

What fiscal policy measures are associated with higher economic growth in South Africa? With specific reference to spending and taxation

A Research Report submitted in partial fulfilment of the Degree of Master of Commerce (Applied Development Economics) in the School of Economics and Finance, University of the Witwatersrand by Siyasanga Qomoyi Student No: 832427

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Word count: 18 580

31 March 2022

Abstract

This paper investigated fiscal policy measures that impact economic growth by testing variables such as expenditure, personal income tax (PIT), corporate income tax (CIT), government debt and household consumption expenditure from 1994 to 2019. The study employed the Vector Autoregressive Model (VAR) for short-run and the Vector Error Regression Model (VEMC) for long-run models for model 1 and model 2 since there was more than two cointegration in the models. The study employed the Ordinary Least Squares (OLS) for model 3 since there was no cointegration. The findings indicated that the variables have varying effects on private investment and economic growth in the short run. At the same time, an increase in debt will likely increase expenditure in the long run. A decreased household consumption expenditure would likely increase economic growth in the long run. There is a significant negative relationship between corporate tax and economic growth. The study further provides recommendations.

Keywords: Fiscal policy, taxation, government expenditure, private investment and economic growth.

Declaration

I Siyasanga Qomoyi declare that this is my own work, that it has not been submitted for any degree or examination in any other university. It is submitted in partial fulfilment for the degree, Master of Commerce (Applied Development Economics) at the University of the Witwatersrand, Johannesburg.

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Signature

Acknowledgements

Firstly, I would like to acknowledge and thank God for giving me the strength and the ability to complete this work. God is always good and His mercies truly endure forever.

I would like to acknowledge and extend my gratitude to my supervisor Dr Gilad Isaacs for showing interest in my work and for providing guidance in completing this writing project. I would like to thank my mother Nombeko Qomoyi, my sisters, Ntombozuko Magxala and Landezwa Magxala for their prayers and support. I would also like to thank my cousins, Unathi Silo, Thembakazi Silo and Zandile Silo for motivating me and for being my biggest cheerleaders. I would also like to thank my friend and dear sister Katherine Love for her immense support and love. I would like to extend a heartfelt thank you to the Kopkowski and Love family as a whole.

Thank you to all my amazing friends for their support and love, for cheering me on, for lifting me up in prayer and for checking up on me. Thank you for the encouragement and support. I appreciate and love all of you so much.

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CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1 Introduction and background of the study

Economic growth forms part of South Africa's long-term developmental objectives. The post-1994 government focused on making reforms in the country's fiscal environment, this was evident in the adoption of the budgeting system, which forms part of the country's public finance management systems. South Africa's Mid-Term Budget Policy Statement (MTBPS) communicates the national fiscal policy stance and outlines fiscal policy goals. The 1998 MTBPS stipulated that government's fiscal policy supports the fiscal policy reforms of the country's economy, which are aligned with the objectives of long-run economic growth (employment creation and equitable income distribution). The National Development Plan (NDP) (2012) also upholds the long term developmental objectives, as it aims to accelerate economic progress over 20 years and to address the low growth trajectory the country has been experiencing. One of the solutions the NDP proposes is to use fiscal policy to increase savings and investment and to reduce consumption expenditure by government.

The South African government spends more than what it receives in revenue, this unsustainable fiscal position developed during the time of the 2008 financial crisis (National Treasury, 2021). The GDP levels did not return to pre-2008 growth levels and fell behind other developing economies (National Treasury, 2021). After averaging 0.6 percent of GDP in the 2000/09 period, the fiscal deficit increased to 3.1 percent in the 2010/18 period and reached 5.7 percent in 2019 prior to the COVID-19 pandemic. At the same time, the country's spending increased significantly due to interest payments, as well as other expenditures. In addition, the country's budget has not been able to adjust to the declining fiscal space - sluggish economic growth has not matched up to the increasing expenditure, thus resulting in widening deficits (The World Bank, 2021). The World Bank (2021) also reflected on South Africa's recovery from COVID19 and reported that South Africa experienced fiscal revenue constraints due to weak economic growth even though the country had a comparatively high and stable revenue collection - at over 29 percent of GDP. This study intends to investigate how fiscal policy measures can be explored to achieve desired growth.

1.2 Significance of the study within the current South African context

Fiscal policy, as a component of macroeconomics, is an important tool to promote economic stability as well as to address structural and developmental issues. The impact of how fiscal policy is implemented is a fundamental issue to investigate, particularly in a developing country

such as South Africa, where economic growth is linked to developmental issues such as unemployment, poverty and inequality.

The study is undertaken in the context of significant developmental challenges in South Africa. The official unemployment rate in South Africa rose by 0.5 percentage points (34.9 percent) in the third quarter of 2021 compared to the previous quarter (34.4 percent), reaching the highest recorded unemployment rate since the first Quarterly Labour Force Survey (QLFS) in 2008 (Statistics South Africa, 2021). The high unemployment rate reflects the poor economic prospects in the country, since employment amongst other factors is dependent on economic growth (Altman 2003) based on Okun's law. Okun's law states that there is a negative correlation between changes in the real GDP growth rate and unemployment in the long run (Daly and Hobijn, 2010; Levine, 2013; Smith, 1974). This means that an increase or decrease in GDP causes a corresponding opposite change in unemployment the unemployment rate.

South Africa's economic growth trajectory was poor before COVID-19 and worsened in its wake. According to Statistics South Africa (2020), the South African economy experienced two consecutive quarters of recession in 2019. Furthermore, South Africa's GDP declined by 1.4 percentage points in the fourth quarter of 2019, following a contraction of 0.8 percentage points in the third quarter (Statistics South Africa, 2020). South Africa's economic recovery and reconstruction plan highlighted that the economic crisis of the country was worsened by the COVID-19 pandemic, resulting in job losses, loss of income, growing inequality and poverty. Furthermore, the increasing unemployment rate reflects the unfavourable economic environment and high levels of economic inactivity, which was worsened by the lockdown restricts due to the COVID-19 pandemic (Statistics South Africa, 2021). The social unrest which occurred in July 2021 resulted in the closing down of some businesses and negatively affected output and employment. The economic recession persisted in the first quarter of 2020 and South Africa's real GDP contracted at an annual rate of 2.0 percent (South African Reserve Bank, 2020). Regarding the effects of the COVID-19 lockdown restrictions and the resulting negative impacts on the country, the South African recovery and reconstruction plan emphasised that the economic interventions required would have to match or surpass the disruptions cause by the pandemic.

Considering the state of the country's economy and the current fiscal position, this paper seeks to investigate fiscal policy measures that results in significant economic growth. Furthermore, the paper seeks to contribute to the continuous debates and attempts to explore how fiscal policy can be used to effectively spur economic growth.

1.3 Objectives and research questions

Given the above background and the stated significance, the objective of the study is to explore fiscal policy measures that are associated with significant economic growth in South Africa over a twenty five-year period (1994 to 2019). The study objective is to:

- Investigate whether the level of government expenditure affect private sector investment
- Examine whether the level of taxation affects government spending and economic growth

1.4 Research questions

These objectives are achieved by examining the following questions:

- 1. Does an increase or decrease in the level of government spending affects private sector investment?
- 2. Does an increase or decrease in the level of taxation affects government expenditure and economic growth?

1.5 Layout of the study

The paper is organised in six chapters, Chapter One provides the background and introduction and the significance as well as the objectives of the study. Chapter Two gives a review of the literature on economic theories regarding the relationship between fiscal policy and economic growth, and also provides a review of empirical studies. Chapter Three provides and overview of South Africa's fiscal policy. Chapter Four outlines the methodology and model specification. Chapter Five provides the empirical results and Chapter Six provides the conclusions and recommendations.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter outlines economic growth theories, as well as an overview of the empirical studies that reflect and provide evidence on the correlation between fiscal policy and economic growth. The theoretical summary outlines the standpoints of the Keynesian, Neoclassical and the Endogenous growth theory schools, concerning the effect of fiscal policy measures on economic growth. The key arguments outlined in the Keynesian growth theory include arguments of aggregate demand as a stimulant for growth. The key elements of the Neoclassical growth theory outline the negative impacts of government spending and debt on private investment and economic growth through the interest rate effects. The Endogenous growth theory highlights the effects of 'distortionary' and 'non-distortionary taxes' as well as 'productive' and 'unproductive spending' on economic growth. The empirical literature summarises various studies that have provided evidence concerning the effects of fiscal policy on economic growth, with different variables included in the analysis. Some of the empirical studies also attempt to prove the arguments of the economic growth theories discussed in this paper.

2.2 Theoretical literature: theories of economic growth

2.2.1 Keynesian Growth Theory

The Keynesian theory promotes government intervention and suggests that markets are not stable or efficient, nor on their own, lead to full employment. Jahan, Mahmud and Papageorgiou (2014), assert that during the Great Depression of the 1930s, theories that existed could not give reason to the cause of the severe global economic downfall or present suitable policy solutions to accelerate production and employment. The prevailing notion that free markets would automatically provide full employment was overturned by Keynes's economic thinking, that aggregate demand, which is measured by the aggregate of expenditure by households, businesses and government, is the most significant driving mechanism in an economy (Jahan, et al., 2014). Aggregate demand is one of the main premises of the Keynesian growth theory, any fluctuations in the expenditure components is considered to have an a short run impact on (Keynes, 1936).

According to Arestis, Filho and Bittes Terra (2018), the role of fiscal policy according to Keynesians, is to pursue economic growth as well as wealth and income distribution, but fiscal policy must be implemented over time to avoid peaks and slumps and avoid a lack of

confidence from entrepreneurs. Entrepreneur uncertainty may result in the demand for money instead of capital goods, resulting in insufficient effective demand. Keynesian fiscal policy affects aggregate demand, particularly on consumption and investment and is the government's main economic intervention, with tax policy and government expenditure being the main anchors (Arestis, et al., 2018). Thus, it is argued that government intervention through the implementation of macroeconomic controls such as fiscal policy variables (government expenditure, taxation and debt), directly impacts effective demand – substituting reduced private expenditure and preventing insufficient aggregate demand (Arestis, et al., 2018).

In the Keynesian perspective, a large share of the population is considered to be liquidity constrained and have significantly high propensities to consume out of their disposable income (Bernheim, 1989). Thus, temporarily reducing tax presents an instant and quantitatively significant impact on aggregate demand (Bernheim, 1989). Furthermore, the underemployment of resources raises national income, resulting in second round effects and the Keynesian multiplier. Deficits are considered to stimulate consumption as well as national income and should not affect saving and capital accumulation. Therefore, timed deficits are considered to have beneficial consequences (ibid. p.56). Fiscal deficits achieved by tax reductions or high public spending could effectively counteract recessions as the change in government spending or levels of taxes affects aggregate demand (Vladimirov & Neicheva, 2008). While Keynesians highlight the importance of government intervention to stimulate demand in order to promote growth, proponents of the Neoclassical growth theory argue against government intervention.

2.2.2 Neoclassical Growth Theory

The Neoclassical growth theory advocates for limited government intervention to achieve economic growth. The essence of fiscal policy in the Neoclassical growth theory considers the effect of government spending on aggregate supply (Rao, 1975). Fiscal policy affects the motivation to save or invest in new capital as it changes the equilibrium capital output ratio, thereby affecting the output path but not its slope (Bleaney, et al., 2001). From the Neoclassical growth theory standpoint, engaging in fiscal stimulus by increasing spending or reducing tax revenue requires the government to increase the size of its deficits and borrow money to finance the stimulus. This in turn may result in an increase in interest rates, subsequently decreasing investment, and consumer spending, which may offset the increase in economic activity spurred by the stimulus (Weinstock, 2021). Regarding the mechanism between government deficits or government borrowing and interest rates, Gamber and Seliski (2019) explains that in the Cobb-Douglas production function, an increase in government debt results in a decrease

in private capital, which results in an increase in the marginal product of capital and subsequently increases the real inflation adjusted interest rate. Gbenga (2015) further explains that the increase in interest rates occurs when an increase in government capital spending is supported by borrowing.

