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Evaluating the Impact of Tax Policy Changes on Economic Growth in South Africa

Keneuwe Mosholi, Diana Viljoen, Abigail Stiglingh-Van Wyk*, Oladipo Olalekan David

North-West University, Potchefstroom, South Africa. *Email: abigail.stiglingh@nwu.ac.za

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ABSTRACT

This study investigates how tax policy changes affect economic growth in South Africa, focusing on personal income tax (PIT), corporate income tax (CIT), and value-added tax (VAT), alongside the roles of savings and consumption. Using secondary time-series data from 2000 to 2022 and applying a Vector Autoregressive (VAR) model, the study finds that both PIT and CIT negatively influences GDP growth. CIT has the most significant impact—a 1% increase results in a 37.3% drop in GDP—while PIT also contributes to economic decline, though to a lesser extent. In contrast, savings and consumption positively affect growth, with consumption notably boosting GDP. VAT, while included as a key tax, has only a marginal effect on economic performance. The findings suggest that in a developing country like South Africa, the burden and impact of taxation differ from those in more advanced economies. Importantly, the study challenges the common assumption that all forms of taxation support growth equally. It recommends that policymakers consider lowering PIT and CIT to encourage investment and consumption, while also introducing incentives to promote savings. VAT should be regulated to avoid dampening consumer spending. The study concludes by calling for broader research, incorporating other macroeconomic indicators such as employment and investment, to deepen understanding of the full impact of tax policy on economic growth.

Keywords: GDP, Economic Growth, Tax Policy, Taxation, Tax Rates
JEL Classifications: E62, H21, O40

1. INTRODUCTION AND BACKGROUND OF THE STUDY

Taxation plays a central role in the functioning of governments, serving as a primary and stable source of public revenue used to fund essential services and infrastructure. As Mpofu (2021) highlights, taxes offer predictable revenue that enables states to provide public goods and redistribute income to enhance equity and attract investment. Tax policy, therefore, is not just a fiscal tool but also a mechanism for socioeconomic transformation. A good tax system must align with four core principles: it must be administrable, fair, simple, and efficient (Smith, 2010). These principles aim to ensure that the tax burden is appropriately distributed, understandable by taxpayers, and cost-effective in implementation and compliance. Tax policies that ignore these principles risk distorting economic behaviour, discouraging investment, reducing consumption, and weakening productivity.

Taxation's relationship with economic growth has been widely debated, with many empirical studies identifying a negative link between high taxes and economic performance. Excessive taxation can lower the marginal propensity to save (MPS), discourage investment, and reduce business productivity due to higher operational costs (Leibfritz et al., 1997). This is particularly relevant in South Africa, which operates a residence-based tax system. Although it has undergone various reforms to enhance efficiency and equity (SARS, 2023), studies still show that high personal and corporate taxes dampen economic activity (Khumbuzile & Hlalefang, 2018; Badri & Allahyari, 2013). The sluggish GDP growth of 0.1% in the third quarter of 2023 (SARB, 2024) underscores the need to examine the impact of tax

policy on macroeconomic outcomes. While some research finds positive impacts of taxation through government spending and service delivery (Ismail and Alqadi, 2019), others suggest that the tax burden can outweigh such benefits in economies with high inequality and unemployment.

Furthermore, theoretical frameworks such as optimal taxation theory, the ability-to-pay principle, and the benefit theory provide essential insights into the fairness and efficiency of tax systems. Optimal taxation theory, as discussed by Fleurbaey and Maniquet (2015), focuses on how to maximise social welfare by balancing efficiency and equity. It acknowledges the trade-offs between raising revenue and minimising economic distortions. Meanwhile, the ability-to-pay theory advocates for taxes to be levied based on a person's income or wealth, ensuring that those with greater means contribute more (Dodge, 2005). Similarly, the benefit principle argues for proportional taxation based on the extent of benefits received from public services (Bala et al., 2021). These theories emphasize that tax systems should not disproportionately burden low-income earners, especially in developing countries where inequality is already entrenched.

To explore the impact of tax policy on economic growth within the South African context, this study adopts a quantitative research design. It integrates both empirical data and theoretical analysis to understand how changes in tax rates influence economic indicators over time. Relying on secondary sources such as academic articles, official government reports, and books, the study aims to bridge the gap in understanding how taxation affects South Africa's growth trajectory. Quantitative methods allow for precise measurement of the effects of tax changes, providing a clearer view of whether certain tax types—such as personal income tax, corporate income tax, or value-added tax—hinder or promote economic development. In doing so, the study hopes to offer practical recommendations for improving tax policy to support inclusive and sustainable economic growth.

This study is important because it helps understand the relationship between tax rates and economic growth as policymakers need to construct effective fiscal policies and tax policies. Tax policy plays a crucial role in promoting macroeconomic stability, it is important to study the relationship between the two as it can provide policymakers with an idea of how tax reforms can be constructed to contribute to growth and economic stability. Also, this study can contribute to existing literature on economic development and fiscal policy. Therefore, research findings from this study can propose recommendations that can improve economic growth by enhancing tax policies. While this study has the possibility to provide some effective tax policy measures that can impact economic growth positively, it can guide policymakers in implementing the most effective reforms to improve economic development.

To address the knowledge gap, the primary objective of this study is to evaluate the relationship between taxes and economic growth and investigate the impact of tax policy changes on economic growth in South Africa by building on earlier studies. The first section of the study provides an overview of relevant literature, the second section entails the methodology, the third section provides the reporting of results and discussion, and the last section concludes the study.

2. LITERATURE REVIEW

2.1. Understanding Taxation

The role of taxation is that it serves as revenue to finance government spending priorities such as providing public goods and services to consumers, but it can also be used as a tool for redistribution (Cerra et al., 2021). This means that taxation is an essential mechanism for the generation of revenue to enable government to provide public goods and services. In a way that taxation serves as another primary source for the provision and availability of those services such as investment in education, healthcare, and transportation, which are part of the well-being of the society. In addition to its role of funding services, taxation also helps as a tool to reduce inequality or wealth redistribution and manage the economy. Government has other uses for taxes, such as using taxes to discourage certain behaviours (e. g. excise tax) and promote the well-being of environments. Moreover, using progressive tax systems, where individuals who earn more pay more, helps balance the differences in income and promote social programs. In general, taxes are used to assist with the balancing of social and economic objectives, ensuring that resources are allocated effectively and benefit the society.

2.2. Types of Taxes

Taxation can take the form of indirect taxes and direct taxes (Oyegun and Efangwu Ugochukwu, 2023). Direct taxes such as property tax, corporate tax, and income tax are levied directly on businesses and individuals based on their property values, profits, and income. Moreover, those who are imposed with these taxes pay them directly to the government. This is to create transparency and accountability between the taxpayers and the government. However, direct taxes often relate to the ability-to-pay, meaning that the taxes imposed on businesses and individuals differ according to their levels of income and wealth (Utz, 2001). In contrast, indirect taxes include value-added tax (VAT), excise tax, and sales tax, and these are included in the prices of goods and services; and instead of the government collecting them, they are collected by businesses on their behalf (Erero, 2015). Likewise, these types of tax are already added to the prices of goods and services purchased by individuals, and they have no but to contribute (Schenk et al., 2015). Similarly, this is to ensure that people who buy or use certain products contribute to the revenue needed by the government to provide public goods and services. Therefore, both direct and indirect taxes generate an approach to tax policy that would be balanced to implement, that would address a variety of revenue.

