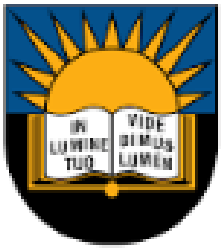

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THE IMPACT OF PUBLIC DEBT ON ECONOMIC GROWTH IN SOUTH AFRICA

BY

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ABSTRACT

This study investigates the impact of public debt on economic growth in South Africa between 1990 -2022. The study employed the ARDL model to estimate the long run and ECM for the short run. After performing an ARDL bounds test, co-integration was determined. The long-run model was estimated, and the results showed that government debt and investment negatively impact economic growth and the impacts are statistically significant. On the other hand, government expenditure showed a positive coefficient, it lacked statistical significance, suggesting that its impact on GDP growth may not be robust. The dummy variable representing structural breaks, particularly the transition to democracy in 1994. In the short run, public debt and investment has an impact on economic growth and the impact is negative. Government expenditure is the only variable that has short run positive impact on economic growth. Several policy implications emerged from the empirical results. In South Africa investments are directed towards unproductive sectors or are subject to high levels of inefficiency and corruption. The economic instability can lead to underutilization of capital and resources, further dampening the growth effects of investment. Therefore, it is essential for policymakers to focus not only on the quantity of investment but also on improving its quality and ensuring a stable economic environment. In this study, the non-significant results might indicate inefficiencies or the presence of offsetting negative factors, such as high levels of corruption or misallocation of resources. Hence the government should reduce corruption by effectively implementing the rule of law.

Key words: ARDL, South Africa, economic growth, public debt

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Contents

LIST OF TABLES

Chapter 2

Chapter 5

LIST OF FIGURES

Chapter 2

Chapter 5

LIST OF ACRONYMS

ADF: Augmented Dickey Fuller

AMECO: Annual Macro-Economic Database

ARDL: Autoregressive Distributed Lag

CBK: Central Bank of Kenya

ECM: Error Correction Model

FPE: Final Prediction Error

FRED: Federal Reserve Bank

GDP: Gross Domestic Product

GMM: Generalized Method of Moments

GNI: Gross National Income

IMF: International Monetary Fund

LR: Likelihood Ratio

MTBPS: Medium Term Expenditure Framework

OLS: Ordinary Least Square

OECD: Organisation for Economic Co-operation and Development

SADC: Southern African Development Community

SARB: South African Reserve Bank

STATS-SA: Statistics South Africa

TSLS: Two-Stage Least Squares

VAR: Vector Auto Regression

VECM: Vector Error Correction Model

WGI: World Bank Global Governance Indicator

PFMA: Public Finance Management Act

PP: Phillips–Perron

SA: South Africa

CHAPTER 1

INTRODUCTION AND BACKGROUND

1.1 Introduction and the background of the study

The matter concerning how the state debt affects economic growth has persisted in research and policy decisions. The amount of governmental debt indicates the amount of spending that is funded by borrowing as opposed to tax revenue and a rise nation's entire production of goods and services is well-known as economic growth. From one historical era to the next, economy's ability to generate goods and services has risen (Springer, New York & Sharaf, 2022). At sub-national, national, international levels public debt has increased. Economic growth be hindered in nations that significantly rely on governmental debt. Public borrowing is not only inevitable, but also not a bad sign of economic expansion. Instead, it is thought of as a plan to quicken economic expansion (Sanusi, Hassan & Meyer, 2019).

The division of resources between those who have enough to utilize right away and those who require them to create economic projects, as well as the financial inflow of foreign investors are to blame for this (Quantec Research, 2019). Public debt is the principal macroeconomic indicator used to portray a country's position in the world markets. National Treasury (2021) argues South Africa is viewed as an African nation with significant potential for development and economic growth. From 4.9% in 2021, real GDP growth shrank to 2.0% in 2022. South Africa experienced 24.11% increase of GDP 2020, following 13.1% cut in 2019 and 3.87% drop in 2018. State debt as a percentage of 2019 GDP was 56, 22%. There has been an increase to 69% in 2020 and 68, 98 in 2021 (National Treasury, 2021)

State debt keeps on increasing due to the worldwide pandemic of COVID 19, and load-shedding. South Africa has been plagued by severe socioeconomic issues. South Africans are still very dependent on the government (Stats SA, 2020). High unemployment rates (29, 95% in 2023Q1), reduced output, mismanagement of state funds, lack of accountability, lower tax income collection and weak demand in the two main industries (manufacturing and agriculture), have led to job losses as output has decreased (Stats SA, 2020). Government therefore requires greater funding for public spending, which encourages investment, resolution of climate, economic and development, provision of services, and environmental issues. These macroeconomic issues are putting tremendous pressure on the country to provide public services (World Bank, 2021).

In South Africa, government borrows money from the World Bank, domestic and international investors also because of tax relaxation, natural disasters and calamities, budget deficit accumulation. The issue of load-shedding is increasing public debt since government needs to increase spending on power generation, assisting Eskom, repair costs and buying other machineries. It is estimated that the damage to the economy is more than R4 billion a day. More load shedding reduces government tax revenue, which results in high levels of state debt (Kose & Ohnsorge, 2019). Productivity is being affected.

After the world economic threatening financial crisis in the year of 2008, government debt significantly added so much value to economic development, macroeconomic goals, and economic growth in many emerging nations (Kose & Ohnsorge, 2019). To cover its fiscal deficit after 2008, South Africa's government borrowed more money each fiscal year as a result. In the national budget address for 2018, it was noted that the increasing state debt ratio in South Africa which is experiencing slow or uncertain growth is a result of the rising debt expenses outpacing social and the economic spending. According to Mr. Malusi Gigaba, the former finance minister, the state wants to resolve the concerning budget deficit problem with the intention of maintaining the country's debt to GDP ratio at a consistent 56.2% by 2022–2023. Despite pressure on state revenue, this in the case (National Treasury, 2023). (Mabugu, Maisonnave, Chitinga and Decaluwe, 2016) contend that using accumulated taxation to fund and also finance the additional spending will lessen the actual risk of experiencing cash flow problems.

According to preliminary figures for the 2018-2019 fiscal year released by the government, there would be R1.272 trillion in revenue, R1.505 trillion in spending, and R232 billion in total financing (debt used to fund government spending). Despite the economy's continued sluggish growth, the projected budget deficit in 2019–2020 fiscal year amounted to R255 billion, a raise of 9.61% over the previous financial year. The real GDP fall of 1.4% in 2019Q4 following a loss of 0.8% in 2019Q3 have been reported by Statistics South Africa (Stats SA, 2018).

Numerous macro-economic theories contend that government spending ought to boost economic expansion. Given that state spending accomplished a number of goals, including both social and economic investment, the distribution of essential services, the change of communities, the encouragement and support of business, and financing for research and innovation (Mark, 2018). However, if the majority of government spending goes toward wasteful activities, it could slow down economic growth. Given this context, understanding

how state debt affects the economy is crucial for policymakers and all other economic actors (Mark, 2018).

1.2 Problem Statement

South Africa has struggled to restructure its state debt, which was accumulated via counter-cyclical fiscal policies, ever since the post-financial crisis era began (Mark, 2018). Hence, South Africa's rate of economic growth slowed down. Public debt has recently gotten close to the sustainable top limit (MTB policy statement, 2020). Repaying cost of state debt threatens the stability of the nation's budget, which in turn threatens the growth of state services and investment. To safeguard the public finances, the government must act within its financial means in a way that is long-lasting (MTB Policy Statement, 2014).

The state debt increased in South Africa to 45, 15% of GDP due to the slowdown in economic growth that required a significant government deficit (International Monetary fund, 2020). The sustainability of present debt appears to be threatened by South Africa's demographic pressure. The entire amount of government debt in South Africa as of 2021 was R2.27 trillion. Now, South Africa spends R303 billion year on debt servicing; but, over the next three years, this amount might rise to R1 trillion (Makhoba, 2022). The economy and the disadvantaged are not best served by high and unmanageable debt. Due to the nation's high debt costs, essential expenditures like service delivery are being cut back. Currently, R1 of every R5 the government raises goes toward debt repayment. The debt load might be challenging to repay should leading agencies of rating choose to reduce South African credit rating even more. The ongoing load-shedding, COVID 19, and the global crisis are to blame for everything (Makhoba, 2022).

For the country and most of the world, the amount of the national deficit and the strategy for reducing it continue to be challenging decisions (Makhoba, 2022). The MTB Policy Statement (2014) states that when the economy is not responding, the state deficit does not need to be maintained high because a hike in the current account deficit would result in higher interest rates and cumulative inflation. The global crisis is to blame for South Africa's enormous state debt, which is far worse than any level of crowding out consequences. The most industrialized country in Africa, South Africa, dramatically increases public borrowing to pay off two-thirds of Eskom's obligations while the faltering state energy monopoly imposes the worst rolling blackouts yet. Via bailouts and the direct absorption of some loans over the course of the following years, the state would finance R254 billions of reliefs for Eskom's R400 billion debt.

The Executive Directors Board of World Bank Group's has approved a R7.6 billion loan for the COVID 19 Emergency Response Project in South Africa (National Treasury, 2023).

In South Africa, government supposed to use taxation to fund its spending, but unfortunately public debt is being used. The Japan economic overview and performance provides an example; despite experiencing the greatest debt to GDP ratio in the world, the nation is unable to achieve growth in its economy (Egert, 2015). The governmental debt ratio in Norway, Australia and Sweden is around 50 (Mark, 2018). The examples provided above gave rise to the hypothesis that South Africa is one of several nations with an issue of state debt. More research on the state debt impact in the economic growth is therefore required, having a particular emphasis to the South Africa's economy.

Huge public debt is dangerous for South African economy as it causes economic recession, it is difficult to have enough funds to deal with increasing demands of the governance. Because the debt is very high and keeps on increasing, the state struggles to pay the loans, which results in loss of credibility and trust. The other danger is that the country is losing investors as it is not a good option to invest in a country that keeps on making loans. Investors are scared that they might experience low returns or losses by investing in South Africa (Odhiambo & Saungweme, 2019). There might also a disadvantage of losing assets locally and internationally because of not being able to pay debt. These are some of the reasons the country has to worry about state debt.

1.3 Objectives

The aim of the study is to examine the impact of public debt on economic growth in South Africa from 1990 to 2022.

The specific objectives:

- To analyse the trends in public debt and economic growth in South Africa
- To econometrically examine the impact of public debt on economic growth in South African
- To investigate the co-integration relationship between public debt and economic growth in South Africa.

1.4 Hypothesis

The hypothesis which the study seeks to test is:

H_0: There is correlation between the trends in public debt and economic growth in South Africa

H_1: There is no correlation between the trends in public debt and economic growth in South Africa

H_0: Public debt increase has a negative impact on economic growth in South Africa.

H_1: Public debt increase has a positive impact on economic growth of South Africa.

H_0: There is a statistically significant long-run co-integration relationship between public debt and economic growth in South Africa.

H_1: There is no statistically significant long-run co-integration relationship between public debt and economic growth in South Africa.

1.5 Significance of the study

This study will fill in literature void on significant impact of public debt in South African economic growth and contribute to our understanding of the relationship between those two factors.

The study's difference is that the Autoregressive Distributed Lag (ARDL) model of econometrics will be utilized for the analysis of the connection between state debt and the economic growth in South Africa. As stated before, one economic measure of the nation's performance is the quantity of public debt. It is crucial to comprehend how South Africa's state debt and economic growth interact. Consequently, the following motivations drive this study; the lack of a latest study that evaluated the major state debt impacts on economic growth as well as how rising debt impacts the South African economy taking in to consideration the COVID 19 pandemic and continuing matter of load-shedding.

Given that South Africa heavily relies on debt to cover its annual budget, the timing of the research is crucial. This research will broaden our understanding, aid stakeholders in comprehending the relation between the state debt in South Africa and the economic growth, providing crucial information to policymakers about the need of monitoring the level of state debt (Johan, 2020). The significance of this work is broad-based. Several political initiatives, including economic, industrial, and development policy, are affected by it. With debt being considered as a significant source South African income, it is very crucial that debt's impact on economic growth be carefully investigated. Policy makers will then be able to decide or influence international, national, regional, or local policies and procedures that needs to be followed when dealing with public debt in South African economy. Policy makers will gain information and knowledge that will enable them to create ideas and plans on how to create

polices that will assist the country on eliminating the tendency of financing public spending using debt. Researchers will get a theoretical and empirical analysis of the essential function played by state debt in the South African economic expansion

1.6 Layout of the dissertation

The work is divided into six chapters. The study's problem statement, background information, and objectives are presented in Chapter 1. The review of state debt and South Africa's economic growth will be the main topic of Chapter 2. Theoretical principles and literature review are the main topics of Chapter 3. The focus of Chapter 4 will be the empirical analysis, Results interpretation is the main topic of Chapter 5. The primary findings and summary are presented in chapter 6.

CHAPTER 2

OVERVIEW OF PUBLIC DEBT AND ECONOMY OF SOUTH AFRICA

2.1 Introduction

The economic growth review and government debt is given in this chapter. The chapter provides a clear picture of what have been happening in South Africa, focusing on how the South African operations are funded. The current state of South African revenue and expenditure is also discussed. The explanation of how South Africa's economy came to experience a budget deficit follows this. Having all that explained, then the discussion regarding the state debt and economic growth is then provided showing all the trends. Lastly the comparison of debt of South Africa to a few chosen nations is discussed.

2.2 Economic growth in South Africa

The economy of South Africa is one of eight in Africa that is upper-middle-income, mixed, and an emerging market. The path of the country's economic growth has been complicated, impacted by a number of elements such as infrastructural difficulties, local policies, and worldwide economic trends. Although there have been times when the nation has grown rapidly, there have also been major economic setbacks. GDP is the most often used indicator of economic growth. The GDP of a nation reflects the aggregate worth of goods and services provided within its borders during a specific time period (National Treasury, 2023).

The average annually rate of expansion for the economy has been 3.3% since 1994 in South Africa. This is compared to 3.6 % global economy average. The economy increased by 2.9 percent on average between 1994 and 2000, 4.3 percent on average between 2001 and 2007; and 2.2 percent during the Great Financial Crisis (Roy, 2016. There has been a sustained downturn in the primary sector, which comprises mining and agriculture. The manufacturing sector's contribution has decreased. Since 2003, Gross domestic product growth has generally been 2% annually, and gross national income per capita has expanded even more rapidly, at 2.6 percent since 2003. In the first ten years of democracy, GDP growth averaged less than 1

percent annually. There was an increase of R48 000 from R12 504 in 1994 to R60 505 in 2012 (Statistics South Africa, 2012).

The economy of South Africa expanded by 1.3% in 2015, compared to 1.5% in 2014 and 2.2% in 2013, based on preliminary real GDP data from by Stats SA. In terms of overall economic growth, eight of the major industry groupings showed minor increase in 2015, while two saw shrinkage. The agricultural industry was the key cause of the 2015 slowdown. The industry shrank by 8.4% due to severe drought conditions, marking the biggest yearly decline in agricultural production since 1995. The primary cause of the decline in 2015 was a precipitous decline in field crop production. The industry that provides gas, electricity, and water also experienced a contraction of 1, 0% in size. Manufacturing saw almost flat growth in 2015, with a 0.1% increase in the industry (Statistics SA, 2012). Out of the 10 industries, the mining sector grew at the fastest rate 3.0%. The manufacturing of platinum group metals (PGMs) increased, which was the main factor in the increase. The low base created by the PGM miners' strike in 2014 allowed PGM production to rise by 46, 2% in the year of 2015 compared to 2014. PGMs were the only major mineral group (together with iron ore, gold, coal, and PGMs) to show increased output in 2015 (Statistics SA, 2015).

According to Statistics (2019), South African fourth quarter of 2018 growth rated 1, 4% in the economy, which added to the year's total growth rate of 0.8%. In 2018 South Africa experienced its second economic downturn since the early 1990s. The GDP shrank by 2.7% in the first quarter of 2018 and by an additional 0.5% in the second, marking the first two quarters of the recession. Actual yearly growth rate was 0.8%, which is lower than 1.4% in 2017 but greater than 0.4% in the year 2016. This suggests that, even with the recession, the year's overall growth was only marginally positive due to the favorable growth in the third and fourth quarters (2, 6% and 1, 4%, respectively). The financial, real estate, and business services sectors contributed significantly to the year-over-year growth in 2018, growing by 1.8%. Government expansion accounted for the second-highest share of positive growth, growing by 1.3%. But mining, building, and agriculture all faltered. With a contraction of 4.8%, agriculture in particular had a challenging year. Growth was impeded in the first two quarters by a slowdown in the output of horticultural items and field crops (Statistics South Africa, 2019).

The mining industry shrank by 1.7%. The Mining: Production and Sales report from Stats SA states that the three main commodities that hindered production in 2018 were gold, copper, and iron ore. In 2018, the annual decline in gold production was 14.5%, the most since 2008. In

that same year, copper production fell by 28, 5% the largest decline ever recorded since 1981, when Stats SA began releasing the current monthly mining data series. Based on GDP data, 2018 was the worst year for the construction industry in 20 years. The industry saw its largest yearly decline in production since 1999, when activity fell by 1.4%. Production declined by 1.2%. In 2018, the industry saw its second year of straight economic contraction and has fought to stay afloat. GDP growth fell from 1.9% in 2022 to just 0.7% in 2023 due to a combination of worsening local constraints and slowing global demand. Mining production decreased but industrial production marginally increased as load shedding and transportation restrictions become more severe. Growth was mostly driven by internal trade and the banking, transportation, and personal services industries (Statistics South Africa, 2019).

Figure 2.1: South African Economic growth for the period 1990-2022

Source: Author's design utilizing data from World Bank.

Figure 2.1 demonstrates that although the South African economy improved after 1994, other challenges led to a decline over time. The country's growth rate depreciated from 4.2% to 2.6% in 1996 due to a 23% decline in the rand's value, resulting from low capital flows and interest rate hikes. In 2008, a sharp decline in growth from 3.53% to -1.53% occurred as the country and the world faced a financial crisis. Other contributing factors included an increased unemployment rate from 25.8% to 27% and rising inflation. In 2010, the economy experienced a favorable rise from -1.53% to 3.16% in 2011 (World Bank, 2011). The FIFA World Cup played a significant role in this growth, as tourists spent money in South Africa, boosting the

rand's value and creating numerous job opportunities. The country's investment in infrastructure also proved advantageous for the economy, and consumption increased.

The economy faced a 5.96% decline in 2020. In that period, COVID-19 affected the global economy, including South Africa. This was a particularly difficult time for South Africa, as production declined, unemployment increased, and many businesses suffered losses, all of which negatively impacted the economy. In 2021, the economy improved, growing to 4.7% from -5.96%. This growth led to increased job opportunities, business recovery, profit generation, and higher production levels. However, the economy declined again in 2022, falling from 4.7% to 1.9%. This decline was attributed to power cuts, unexpected flooding in KwaZulu-Natal, rising fuel and food prices, and other factors. Even though there are ups and downs in South African economy but it is not that bad compared to other countries (Statistics South Africa, 2020).

