

**The relationship between tax and economic growth:
A South African perspective**

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by

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ABSTRACT

South Africa faces critically low growth levels amidst challenges of high unemployment levels and significant socio-economic inequalities. In intervening in the economy through provision of public goods and services promoting economic development, government levies taxes. Current public expenditure has been on the rise with the country having experienced current account deficits over more than a decade and declining growth rate over the last 5 years, thus bringing about talk of another wave of tax reforms in promoting growth. With the current concerns around tax policy and imminent tax increases in South Africa, it is imperative that a causal relationship between taxes and growth be investigated. The study, therefore, seeks to examine the impact of taxes in general and across the major three tax types, PIT, CIT and VAT on economic growth in South Africa.

The study uses quarterly data from 2003 to 2016 and employs the autoregressive distributed lag (ARDL) cointegration framework to examine the long run relationship between taxation and economic growth at the aggregate tax level, as well as at the major tax type levels, made up of personal income tax (PIT), corporate income tax (CIT) and value added tax (VAT). The model specified is derived from economic growth theory on the GDP aggregate income approach. Results obtained indicate the existence of long run equilibrium only at tax type levels. The results of the causality analysis provide support for the demand-following hypothesis of economic growth stimulating changes in aggregate taxes, PIT and CIT while a bi-directional relationship is observed between growth and VAT. The results suggest that a positive relationship exists between taxes and growth, where increases in VAT lead to increases in growth and increases in PIT and CIT are stimulated by economic growth.

It is recommended that there rather be an increase in VAT as opposed to the other tax types so as to bring about a more impactful, positive increase in economic growth, in alignment to the NDP. The resultant growth will thus bring about increases in PIT and CIT as income is boosted by higher growth levels.

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ABBREVIATIONS

GDP – gross domestic product

SADC – Southern African Development Community

PIT – personal income tax

CIT – corporate income tax

VAT – value added tax

NDP – National Development Plan

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Thank you.

CHAPTER I:

INTRODUCTION

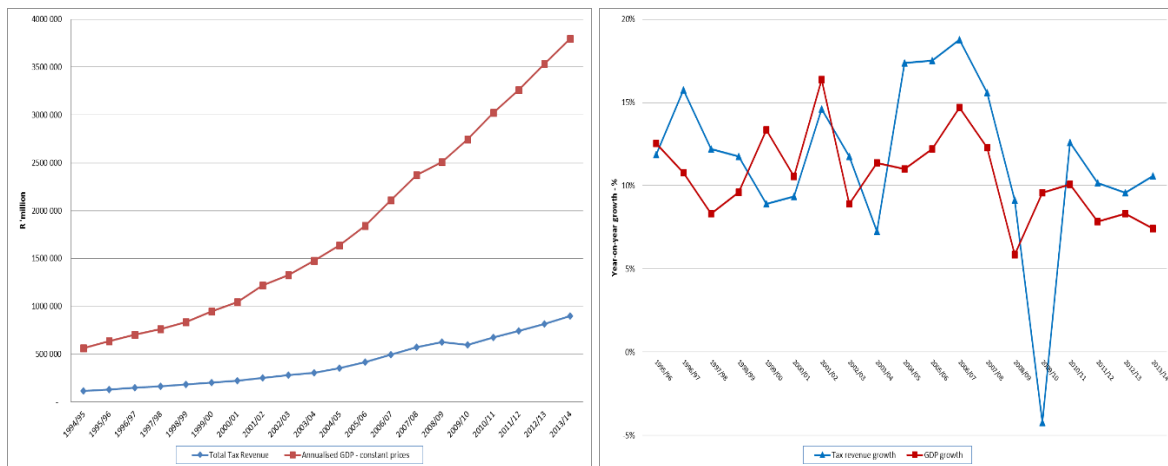
1.1 Background

Economic theory defines economic growth as the increase in the production of goods and services over a period, or simply put by Lewis (1955), progress or development. Considering that taxes are a proportion of income or consumption of a country's population, could they thus be viewed as a nation's measure of progress or development? There have been a number of studies performed to this effect in trying to determine if there is a relationship between taxes and economic growth across developed and developing countries, with their interesting findings indicating either a positive or negative or insignificant relationship in the various instances.

Since the advent of democracy in South Africa, it can be noted that over the past 20 years tax revenue and GDP (annualised at constant prices) have been on an upward growth trajectory in absolute terms, as evidenced by the graph on the left in Figure 1 below, with tax revenue growth less accelerated than GDP. When the trend is analysed according to year-on-year growth as per the graph on the right in Figure 1 below, it becomes more evident that the magnitude of the growth trajectory is steadily declining for both tax revenues and GDP, in similar traits although at a lag for tax revenue.

South Africa is considered to have a well-established tax system after several tax reforms over the various phases of the country's development over the years. Post the financial crisis, the country has been viewed to be veering towards an undesirable state of economic decline by various participants of the economy, with the latest GDP growth announcement indicating a decline of 1.2% in the first quarter of 2016 as reported by Statistics South Africa (Stats SA).

Fig. 1: Tax revenue and GDP trends



Source: Statistics South Africa

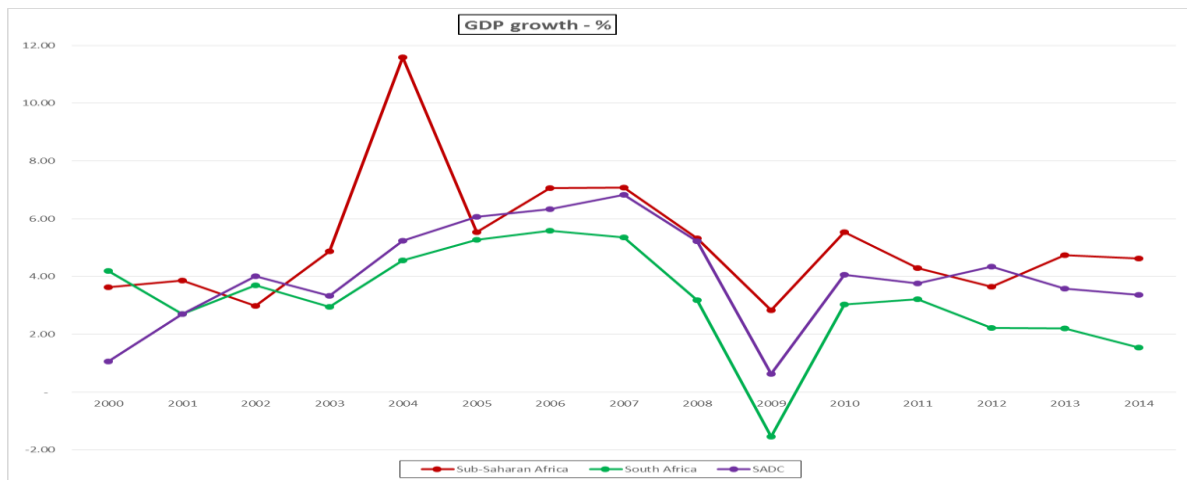
This paper seeks to assess if the current wave of concern expressed over the negative growth outlook is warranted, based on the extent of taxes collected by the government, by establishing if there is a causal relationship between taxes and economic growth.

1.2 Problem Statement

South Africa is considered an upper middle income country based on its GDP per capita, as classified by the World Bank. At a current level of -1.2% growth for the first quarter, as indicated above, it lags behind its neighbouring countries at 4.7% for sub-Saharan Africa as at 2015 data, according to the World Bank.

The graph in Figure 2 below compares growth in surrounding regions as classified by the sub-Saharan Africa region and the SADC region over the past 14 years as derived from World Bank indicators and SADC statistics Yearbook 2014. Both regions exhibit higher growth rates than South Africa pre and post the financial crisis lag (2009), with the South African growth exhibiting the most significant decline of the three regions.