2.3. Importance of Tax Policy

Tax policy refers to principles and guidelines established by the government for the imposition and collection of taxes (Sabry, 2024). Due to the importance of taxation, a tax policy was constructed to measure the effectiveness of imposing taxes on consumers and the redistribution of income and opportunities. It is always crucial for a country to have a well-built tax system

to ensure uninterrupted functioning of a national economy and effective in the life of a country (Khasanova, 2022). Even so, the right tax system should have principles of simplicity and transparent administrative procedures so that it is visible when the system is not being enforced (Tanzi, 2001). On the other hand, Abdel-Kader and De Mooij (2020) argues that the right tax system should have the principles of efficiency and equity, while the efficiency principle aims to minimise the total deadweight loss of taxes. However, Tanzi further emphasises that selecting the right tax system can be based on personal income tax, corporate income tax, value-added tax, excises and import tariffs, tax incentives, tax holdings, tax credits, and investment allowances, accelerated depreciation, investment subsidies, indirect tax incentives, and triggering mechanisms.

In addition, these types of taxes can contribute to total tax revenue (Abdel-Kader and De Mooij, 2020). Broadly, tax policy has an impact on economic growth, in as much as taxation has an impact on long-term economic growth (Hettiarachchi et al., 2022). However, Streeter (2022) points out that tax policies affect the amount of income that consumers get, subject to the type of tax and the rate, at the same time, it affects the economic decision-making of consumers and businesses based on work, savings, consumption, and investment. Similarly, structural changes in tax policy affect investment and savings (Boskin, 1988). In contrast, taxes affect investment and employment and inequality through a progressive tax system (Abdel-Kader and De Mooij, 2020). In general, it is always essential to understand the use of taxes, different tax rates, and the main purpose of a tax policy. In other words, tax policies affect all aspects of the economy, whether economic or political.

2.4. Tax Policy and Economic Growth

2.4.1. Economic growth

The term 'economic growth' could refer to at least three concepts (Gale and Samwick, 2017). Gale and Samwick (2017) point out that the first concept revolves around the mainstream that economic growth is the steady-state rate of growth, meaning that it incorporates an economic model of demand and supply over time; the second concept is that economic growth relates to any change in the level of economic productivity over some time; the third concept conceptualise economic growth as any change in the level of economic activity for periods longer than the business cycle. Adudu and Ojonye (2015) note that economic growth can be affected by taxes as a fiscal policy instrument, which is the most crucial instrument used in managing the economy, and there are five mechanisms for that which will be discussed in the next section.

2.4.2. Impact of tax policy on economic growth

These five mechanisms include, firstly, that high taxes on labour supply can take out of context the efficiency of human capital. Secondly, some sectors may have low productivity, therefore, because of taxes, the resources can flow to those sectors. Thirdly, tax policy can affect productivity growth through the discouragement of its effect on research and development expenditures. Fourth, taxes have the possibility of slowing down labour supply growth by disposing of labour. Finally, taxes can interfere with investment rates through taxes such as capital gain tax, personal income tax, and corporate tax. Furthermore, tax policy can have an impact on economic growth, and it can be a positive, negative, or nonlinear effect based on the type of tax and tax rate.

Since different taxes and tax rates can potentially affect economic growth, it is crucial to understand the kind of relationship that exists between taxes and economic growth (Dzingirai Canicio, 2014). However, most studies focused on the impact different tax rates have on economic growth but hardly examined the relationship between tax policy changes in terms of tax rates affecting economic growth (Johansson et al., 2008). Moreover, the most examined tax rates are personal income tax and value-added tax, but not in the South African context considering its uniqueness regarding the socioeconomic challenges the country faces.

However, taxes affect inequality, through a progressive tax system that increases the tax burden on the wealth or income of the taxpayer, but also through the dimensions of equality (Abdel-Kader and De Mooij, 2020). The authors further state that there should be horizontal and intergenerational equity between consumers. The study emphasises the importance of adhering and complying to tax policy regulations and relates to the principle of fairness for a good tax system as stated by Grundoff et al. (2022), which also relates to the ability-to-pay theory and depends on the Adam Smith conceptualisation of a sound tax system. However, the theory that is held to justify progressive taxation under three theories, which are the ability-to-pay theory, the benefit theory, and optimal taxation theory will be discussed in the following section.

2.5. Theories of Taxation

2.5.1. Ability-to-pay theory

According to Seriah (2024), the ability-to-pay theory supports the idea of proportionate taxation established based on financial capability, with some of the taxpayers who possess more resources bearing more tax burden. Similarly, the theory dictates that those who can pay more should be taxed heavily than those who are worse off regardless of whether they benefit from the government or not (Alao et al., 2015). According to this theory, each consumer should contribute to the state proportionately to his or her ability-to-pay (Baharu Sisay Negatu, 2023). However, Istaiteyeh et al. (2023) and Otekunrin et al. (2023) argued that this theory was built on concepts like subjectivity and vagueness, such as burden and sacrifice, which in practice are not easy to measure and define. This theory ignores the benefits that taxpayers obtain as a return to their payments for tax.

2.5.2. The benefit theory

The benefit theory, developed by Adam Smith in 1956 states that between the benefits taxpayers can get and the services the government provides, there should be some favourable exchange (Smith, 1776). Similarly, according to Bala et al. (2021) and Dodge (2005), the benefit received from the state should be proportional to the person's taxes. However, Chauke (2023) argues that the benefit theory will only be applicable to a limited number of people. Fuchi (2024) argues that for a progressive tax structure, it is difficult to justify the redistribution of income. He further insinuates that this is mainly because the tax burden is not proportional to the benefits

acquired and enjoyed by people under progressive income taxation. Therefore, the benefit theory does not always work in favour of taxpayers who bear the tax burden, as they might not be enjoying the benefits of services provided by the government in all instances.

2.5.3. The optimal taxation theory

Finally, the last theory, the optimal taxation theory, according to Revesz (2020), was introduced into the literature by Atkinson and Stiglitz (1976) hand Mirrlees (1976). Barbu et al. (2022) state that the "optimal taxation" describes attempts to combine the principles of efficiency and fairness. The theory suggests that there is an assumption of homogeneity that is taken into account (Baharu Sisay Negatu, 2023). Baharu further states that this theory is about welfare maximisation, and the government usually collects a large amount of revenue to cover the construction costs of different social goods. Similarly, Josheski (2022) presents that the theory concludes that considering how consumers respond to transfers and taxes, subject to government constraints, the tax system should maximise a social welfare function.

However, Fiorito and Russo (2017) argue that the optimal tax theory is incomplete because it focusses on taxation as a revenue generation and ignores the problem of taxation as a system of force-collected revenue from consumers who usually tend to resist paying tax. The study states that according to the theory, subject to a set of constraints, a tax system should be chosen in alignment with the maximisation of social welfare function. But this function is set to be assumed that is based on the utility of consumers, hence, the objective is to set a tax system that maximises the welfare of a taxpayer (Fiorito and Russo, 2017). Fiorito and Russo (2017) further state that the assumption of homogeneity detours the issue of welfare regarding interpersonal comparisons, however, in practice the issue of heterogeneity is dealt with.

Therefore, they argue that the optimal taxation theory does not always protect the social welfare of taxpayers, even for those who potentially resist but are forced to pay tax due to a progressive tax system. Similarly, optimal tax theory is insufficient as a guide for critical issues in tax policy (Slemrod, 1990). Slemrod stresses that this is mainly because it has not accommodated taxation as a system of force for collecting taxes from consumers who potentially resist as a form of revenue generation. The study acknowledges that for alternative tax systems, there is a greater difference in the costs of operation of resources. Therefore, the ease of managing various taxes will continue to be a crucial determinant in choosing an appropriate tax policy.