Makin (1998) asserts that fiscal activism is considered to be counterproductive as a macroeconomic stabilisation tool under certain circumstances and suggests that a reduction in public spending can present an expansionary effect on an country that is significantly integrated with international goods, services and assets markets (Makin, 1998). According to Halkos and Paianos (2005), the growing size of government spending results in the allocation of resources through political rather than market mechanisms, thus diminishing long-run growth. Long-run growth is also affected by diminishing returns of government expenditure. Fiscal policy is considered to only have temporary effects on growth and in the long run, the economy increases at the exogenously determined rate of technological process (Halkos & Paianos, 2005). The Solow growth theory maintains that sustained long-run economic growth is attainable through technological progress. In addition to technological progress as a catalyst for growth, the saving rate has an influence on growth (Solow, 1956).

While Keynesians suggest that deficits have a substantial impact on aggregate demand, the Neoclassical growth theory holds the view that budget deficits increase interest rates which results in the 'crowding out' of private investment, as the private sector borrows less at higher interest rates (Carrasco, 1998). In contrast, the Keynesian growth theory assumes that the interest rate sensitivity of investment is insignificant, and that expansionary fiscal policy results in little or no increase in the interest rates. Bernheim (1989) supports the view of the inverse correlation between budget deficits and private investment and argues that the immediate effect of deficits on aggregate demand is probably less significant than the impact anticipated by most Keynesians. Bernheim (1989) further explains that budget deficits increase total consumption by moving taxes to the next generation. Additionally, fully employing resources suggests decreased savings, rising interests to balance capital markets, thus ultimately resulting in the 'crowing out' of private capital accumulation (Bernheim, 1989). Baker (2010) states that fiscal changes in the form of high taxes and/or reduced government expenditure will decrease government's demand for the economy's resources and will result in lower interest rates, enabling the private sector to make better use of the resources. Thus, the increase in private consumption prompted by lower interest rates, promotes domestic investments and consumption.

2.2.3 Endogenous Growth Theory

The endogenous growth theory provides an explanation of the effects of factors such as human capital, fiscal policy and the environment on economic growth (Vsetickova, 2017). Furthermore, the endogenous growth theory suggests that the long-run economic growth primarily relies on policy measures which have significant consequences on openness, competition, change and innovation. Nikos (2009) explains that endogenous growth models classify fiscal policy instruments into 'distortionary taxation' - which decreases the incentives to invest in physical or human capital, resulting in the reduction of growth, as well as 'nondistortionary taxation' - which has no effect on investment incentives and growth due to the nature of the utility function for private agents.

In distinguishing between 'distortionary' and 'non-distortionary taxation', Ugwunta and Ugwuanyi (2015) explain that a distortion is a departure from the allocation of economic resources from the state in which each agent maximises his or her own welfare. An example of 'distortionary taxation' includes proportional wage-income tax. Taxes on income, payroll and workforce profits, capital gains, as well as taxes on property, inheritance, capital and financial transactions lower the incentive to invest in physical or human capital and therefore discourage growth (Ugwunta & Ugwuanyi, 2015). A 'non-distortionary tax' is a lump-sum tax which is a fixed amount regardless of change in circumstances of the taxed entity. Such lump-sum taxes include direct taxes such as sales tax custom and excise taxes, which do not inhibit investment on physical or human capital and therefore have a neutral effect on economic growth (Ugwunta & Ugwuanyi, 2015).

Secondly, spending is classified as 'productive' if it positively influences the marginal product of private capital, which then enhances growth. 'Non-productive spending' is considered to not have an effect on the private marginal product of capital or result in growth, but directly increases household utility (Nikos, 2009). Additionally, the estimations of the Endogenous growth model are that an increase in 'productive spending' financed by 'non-distortionary taxes' will result in an increase in growth while the effects of 'distortionary taxes' is unclear. On the other hand, an increase in 'non-productive spending' financed by 'non-distortionary taxes' will have a neutral effect on growth, however, the use of 'distortionary taxes' on the impact on growth may be negative (Nikos, 2009). While the Neoclassical growth theory argues that 'distortionary taxation' and 'productive spending' may affect the incentive to invest in human or physical capital, but only affects the equilibrium factor ratios and not the growth rate in the long run, endogenous models predict that 'distortionary taxation' and 'productive spending' will affect the long-run growth rate (Bleaney, et al., 2001).

2.3 Empirical studies

This sub-section provides a summary of the empirical studies relating to fiscal policy and economic growth. The empirical studies present results from developed and developing countries – predominantly countries in the Organisation for Economic Co-operation and Development (OECD) and Sub-Saharan Africa (SSA). The studies provide varying results regarding the effect of the main fiscal variables (government spending, taxation and government debt) on economic growth. The studies chosen are also based on the economic growth theories that have been reviewed in the previous section.

2.3.1 Government spending and economic growth

Some of the studies reviewed attempt to prove that expansionary fiscal policy through government expenditure is beneficial for economic growth. Theoretical debates on the benefits of expansionary fiscal policy are based on the Keynesian growth theory, where the determinants of aggregate demand, including fiscal policy, can affect output and employment significantly (Halkos & Paianos, 2005). Symoom (2018) highlighted in her study that Keynesian economics recommend increasing government expenditure on public infrastructure and socio-economic activities to stimulate economic growth. The study determined the impact of government expenditure and tax revenue on economic growth in four South Asian developing countries – Sri Lanka, Pakistan, India and Sri Lanka and Bangladesh - using the Error Correction Model (ECM) and Autoregressive Distributed Lag (ARDL) model on panel and pooled cross-section time-series data. The findings indicated that neither government spending nor tax revenue significantly impacts the economic growth of these countries in South Asia. However, real investment was observed to have a significantly positive effect on real GDP growth (Symoom, 2018).

In examining the effect of taxation on growth, Booth et al. (2016) utilised data that primarily focused on government spending more than taxation as they explained that government spending determines the tax burden. They indicated that government spending often exceeds taxation and is then compensated by increased government borrowing. Government spending was therefore indicated as the main long-run determinant of the tax burden (Booth, et al., 2016). The endogenous growth theory proposes that the structure of government expenditure is a significant issue and if the objective is to stimulate growth, the emphasis should be on the more 'productive' items on the budget (Afonso & Furceri, 2010). According to Chu et al (2018), if

public expenditure on health, education and general public services prove to present more growth effects compared to other types of expenditure such as recreation and social protection as well as public order and safety, then they can be considered as 'productive'. According to Lucas (1988, cited in Afonso and Furceri 2010), public investment in education increases the level of human capital, and this can be considered as the key source of long-run economic growth. A study by Vsetickova (2017) also indicated that expenditure on education and health positively influences growth while spending on defence and social protection influence growth negatively. The analysis also indicated that education, general public services and health are 'productive' in nature while social protection and defence are 'unproductive' (Vsetickova, 2017).

A study by AL-Masaeed & Tsaregorodtsev (2018) investigated the effects of fiscal policy measured by government revenue, government expenditure, internal and external public debt on economic growth in Jordan. The study used a multiple linear regression and Ordinary Least Squares (OLS). The findings revealed that public expenditure has a statistically significant impact on economic growth. An increase in public expenditure results in an increase in economic growth since high public expenditure linked with a flexible and efficient production structure results in the optimum employment of human, natural, economic, financial and material resources. The exploitation of these resources, in turn, was found to increase income and GDP (Al-Masaeed & Tsaregorodtsev, 2018), which seems to support the endogenous growth theory. Other studies show that expansionary fiscal policy is harmful to economic growth, justified by the effects of expansionary fiscal policy on private investment which is based on the Neoclassical growth theory on budget deficits and interest rates. Alesina et al. (2002) estimated the impact of fiscal policy on investment in OECD countries. The results indicated that changes in government expenditure present a larger impact on private investment than changes in tax. The significant effects on private expenditure occur from changes in primary government spending, particularly government wages as they create wage pressures for the private sector.

2.3.2 Taxation and economic growth

Macek (2014) assessed the effect of individual types of taxes on economic growth by using regression analysis in OECD countries over a ten-year period. The effects of taxation were analysed on individual growth variables, which include capital formation and investment, human capital and technology and government spending. The findings indicated that the theoretical assumptions of the positive correlation between government spending and

economic growth supported by the Keynesian theorists, were not valid as the results showed that government expenditure reduces economic growth. The findings were associated with the existence of the 'crowding-out effect' and the structure of total government expenditure where 'unproductive spending' dominates (Macek, 2014). Ugwunta and Ugwuanyi (2015) conducted a study underpinned by the endogenous growth theory to determine the effects of 'distortionary' and 'non-distortionary taxes' on the economic growth of SSA countries. The findings showed that distortionary tax has a negative and significant impact while 'nondistortionary tax' has a positive and significant impact on economic growth in SSA (Ugwunta & Ugwuanyi, 2015). Evidence established by Abba and Klemm (2013) proved that the impact of corporate income tax on investment is no larger in developing countries compared to developed countries.

2.3.3 Government debt and economic growth

The connection between debt and economic growth has been investigated in academic research, while some scholars agree that debt and economic growth are negatively correlated, there is no consensus on the debt threshold. Reinhart and Rogoff (2009) argued that no negative correlation between debt and economic growth exists if the debt levels are low or moderate, however there is a negative correlation between debt and growth when the debt-to-GDP ratio is above 90 percent. They argued, the average growth rate falls by 1 percent for both developed and developing economies (Reinhart & Rogoff, 2010).

The findings of the study by Reinhart and Rogoff (2010) were criticised by Iron and Bivens (2010) firstly, on the basis that only the yearly growth and debt levels are considered and there is no consideration of other impacts over time or other dynamic relationships between debt and growth. Secondly, the 90 percent threshold relies on a basic correlation of high debt levels with low growth, but there is no evidence of the causality. Furthermore, the causality underlying the correlation between debt and growth could occur in the opposite direction, from low growth to high debt levels, rather than from high debt to low growth (Irons & Bivens, 2010). Herndon,

Ash and Pollin (2013) replicated Reinhart and Rogoff's study and attempted to verify the validity of the study. They found that the connection between public debt and growth among the advanced economies was inaccurately presented due to errors in coding, exclusion of data and unconventional weighting of summary statistics. The GDP growth rate for countries with a public debt-to-GDP ratio of over 90 percent was found to be 2.2 percent, instead of the 1 percent stated by Reinhart and Rogoff (2010). Moreover, there is non-linearity in the

correlation between public debt and GDP growth, but the non-linearity is between the 0 to 30 percent and 30 to 60 percent public debt-to-GDP category (Herndon, et al., 2013).