Fig. 2: South Africa, SADC and sub-Saharan Africa GDP growth



Source: 2015 World Bank indicators and SADC statistics Yearbook 2014

South Africa faces a plethora of challenges as highlighted by Faulkner et al (2013), all contributing to this decline, including increasing economic and social inequality, high levels of unemployment and sensitivity to international market trends (since opening up of markets with the advent of democracy). These same challenges are also experienced by the surrounding regions. It is thus noteworthy to assess what makes South Africa unique, impacting GDP growth to such an extent as compared to its neighbouring countries.

The Constitution of South Africa (the Constitution) lays the principles and precedents of how the country is to be governed to ensure harmony and rule of law among its citizenry. “Improve the quality of life of all citizens and free the potential of each person”, an extract from the Preamble to the Constitution, “Secure the well-being of the people of the Republic”, one of the principles of co-operative government and intergovernmental relations stated in the Constitution. What then is the role of government in a developing country like South Africa? How then does government “improve the quality of life and secure the well-being of the people” as enshrined in the Constitution?

The three main roles of a government as attributed by Adam Smith (1776) are: 1) protection of the society from the violence and invasion of other independent societies by a military force; 2) protection of every member of the society from the injustice or oppression of every other

member through administration of justice and; 3) erecting and maintaining public institutions and those public works, which cannot be expected that any individual, or small number of individuals, should erect or maintain, all three dependent on the state of the society or level of development. These views are similarly expressed by Gwartney et al (1996), who state the two main purposes for government as protection of individual's property rights and provision of public goods and services.

This mechanistic view of the role of government by Smith differs significantly from that currently espoused by the South African government, as indicated in the Constitution gravitating to a combination of the organic view or socialist view of government tweaked to accommodate the individual to also achieve individual goals. In terms of economic theory, government exists to intervene where there is market failure, due to markets failing to maximise gains from efficient trade in achieving the most effective outcome for society (Alagidede, 2012).

There are several ways that government intervenes in an economy, the most popular of which constitutes taxation as a means for provision of public goods and services. A good tax system has the traits of equity in terms of progressivity thereof and efficiency in terms of collection thereof. The South African tax system is viewed to be progressive among the various tax types and improved on efficiency (Steenekamp (2012) and Nyamongo and Schoeman (2007)).

As indicated earlier economic growth refers to increase in production of goods and services over a period of time. Government's role thus seems aligned to this in that it provides public goods and services. In government carrying out its functions, it collects taxes. It would thus seem that taxes have a role to play in economic growth, as defined earlier.

Thus the following specific research questions are to be addressed in this study:

- *Is there a relationship between taxes and economic growth in South Africa?*
- *Is this relationship contingent on the type of tax analysed?*

1.3 Research objectives

In the context of the research questions above, the main research objectives of this study are as follows:

- To examine the relationship between taxes and economic growth in South Africa.

- To assess the impact of different types of tax on economic growth in South Africa.

1.4 Hypothesis of the study

In the context of the research objectives above, the appropriate hypothesis for this study is as follows:

- H_1 : There is a significant positive relationship between taxation and economic growth in South Africa.
- H_2 : The relationship between taxes and economic growth in South Africa is impacted by tax type.

1.5 Justification of the study

Various studies have been performed on the relationship between taxes and economic growth in South Africa and several other developing countries, with differing outcomes and additional attributes explaining determinants of economic growth. However, there haven't been more recent studies performed that take into account the current tax collection trends where tax revenues have surpassed the trillion-rand level, with public expenditure further increasing and thus widening the current account deficit. The current turbulent economic cycles have also driven down company profits, thus resulting in lower CIT and less compliance on the side of VAT taxpayers, possibly resulting in even lower levels of VAT revenues being collected. These concerns, coupled with the current low economic growth levels, high unemployment and inequality, make this study an interesting area of focus in the context of the current economic climate. According to the 2016 Macro Analysis Report, the Davis Tax Committee is commissioned to 'assess the role of the tax system in supporting inclusive growth, employment, development, equity and fiscal sustainability in South Africa and how it might best be structured to achieve these objectives'. It faces a delicate task of balancing tax reforms to increase tax revenues, promote economic growth, and yet still ensure that progressivity and equality are key attributes to the tax system, given our socio-economic challenges as a country.

1.6 Organisation of the study

This paper is thus organised as follows: The proceeding chapter provides an overview of the taxation system and reforms in South Africa, as well as prior literature on this relationship with economic growth, primarily in developed countries and in South Africa. This is followed by the methodology followed in testing this relationship; then a discussion of the empirical results and analysis, and finally the conclusion and recommendations based on results obtained.

CHAPTER II:

LITERATURE REVIEW

2.1 Introduction

There are several studies on the relationship between taxes and economic growth that have been conducted across the board, based on either the neoclassical or endogenous growth theory. It is, however, noted that these are mainly conducted within the realm of developed countries, which may exhibit differing traits from developing countries, especially in the Sub-Saharan African context. As this study is specifically for the South African context, around five papers were noted of studies conducted to date on this relationship within the South African context. Other studies based on the South African context either looked at the relationship between other factors such as the financial system, inflation and economic growth or at taxes in depth and methods in which to make the tax system efficient and progressive. The sections to follow will first examine the tax administration system of South Africa, covering the applicable legislation and reforms over the past two decades, as well as look at the various growth strategies launched by government in developing the country economically. This will be followed by an analysis of literature covered in relation to studies surveyed across broad captions of positive and negative attributes of taxes on economic growth, factors driving economic growth and tax types and impact on growth.

2.2 Overview of tax administration system

In South Africa, tax policy is set by the National Treasury (Department of Finance) and tax administration and collection by the South African Revenue Service (SARS) in terms of the South African Revenue Service Act (No. 34 of 1997). The primary legislation that SARS governs includes: Income Tax Act, 1962; Customs and Excise Act, 1964; Value-Added Tax Act, 1991; Tax Administration Act, 2011; and Employment Tax Incentives Act, 2013. There have been a number of tax reforms that have characterised the country, especially in post-democratic South Africa (since 1994), across the various tax types. The tax types within the South African tax system, as found in the National Treasury and SARS Tax Statistics joint publication, consist of direct taxes, being: personal income tax (PIT), corporate income tax

(CIT), dividends tax (previously called secondary tax on companies – STC) and other minor taxes, as well as indirect taxes, being value added tax (VAT), excise duties, fuel levies, customs duties and other minor taxes. These minor taxes include: Air Passenger Tax, Capital Gains Tax, Diamond Export Levy, Donations Tax, International Oil Pollution Levy, Mineral and Petroleum Resource, Securities Transfer Tax, Skills Development Levy, Transfer Duty, Turnover Tax, Unemployment Insurance Fund, Withholding Tax on Interest and on Royalties.

Table 1 below indicates how these various taxes contribute to the total tax revenues versus other OECD countries as at the 2013 and the 2015 year for South Africa, and 2013 for the OECD countries. The data for the 2013 information is obtained from the latest data obtained from the OECD tax database, whereas the 2015 data for South Africa the information is obtained from the joint National Treasury and SARS, Tax Statistics publication.

Table 1: Contribution of taxes to total tax revenue of SA versus OECD countries

Tax types (%)	OECD - 2013	SA - 2013	SA - 2015
Personal income tax	24.8%	34.0%	35.9%
Corporate income tax	8.5%	19.8%	18.9%
STC/Dividends tax		2.4%	2.2%
Other direct taxes		1.5%	1.6%
Total direct taxes	33.3%	57.7%	58.6%
General consumption taxes/VAT	20.2%	26.4%	26.5%
Specific consumption taxes	10.5%	-	-
Fuel levy		5.0%	4.9%
Customs duties		4.6%	4.1%
Specific excise duties		3.5%	3.3%
Other indirect taxes		2.6%	2.6%
Social security contributions 1	26.1%	-	-
(employee)	9.6%	-	-
(employer)	14.6%	-	-
Payroll taxes	1.1%	-	-
Property taxes	5.6%	-	-
Other taxes	3.3%	0.2%	0%
Total indirect taxes	66.7%	42.3%	41.4%
Total	100.0%	100.0%	100.0%

Source: OECD tax database and National Treasury- SARS Tax Statistics publication

The OECD countries include Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States,

Korea, Mexico, Chile, Hungary and Poland, Czech Republic, Estonia, Israel, the Slovak Republic and Slovenia.