2.3 South African economic growth in comparison to Egypt, Kenya, and Morocco.

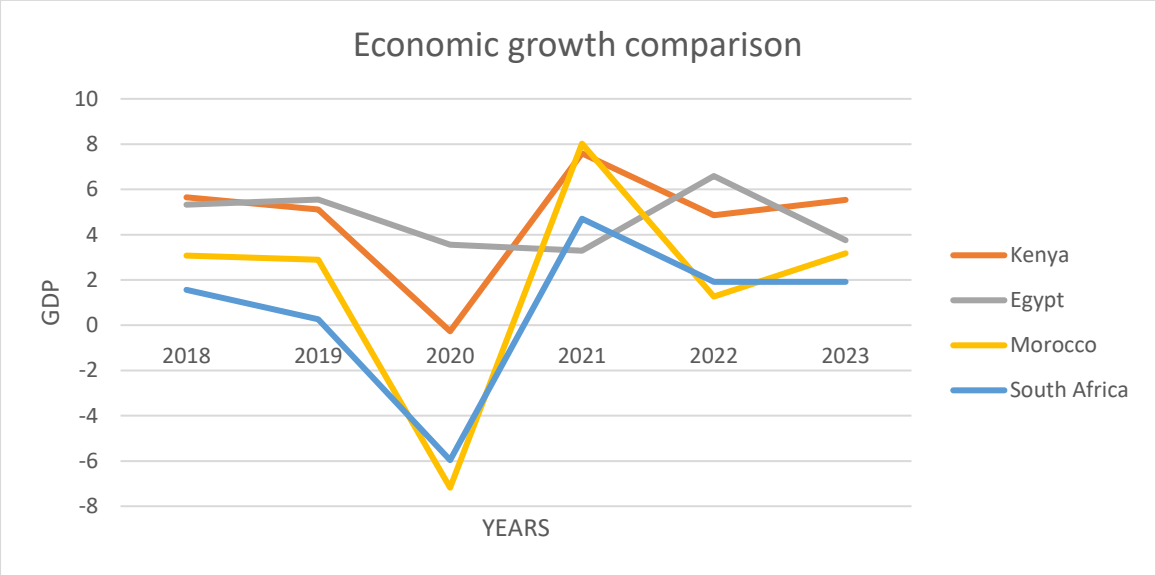

Figure 2.2: Economic growth comparison for the period 2018-2023

Source: Author's design utilizing data from World Bank.

The economic growth prior 10 years has been uneven and sluggish in South Africa, expanding more slowly than Egypt's. According to World Bank data (World Bank South Africa, 2022). Figure 2.2 shows that the growth dropped sharply from 1.9% in 2022 to 0.6% in 2023. Egypt's growth has been steadier, if not spectacular. One of South Africa's challenges is its limited infrastructure. Productivity has been hindered by "load shedding" power shortages and traffic jams (World Bank South Africa, 2023). The economy's heavy reliance on services and resource

extraction, along with a fall in manufacturing that limits job creation and unequal income distribution that dampens economic activity, have made slow structural transition difficult (National Treasury, 2020).

Egypt has benefited from its concentration on infrastructure, as evidenced by its investments in growth-stimulating initiatives like the development of the Suez Canal. Additionally, this nation implemented measures like currency depreciation, which can be dangerous but also result in rapid growth in the near run (Markus, 2015). The graph reveals an upward slope, implying that Kenya's economy has also been growing rapidly. In 2022, the growth rate accumulated to 4.85%. Kenya's economy is not as dependent on one industry. Tourism, technology, and services have all experienced growth. In order to promote trade and business activities, Kenya has given great emphasis infrastructure development, particularly in the areas of transportation and communication (World Bank Kenya, 2023). In comparison to South Africa, the relative political stability has encouraged long-term planning and investor confidence.

Figure 2.2 shows a hike in Morocco's country growth rate, indicated by an upward slope from 2022 to 2023. According to the World Bank (2023), Kenya's growth rate increased from 1.26% to 3.18%. The country has prioritized the development of vital industries including tourism, automotive manufacturing, and renewable energy to promote diversification. In comparison to South Africa, the nation has continued to maintain reduced public debt and budget deficits, which has encouraged investor confidence. The business climate has improved, and attempts to draw foreign direct investment (FDI) have been successful.

2.4 South African government revenue

The drop in South Africa's government revenue has triggered a financial struggle. The government earned R60 billion less in income than predicted. The anticipated revenue from tax for period between 2023 and 2024, which comes in at R1.73 trillion, R56.1 billion smaller than the 2023 budget. This followed the large windfall associated with the post-COVID 19 spike in metal prices in the year of 2021. Government revenues, which peaked at 25% growth rates in late 2021, have now dropped substantially to zero growth due to the recent downturn in metal prices and mining firm earnings (National Treasury, 2024).

The overall revenues of the national government lowered by R95 billion between 2019-2020 and 2020-2021, as it amounted R1 385 billion before to R1 290 billion. Revenue from taxes

fell short of budget by an amount of R106 billion. In the period of 2019 to 2020, it amounted R1 356 billion and dropped badly to an amount of R1 250 billion in the period of 2020 to 2021, mostly due to reductions in individual income taxes, excise taxes, value-added taxation, and the taxes collected from corporate and other active businesses. This implies R95 billion decrease between 2019/2020 and 2020/2021 (Statistics SA, 2022).

The joblessness and wage cuts for many working people, individual tax payments dropped by R41 billion. Due to the COVID-19 epidemic's unfavorable economic effect, value added tax (VAT) was lowered by R16 billion, and corporate and other company taxes were lowered by R13 billion. Once more, the effects of COVID-19 are apparent; the closing of restaurants and bars, prohibition of tobacco and alcohol were a few of the causes of the R20 billion reduction in excise revenue. The continuous load shedding (power outages) in South Africa cause disruptions to enterprises, resulting in production halts and closures (National Treasury, 2020). As a result, corporate tax revenue has also decreased.

2.5 South African government expenditure

There has been expanded government spending in South Africa due to the challenges the country has faced, as discussed in the previous sections. Statistics South Africa (2022) data shows that South Africa's overall government spending for the 2019–20 fiscal year almost reached the R2 trillion mark. The availability of comparable pandemic-period data is compared to pre-COVID-19 era data, which was most recently disclosed by the statistical financial statistics release of the general government. The South African government spending R1, 97 trillion in the period 2019–2020 is 10% more than it did in 2018–2019 (R1, 79 trillion). The publication gathers information from numerous surveys that were conducted during the year and covers 707 organizations, 230 including municipalities, extra-budgetary accounts and funds, departments of the provincial governments, and institutions of higher learning.

The largest expenditure items are social assistance, education, and general public services. In the illustration below, the products that the government purchased in 2019–20 are shown in Figure 2.3 In 2019–2020, the general public's services, social protection, and education sectors of the general government incurred the largest financial outlays. When combined, these three purchases made up about 60% of the entire amount spent (Statistics South Africa, 2020).

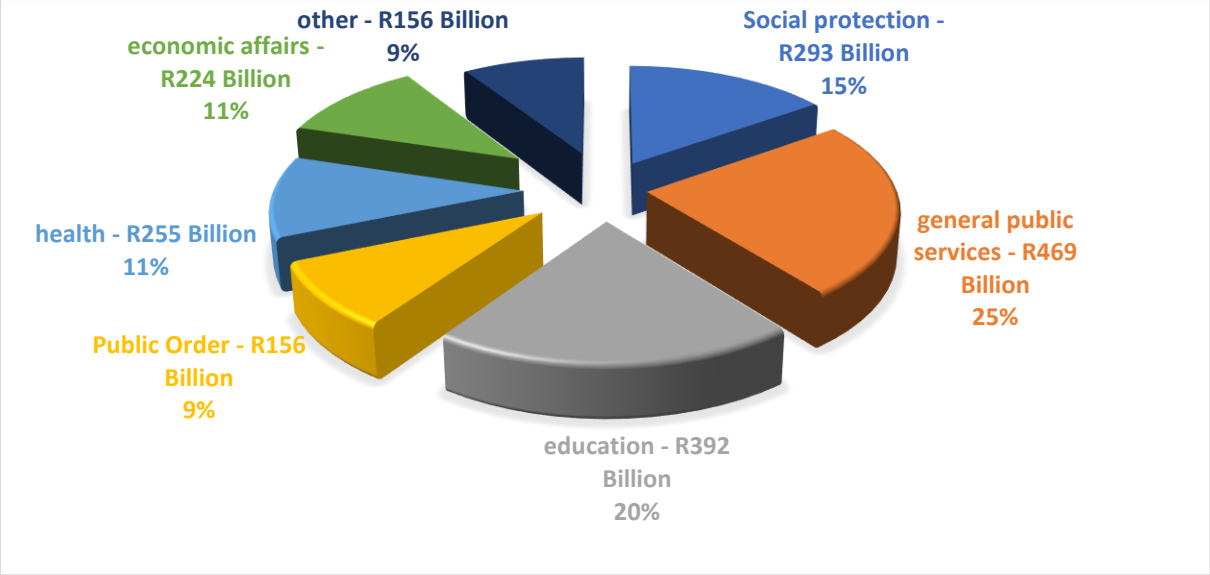

Figure 2.3: Expenditure items.

Source: National Treasury, 2020

According to National Treasury (2020), 10% of all spending, or R199 billion, went for this substantial purpose. Expenses associated with managing the provincial legislatures, mayoral offices, and parliament are mostly included in the category of executive and legislative services. Interest on public debt payments are located directly to the left of this component. The National Treasury calculates that South Africa's gross loan debt was around R3.2 trillion in 2019–2020, which resulted in high interest costs. Figure 2.3 illustrates that 10% (or R205 billion) of the total expenses were paid in interest. This is roughly equal to the amount spent on primary and secondary education all together, and it exceeds the amount the state spent on maintaining public order (police, jails, and courts.

National Treasury (2020) reports that in 2019–2020, Eskom, social grants, and debt payments were the main sources of costs. In comparison to 2018–19, the state spent R182, 8 billion more in 2019–2020. The primary driver of increased overall government spending in 2019–20 was economic concerns. There was R49, 7 billion national government spending hike on economic matters. A significant transfer of capital from the Department of Public Enterprises to Eskom viewed as the main cause for this expansion. National Treasury (2020) further added that the amount allotted by the national government for general public services accumulated by R25.4 billion. A hike in interest payments on the state's debt of R22, 9 billion, or the 12, 6% expansion, was the primary cause of this. The state government raised its education budget by R16.5 billion, mostly because KwaZulu-Natal and Gauteng allocated funds for educational

services. The Water Trading Entity reported a reduction in operational expense in 2019–2020, which contributed to the R2, 2 billion drop in extra-budgetary accounts and funds (such as housing and community amenities).

Despite these circumstances, government spending went up. Grants to other different levels of general government are intended to cover a sizeable portion of the entire expenses (R1, 84 trillion, or 55%). Interest paid on debt was the second-highest expense item after grants, accounting for 13% of total national government budget expenditures. Social assistance comprised 12% of the aggregate national government spending. Social Development was the recipient of the majority of the money in this category. The COVID-19 pandemic was attributed for a 15% increase over 2019/2020, and this increase was linked to a rise in social grant payments to households (mostly in the form of awards for children and social alleviation of grief grants) (Statistics SA, 2020).

Capital transfers from the Department of State Enterprises to non-financial state entities drove a 16% increase in other payments (R106 billion in 2020 - 2021 compared to R91 billion in 2019 - 2020). The reduction in travel and lodging expenses, training and development expenses, and venue and facility costs mostly associated with COVID-19 restrictions—was the primary reason of the 9% decline in goods and services across nearly all national government agencies. In the previous ten years, the government of South Africa has altered its expenditure patterns with increased spending on high interest payments and social benefit on debt (Statistics SA, 2020). The South African government spent R2, 187 billion in the fiscal year 2021–2022, which is R83 billion more than the previous fiscal year, according to Stats SA. With R565.2 billion in government spending in 2021–2022, general public services were the most expensive activity in terms of function (the different services or activities that the government provides). In economic terms (nature of the transactions involved), compensation of employees was the most expensive at R799.8 billion (Statistics South Africa, 2022).

The state places a high priority on employee compensation, accounting for 36.6% of total spending. Public order and safety (6.3%), health (7.4%), and education (12.7%) were the main focus areas. Other big budget items in 2021/22 contained social benefits (13.7%) and family social grants 12.7%. Although compensation of employees takes up the largest percentage of government spending, its share of overall spending has declined since 2014/15 – the earliest year for which easily comparable data is available. In 2014/15, total compensation for

employees accounted for 37.5% of total government expenditure – 0.9% more than in 2021/22 (Statistics SA, 2022).

“Note that this does not mean that the line item has decreased in rand terms. In fact, the public wage bill rose from R513, 5 billion to R799, 8 billion over this period,” Stats SA said. The statistics body also highlighted the decline in purchases of non-financial assets, which fell from 9.7% of total expenditure in 2014/2015 to 5.9% in 2021/2022. This category includes infrastructure investments and other fixed assets (Statistics SA, 2022). Although compensation of employees takes up the largest percentage of government spending, its share of overall spending has declined since 2014/15 – the earliest year for which easily comparable data is available. In 2014/15, total compensation for employees accounted for 37.5% of total government expenditure – 0.9% more than in 2021/22. The statistics body also highlighted the decline in purchases of non-financial assets, which fell from 9.7% of total expenditure in 2014/2015 to 5.9% in 2021/2022. This category includes infrastructure investments and other fixed assets (Statistics SA, 2022).

Goods and services saw the second most significant decline (2.3%), mainly in general state services, public safety and order, defense and economic affairs. Nevertheless, the contribution of health-related goods and services increased (1.0%). With debt payments more than tripling between 2014–2015 and 2021–2022, R125.6 billion (that is 9.2% total spending) and R284.4 billion (that is 13.0% total spending) respectively, interest recorded the biggest percentage increase. Stats SA said that this was in line with the rapid rise in South African gross loan debt over the period. Social benefits saw the second largest increase, climbing 2.5% over the seven years (Statistics South Africa, 2022).

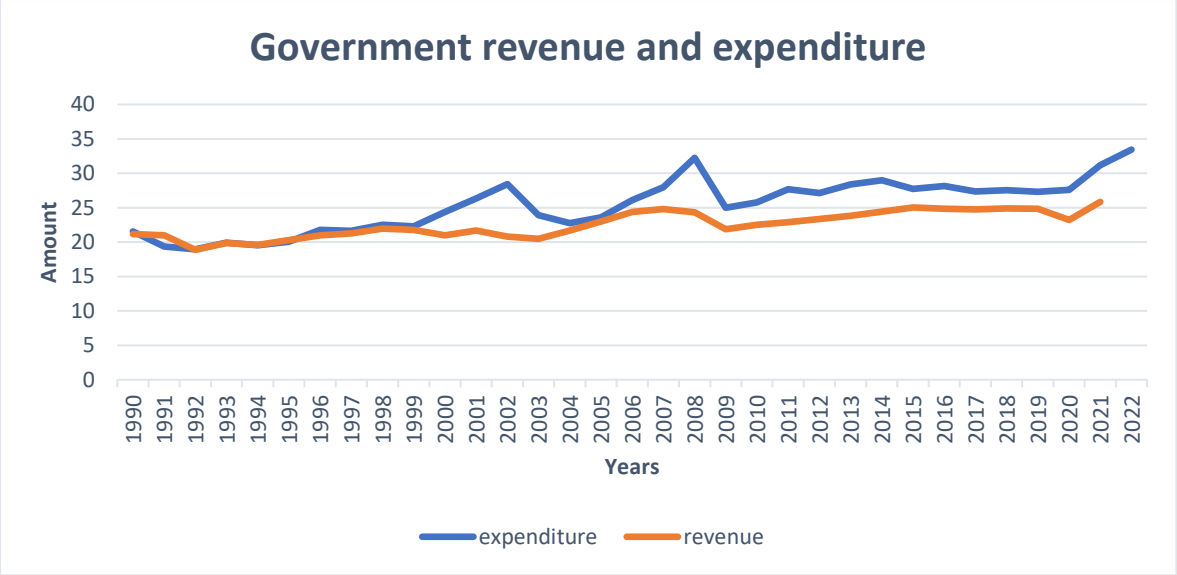

Figure 2.4: Trends in government revenues and expenditure for the period 1990-2022

Source: Statistics South Africa, 2022.

Observing the government revenue and expenditure, Figure 2.4 below shows that even though the revenue that is generated from taxes is not enough to fund the South Africa operations, spending keeps on increasing. Secondly the graph emphasises that the South African spending is higher than the revenue that the country generates. This indicates government must continue borrowing money with the intention of bridging the gap between revenue and unmanageable expenses. This results to budget deficit.

2.6 South African budget deficit

Budget deficit is the result of spending far exceeds generating revenue which is typically calculated over a single fiscal year and includes taxes and other borrowed funds. In 1994, the government debt was getting close to 50% of GDP, and the 4.3% budget deficit. During the 1997–2000 fiscal consolidation period, medium-term spending planning was implemented, significant resources were allocated to tax reform and revenue administration, and fiscal and monetary policy were well coordinated. The national debt lowered from 49.7% of GDP in 1994 to 44.4% in 2000, budget deficit decreased to 3.0% of GDP, and average borrowing rates sharply declined. The government was able to raise spending on infrastructure, as well as social services as a result of these developments (National Treasury, 1994).

The South African government took a more cautious approach to budgeting between 2001 and 2008. Budget deficit was 4.6% between 1992 and 1999. On the other hand, the average was

1.3% from 2001 to 2005. Following this, there was a budget surplus of 0.3% and 0.7% of GDP in 2006 and 2007.

The government succeeded in bringing down its target budget deficit from 6.8% of GDP in 1993 to 0.6% in 2008 but situation has since changed once more, principally because of the global economic slowdown, which also had an impact on South Africa's revenue base. However, between 2003 and 2008, the fiscally prudent approach resulted to a notable reduction in the real cost of servicing debt, even as the economy's real growth rate climbed significantly. However, since the former is greater than the latter, the real cost of debt servicing and the real growth rate are still not equal (National Treasury, 2017).

Additionally, it seems that the reduction of national debt as well as budget deficit has come at the expense of a relative decrease in spending on service delivery. The fact that the average percentage of GDP spent on education fell from 6.21 percent between 1990 and 1999 to 5.6% between 2000 and 2008, and the average percentage of GDP spent on health care fell from 2.93 percent between 1990 and 1999 to 2.84 percent between 2000 and 2008, serves as evidence for this (National Treasury, 2021).

The 2020–2021 budget deficit ranges from R370 billion to R689 billion, approximately 14% of GDP. These figures demonstrate the effect and strain that the COVID 19 epidemic has had on government spending. For the fiscal year 2021–2022, a deficit of R5OO billion, or 9.3% of GDP, is planned. Prior to COVID, the National Treasury blamed sluggish economic growth and greater assistance for state-owned businesses for the rise in the budget deficit (National Treasury, 2021).There is still disagreement on whether the efforts to address the severity of the country's economic issues or bad governance is to blame for the budget's inability to balance. Regardless of the reason, the issue of debt incurred to bridge the difference between income and expenses is becoming more prevalent and will inevitably leave future generations with a lasting debt load (National Treasury, 2022).

The cost of servicing South Africa's debt for the 2021–2022 fiscal year is R269.7 billion, up from R229 billion the year before. Only the overall combined allocation to basic education exceeds the cost of debt service. In 2020, the National Treasury already observed that the fastest-growing category of national budget expenditures was debt servicing costs. The nation is currently trapped in a debt trap, which cannot continue. For the 2020–2021 fiscal year, South

Africa's gross debt climbed from 65.6% to 80.3% of GDP. There is a concerning amount of debt (National Treasury, 2020).

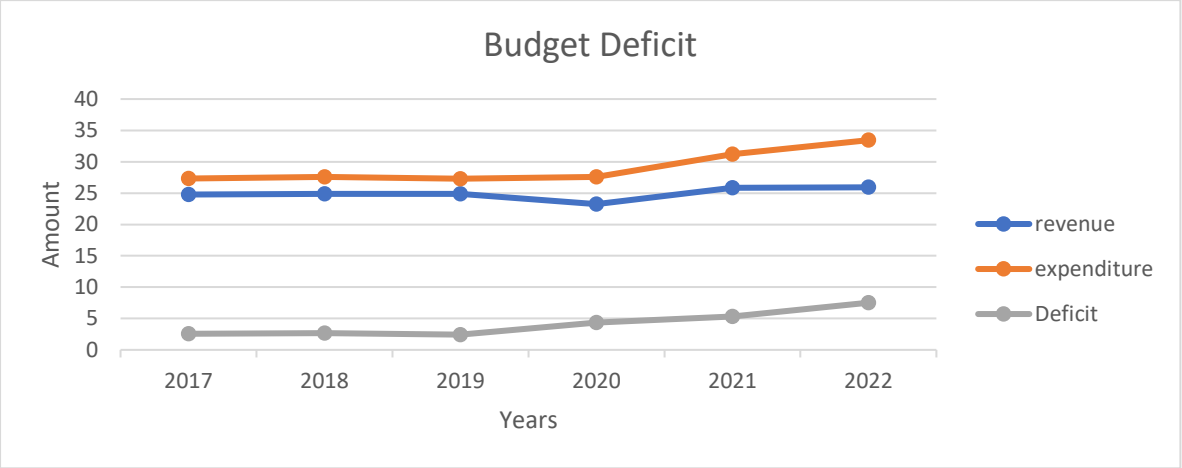

Figure 2.5: Budget deficit percentage to GDP for the period 2017-2022

Source: Author's design utilizing data from World Bank.