Cecchetti, Mohanty and Zamolli (2011) studied the influence of debt on economic growth in OECD countries, the observation was made on household, non-financial and government debt. The findings indicated that above a certain level, debt is not good for growth. The threshold for government debt that is detrimental to economic growth was observed to be 85 percent of GDP, while it was close to 90 percent for corporate debt, and approximately 85 percent for household debt (Cecchetti, et al., 2011). On the other hand, a study by Chudik et al (2015) explored the long-run impact of public debt on economic growth using a data sample on 40 advanced and developing countries. Evidence indicated that a universally applicable threshold effect in the link between public debt and economic growth does not exist. The results indicated that significant negative long-run effects of public debt accumulation on economic growth do exist, regardless of the threshold (Chudik, et al., 2015). A study by Balassone, Francese and Pace (2011) on the connection between government debt as a percentage of GDP and real per capita income growth in Italy indicated that a negative relationship exists between public debt and growth, and the effects of foreign debt are more significant compared to domestic debt. The effect of debt on capital growth was also tested, and the results indicated that debt presents a negative effect on capital growth (Balassone, et al., 2011).

The empirical literature reviewed includes an assortment of variables to assess their relationship with GDP. The studies are chosen on the basis that they include the variables that are included in this paper (government spending, gross fixed capital formation, personal income tax, corporate tax and as government debt). The studies were also chosen because they provide evidence on the Keynesian, Neoclassical and Endogenous growth theories, regarding fiscal policy measures and economic growth. The varying outcomes of the studies that have been reviewed may be attributed to the fact that the studies vary between high-income earning countries (OECD countries) as well as developing countries in Sub-Saharan Africa. The studies also used different estimation techniques and the authors proposed different theoretical assumptions in the studies.

2.3.4 South Africa empirical literature

Various studies have investigated the influence of government spending, taxation and government debt on private investment and economic growth in South Africa. Ocran (2011) examined the connection between fiscal variables such as government gross fixed capital formation, government consumption expenditure, tax expenditure and budget deficits. The

study used the vector regressive model and impulsive response function and the results showed that government consumption expenditure positively and significantly affects economic growth. Government gross fixed capital formation positively affects output, however, the size of the impact is less than that achieved by government consumption expenditure. Tax positively affects output growth, while the magnitude of the deficits on the other hand, had no impact on growth (Ocran, 2011).

In relation to government spending, which is enabled by tax revenue and government borrowing, a study by Bonga-Bonga and Mabejane (2009) evaluated the connection between the long-term interest rate and budget deficit in the context of the 'loanable-funds theory' of interest rates in South Africa. The study used the cointegration vector autoregressive method and the findings indicated that private investment in South Africa shows more sensitivity towards long-term interest rates than short-term interest rates. These findings are also comparable with Le Roux and Ismail (2004). This potentially implies that the 'crowing out' assumption of the Neoclassical growth theory does not necessarily apply in South African in the short run. Furthermore, the long-term interest rate is important for investment or consumption demands (Bonga-Bonga, 2010). Taylor (1995) explained that the long-run interest rate is an important variable to consider for long-term decisions which include investing in plant and equipment.

Ayadi and Ayadi (2008) investigated the influence of high external debt with its servicing requirements in Nigeria and South Africa applying the Neoclassical growth model, using Ordinary Least Squares (OLS) and Generalised Least Squares (GLS). The study considered variables including foreign debt stock, gross investment, exports, debt service variables, debt service indicators, real GDP as well as debt stock indicators. The findings indicated that debt servicing ratio exerts a negative impact on productivity and confirms the 'debt overhang' theory in Nigeria and South Africa. Unlike the other studies presented in the previous section, that have attempted to prove a certain debt threshold that hampers economic growth, the findings of this study did not specify a threshold at which the debt servicing ratio becomes harmful to economic growth. Public external debt as a percentage of GDP was found to be negatively correlated to growth in investment at an initial point and the relationship becomes reversed at some point, although the turning point cannot be determined in the study. The authors further highlight that external debt acquisition has a significant contribution to growth in investment at the initial period of acquisition, at its manageable size. However, up to a certain

point further debt acquisition discourages investment in both countries (Ayadi & Ayadi, 2008), but the turning point is not determined in the study.

Ngotana (2021) analysed the relationship between economic growth and public debt in South Africa. The study employed the VAR method to analyse the short-run and long-run relationship between economic growth and public debt and the study only considered GDP and debt, which includes domestic and external debt but did not consider other variables. The findings indicated that an increase in public debt causes a decrease in economic growth in the next period. The results from the impulse response function indicated that debt negatively affects GDP, meaning that economic growth decreases as debt increases (Ngotana, 2021). The concept of 'debt overhang' – the impact of debt servicing on investment has also been explored by scholars in their study on debt and economic growth. According to Sichuba's (2012) a high debt service burden causes future taxes on the private sector to increase and decreases private investment. Additionally, the 'debt overhang' deteriorates economic performance by altering the value or quality of investments (Sichuba, 2012). However, this view is not empirically tested in the study.

An empirical study by Saungweme and Odihiambo (2021) tested the effect of the public debt service on economic growth in South Africa from the period 1970-2017. The results indicated that no statistically significant correlation exists between public debt service and economic growth in South Africa, regardless of whether the estimations are performed in the long run or in the short run (Saungweme & Odhiambo, 2021). Baaziz et al (2015) investigated the connection between public debt ratio and real GDP growth in South Africa and found that the correlation between public debt and real GDP growth is dependent on the level of the country's indebtedness. The threshold level that causes the positive relationship between public debt and growth turn negative was 31.3 percent. Once the accumulated public debt goes beyond this threshold, the effect on the performance of South Africa's economy becomes negative and statistically significant (Baaziz, et al., 2015).

2.4 Conclusion

The empirical studies have tested the impact of expansionary fiscal policy on the Keynesian theory of growth, however, some of the country studies indicated that government expenditure and revenue do not necessarily have a significant effect on growth. Studies that have explored fiscal policy through the Endogenous growth theory have highlighted how 'productive' government spending has more significant effects on economic growth compared to other types of spending. The studies provided evidence regarding what is considered 'productive' and

'unproductive', showing that government expenditure on education, health and general public services is considered to be more 'productive'. These studies explained that these types of spending are deemed to have more effects on factors such as human capital, which then contributes to growth. The studies also indicated that 'distortionary' and 'non-distortionary taxes' have different effects on economic growth. The Endogenous growth theory provides a better perspective of government spending and taxation because the theory focuses on the type of government expenditure and taxation that either enhance or decrease growth. The South African empirical studies indicated that government consumption expenditure in South Africa is positively correlated to economic growth.

Other studies based on the Neoclassical growth theory provided mixed results of the detrimental effect of government spending, taxation and government debt on economic growth. South African empirical literature concerning the correlation between government and the debt servicing ratio indicated mixed results; the debt servicing ratio in some of the studies was shown to be negatively correlated to economic growth. Other studies indicated that there is no statistically significant correlation between government debt and economic growth, while others indicated that the negative correlation between government debt and economic growth depends on a certain debt threshold – that when government debt is accumulated up to a certain point, it discourages growth. Other studies show that a positive relationship exists between government debt and economic growth. What can be concluded from the studies regarding government debt is that there is no consensus in terms of the debt-to-GDP threshold that will lead to less detrimental effects on economic growth. There is no debt-to-GDP threshold that is universally applicable in developed and developing countries. Methodologies, datasets, the type of debt accumulated and bias in country selection can also result in the varying and flawed results regarding the effects and intensity debt has on economic growth. Therefore, this study seeks to contribute to the existing literature by providing an analysis of fiscal policy instruments on South Africa's economic growth. Secondly, the study contributes to existing literature by applying VAR and VECM models to investigate how fiscal policy measures influence economic growth in the short and long run.

CHAPTER 3: TRENDS IN FISCAL POLICY IN SOUTH AFRICA

3.1 Trends in government spending and borrowing post 1994

Significant reforms took place in South Africa's public expenditure management system since the mid-1990s (Folscher & Cole, 2006). Horton (2006) states that fiscal adjustment phases in South Africa can be divided in three phases, the initial two phases paid attention to building policy credibility and the last phase focused on modest stimulus approaches through tax relief and increased social spending (Horton, 2006). The initial consolidation took place in the 1993/96 period in support of the political transition (Horton, 2006), the transition was characterised by comparatively high deficits and a stable rise in public debt (to almost 50 percent of GDP in the 1996/97 period).

Reforms such as fiscal consolidation, maintaining steady levels of debt and reducing the budget deficit (which was intended to reduce interest rates), as well as improving fiscal sustainability and making resources available for social, developmental and infrastructure took place during the 1997 to the early 2000s (Folscher & Cole, 2006). The 1996/98 period was also a period of policy reinforcement, with the adoption of the Growth, Employment and Redistribution (GEAR) programme in 1996, as well as institutional reforms. During the 1999/2003, period deficits were reduced to below 3 percent of GDP and public debt was on a declining path (Horton, 2006). These macroeconomic reforms in South Africa were also aligned with international economic policies such as the Washington Consensus, with its recommendations including inter alia, fiscal discipline, reordering public expenditure and tax reform (Williamson, 2008).

South Africa adopted the Mid-Term Expenditure Framework (MTEF) budgetary process in the 1999/2000 Budget (National Treasury, 2021). The budgeting process in the MTEF started with the revision of the macroeconomic variables, such as the GDP and inflation over the medium term, as well as fiscal policy targets. The fiscal targets since the launch of the MTEF have involved the reduction of the tax burden, public debt as a percentage of GDP, general government dissaving, and increasing public fixed investment expenditure (Folscher & Cole, 2006). Furthermore, expenditure in the main budget framework is a function of what is determined by the targeted ratio of tax and GDP as well as the perceived affordable level of borrowing (Folscher & Cole, 2006). Over the decade from 2001, the spending in the country increased at a real rate of 7 percent each year on average. The

period was also characterised by the easing of tax; the corporate income tax was lowered from 40 percent to 28 percent between 1994 and 2009, and the top rate on personal income was lowered from 44 percent in to 40 percent in 2002 (Sachs, 2021).

During the 2008 financial crisis, South Africa adopted a counter cyclical fiscal policy, resulting in increased deficits to counter the effects of the financial crisis. The country experienced a downward economic growth trend, characterised by shortfalls in tax revenue which were not accompanied by adjustments in spending growth, thus resulting in the widening of the budget deficit, increased borrowing and an increased debt-to-GDP ratio (National Treasury, 2021). The government continued to promote austerity measures in an attempt to reduce the budget deficit. The 2012 Budget Review indicated that the budget deficit of 4.6 percent projected in the 2012/13 period would be narrowed to 4 percent in the 2013/14 period and 3 percent in the 2014/15 period (National Treasury, 2012). Furthermore, the 2015 Budget review indicated that a budget deficit of 3.9 percent was anticipated for the 2014/15 period and would be narrowed to 2.5 percent in the 2017/18 period and the debt stock as a percentage of GDP would be steady at 43.7 percent in the 2017/18 period (National Treasury, 2015). However, it seems that the government falls short in keeping its debt target as the 2016 Budget Review indicated that the government anticipated for the budget deficit to decrease from 3.2 percent in the 2016/17 period to 2.8 percent in the 2017/18 period and further fall to 2.4 percent in the following year. The debt stock as a percentage of GDP was also estimated to be steady at 46.2 percent in the 2017/18 period (National Treasury, 2016), although the target was higher than the target stated in the 2015 Budget Review.

The 2021 MTPBS speech highlighted that the country's debt is increasing continuously. The increasing debt incurs debt service costs which are anticipated, from the year to follow, to be the largest portion of spending compared to other individual functions. The revenue cash flows from operating activities¹ amounted to R1.6 billion and the expense cash flow amounted to R1.8 billion, which resulted in a cash outflow from operative activities of R164 357 million in the 2019/20 fiscal year ending in March 2020 (Statistics South Africa, 2021). This indicates that the government spends more than what it receives in revenue, thus resulting in dissaving and a continuous cycle of deficit spending.