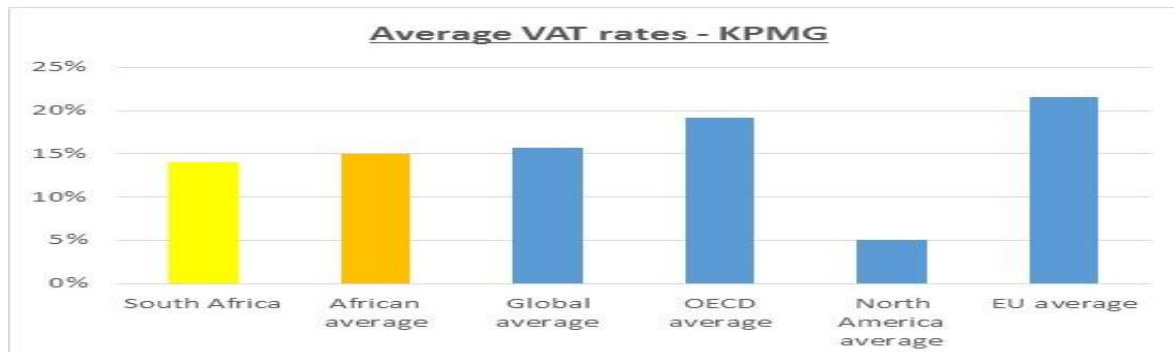
In the South African context based on the contributions of the various tax types to total taxes as depicted above, it can be seen that PIT, CIT and VAT contribute just over 80% of total tax revenues (as compared to 63% in OECD countries). These three major tax types will thus be the focus of this study, similar to related studies by Nyamongo and Schoeman (2007), Koch, Schoeman and Van Tonder (2005) and Steenekamp (2012). PIT and CIT are governed by the Income Tax Act, 1962 (Act 58 of 1962) and VAT by the Value-Added Tax Act, 1991 (Act 89 of 1991).

Nyamongo and Schoeman (2007), in their study on tax reforms and progressivity of PIT, provide a summation of the major reforms in PIT and CIT over the last 2 decades to 2004. They indicate how, prior to 1989, the income tax system differentiated between married, unmarried and female taxpayers, with 19 tax brackets and marginal rates of 45% at the highest bracket. The brackets were minimised in 1993 to eventually consist of 11 for married taxpayers, 9 for unmarried taxpayers and from 11 in 1991 to 8 for women (down from 11 introduced in 1991). Post-1994, the government appointed the Katz Commission to look into the efficiency and effectiveness of the tax system. As a result of their investigation into 'gender issues, tax base, tax thresholds, income brackets, tax rates, progressivity, fiscal drag and income tax exemptions for charitable, religious and educational institutions', there came a number of reforms over a number of phases. The initial reforms included: a reduction in the number of tax brackets and 'harmonised' schedules where taxpayers were classified as natural (PIT) or unnatural persons (CIT); the introduction of transfer pricing and capitalisation rules; the introduction of fringe benefits tax; and a tax amnesty to ensure all eligible taxpayers are registered, thus increasing the tax base. The second set of reforms were characterised for convergence to international tax laws and included: changing from source-based to residence-based tax; the introduction of the concept public-benefit organisation; the abolishment of child rebates; annual adjustments of tax brackets and thresholds in line with inflation; and a second amnesty for violators of exchange control regulations. Currently, the Davis Tax Committee has been set up and has already produced some reports regarding further future reforms to broaden the tax base further, while still ensuring a progressive and appropriate tax system.

Kearney (2003) conducted a study with recommendations on restructuring VAT while addressing the country's then economic growth plan, GEAR. The study provides a succinct account of reforms in the VAT spectrum, also over the past two or so decades. VAT was

introduced in 1991 to replace general sales tax (GST). It was initially introduced at 10%, in line with then international practice; however, this rate increased to 14% in 1993 and has stayed at this level since then. In order to reduce its regressive nature, certain items were zero-rated or exempted from VAT for various reasons, including: to minimise the negative impact of basic food items and paraffin, consumed mostly by poorer households; to avoid complexity in calculating value-added tax of certain services such as financial services; to administer the VAT system effectively by applying a threshold so as to not burden small businesses, at a considerable cost to the tax system, thus outweighing any associated benefits. VAT is administered on an invoice basis at last point of retail. At the time of this study being done, the USA had not as yet introduced VAT in the same sense as in the context of the other OECD countries. Japan, although first to introduce this type of tax, repealed it and then subsequently reintroduced it. Considering that these countries are developed countries and have enjoyed economic growth, it raises questions about the significance of VAT in their general tax system. Figure 3 below indicates the average standard VAT rates in 2015 for the various regions globally as extracted from the KPMG tax database.

Fig. 3: Regional average VAT rates



Source: KPMG tax database

The EU region and OECD countries are considered to be developed countries, however, exhibit higher VAT rates when compared to the African average rate. Upon assessing these average rates at country level for the OECD countries as listed in Table 2, it is interesting to note that the majority of the developed countries have higher VAT rates, with only four countries having standard VAT rates that are less than South Africa’s 14% rate. The North America average tax rate represents that of Canada which forms one of the four developed countries mentioned with a low tax rate. The US as previously mentioned does, not levy VAT.

This picture somewhat changes when we evaluate South Africa among its contemporaries in the emerging markets as per the Standard and Poors (S&P) emerging markets list and Market Classification Index (MSCI). The emerging market countries evaluated were limited to the BRICS economies based on 2016 rates obtained from the KPMG indirect tax rates tables as listed in Table 3 below. These countries are found to have rates that are in the midrange, relative to the OECD countries with rates between 14% and 19%.

Table 2: Standard VAT rates for OECD countries

OECD country	VAT rate	OECD country	VAT rate
Australia	10%	Japan	8%
Austria	20%	Korea	10%
Belgium	21%	Luxembourg	17%
Canada	5%	Mexico	16%
Chile	19%	Netherlands	21%
Czech Republic	21%	New Zealand	15%
Denmark	25%	Norway	25%
Estonia	20%	Poland	23%
Finland	24%	Portugal	23%
France	20%	Slovak Republic	20%
Germany	19%	Slovenia	22%
Greece	23%	Spain	21%
Hungary	27%	Sweden	25%
Iceland	24%	Switzerland	8%
Ireland	23%	Turkey	18%
Israel	17%	United Kingdom	20%
Italy	22%	United States	0%–7.5%

Source: OECD Tax Statistics

Table 3: Standard VAT rates for BRICS countries

Brics - emerging markers (KPMG)	VAT rate
Brazil	19%
China	17%
India	14.50%
Russia	18%
South Africa	14%

