable which constitutes agriculture expenditure (**AGR**), education expenditure (**EDU**), expenditure on health (**HEA**), total spending on transport and communication (**TC**). In addition, **Y** is national income measured by GDP (at constant prices) as a control variable. Lastly, $\boldsymbol{\beta_0}$ is the intercept, $\boldsymbol{\beta_1}$ ***to*** $\boldsymbol{\beta_5}$ are coefficients of the independent variables and $\boldsymbol{\mu}$ is the error term. And, in addressing the objectives of the study, the econometric form of ARDL model tested specified as follows:

$$\Delta PI_t = \boldsymbol{\beta_0 + \beta_1 \nabla lnAGR_{t-1} + \beta_2 \Delta lnEDU_{t-1} + \beta_3 \Delta lnHEA_{t-1} + \beta_4 \Delta lnTC_{t-1} + + \beta_5 \Delta lnY_{t-1} + \sum_{i=1}^{n} \beta_6 \nabla lnAGR_{t-1} + \sum_{i=1}^{n} \beta_7 \nabla lnEDU_{t-1} + \sum_{i=1}^{n} \beta_8 \nabla lnHEA_{t-1} + \sum_{i=1}^{n} \beta_9 \nabla lnTC_{t-1} + \sum_{i=1}^{n} \beta_{10} \nabla lnY_{t-1} + \varepsilon_t} \ldots\ldots (4)$$

Where Δ represents the difference operator, while β_0 is the intercepts, while $\beta_1, \beta_2, \beta_3, \beta_4$ *and* β_{05} are the long-run coefficients and $\beta_6, \beta_7, \beta_8, \beta_9$ *and* β_{10} are short-run parameters. Further, εt is the white noise error terms and n represents the lag length of the variables.

CHAPTER FIVE

ANALYSIS AND DISCUSSION OF THE EMPIRICAL RESULTS

5.1 Introduction

The purpose of this study aimed impact public expenditure on private investment in Namibia. It further examined how the gross domestic product would influence private investment in Namibia. Using a time-series econometric statistical package (Eviews version 9.0), the study began by conducting a unit root test to check the stationarity of data and the order of integration.

5.2 Unit root test

A study by (Arltová & Fedorová, 2016) indicated that statistics and econometrics use single-equation or multi-equation regression models of time series for modelling economic variables and their interrelations. These models are based on the Box and Jenkins methodology (Box & Jenkins, 1970) and the fundamental assumption for their use is time-series stationarity or their linear combinations stationarity in the case of multi-equation models. In practice, however, this condition is often not met because most economic time series are non-stationary.

The study has for this purpose used a well-known test: namely the Augmented Dickey-Fuller (ADF) test, based on the null hypothesis that a series is not stationary '(i.e. has a unit root) against the alternative that it is stationary. By rejecting the null hypothesis, one can conclude that the series is stationary. One advantage of the ADF test over the other stationarity tests is that the ADF tests

can be used in the presence of serial correlation. Hence, the unit root test was conducted given the following general hypothesis:

- *Null hypothesis: There is a unit root (series are non-stationary)*
- *Alternative hypothesis: There is no unit root (series are stationary)*

When testing for stationarity, if the statistical t-value (calculated) is less than the critical t-value in absolute terms then the null hypothesis is accepted. This implies that the variable has the presence of a unit root and that it is non-stationary. If the statistical t-value is greater than the critical t-value in absolute terms then the null hypothesis is rejected, meaning that the variable has no unit root and is stationary. Unit root have been tested in both levels and first differences to check if variables are integrated of order one and/or zero, which is fit for an ARDL model bound testing to cointegration.

Table 5.1: Results of unit root test

Name of Variable	**Augmented Dickey-Fuller (ADF)**			**Order of integration**
	Level	**1st Difference**	**Critical Value**	
	T-Stats	T-stats	at 5 (0.05) per cent	
InAgr	-2.309	-4.826	-2.96	I(1)
InEdu	-0.992	-6.685	-2.96	I(1)

InY	-0.155	-3.462	-2.96	I(1)
InHea	-0.768	-4.419	-2.96	I(1)
InPI	-1.311	-5.948	-2.96	I(1)
InTC	-0.948	-4.419	-2.96	I(1)

Source: *Authors' computations from Eviews output*

As can be inferred from the ADF test result in Table 5.1, all the variables were non-stationary in levels. However, they all became stationary after the first difference, I (1). After determining the order of integration of variables, the study proceeded to determine whether they are cointegrated/possess a long-run relationship. However, before testing for cointegration there is a need to determine the optimal lag length.