General public services (23.8 percent) was the main contributor to the total expenditure for operating activities and purchases of non-financial assets, followed by education (19.9

¹ Activities of the Department that are not investment or financial activities. National Treasury, 2015

percent), social protection (14.9 percent), health (11.4 percent), economic affairs (11.4 percent), public order and safety (9.3 percent), housing and community amenities (3.7 percent) defence (2.6 percent), recreation, culture and religion (2.4 percent) and environmental protection (0.8 percent) (Statistics South Africa, 2021). This implies that a relatively significant proportion of the spending in South Africa is designated towards what Endogenous growth theorists classify as 'productive' items or productive government spending. This is also due to the government's burden to deliver social and basic services to the larger proportion of low income and poor households in the country.

Table 3.1illustrates the South African government finances for the period 2020/21.² According to the SARB (2021), the largest contributor to government revenue in the 2020/21 fiscal year was personal income tax (PIT), followed by Value Added Tax (VAT) and corporate income tax (CIT). The revenue was 8 percent lower than the previous year and the 2020 budget projections, highlighting the consequences of the COVID-19 lockdown restrictions on domestic economic activity, such as job and income losses. Revenue generated from personal income tax was R488.1 billion, with VAT and corporate tax generating R331.2 billion and R204.4 billion respectively in fiscal year 2020/21.

Originally budgeted

Actual Fiscal 2020/21 fiscal 2020/21 Fiscal 2020/21 fiscal 2020/21

Revised estimates

Originally budgeted

	R	Percentag	R	Percentag	R	Percentag	R	Percentag
	billions	e change						
Revenue	1 236	-8.0	1 398	4.1	1 098	-18.3	1 352	9.3
Percentage of GDP	24.1		25.8		22.6		25.3	
Expenditure	1 788	5.8	1 766	4.5	1 806	6.9	1 834	2.6
Percentage of GDP	35.8		32.5		37.2		34.3	
Cash book								
balance	-552		-368		-708		-483	
Percentage of GDP	-11.0		6.8		-14.6		-9.0	
Primary balance	-320		-139		-475		-213	
Percentage of GDP	-6.4		-2.6		-9.8		-4.0	
Gross loan debt	3 936	20.7	3 562	9.2	3 974	21.9	4 383	11.4
Percentage of								
GDP	78.8		65.6		81.8		81.9	

Table 3.1 National government finances (2020/21)

Source: South African Reserve Bank, 2021

The revised estimates for the revenue-to-GDP ratio in the 2020/21 fiscal year was 22.6 percent, lower than the 25.3 percent originally budgeted ratio in the same period. This aligns with what

² As at March 2021

the International Monetary Fund (2005) deems to be a moderate revenue-to GDP ratio for emerging countries. According to the IMF, a tax ratio of 15 percent to increase revenue, requires an expansion of the tax base, which is difficult politically and technically for low to lower-middle income countries. On the other hand, a ratio close to 20 percent can provide more room for fiscal expenditures, where diminishing returns do not set in quickly and there is no evidence that it is detrimental for growth (International Monetary Fund, 2005).

The deficit of R552 billion in the 2020/21 fiscal year was due to low revenue and high expenditure compared to the previous fiscal year. The revenue shortfall reflected the consequences of the COVID-19 lockdown restrictions which lowered growth (SARB, 2021). The growing deficit over the past decade in South Africa has been accompanied by increasing debt service costs. The debt service cost was R232 billion in the 2020/21 fiscal year, 13.5 percent higher than the previous fiscal year. Debt service cost are also the fastest growing expenditure category (SARB, 2021).

South Africa fiscal policy uses a countercyclical fiscal policy at certain times to stabilise the economy. Countercyclical fiscal policy call for government deficits to increase during recessions and to be lower during booms (Swanepoel & Schoeman, 2003). However, government deficits are a persistent challenge in South Africa's fiscal policy. South Africa's fiscal policy has particularly prioritised fiscal sustainability, reducing the deficit to improve economic growth. Since the 2014 MTBPS, a fiscal consolidation strategy was introduced in response to the worsening deficit and budget outlook, to constrict the budget deficit, stabilise debt and restructure the fiscal space (International Monetary Fund, 2014). Fiscal consolidation has also been a priority due to particular pro-business interests in the economy, the expenditure ceiling was lowered by a cumulative of 0.6 percent of GDP over a period of two years not only to reduce the deficit and stabilise debt, but to also maintain investor confidence (International Monetary Fund, 2014), as well as to reduce the cost of doing business and support job seekers (National Treasury, 2021). Nonetheless, fiscal consolidation is considered to be self-defeating as efforts to consolidate results in lowered growth, resulting in higher instead of lower debt-to GDP ratios when considering fiscal adjustment on economic growth after the 2008 financial crisis (Fatas & Summers, 2018). Although fiscal policy, fiscal policy has limitations and is not a solution to South Africa's growth problems. Sacks (2021) states that South Africa's growth is significantly threatened by the fiscal position of the country. Available resources to provide public goods such as basic education, healthcare and criminal defence are constrained due to pressures of fiscal consolidation, although these public goods and services are important for a developing country such as South Africa.

3.2 Tax evolution in South Africa post 1994

The democratic transition in South Africa called for reforms in the tax system and structure. According to Nyamonogo and Schoeman (2007), the first phase of the tax reform included the period from 1994-1999 and included policy evaluations, investigations as well as reports by the Katz Commission which reviewed, among other reforms, the status of the tax system on issues such as gender, the tax base, tax thresholds, income brackets and tax rates. The second phase of the tax reform covered the period from the years 2000 and paid attention to widening the tax base and adjusting the tax system to adapt to international tax laws (Nyamongo & Schoeman, 2007). The aims of the reforms were in line with the government's tax policy aims to improve efficiency, lessen economic distortions related to the tax structure, to reduce the costs of investment, and to promote job creation as well as improve household spending power (Steenekamp, 2012). Tax reductions are supported by Neoclassical growth theory proponents, however, a reduction in taxes also limit government expenditure on items that contribute to long-term economic growth, such as education and investment in infrastructure.

Steenekamp (2012) compared South Africa's marginal personal income tax rates with countries in the Southern African Development Community (SADC) and found, the average top marginal PIT rate in SADC (30 percent) is lower than the marginal PIT rate in OECD countries (41 percent) and in South Africa (40 percent). In 2020, the OECD average top PTI rate was 42.6 percent and was 2.5 percentage points lower than in 2000 (OECD, 2021). Thus, PIT rates in South Africa were found to be comparable with the average for OECD countries. South Africa implements progressive income tax and PIT is payable up to 45 percent of taxable income above 1.6 million as shown in Table 3.2, which shows the rates for personal income tax for the period of 1 March 2021 to 28 February 2022.

Taxable income (R)	Rates of tax (R)
1 - 216 200	18% of taxable income
216 201 - 337 800	38 916 + 26% of taxable income above 216 200
337 801 - 467 500	70 532 + 31% of taxable income above 337 800
467 501 - 613 600	110 739 + 36% of taxable income above 467 500
613 601 - 782 200	163 335 + 39% of taxable income above 613 600
782 201 - 1 656 600	229 089 + 41% of taxable income above 782 200
1 6456 601 and above	587 593 + 45% of taxable income above 1 656 600

Table 3.2 PIT tax rates for the tax year (1 March 2021 – 28 February 2022)

Source: South African Revenue Services, 2021

According to Stennekamp (2012), tax levels and the composition of invariability differ between countries due to the varying history, development stage, the size of the tax base and the level of resource endowment. However, benchmarks can be set for tax reform and policy options based on inter-country comparisons and the scope of additional tax revenue in South Africa can be contextualised by comparing the total tax burden of the country to that of comparable countries (Steenekamp, 2012). Proponents of the Neoclassical growth theory support tax decreases based on the perceived positive effects on income. Gale and Samwick (2014) for instance, argue that tax cuts would increase the after-tax return to working, saving and investment and the result of this effect would be an increase in economic activity through substitution effects. On the other hand, the tax cut would increase the after-tax income individuals obtain from their present level of activities, which would lessen their desire or need to work, therefore resulting in the reduction of economic activity through income effects. However, if tax rate reductions are not financed by reduced government expenditure, tax reductions will result in an increase in government borrowing, which will consequently decrease long-term growth (Gale & Samwick, 2014). This argument however disregards the effects lower taxes may have on government expenditure. Given that the government receives revenue through taxes, lower taxes result to less available funds for the government spend on public goods and services, which can lead to substantially lower growth rates.

The corporate income tax rate in South Africa is payable at a rate of 28 percent (South African Revenue Services, 2021). The Davis Tax Committee report (2018) reviewed the efficacy of South Africa's corporate tax rate and indicated that arguments to reduce the CIT rates were based on South Africa's competitiveness compared to the country's trading partners, the United Kingdom and the United States of America and neighbouring countries such as Mauritius and Botswana, which have lower CIT rate compared to South Africa. The corporate tax rate in the United Kingdom for the year beginning 1 April 2021 is 19 percent, (PwC, 2021) that of the USA is 21 percent (Tax Policy Center, 2021), while the corporate tax rate in Mauritius (PwC, 2021) and Botswana is 15 percent and 22 percent respectively (PwC, 2021). Based on Neoclassical growth theory assumptions, McKensie, et al (1998) argue that the focus on CIT tax is due to the predominant concerns regarding the effect of taxes on capital accumulation and investment (McKenzie, et al., 1998), corporate taxes may also distort the organisational arrangement, financial structure and the dividend policy. Investment decisions regarding industry, asset mix, location, risk and timing may be impacted by variations in effective tax rates (Bird, 1996). Tax, however, may not be the main factor that determines investment and growth. According to Kinda (2014), various constrains and conditions may hinder investment

by foreign firms. Such constraints include poor infrastructure, inappropriate macroeconomic structural policies, unclear property rights and weak governance systems. These non-tax related restrictions should therefore be addressed through suitable macroeconomic or structural policies (Kinda, 2014).

3.3 Conclusion

South Africa's fiscal policy underwent reformations mainly to decrease public debt and the budget deficit. The reformations in South Africa's fiscal policy also include reductions in the corporate income tax rate and the top rate on personal income tax in the 1994 and 2009 period. The South African government has experienced increased government spending. However, the spending has not been matched by adequate revenue, thus resulting in deficit spending and a further widening of the budget deficit. Since the government adopts a countercyclical fiscal policy, exogenous factors such as the 2008/09 global financial crisis and the recent COVID-19 pandemic have contributed to increased government spending.

Personal income tax is the largest contributing tax to the government's revenue, and South Africa's PIT rate is comparable with the PIT tax rate in OECD countries. Tax reductions do result in more disposable income for households and may increase aggregate expenditure, all things being equal. However, a reduction in taxation reduces government expenditure and may affect growth, given that government would spend on items that contribute to long-term growth such as education and investment. In terms of corporate income tax, the literature indicated that there are other factors that impact private investment besides changes in the corporate income tax rate, these factors include infrastructure, structural policies and governance systems.

CHAPTER 4: METHODOLOGY AND MODEL SPECIFICATION

4.1 Introduction

This chapter presents the methodology, the model specification and the variables used in the study. The chapter also provides a discussion of the various estimation techniques used to analyse the data. The chapter also provides the data sources used for the purpose of this study.