Figure 2.5 details the national revenue, national spending, and national deficit as a proportion of GDP. The graph reveals that South Africa has faced a persistent challenge for many years: spending being higher than revenue. This imbalance has resulted in a budget deficit, and the gap between expenditures and revenues continues to widen. This implies that the country's budget deficit will keep on going up (National Treasury, 2021).

The action of cutting costs gradually is receiving a lot of attention, but the income shortfall and expanding the revenue envelope also require more concentration. Given the epidemic, this was a very challenging time to cut back on spending, since an estimated R11 billion had to be reserved for the distribution of free vaccines. Even prior to COVID 19, the South African economy was not doing well. There was no surprise that the economy could not maintain growth and that the unemployment rate was high. Zero-based budgeting is not enough for South Africa; the nation also needs specific plans and laws to increase GDP and guarantee value for money when it comes to spending. An empirical study found that macroeconomic issues, a high unemployment rate, slow economic development, and large government investment expenditures are the primary drivers of the budget deficit.

Options available to lower the budget deficit: raising revenue, cutting spending, or doing a little bit of both are the apparent ways to address the budget deficit. In considering the current economic climate and pandemic, cutting expenditure in non-job-creating industries will be a

key focus for 2021–2022. Taxes are the government's main source of income, but economists say that if economic growth is slower than population growth, the government cannot raise taxes (National Treasury, 2022).

2.7 South African Public debt

South Africa is struggling to fund its operations solely through tax revenue and other income sources. Hence, the country has resorted to borrowing to finance its operations. This ongoing reliance on debt is unsustainable, but the government faces increasing pressure to deliver services and invest in infrastructure, leading to persistent budget deficits.

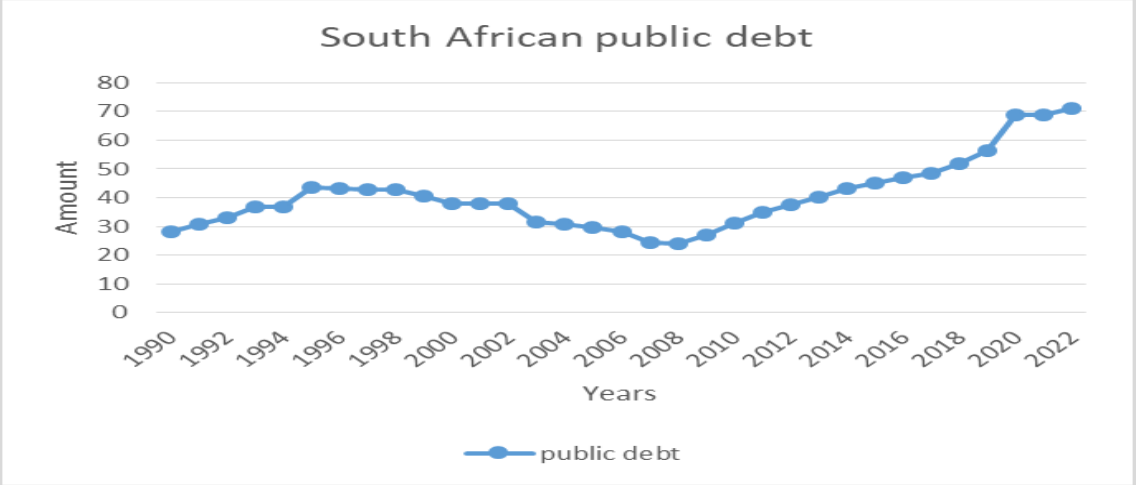

Figure 2.6: Public debt in South Africa for the period 1990-2022

Source: Statistics South Africa, 2022

Figure depicts a continuous increase in debt as it shows an upward slope to the right. South Africa is struggling with state especially after that 2008 global financial crisis. The economy didn't recover at all instead the matter becomes worse. The graph shows an upward slope which depicts an unmanageable increase in state debt. As debt-service costs rise, borrowing becomes more expensive for the whole economy. Crucially, the rising cost of government debt servicing means that less money is available to achieve goals for national development. Owing to the "crowding out" effect, budgetary allotments for economic, social, health, community, or peace and security are smaller than those for debt servicing. The government is not funding programs that encourage quicker growth and job creation with the money it borrows. Stopping this tendency is a key financial objective.

Ever since the recession of 2010, government revenues have continuously fallen short of spending by one or two percent annually. Naturally, revenue-wise, the Covid-19 lockdowns were more taxing than government spending. The disparity between revenue and expenses has required the government to borrow a substantial amount of additional money. Since 2014, the national government's interest payment as a percentage of income and expenses has doubled. Currently, interest payments on the national debt account about 20% of all federal revenue and roughly 16% of all spending (Bloomberg and Investec Wealth & Investment, 2023).

The government can keep funding the loan if the rate is relatively low. The proceeds from the loan must be used to sustain the government's long-term economic expansion. In South Africa, proper debt management is essential; excessive debt accumulation would lead to unsatisfactory economic performance and imperil the stabilization of the micro-economy in the nation. When government spending exceeds tax revenue, South Africa uses loans, or debt, to make up the difference in its budget. Loans developed became a tool for increasing economic activity and speeding up the economy, as well as a way of "escaping" the economic slump (International Monetary Fund, 2003).

Like other African nations, the nation has had financial and economic downturns as well as n umber of economic issues that have negatively impacted the nation's economy. (International Monetary Fund, 2003). Many countries have become increasingly dependent on loans in the last few decades to pay for their expenses and disaster relief operations (Ventura 2019 in Blom, 2021). When managed and preserved appropriately, debt can be a valuable funding source for the country. Between 2008–09 and 2022–23, the gross loan debt to GDP ratio in South Africa rose by 47.2 percentage points. Both the amount of debt and the cost of servicing newly issued debt have expanded significantly faster than the GDP.

More of the national debt is currently being funded by South African banks. Just 4% of total bank assets were made up of government shares and Treasury notes in 2008; today, this percentage is 14%. After 2020, the banks raised their loans to the government by R600 billion, largely for short terms, while the fiscal deficit grew due to lower income and increased post-Covid spending. As a result, the banks have shifted their lending from the private sector to the government, which makes sense considering how little credit the private sector is willing to provide (SARB, 2020). This could lead to inflation. When backed by substantial cash reserves provided by the Reserve Bank, depending on banks to finance public spending could result in an overabundance of deposits (money) in the system. This is a result of banks making larger,

potentially inflationary loans to the government. If it results in a surplus of money supply, prices may rise as the excess money is traded for goods and services. Both government borrowing from banks and private sector borrowing and spending that results in excess bank deposits are affected by increasing lending and spending on the money supply (SARB, 2020).

Controlling the national debt's interest payments can help the government address its poor growth issue to some extent. The interest rate trap can only be escaped, nevertheless, by higher growth, as all government spending and interest payments must increase. In the absence of growth, the temptation to turn to money creation may become compelling due to the weight of interest payments rather than alternative forms of spending. (National Treasury, 2013). Prior to 1999, the primary goals of debt consolidation were to boost the home economy and maintain a stable loan portfolio. After 1999, the focus shifted to increasing financing options, safeguarding the nation's exposure to both domestic and foreign stock markets, and reducing debt costs under prudently defined risks (National Treasury, 2013).

These priorities support the nation's debt management strategy. According to Nene (2015), South Africa is prepared to finance the structural adjustments needed in the near future to boost demand and get past the challenges posed by public debt. The 1997–1998 economic collapse demonstrated that South Africa's government financial markets had matured (Poon, 2009). Priorities for debt management had to change on the government's part to address emerging socioeconomic and economic issues. The South African bond market saw an increase in total turnover from R5 trillion in 1997 to over R11 trillion in 2000 (International Monetary Fund, 2003).

Steytler and Powell (2010) argued that the government started lowering its loan load as a percentage of GDP in 2000 and implemented a counter-cyclical policy in 1996 to prevent further debt increases. The plan of getting the debt ratio down to less than 24 percent in the first quarter of 2008 was made possible by budget surpluses and reduced spending. The nation has had a budget deficit since 2008 (Mrwebo, 2013). The primary reasons of the budget deficit, according to the MTBPS (2009), included pay distribution in the health and education sectors as well as increases in the wages of public employees. To bridge the massive gap (deficit) between government revenue and expenditure, which has been growing over time, the government is turning to borrowed funds.

The amount of government debt began to approach one trillion rand in 2011. Although 2% GDP growth was projected, 1.3% real growth was reported in the first quarter of 2015. This was made worse by the gas crisis' negative effects. South Africa's GDP has not expanded by more than 5% in a year since the 2008–2009 financial crisis. The economy didn't start to develop until 2010 when South Africa hosted the World Cup of soccer (National Treasury 2013) In 2010, 2011, 2013, and 2017, there was expansion on economy, but at a growth rate of less than 5% (MacroTrend, 2019).

The South African government raised its borrowing objective and framework for the preceding five years in response to the unfavourable economic conditions (National Treasury, 2021). In order to cover budget deficit, there was a hike in the amount of debt accumulated as a result of the weak economy and tax collection. The plan measures debt ratios, the primary fiscal balance, financing instruments, operating cash flow circumstances, investor demands, global and domestic trends, and the costs and uncertainties associated with different strategies. The government's intentions, budget forecast, and methods for preserving stability in debt management were presented in the 2020 MTBPS. When the pay schedules for public sector employees are arranged to align with the government's debt stabilization objectives, debt stability can be attained (National Treasury, 2023). The country's Covid-19 pandemic's impact on less income and higher costs was taken into account in the medium-term budget policy statement as well as increased debt servicing payments, extended June's estimate for the financial year until March 2021, or 15.7% of GDP. (National Treasury, 2020). The inability of South Africa to finance the government's economic development, rising interest rates and debt loads, a decline in trust that will result in lower expenditure but still lower wealth creation, and worsening economic development are all expected to occur over time (National Treasury, 2019).

2.8 The comparison of South Africa's state debt with Egypt, Kenya and Morocco.

South Africa's state debt is 71.1% of GDP as of 2022. This amounts to an astounding R5.84 trillion, which has been rising over the last ten years and represents an average of almost 54.1% of GDP. This is higher than the norm for Sub-Saharan Africa, which is 43.7%, even if it is still below the 60% criterion that the Southern African Development Community recommends (National Treasury, 2020). The total of multiple variables has led to the current level of debt. The 2008's worldwide financial crisis caused significant harm to South Africa's economy, prompting greater government spending to promote growth. Further borrowing was also prompted by growing social demands and the need to fund infrastructure. Fiscal consolidation

attempts stalled in the wake of the economic recovery, which added to the debt's increasing trend.

Egypt's national debt as of 2022 is an astounding 88.5% of GDP, a percentage that is significantly greater than the average for the region of the North Africa and Middle East, which is 40.7%. This equates to around E£10.2 trillion, a burden that has increased gradually over the last ten years to average 86.7% of GDP. Although Egypt's debt is still below the 100% mark that the IMF deems dangerous, its sharp increase raises questions about sustainability (International Monetary Fund, 2022). This increasing trend has been influenced by multiple variables, raised government spending on social services and security followed the 2011 Arab Spring upheavals, and the debt load was further raised by economic instability and infrastructure initiatives (FocusEconomics, 2022).

Kenya's national debt was 9.68 trillion Kenyan shillings (about 66.4 billion US dollars) as of May 2023. This is more than the 50% recommended requirement by the East African Community, amounting to almost 66.4% of GDP. Over the previous ten years, the debt has been rising rapidly and has averaged 54.6% of GDP. Increased infrastructure spending, fiscal deficits, and foreign borrowing are some of the causes of this trend. The recent COVID-19 outbreak made matters worse, necessitating further borrowing to fund medical expenses and attempts to revive the economy (International Monetary Fund, 2022).

The Central Bank of Kenya (CBK) released data as of June 2023 that shows that the overall public debt was Kshs 10.2 trillion as of June 2023, up from Kshs 8.6 trillion in June 2022. Both external and domestic debt make up the national debt, with the external debt to domestic debt ratio standing at a high 54.3% to 45.7% as of September 2023. With all of the short-day papers exceeding the 15.0% threshold in the most recent auction results, the government has been attempting to reduce domestic borrowing in an effort to relieve pressure on interest rates. Another goal of lowering local borrowing is to lessen the private sector's exodus.

Treasury bonds and treasury bills are the primary instruments of domestic debt whilst bilateral and multilateral creditors are the primary external debt sources. As of September 2023, ratio of debt service and the revenue had risen over the time to 64.3%, which is 34.3% points more than the IMF benchmark of 30.0%. Notably, as of July 2023, debt service to revenue ratio reached an all-time high of 101.4%, demonstrating the ongoing burden that debt payment places on government spending.

As of 2022, Morocco's public debt stands at 91.099 billion USD, representing 71.6% of its GDP. Although this is above the Sub-Saharan African average of 43.7%, it is still below the Southern African Development Community's suggested benchmark of 60% (National Treasury, 2023). The current level reflects a steady upward climb over the past decade, averaging around 54.1% of GDP. While recent efforts to control spending and boost revenue collection have slowed the growth, projections suggest further increases in the short term, reaching 73.6% of GDP in 2025/26 before potentially stabilizing and declining thereafter.

Even while it can be difficult to compare public debt directly between nations, examining important debt indices can provide insightful information. Table 2.1 gives a detailed summary based on a few standard metrics:

Table 2.1: Public Debt Comparison

Countries	Ratio of Debt to GDP	External Debt to GDP Ratio	Debt Service-to-Revenue Ratio
1. South Africa	74.8%	24.8%	20,7%
2. Egypt	88%	34%	10.5%
3. Kenya	68.5%	20%	12.6%
4. Morocco	73%	22.2%	6%

Source: Author's design utilizing SARB data

- Ratio of Debt to GDP

Egypt, South Africa, and Morocco have the greatest debt loads in relation to their respective economic outputs. Of these nations, Kenya has the lowest debt-to-GDP ratio.

- External Debt to GDP Ratio

Egypt's increased reliance on borrowing from outside sources puts it at risk of interest rate increases and currency swings. The countries with the least amount of external debt exposure are Kenya, South Africa, and Morocco

- Debt Service-to-Revenue Ratio

In terms of government revenue, South Africa bears the largest debt servicing load, suggesting possible financial difficulties. The least amount of debt service is Morocco; Egypt and Kenya are in the middle.

South Africa bears the largest debt servicing load, suggesting possible financial difficulties. The least amount of debt service is Morocco; Egypt and Kenya are in the middle. South Africa's heavy debt payment burden is a source of budgetary concerns. Egypt seems to have the most worrisome state of public debt based on these debt indicators, having a high ratio of the debt to GDP and a large reliance on foreign borrowing. Kenya and Morocco appear to be in a better financial situation overall, with reasonable debt servicing expenses and smaller debt loads.

2.9 Conclusion

Since the public debt is readily available on financial markets, it is one essential source of funding that is accessible globally. Since state debt could improve the prospects for economic growth and standardize overall performance, it must be properly managed and administered. If public debt is not properly managed and controlled in accordance with the PFMA and other legal frameworks, it may also pose a threat to the nation. Mismanagement of financial resources can result in a number of issues, such as increased unemployment, poverty, inequality, recession, and decreased investment returns. One of the difficulties debt managers encounter while trying to fix and avoid issues in the Finance Department is managing public debt to safeguard the national debt and control and guarantee the nation's economic progress, debt managers overseeing the portfolio of public debt must exercise sound judgment and put acceptable policies into place.

CHAPTER 3

LITERATURE REVIEW

3.1 Introduction

In this chapter, the theoretical stances pertaining to this investigation would be covered. As a result, several theories that neither support nor refute one another will be considered when producing the study's evidence-based conclusions. The empirical research will also be looked at in addition to these ideas so that the conclusions and findings from this study are supported by additional research. By taking into account the literature, this study will be able to assess and void the gap on the relationship between national debt and economic growth in South Africa.

3.2 Theoretical Framework

Many theories make an effort to clarify how state debt and the economic growth are connected. Neoclassical, the two-gap theory, Public Debt Overhang, Ricardian, Crowding-out effect and Keynesian have theoretical positions and viewpoints on national debt and economic growth that are adopted in this study.

3.2.1 Growth theories

3.2.1.1 The classical growth theory.

According to the classicalist, a society would unnecessarily be burdened by national debt. David Ricardo characterized state debt was as one of various factors that were intended to cause the country distress. The main thrust of Ricardo's thesis was that the majority of the state debt was borne by the yearly transfer of interest and the initial capital reduction. Taxes are accumulated with the intention of financing interest payments. But if a tax is imposed to pay the interest debt, there might be capital flight to other nation (Njimanted and Mukete, 2013).

Classical growth theory declare that national debt has adverse connection on economic growth in several ways. Public debt crowd out individual investment. In a case whereby the state takes out a loan, it competes with businesses and individuals for loans. This leads to accumulated interest rate. Secondly state debt results to higher taxes. The government needs to raise taxes to service debt (Njimanted and Mukete, 2013).

This reduces disposable income and consumption, which slow economic growth. Public debt diminishes the state’s ability to invest in infrastructure and other public goods. Government

spending on debt service declines the amount of money available for economic activities, which lowers the economy's potential for long-term growth. (Njimanted and Mukete, 2013).

3.2.1.2 Neoclassical Theory

Since ongoing deficits discourage private investment, theory of neoclassic shows that economic growth and budget deficits have an inverse relationship. Neo-classicalists contend that economic collapse occurs when government spending backed by debt is insufficient to offset the negative impacts of private investment incentives (Chervinska, 2019). The government deficit, according to neoclassical economists, raises the supply of state bonds, which lowers the market value and promotes increased interest rates, motivating to be more expensive for firms to fund fixed investment. Additionally, they thought that public debt increased the supply of state bonds, which decreased market value and promoted high interest rates, which damaged profitability (Lee & Ng, 2015).

Neo-classicalist believed that the state spending should never be financed by borrowing regardless of the situation because public debt should be used for production investments rather than individual consumer consumption (Ncanywa & Masoga, 2018). This is supported by a study that looks at how Unite States budget deficits affected real GDP growth from 1955 to 1992. The study's findings demonstrate the sluggish economic growth rate because of government budget deficit. According to the neoclassical view, state debt results in slow economic growth (Ncanywa & Masoga, 2018).

3.2.1.3 The two-gap theory.

Although there are numerous development models, concepts vary, thoughts interact, and diverse methodologies are suggested, the goal is always to accelerate economic growth. Savings from both domestic and foreign sources are mentioned by Mohanty and Mishra (2016) as one of the elements that support economic expansion. Savings both domestically and abroad are crucial for financing the investments a nation needs to prosper. The amount of capital necessary for a nation to achieve its desired economic growth rate, is calculated using the HarrodDomar model. According to the below model, the output growth -g is calculated by dividing the savings -s rate by the extra capital to output -v ratio.

The algebraic expression for this connection is as follows:

$$g = \frac{s}{v}$$

Accordingly, the aforementioned equation suggests that, for a growth objective and the ratio of capital to production, a particular investment rate is necessary in order to reach the growth objective. This analysis is a result of the requirement for investment in expansion (Lee & Ng, 2015). When given a growth target, there are two gaps: domestic savings fall short of what is necessary to fund expansion (savings gap), and inflows from foreign exchange fail to meet the requirements needed to finance the import of capital goods, creating a foreign currency gap. As a result, either new aid or net imports of capital goods are used to close the two disparities. This model provides a pathway via which debt influences economic growth. Debt boosts domestic savings and encourages investment.

According to Njokwe (2012), this model has come under criticism due to the fact that, it couldn't account for growth variances from the short to the long term. These short-term instabilities, according to Bender and Lowestein (2005), are unemployment, cyclical inflation, and aggregate demand. As a result, the model promotes foreign exchange and savings as the main sources of the growth while ignoring other sources that adds vital role on growth of the country, such as efficiency in the use and foreign exchange and savings.