5.3 Determination of lags

In selecting the appropriate lags for the long run underlying equation, the study used the VAR lag order selection criteria test to determine the optimal lag length for the variables and the results are presented in Table 5.2. Selecting the optimal lag length for variables is important because including too many lagged terms will consume degrees of freedom, not to mention introducing the possibility of multicollinearity. Whereas including too little lags will lead to specification errors (Gujarati & Porter, 2009).

Table 5.2: VAR lag order selection criteria test

VAR Lag Order Selection Criteria						
Endogenous variables: LNPI						
Exogenous variables: C LNAGR LNEDU LNHEA LNTC LNGDP						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-10.057	NA	1.94e-06	1.038456	1.274196	1.112287
1	113.7876	196.4442*	2.19e-09*	-5.778458*	-4.364014*	-5.335472*
2	132.1087	22.74339	4.12e-09	-5.317841	-2.724694	-4.505700
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Source: *Authors' compilation from Eviews output. Note: * indicate the lag order.*

Table 5.2 revealed that the appropriate optimal lag length across the various information criteria was a lag order of 1 for the log of private investment as indicated by the row with the most stars.

5.4 Cointegration test

After determining the order of integration of variables, the Autoregressive Distributed Lag (ARDL) cointegration method was used in the study to examine the long-run relationship and short-run dynamics of the effect of public expenditure on private investment. The cointegration analysis is significant to avoid the risk of spurious regression. One way of resolving this is to difference the series successively until stationarity is achieved and then us e the stationary series for regression analysis. According to Gujarati (2003), two variables will be cointegrated if they have a long-term or equilibrium relationship between them. In addition, Miller and Russek (1989) posit that cointegration occurs when two or more non-stationary or stationary time-series data move together in a similar direction. In addition, testing cointegration is a necessary step to establish whether there is an empirically meaningful relationship. Variables cannot stay in a fixed long-run relationship if they have different trend processes.

5.3.1. The Bound Test for Cointegration analysis

The bounds test for cointegration was tested using the Wald Test, whereby the null and alternative hypotheses were specified as follows:

- H_0: $B_1 = B_2 = B_3 = B_4 = B_5 = 0$ *(There is no cointegration)*
- H_1: $B_1 \neq B_2 \neq B_3 \neq B_4 \neq B_5 \neq 0$ *(There is a cointegration)*

According to Narayan (2005) if the F-statistic of the Wald test is below the lower bound critical value I (0) then the null hypothesis (H_0) could not be rejected (concluding that there is no long-run relationship between the variables). However, if it is above the upper bound critical value I (1), then the null hypothesis (H_0) is rejected (concluding that there is a long-run relationship between variables). Or else, if the F-statistic falls, between the two bounds then it is inconclusive and awareness of the order of the integration of the underlying variables is required before conclusive inferences could be made.

Table 5.3: Bounds test results for cointegration analysis

CRITICAL VALUE	LOWER BOUND	UPPER BOUND
10%	2.26	3.35*
5%	2.62	3.49*
F-Statistic = 3.60, K= 5		

Source: *Authors' compilation from Eviews output. Note: * at the upper bound shows that the upper bound is lower than the F-stats.*

Note: * *denotes rejection of the null hypothesis at the 0.05 and 0.1 level*

In keeping with the objectives of the study as stated in chapter one, the bounds test for cointegration was estimated. As shown in Table 5.3, the computed F-statistic of 3.60 is greater than the upper bound critical value of 3.49 and 3.35 at 5 per cent and 10 per cent levels of significance, respectively. Therefore, the null hypothesis cannot be accepted, and as a result, the study concludes that variables are cointegrated and there is a long-run relationship among the variables.

5.5 The Long-run model results

Having established the long-run relationship between variables, the study estimated and examined the long-run marginal impact of government expenditure and GDP on private investment in Namibia and the results are presented and discussed as follows.