4.2 Methodology

The study explores fiscal policy measures that, on the basis of the previous literature, might impact economic growth in South Africa. Thus, the study uses a quantitative approach to measure the statistical significance of the variables used. According to Goundar (2012), some strengths of the quantitative research method include accuracy through quantitative and reliable measures, that it can be controlled through sampling and design, and it can present causality statements through the use of controlled experiments. Additionally, statistical techniques can enable a refined analysis. On the other hand, the limitation of the quantitative approach is that it often presents banal and trivial results of minute significance because of the constraints on and the control of variables. Furthermore, it is unable to consider people's unique ability to interpret their experiences and create their own meanings (Goundar, 2012). The quantitative approach does not consider the shared meanings of social phenomenon (Denzin and Lincoln, 1998, cited in Rahman, 2017: 106) and the effects and meaning of contextual influences (Rahman, 2017). Although the quantitative approach presents these weaknesses, it is selected as the suitable approach for this study. The benefit of quantitative approach is that it can be replicated (Daniel, 2016). In addition, Lichtman (2013), cited in Daniel (2016), states that the quantitative method depends on hypotheses testing and the researcher can follow clear guidelines and objectives.

4.3 Model specification and variable description

The econometric model employed in this study is given in the following equations.

Model 1

$$GDP_{t} = \beta_{0} + \beta_{1} GovtSpendt + \beta_{6} Prvtinvt + \mu t$$
(1)

Where:

GDPt – Gross Domestic Product (at constant Local Currency Unit)

Govt borr – Government borrowing/debt (measured by gross loan debt as a percentage of GDP) μ_t – Error Term

Prvt Cons – Private investment (measured by Gross Fixed Capital Formation as a percentage of GDP)

Then, model 2 is expressed as

 $GDP_t = \beta_0 + \beta_1 GovtSpendt + \beta_3 pintaxt + \beta_5 corptaxt + \mu t$

(2)

Where: Govt Spend – Government spending (measured by expenditure on public goods and services as a percentage of GDP)

PIn Tax – Personal Income Tax rate (measured by the average tax rates for all income brackets)

Corp Tax – Corporate Income Tax rate (measured by the effective corporate income tax rate)

Model 3

 $GDP_t = \beta_0 + \beta_3 pintaxt + \beta_5 corptaxt + \mu_t$

(3)

Where: PIn Tax – Personal Income Tax rate (measured by the average tax rates for all income brackets)

Corp Tax – Corporate Income Tax rate (measured by the effective corporate income tax rate)

4.4 Estimation techniques

The study employed the Vector Autocorrelation (VAR) model and the Johansen cointegration and Vector Error Correction Model (VECM) as suitable estimation methods to evaluate the short and the long-run relationship between the variables.

4.5 Preliminary tests

4.5.1 Stationarity test

The VECM approach requires pre-testing for unit roots as well as the existence of cointegration vectors (Bhaskara Rao, 2005), thus stationarity tests are run to check for the stationarity of the

data. Stationarity, according to Gujarati and Porter (2009), is when a time series has a mean, variance and covariance that do not consistently vary over time. Using non-stationary variables in the regression analysis may result in a spurious or fake relationship between the variables (Granger & Newbold, 1973). Non-stationarity will be handled by performing the time series regression analysis on the first difference instead of the raw values.

The Augmented Dickey-Fuller (ADF) test is used to test the stationarity of the data and is an expanded version of the Dickey test as it consists of extra lagged terms of the dependent variable as a means to remove autocorrelation, which is determined by the Akaike information criterion (AIC) or the Shwarts Bayesian criterion (SBC) (Asteriou & Hall, 2011). The Phillips-Perron (PP) test is comparable with the ADF test, however, it includes an autocorrelated residual and it often offers the same results and presents similar limitations as the ADF test (Brooks, 2002). The nonparametric statistical approaches are used in the PP test to remove serial correlation in the error terms but does not add lagged difference terms (Gujarati and Porter 2009). The study thus, employs both the ADF and the PP stationarity tests.

4.5.2 Serial correlation

The error terms for the regression analysis are assumed to be uncorrelated, if the error terms are correlated there is serial correlation. The cause of serial correlation could arise from several factors including specification biasness, such as excluding variables, using the incorrect functional form, manipulating data or transforming the data (Guajarati & Porter, 2009). There are different types of serial correlation that exist, first-order serial correlation take place when errors in a particular time period are correlated directly with errors in other periods:

 $\varepsilon_{t=\rho\varepsilon t-1+\mu t,-1<\rho<1}$. The presence of serial correlation in the model is determined by the Durbin-Watson (DW) statistic.

The DW statistics is denoted as: $DW = \frac{\sum_{t=2}^{T} (\hat{\varepsilon}_t - \hat{\varepsilon}_{t-1})^2}{\sum_{t=1}^{T} \hat{\varepsilon}_t^2}$. The T represents the number of time periods. When the sequential values of $\hat{\varepsilon}_t$ are close to each other, the DW statistics will be low and this indicates that there is positive serial correlation. If the DW statistic falls within the range of 0-4, with a value close to 2, it indicates that no first-order serial correlation exists. Furthermore, positive serial correlation is associated with DW values that are below 2 and negative serial correlation is associated with values above 2 (Williams, 2015). The study will employ the Durbin Watson statistics as it is appropriate for a time series analysis.

4.5.3 Heteroskedasticity test

Heteroskedasticity is the violation of the Classical Linear Regression Model (CLRM) assumption, that the variances of each disturbance term u_t have a constant variance regardless of the explanatory variables (Gujarati 2009). The study then applies the Breusch-PaganGodfrey test to check for heteroskedasticity in the model. One of the assumptions of the Brusch-Pagan-Godfrey test is that the error terms are normally distributed (Gujarati, 2009:385). The null hypothesis is that there is no heteroskedasticity; a rejection of the null hypothesis then indicates homoscedasticity.

4.6 Data sources

The data set used for the variables analysed was obtained from the World Bank, the South African Revenue Services and the South African Reserve Bank for the period from 1994 to 2019.

CHAPTER 5: EMPIRICAL RESULTS

5.1 Introduction

This chapter presents the summary statistics, results, and interpretations of all relevant estimations conducted in this study. The scope of the study for the variables used considers the period from 1994-2020. Further, the study employs all relevant econometric tools as mentioned in chapter four.

5.2 Summary of statistics

Table 5.1 provides the descriptive statistics of key variables. The gross domestic product (log of GDP) is with a minimum of 28 and a maximum of 29 and other variables are within a similar range of 1 digit. The study is likely not to have outliers because all the variables are within a similar range of 1 to 2 digits. However, the major issue in the time series data is the omission of values or data, of which our dataset is not exempted. The study employs interpolation with a backward option to complete the missing value for some of the variables. The normal skewness is zero, some variables are less than one (<1) therefore, we can assume that they are normal skewness.

The kurtosis measures the flatness or the peakedness of the variables, therefore, when the variables are lower than 3, they are platykurtic and leptokurtic when they are greater than 3.

			ma	mea		varia	skew	kurto
Variable	Ν	min	X	n	sd	nce	ness	sis
Households and NPISHs final	2	4.12	4.19	4.15	.0			
consumption expenditure	7	6	0	6	17	.000	.219	2.475
	2	2.64	3.07	2.80	.1			
Gross fixed capital formation	7	1	3	5	07	.012	.512	2.654
government final consumption	2	2.76	2.97	2.87	.0			
expenditure	7	4	6	5	69	.005	.063	1.650
	2	3.25	4.12	3.72	.2			
Gross loan debt	7	8	1	1	42	.059	266	2.175
Log of Gross Domestic Product	2	28.5	29.1	28.8	.2			
(GDP)	7	02	51	88	23	.050	326	1.602
	2	2.83	2.94	2.89	.0			
Personal income tax (Minimum rate)	7	3	4	0	27	.001	137	4.507
Personal income tax (Maximum	2	3.68	3.80	3.71	.0			
rate)	7	9	7	7	47	.002	1.222	2.721
	2	3.33	3.55	3.39	.0			
Corporate income tax	7	2	5	3	84	.007	1.240	2.985

Table 5.1 Descriptive statistics

According to the NDP (2012), investment spending in South Africa declined from an average of 30 percent of GDP in the early 1980s to approximately 16 percent by the early 2000s. As a result, the NDP's target for gross fixed capital formation as a percentage of GDP is to reach 30 percent by 2030 to achieve a sustained impact on economic growth and household services (National Planning Commission, 2012). However, the gross fixed capital formation trend is currently averaging less than 20 percent of GDP, which amounted to 14 percent in the second quarter of 2021. Furthermore, weak confidence and demand, as well as challenges such as the insufficient supply of electricity, have contributed to the relatively slow recovery of the gross fixed capital formation from 2020 (National Treasury, 2021).

Government expenditure as a percentage of GDP was less than 20 percent during the period. However, the gross loan debt and the maximum personal income tax rate averaged more than 40 percent between 1994 and 2019, while the average minimum tax rate as a percentage of GDP was 18 percent and corporate income tax was 29.8 percent in the same period. The debt reflects the persistent challenge of the growing debt in South Africa, although the government aims to lessen the debt.

5.2.1 Correlation Analysis

Error! Reference source not found. presents that correlation analysis of the covariates and the outcome variables. The correlation suggests that log of GDP per capita and Households consumption expenditure (r=-0.55) and with the corporate tax (r=-0.82) are negatively correlated. Government expenditure and government debt are positively correlated (r=0.71). Also, GDP and expenditure are correlated (r=0.66).

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) GDP	1.000							
(2) Consumpt. exp	-0.548	1.000						
(3) Private invest.	0.523	-0.378	1.000					
(4) HH consumpt.	0.655	-0.184	0.178	1.000				
(5) Debt	0.116	0.376	-0.360	0.709	1.000			
(6) Minimum rate	0.100	0.217	0.053	-0.042	-0.057	1.000		
(7) Maximum rate	-0.817	0.761	-0.357	-0.315	0.284	0.054	1.000	
(8) Corporate income tax	-0.886	0.553	-0.405	-0.387	0.157	-0.169	0.877	1.000

Table 5.2 Matrix of correlation

Table 5.3 presents variance inflationary factors (VIF) analysis. The rule of thumb in the variance inflationary factors (VIF) is that the VIF must not exceed 10. Otherwise, there is a probability of collinearity in the model. Hence, the analysis is not likely to suffer multicollinearity in the estimation.

Table 5.3 Variance inflation factor

	VIF	1/VIF
Maximum rate	8.994	.111
Corporate income tax	6.15	.163
Household Consumption expenditure	2.948	.339
Minimum rate	1.346	.743
Debt	1.241	.806
Mean VIF	4.136	

5.2.2 Graphical interaction of key variables

Figure 5.1 shows the relationship between the log of GDP and public debt. While economic growth presents a constant parallel line over time, government debt came down in 2009 and experienced an upward trend over time. We might expect government debt not to decrease, which will likely hamper economic growth significantly.



Figure 5.1 Log of GDP and Debt

Figure 5.2 shows the relationship between Log of GDP, household consumption and government expenditure. The government expenditure line is at a constant trend similar to economic growth, but it is at a lower trend. While the household consumption expenditure is higher both other lines. It is likely to be challenging for the country to have desirable growth due to the high pace of household consumption.



Figure 5.2 Log of GDP, Household consumption and Government expenditure

Figure 5.3 shows the relationship between the Log of GDP and private investment. The log of GDP is at parallel trend while private investment is lower compared to it. There is a fluctuation in the private investment similar to the instability in the business cycle.



Figure 5.3 Log of GDP and Private investment

Figure 5.4 shows the relationship between economic growth and taxes. There is an interaction between economic growth and corporate tax. Maximum personal income tax increases at a constant rate over time, while minimum personal income tax, is also at a constant trend but it is at the bottom of the graph. The maximum personal income tax and corporate tax are higher than the minimum personal income tax.