Makin (2015) argued that besides all of this argument, model of Harrod-Domar provides a straightforward explanation of how state debt contributes to growth. The two-gap model's presumptions were implausible when it came to explaining growth in developing nations, they later developed the Two gap concept, which permits borrowing to occur in addition to in come from exports of foreign exchange and essential purchases. The idea highlights the significance of imports and foreign exchange for development. It is predicated on the idea that a nation can experience economic growth by spending more than it makes or investing more than it saves because of the volume of imports to exports that are backed by external borrowing. The two factors limiting growth, according to Lee and Ng (2015), are savings and foreign exchange differences.

While limiting its ability to save, the savings gap stimulates the country to invest. Additionally, the limited export profits as well with predetermined rate of growth force imported items to exceed the economy's ability to fund them. While the theory is somewhat similar to the Harrod-Domar growth model, it describes the growth-debt relationship indirectly by referring to external debt. As a result, it is becoming apparent through foreign exchange and savings gaps (Mohanty & Mishra, 2016).

3.2.1.4 The Endogenous Growth Model.

According to the Endogenous Growth Model, if public debt is intentionally utilized to fund profitable ventures that improve infrastructure, knowledge, and human capital, it may be a vehicle for fostering long-term economic growth (Romer, 1986) and (Barro, 1990). It is also important to make sure that debt is manageable, expenditure is effective, and investments that provide positive externalities and support long-term productivity development are prioritized. IMF (2022) gives some empirical support to the endogenous growth model's contention that public debt may boost economic development if it is properly managed and allocated to profitable ventures.

3.2.2 Theories on debt burden

3.2.2.1 Keynesian Theory

The Keynes school of thought, however, supported what have come to be known as counter-cyclical fiscal policies, or actions that have fought against the business cycle flow, i.e., spending on a deficit when an economy is in a recession or when a considerable delay in recovery, and unemployment is stubbornly high. Increasing national output leads to the development of jobs and there is a correlation between the two. Based on the theory that economic development is directly resulting from the public debt's increase (Makin, 2015).

By the standards of the Keynesian school of thought, if resources in the economy are originally underutilized, a budget deficit will eventually result in hike in national income and need not compete with private investment. Public debt costs don't always have to be wasted; in fact, government spending on activities like public health, education, necessary research and infrastructure may help long-term prospective output development. On the other hand, when used for positive purposes, public debt may potentially speed up economic growth (Lee & Ng, 2015). According to Keynesian philosophy, managing and growing the economy may be accomplished by proactive government policy. According to this view, rising governmental debt contributes to economic expansion.

3.2.2.2 Ricardian Theory

The Ricardian theory has its foundations in the following presumptions, in comparison to the Keynesian and classical perspectives on public debt:

- The ideal financial system would have no lending limits.
- Free of distortion fees
- ideal conviction regarding upcoming taxes

Kur, Abugwu, Abbah, and Anyanwu (2021) asserted that if purchasers are looking ahead, future tax assessments will be equal to present tax assessments and public obligation will be proportional to future taxes. It also implies that borrowing money to cover state expenditures is equivalent to taxing them. Debt financed by tax cuts has little effect on consumption because of the Ricardian proportionality effects

In order to lessen the implied risk of future regulatory expenses related to the tax gain, people set aside the greater discretionary cash flow. The rise in the private saving perfectly balances the decline in state saving. Because all savings and investments, both public and private, continue as before, there is no impact on real consumption or output. It is proposed that, for certain forms of government consumption, the tax timing or dissimulation or accumulation of state debt might not impact the private consumption, national income and savings. Consequently, in a closed economy, investment, and production and the interest rates remain unchanged (Kur et al. 2021).

3.2.2.3 Public debt overhang theory.

The theory's argument holds that unmanageable governmental debt diminishes the credibility of public policy (Reinhart, Carmen, Vincent, and Kenneth, 2012). Hence, hinder the government's commitment to taking policy steps. That suggests that the government has the option to forego budgetary consolidation despite the weight of the national debt. High state debt is a risk factor for protracted stagnation in certain countries (Makhoba, 2022).

According to Ndoricimpa (2022), this cumulative cost of debt repayment may discourage investment if a country's anticipated foreign debt exceeds its capacity to service its domestic debt. Nevertheless, debt reduction is a possibility when there is a debt overhang. The uncertainty brought on by default risk, deadline renegotiation, and arrears accumulation can be reduced through debt reduction. As a result, policies in the state and debtor countries would be more effective in allocating resources. Debt overhang theory states that a higher debt stock gives creditors and debtors different incentives. Therefore, debt reduction helps creditors as well as debtors.

3.2.2.4 Crowding-out effect

According to the theory of the "crowding out effect," a government expenditure rise and deficit financing in a nation causes an investments decline as well as goods and services consumption by organizations, further increasing interest rates while reducing the amount of money that is available. That is allegedly an explicit outcome of an expansive fiscal policy that is funded by

either borrowing or higher taxes, if not both (Kur et al. 2021), the government's inability to effectively affect the economy results in the crowding out effect, which makes it difficult for fiscal policy to run smoothly.

The "crowding-out effect," an economic theory, states that more government spending may lead to decreased private sector spending. This occurs as a result of the government effectively competing with private companies and individuals for loanable funds when it increases its spending. Interest rates rise in response to the state's increased borrowing, making borrowing money more costly for both individuals and enterprises. This may deter people from making purchases and investments, which would slow down an expansion of the economy (Kur et al. 2021).

3.3 Empirical Literature Review

The theoretical perspective on public debt and economic growth is described in the previous section, providing the foundation for the findings. These theories have undergone substantial empirical testing. Numerous empirical investigations on the debt and growth nexus have been conducted in both African and non-African countries, using a variety of econometric techniques and models that have yielded contradictory results. This part of the research will examine the empirical data for South Africa, African and developed nations.

3.3.1 Empirical evidence from South African studies.

A number of authors have focused on establishing a link between public debt and economic growth in South Africa, focusing on different periods.

Mbali (2021); Saungweme and Odhiambo (2019); Hlongwane (2019); and Mhlaba and Phiri (2017) used the same economic technique ARDL to analyse the economic growth and nation's debt link focusing in South Africa. Starting with Mbali (2021), the author look at how South Africa's governmental debt and economic growth relate to one another between 1977 and 2019. To achieve the research purpose, this study used the time series technique, namely the Granger causality approach to test the causal link between variables and the ARDL bound testing strategy of co-integration test. The study found a favourable correlation between economic growth and governmental debt. Nonetheless, GDP growth and national debt are directly correlated. The study's overall conclusions indicate a significant adverse long-term relationship between public debt and economic growth when controlling for inflation and gross capital development. However, in the near run, the relationship is significant. The impulse response function showed that both GDP growth and public debt were susceptible to shocks to these

variables. Nonetheless, the variance decomposition test results explains the co-movement of GDP growth and public debt. The short-term self-variance of the GDP growth co-movement is around 100%, whereas the long-term self-variance is 91.79%. Public debt did not significantly alter bilateral co-movement aside from self-variation. However, public debt provides a maximum fluctuation of 8.22% over the long term. According to the numbers above, 91.78% of swings may be attributed to shocks to economic growth. Over time, a shock to public debt results in notable variations in GDP growth.

Conversely, Saungweme and Odhiambo (2019 focusing on the period of 1970 to 2017 findings shows a unidirectional causal relationship between the two variables in the short term, but over the long term, South Africa's total public debt has a statistically significant and adverse impact on economic development. The report advises the government to finance long-term, high-return, productive projects that ought to encourage economic development and to efficiently manage its debt. The analysis concludes by warning the nation against expanding its public debt, primarily foreign debt, in order to pay for its rising ongoing spending requirements. Mhlaba and Phiri (2017) concurs with Saungweme and Odhiambo (2019). Authours analysis was performed using data from the first quarters of 2002 to 2016, respectively. The findings also indicated that there is a long-term inverse relationship between public debt and economic growth. Although there may be a short-term positive correlation between growth and national debt, it is unclear exactly what that relationship may look like. The study's conclusion emphasized that policymakers must exercise caution when taking on new debt and that they must promote debt management strategies to lessen excessive debt since it is detrimental to the economy.

Moreover, Ncanywa and Masaga (2018) used quarterly data spanning from 1994 to 2016 in investigating how governmental debts affect investments and economic growth in South Africa. They used several econometrics tests to attain their goal. The factors that were included were the GDP, government deficit, public debt and investment, the co-integration of the variables under investigation was confirmed by their results for the Johansen co-integration test, confirming the long-term relationship. Most importantly, VECM was the main econometric test that supported their study findings, along with the variance decomposition, Granger causality and impulse response function. The VECM results confirmed the short-term relationship between public debt and economic growth. According to results of the Granger causality test, public debts can really affect economic growth, and there is a bi-directional relationship between the two variables. Musa, Sohag, Said, Ghapar & Ali (2023) supports this

study. Using a dynamic panel threshold model, authors examine the threshold impacts of public debt on economic growth in emerging nations from 1990 to 2020. According to the World Bank's income-based classification, the sample is divided into lower-middle-income and upper-middle-income nations in order to investigate the diverse threshold impacts of public debt. According to the study, public debt has an adverse influence on emerging nations' economic growth above the 50.988% threshold. Additionally, there are differences in threshold effects between the two subsamples, as public debt has a detrimental effect on economic growth above threshold levels of 50.243% and 62.646%, respectively, for lower-middle-income and upper-middle-income economies.

Ngotana (2021) analyses quarterly historical data from 1990 to 2020. Economic growth and public debt as a proportion of GDP are first-order integrated, according to the results of stationarity tests. According to the vector autoregressive model's impulse response results, a shock to the public debt will result in slower GDP growth over the next time frame.

The dynamic link between the South African economy's total public debts to real GDP growth rates from 1980 to 2014 was analyzed by Baaziz, Guesmi, Heller, and Lahiani (2015). The study's LSTR model contained two macroeconomic control variable namely trade openness and the inflation rate. Additionally, it was shown that the type of relationship that might exist between public debt and real GDP growth depends on the amount of debt a country has. They argue that South Africa's economic momentum is at risk if the country's public debt surpasses 31.37% of GDP. Their findings sent a strong message to the government and decision-makers about the necessity to tighten countercyclical fiscal measures.

3.3.2 Empirical evidence from African countries

Studies, with a focus on African nations, reveal different results. Onyele and Nwadike (2021) paper contends that as the debt overhang increases, a foreign reserve is insufficient to pay short-term external debt, and government revenue is insufficient to service debt, the national debt becomes a burden. The impact of Nigeria's debt load on the nation's economic stability is investigated in this research. The research was conduct between 1981 and 2019. With the exchange rate acting as a control variable, the debt load is therefore determined using the debt service cost-to-government revenue ratio (revenue adequacy), short-term external debt-to-reserves ratio (reserve adequacy), and total debt-to-GDP ratio (debt overhang). In the meanwhile, economic stability is gauged by the real GDP growth rate. The ARDL model is used for the investigation as the variables are stationary at both levels and first difference.

According to the ARDL model, revenue adequacy has a negative and considerable influence on economic stability over the long term, whereas the other explanatory variables together have a declining effect. With the exception of debt overhang, every aspect of debt load has a detrimental and substantial short-term effect on economic stability. In these situations, the exchange rate has a long-term, favourable, and substantial effect on economic stability.

The results of Bonga, et al. (2015); Egbetunde (2012); Ghourchian and Yilmazkuday (2020); and Munzara (2015) supports these findings. Egbetunde (2012) investigate Nigerian public debt and economic growth link for the period between 1970 and 2010 also indicates that there is a long-term link between the two. According to the VAR model's results shows bi directional relationship. Two-stage least-squares methods and control variables that are similar to earlier work were used by Ghourchian and Yilmazkuday (2020) to assess the state debt effects and consumption on economic development in 83 nations for the period of 1960 to 2014. The results indicate that, on average, restrictions on public debt are much crucial in blocking inverse growth consequences for nations with stronger trade openness, lower inflation, or higher financial depth. Real economic growth declines by 0.1 percentage points for each percentage point rise in the ratio of government consumption to GDP, while real GDP growth declines by 0.01 % points for every percentage point increase in the ratio of government debt to GDP.

Bonga, et al. (2015) and Munzara (2015) studies utilized OLS regression to evaluate the data and meet their study's goals. Both studies focused in Zimbabwe's economy. Munzara (2015) looked at how debt affect economy of Zimbabwe. Using annual time series data covering the years 1980–2013, trade openness, capital investment, and labor force make up the control variables. The findings showed that while investments in capital and labour force expansion had beneficial benefits on the economy of Zimbabwe, external debt and trade openness had negative consequences. The study underlined that the nation should foster an atmosphere that is conducive to alternative foreign funding sources, such as project finance and foreign direct investment, rather than merely depending on borrowing from overseas to finance economic growth. In a similar vein, the country ought to encourage value-added exports from regional producers as opposed to excessive imports of consumables.

Bonga et al. (2015) investigate in detail the causes, effects, and potential solutions to the debt crisis. To support its conclusions, the research utilized OLS models and performed econometric tests, including the correlation matrix and ADF test, to measure the strength of correlations between explanatory variables. The yearly time series data utilized, which covered the years

1980 to 2013, demonstrated the significant impact of state debt on economic growth. This suggests that capital accumulation is susceptible to accumulated levels of debt and will ultimately reduce Zimbabwe's GDP growth momentum. The research recommended that government refrain from borrowing and that, if it does, that any money borrowed be used solely for investments to foster economic growth.

In contrast, Sulaiman and Azeez (2012); Mensah (2017); Saifuddin (2016); Ali and Mustafa (2010) shows a positive relationship. The model utilized in the study of Sulaiman and Azeez (2012) uses inflation, the ratio of foreign debt to export, the exchange rate proxy, and the proxy GDP as the exogenous variables and the endogenous variable to measure economic growth as a function of international debt. From1970 to 2010, annual time series data were collected. The empirical study makes use of the econometric methods of OLS, ECM, Johansen Co-integration test, and ADF Unit Root test. The variables exhibit a long-term equilibrium relationship, as shown by the co-integration test. The error correction model's outcomes show that foreign debt has helped Nigeria's economy. The paper argues that the government should ensure economic and political stability and should mainly take on external debt for economic, not social or political, reasons. Mensah (2017) support argument as the author looked at how Ghana's public debt affected the country's economic growth from 1970 to 2014 and ARDL Bounds test was employed, the stationarity of the time series data was tested using the ADF test. At a five percent significance level, the t-test statistic was employed to determine if the individual values of the independent variables in the general function were significant. According to the study, economic growth and public debt are positively correlated.

Similary, Saifuddin (2016) findings show positive correlation between this two variables. The author examined how Bangladesh's public debt may impact economic growth for the years 1974 to 2014. This study examined how public debt may indirectly affect investment, which in turn may have an effect on GDP, using the investment model. Using the growth model, the study also looked at the direct relationship between government debt and economic growth. TSLS regression was used and results shown that there was a positive correlation between public debt and both investment and economic growth.

In order to investigate how public debt affected Pakistan's economic growth between 1970 and 2010, Ali and Mustafa (2010) created a function that compared the nation's overall output to a number of proxies, such as the amount spent on education, the creation of capital, the availability of labor, and foreign funding.The short- and long-term effects of these variables

were assessed in this study. The review's primary conclusion was that external finance had a major, detrimental impact on Pakistan's economic growth during both the intermediate and long terms. Nonetheless, it was discovered that both the short- and long-term effects of growing human capital and capital formation favourably impacted the nation's overall national output.

The study conducted by Hilton (2021) tests the causal linkages between public debt and economic development using a Granger-causality model based on dynamic multivariate autoregressive-distributed lag (ARDL). Time-series data collected annually between 1978 and 2018. The findings show that while there is a unidirectional Granger causation from public debt to GDP over the long term, there is no causal link between the two variables in the short term. Once more, there is a short-term negative bidirectional causal link between investment spending and GDP, but a long-term positive bidirectional causal association. On the other hand, there is a long-term Granger causal link between government consumption spending and GDP, but there is no short-term causal relationship between the two. Lastly, there is a short-term positive correlation between governmental debt and the rate of inflation.

3.3.3 Empirical evidence from developed countries

Numerous studies conducted by different authors, looking at developed countries, consistently reveal an inverse relationship between the two main variables, even though the samples, focused countries, and economic techniques may differ. Starting with the work of Caner, Fan, and Grennes (2019); Vinokurov, Lavrova, and Petrenko (2020) and Swamy (2020) used GMM approach to examine the connection which is different from past research between governmental and private debt and economic growth. Caner, Fan, and Grennes (2019) investigated if there is a nonlinear threshold link between the interaction of public and private debt and GDP growth using an endogenous panel threshold model with standard control variables. Pooled OLS regressions and the GMM approach were used to find the relationship. According to the study, when it rises above a threshold of 137 percent, there is a negative and significant link between public and private debt difficulties and economic development. The research reveals that a greater level of private debt in the sample of 29 OECD nations predicts a harmful effect of governmental debt on economic growth.

Vinokurov, Lavrova, and Petrenko (2020) addressed the unobserved heterogeneity of countries' institutional development by using a cluster analysis technique in addition to a panel regression approach and the GMM method. The study found that debt thresholds in nations with weak political institutions are usually 37 percent, while thresholds in nations with good institutions

are usually 56 percent or higher. It is evident from examining the 12 Eurozone countries with the most advanced institutions between the late 1990s and the early 2000s that debt growth negatively impacts economic performance beyond a certain point, approximately 100%.

In order to estimate panel data growth regressions with time- and country-specific fixed effects, Swamy (2020) used the Solow growth model. The study shows a negative link between government debt and growth for a very large global dataset comprising 252 nations from 1960 to 2009 using a two-step GMM estimator. One set of econometric parameters point to a correlation between a 10-percentage-point increase in the debt-to-GDP ratio and a 23-basis-point decline in annual growth. These particulars align with the conclusions of prior research that demonstrated similar effects of debt on growth (Afonso & Jalles 2013; Woo & Kumar 2015; Baglan & Yoldas 2016). The results growth is boosted by debt in countries where debt is less than 60% of GDP, has little effect on growth in countries where debt is between 60% and 90% of GDP, and has a negative tendency on growth in countries where debt exceeds 90% of GDP, with the trend sharply declining at roughly 100%.

The study conducted by Snieska and Burksaitiene (2018); Rabia and Kamran (2012) supports these studies. Authors applied OLS model. The analysis done by Snieska and Burksaitiene (2018) did not include smaller Eurozone countries because of the volatility in their growing economies caused by the uncertain influence of offshore financial services on their economic dynamics. According to the results, nation's debt increase has a considerable inverse impact on the economy in each of the 24 countries that make up the European Union, when analysed utilizing zero-, one-, and two-year lags. Rabia and Kamran (2012 findings showed adverse correlation between domestic debt and the growth of the national economy. Likewise, it was shown that there was a negative correlation between the nation's economic growth and public loans sourced internationally.

Similary, Pegkas, Staikouras, and Tsamadias (2020) find that public debt has a negative long-term effect on growth using AMECO data. The results also point to a bidirectional relationship between state debt and growth as well as a long-term, linear causal relationship between trade openness, investment, and human capital. Twelve countries from the Eurozone are represented in the sample, spanning the years 1995 to 2016. The paper's analysis is a time series utilizing a fully modified least squares technique. It includes a dummy variable for the 2009 financial and economic crisis along with control variables including trade openness, investment, and human capital. The authors suggest that nations in the Eurozone should utilize fiscal consolidation as the cornerstone of their economic policies.

Moreover, nonparametric methodology based on data symbolization and clustering methodologies is utilized by Brida, Gomez, and Seijas (2017) to investigate the changing connection between public debt and economic growth. The creation of Minimum Spanning Trees and Hierarchical Trees is the standard method for comparing and clustering a collection of time series. Applying this unique technique to a dataset of 16 advanced nations from 1977 to 2015, the results show an adverse interaction between debt and growth consistent with most previous empirical studies on this issue. It was discovered that the ratio of debt-to-GDP of 90% was what drove country output dynamic performance during the examined time and for the countries evaluated.

Checherita-Westphal and Rother (2012) examined how public debt affected economic development in twelve Eurozone members between 1970 and 2010. The outcomes of the analysis demonstrated a non-linear, highly statistically significant connection between the growth rate of GDP per capita and government debt. The authors found that public debt negatively affect economic growth when it amounted to between 90% and 100% of GDP. Additionally, the growth model was utilized to investigate the direct relationship between government debt and economic growth.