Table 5.4: The long run test coefficient results

Variable	Coefficient	Std. Error	T-Statistics	Prob.
D(LNAGR)	0.667187	0.164187	4.063588	0.0006***
D(LNEDU)	-0.541162	0.325871	-1.660661	0.1116
D(LNHEA)	0.514645	0.367370	1.400890	0.1759
LNTC	-0.070456	0.055731	-1.264223	0.2200
LNGDP	0.348278	0.657362	0.529812	0.6018
C	-1.375461	4.386223	-0.313587	0.7569

Source: *Author's compilation from Eviews output.* Note: *** denotes level of significance at 1 percent.

From the results in Table 5.4, it was revealed that agricultural expenditure had a positive and significant impact on private investment in the long run at a 1% level of significance. This implies that, ceteris paribus, a one-unit increase in the public expenditure through agricultural expenditure will attract private investment growth rate by 0.667 units in the long run. This finding is in support of the Keynesian theory, which is of the view that an increase in public expenditure crowds in private investment. On the other hand, both education

and total cost of transport & communication expenditure had a negative and insignificant impact on private investment signifying that these variables have no crowd-in or crowd-out effect on private investment in the long run. This finding, however, contrasts with a priori expectation that government capital expenditure such as education has a positive and significant effect on private sector investment (Wang, 2005). Lastly, it is also observed that both health and GDP are positive but insignificantly influencing private investment in Namibia.

5.6 The Error Correction Model (ECM)

Since there is co-integration between variables, the Error Correction Model (ECM) was estimated to examine the short-run adjustment of the dependent (target) variable and the impacts of various explanatory variables on it. The ECM will enable the study to include both the short and long run information. The ECM is specified as follows:

$$\Delta lnPI_t = \beta_0 + \sum_{i=1}^{p}\beta_{1i}\Delta InPI_{t-1} + \sum_{i=1}^{q}\beta_{2i}\Delta lnAGR_{t-1} + \sum_{i=1}^{q}\beta_{3i}\Delta lnEDU_{t-1} + \sum_{i=1}^{q}\Delta\beta_{4i}\Delta lnHEA_{t-1} + \sum_{i=1}^{q}\beta_{5i}\Delta lnTC_{t-1} + \sum_{i=1}^{q}\beta_{6i}\Delta lnY_{t-1} + \lambda ECT_{t-1} + \varepsilon_t \ldots\ldots\ldots (5)$$

In this model β_{1i} **to** β_{6i} are multiplier impacts, short term effects, that measure the immediate impact a change in the different government expenditure will have on a change in private investments, while λ is the feedback effect or the adjustment effect which shows how much the disequilibrium is being corrected.

However, to obtain the value for the long run term (λECT_{t-1}), the long-run model specification model for the log of private investment needed to be

estimated to obtain residuals. The long-run specification model for the log of private investment is as follows:

$$lnPI\ \beta\ lnPI(-1)\ lnAGR(-1) lnEDU(-1)\ lnHEA(-1)\ lnTC(-1)\ lnY(-1)..(6)$$

Therefore, the error correction model specification developed was as follows:

$$d(InPI)\ c\ d(InPI(-1))\ d(InAGR(-1))\ d(InEDU(-1))\ d(InHEA(-1))\ d\ (InTC(-1))$$

$$d(InY(-1))\ ecm(-1) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (7)$$

Table 5.5: The error correction model (ECM) test Results

Dependent Variable: LNPI (Private Investment)				
Method: Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNPI(-1))	0.802025	0.166539	4.815847	0.0001***
D(LNAGR(-1))	0.044434	0.047526	0.934932	0.3616
D(LNEDU(-1))	0.527421	0.161439	3.266998	0.0041***
D(LNHEA(-1))	-0.157821	0.121822	-1.295502	0.2107
D(LNTC(-1))	1.963199	0.465762	4.215028	0.8575
D(LNGDP(-1))	0.000855	0.004699	0.181976	0.0005***
ECM(-1))	-0.596309	0.109484	-5.446521	0.0000***
C	-0.115160	0.046562	-2.473264	0.0230
R-Squared		0.857122		

F-statistics	12.66452
Prob(F-statistics)	0.000003

Source: *Author's compilation from Eviews output. Note: *** denotes level of significance at 1 percent.*

As can be seen from table 5.5, government expenditure on agriculture has a positive sign however; it is statistically insignificant, implying that the rate of government expenditure on agriculture has no significant impact on private investment during the short-run period.