2.6. Empirical Studies on Taxation and Economic Growth

However, there are some empirical findings from different studies on the impact tax rates have on economic growth, whether in the short or the long run. Overall, these studies find that there is a negative, positive, or non-linear relationship between different tax rates and economic growth and recommend that tax rates should be lowered.

2.6.1. Negative relationship

Fang (2024) conducted a study in the United States, using a systematic review, and focused on the impact of income tax, corporate tax, and individual tax on economic growth using a systematic review. He then concluded that there is a negative relationship between tax rates and economic growth, and they all depend on the rate of tax. Fang states that different tax rates determine how GDP will change for that period of increase or decrease and whether a positive or negative change could occur. There is a negative correlation between taxation and economic growth (Fang, 2024). Taxes affect economic growth through reduced savings and investment, amount of demand, and supply of labour (Kesner-Škreb, 2000).

Similarly, Dackehag and Hansson (2012) acknowledge that different researchers have found a negative relationship between economic growth and taxation, and further emphasise this by providing empirical evidence on the interrelationship between taxation and economic growth. The authors point out that high tax rates, initially on corporate tax, slow down economic growth, particularly in developed countries. Dackehag and Hansson (2012) emphasise that, regarding personal income tax, the negative impact on economic growth is significant like corporate rate but not consistent. In other words, the relationship between corporate income tax and personal income tax negatively influences economic growth, but with the correlation between economic growth and corporate income tax being robust. Therefore, their findings critically indicate the need for a tax policy that seeks to balance economic growth objectives with tax policies.

However, Kneller et al. (1999) compiled a study using panel data from 1970 to 1995, and found convincing evidence of the negative effects taxation has on economic growth for OECD countries; and a result also found by Cashin (1995) for developed countries using cross-sectional data from 1971 to 1988; and by Benos (2009) and Romero-Avila and Strauch (2008) for European countries for time period from 1990 to 2006. Similarly, Arnold et al. (2011) estimated the relationship between taxes and economic growth based on their effect on economic growth with corporate income tax to be the most harmful tax on growth, while personal income tax is a friendly type of tax; the results were supported by Acosta-Ormaechea et al. (2019) using a cross section of countries for a time period from 1970 to 2009. However, these findings may be robust and suggest that studies should look at changes in the tax structure in place of tax burden and may produce additional conclusive improvements in the existing literature (Widmalm, 2001).

2.6.2. Positive relationship

Menescal and Alves (2024) conducted a study on developing countries using panel data for a period from 1990 to 2019, and their findings are supported by those of Arnold et al. (2011), suggesting that there is a positive impact of corporate income tax on economic growth. Menescal and Alves (2024) believe that their results support the existing non-linear relationship between economic growth and different tax rates and are both from the short- and long-run viewpoint. In contrast to Arnold et al. (2011), Xing (2012) argues that the ranking between consumption taxes, personal income taxes and corporate income taxes has no

robustness. Corporate taxes have an insignificant relationship and consumption taxes have a negative impact on growth (Zimčík, 2016). Subsequently, many studies focused on the existence of an optimal level of government and tax rates for developed and developing countries (Armey, 1995; Barro, 1989; Rahn, 1996).

On the other hand, studies such as Aydin and Esen (2019) using dynamic panel data from 1995 to 2014 for central and south-eastern European and Baltic countries, and Amgain (2017) using panel data of 32 Asian countries from 1991 to 2021 focused on total public revenue by estimating its optimal level of linear relationships and found that there is a quadratic relationship between economic growth and tax rates. Furthermore, based on the quadratic relationship, Alves and Afonso (2019) focusing on OECD countries, using panel data from 1980 to 2015, found that several types of taxes can increase per capita GDP. Depending on the tax policies pursued, there is a fiscal space for higher overall tax-to-GDP ratios and increments in specific taxes (Menescal and Alves, 2024).

2.6.3. Non-linear relationship

On the contrary, Myles (2000) states that the theoretical models suggest that taxation significantly impacts economic growth, empirical results indicate that there is a very weak effect of taxation on economic growth using a systematic review. The author's conclusion is based on historical data showing that growth rates have remained stable while tax levels have increased significantly. Myles further points out that studies such as that of King and Rebelo (1990) found no significant robust relationship between marginal tax rates and economic growth while controlling factors such as income levels and political stability. The author outlines that some studies find the existence of a negative relationship, while others find the relationship to be positive or insignificant under certain conditions.

2.6.4. Comparison

However, Dackehag and Hansson (2012), Fang (2024), and Kesner-Škreb (2000) emphasise that corporate income taxes are harmful to economic growth. Dackehag and Hansson (2012) find that higher corporate taxes are associated with reducing GDP per capita growth; Myles, on the other hand, discusses those higher corporate taxes temper with innovation and investment decisions, eventually slowing growth. Although Myles did not conclude on the negative relationship between tax rates and growth, he acknowledges that corporate income tax hinders economic growth in as much as personal income tax could discourage labour supply and negatively affect growth. But Myles reviewed previous empirical studies, while Dackehag and Hansson (2012) conducted their own empirical analysis. Therefore, an increase in tax rates may have a substantial negative impact on growth, but, in general, tax rates might not significantly deter growth. And Acosta-Ormaechea et al. (2019) argue that the effect different taxes rates, including corporate tax, have on economic growth, depends on the model specification.

In contrast, taxation forms, both indirect and direct taxes, contribute to GDP growth by financing government redistribution and spending. At the same time, the contribution can be positive or negative. However, taxation is essential to reduce costs and manage redistribution of income. Furthermore, corporate income tax, excise and import tariffs, value-added tax, tax incentives, and personal income form part of the tax system, along with the triggering mechanisms. In previous studies, the authors defined tax policy as the way tax systems are constructed in a way that should be fair and efficient. Furthermore, tax policies affect employment savings, income, investment, and economic decision-making of consumers or taxpayers. Although the right tax system should be efficient, transparent, and simple. However, some argue that a tax system can be efficient and not fair and can be fair but not efficient. In addition, long-term growth is likely to be significantly impacted by tax policy.

Since tax policy can positively or negatively impact economic growth, it initially depends on the type and rate of tax. However, to achieve better growth rates for a fair tax system, there should be adherence to tax policy regulations as per the ability-to-pay theory and a sound tax system as classified by Adam Smith. Thus, the ability-to-pay, the benefit, and optimal taxation theories justify a progressive tax system. In this context, the ability to pay theory suggests that based on the financial ability, there should be proportionate taxation, with those who earn higher income bearing more tax burden. But this theory has been criticised for its lack of precision, not only that, but also its disregard for return on tax payments for taxpayer benefits. However, the benefit theory suggests that there should be a favourable exchange between government services and taxpayer benefits and was developed by Adam Smith in 1956. As a result of tax burden not being proportionate to the benefits received, it is often hard to justify in progressive tax structures and apply to a limited number of people.

Furthermore, the optimal taxation theory combines the principles of efficiency and fairness, and the homogeneity assumption is considered, in other words, it is assumed that taxpayers act in the same way. In this theory, it is about the maximisation of social welfare, and the government imposes taxes to collect revenue that covers the costs of providing public goods and services. However, some studies argue that this theory focuses on revenue generation, does not always protect the social welfare of taxpayers, and for issues in tax policy, it is insufficient to serve as a guide. Although tax policy affects all aspects of the economy, the goal is to have economic growth. Although different authors define economic growth in separate ways, all are summed into three categories. Therefore, understanding the relationship between economic growth and taxation is crucial, as it is part of an economy. Most studies concluded that there is a negative relationship between economic growth and taxation, while some argue that the impact depends on the type and the rate of tax, and the way in which the tax system is constructed and managed.