Using the latest dataset of debt increases in 190 countries from 1970 to 2020, Jalles and Medas (2022) investigated a local projection approach. Our findings demonstrate the complexity of the link between debt spikes and economic expansion. Weaker economic growth and consistently reduced production are typically the results of debt rises. This unfavorable correlation does not always exist, though. Future economic prospects are often most negatively impacted by increases in governmental debt. This is especially true if there is already a significant positive production gap in the economy. Additionally, if the starting levels of debt are high, debt surges particularly private debt surges tend to be followed by slower economic development. The findings also demonstrate the impact of debt spikes on future growth.

In this work, 826 estimates from 48 main investigations are subjected to meta-regression techniques. With a 95% confidence interval between 0.10 and 0.18 percentage points, the unweighted mean of the published studies indicates that a 10 percentage point rise in public debt to GDP is linked to a 0.14 percentage point drop in annual growth rates. However, even after accounting for publication bias, we are unable to rule out a zero impact. Furthermore, the meta-regression study demonstrates that estimates tilt less toward the negative side when endogeneity between public debt and growth is addressed. Our findings, which account for non-linear effects, do not suggest a general public debt-to-GDP barrier at which growth slows.

Estimates of this threshold depend on the data and econometric decisions. These results suggest that there is insufficient proof of a persistently detrimental growth effect of greater public debt to GDP (Heimberger, 2023).

Few authors' results imply that the link between the two variables is positive in the short run but still negative in the long run. According to Abubakar and Mamman (2020) study, the data demonstrate that public debt exerts a considerable negative permanent and positive temporary effect on economic growth. It was discovered that the harmful long-term impact of debt outweighed its temporary benefits. Furthermore, not every nation group reported favourable transitory benefits, even though every country group suffered negative persistent impacts. In order to assess whether there have been any shifts in the threshold beyond which a change in public debt may have a detrimental effect on economic growth across Euro Area nations between 1961 and 2015.

Moreover, Gomez-Puig and Sosvilla-Rivero (2017) used the ARDL approach on a database of 11 Eurozone nations over the period 1961–2013 in order to empirically investigate the relationship between public debt and economic development. The study's findings demonstrated that, depending on the nation public debt may have favorable short-term impacts but always has an unfavorable influence on long-term economic growth. According to the authors, a large public debt deters private investment, raises uncertainty about future taxation, and reduces a nation's ability to withstand shocks.

3.4 Assessment of Literature

The empirical research mentioned above has produced conflicting and arguable findings from many nations about the relationship between public debt and economic growth. Studies conducted by Vinokurov, Lavrova, and Petrenko (2020); Swamy (2020); Snieska and Burksaitiene (2018) investigates the link between these two variables and results implies that there in inverse link whereas study such as the ones conducted by Saifuddin (2016); Mensah (2017) and Mbali (2021) shows positive connection. There is disagreement among theories regarding the cause and effect of governmental debt on the economy. According to the neoclassical hypothesis, public spending supported by debt has a detrimental effect on economic growth. The Ricardian School, on the other hand, believes that public debt has no actual impact and just delays taxes. In contrast, the Keynesian view contends that economic growth is a result of governmental debt.

The literature on South Africa points to a negative correlation between government debt and economic growth. Even if the recently proposed fiscal consolidation approach lists borrowing for debt repayment as one tactic for managing the debt crisis, debt has nevertheless continued to rise. Despite already having a large amount of debt, South Africa keeps using debt more and more. Because of this, and in light of the changes in the economy, the study aims to offer more proof of the effect of debt on growth.

3.5. Conclusion

The theoretical and empirical research on public debt and economic growth was reviewed in this chapter. Several studies that make minimal mention of South Africa but try to explain the connection between state debt and economic growth. Mixed results were obtained over various sample periods by some of these researches. Thus, by examining the connection between public debt and economic growth as well as their causality from a South African perspective, the current study seeks to add to the body of existing work.

CHAPTER 4

METHODOLOGY

4.1 Introduction

Different viewpoints on the relationship between public debt and economic growth have been given in the literature review in the preceding chapter. The methodology employed for this investigation is outlined in this chapter which has eight sections. Following the introduction, model specification is presented in the second section. A priori expectations and the definition of variables are covered in the third section. The fourth section presents data sources, fifth section provides a review of the estimation technique, the diagnostic tests are covered in the sixth section, the seventh section indicates the stability tests, and the chapter is concluded in the final section.

4.2 Model specification

This study is underpinned by Neo-Classical theory which contends that debt-backed spending fails to fully offset the negative impacts of private investment incentives and ultimately causes the economy to collapse. The study will adopt and modify the model by Chukwu (2023) who researched about the public debt impact and debt servicing on economic growth in Nigeria. The model is shown as follows:

$$RGDPt = \beta 0 + \beta 1PDSt + \beta 2EXRt + \mu t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots [4.1]$$

Where: RGDP = Real Gross Domestic product, EXR = Exchange rate, PDS = public debt servicing, β_0 = constant, β_1 - β_2 are coefficients, μ_t = error term

For this study, the modified model is shown as:

$$GDPt = \beta 0 + \beta 1PDTt + \beta 2GEXt + \beta 3INVt + \beta 4DUt + \mu t \ldots\ldots\ldots\ldots [4.2]$$

Where: GDP is gross domestic product; PDT is public debt; GEX is government expenditure; INV is investment; DU is a dummy variable; β_0 is the constant; $\beta_1 - \beta_4$ are coefficients; t is time; μ_t is the error term

4.3 Definition of variables and a priori expectations

GDP: is defined as the total monetary value of the finished goods and services—those that the consumer purchases—that a country produces over a given length of time (quarter or year). It is the entire amount of production made within the borders of a country. GDP is composed of goods and services produced for the market as well as certain non-market production, such as government-supplied services in the fields of education and defense (Callen, 2023). The gross domestic product will be represented by the GDP growth rate.

Public debt (PDT): The total amount a central government owes its creditors in terms of loans and guarantees is known as public debt. This debt might come from the selling of bonds inside the borders of the government, or it could be external debt that is owed to other countries or international organisations like the World Bank. It is not always possible to determine a government's economic health or weakness by looking at how much public debt it has. Strong economies are frequently very engaged in international trade and have substantial quantities of public debt (SADC, 2022). It is anticipated that state debt and economic growth will be inversely correlated.The research conducted by Constance and Mengxue (2022) examined 178 nations between 1995 and 2020, discovered that unexpected rises in public debt typically cause real GDP growth to decline, particularly for those with high starting debt levels or rising debt trajectories. On the other hand, nations with low incomes or those gaining from debt relief programs may see brief increases in growth. The Crowding Out Effect lends validity to this. The theory emphasizes that Excessive public debt could increase interest rates and deter private investment by competing with the private sector for loanable money. Long-term growth and capital accumulation may be hampered by this.

Government Expenditure (GEX): A significant portion of the GDP is made up by government expenditures, which are defined as governmental purchases of goods and services. Setting budget goals, changing taxes, raising spending on welfare, and investing in infrastructure projects are all extremely effective ways for the government to influence the economy (Trading economics, 2023). A favourable relationship is expected between government expenditure and economic growth. World Bank (2019) examined 122 nations over a 40-year period, discovered that public investment on infrastructure, health, and education

contributed positively to long-term economic growth, particularly in developing nations. This relationship is supported by Keynesian Theory Emphasizes the function of the government in controlling aggregate demand in recessions. During recessions, higher government spending stimulates growth, employment, and aggregate demand.

Investment (INV): Investment is the process of purchasing manufactured assets (including used assets), as well as the creation of such items by companies for their own utilisation, less disposals. The assets that are important are those that are planned to be used for over a year in the production of other products and services (OECD, 2023). A positive relationship is expected between investment and economic growth. A statistically significant positive correlation between investment (as a percentage of GDP) and economic growth was discovered after analysing 128 nations over a 40-year period. There was a 1.5 percentage point rise in per capita GDP growth when the investment rate was doubled (World Bank, 2020). Constance, Reina and Mengxue, (2022) emphasized that increased investment typically results in stronger economic growth, especially in nations with strong institutions and productive business environments, according to a study that looked at 178 countries between 1995 and 2020 and OECD releases studies and reports on a regular basis emphasizing the benefits of public infrastructure, Research and Development, and human capital investments for long-term economic growth in all member nations.This is all supported by Classical Growth Theory based on capital accumulation, highly valued human input and physical capital accumulation to economic progress (Springer, New York & Sharaf, 2022). Greater capital stock is produced by more investment, and greater capital stock permits higher production capacity, higher output, and eventually higher growth.

DU: The dummy variable will cater for the structural break that occurred with the advent of democracy in 1994. The dummy will have a value of 0 for all the years before democracy and 1 for the years after 1994.

4.4 Data sources

The study uses annual secondary time series data for the period 1990 to 2022. The choice to use this period is because it caters for both pre- and post-independence periods hence, this provides greater analyses. The data was obtained from World Development Indicators and Federal Reserve Bank (FRED) websites.

4.5 Estimation technique

To determine the connection between variables, a variety of estimating approaches can be applied. The unit root test is conducted to ensure series stationary and reliable regression findings are produced. It is necessary that this test be performed since time series data tend to be non-stationary. The co-integration test is then used to ascertain whether there is a link between the variables. The ARDL long run model and the Error Correction Model are then computed to develop connections between the variables after the identification of the co-integration connections.

4.5.1 Unit root/Stationarity test

The presence of a unit root in a time series indicates that it is non-stationary. A unit root is stated to be present in a time series with the value alpha = 1 in the equation below.

$$Yt = \alpha Yt - 1 + \beta Xe + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots [4.3]$$

Where Y_t is the time series number at time 't' and Xe is an exogenous variable (another explanatory variable that is itself a time series). The existence of a unit root indicates that the time series is non-stationary. Furthermore, the amount of unit roots in the series is proportional to the number of differencing processes necessary to make the series stationary (Prabhakaran, 2019).

Rath and Akram (2021) argue that unit root testing is crucial in determining how well data series integrate in time-series analysis. In econometrics throughout the past forty years, the significance of unit root tests and their advancement have been emphasised. The importance of the unit root is shown by the fact that understanding whether unit roots exist in time-series data has effects on econometric models and formulation of policy.

4.5.1.1 Informal unit root test

Informal testing utilizes visual charting of time series data to create graphical representations. One may visually inspect the trend or movements in the variables using the graphical presentations provided by plots. This may be achieved by stating variables in both levels and first differences. The graphical observation shows that data series that deviate significantly from the mean of zero are non-stationary, whereas those that move closer to the mean are regarded as stationary. However, it might help to compare with formal tests to determine the consistency of the data pattern based on various tests. Informal testing is not sufficient to demonstrate the real nature of the series (Kholwane, 2018).

4.5.1.2 Formal unit root test

According to Arltova and Fedorova (2016), there are several formal methods for testing for unit root, including the Dickey and Fuller DF-test and ADF test, the Phillips-Perron test, the KPSS test, and others. There are many different unit root tests available, and they are frequently included in analysis. To evaluate the variables' stationarity and identify their order of integration, this research will use the Augmented Dickey Fuller (ADF) and Phillips Perron (PP) tests.

4.5.1.2.1 Augmented Dickey Fuller (ADF) test

When determining whether a particular time series is stationary or not, the Augmented Dickey Fuller (ADF) test is frequently utilised. When examining a series' stationary, it is one of the statistical tests that is most frequently applied (Prabhakaran, 2019). The first stage is to comprehend the Dickey-Fuller test before moving on to the ADF tests. The following model equation's null hypothesis that α = 1 is tested using a unit root test called a Dickey-Fuller test. The initial lag's coefficient on Y is alpha.

Null Hypothesis (H_0): α = 1

$$yt = c + \beta t + \alpha yt - 1 + \phi \Delta Yt - 1 + et \dots\dots\dots\dots\dots\dots\dots [4.4]$$

Where:

- $y_{(t-1)}$ = lag 1 of time series
- delta $Y_{(t-1)}$ = first difference of the series at time $_{(t-1)}$

It has a null hypothesis that is fundamentally comparable to the unit root test. In other words, the coefficient of Y(t-1) is one, indicating the existence of a unit root. If the series is not rejected, it is assumed to be non-stationary. Based on the aforementioned equation, the Augmented Dickey-Fuller test emerged and is one of the best-known and most popular type of Unit root test. The ADF check, as the term implies, is an 'augmented' form of the Dickey Fuller check (Prabhakaran, 2019). The ADF test extends the Dickey-Fuller test formulation to incorporate in the model a high order regressive component.

$$yt = c + \beta t + \alpha yt - 1 + \phi 1 \Delta Yt - 1 + \phi 2 \Delta Yt - 2 + \dots \phi p \, \Delta Yt - p + et \dots [4.5]$$

It should be noted that only extra differencing terms have been included; the remainder of the equation is unchanged. This makes the test more comprehensive. Nevertheless, the Dickey Fuller test's null hypothesis remains the same. Here's an important thing to keep in mind: Since

the null hypothesis presupposes the presence of unit root, α = 1, the p-value produced should be smaller than the significance threshold (5%), in order to reject the null hypothesis. Therefore, it may be concluded that the series is stationary (Prabhakaran, 2019). The ADF test examines the data points and determines if their average value has remained constant throughout time. The time series is stationary if the average value stays unchanged. The time series is non-stationary if the average value differs (Sanderson, 2023).

Also, assuming there is a series y_t for checking unit root. Then, ADF framework checks unit root as shown below:

$$\Delta yt = \mu + \delta yt - 1 + \sum ki = 1 \beta i \Delta Yt - i + et \ldots\ldots\ldots\ldots [4.6]$$

Where: δ = α – 1; α = coefficient of y_{t-1}; Δy_t = first difference of y_t, thus $y_t - y_{t-1}$

Contrary to the alternative hypothesis of δ < 0, the null hypothesis of ADF is =δ = 0. When we reject the null hypothesis, the series is stationary as opposed to non-stationary when we do not (Shrestha & Bhatta, 2018).

4.5.1.2.2 Phillips Perron test

The Phillips-Perron test is comparable to the ADF test, although it is slightly more sophisticated. It examines if the data values change in a pattern that can be predicted. The time series is stationary if the data values change in a predictable manner. The time series is non-stationary if the data values change in an unanticipated manner. In summary, the ADF test determines if the mean of a time series remains constant over time, whereas the Phillips-Perron test determines whether the variance of a time series remains constant over time (Sanderson, 2023).

Afriyie, Twumasi-Ankrah, Gyamfi, Arthur and Pels (2020) assert that the PP test extends the DF test. It corrects the t-test statistic nonparametrically. The PP test has one benefit over the ADF test in that it is resistant to general kinds of heteroscedasticity in the error term εt. Furthermore, the user is not required to specify a lag period for the test regression.

Hypothesis:

H_0: There is a unit root.

H_1: There is no unit root.

Eric (2019) states that in addition to comparing the null hypothesis (series has a unit root) with the alternative (series has no unit root), the Phillips-Perron check also takes these two

possibilities into account. But it tackles serial correlation concerns by modifying the OLS estimate of the AR(1) coefficient. Regression of the PP test follows the AR (1) process that says:

$$\Delta yt - 1 = \alpha 0 + \gamma yt - 1 + \varepsilon t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots [4.7]$$

According to Moffat (2019), the main distinction between the PP unit root test and the ADF test, despite similarities, is how each test handles serial correlation. The ADF utilises a parametric autoregression to simulate the structure of errors, whereas the PP test ignores any serial correlation. Surprisingly, considering their differences, both tests frequently result in the same results.

4.5.2 Autoregressive Distributed Lag (ARDL) technique

The study will apply a well-known approach by Pesaran et al. (2001) called the Autoregressive Distributed Lag (ARDL) approach. Pahlavani, Wilson and Worthington (2005) argued that ARDL provides a number of benefits over traditional Johansen cointegration methods. To begin with, the ARDL is a more statistically significant method for finding cointegrating connections in small samples, whereas the Johansen co-integration approaches still require large data samples for the reasons of validation. The fact that the ARDL can be used whether the regressors integrated of order 1, order zero or both, is an additional benefit over other cointegration approaches. This implies that it does not have the pre-testing issues that come with normal cointegration, which calls for order one variables.

Nasrullah, Rizwanullah, Jo, Sohail and Liang (2021) maintained that the ARDL technique uses the ordinary least square (OLS) for cointegration across variables and is suitable for simultaneously calculating short- and long-term elasticities for a small sample range. The sequence of the variables' integration is flexible with ARDL. Also, ARDL works well when the framework's explanatory variable integrated of order one, order zero or mix. However, it fails when variables are integrated of order two,

Yakubu, Salisu, and Umar (2015) claim that under the underlying ARDL framework where the disturbance terms are not serially linked, it is also crucial to accurately estimate the correct lag length. We use the Schwarz Bayesian (or Information) Criterion (SBC), the Hannan-Qiunn Criterion (HQC), and the Akaike Information Criterion (AIC) to determine the optimal lag length. The optimal lag is the length where these techniques' values are minimised. AIC and SBC are the most often used types.

Chandio, Jiang and Rehman (2019) asserted that before performing the ARDL bounds test, the suitable lag length must be selected. Furthermore, the selection of lag length should be done with attention, since incorrect lag length might end up generating biased data that is unsuitable for decision-making purposes. As a result, to ensure that the lag length is adequate, we utilise the AIC to depict the relative lag length. The AIC criteria produces solid findings and outperforms the SC and HQ.

4.5.2.1 ARDL Bounds test.

The ARDL bounds checking technique to co-integration finds the long run connection between variables and then derives the error correction framework for estimating the variables' short run coefficients if the long-run connection emerges. The joint significance test's F-statistic (Wald testing) can be applied to assess if the lagged levels of variables are significant and co-integrated in the model's initial difference regression (Yakubu et al., 2015).

The two asymptotically established critical values are compared to the F-statistic. Depending on whether the model has a pattern that is deterministic or not, the critical values represent the lower bound I (0) and upper bound I (1). Long run level relationships between the variables are considered to be present if the F-statistics are larger than or equal to the upper bound; they are considered not to be present if they are less than or equal to the lower bound. If the F-statistics is between the upper and lower boundaries, the conclusion about the existence of co-integration among the variables remains unclear (Yakubu et al., 2015).

In the ARDL bounds approach, co-integration is examined by utilizing hypothesis:

$$H0: \alpha 1 = \alpha 2 = \alpha n = 0 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots [4.8]$$

$$H1: \alpha 1 \neq \alpha 2 \neq \alpha n \neq 0 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots [4.9]$$

The suppositions are provided as follows: If the null hypothesis is rejected, co-integration will take place (Menegaki, 2019).

4.5.3 Error Correction Model (ECM)

If the variables have a long-run connection, the error correction model (ECM) must be utilised. The ECM approach can be utilised to identify the short-run connection between the variables. It defines the rate at which the dynamic model adjusts to restore equilibrium after a disruption. The ECM coefficient reflects how fast or slow the variable returns to equilibrium. It is anticipated to be negative and significant in this case (Wan Husin, Rusfahizan, Sauji & Tuan Mohammad, 2021).

Shrestha and Bhatta (2018) highlighted that a dynamic error correction model (ECM) may be generated from ARDL using a basic linear transformation. ECM combines the short-run dynamics with a long-term equilibrium without sacrificing long-run information and removes difficulties such as incorrect relationships caused by non-stationary time series data. The following basic model may be used to demonstrate the ARDL technique:

$$yt = \alpha 0 + \beta xt + \delta zt + et \ldots\ldots\ldots\ldots\ldots\ldots\ldots [4.10]$$

The error correction form of the ARDL model is shown below:

$$\Delta yt = \alpha 0 + \sum pi = 1\, \beta i \Delta yt - i + \sum pi = 1\, \delta i \Delta xt - i + \sum pi = 1\, \varepsilon i \Delta zt - i + \lambda 1\, yt - i + \lambda 2\, xt - i + \lambda 3\, zt - i + \mu t \ldots [4.11]$$

The first section of the equation with β, δ and ε depicts the model's short-run characteristics. The second portion with a λs stands for a long-term connection. The null hypothesis in the equation is λ1 + λ2 + λ3 = 0 indicating that the long-term connection is not present.