Expansive government expenditure on education will be crowding in private investment in the short run. Meaning that ceteris paribus, a one-unit increase in government expenditure on education will promote private investment by 0.0041 units during the short run. This conforms to the Keynesian economic theory as well as the results by Olaifa and Benjamin (2019) who submitted that an increase in government expenditure on human capital improves private sector investment in Nigeria.

Furthermore, the results revealed a positive and significant relationship between GDP and private investment at a 1 per cent significance level. This implies that holding other variables constant, a one-unit increase in economic growth attracts private investment by 0.0008 units in the short run. This further indicates that in the short term, the condition of economic growth in Namibia matters and it is a vital indicator that guides the attractiveness of private investors.

The results further revealed that government expenditure on both health and infrastructures such as transport and communication remain insignificant in influencing the flow of private investment into the country. This is however in contradiction with the Keynesian economists' view, which postulates that such investment or expenditure by the government complement or crowds in private investment as such projects increase the rate of returns on private investment. However, the results are advocating for the neoclassical theory that public spending crowds out private investment. This could be true in view, that when the state increases it is spending in any economy through public debt and rising taxes will eventually discourage private investment.

The ECM coefficient shows the speed of adjustment in the long run. According to literature, when the ECM coefficient is negative it implies convergence in the long run. Conversely, if it comes out with a positive sign, it implies that the model is explosive and that there is no convergence. From the estimated results, the ECM coefficient of -0.596309 is statistically significant at a 1 per cent level of significance. This indicates that short-term equilibrium fluctuations will be corrected towards long-term equilibrium, whereby about 59.63 per cent of the adjustments occur in the first year while about 40.37 per cent of the adjustment process will occur in the next year period.

Furthermore, it is observed that private investment of previous years positively affects current year investment whereby a one per cent increase in one year lagged of private investment results in an 80.2 per cent increase in current year private investment. This implies that private investment is effective and efficient in providing revenue for public sector growth. This conforms to the study of Aschauer (1989).

In conclusion, it is difficult to find a consistent pattern regarding the impact of public expenditure on private investment. The theoretical and empirical evidence regarding the impact of public expenditure on private investment is ambiguous, which strengthens the argument that results tend to be country-specific, either because economic circumstances vary or simply because governments behave differently in terms of policy-making. Thus, the study can conclude that some government expenditure sectors crowds in private investment whereas other crowds out.

5.7 Diagnostic Tests

After the model was estimated, several diagnostic tests were performed to determine its stability of the model.

5.7.1 Serial correlation test

The first is the Breusch-Godfrey Serial Correlation LM test. This particular test was estimated to check for serial correlation, with the null hypothesis being no serial correlation and the alternative hypothesis being there is a serial correlation.

Table 5.7.1: Serial correlation LM test results

Breusch-Godfrey Serial Correlation LM Test		
F-statistic 0.96	Prob. 0.39 (2.19)	F
Obs*R-squared 2.76	Prob.Chi-square(2)	0.25

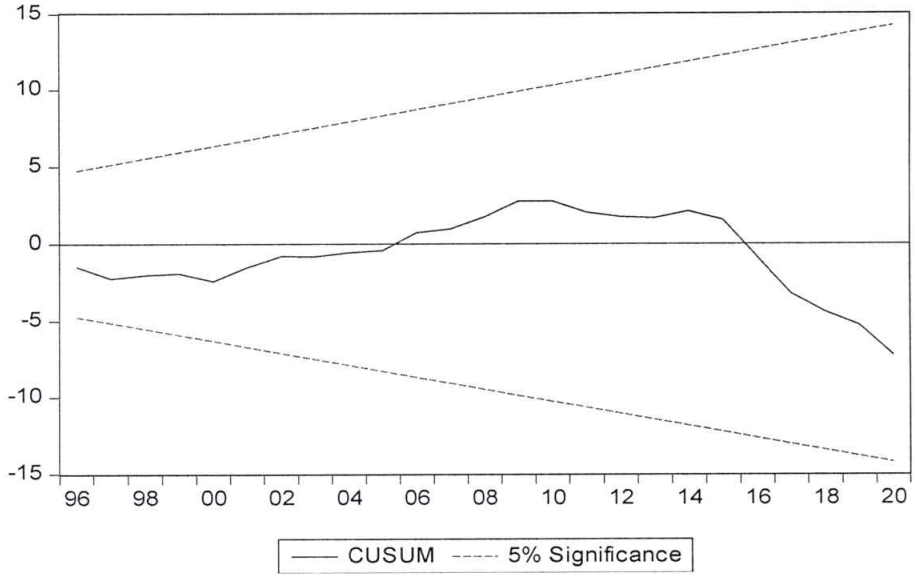
Source: *Author's compilation from Eviews output*

In Table 5.7.1, the Obs*R-squared (3.69) is greater than the critical value (0.05 and 0.10) therefore, the study failed to reject the null hypothesis of no serial correlation which is desirable.