Therefore, the relationship between taxation and economic growth depends on the tax system in place and the goals. Moreover, most previous studies have focused on the impact that corporate income tax has on income growth, including personal income tax as one of their control variables. Very few authors have focused on personal income tax, corporate income tax, and value-added tax as a collective without including variables

such as employment, investment, and inflation to overview the relationship that exists between tax policies and economic growth. However, an inefficient and unfair tax system is blamed for low economic growth regarding taxation. It is often argued that tax rates are quite higher, and some consumers cannot afford to pay tax while also having to take care of their basic needs and wants. In summary, this then often results in high unemployment because consumers do not want to work for this reason of high taxes, especially in the South African context, considering the issue of inequality. In this literature review, previous studies were reviewed and most of them focused on OECD and EU countries, while some studied South Africa using theories from these countries.

3. METHODOLOGY AND DATA

The research was designed to examine the effects that various taxes such as personal income tax (PIT), corporate income tax (CIT), and value-added tax (VAT), have on economic growth, as represented by the tax-to-GDP ratio. This study used secondary data from 2000 to 2022 and employs a Vector Autoregressive (VAR) model to analyse the relationship between the variables. Moreover, this chapter is organised in a way that covers research design, followed by data collection and sources, then model specification, estimation procedures and lastly the limitations of the study.

3.1. Research Design

This study used a quantitative approach that is suitable for the analysis of numerical data and the examination of relationships between variables. The focus on this approach allows for objective measurement of the impact of tax policy changes on economic growth. And it is compatible with the objective of the study, as it uses econometric models to test hypotheses and derive empirical findings.

3.2. Research Data and Sources

This study relies on secondary data for the variables chosen in this model. To demonstrate the long-term and short-term effects of tax policy changes on economic growth, the data covered the period from 2000 to 2022. Moreover, annual data were obtained for that period. The secondary sources of data include savings, consumption data, GDP data, which was obtained from Easy Data Quantec, then tax data was collected from the International Monetary Fund (IMF) data. The data collection process used a systematic approach, by which relevant time series data was extracted from the abovementioned sources for the selected period. Then these datasets were cleaned to address any outliers, missing values, or inconsistencies, this was to ensure that the data have integrity. To analyse this dataset, the study makes use of Eviews14. This is because EViews is suited for time series analyses, which allows for the estimation of a VAR model, diagnostic testing, and the interpretation of results.

3.3. Model Specification

This study will be making use of quantitative secondary time series data from 2000 to 2022 (30 observations) to achieve the empirical objectives. The variables would then include tax-to-GDP ratio (shows tax revenue as a percentage of GDP), tax rate (measured by using corporate tax), consumption (measured by using Value Added Tax [VAT]), and income tax (measured by using Personal Income Tax [PIT]).The data will be collected from Easy Data Quantec and the International Monetary Fund (IMF) database, therefore the econometric software EViews will be used for this analysis. However, the econometric model approach that will be used to achieve the empirical objectives, will then be used to dictate the short- and long-run relationships, and casual relationship between taxation and economic growth in South Africa. Therefore, the unit root test will also be comprehended to make sure that the model chosen in this study is accurate. This unit root test will assist in dictating the stationarity level of variable. The Vector autoregressive (VAR) model will be used when there is evidence of stationarity at first differences in all the variables to show any linear interdependence between various time series. Moreover, variance decomposition (VDC) will follow by investigating the presence of a long-run relationship between variables. Finally, the Granger causality test will be used to examine the causal relationship between economic growth and taxation in the short run. Before the specification of the model, all the variables will be transformed to their natural logarithm.

$$GDP_t = f(TAXES, CONS, SAV) \quad (1)$$

Then this is transformed by their natural logarithm. Therefore, the model becomes:

$$GDP_t = \alpha + \beta_1 ltaxes_{t-1} + \beta_2 lcons_{t-1} + \beta_3 lsav_{t-1} + \varepsilon_t \quad (2)$$

Where: GDP_t is gross domestic product; $cons_t$ is consumption; sav_t is saving and $taxes_t$ is total taxes. However, as indicated above, three types of taxes will be used to analyse the relationship between taxation and economic growth. As a result, further models are obtained as follows.

$$GDP_t = \alpha + \beta_1 lPIT_{t-1} + \beta_2 lcons_{t-1} + \beta_3 lsav_{t-1} + \varepsilon_t \quad (3)$$

$$GDP_t = \alpha + \beta_1 lCIT_{t-1} + \beta_2 lcons_{t-1} + \beta_3 lsav_{t-1} + \varepsilon_t \quad (4)$$

$$GDP_t = \alpha + \beta_1 lVAT_{t-1} + \beta_2 lcons_{t-1} + \beta_3 lsav_{t-1} + \varepsilon_t \quad (5)$$

Where personal income tax is denoted by PIT, CIT denotes corporate income tax and VAT refers to value-added tax. Despite that it is not the primary objective of this study to interpret consumption and savings dynamics in this context, household consumption and savings will be used as control variables to make certain that the results are not spurious but are robust and enhance the effectiveness of the study (Riba, 2016: 27).

As mentioned above, the study uses VAR model to analyse the dynamic relationship between the economic growth, denoted by GDP (tax-to-GDP ratio), and chosen independent variables, which are PIT, CIT, VAT, savings, and consumption. The VAR model was selected due to its ability to model the interrelationships among numerous time series without needing prior assumptions about the direction of causality (Bose et al., 2017).

The VAR model is specified as follows:

$$GDP_t = \propto + \sum_{i=1}^{p} \beta_{1i} GDP_{t-i} + \sum_{i=1}^{p} \beta_{2i} PIT_{t-i} + \sum_{i=1}^{p} \beta_{3i} CIT_{t-i}$$
$$+ \sum_{i=1}^{p} \beta_{4i} VAT_{t-i} + \sum_{i=1}^{p} \beta_{5i} Savings_{t-i} + \sum_{i=1}^{p} \beta_{6i} Consumption_{t-i} + \varepsilon_t$$

In this model, GDP in time t is the dependent variable, while the lagged value of PIT, CIT, VAT, savings, and consumption are independent variables. Moreover, the optimal number of lags, p, is determined by using information criteria such as the Schwarz Bayesian Criterion (SBC) and Akaike Information Criterion (AIC), this is to ensure that the model captures relevant dynamics without overfitting. Then, as there are some unexplained variations with every model, the error term, ε_t, then captures these variations.

3.4. Model Estimation

The estimation of a VAR model follows a logical process, ensuring that the model is reliable and robust. The steps include stationarity test, lag length selection, estimation of a VAR model, diagnostic testing, impulse response functions (IRFs), variance decomposition, and Granger causality testing. These steps are discussed below.

Before the estimation of any VAR model, it is important to test for stationarity of the time series. The stationarity testing suggests that the statistical properties of the series, such as variance, mean, and autocorrelation, remain unchanged over time (Nau, 2020). Consequently, non-stationary data can result in spurious regression results (Cheng et al., 2021). Therefore, to avoid this and test for stationarity in each variable, the Augmented Dickey-Fuller (ADF) test was used. The variables are differenced until they are stationary if they are found non-stationary. Once stationarity is confirmed, the next step is to determine the optimal lag length for the VAR model. It is crucial to have lag length that is appropriate for capturing the time related dynamics of the variable without overfitting the model (Liew, 2004). Moreover, the lag length is chosen based on the information criteria such as SBC, AIC, and Hannan-Quinn Criterion (HQC) (Ivanov and Kilian, 2001). This is because these criterions help balance the trade-off between accuracy and model complexity. With the lag length being known, the VAR model is estimated using Ordinary Least Squares (OLS) for each equation in the system (Eric, 2021).