Figure 5.5 shows the relationship between private investment and personal income tax and corporate tax. While the maximum personal income tax increases at a constant rate over time, minimum personal income tax is at a constant trend and intercepts private investment. The corporate and maximum personal income tax are higher than private investment.



Figure 5.5 Private investment and taxes

Table 5.4 Unit root tests

	Unit root wi structural b	ithout reaks	Unit root with structural breaks			
	ADF	PP	Zivot-Andrews unit root test Both intercept & trend			
Variables	level	level	Break date	Critical value	T.stat	I(d)

GDP	-0.250	0.297	2010	-4.82* ^t	-3.217	I(1)
Expenditure	-1.401	-2.772	2008	-5.57*** ^b	-9.081	I(0)
consumption	-2.754	-2.336	2004	-5.08** ^b	-5.506	I(0)
Private investment	-1.998	-1.464	2009	-5.08** ^b	-5.413	I(0)
Debt	-1.139	-0.321	2009	-5.57*** ^b	-6.558	I(0)
Minimum Personal tax	-4.156 **	-3.243**	2004	-5.57*** ^b	-22.572	I(2)
Maximum Personal tax	-1.226	-1.497	2003	-5.57*** ^b	-9.752	I(0)
Corporate tax	-1.717	-1.958	2001	-5.57*** ^b	-8.987	I(0)

Note: ^b indicates both intercept and trend in Zivot-Andrews unit root test; ^t trend in the Augmented Dickey-Fuller unit root test. The ADF and PP denote the Augmented Dickey-Fuller and Phillip-perron unit root test denoted. *, **, *** implies series stationary significant level at 10%, 5%, 1% respectively. ^d represents ADF with drift.

For robustness, the study employs two conventional unit root tests, the Augmented Dickey-Fuller and Phillip-perron, for the stationary of the dataset (see Table 5.3). The unit root test of stationarity includes trends, lag (1) and differences in the variables that are statistically significant. The first difference of the variables involves around zero, which is stationary. The result is consistent with the Phillip-perron unit root test except for expenditure, debt, private investment and corporate tax. In other words, we assume that variables are stationary at the first difference; that is, they are integrated into order one. Both series report one break date, tstatistics, lag differences, and critical value using the ADF with the structural break. The tests indicated various breaks in the linear combination of the variables used in the current study. The study uses the Zivot-Andrews unit root test with the structural break, the series report one break date, t-statistics, lag differences, and critical value. The tests indicated various breaks in the linear combination of the variables used in this study. The breakpoints are when instability, such as the effect of the high rate of unemployment, high inflation, and poverty, among others, has affected the South African economy.

Table 5.5 presents the results of Johansen tests for cointegration, which establish the number of cointegrating vectors. The study uses the trace and maximum eigenvalue tests, and the study reported both statistics. The importance of a cointegration test is to establish a long-run relationship. We can assume a long-run relationship in the model, although the series drift apart or trend upward or downward.

The hypothesis is stated as: Ho: no cointegration and Hi: there is cointegration.

Table 5.5 Model 1 Johansen tests for cointegration

Trend: constant: constant Number of obs = 25

Lags = 2

Sample: 1996 – 2020

Maximum Rank	Parms	LL	Eigenvalue	Max statistics	5% critical value
0	56	463.162	•	327.984	124.24
1	69	520.971	0.990	212.367	94.15
2	80	561.101	0.960	132.107	68.52
3	89	586.476	0.869	81.356	47.21
4	96	611.357	0.863	31.596	29.68
5	101	620.120	0.504	14.069*	15.41
6	104	625.635	0.35674	3.038	3.76
7	105	627.154	0.114		

Maximum Rank	Parms	LL	Eigenvalue	Max statistics	5% critical value
0	56	463.162		115.617	45.28
1	69	520.970	0.990	80.260	39.37
2	80	561.101	0.960	50.751	33.46
3	89	586.476	0.869	49.761	27.07
4	96	611.357	0.863	17.527	20.97
5	101	620.120	0.504	11.030	14.07
6	104	625.635	0.357	3.038	3.76
7	105	627.154	0.114		

The result shows that there is conintegration equation in the model 1 (see Table 5.5).

Table 5.6 Model 2 Johansen tests for cointegration

Trend: constant Number

Number of obs = 25

Sample: 1996 – 2020 Lags = 2

Maximum Rank	Parms	LL	Eigenvalue	Max statistics	5% critical value
0	42	396.962		202.984	94.15
1	53	445.044	0.979	106.819	68.52
2	62	465.151	0.800	66.607	47.21
3	69	481.650	0.733	33.607	29.68
4	74	490.018	0.488	16.872	15.41
5	77	496.676	0.413	3.556*	
6	78	498.454	0.133		

Maximum Rank	Parms	LL	Eigenvalue	Max	5% critical
				statistics	value
				0.4.4.7	a a a-
0	42	396.962		96.165	39.37
1	53	445.044	0.979	40.213	33.46
2	62	465.151	0.800	32.999	27.07
3	69	481.650	0.733	16.735	20.97
4	74	490.018	0.488	13.316	14.07
5	77	496.676	0.413	3.556	3.76
6	78	498.454	498.454	0.133	

The results show that there is conintegration equation in the model 2 (see Table 5.6).

Table 5.7 Model 3 Johansen tests for cointegration

Trends: constant Number of obs = 25

Sample: 1996 – 2020 Lags = 2

Maximum Rank	Parms	LL	Eigenvalu	Max statistics	5% critical value
			e		
0	42	408.676	•	259.692	94.15
1	53	470.371	0.993	136.304	68.52
2	62	501.052	0.914	74.940	47.21
3	69	516.244	0.703	44.556	29.68
4	74	526.138	0.547	24.768	15.41
5	77	533.129	0.428	10.787	3.76
6	78	538.522	0.3504		

Maximum Rank	Parms	LL	Eigenvalu	Max statistics	5% critical value
			e		
0	42	408.676		123.388	39.37
1	53	470.371	0.993	61.364	33.46
2	62	501.052	0.914	30.383	27.07
3	69	516.244	0.703	19.788	20.97
4	74	526.138	0.547	13.981	14.07
5	77	533.129	0.428	10.787	3.76
6	78	538.522	0.350		

The results show that there is no cointegration equation in the model 3, which implies that the study can use OLS or VAR for the model 3 (see Table 5.7).

5.2.3 Estimation and Interpretation

The regression results have a different partition. First, the study explores the Vector Autoregression and Vector Error Correction Model (VECM) in models 1 and 2 and their

diagnostic tests. Since there was no cointegration in model 3, the study uses ordinary least squares (OLS) to examine the relationship between the independent and dependent.

	Coef.	Std.Err.	Z	P>z	[95%Conf.	Interval]
Private investmen	nt					
Private investmer L5.	nt -0.508	0.096	-5.260	0.000	-0.697	-0.319
Expenditure L5.	0.377	0.320	1.180	0.240	-0.251	1.005
Minimum Personal L5.	tax 0.283	0.275	1.030	0.303	-0.256	0.821
Maximum Persona L5.	l tax -0.082	0.449	-0.180	0.855	-0.961	0.798
Corporate tax L5.	-0.179	0.193	-0.930	0.353	-0.557	0.199
Household consum L5.	ption -2.397	0.716	-3.350	0.001	-3.801	-0.994
Debt L5.	-0.427	0.116	-3.670	0.000	-0.655	-0.199
_cons Expenditure	14.790	2.996	4.940	0.000	8.917	20.663
Private investmer L5.	nt 0.453	0.068	6.650	0.000	0.319	0.586
Expenditure L5.	-0.010	0.226	-0.040	0.964	-0.453	0.433
Minimum Personal L5.	tax 0.126	0.194	0.650	0.515	-0.254	0.506
Maximum Persona L5.	l tax -0.433	0.317	-1.370	0.171	-1.053	0.187
Corporate tax L5.	-0.186	0.136	-1.360	0.173	-0.452	0.081
Household consum L5.	ption -0.454	0.505	-0.900	0.369	-1.444	0.536
Debt L5.	0.127	0.082	1.540	0.123	-0.034	0.288
_cons Minimum Personal	4.941 tax	2.114	2.340	0.019	0.798	9.084
Private investmer L5.	nt -0.040	0.025	-1.610	0.108	-0.088	0.009

Table 5.8 Vector Autoregression (VAR) model (Short-run) Model 1

Expenditure L5.	0.208	0.082	2.540	0.011	0.048	0.369
Minimum Personal L5.	l tax -0.148	0.070	-2.110	0.035	-0.285	-0.010
Maximum Persona L5.	l tax -0.063	0.115	-0.550	0.584	-0.287	0.162
Corporate tax L5.	0.113	0.049	2.300	0.021	0.017	0.210
Household consum L5.	ption 0.347	0.183	1.890	0.058	-0.012	0.705
Debt L5.	-0.060	0.030	-2.030	0.043	-0.119	-0.002
_cons Maximum Persona	1.464 l tax	0.766	1.910	0.056	-0.037	2.965
L5.	nt -0.047	0.037	-1.260	0.208	-0.119	0.026
Expenditure L5.	0.304	0.123	2.470	0.014	0.062	0.545
Minimum Personal L5.	l tax -0.628	0.105	-5.960	0.000	-0.835	-0.422
Maximum Persona L5.	l tax 0.118	0.172	0.690	0.493	-0.219	0.456
Corporate tax L5.	0.181	0.074	2.440	0.015	0.036	0.326
Household consum L5.	ption 0.379	0.275	1.380	0.168	-0.160	0.918
Debt L5.	-0.085	0.045	-1.900	0.058	-0.172	0.003
_cons Corporate tax	2.456	1.150	2.140	0.033	0.202	4.711
Private investmen L5.	nt -0.061	0.021	-2.940	0.003	-0.102	-0.020
Expenditure L5.	0.113	0.069	1.630	0.103	-0.023	0.248
Minimum Personal L5.	l tax -0.050	0.059	-0.840	0.402	-0.165	0.066
Maximum Persona L5.	l tax 0.521	0.097	5.400	0.000	0.332	0.711

Corporate tax

L5.	0.061	0.042	1.470	0.141	-0.020	0.142
Household consump L5.	otion 0.105	0.154	0.680	0.494	-0.197	0.408
Debt L5.	-0.035	0.025	-1.410	0.159	-0.084	0.014
_cons Household consumpti	0.891 on	0.645	1.380	0.167	-0.373	2.155
Private investment L5.	t 0.011	0.024	0.460	0.642	-0.035	0.057
Expenditure L5.	0.043	0.079	0.550	0.586	-0.111	0.197
Minimum Personal 1 L5.	tax -0.488	0.067	-7.240	0.000	-0.620	-0.356
Maximum Personal L5.	tax 0.330	0.110	3.000	0.003	0.115	0.546
Corporate tax L5.	-0.101	0.047	-2.140	0.033	-0.194	-0.008
Household consump L5.	otion -0.093	0.176	-0.530	0.598	-0.437	0.252
Debt L5.	-0.010	0.029	-0.350	0.726	-0.066	0.046
_cons Debt	4.945	0.735	6.730	0.000	3.504	6.387
Private investment L5.	t 1.755	0.194	9.050	0.000	1.375	2.135
Expenditure L5.	0.078	0.645	0.120	0.904	-1.185	1.341
Minimum Personal 1 L5.	tax -2.192	0.552	-3.970	0.000	-3.275	-1.109
Maximum Personal L5.	tax -1.111	0.902	-1.230	0.218	-2.880	0.658
Corporate tax L5.	-0.683	0.388	-1.760	0.078	-1.443	0.077
Household consump L5.	otion 0.895	1.440	0.620	0.534	-1.928	3.718
Debt L5.	0.852	0.234	3.640	0.000	0.393	1.311
_cons	4.500	6.027	0.750	0.455	-7.313	16.312

Interpretation short run: Model 1

Private investment is the endogenous variable in model 1. A decrease in household consumption positively impacts private investment (Sarkar, 2012) at the fifth lag. When household consumption is reduced, there is a possibility that households will increase their savings, and that is likely to improve private investment. Also, a decrease in government debt is likely to increase private investment, all things being equal.