5.7.2 Stability test

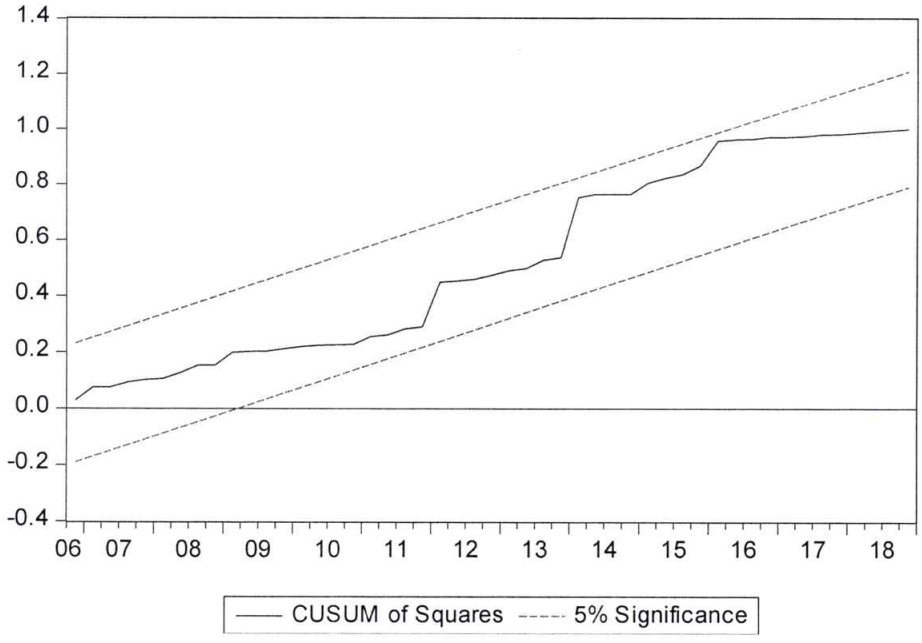
The second diagnostic test was the stability test using the Cumulative Sum of Recursive Residuals (CUSUM) and the Cumulative Sum of Recursive Residuals of Squares (CUSUM of Squares) tests. This diagnostic test was estimated to check the stability of the model. As can be seen from figure 5.7.2 (a) and figure 5.7.2 (b) for CUSUM and CUSUM of Squares respectively below, the model is stable as the line (blue line) falls within the bands at 5% significance.

Figure 5.7.2 (a): Plot of Cumulative Sum of Recursive Residuals



Source: *Eviews output.*

Figure 5.7.2 (b): Plot of Cumulative Sum of Recursive Residuals of Squares



Source: *Eviews output.*

5.7.3 Heteroscedasticity test

The last diagnostic tests were the heteroscedasticity test. Heteroscedasticity is a major concern in regression analysis, as it could invalidate statistical tests while homoscedasticity is desirable. Hence, its presence was checked with the null hypothesis postulating homoscedasticity and the alternative hypothesis postulating heteroskedasticity.

Table 5.7.3: Heteroscedasticity test results

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.32	Prob. F(8,21)	0.94
Obs*R-squared	3.32	Prob. Chi-Square(8)	0.91

Scaled explained SS	0.27	Prob. Chi-Square(7)	0.99

Source: *Author's compilation from Eviews output.*

Table 5.7.3, shows the results yielded after testing for heteroskedasticity. The P-Value of the F-statistic is greater than the critical value (0.10), therefore, the study failed to reject the null hypothesis of homoscedasticity, which as mentioned earlier is desirable and helps authenticate the estimated model and its findings.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This chapter concludes the study. It provides the summary of the study, recommendations and alludes to other perspectives that could be looked at, to build on the present study.