Furthermore, after estimating the VAR model, diagnostic tests were run to ensure the model reliability and validity. These tests include the autocorrelation, where a Ljung-Box Q test is used to detect the presence of autocorrelation in the residuals; heteroskedasticity test, the Breuch-Pagan test is used to check for heteroskedasticity, this is to ensure that the variance of the residual is constant (Abdul-Hameed and Matanmi, 2021; Chan et al., 2022) In addition, IRFs were used to analyse the response of the GDP to a one-time shock in one of the independent variables. This examination helps to understand how tax policy changes affect economic growth over time, capturing both short- and long-term effects. Moreover, to assess the contribution of each variable to the forecast error variance of GDP, a variance decomposition was used. This analysis provides insights into which variables have a significant impact on GDP, helping to highlight the key drivers of economic growth in the South African context. Finally, the Granger causality test was conducted to assess the direction of the relationships between the independent variables and GDP. This test examines whether past values of each variable can predict future changes of one another, providing significant views into causal relationships between variables (Seth, 2007).

3.5. Data Limitations

The limitation of this study is that there was data from at least year 2000 from the publications of the National Treasury, Statistics South Africa (Stassa) and South African Revenue Services (SARS), for the taxes. Tax-to-GDP data was available from 1997 onwards. Therefore, data for all variables from 2000 was obtained.

4. RESULTS AND DISCUSSION

This section presents the discussion of results produced from the empirical analysis of this study. It includes the discussion of descriptive statistics, stationarity test, lag order selection, VAR results and diagnostics test such as autocorrelation test and heteroskedasticity test using the approach discussed in the previous section. It continues with the discussion of IRFs, variance decomposition test, causality test and model stability and roots table.

4.1. Descriptive Statistics

The descriptive statistics of the variables are presented in Table 1. It is noted from the table that yearly changes in consumption record the highest mean and median. This indicates that yearly changes in consumption are of significant magnitude, as compared to the rest of the variables, followed by GDP, SAV, and PIT. This is the indication of its sensitivity to change. However, in terms of changes from one year to the next, shown by standard deviation, consumption has the lowest magnitude and CIT the highest. This is evident that consumption yearly changes are least responsive to influences, followed by GDP.

With regards to skewness and kurtosis, are known to be indicators of data that is normally distributed. However, skewness measures

Table 1: Descriptive statistics

Name	LGDP	LCONS	LCIT	LPIT	LSAV	LVAT
Mean	3.155113	4.399866	1.644099	2.073249	2.916902	1.779619
Median	3.171004	4.405928	1.620276	2.054493	2.893966	1.796608
Standard Deviation	0.017206	0.019153	0.154423	0.113545	0.083432	0.072597
Skewness	−0.418833	−0.250327	0.321589	−0.0464	0.172737	−0.791824
Kurtosis	2.037084	1.580266	3.305396	1.590734	1.545879	2.42196

Source: Compiled by authors

the extent at which data is consistent around the mean, and for a symmetric normal distribution, it is expected to be close to zero. Moreover, all other variables have a negative skewness, thus showing a concentration of points of data that are bigger in number, except for savings and CIT. The values range from −0.8 to 0.2, thus having more correspondence to a normal distribution. Regrading kurtosis, a standard normal distribution is equal to 3. The higher the value, the sharper the peak is, thus, also speaks to the volatility of the data. GDP and VAT have the valued ranging from 2.0 to 2.4, which indicated that they are close to being an acceptable norm. Consumption, savings, and PIT have the values ranging from 1.5 to 1.6, depicting. flatter peaks or distribution. CIT value is an excess of the benchmark 3, being 3.3 exhibiting a steep peak, implying the presence of outliers.

4.2. Results of Stationarity Test

It is often crucial that the variables must be stationary in time series analysis (Heymans et al., 2014). The stationarity test is one of the requirements of VAR because the order of integration of the variables will show the right model to be selected for the estimation of the parameter and will prevent spurious regressions (Jalil and Rao, 2019). This study used the Augmented Dickey-Fuller (ADF) test. Table 2 summarises the findings of the unit root test and all the variables are integrated of order one or I (1). However, VAT, GDP, and PIT are stationary at levels using trend and intercept. And PIT is non-stationary at first difference using trend and intercept. Therefore, PIT is integrated of order two or I (2).

These results are similar to that of Obadiaru et al. (2024) on the impact of tax revenue on economic growth in Nigeria, using Autoregressive Distributed Lag (ARDL) model for a period from 1991 to 2021. The author found that GDP, VAT and CIT are non-stationary at levels, and PIT is stationary at levels. For the non-stationary of PIT when first differenced, could be related to the reality that PIT is considered to not be a determinant but a function of GDP in line with the Keynesian economics and fiscal policy theory.

4.3. Optimal Lag Length

The lag order selection was chosen using the Akaike Information Criterion (AIC), Schwarz Criterion (SC), and Hannan-Quinn Information Criterion (HQ). These information criterions were chosen because the results they generate are more resilient and stronger (Hamilton, 2020). The results of the lag order selection are shown in Table 3. Therefore, a first-order VAR or VAR (1) is used in this study was used. This lag selection is similar to that of Musa and Sanusi (2013) on the study of analysing the impact of VAT on economic growth in Nigeria, using unrestricted VAR technique for a period from 1994 to 2010.

4.4. Analysis of VAR Results

As the results are stationary at I (1), we continue to run our model. Table 4 presents evidence that the lag values of GDP predict GDP, PIT, VAT, and cons. Similarly, the values of PIT predict PIT and savings. Likewise, the lag values of CIT predict only savings. Equally so, the lag values of VAT predict CIT and sav. Correspondingly, the lag values of sav predict sav, GDP, PIT, CIT, and VAT. And finally, the lag values of cons predict GDP, PIT, CIT and sav. The results show that there is reverse causality between GDP and cons, PIT and sav, CIT and sav, VAT and sav. These results show that GDP is affected by its own past values and PIT, CIT, VAT, sav and cons significantly. The results show that GDP is highly autoregressive with a coefficient of 0.97. This indicates that the current GDP is explained by its own past values, ceteris paribus.

With regards to the impact of PIT on economic growth, PIT has a negative coefficient of −0.715, suggesting that a 1% increase in PIT would lead to a reduction in GDP growth. This result is in line with the Keynesian economic theory, as higher PIT reduces disposal income. And it often leads to a reduction in the size of household consumption, which is a primary driver of economic growth especially for South Africa. These results are consistent with Tala (2024) study on the effects of fiscal policy on economic growth in South Africa, for the period 1993Q3-2022Q4, using Non-linear Autoregressive Distributed Lag (NARDL). Tala (2024) concluded that a rise in PIT is detrimental to growth in the long run, though it is growth friendly in the short run. Even though in this model the impact is not statistically significant, a negative sign shows that any shift in the tax policy towards increasing PIT could have restrictive effects on the economy, especially with households spending. Similarly, the CIT coefficient (−0.373) suggests that corporates taxes that are higher are associated with slower GDP growth. This mean that a one percent increase in

Table 2: Stationarity test results (ADF Test)