When minimum personal income tax is the endogenous variable in model 1 at the fifth lag, an increase in government expenditure is likely to increase the minimum personal income tax. Similarly, increasing corporate tax and government debt will likely increase the minimum personal income tax. In addition, household consumption is likely to increase the minimum personal income tax.

When maximum personal income tax is the endogenous variable in model 1 at the fifth lag, an increase in government expenditure is likely to increase the maximum personal income tax. Also, corporate tax and government debt will likely increase the minimum personal income tax when corporate tax is the endogenous variable in model 1 at the fifth lag. Therefore, increasing the maximum personal income tax will likely increase the corporate tax.

When household consumption is the endogenous variable in model 1 at the fifth lag, increasing the maximum personal income tax is likely to increase household consumption. At the same time, decreasing the minimum personal income and corporate tax is likely to increase household consumption. When government debt is the endogenous variable in model 1 at the fifth lag, decreasing the minimum personal income tax and corporate tax may increase government debt. An increase in private investment is likely to increase the government debt.

Furthermore, the study conducted a diagnostic test for model 1. The study runs various tests such as the LM, Jarque-Bera test and stability for validity and stability of the VAR technique. Table 0.1 for model 1 in this study shows that the study cannot reject the null hypothesis of autocorrelation; hence the model is good. Furthermore, the LM test for residual autocorrelation shows no autocorrelation at the second lag. In addition, the study performs the Jarque-Bera test, and the overall VAR errors are normally distributed (see Table 0.2). Finally, the study performed a diagnostic stability test and found that VAR satisfies the stability condition.

Long run results for model 1

The study performs a vector error correction model (VECM), establishing the long-run relationship between the dependent and independent variables. We assume a long-run relationship in the model, although the series drift apart or trend upward or downward.

It is noteworthy that the signs of the coefficients must be reversed in the long-run interpretation (with VECM). Table 5.9 presents a forecasting impact of government expenditure on private investment for model 1. In the long run, a percentage change (decrease) in government expenditure will likely increase private investment by 24.3%, ceteris paribus. Also, decreasing the minimum personal income tax will likely improve private investment. At the same time, an increase in the maximum personal income tax is likely to increase private investment. A reduction in government debt is likely to improve private investment. This implies that this study has new evidence and suggests policy evaluation on debt that may influence private investment and, perhaps, economic growth in the South Africa case. However, this finding contradicts previous studies and literature that justify the negative long-run effect of government debt on economic growth (Panizza and Presbitero, 2014).

A percentage change (increase) in household consumption expenditure will likely increase private investment in the long run. Household consumption is influenced by various factors, including, among other things, income, the availability of finance and the saving rate, interest rate and consumer confidence (D'Acunto et al., 2015) and these factors influence household consumption to varying extents. The MTBPS (2021) indicated that household consumption in 2021 was expected to grow by 5.7%, given the improved earnings and growing credit extension, which is linked to low-interest rates. Persistent high unemployment, however, continues to threaten household income and spending (National Treasury, 2021). However, unemployment, poverty and inequalities may hamper the growth and reverse the outcome. In addition, a percentage change (increase) in government expenditure is likely to increase economic growth, but it is not statistically significant. This implies that an increase in government expenditure might not significantly affect economic growth.

					[95%	
beta	Coef.	Std. Err.	Z	P>z	Conf.	Interval]
_ce1						
Gross capital formation	1	,			•	
Log of expenditure	0.243		-5.29	0.000	1.757	-0.806
Minimum Personal tax	5.783	0.229	25.24	0.000	5.333	6.232
Maximum Personal tax	-3.103	0.5892	-5.27	0.000	4.258	-1.948

Table 5.9 Vector Error Correction Model (VECM) (Long-run)

Corporate tax	3.7956	0.286	13.23	0.000	3.233	4.357
Household consumption	-8.916	0.698	-12.77	0.000	10.286	-7.548
Debt	0.773	0.063	12.13	0.000	0.648	0.898
	16.99					
_cons		•			•	

The study conducted a diagnostic test for all the models. In addition, the study runs various tests such as the LM, Jarque-Bera test and stability for validity and stability of the VECM technique.

Table 0.4 (in the appendix) that the study cannot reject the null hypothesis of autocorrelation. Hence the model is good. In other words, the LM test for residual autocorrelation shows no autocorrelation at the fifth lag.

In Table 0.5 (see appendix), the study performs the Jarque-Bera test, and the overall VECM is normally distributed.

The study performs a diagnosis test of stability and found that VECM satisfies the stability condition (see Table 0.6 in the appendix).

	Coef.	Std.Err.	Z	P>z	[95%Conf.	Interval]
Expenditure						
L5.	1.032	0.283	3.650	0.000	0.477	1.587
Minimum tax L5.	-0.112	0.331	-0.340	0.736	-0.759	0.536
Maximum tax L5.	0.468	0.497	0.940	0.346	-0.505	1.441
Corporate tax L5.	-0.393	0.230	-1.710	0.087	-0.844	0.057
Household consun L5.	nption -0.000	0.869	0.000	1.000	-1.703	1.703
Debt L5.	-0.233	0.107	-2.170	0.030	-0.444	-0.023
_cons Minimum tax	0.706	3.499	0.200	0.840	-6.153	7.564
L5.	0.117	0.062	1.870	0.061	-0.005	0.239
Minimum tax L5.	-0.127	0.073	-1.740	0.081	-0.270	0.016

Table 5.10 Vector Autoregression (VAR) model (Short-run) Model 2

Maximum tax L5.	-0.142	0.110	-1.290	0.196	-0.356	0.073
Corporate tax L5.	0.132	0.051	2.600	0.009	0.032	0.231
Household consur L5.	mption 0.307	0.192	1.600	0.109	-0.069	0.683
Debt L5.	-0.029	0.024	-1.220	0.222	-0.075	0.018
_cons Maximum tax	1.834	0.772	2.380	0.018	0.321	3.347
Expenditure L5.	0.196	0.092	2.140	0.033	0.016	0.376
Minimum tax L5.	-0.604	0.107	-5.630	0.000	-0.814	-0.394
Maximum tax L5.	0.025	0.161	0.160	0.874	-0.290	0.341
Corporate tax L5.	0.202	0.075	2.710	0.007	0.056	0.348
Household consur L5.	mption 0.333	0.282	1.180	0.238	-0.220	0.885
Debt L5.	-0.048	0.035	-1.370	0.171	-0.116	0.021
_cons Corporate tax	2.892	1.136	2.550	0.011	0.666	5.118
Expenditure L5.	-0.028	0.059	-0.480	0.633	-0.143	0.087
Minimum tax L5.	-0.018	0.069	-0.260	0.798	-0.152	0.117
Maximum tax L5.	0.400	0.103	3.880	0.000	0.198	0.602
Corporate tax L5.	0.089	0.048	1.870	0.062	-0.004	0.183
Household consur L5.	mption 0.044	0.180	0.240	0.807	-0.309	0.398
Debt L5.	0.013	0.022	0.590	0.553	-0.030	0.057
_cons Corporate tax	1.463	0.726	2.010	0.044	0.039	2.886
Expenditure L5.	0.068	0.057	1.200	0.232	-0.044	0.180
Minimum tax L5.	-0.494	0.067	-7.410	0.000	-0.624	-0.363

Maximum tax L5.	0.352	0.100	3.520	0.000	0.156	0.548
Corporate tax L5.	-0.106	0.046	-2.290	0.022	-0.197	-0.015
Household consum L5.	nption -0.082	0.175	-0.470	0.640	-0.425	0.261
Debt L5.	-0.019	0.022	-0.870	0.386	-0.061	0.024
_cons Debt	4.843	0.705	6.870	0.000	3.462	6.224
Expenditure L5.	4.119	1.010	4.080	0.000	2.139	6.098
Minimum tax L5.	-3.113	1.180	-2.640	0.008	-5.425	-0.800
Maximum tax L5.	2.383	1.772	1.340	0.179	-1.090	5.857
Corporate tax L5.	-1.489	0.820	-1.820	0.069	-3.096	0.118
Household consum L5.	nption 2.654	3.101	0.860	0.392	-3.424	8.732
Debt L5.	-0.544	0.383	-1.420	0.156	-1.295	0.208
_cons	-11.920	12.489	-0.950	0.340	-36.398	12.558

Interpretation short run: Model 2

Government expenditure is the endogenous variable in model 2. Corporate tax has a significant negative impact effect on government expenditure. This implies that a decrease in corporate tax might affect government expenditure. Government debt has a significant negative effect on government expenditure. This makes sense because the reduction in South Africa is likely to significantly impact government expenditure because the government is in considerable debt, and most social grants are serviced from the debt.

When minimum personal income tax is an endogenous variable in model 2, government expenditure has a significant positive impact on the minimum personal income tax. An increase in government expenditure will likely increase the minimum personal income tax because the burden of government expenditure may be shifted to minimum personal income taxpayers. Similarly, an increase in corporate tax will likely increase minimum personal income tax.

When the corporate tax increase, the burden will likely be on the consumer, who are minimum personal taxpayers.

When maximum personal income tax is an endogenous variable, government expenditure will likely increase significantly. Therefore, the minimum personal income tax significantly negatively impacts the maximum personal income tax.

An increase in the high-income earner's tax might lead to avoidance of payment of tax, which may reduce the revenue and shift the burden to the minimum (or lower) taxpayer. An increase in corporate taxes is likely to increase the maximum tax (high-income taxpayers) in the short run. When corporate income tax is an endogenous variable, there is a probability that maximum personal income tax will have a significant positive impact on corporate tax. When government debt is an endogenous variable, government expenditure and corporate tax have a significant positive impact on government debt. At the same time, minimum personal income tax has a significant negative impact on government debt.

Furthermore, the study conducted a diagnostic test for VAR in model 2. The study runs various tests such as the LM, Jarque-Bera test and stability for validity and stability of the VAR technique.

In addition, the study performs the Jarque-Bera test; the overall VAR errors are normally distributed (see Table 0.8). However, the Jarque-Bera test reveals that minimum personal tax is not normally distributed.

The study performs a diagnosis test of stability and found that VAR satisfies the stability condition (see Table 0.9 in the appendix).

	Coef.	St.Err.	Ζ	p-value	[95%	Interval]
					Conf	
_Cel						
Expenditure	1					
Minimum tax	5.856	0.243	24.09	0.000	5.379	6.332
Maximum tax	-0.654	0.589	-1.11	0.267	-1.809	0.500
Corporate tax	1.766	0.297	5.93	0.000	1.182	2.349
Household consuption	3.360	0.676	-4.97	0.000	-4.685	-2.035
Debt	-0.129	0.022	-5.84	0.000	-1.173	-0.086
Constant	-8.856			•	•	•

Table 5.11: Vector error-correction model

Table 5.11 presents the forecasting of the impact of taxes on government expenditure. In the long run, a percentage change (decrease) in minimum personal income tax will likely decrease government expenditure. This implies that if the government increase the tax burden on high-income earners, that could make available resources to subsidy investors. Also, a cut in the corporate tax may decrease government expenditure. Furthermore, a change in household consumption (decrease) is likely to increase government expenditure. A percentage change (decrease) in the corporate tax is expected to decrease government expenditure. This implies that decreasing the tax burden on businesses may encourage businesses to invest, while increasing the tax burden on the firm may lead them out of operation.