4.6 Diagnostic tests

The execution of numerous diagnostic tests is a critical stage in time series modelling. There are several diagnostic methods available in the literature to assess the dependency structure of a time series (Kuan, 2008). The dependable nature of derived coefficients is revealed by diagnostic testing. Diagnostic test data is usually not provided automatically by software and must consequently be approximated manually. The modeling approach chosen determines the type of diagnostic test. However, the most widely used types of diagnostic testing include residual diagnostics, lag structure, and coefficient diagnostics. Furthermore, the stability diagnostics assess whether the calculated model's values are stable across different data subsamples (Shrestha and Bhatta, 2018). The diagnostic tests for this study are normality, serial correlation, heteroskedasticity and correlogram of residuals.

4.6.1 Normality test

A normality test is typically used to determine if the data used in the study has a normal distribution. Many statistical processes, such as regressions, are predicated on data distributions that are normally distributed (Editage, 2023). Several checks have also been developed to determine data normality. One popular goodness of fit test that may be used to assess the distributional properties of data is the Jarque-Bera (JB) test. To validate the idea of normality, the JB test is predicated on the idea of matching the sample data's skewness and kurtosis with the normal distribution. The test is used to compare the null hypothesis of no significant

difference between the data in hand and the normal distribution against the alternative hypothesis of a significant difference (Aslam, Sherwani & Saleem, 2021).

4.6.2 Serial Correlation test

A technique called serial correlation is used to transfer error terms in a time series from one period to the next (also known as autocorrelation). In simple terms, there is a correlation between the error for one time period and the error for the next time period. For instance, if earnings for a specific quarter are understated, profits for next quarters may also be underestimated. High T-statistics and false-positive results for significant regression coefficients are only two issues that might result from this. To put it another way, a regression coefficient may seem statistically significant even when it is not. (Statistics, 2023). The study will apply the Breusch-Godfrey test, a statistical procedure designed to identify autocorrelation in the residuals of a linear regression model, to test for serial correlation. Both linear and non-linear models can use it, and it aids in the detection of autocorrelation at various lags (Tan, 2023).

4.6.3 Heteroskedasticity test

The White test is a widely used test for heteroskedasticity that starts by permitting the heteroskedasticity procedure to be an expression of one or more of your explanatory factors. Contrary to the Breusch-Pagan test, the White test permits the independent variable to have a nonlinear and interacting impact on the error variance (Pedace, 2016). In the White test, heteroskedasticity is tested by evaluating the residuals from regression models. The Chi-square distribution is the basis for the test, which uses it to assess the hypothesis (Rehal, 2023).

4.6.4 Correlogram of residuals

The correlogram of residuals is another tool used in the study to check for autocorrelation. For a given order of autocorrelation lags, the Ljung-Box Q-Statistic and its associated probability value serve as a test statistic for the null hypothesis that there is no autocorrelation. The autocorrelations and partial autocorrelations at all lags should be almost nil if there is no serial correlation, and all Q-Statistics must be insignificant with high probability values (Stubblebine, 2002).

4.7 Stability test

The stability test assesses if the model displays structural changes across the course of the research, as well as the predictability of the results. The cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests are widely established as representative

approaches for identifying variations in structure in time series models (Lu, Maekawa & Lee, 2008). These tests are used to evaluate stability of the model. The cumulative sum test reveals regular shifts in regression coefficients, whereas the cumulative sum of squares test reveals an abrupt shift in regression coefficient constancy (Ravinthirakumaran, Selvanathan, Selvanathan & Singh, 2015). The ARDL model's coefficients will be stable when the statistics in the CUSUM and CUSUMSQ lie within crucial boundaries at a 5% significance level (Nasrullah et al., 2021).

4.8 Conclusion

This chapter discussed the methodology that will be used in this study. The chapter indicated the theory underpinning the study as well the adopted and modified empirical model. This was then followed by the definition of variables and a priori expectations. The chapter covered the estimating methods that this study will use. The unit root tests, including the PP and ADF tests that will be employed were described in this chapter. The chapter also demonstrated how, if the variables are integrated of order 0, order 1, or a combination of the two, the ARDL estimate technique will be applied. Also, the ECM was also discussed for short run analysis. This was mostly due to the possibility of short-term variable disequilibrium, which is linked to disturbances as the equilibrating error. The ECM will provide light on the dynamic relationship between the factors that leads to short-run disequilibrium. Also, stationary tests discussed include normality, serial correlation, correlogram of residuals and heteroscedasticity tests. Lastly the stability tests were also explained, and these are CUSUM and CUSUM of squares tests. The next chapter goes further to interpret and presents the empirical results of this study.

CHAPTER 5

DATA ANALYSIS AND PRESENTATION OF RESULTS

5.1 Introduction

The research delved into the comprehensive analysis of our dataset, which focuses on exploring the intricate relationship between main economic variables and Gross Domestic Product growth in this chapter. Leveraging various econometric techniques and diagnostic tests, we aim to uncover the underlying patterns, dynamics, and determinants of economic growth. The analysis begins with an exploration of descriptive statistics, providing a quick overview of the variables under consideration's distributional features, variability, and central tendencies. This is followed by unit root tests which are then followed by ARDL model; diagnostic tests and conclusion.

5.2 Descriptive statistics

The summary statistics of the study are shown in Table 5.1. The descriptive statistics provide a thorough picture of the distributions of GDP Growth, Public Debt (PDT), Gross Domestic Expenditure (GEX), and Investment (INV) over 33 observations. Along with normality tests (Jarque-Bera test), shape measurements are included in these statistics (skewness, kurtosis), dispersion (minimum, maximum, standard deviation), and central tendency (mean, median). As table 5.1 illustrates.

Table 5.1: Descriptive statistics

	GDP	PDT	GEX	INV
Mean	2.059813	41.03597	17.88990	16.81501
Median	2.485468	39.95077	17.79363	16.61073
Maximum	5.603806	71.10000	20.57489	21.28725
Minimum	-5.963358	24.00000	15.86074	12.53754
Std. Dev.	2.420415	12.02397	1.223760	1.897038
Skewness	-1.148411	0.994104	0.178127	-0.100003
Kurtosis	4.974186	3.665261	2.073106	2.952401
Jarque-Bera	12.61260	6.043877	1.355817	0.058119

Probability	0.001825	0.048707	0.507678	0.971359
Sum	67.97382	1354.187	590.3666	554.8955
Sum Sq. Dev.	187.4691	4626.427	47.92283	115.1601
Observations	33	33	33	33

Source: Author's own

The mean value is 2.06%, indicating that on average, the economy experienced modest growth. However, the median is slightly higher at 2.49%, suggesting that the distribution of GDP growth rates is skewed. This is confirmed by the negative skewness value of -1.15, which indicates a leftward tail and implies that there were some instances of significant economic downturns, as highlighted by the minimum value of -5.96%. The standard deviation of 2.42% points to considerable variability in GDP growth. In contrast to a normal distribution, the data appear to have a leptokurtic distribution, as shown by the kurtosis value of 4.97, which indicates heavier tails and a sharper peak. With 0.0018 as the p-value, the Jarque-Bera test statistic of 12.61 indicates that the GDP growth data is considerably out of normality.

The Public Debt (PDT) shows that the average amount of government debt is relatively high, with a mean of 41.04% and a median of 39.95%. The maximum and minimum values of 71.10% and 24.00%, respectively, reflect a wide range in debt levels. The standard deviation of 12.02% underscores this variability. PDT's positive skewness of 0.99 shows a rightward tail, suggesting a greater proportion of higher debt numbers than lower ones. The 3.67 Kurtosis signifies a slightly leptokurtic distribution. The 6.04 Jarque-Bera statistic and the 0.0487 p-value signifies that the data slightly depart from a normal distribution at 5% significance level.

For Government Expenditure (GEX), the mean is 17.89%, and the median is 17.79%, indicating a very consistent measure with little variation between the central tendency metrics. The standard deviation is low at 1.22%, reflecting the stability in GEX values. The range between 20.57% maximum value and 15.86% minimum value is relatively narrow. GEX has a near-zero skewness of 0.18, indicating a nearly symmetric distribution, and a kurtosis of 2.07, which is little bit platykurtic. The Jarque-Bera test yields a statistic of 1.36 0.5077 and p-value, suggesting that the GEX data do not significantly deviate from normality.

Investment (INV) has 16.82% mean and 16.61% median, indicating that the average investment level is moderately high. The highest and minimum amounts are 21.29% and

12.54%, respectively, suggesting some variability, but this is relatively moderate as indicated by the standard deviation of 1.90%. The skewness is almost neutral at -0.10, showing a roughly symmetric distribution, while the 2.95 kurtosis value suggests that the distribution is close to normal (mesokurtic). The investment data are confirmed to adhere a normal distribution by the 0.9714 p-value as well as Jarque-Bera test statistic of 0.06.

In summary, these descriptive statistics provided valuable insights into the characteristics of each variable. GDP Growth shows significant variability and negative skewness, indicating economic fluctuations, including downturns. Public Debt is highly variable and positively skewed, suggesting occasional high debt levels. Gross Domestic Expenditure and Investment are more stable, with relatively low variability and distributions close to normality. These findings can guide economic analysis and policy decisions, highlighting areas of stability and volatility within the economic indicators.

5.3 Correlation matrix

The correlation matrix demonstrates important insights into the relationships between GDP Growth, Public Debt (PDT), Government Expenditure (GEX), and Investment (INV).

Table 5.2: Correlation matrix

	GDP	PDT	GEX	INV
GDP	1.000000	0.556611	0.623324	0.668411
PDT	0.556611	1.000000	0.972049	0.936034
GEX	0.623324	0.972049	1.000000	0.989963
INV	0.668411	0.936034	0.989963	1.000000

Source: Author's own

The correlation matrix illustrates a highly interconnected economic system where increases in one variable are associated with increases in the others. The particularly strong correlations between PDT, GEX, and INV suggest that these variables move together very closely. Policymakers should be aware of these relationships, as changes in one area, such as government debt or domestic expenditure, are likely to have significant impacts on the other variables, influencing overall economic performance.

Starting with GDP Growth, there is a moderate positive correlation (0.5566) with PDT, suggesting that as GDP grows, government debt also tends to increase. The correlation between GDP Growth and GEX is stronger at 0.6233, indicating a significant positive relationship where higher GDP growth is associated with higher domestic expenditure (Mahara, 2023). The strongest correlation for GDP Growth is with Investment, at 0.6684, suggesting that increases in GDP are closely linked to increases in investment levels.

PDT shows an extremely strong positive correlation with GEX (0.9720), indicating that rises in government debt are almost directly associated with rises in gross domestic expenditure. Similarly, PDT and Investment have a very strong positive correlation (0.9360), showing that greater levels of government debt correspond closely with greater levels of investment.

GEX is also strongly correlated with GDP Growth (0.6233) and shows an almost perfect correlation with Investment (0.9899). This near-perfect correlation indicates that changes in domestic expenditure are almost perfectly aligned with changes in investment levels, highlighting a very close relationship between these two economic indicators.

Finally, Investment has a strong favourable correlation with GDP Growth (0.6684), a very strong correlation with PDT (0.9360), and an almost perfect correlation with GEX (0.9899). These strong correlations indicate that investment levels are closely tied to both government debt and gross domestic expenditure.

5.3.1 Principal Components Analysis

Principal Components Analysis
Date: 03/03/25 Time: 05:10
Sample: 1990 2022
Included observations: 33
Computed using: Ordinary correlations
Extracting 4 of 4 possible components

Eigenvalues: (Sum = 4, Average = 1)

Number	Value	Difference	Proportion	Cumulative Value	Cumulative Proportion
1	2.385146	1.451966	0.5963	2.385146	0.5963
2	0.933180	0.375290	0.2333	3.318326	0.8296
3	0.557890	0.434107	0.1395	3.876217	0.9691
4	0.123783	---	0.0309	4.000000	1.0000

Eigenvectors (loadings):

Variable	PC 1	PC 2	PC 3	PC 4
GDP	-0.435939	-0.558402	0.668642	-0.225970
GEX	0.548724	0.360495	0.455675	-0.601087
INV	-0.417167	0.701675	0.440334	0.373805
PDT	0.578646	-0.256678	0.389081	0.669254

Ordinary correlations:

	GDP	GEX	INV	PDT
GDP	1.000000			
GEX	-0.571608	1.000000		
INV	0.221927	-0.225808	1.000000	
PDT	-0.341492	0.720091	-0.617277	1.000000

The correlation matrix above (Table 5.3) Showed that there is multicollinearity as most of them are above 80%. The multicollinearity is resolved via component analysis, which produced new independent components that improved statistical modeling and interpretation. The correlation between the variables is now below 80%.

5.3.2 Variance Inflation Factors

Variance Inflation Factors			
Date: 03/05/25 Time: 18:45			
Sample: 1990 2022			
Included observations: 32			
	Coefficient	Uncentered	Centered

Variable	Variance	VIF	VIF
GDP(-1)	0.038285	3.153563	1.825396
GEX	0.267706	701.3761	3.256881
INV	0.089583	207.6591	2.576935
PDT	0.003511	52.82566	4.063226
C	49.23807	400.7741	NA

The Variance Inflation Factor (VIF) results indicate that multicollinearity is not a significant concern in this model, as all cantered VIF values remain below the commonly accepted threshold of 5. According to Gujarati & Porter (2009), a VIF value above 10 is considered a strong indication of multi-collinearity, while Montgomery, Peck, & Vining (2012) suggest that values between 5 and 10 indicate moderate correlation, which may warrant further investigation. In this case, GDP (-1) (1.83), GEX (3.26), INV (2.58), and PDT (4.06) remain well within the acceptable range, suggesting that the variables are sufficiently independent. This enhances the credibility of the regression results, ensuring that the estimated coefficients are reliable for economic interpretation and policy formulation.

5.4 Unit root/Stationary test

When assessing the degree of stationarity in a time series model, unit roots are used as the unit of measurement. Through the application of statistical hypothesis testing, or unit root process, we evaluate the model's stochasticity. These statistical stationarity hypothesis tests are utilized to figure out if differencing should be performed or not (Ozbun, 2021). This study presents both informal and formal unit root tests.

5.4.1 Informal unit root test (Graphical approach)

The simplest method for determining stationarity is the informal unit root test. Its foundation lies in using charts to represent the data or some of its functions and graphically identifying any non-stationarity or stationarity that may be present. Figures 5.1 and 5.2 reveals the informal unit root test findings at levels and differencing, respectively.

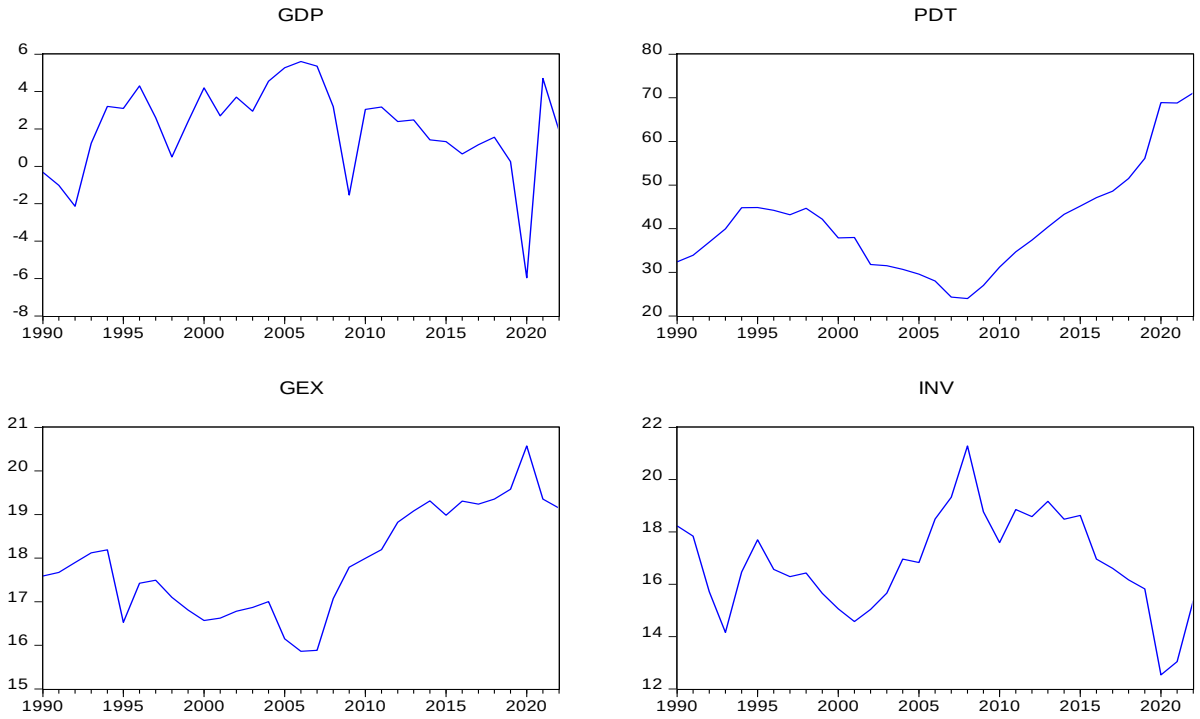

Figure 5.1: Graphical presentation at level series (1990-2022)

Source: Author's own

Figure 5.1 shows unit root evidence within the data set; the trends imply that the series is not stationary, potentially except for GDP and INV. The series lacks stationarity since the variables do not oscillate around the zero mean. In order to achieve stationarity, this calls for differencing. The graphic patterns following differencing are displayed in Figure 5.2.

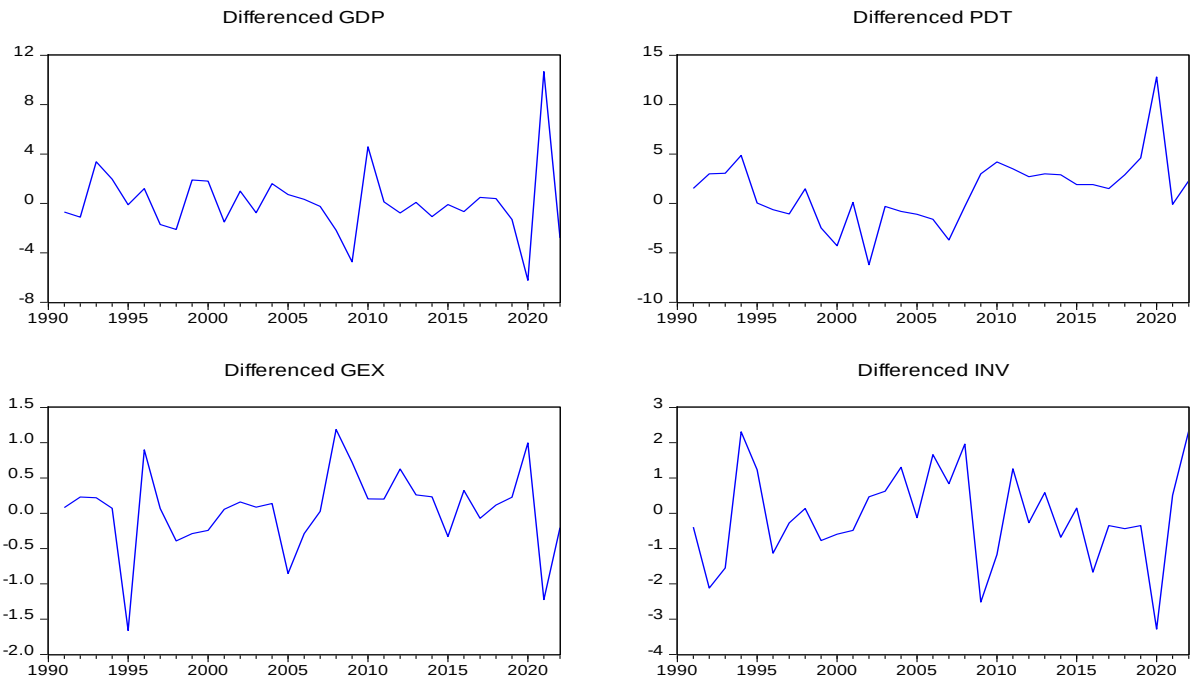

Figure 5.2: Graphical presentation at first difference (1990-2022)

Source: Author's own

The trends that existed prior to differencing (as illustrated in Figure 5.1) are no longer evident in Figure 5.2, as all the variables now fluctuate around the constant variance and zero mean. This suggests that on first differencing, stationarity has been attained. However, it should be noted that for variable PDT, data was unavailable for some periods under review. Also, the graphical plots are not enough to justify the order of integration of variables hence formal tests were performed utilising the Augmented Dickey Fuller (ADF) and Phillips Perron (PP) tests.