Name	Intercept	Trend+intercept	None	Intercept I (1)	Trend+intercept I (1)	None I (1)
LCONS	0.4786	0.1678	0.6988	0.0027	0.0127	0.0001
LGDP	0.4704	0.025	0.9107	0.0019	0.0106	0.0001
LPIT	0.8864	0.028	0.8075	0.0583	0.1901	0.0056
LSAV	0.4833	0.1775	0.6242	0.003	0.0143	0.0001
LVAT	0.1689	0.0075	0.8632	0.0017	0.0088	0.0001
LCIT	0.0874	0.4097	0.8262	0.0035	0.0211	0.0001

Source: Compiled by authors

Table 3: Lag order selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	318.2902	NA	1.89E-20	−28.09246	−28.09246	−28.31992
1	387.4746	94.34243*	1.06e-21*	−29.32388*	−29.32388*	30.91611*

Source: Compiled by authors

Table 4: VAR results

Variable	DLGDP
DLGDP (-1)	0.971612
DLPIT (−1)	−0.715949
DLCIT (−1)	−0.373589
DLVAT (−1)	−0.023562
DLSAV (−1)	2.826386
DLCONS (−1)	11.69028
c	0.009152
R-squared	0.303437
Adj.R-squared	0.004910
Akaike AIC	−3.070980
Schwarz SC	−2.722806
Log likelihood	39.24529

Source: Compiled by authors

CIT, is likely to lead to a 37.3% decrease in GDP. CIT increases could decrease the businesses probability of production, leading to lower investment in human and physical capital, and as a result, it hampers the productivity growth in the long run. Even though the impact is not statistically significant, the results indicate that shifts that may occur in the tax policy to push toward higher CIT could demoralise business expansion and weaken economic growth.

Likewise, the VAT is the least influential tax variable in this model that has a negative impact of −0.023. Since VAT is a large part of economic growth, a higher rate could decrease consumer spending which often will lead to the slowing down of economic growth. Even though it is less influential, with regards to tax policy interventions to try to increase the VAT rates, may have an adverse impact on economic growth as most consumers would reduce their spending especially with the products and services they do not necessarily need. However, the results show that savings play a positive and significant role in promoting GDP growth with a coefficient of 2.826. This indicates that higher savings have a substantial and robust impact on GDP growth. In addition, this finding suggests that tax policies such as reduced taxed on interest income, which encourage income, could lead to a strong economic growth. This means that when consumers and businesses save more, it increases of funds for investment, which supports not only the short-run productivity gains but also the long-run and capital formation. Hence, it is vital to have tax policies that promote saving which could have a positive impact on economic growth.

Furthermore, the results show consumption as an essential driver of GDP growth in this model, with a large coefficient of 11.69 and it is statistically significant. This indicate that past increases or changes in consumption have a direct impact of GDP growth. This emphasises the essence consumer consumption in an economy. For example, lowering VAT or PIT could leave consumers with more disposable income, this means that consumers will spend more, in turn, driving economic growth. Conversely, policy interventions that decreases disposal income and increase consumption taxes through direct taxes that are high could reduce growth, as seen through insignificant and negative coefficients for VAT and PIT. Moreover, Riba (2017), Anghelache (2011) and Diacon and Maha (2015) also confirmed that consumption was the most positive significant contributor to economic growth. However, the R-squared for DLGDP is 0.303, meaning that the model explains about 30% of the variance in GDP growth. While these variables included in the model provide some explanations of the contributions to GDP growth, there are still some other factors outside the model that contribute to growth. However, the log likelihood (39.245), AIC (−3.070) and SC (−2.722) provide a standard for comparing this model to other potential specifications. The adjusted R-squared for the equation for the GDP is 0.004910, this indicates that a small amount of variability in GDP, after the accounting for the number of predictors, it is explained by the included variables in the model.

Table 5 presents the regression results for VAR system, and according to the results, there is a loglikelihood 347.5042, alongside with low values of AIC and SC indicates a strong fit of the model to the observed data. This high value suggests that the relationship among GDP, PIT, CIT, VAT, savings, and consumption are effectively captured by the model, increasing its power to predict. They also help understand how changes in fiscal policies such as tax policy's influence on economic growth. Moreover, this model effectively captures the dynamic interdependencies among variables, offering valuable insights into the future economic trends.

4.5. Diagnostic Tests

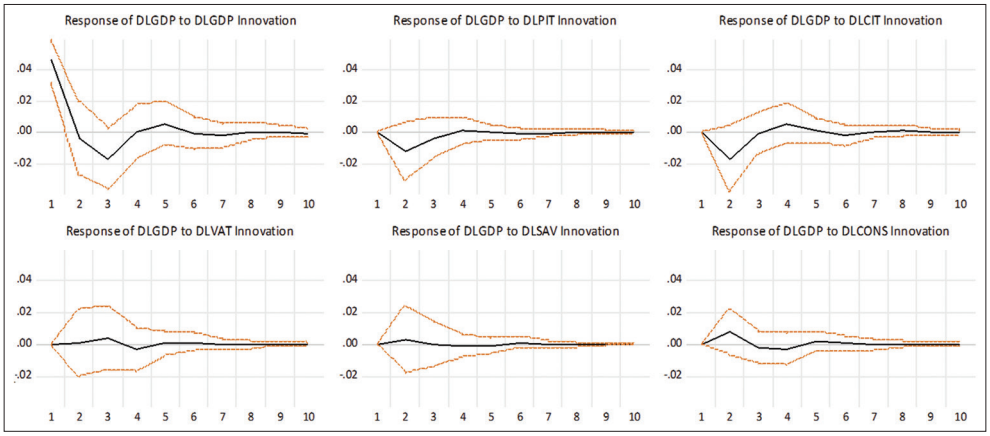
Table 6 presents the results of autocorrelation test and occurs when the residuals of the model are correlated overtime. The null hypothesis is that there is no serial correlation at lag one as a chosen optimal lag, and the alternative hypothesis is that there is serial correlation at lag one. The results show that we fail to reject the null hypothesis as the P-value (0.1222) is >0.05 significance level. This means that there is no significant evidence of serial correlation in the residuals at lag and the model does not suffer from serial autocorrelation. Therefore, it suggests that the model properly captures the structure of the variables. In other words, this model is well-specified and at least at lag 1 there is no evidence that essential dynamics have been omitted from the analysis.

Table 7 shows the results of heteroskedasticity test. The null hypothesis suggests homoskedasticity, meaning that there is no heteroskedasticity in the model. According to the results obtained, the P-value of an f-statistic and obs*R-squared are greater that 5% significance level. Therefore, we fail to reject the null hypothesis. This is another way of checking of the chosen VAR model.

4.6. Impulse Response Functions (IRFs)

The IRF plot displays the dynamic responses of GDP to the shocks of PIT, CIT, VAT, savings, and consumption over time. Figure 1 illustrates the IRF results, and each line represents how GDP responds to shocks in explanatory variables. The length of the response shows how long it takes for the effects of shocks to fade. A shorter length indicates a short-term effect, whereas a larger duration suggests a more lasting effect. The figure shows that a shock that comes with the variables, one or more of them has a negative immediate effect on GDP growth. If there is a standard deviation shock to PIT, GDP will initially decrease. This negative response gradually declines until the second period and then starts to increase. GDP then starts to increase and be at equilibrium for

Figure 1: IRFs results



Source: Compiled by authors

Table 5: Regression statistics for the VAR system

AIC	SC	Log-likelihood
−29.09564	−27.00659	347.5042

Source: Compiled by authors

Table 6: Autocorrelation test

Lag	LRE*stat	df	RaoF-stat	df.	Prob.
1	46.03002	36	1.368049	(−36.159)	0.2658

Source: Compiled by authors

Table 7: Heteroskedasticity test

Statistic	Value	df	Prob.
F-statistic	1.582324	Prob. F (5.16)	0.2213
Obs*R-squared	7.279125	Prob. Chi-square (5)	0.2007
Scaled explained SS	2.991616	Prob. Chi-square (5)	0.7013

Source: Compiled by authors

the rest of the periods. This implies that PIT shocks have an impact on GDP in the short-run but not the long-run. In other words, PIT increases may be contractionary, slowing down GDP growth.