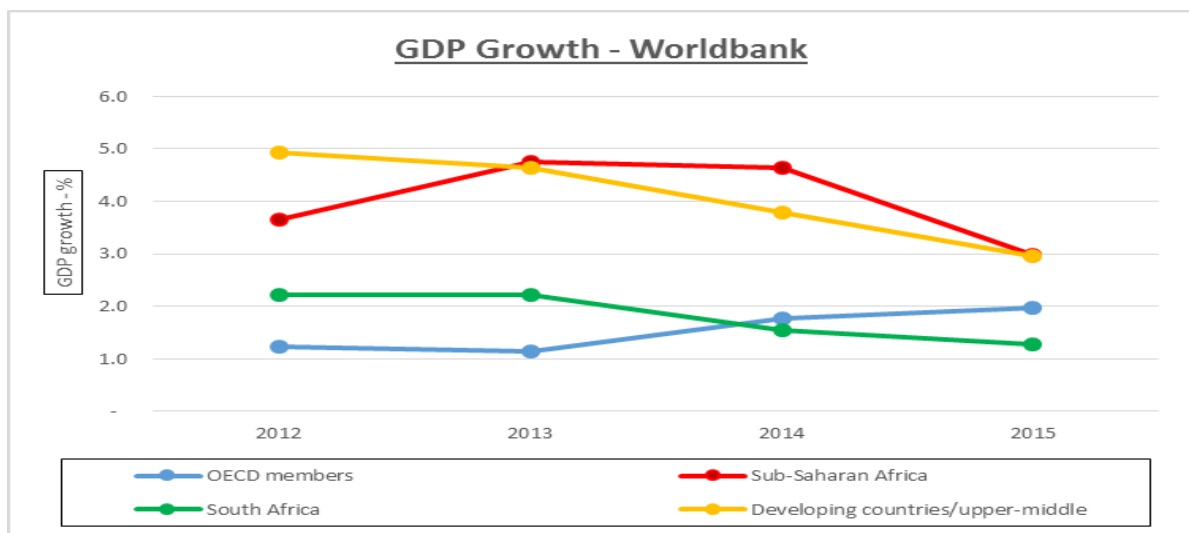
Source: KPMG indirect tax database

It may be concluded that consumption based tax rates are generally higher in developed countries than they are in developing or emerging markets. The lower VAT rate for South Africa could be seen as a competitive advantage among its peers, however, could be seen to provide tax policymakers with some room for a further increase in the rate to align to BRICS contemporaries, without being as excessive as developed countries.

2.3 South African growth strategies

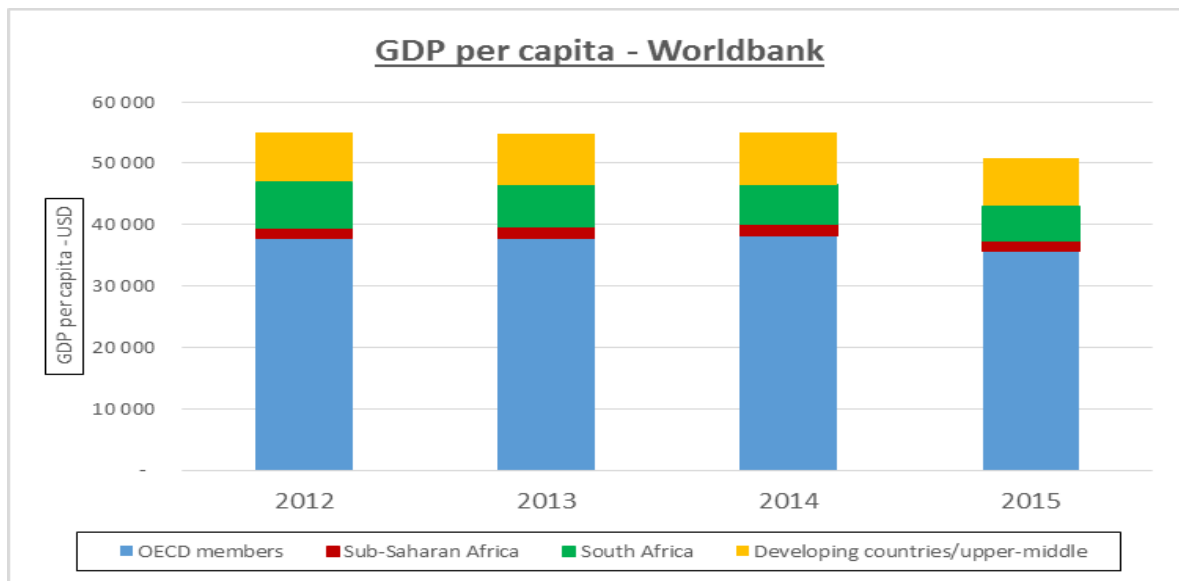
Over the last two decades, government has launched a number of growth strategies that have in part looked to develop economic growth. In the first democratic government, the Reconstruction and Development (RDP) trajectory was implemented with a specific consideration for redress. On an economic level, issues such as liberalising the economy and opening it up for trade were foremost, while balancing this with socio-economic concerns of reducing inequality. In the second government, the Growth, Employment and Redistribution (GEAR) strategy was implemented with major budget reforms in terms of public expenditure and increased incentives for promoting employment-creating investment. Currently, the government has launched the National Development Plan with a primary focus on reducing inequality. Despite this new growth strategy, economic growth has been on the decline, as measured in Figures 4 and 5 below per annual growth rate over the last four years and in terms of GDP per capita, respectively. South Africa is compared to its contemporaries within Sub-Saharan Africa as well as with other upper middle income economies per the World Bank economic classification, then also to developed countries constituting the OECD countries.

Fig. 4: GDP growth



Source: 2015 World Bank Indicators

Fig. 5: GDP per capita



Source: 2015 World Bank Indicators

South Africa, Sub-Saharan Africa and upper middle income economies have been experiencing a decline in respective growth trajectories since 2013 to 2015, whereas the OECD countries have been experiencing increases in growth rate over the same period. With regards to GDP per capita, the OECD countries show the highest average GDP per capita as compared to the average for upper middle income or developing economies and South Africa. The Sub-Saharan Africa average GDP per capita is the least of the four categories depicted, indicating a slight increase of 2% in 2013 and 2014 then declining by 13% in 2015. A similar trend is noted for upper middle income economies with growth rates of 5% and 2% in 2013 and 2014 and the OECD countries at 0% and 1%. They then also decline in 2015 by 8% and 7% respectively. South Africa's GDP per capita over the same period declines by amounts 9%, 6% and 12% year-on-year. This illustrates how significant the growth decline for the country is when put in context alongside its peers (Sub-Saharan Africa and upper middle income economies) and prospects (OECD countries).

2.4 Positive attributes of taxes on economic growth

Helms' (1985) study on the effect of taxes on economic growth indicates that at the state and the local level, increases in taxes support economic growth on the proviso that tax revenues are used by government to finance improved public services rather than transfer payments. This they attribute to these services being more highly valued by labour and business, and thereby

incentivise productivity. When taxes are used for transfer payments or redistribution of income, Helms finds a negative relationship between tax increases and economic growth.

Yi and Suyono (2014), in their study of the Hebei Province in China, find that at provincial level tax increases may not have as negative an effect on growth as most other studies have indicated, by amending the tax multiplier formula in their methodology. They find that reforming indirect to direct tax produces more conducive effects on growth, as well as directing government spending to factors that promote better living standards such as social security and other social programmes, and compensation for costs in the medical system.

Although Gale and Samwick (2016) focus on income taxes, they find that reforms that entail base-broadening measures have a positive impact on growth due to “the reallocation of resources from sectors that are currently tax-preferred to sectors that have the highest economic (pre-tax) return, which should increase the overall size of the economy”. They further assist with defining economic growth as “the expansion of the supply side of the economy and of potential Gross Domestic Product (GDP)”.

2.5 Negative attributes of taxes on economic growth

McBride (2012) reviews twenty six studies carried out from 1983 up until 2012, examining how taxes affect growth. Twenty of these studies, inclusive of those conducted in the last fifteen years, indicate a long term negative effect of taxes on growth. They move from the premise that growth is preceded by income and wealth production; however, taxes disincentivise investment, thus restricting growth. These studies have however been primarily conducted in developed countries.

Kimel (2011) studied the relationship of taxes to growth by assessing how taxpayers in the top marginal bracket make their investment and consumption choices. He found that as soon as the tax rates exceed 50%, taxpayers convert from investment to consumption. That is “the correlation between the top marginal tax rate and the ratio of investment to consumption for top marginal tax rates below 50% is 55%. That is to say, an increase in tax rates increases the ratio of investment to consumption when tax rates are below 50%. On the other hand, the correlation is negative when tax rates are above 50%”. Thus the increase in investment choice positively impacts on economic growth. Similarly, Levine (1991) finds that when tax policy reduces investment incentives, it negatively affects growth. Gale, Krupkin and Rueben (2015)

find that neither tax revenues nor top income tax rates have a significant relationship to economic growth. Koch, Schoeman and van Tonder (2005) acknowledge this aspect emanating from most studies performed on developing countries. However, in their study on South Africa, considered a developing country, they find a contrary relationship that is consistent with developed countries of decreasing tax burden having a positive impact on growth.