Given the assumptions of the Neoclassical Growth Theory, tax cuts as a stand-alone policy and not accompanied by spending cuts will typically increase the budget deficit, thus resulting in reduced national savings and increased interest rates (Gale & Samwick, 2014).

Furthermore, the study performs the required diagnostic tests for VECM (see Table 7.10 in the Appendix). The diagnostic test of the study revealed that the study could not reject the null hypothesis of autocorrelation, thus indicating that the model is good.

The study also performs a normality test with the Jarque-Bera option. Hence, the expenditure is normality distributed (see Appendix). However, the normality test with the Jarque-Bera test shows that the overall error is normality distributed for model 2.

OLS Results

Table 5.12 OLS results for model 3

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Integration: Model 3

Table 5.12 shows a significant negative relationship between corporate tax and economic growth. When the labour market increases through private investment, that might enhance economic growth as individuals have more disposable income saved, and the circle continues to flow. On the other hand, an increase in private investment might influence growth without substantial evidence, which is likely to happen in the long term in South Africa if care is not taken. Therefore, there is a need for policy recommendations and implementation that attract investors.

There is a significant positive relationship between government debt and economic growth. The findings are not compatible with the studies of Panizza and Presbitero (2014) and Mencinger et al. (2014), which emphasised that government debt has a negative influence on economic growth. However, government debt contributes a slight increase to economic growth. This implies that the government has been borrowing to achieve macroeconomic objectives such as social grants. The revenue from the tax might not be enough to increase economic growth. Incurring debt to improve the country's humanitarian service (social grants) will likely hinder economic growth.

This is true in the case of South Africa, which is known for high rates of inequality, unemployment and poverty. It is noteworthy that social imbalance from the high rate of unemployment and poverty may reduce the contribution and the effect of household consumption on economic growth. Furthermore, the political situation crowned with corruption might contribute to inequalities as the income is skewed to the hands of certain groups (politicians), which could also reduce the impact of household consumption on economic growth.

Post-estimation

The existence of autocorrelation in the dataset could violate the assumption of the ordinary least square (OLS) estimator and make the result biased. The study employs the Breusch-Pagan test for heteroscedasticity. The Breusch-Pagan test (p-value = 0.1680) is not statistically significant. Therefore, the study rejects the null hypothesis and accepts the alternative hypothesis that the variance is homogenous.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

The paper investigated fiscal policy measures that may result in higher economic growth in South Africa. The empirical analysis dealt with independent variables including personal income tax, corporate income tax, government expenditure, government debt and household consumption. The study used the ADF test and the PP stationary tests and the tests indicated that the variables were stationary at first difference and integrated into order one. The Johansen cointegration test was run, the results indicated that there is more than two cointegration for model 1 and model 2. Thus, the VAR and VECM as well as their diagnostic tests were conducted for model 1 and model 2. The Johansen cointegration results for model 3 indicated that there is no cointegration, thus the study used OLS.

The short run results were represented in the VAR models. Private investment was treated as an endogenous variable in model 1. A decrease in household consumption positively impacts private investment and a decrease in government debt increases private investment. When minimum tax is treated as the endogenous variable in model 1, an increase in government expenditure is likely to increase the minimum tax and corporate income tax and government debt will likely increase the minimum tax and an increase in household consumption is likely to increase minimum tax. When household consumption is treated as the endogenous variable is the endogenous variable in model 1, increasing the maximum tax is likely to increase household consumption at the fifth lag. Decreasing the minimum personal income tax, corporate income tax is likely to increase household consumption. When government debt is the endogenous variable in model 1 at the fifth lag, decreasing the minimum and corporate tax may increase government debt. On the other hand, an increase in private investment is likely to increase debt.

The study carried out the VECM to establish the long run relationship between the dependent and independent variables. The results for model 1 indicated that in the long run, a percentage change (decrease) in expenditure is likely to increase private investment by 24.3% and a decrease in the minimum personal tax is likely to increase private investment. A percentage change (increase) in household consumption expenditure is likely to increase private increase private investment in the long run, while a percentage change (increase) in government expenditure is likely to increase economic growth although not significantly.

In terms of the short run results for model 2, when expenditure s the endogenous variable, corporate tax has a significant negative impact on government expenditure. Government debt has a significant negative impact on government expenditure. When minimum tax is the endogenous variable in model 2, government expenditure has a significant positive impact in the minimum personal income tax. An increase in government expenditure is likely to increase the minimum personal income tax and an increase in corporate tax is likely to increase the minimum personal income tax. When the maximum personal income tax is the endogenous variable, government expenditure is likely to increase the minimum personal income tax. When the maximum personal income tax is the endogenous variable, government expenditure is likely to increase significantly. An increase in corporate tax is the endogenous variable, it is likely that maximum personal income tax will have a significant impact on corporate tax. When government debt is the endogenous variable, government expenditure and corporate tax have a significant positive impact on government debt, while minimum personal income tax has a significant negative impact on government debt.

The long run results for model 2 indicate that a percentage change (decrease) in minimum personal income tax is likely to decrease government expenditure, while a change (decrease) in household consumption is likely to increase government expenditure. A percentage change (decrease) in the corporate tax is likely to decrease government expenditure.

The OLS results for model 3 indicated that there is a significant negative relationship between corporate tax and economic growth. There is also a significant positive relationship between debt and economic growth.

6.2 Recommendations

Given that the results indicated that in the short run, the minimum and maximum income tax brackets respond differently to government expenditure at different lags, the government can implement expansionary fiscal policy in the short run to boost aggregate demand and increase economic growth, which will also contribute to employment creation. Thus, the government can increase government spending but focus on expenditure that will contribute to long-run economic growth, such as expenditure on education, healthcare and infrastructure.

Government spending largely depends on the revenue the government receives through taxes. However, given the relatively small effect debt has on long-run economic growth, it would be best for the government to limit debt accumulation as a way to compensate for shortfalls in revenue, because debt does not increase economic growth significantly. The government can also promote the increase of income for households so that households can have more disposable income and be able to save, thus contributing to growth in the economy. The government can implement a contractionary fiscal policy by increasing the maximum personal income taxes, however, the increases in taxes need to be moderate to lessen the intensity of the tax burden on taxpayers who fall under the maximum personal income tax bracket. In addition to increasing taxes, the government should reduce expenditure to reduce the budget deficit. The government can also lower the corporate income tax to promote long-term economic growth.

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APPENDIX 1: VAR DIAGNOSTIC TESTS

lag	chi2	df	Prob>Chi2
1	62.539	49	0.093
2	65.859	49	0.054
H0: no autocorrelation at lag order			

Table 0.1 Lagrange-multiplier test for model 1 VAR

Table 0.2 Jarque-Bera test for model 1 VAR

Equation	chi2	df	Prob>Chi2
Private investment	0.922	2	0.631
Expenditure	0.618	2	0.734
Minimum personal tax	8.106	2	0.017
Maximum personal tax	0.030	2	0.985
Corporate tax	0.515	2	0.773
Household consumption	4.413	2	0.110
Debt	12.754	2	0.002
ALL	27.357	14	0.017
Eigenvalue stability condition			

Table 0.3 stability test model 1 VAR

	Eigenvalue	Modulus	
	-0.905	0.905	
-0.280	-	.8606704i	0.905
0.732	-	.5319235i	0.905
-0.563	-	.7029451i	0.900
0.868	-	.2380531i	0.900
-0.842	-	.3177671i	0.900
0.042	-	.899336i	0.900
0.495	-	.752211i	0.900
-0.702	-	.509811i	0.867
0.268	-	.8248915i	0.867
0.867		0.867	
-0.813		0.813	
0.658	-	.4781003i	0.813
-0.251	-	.7735825i	0.813
-0.666	-	.3864906i	0.770
0.162	-	.7528352i	0.770
0.766	-	.07878712i	0.770
-0.573	-	.5139709i	0.770
0.312	_	.7041421i	0.770

All the eigenvalues lie inside the unit circle. VAR satisfies stability condition

lag	chi2	df	Prob>Chi2	
1	58.762	49	0.160	
2	76.566	49	0.007	
HO: no autoc	orrelation at lag order			

Table 0.4 Lagrange-multiplier test

Table 0.5 Jarque-Bera test

Equation	chi2	df	Prob>Chi2
Private investment	0.311	2	0.856
Expenditure	0.171	2	0.918
Minimum tax	42.141	2	0.000
Maximum tax	7.265	2	0.026
Corporate tax	9.194	2	0.010
Household consumption	3.611	2	0.164
Debt	0.716	2	0.699
ALL	63.409	14	0.000
Eigenvalue stability condition			

Table 0.6 stability tests

Eigenvalu	ue Modulus	
1	1	
1	1	
1	1	
1	1	
1	1	
1	1	
0.482 -	.7576473i	0.898
-0.444 -	.4734594i	0.649
-0.617	0.617	
0.339 -	.3489557i	0.486
0.217	0.217	

The VECM specification imposes 6 unit moduli

Table 0.7 Lagrange test in model 2 VAR

lag	chi2	df	Prob>Chi2	
1	36.525	36	0.444	
2	50.230	36	0.058	
H0: no auto	correlation at lag order			

Table 0.8 Jarque-Bera test in model 2 VAR

Equation	chi2	df	Prob>Chi2	
lExpend_m	1.007	2	0.605	
lMinPIT_m	23.554	2	0.000	
lMaxPIT_m	0.062	2	0.970	
lCYTax_m	3.727	2	0.155	

lHHCons_m	0.461	2	0.794
lDebt_m	1.813	2	0.404
ALL	30.623	12	0.002
Eigenvalue stability	conditions		

Table 0.9 stability in model 2

	Eigenvalue	Modulus		
0.070	-	.9237236i	0.926	
-0.857	-	.3520576i	0.926	
0.486	-	.7884761i	0.926	
0.900	-	.218835i	0.926	
-0.600	-	.70614i	0.926	
	-0.906	0.906		
-0.280	-	.8617766i	0.906	
0.733	-	.5326072i	0.906	
0.238	-	.7311401i	0.769	
	0.769	0.769		
-0.622	-	.4518694i	0.769	
0.078	-	.7424233i	0.747	
0.730	-	.1550248i	0.747	
-0.500	-	.5546534i	0.747	
0.373	-	.6466127i	0.747	
-0.682	-	.3038181i	0.747	

All the eigenvalues lie inside the unit circle. VAR satisfies stability conditions.

Table 0.10: Lagrange-multiplier test

	lag	chi2	df	Prob>Chi2
	1	36.835	36	0.430
	2	46.824	36	0.107
H0 no autocorrelati	ion at lag order			

Table 0.11: Jarque-Bera test

	Equation	chi2	df	Prob>Chi2
	Expenditure	2.113	2	0.348
	Minimum tax	64.429	2	0.000
	Maximum tax	138.670	2	0.000
	Corporate tax	54.480	2	0.000
	Household consumption	0.336	2	0.845
	Debt	0.314	2	0.855
Eigenvalue stability cond	ALL ition	260.341	12	0.000

-

Table 0.12: stability test in model 2 VECM

	Eigenvalue	Modulus	
	1	1	
	1	1	
	1	1	
	1	1	
	1	1	
0.368	-	.7694282i	0.853
-0.282	-	.5162363i	0.588
	0.478	0.478	
	-0.456	0.456	
The VECM specification imposes 5	0.213 unit moduli.	0.213	