A shock in CIT produces a negative response in GDP, causing it to decline. Raising CIT reduces the profits of businesses, which may lead to decrease in investment and in some instances, an increase in unemployment. This can also lead to businesses increasing their prices which shifts the tax burden to them, leading to indirect effects on consumption. GDP decreases until period 2 and starts increasing until it peaks at period 4, fluctuating between the periods. Furthermore, shocks in VAT increases GDP growth. This positive response gradually declines until between the third and fourth periods when it hits a steady state point. The declines implies that consumers are facing higher prices and their real purchasing power declines, in the short run. In the long-run, consumers eventually adjust to changes in prices of goods and services due to VAT increases, hence, the results show a steady state in the long-run. Moreover, shocks of savings and consumption tend to have a positive impact on GDP, with consumption showing a large positive response and influencing GDP growth. For example, if there is an increase in savings, there could be a decrease in consumption, and this tends to boost investments in assets leading to higher growth over time. Conversely, an increase in consumption increases GDP growth through high demand for goods and services. Figure 2 shows a combination of response of GDP to innovations in PIT, CIT, VAT, savings, and consumption.

4.7. Variance Decomposition (VDC)

As indicated in Table 8, the VDC of GDP, we have short periods from 1 to 5 years and extended periods from 6 to 10 years. Table 8, therefor, presents the VDC results of DLGDP. For the 1st year, GDP has a strong endogenous impact on itself by contributing a 100% forecast error variance. This means that other variables in the model do not have an influence on GDP, in that case, those variables have strong exogenous impact, in a sense that they do not influence GDP growth in the short run. By the second period, GDP still has a strong impact on itself with the variation of 81.19%, PIT explaining 5.48%, CIT explaining the second last percentage of 10.90, consumption (2.11), savings (0.29) and the least explaining for this period is VAT (0.00). This means that VAT explains only 0.0077% of GDP variance which is a minimal impact. Moving on to period three, GDP variance explained by its shocks then increases slightly to 82.19%, decreasing other variables contribution except VAT, which also slightly increased.

Moreover, from year 5 onwards, GDP proportion of variance explained by itself stabilises at around 80.5% and later from period eight onwards, it drops to 80.49%. CIT then stabilises around 10.64% of GDP variance. VAT and savings show some influence but small. Consumption contribution then increases with periods settling at 2.4%, meaning that it increasingly becomes a crucial factor in explaining changes in GDP. However, CIT play a critical role in explaining GDP variation, suggesting that any changes in tax policy that are related to CIT may have significant effects on economic growth.

PIT also has an impact, but it is lesser that CIT. Furthermore, VAT does not have much role in explaining the changes that occur in GDP, this suggests that indirect taxes such as VAT may have less impact on the short-term economic growth compared to direct taxes such as PIT and CIT. Therefore, the growing variance in consumption insinuates that stimulating consumption can have a pivotal impact on GDP, especially in the medium to long term growth.

Table 8: Variance decomposition results (VDC)

Period	S.E	DLGDP	DLPIT	DLCIT	DLAVT	DLSAV	DLCONS
1	0.045729	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.050928	81.19219	5.488763	10.90022	0.007737	0.295210	2.115882
3	0.053954	82.19461	5.344930	9.745833	0.407998	0.263029	2.043599
4	0.054472	80.64206	5.262962	10.63047	0.823140	0.313164	2.328206
5	0.054813	80.74279	5.199536	10.52350	0.816874	0.334375	2.382930
6	0.054908	80.50112	5.233627	10.64321	0.868741	0.361865	2.391436
7	0.054962	80.52041	5.227573	10.62264	0.869238	0.361328	2.398815
8	0.054975	80.49462	5.226467	10.64222	0.873028	0.364390	2.399271
9	0.054980	80.49516	5.225680	10.64053	0.873506	0.364338	2.400789
10	0.054982	80.49229	5.226156	10.64221	0.874030	0.364632	2.400677

Source: Compiled by authors

Table 9: Causality results

Null Hypothesis	Obs	F-statistic	Prob.
DLPIT does not Granger cause DLGDP	21	0.98968	0.3330
DLGDP does not Granger Cause DLPIT	21	0.19258	0.6660
DLCIT does not Granger Cause DLGDP	21	0.74873	0.3983
DLGDP does not Granger Cause DLCIT	21	0.07604	0.7859
DLVAT does not Granger Cause DLGDP	21	3.64887	0.0722
DLGDP does not Granger Cause DLVAT	21	3.41901	0.0809
D LSAV does not Granger Cause DLGDP	21	0.07026	0.7940
DLGDP does not Granger Cause DLSAV	21	0.39244	0.5389
DLCONS does not Granger Cause DLGDP	21	0.05380	0.8192
DLGDP does not Granger Cause DLCONS	21	0.27591	0.6058
DLCIT does not Granger Cause DLPIT	21	1.09885	0.3084
DLPIT does not Granger Cause DLCIT	21	1.84993	0.1096
DLVAT does not Granger Cause DLPIT	21	0.05218	0.8219
DLPIT does not Granger Cause DLVAT	21	4.73782	0.0431
DLSAV does not Granger Cause DLPIT	21	0.00660	0.9362
DLPIT does not Granger Cause DLSAV	21	3.15684	0.0925
DLCONS does not Granger Cause DLPIT	21	0.00624	0.9379
DLPIT does not Granger Cause DLCONS	21	3.28434	0.0867
DLVAT does not Granger Cause DLCIT	21	3.09788	0.0954
DLCIT does not Granger Cause DLVAT	21	1.33482	0.2631
DLSAV does not Granger Cause DLCIT	21	0.15004	0.7030
DLCIT does not Granger Cause DLSAV	21	0.36839	0.5515
DLCONS does not Granger Cause DLCIT	21	0.11036	0.7436
DLCIT does not Granger Cause DLCONS	21	0.57450	0.4583
DLSAV does not Granger Cause DLVAT	21	0.61484	0.4432
DLVAT does not Granger Cause DLSAV	21	0.01582	0.9013
DLCONS does not Granger Cause DLVAT	21	0.69882	0.4141
DLVAT does not Granger Cause DLCONS	21	0.02041	0.8880
DLCONS does not Granger Cause DLSAV	21	0.23011	0.6372
DLSAV does not Granger Cause DLCONS	21	0.28210	0.6018

Source: Compiled by authors

Table 10: Roots table

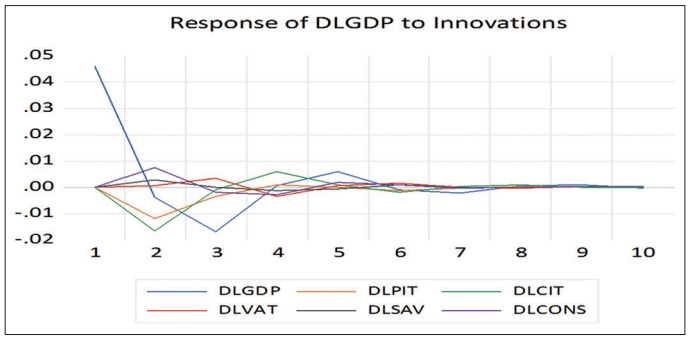
Root	Modulus
−0.057682−0.603041i	0.605794
−0.057682+0.603041i	0.605794
0.568384	0.568384
−0.286590−0.167523i	0.331961
−0.286590+0.167523i	0.331961
−0.116347	0.116347