2.6 Factors driving economic growth

Barro (1996) utilises neoclassical and endogenous growth theory to establish the determinants of economic growth, which are listed as: higher initial schooling and life expectancy, lower fertility, lower government consumption, better maintenance of the rule of law, lower inflation, and improvements in the terms of trade. Also listed is what is referred to as public policies constituting “tax distortions, public-pension and transfer programs and regulations that affect labour, financial, and other markets”.

Chen and Feng (2002) in their study on determinants of economic growth in China, in addition to factors listed above, include four factors that government should employ in increasing economic growth across all provinces in the country. These include: reducing inequality to maintain political stability, diverting government spending to establishing schools, improving health care, and building inter-provincial infrastructure if funding is provided, free flow of goods and a stable macroeconomic environment conducive to sustainable growth. Thus taxation does not feature as a proponent of increases in economic growth, in a country that has been characterised by high growth levels for a good part of the last three decades.

Faulkner et al. (2013) find greater savings, investment, more productive use of capital by better skilled workers and moderation in unit labour costs, as determinants to increases in growth levels in South Africa. In the context of African countries, Kasekende (2012) finds similar determinants, as does Ndung’u (2012), with a focus on sub-Saharan Africa, whereas Masawe et al (2012) add the development of financial sectors to their determinants. McBride (2012) further reiterates production, innovation and risk-taking as factors promoting economic growth.

De Wet et al (2005), in their South African based study, find that government has limited scope in using taxes to directly influence economic growth. They also indicate that changes to the tax

mix and utilisation of tax revenues for increased government spending also point to a negative effect on growth.

Economic freedom is indicated as a promoter but not necessarily a determinant of the level of growth by de Haan and Sturm (2000) in their study on determinants of economic growth. Although the authors do not define economic freedom themselves, they rely on various authors' definitions thereof, including "the extent to which the economic system that controls choice reflects the expressed preferences of the majority of the citizenry rather than those of a ruling few" as expressed by Freedom House. Gwartney et al (1996) indicate that there is "economic freedom for individuals when 1) property they acquire without the use of force, fraud or theft is protected from physical invasions by others, and 2) they are free to use, exchange, or give their property to another as long as their actions do not violate the identical rights of others". These definitions point more to the mechanistic role of government in ensuring the wellbeing of its citizens. De Haan and Sturm thus model their research based on indicators (the Fraser Institute one and that of the Heritage Foundation Wall Street Journal) compiled in expressing economic freedom. They reach the conclusion that economic freedom is a proponent of economic growth as well, to the extent that tax revenues are devoted to the provision of public services valued by businesses and their employees; government spending also promotes economic growth.

De Gregorio (1993) finds that inefficient tax systems lead to high inflation, which in turn negatively impacts on growth. Thus, in order to promote economic growth, the tax system of a country needs to be efficient and not contribute to raising inflation. Myles (2000) includes innovation in production techniques and in goods and services provided to stimulate growth.

2.7 Tax types and impact on growth

Munir and Sultan (2016) analyse the impact of the various taxes on growth in Pakistan, indicating a "pro-growth" relationship with direct tax, sales tax and tax on international trade. Excise duty, on the other hand, is found to have the same trait; however, in the short run, it has a negative effect on growth as measured by real GDP. Pakistan is considered a developing country by the World Bank, i.e. a lower middle income country, thus in a similar, broader group as South Africa considered upper middle, with similar socio-economic challenges, such as income inequality, although with its political instability challenges. Thus the impact of these

taxes on growth could possibly indicate a similar effect on growth in South Africa, not overlooking the context of the lower level of maturity of Pakistan's tax system in terms of equity and efficiency in relation to the South African system, per study by Inam and Khan (extracted on Munich Personal RePEc Archive in June 2016), recommending some considerations for reforms.

In the McBride (2012) paper, he identifies the particularly negative effect of corporate and personal income tax, consumption taxes and property taxes on economic growth. Thus it could be ascertained that the majority of the studies reviewed by McBride point to the more severe negative impact that direct taxes have on growth as opposed to indirect taxes (e.g. sales tax), with the negative impact of corporate tax being the most pronounced. In the context of South Africa, corporate income tax (CIT) is the third largest tax contributor, having had a number of reforms implemented over the years, seeing the rate decrease from 40% in 1994 to 28% since 2008 to date. This reform being probably brought about by the very analogy of reducing the tax burden to promote further investment and production.

De Wet, Schoeman and Koch (2005) find that direct taxes have a negative effect on economic growth, similar to outcomes performed on most other studies on developed and developing countries; however, in contrast, they find an insignificant effect of indirect taxes on economic growth. They thus recommend a substitution effect of direct to indirect taxes to ease the tax burden and thus less negatively impact economic growth.

Phiri (2016) also finds the negative effect of direct taxes on growth; however, in establishing the ideal tax mix in his study on the optimal tax mix for South Africa in promoting growth, that there seems to be an optimal tax of 10.27% of the indirect tax–growth ratio. Below this ratio, indirect taxes are positively related to economic growth, and above this ratio, there seems to be no significant relationship between taxes and economic growth. Thus he makes similar recommendations to De Wet et al (2005) of a greater burden on indirect taxes not exceeding this threshold of 10.27%. Ilaboya and Mgbame (2012) in their study based on Nigeria, find an insignificant, negative relationship between indirect tax and economic growth, thus differing somewhat to the studies above. It should, however, be noted that in as much as Nigeria is also a developing country like South Africa, its oil-reliant economy is not as diversified as South Africa's, possibly explaining this outcome. To an extent, though, this correlates to Koch et al (2005), who find that the lower the ratio of indirect taxes to total taxes, the more positive the relationship to economic growth, contrary to other South African studies performed.

The section has summarised a number of studies concerning the relationship between taxes as a form of government revenues and a “burden” on citizens and the economic growth across a number of countries, developed and developing, at provincial, local and national levels. It goes to say that most studies of countries considered to be the most economically developed indicate that increases in taxes negatively impact economic growth, with corporate income taxes having the most negative impact, followed by personal income tax. In some of the studies, indirect taxes also exhibit a negative relationship, in others a positive relationship, and yet in others no effect at all.

It would thus seem imperative to perform this study taking tax types and tax mix (i.e. the composition of the various tax types to total taxes) into account, as well as the other variables highlighted in the various studies in assessing this relationship. South Africa sits with the current dilemma of establishing the ideal tax structure facilitating economic growth in line with the development objectives and policies such as the National Development Plan, balancing socio-economic challenges it is currently faced with, and advancing towards a more inclusive economy benefitting all its citizenry.

CHAPTER III:

METHODOLOGY

3.1 Introduction

This chapter discusses the methodology followed in testing the hypothesis presented. It presents data used for purposes of this study as well as the sources therefore, the research design employed, model specification and model estimation.

As the study seeks to examine the relationship between tax and economic growth, these factors will constitute the variables used in specification of the model. Chapter 2, gave an indication of how total taxes as well as tax types will need to be tested in the model, whereas GDP will constitute the measurement for economic growth.

3.2 Research data and sources

Secondary data is to be used in this study for the variables identified in the model. In order to establish the impact of major reforms over an extended period, for which taxation and growth data is available, the data will cover the period 2003 to 2016, to assess whether these reforms and the various business cycles also influenced the relationship between taxes and economic growth. In order to obtain sufficient data, more periodic data was obtained, being on a quarterly basis, as per published GDP data.

Data used in this study was sourced as follows: Economic data, being GDP, Consumption and Savings were obtained from quarterly GDP reports previously published by the SARB, and with effect from the 1st publication for 2016, by Stats SA. The tax data was obtained from reports and other publications from the National Treasury and SARS.