6.2 Summary of the study

The main objective of the study was to analyse the impact of government expenditure on private investment in Namibia during the period of 1990 to 2020. The macroeconomic variables used in the study included: the components of government expenditure (agriculture, education, health, transport & communication), economic growth and private investment. Firstly, the unit root tests were estimated using the augmented dickey-fuller stationarity test and it was established that all variables were non-stationary in levels however, they all became stationary at first difference. The study used an ARDL framework model because all variables had the same order of integration I (1). Following that, the bounds test for cointegration was estimated to determine if there was a long-run relationship between the variables. Based on the Bound test results, cointegration was present as the F-statistic fell outside the upper bound of the test.

To examine the short-run adjustment of the dependent (target) variable as well as the impacts of various explanatory variables on private investment, the ECM estimation was conducted. Moreover, the diagnostic checks validated the estimated model, leading to the study's conclusion that the models are reliable and can be used for economic policy, forecasting, and prediction.

According to the ARDL estimates, and in contrast to the long run estimates, government spending on education has a positive and significant effect on private investment in the short run, implying that government spending on education encourages private investors to invest in the country. This is also consistent with the findings of Olaifa and Benjamin (2019), lending support to the Keynesian school of thought, which favours government spending to stimulate private investment growth. Moreover, control variables such as GDP also crowd in private investment as it shows a positive and significant effect during the short-run period indicating that investors consider the level of economic growth as an important indicator when making their investment decisions. However, in the long run, factors such as health, total transportation costs, and communication remain insignificant in influencing the level of private investment, supporting the neoclassical theory that public expenditure crowds out private investment.

It was also observed that the previous year's private investment value does influence the level of the current year's investment. Finally yet importantly, the expenditure on agriculture becomes insignificant in crowding in private investment during the short run. Overall, it is difficult to find a consistent pattern in Namibia regarding the impact of public expenditure on private investment. As a result, the study concluded that both Keynesian and Neoclassical theories of public expenditure are valid in Namibia in the short and long run respectively.

6.3 Recommendations

From the empirical results, it is noticeably that some public expenditures insignificantly crowds-in private investment in Namibia, therefore for the government expenditure to sufficiently crowds-in private investment in Namibia, efforts need to be accelerated in the following areas: decentralisation with the

elimination of structural rigidity such as the number of checkpoints as a way of facilitating the movement of goods and people in Namibia.

In addition, the government should adopt consistent fiscal policy measures that can establish budget discipline, transparency and accountability aimed at increasing the standard of living by assuring an efficient public expenditure budget. Furthermore, the government should also increase expenditure on health, since it will enhance private investment through improved health status and labor productivity.

Lastly, as per the Keynesian school of thought which advocate for government spending as a booster of private investment through infrastructure development, Namibian government expenditure should be concentrated in the areas of infrastructural development, education and research, and health at the expense of excessive expenditure which may be politically driven with little or no economic consideration and in return crowd-in private investment.

6.4 Recommendation on further areas of study

All efforts have been made to analyse the impact of various components of government expenditures on private investment; however, there may be some other components like expenditures on administration, military, economic affairs, law etc. that may also affect the private investment. In the future, other researchers can include them as well in exploring this relationship further.

Lastly, a longer time period can be used to access this impact of government expenditure on private investment as more data becomes readily available.