No root lies outside the unit circle, VAR satisfies the stability condition
Source: Compiled by authors

4.8. Granger Causality Test

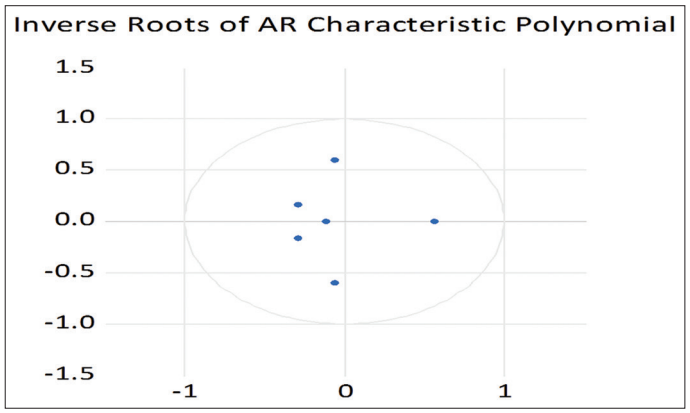
Table 9 below shows the causal relationship between variables. The null hypothesis is that x does not granger cause y (x and y can be any of the variables). The results show that we fail to reject the null hypothesis in all instances that there is a causal relationship between tax rates, consumption, savings and GDP except for PIT and VAT at 5% level of significance. Therefore, there is a significant relationship between them VAT and PIT. PIT granger causes VAT (P=0.0431), meaning that there is a unidirectional causality effect between the two variables. This also means that changes in PIT can predict VAT variation. Hence, we reject the null hypothesis. However, at 10% level of significance, we can reject the null hypothesis that GDP does not granger cause VAT, PIT, does not granger cause CIT, VAT does not granger cause CIT, PIT does not granger cause consumption, and PIT does not granger cause savings. This means that in the long run, one variable can lead to a change and variation in the other variable.

Figure 2: GDP response to innovations (IRF)



Source: Compiled by authors

Figure 3: Stability of the model



Author's own research

4.9. Model Stability

To check the stability of the model, an inverse roots diagram of the AR polynomial is generated. The condition here is that, for a

model to be considered stable, all the roots should be inside the unit cycle (Wang, 1996). According to Figure 3, it is detected that the VAR model meets the stability condition. All the inverse roots of AR characteristic polynomial are inside the unit cycle; therefore, one lag period is considered appropriate. Table 10 shows how are the roots distributed and proves that there are no roots outside the unit cycle and confirms the stability of the chosen VAR model.

4.10. Discussion

Numerous studies have investigated the relationship between taxation and economic growth and get different results, some studies concluded the same results as this study. For instance, Arnold et al. (2011) and Acosta-Ormaechea et al. (2019) both concluded that corporate and personal income taxes are likely to have a negative impact on economic growth, as compared to VAT. Arnold et al. (2011) conducted their study using data from 21 OECD countries for a period from 1970 to 2004, using an error correction setup. On the other hand, Acosta-Ormaechea et al. (2019) analysed data using a period from 1970 to 2009, for 69 countries, including developing and developed countries. Similarly, Martinez-Vazquez et al. (2011) who examined data from a sample of 116 countries, developing or developed countries for a period from 1972 to 2005, found that a tax structure that is more reliant on indirect taxes such as VAT tends to be more good to growth than ones that are dominated by direct taxes, especially in developing countries.

Furthermore, these studies use regression techniques and panel data to analyse the relationship between tax policy and economic growth. This includes studies of Arnold et al. (2011) and Gemmell et al. (2011) who used fixed effects regression models to account for unobserved heterogeneity across countries. Gemmell et al. (2011) analysed the data from 1970 to 2004, from a panel of OECD countries. On the one hand, Acosta-Ormaechea et al. (2019) used panel data regression to capture effects of tax composition over time. On the other hand, Martinez-Vazquez et al. (2011) used a panel data model to examine the effects tax structures have on economic growth in the long-run for developing countries. Furthermore, a study by Lee and Gordon (2005) highlighted that low corporate tax rates tend to stimulate economic activity, especially in open economies. This study analysed data from 1970 to 1974 using cross-country data and found that high corporate tax rates are usually associated with lower growth. However, Arnold et al. (2011) and Martinez-Vazquez et al. (2011) suggested tax policy reforms that shifts the burden towards the less distortionary taxes to promote long-tern economic growth.

5. CONCLUSION

This study assessed the impact of tax policy changes on economic growth in South Africa, with a focus on personal income tax (PIT), corporate income tax (CIT), and value-added tax (VAT) from 2000 to 2022. The research aimed to find how these taxes influence GDP, while also examining the roles of savings and consumption in promoting growth. The empirical results indicated that both PIT and CIT have a negative impact on GDP, with CIT having a greater effect, suppressing economic expansion and business investment. Specifically, increases in CIT and PIT rates significantly discourage entrepreneurship, investment, and economic expansion. Savings and consumption, however, were found to positively influence GDP, strengthening their importance as drivers of economic growth. VAT, while important for revenue generation, showed negligible impact on growth in the South African context.

This study provides important insights into South Africa's unique economic challenges, differentiating it from other developing countries. In many emerging economies, VAT serves as a key tool for stimulating growth due to its broad base, but in South Africa, structural factors such as income inequality and high unemployment limit its effectiveness. Additionally, the significant negative impact of CIT on growth in South Africa stands out compared to other developing nations, where corporate taxes, although oppressive, does not have such a pronounced effect on GDP. This highlights the sensitivity of South Africa's corporate sector to high tax rates, which may discourage investment and reduce overall economic productivity.

These findings align with existing literature and theoretical expectations, highlighting the importance of tax policy and systems in shaping economic outcomes. The results offer insights to policymakers on how to achieve economic growth while ensuring that tax rates are not high to suppress GDP growth. To foster economic growth, policymakers should consider reducing both PIT and CIT. Lowering CIT could stimulate business investment while reducing PIT could encourage household consumption, both of which are important for driving growth. Furthermore, encouraging savings and consumption through the implementation of policies such as consumption-oriented subsidies or tax-free savings accounts. Another way is through tax incentives which could provide an additional boost to the economy by increasing the funds available for investment especially in small and medium-sized enterprises (SMMEs). Although VAT has a limited impact on growth, it should still be managed carefully to avoid placing financial pressure and tax burden on low-income households. Moreover, these recommendations can advise South Africa's economic growth strategies and tax policy, promoting a more conducive business environment and stimulating economic growth.

However, the study has certain limitations. It focuses only on PIT, CIT, and VAT, without considering other taxes such as property taxes or excise duties, or broader economic variables such as government spending and inflation. Future research should broaden the analysis to include these factors and examine the sector-specific effects of tax policies to better understand the full scope of taxation's impact on South Africa's economy. It also uses annual data for 22 years, an exploration of quarterly data for an extended or short period should be used to fully understand the influences of tax policy interventions on economic growth. In conclusion, this study highlights the importance of tax reforms in South Africa, especially in reducing CIT and PIT to create a more favourable environment for economic growth. By balancing the need for government revenue with the imperative to stimulate consumption and investment, South Africa can promote sustainable long-term development and address the country's unique socio-economic challenges.

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