5.4.2 Formal unit root test

The stationary state of each variable must be confirmed before moving on to the ARDL bounds test with the aim of establishing the integration order and confirm that order two integration has not occurred. The sequence of integration that is suitable for the ARDL modelling approach was determined utilising PP and the ADF tests. To verify the reliability of the findings, more than one-unit root test was used.

The unit root tests in Table 5.3 assess the stationarity of GDP Growth (GDP), Public Debt (PDT), Government Expenditure (GXE), and Investment (INV) using both Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. Stationarity is essential in time series analysis because non-stationary series can lead to misleading regression results.

Table 5.4: Unit root at level series

	Augmented Dickey Fuller			Phillips Perron		
Variable	**Intercept**	**Trend and Intercept**	**None**	**Intercept**	**Trend and Intercept**	**None**
GDP	-4.036172***	-4.028766**	-2.690592***	-4.036172***	-3.989057**	-2.533473**
PDT	1.229805	0.392901	1.194889	0.388310	-0.159884	1.505771
GXE	-1.107202	-1.910417	0.406634	-1.094411	-1.833033	0.491360
INV	-2.051710	-2.017340	-0.592048	-2.183982	-2.152349	-0.638105

Source: *Source: Author's own computation using EViews 12*

For GDP Growth, the ADF test results indicate the stationary of the series across all specifications. The test statistic for the intercept is -4.036172, which is highly significant (indicated by ***), showing that the GDP series is stationary when considering only the intercept. With trend and intercept, test statistic is -4.028766, significant at the 5% level, confirming stationarity. Without any deterministic components, test statistic is -2.690592, significant at the 1% level, indicating stationarity. The PP test results align with the ADF results. The intercept test statistic is -4.036172 (*), the trend and intercept test statistic is -3.989057, and the none test statistic is -2.533473 (**). These results consistently show that GDP Growth is stationary, meaning its statistical properties do not vary over time.

In contrast, Public Debt (PDT) is non-stationary across all tests and specifications. The ADF test shows that the test statistics are not significant: 1.229805 (intercept), 0.392901 (trend and intercept), and 1.194889 (none). Similarly, the PP test results are not significant: 0.388310 (intercept), -0.159884 (trend and intercept), and 1.505771 (none). These non-significant results indicate that PDT is non-stationary, implying its statistical properties change over time.

Government Expenditure (GXE) is also non-stationary. The ADF test statistics are -1.107202 (intercept), -1.910417 (trend and intercept), and 0.406634 (none), all of which are not significant. The PP test results support this, with test statistics of -1.094411 (intercept), -1.833033 (trend and intercept), and 0.491360 (none), none of which are significant. These results suggest that GXE's statistical properties vary over time.

Investment (INV) follows a similar pattern of non-stationarity. The ADF test results show non-significant test statistics: -2.051710 (intercept), -2.017340 (trend and intercept), and -0.592048 (none). The PP test confirms this with non-significant statistics of -2.183982 (intercept), -2.152349 (trend and intercept), and -0.638105 (none). This non-significance across tests indicates that INV is non-stationary.

Unit root tests expose that GDP Growth is stationary, suggesting stable statistical properties over time, while Public Debt, Government Expenditure, and Investment are non-stationary, indicating that their statistical properties change over time. For accurate modeling and forecasting, transforming these non-stationary series, such as by differencing, may be necessary to achieve stationarity.

Table 5.5: Unit root at first difference

	Augmented Dickey Fuller			**Phillips Perron**		
Variable	**Intercept**	**Trend and Intercept**	**None**	**Intercept**	**Trend and Intercept**	**None**
GDP	-5.543868***	-5.746387***	-5.647610***	-11.49955***	-15.85247***	-11.82205***
PDT	-3.514515**	-3.908922**	-3.281164***	-3.513852**	-3.858853**	-3.243137***
GVE	-5.786462***	-5.753409***	-5.841064***	-5.832389***	-5.862525***	-5.877492***
INV	-4.800806***	-4.692862***	-4.881541***	-4.705751***	-4.544039***	-4.830783***

Source: Author's own

The unit root tests as seen in Table 5.4 evaluate the stationarity of GDP Growth (GDP), Public Debt (PDT), Government Expenditure (GEX), and Investment (INV) at their first differences utilising both the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. The results show that GDP is highly significant across all test specifications (intercept, trend and intercept, and none) for both PP and the ADF tests, indicating stationarity. Similarly, GEX and INV also exhibit high significance in both tests across all specifications, confirming their stationarity

after first differencing. For PDT, the ADF and PP tests show significance at the 5% level for intercept and trend and intercept specifications, and at the 1% level for the specification with no intercept or trend, indicating that PDT is stationary after first differencing.

All variables—GDP, PDT, GEX, and INV—become stationary, implying they are integrated of order one, I(1) after first differencing. Given that all series exhibit the same order of integration, the Autoregressive Distributed Lag (ARDL) model is the most appropriate econometric technique for further analysis. The ARDL model is particularly suitable for small sample sizes and can accommodate variables that are either I(0) or I(1), ensuring robust and efficient estimation of the relationships between the variables over time. This method's flexibility and effectiveness make it ideal for analysing the dynamic interactions among the economic indicators in the dataset.

5.5 Lag Order Selection Criteria

Table 5.6: VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-265.6950	NA	88.17906	18.66862	18.90436	18.74245
1	-149.2256	184.7445*	0.165514	12.36038	13.77483*	12.80337
2	-130.5032	23.24160	0.302212	12.79332	15.38647	13.60546
3	-92.48861	34.08203	0.201434	11.89577	15.66762	13.07706
4	-28.45288	35.33005	0.046691*	9.203647*	14.15420	10.75410*

* 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: Author's own

The table presents the results of the VAR Lag Order Selection Criteria for the endogenous variables GDP, PDT, GEX, INV, and the exogenous variable DUMMY. The selection of an appropriate lag order is crucial for VAR analysis as it affects the model's performance and the accuracy of its predictions. The table displays various criteria, including log-likelihood (LogL), likelihood ratio (LR), final prediction error (FPE), and information criteria such as AIC, SC, and HQ, for different lag orders ranging from 0 to 4.

Based on the criteria, lag order 1 is selected for the dependent variable and 4 for the independent variable as it maximizes the log-likelihood and LR statistics while minimizing the FPE and information criteria scores. This selection ensures improved model fit and explanatory power. The significance of these results lies in their implications for forecasting accuracy and the understanding of the dynamic relationships among the variables.

5.6 Autoregressive Distributed Lag (ARDL) Bounds test

After completing the unit root testing using the graphical approach, ADF and PP tests, the ARDL technique is employed because all variables are integrated in the same order. The ARDL bound test was used to investigate cointegration, and the following findings were obtained:

Table 5.7: ARDL Bounds test.

F-Bounds Test		**Null Hypothesis: No levels relationship**		
Test Statistic	**Value**	**Signif.**	**I(0)**	**I(1)**
F-statistic	5.889881	10%	2.2	3.09
k	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

Source: Author's own

The F-Bounds Test findings provide essential understandings of the presence of a long-term relationship between the variables under consideration in the ARDL model. Given that the calculated F-statistic (5.889881) exceeds the upper bound critical values at all significance levels, we can reject the null hypothesis of "no levels relationship" with strong confidence. This implies that there is a substantial long-run relationship between the variables in the ARDL model. This finding justifies proceeding with the estimation of the long-run coefficients of the

ARDL model, to understand the specific long-term impacts of each explanatory variable on the dependent variable, GDP.

5.6.1 Long run ARDL model

This study uses the ARDL technique to continue assessing the coefficients of the long-run connections after proving the presence of co-integration. Table 5.6 presents the findings:

Table 5.8: ARDL long run results.

Dependent variable: GDP		Sample: 1990-2022		
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
PDT	-0.449255	0.189772	-2.367338	0.0454
GEX	2.233486	1.533088	1.456855	0.1833
INV	-1.665722	0.779722	-2.136303	0.0652
DUMMY	-0.626228	1.023093	-0.612093	0.5575
C	10.09668	12.09985	0.834447	0.4282
EC = GDP - (-0.4493*PDT + 2.2335*GEX -1.6657*INV -0.6262*DUMMY + 10.0967)				

Source: Author's own

The ARDL model results for the long-run connection between GDP growth and its determinants reveal significant insights, particularly concerning public debt. The coefficient for Public Debt (PDT) is -0.449255, with a standard error of 0.189772 and a statistically significant t-statistic of -2.367338 (p-value = 0.0454). This suggests that longer-term GDP growth is inversely correlated with public debt, with a unit hike in public debt translating into a 0.449-unit decline in GDP growth. This negative relationship aligns with existing literature, such as Mhlaba and Phiri (2019); and Kose *et al,* (2021), which highlights the unfavourable effects of high public debt on economic performance by crowding out private investment and increasing fiscal pressures. Additionally, the debt overhang theory posits that excessive debt levels discourage investment because potential investors fear future taxation or inflation, further stifling economic growth (Al Kharusi & Ada, 2018). South Africa continues to struggle to finance its operations solely through its own revenue. As a result, the government often resorts to borrowing. Additionally, the weak economy, high unemployment, poverty, and a

high birth rate place a significant burden on the government, requiring increased spending on social programs and basic services. This further exacerbates the need for borrowing. To address these challenges and reduce the reliance on debt, investments in infrastructure, job creation, and other opportunities are crucial. However, the government's ongoing debt obligations can hinder its ability to implement these necessary measures. Hence, managing public debt levels is crucial for maintaining sustainable economic growth.

Government Expenditure (GEX) possesses a coefficient of 2.233486, with a standard error of 1.533088 and a t-statistic of 1.456855, but it is not statistically significant (p-value = 0.1833). While the positive sign suggests that higher government expenditure could boost GDP growth, the lack of statistical significance prevents definitive conclusions. The Keynesian economic theory suggests that government spending can stimulate economic activity, particularly during periods of low private sector demand (Ramey, 2014). Empirical studies, such as those by Senadza et al (2017) have found that government expenditure can positively impact GDP growth, especially in developing countries. However, the effectiveness of state spending depends on its efficiency and the sectors in which it is invested. In this study, the non-significant results might indicate inefficiencies or the presence of offsetting negative factors, such as high levels of corruption or misallocation of resources.

Investment (INV) possesses a coefficient of -1.665722, with a standard error of 0.779722 and a t-statistic of -2.136303, with a p-value of 0.0652, indicating a near-significant negative impact on GDP growth. This suggests that during the study period, investments may have been inefficient or misallocated, possibly due to poor investment choices or economic instability. This observation corresponds with the conclusions of Aghion et al (2005), who argue that the quality of investment is crucial for economic growth. In economies where investments are directed towards unproductive sectors or are subject to high levels of inefficiency and corruption, the expected positive impacts on growth may not materialize. Moreover, economic instability can lead to underutilization of capital and resources, further dampening the growth effects of investment. Therefore, it is essential for policymakers to focus not only on the quantity of investment but also on improving its quality and ensuring a stable economic environment.

Finally, the dummy variable representing the structural break in 1994, marking the transition to democracy, possesses coefficient of -0.626228, with a standard error of 1.023093 and a non-significant t-statistic of -0.612093 (p-value = 0.5575). This indicates that the transition to

democracy did not have a significant long-term impact on GDP growth. This finding is consistent with studies like Acemoglu et al (2019), which suggest that the benefits of political and economic reforms may take time to manifest and depend on various other factors, including institutional quality and policy stability. The literature on the political economy of growth emphasizes that while democratization can lead to better governance and economic policies, the immediate economic outcomes can be mixed. The initial phase of democratization often involves economic and political adjustments that can temporarily hinder growth. Therefore, the non-significant impact of the 1994 transition in this study highlights the importance of supporting democratic transitions with robust economic policies and institutional reforms to realize their long-term growth potential.

5.6.2 Error Correction Model (ECM)

The error correction model was used after the long run relationship was satisfied to see if the variables were also co-integrated in the short run. The following is the estimated ECM:

Table 5.9: ECM results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PDT)	-0.836895	0.060839	-13.75592	0.0000
D(PDT(-1))	0.408805	0.081450	5.019105	0.0010
D(PDT(-2))	0.301849	0.067990	4.439641	0.0022
D(PDT(-3))	-0.111808	0.061522	-1.817364	0.1067
D(GEX)	1.036788	0.264425	3.920915	0.0044
D(GEX(-1))	-0.957802	0.251705	-3.805261	0.0052
D(GEX(-2))	-0.025257	0.274307	-0.092074	0.9289
D(GEX(-3))	-0.636637	0.236576	-2.691048	0.0275
D(INV)	-0.137596	0.110828	-1.241528	0.2496
D(INV(-1))	-0.042100	0.143915	-0.292531	0.7773
D(INV(-2))	0.419753	0.099540	4.216914	0.0029
D(DUMMY)	-1.649674	0.645007	-2.557608	0.0338
D(DUMMY(-1))	0.817178	0.624242	1.309072	0.2269
D(DUMMY(-2))	-5.040808	0.664070	-7.590781	0.0001
D(DUMMY(-3))	-1.550264	0.887033	-1.747696	0.1186
CointEq(-1)*	-0.712964	0.094083	-7.578017	0.0001

Source: Author's own computation using EViews 12

From table 5.8 shows that PDT has short run relationship with GDP. A one unit increase in PDT leads to 0.836895 decrease on economic growth, which means that PDT negatively impact growth in the short run. This relationship is statistically significant at 1% level. This result aligns with Ngotana (2021) study, which emphasizes an adverse link between debt and a country's growth. As public debt increases, the government must allocate more of its budget to debt servicing, reducing funds available for public investment in healthcare, education, and infrastructure, all of which are crucial for sustained economic growth.

GEX has short run relationship with GDP. A one unit increase in GEX leads to 1.036788 increase on economic growth, which means that GEX positively impact growth in the short run. This relationship is statistically significant at the 1% level. Hlongwane et al. (2021) concurs this relationship. Authors discovered a favourable relationship between South Africa's economic growth and government spending. According to the study, South Africa's economic growth increased by a noteworthy 0.15% in short run for every 1% rise in government spending.

INV has a short run relationship with GDP. A one unit increase in INV leads 0.137596 decrease on economic growth. This means that INV negatively impact growth in the short run. This relationship is not statistically significant at the 5% level. These results concur with Panizza and Presbitero (2014) study which states that private investment and governmental debt are negatively correlated, especially in emerging nations. They contend that by raising interest rates and undermining investor confidence, large public debt could discourage private investment.

The DUMMY variable representing the structural break in 1994, marking the transition to democracy, had a negative impact on economic growth and the impact is statistically significant.

This negative and statistically significant coefficient verifies the presence of a strong long-run equilibrium relationship between the variables. The magnitude of the error correction term indicates that approximately 71% of the disequilibrium in GDP from the previous period is corrected in the current period, reflecting a relatively high speed of adjustment to the long-run equilibrium. This finding is consistent with the theory of cointegration, which indicates that the variables in the model are adjusting to maintain a long-term equilibrium relationship despite short-term fluctuations (Engle and Granger, 1987). Thus, the presence of this significant error

correction term further validates the robustness of the long-run relationships identified in the ARDL model.

5.7 Diagnostic test

All diagnostic tests must be performed to determine whether the coefficients have the appropriate signs to achieve dependable robust outcomes. The following diagnostic tests were performed during the investigation in order to prevent incorrect results:

Table 5.10: Diagnostic tests

Test	**Null Hypothesis**	**Test Statistic**	**Probability Value**	**Conclusion**
Normality: Jarque-Bera Test	Residuals are normally distributed	1.820118	0.402500	Residuals are normally distributed.
Serial Correlation: Breusch-Godfrey LM Test	No serial correlation in the residuals	2.361082	0.1244	No serial correlation in the residuals.
Heteroskedasticity: White test	Homoskedasticity (constant variance of residuals)	18.90659	0.5279	Residuals are homoscedastic.

Source: Author's own

The results indicate that the residuals are normally distributed, there is definately no proven evidence of serial correlation in the residuals, and the model exhibits homoskedasticity. These findings suggest that the model meets the assumptions required for reliable estimation and inference.

5.8 Stability tests

Figures 5.3 and 5.4 for the long-run ARDL model provide the visual depiction of CUSUM and CUSUM of squares, respectively. When examining the CUSUM and CUSUM of squares, it is essential to keep in mind that, in the event that these statistics stay inside the critical boundaries of 5% level of significance, the null hypothesis cannot be rejected.

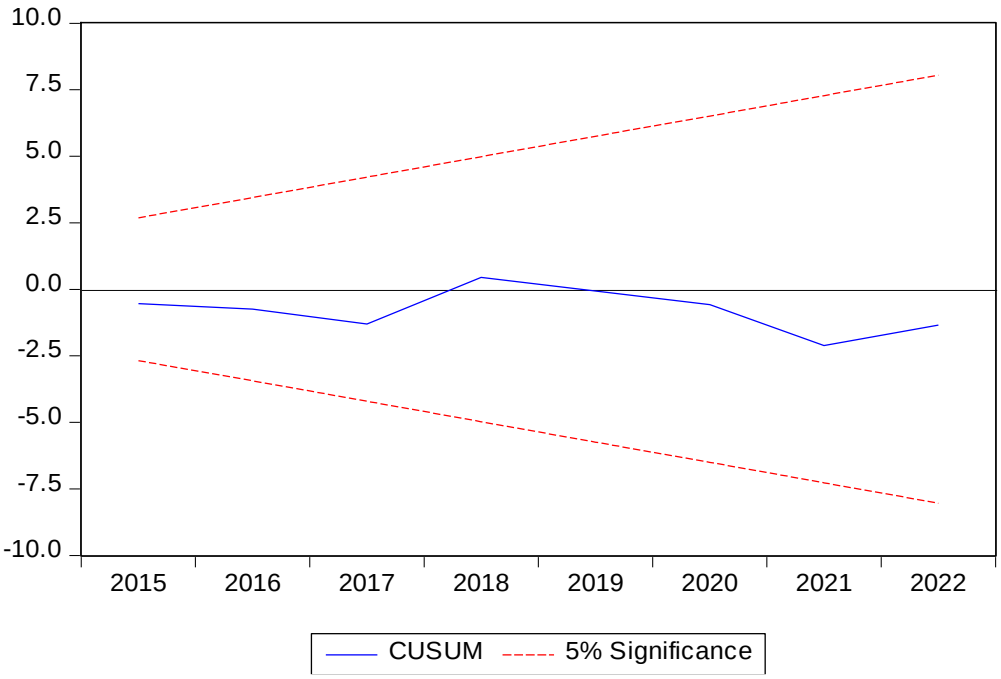

Figure 5.3: CUSUM test

Source: Author's own

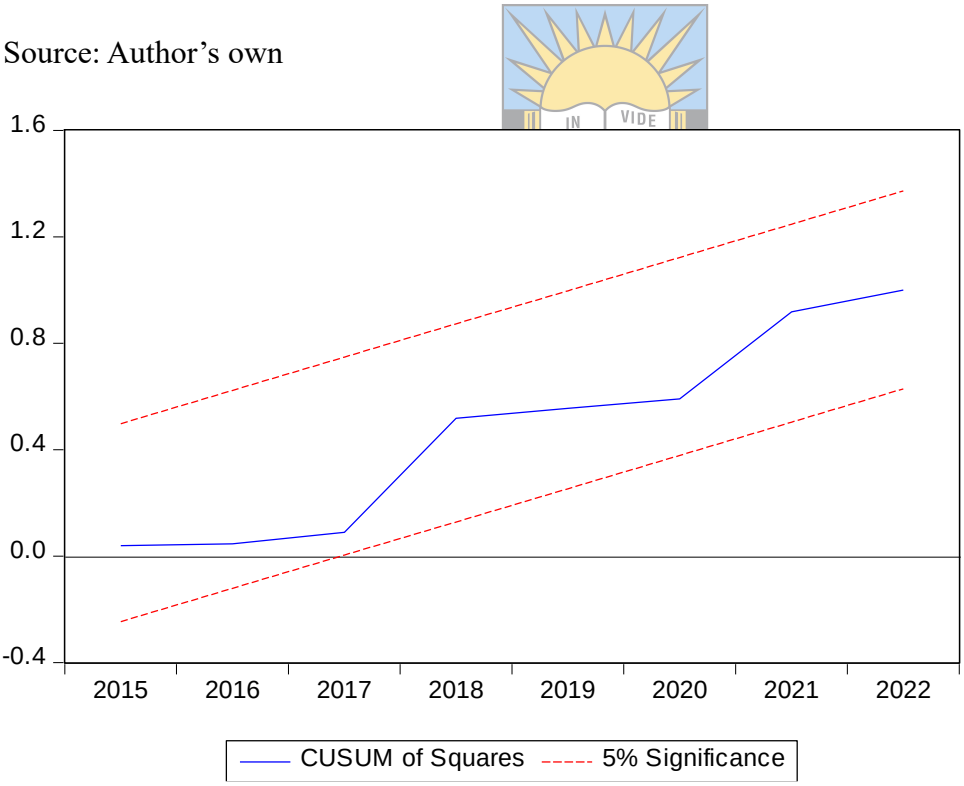

Figure 5.4: CUSUM of squares test

Source: Author's own

The plots of the CUSUM and CUSUMSQ statistics, as seen in Figures 5.3 and 5.4, are within the parameter stability's 5% confidence range. This implies that the coefficients are stable since

in simple terms, the blue line lie between the two red lines in both graphs. This leads to the conclusion that the null hypothesis on model stability was not rejected, indicating that the variables utilised in this investigation were stable in South Africa across the study timeframe.