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APPENDICES

APPENDIX A: TIME SERIES DATA

Years	Private Investment (N$ million)	Agriculture (N$ million)	Transport and communication (N$ million)	Education (N$ million)	Health (N$ million)	GDP (N$ million)
1990	5,965	75,185	256,253	510,135	247,338	50,153
1991	4,614	146,058	325,697	617,274	275,275	54,249
1992	6,449	223,355	452,920	725,833	326,674	58,149
1993	6,806	189,807	283,889	809,833	331,711	57,230
1994	7,267	140,953	226,296	952,291	410,085	58,220
1995	8,366	187,899	270,896	1,049,998	480,662	60,490
1996	9,819	265,117	307,765	1,762,370	524,219	62,421
1997	8,513	295,368	409,136	1,523,500	611,571	65,055
1998	10,585	319,948	320,343	1,700,621	712,643	67,196
1999	11,029	338,510	415,495	1,863,019	837,484	69,460
2000	10,035	339,395	122,291	1,970,443	925,070	71,886
2001	13,577	363,158	72,415	2,078,769	975,642	72,733
2002	13,471	363,940	108,613	2,302,482	1,069,470	76,216
2003	12,799	390,401	189,122	2,426,015	1,155,402	79,447
2004	13,595	413,433	246,700	2,613,246	1,172,792	89,195
2005	14,084	464,026	141,046	2,564,905	1,268,134	91,451
2006	18,279	415,942	296,640	2,630,320	1,334,888	97,919
2007	20,499	700,000	761,272	4,244,000	1,879,000	103,182
2008	24,188	949,000	1,027,000	4,783,000	2,132,000	105,916
2009	27,691	1,316,000	1,141,000	5,546,000	2,300,000	106,229
2010	27,360	1,514,000	1,300,000	6,500,000	2,600,000	112,645
2011	26,166	1,758,000	1,952,000	7,680,000	2,758,000	118,380
2012	34,330	1,803,000	3,084,000	9,416,000	3,976,000	124,372
2013	38,968	1,927,000	4,205,229	9,312,393	5,024,205	131,355
2014	47,710	1,574,189	2,397,460	10,693,900	5,715,974	138,918
2015	45,020	1,258,371	3,036,760	11,422,396	6,236,792	145,207
2016	32,944	1,654,891	3,845,814	12,794,882	7,230,983	144,799
2017	29,445	1,283,631	4,482,586	15,078,261	7,529,000	144,428
2018	30,334	1,194,183	2,616,171	16,434,000	6,537,000	145,437
2019	30,278	1,258,587	2,277,464	16,905,000	6,868,000	143,787
2020	28,219	1,307,461	1,802,408	17,659,000	8,052,000	176,327

APPENDIX B: THE ERROR CORRECTION MODEL (ECM) OUTPUT

Dependent Variable: D(LNPI)
Method: Least Squares
Date: 01/09/22 Time: 11:24
Sample: 1992 2020
Included observations: 29
Convergence achieved after 27 iterations
Coefficient covariance computed using the outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.115160	0.046562	-2.473264	0.0230
D(LNPI(-1))	0.802025	0.166539	4.815847	0.0001
D(LNAGR(-1))	0.044434	0.047526	0.934932	0.3616
D(LNEDU(-1))	0.527421	0.161439	3.266998	0.0041
D(LNHEA(-1))	-0.157821	0.121822	-1.295502	0.2107
LNTC(-1)	0.000855	0.004699	0.181976	0.8575
D(LNGDP(-1))	1.963199	0.465762	4.215028	0.0005
ECT(-1)	-0.596309	0.109484	-5.446521	0.0000

R-squared	0.857122	Mean dependent var	0.062442
Adjusted R-squared	0.789443	S.D. dependent var	0.147362
S.E. of regression	0.067619	Akaike info criterion	-1.522177
Sum squared resid	0.086875	Schwarz criterion	-1.050695
Log likelihood	32.07156	Hannan-Quinn criteria.	-1.374515
F-statistic	12.66452	Durbin-Watson stat	1.437587
Prob(F-statistic)	0.000003		

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Approval for Exemption from Ethical Clearance

Ethical clearance exemption reference N0: DEC FOC/27/01

Review Date: 12/04/2023

Title of Project: AN ANALYSIS OF THE IMPACT OF PUBLIC EXPENDITURE ON PRIVATE INVESTMENT IN NAMIBIA

Student Name: NGHIPONA JONA

Student Number: 201209202

Supervisor(s): Prof, E. KAAKUNGA

Dear Sir/Madam.

This letter certifies that the application for the procedure stated above has been reviewed by the Faculty of Commerce, Management and Law Decentralized Ethics Committee (DEC). The Ethics Committee has given due consideration and concludes that the said proposal be exempted from review as it does not involve direct contact with human participants and in addition your study relies on secondary data which does not require ethical clearance. This is aligned to the University research ethics policy on ethical exemptions page no.16 (C1.3). Please note that any changes to the procedure must be brought to the notice of the DEC. The DEC must determine whether the requested procedure changes alter the risks.

Please contact the DEC office if you have any questions. Any correspondence with the DEC office regarding this action should mention the allocated Ethical clearance exemption reference number indicated at the top of this letter.

Regards,

The ethics committee wishes you the best in your research.

Precious Mushendami (Decentralized Research Ethics Committee)

Prof. Davis Mumbengegwi (Head, Multidisciplinary Research)