3.3 Research design

The objective of this study is to establish whether a relationship exists between taxes and economic growth in South Africa; thus an explanatory study will be undertaken. As indicated above, the nature of this study will be quantitative, investigating the hypothesis of the impact of the independent variables on the dependent variable. A linear regression model will be used for this purpose.

Various studies have been performed to this effect, as indicated earlier, basing methodology on either the neo-classical model or the endogenous growth model or both. Phiri (2016) notes that studies using “linear estimation in their empirical analysis” ignored “possible nonlinear relations between the time series variables,” thus possibly distorting their results. Thus to combat this challenge, he uses the smooth transition regression framework, thereby establishing the optimal indirect tax to growth ratio at 10.24%. Yi and Suyono, in their study based on the Hebei Province in China, contribute to this body of work by comparing results obtained using a simple versus amended tax multiplier formula in their model. One of the significant findings is the importance of the marginal tax rate as an element in the tax multiplier theory. Helms, in his study of the effect of state and local taxes on economic growth, uses pooled time series from 1965 to 1979 and cross section data of 48 states in conducting his study, to eliminate the possible distortion of previous studies of conducting single cross section of states. He also takes into the budget constraint and characteristics of labour, in variables including leasing, to his conclusion that when taxes are used for public goods and services valued by business and labour, they contribute to progressive economic growth. Gale et al (2015) find that statistical tests indicate the inappropriateness of aggregating tax types into a single measure, as the various types seem to have differing relationships with economic growth.

A number of studies rely on the Federer model (1983) in their analysis including De Wet et al (2005) and Ilaboya and Mgbame (2012). It is, however, noted that the vector auto-regression (VAR) model was used by Ocran (2009) in his study on fiscal policy impact on economic growth in South Africa, “to estimate individually the effects of government consumption and investment expenditure, deficit and tax receipts on economic growth respectively”. The analyses covered the period 1990 to 2004 using quarterly data and found specific to this paper that taxes have a positive impact on growth in general and that consumption and investment

expenditure as tools for fiscal policy accelerate growth more, as compared to a reduction in the size of government.

These various model inputs were taken into account in the regression model specified in this study.

3.4 Model Specification

According to economic growth theory, GDP can be derived in one of the following ways:

- i. the aggregate expenditure approach where: $GDP (Y) = \text{Household consumption } (C) + \text{Investments } (I) + \text{Government expenditure } (G) + \text{Net imports } (X-M)$ or;
- ii. the aggregate income approach where: $GDP (Y) = \text{Household consumption } (C) + \text{Savings } (S) + \text{Taxes } (T)$

The aggregate expenditure approach is based on the total spending on all final goods and services in an economy, whereas the aggregate income approach is based on the factor income to factors of production, i.e. inputs to production. For purposes of this study, the second model will be the point of reference for the linear time series model to be derived for statistical analysis. The reason, as highlighted above, is that unlike the expenditure approach, the income approach measures GDP by summing the income that firms pay households for their labour, thus including taxes there within, which ties this approach back to the objective of the study, assessing the relationship between GDP and Taxes. In order to adequately test the hypotheses outlined, the following variables will be required for consideration:

- i. GDP will be used as a measurement for economic growth. Market rates at 2010 constant prices were selected over the real GDP rates as inflation is not required to be adjusted for, for purposes of this study. In some studies, the GDP per capita is used as a measure of economic growth, however, for purposes of this study in attaining the research objectives, the additional influences that come with this measure are being avoided to eliminate distortion of results. In line with the research objectives the dependent variable in the model will thus be depicted as *GDP*;
- ii. Total taxes as depicted by *Taxes* (first hypothesis) and the three main tax types, *PIT*, *CIT* and *VAT* (second hypothesis) will form the independent variables;

- iii. In line with the aggregate income approach in measuring GDP, household consumption, C , and savings, S , will also form the independent variables.

As in the study on the relationship between insurance penetration and economic growth in Ghana by Alhassan and Fiador (2014), to estimate the relationship between taxes and economic growth, the linear time-series model used by Han et al. (2010) was used. The variables formulating the model in this study will include GDP measuring economic growth, household consumption, savings by households and taxes in total and for the major tax types being personal income tax, corporate income tax and VAT.

The model is specified as follows:

$$GDP_t = \beta Taxes_t + \gamma X_t + \varepsilon_t \dots \dots \dots (1)$$

This is then transformed by their logarithm for ease of interpretation of regression coefficients in the standardised form of percentage changes. Thus the model becomes:

$$GDP_t = \beta_0 + \beta_1 \ln(Taxes)_t + \beta_2 \ln(Cons)_t + \beta_3 \ln(Sav)_t + \varepsilon_t \dots \dots \dots (2)$$

Where t defines the time period; GDP_t refers to Gross domestic product, $Taxes_t$ are defined as Total Taxes, $Cons_t$ is a household consumption and Sav_t refers to savings. As indicated in chapter 2 above, the relationship of taxes to economic growth will be analysed according to the three main tax types thus resulting in the model being further derived as follows:

$$GDP_t = \alpha_0 + \alpha_1 \ln(PIT)_t + \alpha_2 \ln(Cons)_t + \alpha_3 \ln(Sav)_t + \psi_t \dots \dots \dots (3)$$

$$GDP_t = \delta_0 + \delta_1 \ln(CIT)_t + \delta_2 \ln(Cons)_t + \delta_3 \ln(Sav)_t + \varphi_t \dots \dots \dots (4)$$

$$GDP_t = \eta_0 + \eta_1 \ln(VAT)_t + \eta_2 \ln(Cons)_t + \eta_3 \ln(Sav)_t + \tau_t \dots \dots \dots (5)$$

Where PIT, CIT and VAT refer to personal income tax, corporate income tax and value added tax respectively.

3.5 Model Estimation

Following the convention in time series analysis, this study first examines the unit root properties of the variables. This will be followed by the cointegration approach for examining the existence or otherwise of a long-run causal relationship and the resulting error correction

model. Finally, the causal relationship between taxation (and the various components) and economic growth will be examined using the Granger causality test. The description of the each technique is provided below.

3.5.1 Unit root testing

Unit root testing is performed for establishing stationarity. When performing an economics study, it is often considered that time series are stationary. However, this may not always be the case. The variables utilised in the models specified are thus tested for stationarity using the Augmented Dickey Fuller (ADF) test to ensure regression outcomes that are reliable and non-spurious, indicative of their mean and other significant statistical parameters being constant over time in line with classic linear regression assumptions.

The ADF test came about when Said and Dickey (1984) augmented the basic autoregressive unit root test to accommodate general autoregressive moving average (ARMA (p, q)) models with unknown orders. It is the most popular test for stationarity as it takes care of possible autocorrelation in the error terms and is also easily applied. The null hypothesis of the test is that a time series has a unit root, as evidenced by a test statistic that is less than the critical value. The null hypothesis will be rejected should the t-statistic be greater than the critical value (CV), thus proving time series to be stationary. By confirming the stationarity of the variables, least squares regression may then be performed as the assumptions above are upheld.

3.5.2 Cointegration and Long run estimates

Cointegration exists where the linear combination of the time series is integrated of order zero, over the long run, that is, a long run equilibrium relation that connects the individual variables, represented by some linear combination of them, by testing the residuals for stationarity. The existence of cointegration will indicate the existence of a stable long term relationship among the variables, where the means and variances of the variables remain stable regardless of time.

There are a number of cointegration tests available including Engle and Granger (1987), Stock and Watson (1988) and Johansen. Wassell and Saunders (2000) indicate how the Johansen test has is most preferred for testing cointegration, due to it possessing several desirable properties such as all test variables being treated as endogenous. Gonzalo and Lee (1998) in their paper

on the robustness of the two most commonly used cointegration tests, Johansen and the Engle-Granger tests, use both to take advantage of the Johansen test statistical properties, however, cognisant of its sensitivity to specification errors in small samples. They find that the use of both tests assists in detecting possible pitfalls.