5.9 Conclusion

The chapter presented the empirical results for the study. The data's time series properties were analysed using graphical plots and the ADF and PP unit root tests. Since ADF and PP are formal tests and they verified that the variables are integrated of order one, their results were taken into consideration in this investigation. After performing an ARDL bounds test, co-integration was determined. After co-integration was assessed, the long-run model was estimated, and the results showed that government debt and investment negatively impact economic growth and the impacts are statistically significant. On the other hand, government expenditure showed a positive coefficient, it lacked statistical significance, suggesting that its impact on GDP growth may not be robust. The dummy variable representing structural breaks, particularly the transition to democracy in 1994, indicated a negative impact on economic growth but did not exhibit a significant long-term impact. In the short run, public debt, investment and dummy has an impact on economic growth and the impact is negative. Government expenditure is revealed as the only variable that positively affect the economic growth. The results indicate that the residuals are normally distributed, there is definately no proven evidence of serial correlation in the residuals, and the model exhibits homoskedasticity. These findings suggest that the model meets the assumptions required for reliable estimation and inference. Also, the model is stable as indicated by the stability test.

CHAPTER 6

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This final chapter summarizes the study's major conclusions and results regarding the impact of public debt on South African economic growth, in line with the research questions and objectives outlined in Chapter One. This if followed by the policy recommendations and implications, suggesting actions and decisions to promote effective strategies for South African growth. Finally, the study's contributions and limitations are discussed.

6.2 Overview and Analysis of the Results

The main objective of this study was to investigate the impact of public debt on economic growth in South Africa for the period 1990 to 2022. The first chapter indicated the introduction and background of the study. This comprised of introduction, problem statement, objectives, hypothesis and the significance of the study.

In the second chapter, economic growth and government debt overview have been examined. The history of South Africa's debt, patterns of national debt and economic growth, as well as the comparison of South Africa's public debt with that of a few other nations are all covered. It is found that debt is one essential source of funding that is accessible globally. Since national debt can improve economic prospects and standardize overall performance, economic participants emphasised that it must be properly managed and administered. If public debt is not properly managed and controlled in accordance with the PFMA and other legal frameworks, it may also pose a threat to the nation. A multitude of problems, including higher rates of unemployment, poverty, inequality, recession, and lower investment returns, can be brought on by mismanaging financial resources. One of the difficulties debt managers encounter while trying to fix and avoid issues in the Finance Department is managing public debt. To have the ability to protect the public debt and steer and guarantee the nation's economic progress, debt managers overseeing the portfolio of public debt must exercise sound judgment and put acceptable policies into place.

In the third chapter, theoretical and empirical research on state debt and economic growth were reviewed in this study. There is disagreement among theories regarding the cause and effects

of governmental debt on the economy. The neoclassical hypothesis holds that debt-supported governmental spending is bad for economic growth. Conversely, the Ricardian School holds that public debt just postpones taxes and has no real effect. Conversely, the Keynesian perspective argues that state debt is a driver of economic growth, make minimal reference to South Africa in making an effort to clarify the connection between state debt and economic growth. Various sample period's revealed inconsistent results from some of these studies. Numerous studies including Vinokurov, Lavrova, and Petrenko (2020); Swamy (2020); Snieska and Burksaitiene (2018) investigates the link between these two variables and results implies an inverse link whereas study such as the ones conducted by Saifuddin (2016); Mensah (2017) and Mbali (2021) shows positive connection.

In the fourth chapter, the explanations of the models used to empirically examine the impact of public debt on economic growth in South Africa were done. All variables were clearly explained and a prior expectation were indicated. The ADF and PP tests were also explained for the stationarity of the selected variables. ARDL model was also discussed as the appropriate technique due to the need of a single form equation, in contrast to the VAR model which necessitates many equations. It is also adaptable enough to manage smaller samples and can be used regardless of whether variables are stationary at the level series or at first difference. The study also included a discussion on the suitable diagnostic and stability testing.

The fifth chapter presented the empirical results for the study. The data's time series properties were analysed using graphical plots and the ADF and PP unit root tests. Since ADF and PP are formal tests and they verified that the variables are integrated of order one, their results were taken into consideration in this investigation. After performing an ARDL bounds test, co-integration was determined. After co-integration was assessed, the long-run model was estimated, and the results showed that government debt and investment negatively impact economic growth and the impacts are statistically significant. On the other hand, government expenditure showed a positive coefficient, it lacked statistical significance, suggesting that its impact on GDP growth may not be robust. The dummy variable representing structural breaks, particularly the transition to democracy in 1994, indicated a negative impact on economic growth but did not exhibit a significant long-term impact. In the short run, only public debt has an impact on economic growth and the impact is negative. The results indicate that the residuals are normally distributed, there is definately no proven evidence of serial correlation in the residuals, and the model exhibits homoskedasticity. These findings suggest that the model

meets the assumptions required for reliable estimation and inference. Also, the model is stable as indicated by the stability test.

6.3 Key research findings based on the research specific objectives.

Based on the analysis's findings, the findings demonstrated a statistically significant negative long-run relationship between governmental debt and economic growth. Thus, public debt negatively impact output in the long run. In addition, among the variables, only the national debt has a significant and negative impact on economic growth in the short run. Consequently, it may be said that encouraging a capital-poor nation such as South Africa to borrow money will not lead to a greater accumulation of capital. This will promote the use of debt in addition to tax and other revenue to fund the country's operations.

6.4 Policy Recommendations and implications.

One of the objectives of the study is to provide policy recommendations based on the results. These are given below:

The study revealed that an increase in public debt causes a decline in economic growth in the short and long run and the relationship is statistically significant. Therefore, public debt has negative impact on economic growth in South Africa. This entails that managing public debt levels is crucial for maintaining sustainable economic growth hence the government should keep public debt more manageable, hence South Africa should improve its debt management as this would make the nation more competitive and efficient in different sectors.

The study also revealed a significant inverse relationship between investment and economic growth. This means that investment negatively impact economic growth. This suggests that during the study period, investments may have been inefficient or misallocated, possibly due to poor investment choices or economic instability. This observation entails that the quality of investment is crucial for economic growth. In economies where investments are directed towards unproductive sectors or are subject to high levels of inefficiency and corruption, the expected positive impacts on growth may not materialize. Moreover, economic instability can lead to underutilization of capital and resources, further dampening the growth effects of investment. Therefore, it is essential for policymakers to focus not only on the quantity of investment but also on improving its quality and ensuring a stable economic environment.

Also, the research revealed that government expenditure positively impacts economic growth. However, the impact is not significant. While the positive sign suggests that higher government expenditure could boost GDP growth, the lack of statistical significance prevents definitive conclusions. Government expenditure can drive economic activity, according to Keynesian economic theory, especially when private sector demand is weak. However, the effectiveness of government spending depends on its efficiency and the sectors in which it is invested. In this study, the non-significant results might indicate inefficiencies or the presence of offsetting negative factors, such as high levels of corruption or misallocation of resources. Hence the government should reduce corruption by effectively implementing rule of law, thus punishing those found breaking the law through corruption or misallocation of funds.

6.5 Contributions of the study

The study's findings are not the only important additions; it also provides a detailed explanation of the various causes that have contributed to South Africa's debt's ongoing increase. This is very crucial because it provides the state, policy makers, economists and other economic participants an idea of focus areas when planning, budgeting and in financial decision-making process.

6.6 Delimitations of the study and avenues for future research

Since this study has been noted to employ time series data, using panel data may yield different results. Conducting such a study with panel data would be beneficial. The study focused only on the years 1990–2022, therefore, any variables and events that may have altered data after the aforementioned time are not included. The ARDL technique was also utilized in the study to achieve the intended outcomes. Various models may be taken into consideration in future studies, which might lead to different findings.

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Appendix.

Data utilised

Year	GDP	PDT	GEX	INV
1990	-	32.397195	17.58885342	18.23124
1991	0.317760427	33.9135908	17.66995232	17.83549
1992	-	36.9022311	17.90055855	15.71455
1993	1.018244968	39.9507721	18.12056098	14.16121
1994	-	44.8169697	18.18886888	16.4705
1995	2.137032845	44.868619	16.52693035	17.70001
1996	1.233557939	44.2298759	17.4247249	16.5684
1997	3.200000003	43.175546	17.49187682	16.2941
1998	3.100000001	44.6542618	17.10002618	16.42789
1999	4.299999997	42.1780316	16.81053119	15.65505
2000	2.600000001	37.9	16.56721541	15.06028
2001	0.5	38	16.62185122	14.57378
2002	2.399999997	31.8	16.78038803	15.03612
2003	4.200000001	31.5	16.86632097	15.65711
2004	2.7	30.7	17.00443898	16.96035
2005	3.700374404	29.6	16.14889853	16.83182
2006	2.949075468	28	15.86074039	18.4902
2007	4.554559907	24.3	15.88649786	19.32597
2008	5.277051973	24	17.07245382	21.28725
2009	5.603806459	27	17.79363314	18.76694
2010	5.360474054	31.2	17.9960636	17.59564
2011	3.191043886	34.7	18.19514319	18.85324
2012	-	37.4	18.82054526	18.58454
2013	1.538089135	40.4	19.08137455	19.16876
2014	3.039732881	43.3	19.31406259	18.48796
2015	3.168556279	45.2	18.98507133	18.63321
2016	2.396232385	47.1	19.30756165	16.96045
2017	2.485468008	48.6	19.23607713	16.61073
2018	1.413826452	51.5	19.35222614	16.17058

	2019	1.321862237	56.1	19.58008004	15.82079
	2020	0.664552308	68.9	20.57489356	12.53754
	2021	1.157946951	68.8	19.35132338	13.04499
	2022	1.556783847	71.1	19.14687508	15.37876
		0.259935577			
		-			
		5.963358183			
		4.703062064			
		1.910406169			

Descriptive statistics

	GDP	PDT	GEX	INV
Mean	2.059813	41.03597	17.88990	16.81501
Median	2.485468	39.95077	17.79363	16.61073
Maximum	5.603806	71.10000	20.57489	21.28725
Minimum	-5.963358	24.00000	15.86074	12.53754
Std. Dev.	2.420415	12.02397	1.223760	1.897038
Skewness	-1.148411	0.994104	0.178127	-0.100003
Kurtosis	4.974186	3.665261	2.073106	2.952401
Jarque-Bera	12.61260	6.043877	1.355817	0.058119
Probability	0.001825	0.048707	0.507678	0.971359
Sum	67.97382	1354.187	590.3666	554.8955
Sum Sq. Dev.	187.4691	4626.427	47.92283	115.1601
Observations	33	33	33	33

Correlation matrix

	GDP	PDT	GEX	INV
GDP	1	0.5566114148347421	0.6233240761233549	0.6684110637722145
PDT	0.5566114148347421	1	0.9720486647793746	0.9360343202871676
GEX	0.6233240761233549	0.9720486647793746	1	0.9899625138675029
INV	0.6684110637722145	0.9360343202871676	0.9899625138675029	1

VAR Lag selection criteria

VAR Lag Order Selection Criteria

Endogenous variables: GDP PDT GEX INV

DUMMY

Exogenous variables: C

Date: 11/26/24 Time:

21:42

Sample: 1990 2022

Included observations: 29

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-265.6950	NA	88.17906	18.66862	18.90436	18.74245
1	-149.2256	184.7445*	0.165514	12.36038	13.77483*	12.80337

2	-130.5032	23.24160	0.302212	12.79332	15.38647	13.60546
3	-92.48861	34.08203	0.201434	11.89577	15.66762	13.07706
4	-28.45288	35.33005	0.04669 1*	9.20364 7*	14.15420	10.7541 0*

* 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

Long run form and Bounds test

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GDP)
Selected Model: ARDL(1, 4, 4, 3, 4)
Case 2: Restricted Constant and No Trend
Date: 11/26/24 Time: 22:05
Sample: 1990 2022
Included observations: 29

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.198565	10.09064	0.713390	0.4959

GDP(-1)*	-0.712964	0.281121	-2.536147	0.0349
PDT(-1)	-0.320303	0.065359	-4.900662	0.0012
GEX(-1)	1.592394	0.627129	2.539180	0.0348
INV(-1)	-1.187599	0.273845	-4.336756	0.0025
DUMMY(-1)	-0.446478	0.616632	-0.724058	0.4897
D(PDT)	-0.836895	0.133748	-6.257256	0.0002
D(PDT(-1))	0.408805	0.173595	2.354936	0.0463
D(PDT(-2))	0.301849	0.101349	2.978301	0.0176
D(PDT(-3))	-0.111808	0.144823	-0.772034	0.4623
D(GEX)	1.036788	0.612276	1.693334	0.1288
D(GEX(-1))	-0.957802	0.467700	-2.047898	0.0748
D(GEX(-2))	-0.025257	0.454960	-0.055514	0.9571
D(GEX(-3))	-0.636637	0.399575	-1.593285	0.1498
D(INV)	-0.137596	0.254464	-0.540729	0.6034
D(INV(-1))	-0.042100	0.212100	-0.198490	0.8476
D(INV(-2))	0.419753	0.159135	2.637718	0.0298
D(DUMMY)	-1.649674	0.948773	-1.738745	0.1203
D(DUMMY(-1))	0.817178	1.285454	0.635712	0.5427
D(DUMMY(-2))	-5.040808	1.234421	-4.083541	0.0035
D(DUMMY(-3))	-1.550264	1.330000	-1.165612	0.2773

* p-value incompatible with t-Bounds distribution.

Levels Equation

Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PDT	-0.449255	0.189772	-2.367338	0.0454
GEX	2.233486	1.533088	1.456855	0.1833
INV	-1.665722	0.779722	-2.136303	0.0652
DUMMY	-0.626228	1.023093	-0.612093	0.5575
C	10.09668	12.09985	0.834447	0.4282

EC = GDP - (-0.4493*PDT + 2.2335*GEX -1.6657*INV -
0.6262*DUMMY +
10.0967)

F-Bounds Test			Null Hypothesis: No levels relationship	
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	5.889881	10%	2.2	3.09
k	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37
			Finite Sample: n=35	
Actual Sample Size	29	10%	2.46	3.46
		5%	2.947	4.088
		1%	4.093	5.532
			Finite Sample: n=30	
		10%	2.525	3.56
		5%	3.058	4.223
		1%	4.28	5.84

Error Correction Model

ARDL Error Correction Regression

Dependent Variable: D(GDP)

Selected Model: ARDL(1, 4, 4, 3, 4)

Case 2: Restricted Constant and No Trend

Date: 11/26/24 Time: 22:19

Sample: 1990 2022

Included observations: 29

ECM Regression

Case 2: Restricted Constant and No Trend

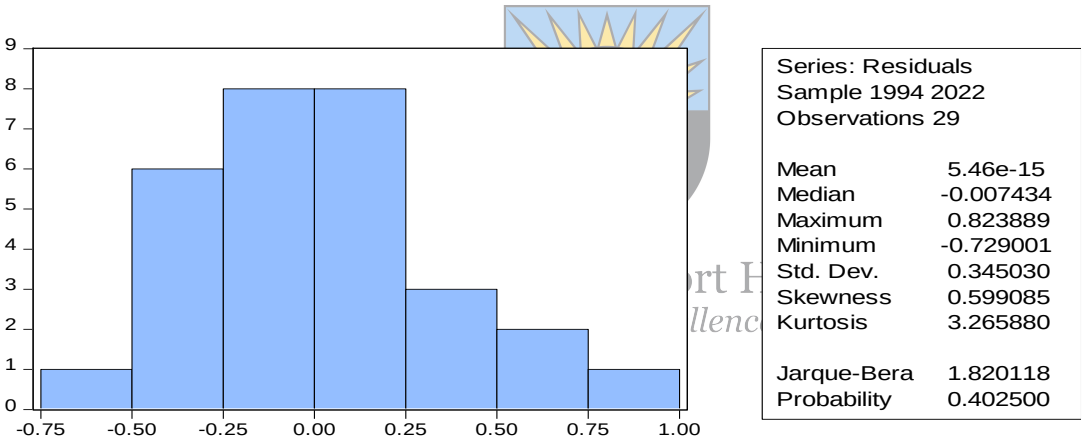
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PDT)	-0.836895	0.060839	-13.75592	0.0000
D(PDT(-1))	0.408805	0.081450	5.019105	0.0010
D(PDT(-2))	0.301849	0.067990	4.439641	0.0022
D(PDT(-3))	-0.111808	0.061522	-1.817364	0.1067
D(GEX)	1.036788	0.264425	3.920915	0.0044
D(GEX(-1))	-0.957802	0.251705	-3.805261	0.0052
D(GEX(-2))	-0.025257	0.274307	-0.092074	0.9289
D(GEX(-3))	-0.636637	0.236576	-2.691048	0.0275
D(INV)	-0.137596	0.110828	-1.241528	0.2496
D(INV(-1))	-0.042100	0.143915	-0.292531	0.7773
D(INV(-2))	0.419753	0.099540	4.216914	0.0029
D(DUMMY)	-1.649674	0.645007	-2.557608	0.0338
D(DUMMY(-1))	0.817178	0.624242	1.309072	0.2269
D(DUMMY(-2))	-5.040808	0.664070	-7.590781	0.0001
D(DUMMY(-3))	-1.550264	0.887033	-1.747696	0.1186
CointEq(-1)*	-0.712964	0.094083	-7.578017	0.0001

R-squared	0.986062	Mean dependent var	0.023340
Adjusted R-squared	0.969980	S.D. dependent var	2.922539
S.E. of regression	0.506366	Akaike info criterion	1.777986
Sum squared resid	3.333280	Schwarz criterion	2.532356
Log likelihood	-9.780803	Hannan-Quinn criter.	2.014246
Durbin-Watson stat	2.249299		

* p-value incompatible with t-Bounds distribution.

F-Bounds Test			Null Hypothesis: No levels relationship	
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	5.889881	10%	2.2	3.09
k	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

Normality



Serial Correlation

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.620430	Prob. F(1,7)	0.4567
Obs*R-squared	2.361082	Prob. Chi-Square(1)	0.1244

Heteroskedasticity

Heteroskedasticity Test: White

F-statistic	0.749264	Prob. F(20,8)	0.7167
Obs*R-squared	18.90659	Prob. Chi-Square(20)	0.5279
Scaled explained SS	1.630062	Prob. Chi-Square(20)	1.0000