Another method for testing cointegration is the ARDL bounds testing approach, as developed by Pesaran and Pesaran (1997); Pesaran et al. (2000), and later by Pesaran et al. (2001). It is popularly used for small sample sizes and provides an alternative test for examining a long-run relationship regardless of whether the underlying variables have a unit root, unlike the tests discussed above. In promoting the choice of cointegration test, Ahmed, Muzib and Roy (2013) find that the ARDL bounds test can distinguish the dependent and independent variables producing an unbiased and efficient analysis, by avoiding serial correlation and endogeneity problems that may arise. It is on this basis that for purposes of this study, the ARDL bounds test was used. The cointegration regression model is specified as:

$$D(\ln(GDP_t)) = \beta_{01} + \beta_{11}\ln(GDP_{t-1}) + \beta_{21}\ln(Taxes_{t-1}) + \beta_{31}\ln(Cons_{t-1}) + \beta_{41}\ln(Sav_{t-1}) + \sum_{i=0}^p a_{1i}D(\ln(GDP_{t-i})) + \sum_{i=0}^q a_{2i}D(\ln(Taxes_{t-i})) + \sum_{i=0}^q a_{3i}D(\ln(Cons_{t-i})) + \sum_{i=0}^q a_{4i}D(\ln(Sav_{t-i})) + \varepsilon_{1t} \dots \dots \dots (6)$$

The null hypothesis tests whether a long-run relationship exists. A comparison between the estimated F- statistics (F-stat) and the lower and upper bounds critical values (CV) forms the basis for either confirming or rejecting the hypothesis. The critical values are estimated for 1%, 5% and 10% level of significance. The hypotheses are denoted as follows:

H0: no long-run relationship exists, i.e. F-stat < CV;

H1: long-run relationship exists, i.e. F-stat ≥ CV

Based on the results of the cointegration analysis, the long-run estimates of the effect of taxation on economic growth is examined with the regression model;

$$\ln(GDP_t) = \beta_0 + \sum_{i=0}^p a_{1i}\ln(GDP_{t-i}) + \sum_{i=0}^{q1} a_{2i}\ln(Taxes_{t-i}) + \sum_{i=0}^{q2} a_{3i}\ln(Cons_{t-i}) + \sum_{i=0}^{q3} a_{4i}\ln(Sav_{t-i}) + \varepsilon_t \dots \dots \dots (7)$$

3.5.3 Short run error correction model

The ARDL framework allows for the determination of short run dynamics and long run relationship as per the study made by Nkoro and Uko (2016) in their study on the ARDL cointegration technique. They indicate that this is achieved through integrating short run dynamics with long run equilibrium, thus resulting in an analysis of long run relations between integrated variables and reparameterising the relationship between the variables into an error correction model (ECM). The reparameterised result then provides the short run dynamics and the long run relationship of the variables concerned.

To obtain error correction estimates associated with the long-run equilibrium model, the study follows Belloumi (2014), Nkoro and Uko (2016), and Alhassan and Fiador (2014), by specifying the error correction model as;

$$D(\ln(GDP_t)) = \beta_0 + \sum_{i=1}^p \alpha_{1i}D(\ln(GDP_{t-i})) + \sum_{i=1}^q \alpha_{2i}D(\ln(Taxes_{t-i})) + \sum_{i=1}^q \alpha_{3i}D(\ln(Cons_{t-i})) + \sum_{i=1}^q \alpha_{4i}D(\ln(Sav_{t-i})) + \alpha ECT_{t-1} + \varepsilon_t \dots \dots \dots (8)$$

Where ECT_{t-1} is the error correction term and all other variables are as defined before. In equations 6, 7 and 8, all models will be estimated by replacing *Taxes* with PIT, CIT and VAT.

In determining the appropriate lag to obtain standard normal error terms, the automatic selection was opted for on Eviews, which based selection on the Akaike Information (AIC), Schwarz Bayesian (SBC) and Hanna-Quinn (HQC) selection criteria.

As a rule of thumb for evidence of a short run relationship, the error correction coefficient (cointEq) should be negative and significant as evidenced by the t-statistic and its p-value. According to Nkoro et al (2016), the cointEq is referred to as the speed of adjustment parameter, as it shows how much of the disequilibrium in the previous period is corrected in the current period. Thus, the cointEq is expected to lie between 0 and -1, with values closer to -1 being considered more significant. Where the cointEq is equal to or beyond -1, it may be indicative of immediate adjustment whereas, at 0.5, the adjustment would be occurring in each period. The coefficients of the first differenced variables indicate the short run impact.

3.5.4 Causality

In cointegration being established as per the above tests, it may indicate the existence of long-run causality in at least one direction, unidirectional. The Granger-cause test is employed in testing for causality by virtue of it being the most widely used in similar studies. Economic studies refer to the supply-leading and the demand-following hypothesis in relation to the direction of causality as far as economic growth is concerned and in finding determinants thereof. In the study by Jenkins and Katircioglu (2010), they also apply the bounds test approach to determine cointegration and causality on the relationship between foreign direct investment, international trade and economic growth in Cyprus. In determining causality, they also employ the Granger-cause test and obtain results supporting demand-following hypothesis where economic growth leads to growth in international trade and money supply.

The null hypothesis in the Granger-cause test is that the independent variable does not Granger-cause the dependent variable in the first regression and that the dependent variable does not Granger-cause independent variable in the second regression, as depicted below, where 3.84 is the criteria for F value to test which hypothesis is accepted as is globally verified and p-value greater than 0.05 results in the acceptance of the null:

H0: X_1 does not cause X_2 , i.e. $F\text{-stat} < 3.84$;

H1: X_1 causes X_2 , i.e. $F\text{-stat} \geq 3.84$

Upon assessing that the time series for each variable stationary and the linear combination of the variables are cointegrated, regression analysis per the selected dependent variable and independent variables may be used, without the risk of getting a spurious regression output.

3.6 Data limitations

Limitations of this study include the following:

- Income tax data was not available over an extended period dating back to cover reforms covered in this study. Thus from publications internal to the National Treasury and SARS (i.e. section 32 reports) data was retrieved from 1994 for income taxes. To mitigate this reduction in data points, more periodic tax data in the form of monthly amounts was obtained, which also was only available from 2003.

- GDP, consumption and savings data covering the same period as the tax data was not obtainable on a monthly basis, but on a quarterly basis. Thus tax data was aggregated on a quarterly basis so as to be in conjunction with the economic data within the South African context.
- Tax revenues over the years have been influenced by the various reforms, and thus some tax types may be newly established and others diminished over the period, also possibly having an impact on economic growth. However, for purposes of this study only the three tax types identified will be covered.

CHAPTER IV:

DISCUSSION OF RESULTS

4.1 Introduction

This chapter presents the discussion of the results generated from the empirical analysis. It comprises of the discussion of the descriptive statistics, correlation, unit root and cointegration analysis using the bounds approach discussed in the previous chapter. It proceeds with the discussion of the long and short run estimates as well as the Granger causality analysis.

4.2 Descriptive Statistics

The summary statistics of the variables are presented in Table 4. As the log transformed quarterly changes are the variables being assessed, it is noted from the table above that quarterly changes in savings record the highest mean. This indicates that quarterly changes in savings are of a greater magnitude, as compared to the rest of the variables, followed by PIT and VAT. This indicates its sensitivity to change. In terms of variability in changes from one to quarter to the next, as evidenced by the standard deviation, again savings has the highest magnitude and GDP the lowest. This is evidence of GDP quarterly changes being least responsive to influences, followed by consumption, whereas savings are more responsive to influences and more volatile in predictability, as evidenced by its wider range.

Excessive skewness and kurtosis are indicative of data that is not normal, thus requiring some form of transformation thereof. As skewness measures the extent to which data is symmetrical around the mean, it is expected to be close to zero for a symmetric normal distribution. Except for CIT and savings, all other variables have a negative skewness, thus depicting a left tail and concentration of data points that are bigger in number. The values range from -1.2 to 0.2, thus bearing more resemblance to a normal distribution.

Regarding kurtosis, for standard normal distribution, the accepted benchmark is 3. The higher the value, the more distinct the peak is, thus to an extent speaking to the volatility of the data.

GDP, CIT and savings have values ranging from 2.6 to 2.9, thus being close to the acceptable norm. PIT has a value of 1.8 and consumption a value of 2.2 thus both exhibiting flatter peaks. Total taxes and VAT values are in excess of the benchmark 3, being 3.7 and 5 respectively thus exhibiting steeper peaks. This could be indicative of the presence of outliers.

Table 4: Descriptive Statistics

	GDP	TAXES	PIT	CIT	VAT	CONS	SAV
Mean	1.0005	1.0016	1.0019	1.0013	1.0018	1.0006	1.0149
Median	1.0013	1.0035	1.0018	1	1.0049	1.0013	0.9878
Maximum	1.0031	1.0089	1.0134	1.0334	1.0256	1.0065	1.359
Minimum	0.9957	0.9854	0.9883	0.9783	0.9627	0.9919	0.7927
Std. Dev	0.002	0.0051	0.0078	0.013	0.011	0.0041	0.1418
Skewness	-0.9024	-1.1584	-0.2092	0.1674	-1.1876	-0.5478	0.702
Kurtosis	2.5589	3.708	1.8276	2.5288	5.014	2.2394	2.8138
Jacque Berra	7.3354	12.4718	3.2927	0.7101	20.6065	3.7802	4.2629
Probability	0.0255	0.002	0.1927	0.7012	0	0.1511	0.1187
Sum	51.0246	51.08	51.0965	51.0652	51.0941	51.0328	51.7601
Sum sq Dev	0.0002	0.0013	0.003	0.0084	0.0061	0.0009	1.0059
Observation	51	51	51	51	51	51	51

4.3 Correlation and multicollinearity

A correlation matrix for all variables was obtained per table 5 below. The strength of correlation speaks to variable selection within the model, with correlation cut-offs for purposes of this study set as follows: should the correlation value obtained be a value of 0.70 and higher (in absolute terms), it will be considered strong and thus indicate normality; if between 0.35 and 0.70 fair and less than 0.35 considered weak. A positive value indicates a direct association and an inverse association is depicted as negative values.

Based on the values within the matrix, the first line of test for normality and variable selection was assessed by evaluating the values under the first column between GDP and each of the independent variables.

Table 5: Correlation matrix

	GDP	Taxes	PIT	CIT	VAT	CONS	SAV
GDP	1	-0.4128	-0.71	0.4028	-0.3939	0.8606	-0.4339
Taxes	-0.4128	1	0.733	0.209	0.8057	-0.0947	0.349
PIT	-0.71	0.733	1	-0.3624	0.6814	-0.5771	0.3094
CIT	0.4028	0.209	-0.3624	1	-0.1279	0.5827	-0.0752
VAT	-0.3939	0.8057	0.6814	-0.1279	1	-0.1624	0.2854
CONS	0.8606	-0.0947	-0.5771	0.5827	-0.1624	1	-0.2016
SAV	-0.4339	0.349	0.3094	-0.0752	0.2854	-0.2016	1

It is evident that consumption has the strongest correlation to GDP and thus is a good variable to include in the model, as it is indicative of predictability power of growth. It is then followed by PIT, although indicative of a strong inverse relationship. As for Taxes (total taxes per model 2 specified), CIT, VAT and savings, these variables have a fair correlation to GDP by falling within the 0.35 to 0.7 cut-off, thus indicating a linear relationship to an extent, however not strongly associated with growth. CIT exhibits a direct association whereas VAT and savings an inverse association. It could thus be said that when there is an increase in consumption and CIT sees an increase is also observed in growth, whereas an increase in PIT, savings and VAT sees a decrease in growth, in order of strength of association. As there are no values less than 0.35, indicative of a weak association, it can be surmised that all the independent variables have a strong to medium association with growth as measured by GDP and thus linearly related to GDP, thus meeting the normality assumption associated with linear regression analysis.

Regarding multicollinearity, the inter-associations between the independent variables to assess their individual significance in the model. In the case of there being a high correlation between the independent variables there is a possible indication of one of these variables being redundant within the model and thus possibly needing to be removed from the model as explained previously under model estimation. Thus the rest of the columns were assessed in relation to each of the independent variables. The matrix indicates a strong correlation between total taxes and PIT and VAT. This is explained by the reasoning that a significant portion of total taxes is made up of these two tax types. However, these three variables are dealt with distinctly in their own models, 3, 4 and 5, thus presenting no redundancy problems. Within the context of model 2, it is evident that the correlation levels between total taxes and consumption and savings are fairly low to significantly low, being less than the 0.35 cut-off. There is thus no indication of multicollinearity and no warranted removal of any of the independent

variables. The correlation levels for model 3, 4 and 5 are medium to low (being less than 0.7), concerning PIT, CIT and VAT in relation to consumption and savings. The correlation values are lowest in model 5, thus indicating a level of significance of each independent variable within the model. It may thus be concluded that the t-statistics and related p-values of each variable may be used to assess the importance of the independent variables in the regression model and that each independent variable selected for purposes of this study is significant per models specified.

4.4 Unit root test

The ADF tests were performed at level I (0), as well as first differenced I (1), as presented in Table 6 below. At level I (0), only one of the six variables has a unit root at 1% significance level, and three of the six to have unit roots at 5% and 10% significance levels.

Table 6: ADF tests result

	t-stat I (0)	t-stat I (1)	CV _{1%}		CV _{5%}		CV _{10%}	
			I (0)	I (1)	I (0)	I (1)	I (0)	I (1)
			-3.5812	-3.5847	-2.9266	-2.9281	-2.6014	-2.6022
GDP	-1.9813	-3.4983	Reject	Reject	Reject	FTR	Reject	FTR
Total taxes	-2.5451	-4.8799	Reject	FTR	Reject	FTR	Reject	FTR
PIT	-3.052	-6.0287	Reject	FTR	FTR	FTR	FTR	FTR
CIT	-2.3167	-9.0696	Reject	FTR	Reject	FTR	Reject	FTR
VAT	-3.5786	-8.3023	Reject	FTR	FTR	FTR	FTR	FTR
Consumption	-1.8191	-2.912	Reject	Reject	Reject	Reject	Reject	FTR
Savings	-5.1125	-6.4159	FTR	FTR	FTR	FTR	FTR	FTR

Note: CV = Critical Value at 4 lags; FTR – Fail to reject = unit root; Reject = no unit root.

When first differenced, almost all variables have unit roots, with the exception of GDP at 1% significance level and consumption at 1% and 5% significance levels. The variables were initially lagged based on automatic selection; however, for consistency, applied a lag of 4 due to the data being quarterly. The rest of the automatic test parameters set were made use of, i.e. only the intercept was included in the test equation (type 1 test on Eviews).

Of all the variables, the savings time series exhibits a unit root at 1%, 5% and 10% significance levels, being non-stationary at level I (0) and when first differenced, due to the failure to reject the null hypothesis. This is in line with the study of Najarzadeh, Reed and Tasan (2014) on the relationship between savings and economic growth in Iran, in line with economic theory regarding economic variables. They, however, found it to be non-stationary when first differenced and using trend and intercept in the test equation. This could be related to the fact that savings is seen to be a function and not determinant of GDP in line with Keynesian theory as pointed to by Najarzadeh et al. (2014) Despite the outcome obtained, for purposes of this study, savings is retained in the models specified as a composite of GDP based on economic theory.

4.5 Cointegration

The results of the cointegration analysis undertaken using the ARDL framework, as described in Chapter 3 are presented in Table 7 below. The ARDL model is estimated for regression Models 2, 3, 4 and 5 for total taxes, personal income tax (PIT), corporate income tax (CIT) and value added tax (VAT) respectively.

Table 7: Bounds test results

F-Statistic	CV _{1%}		CV _{5%}		CV _{10%}	
	I (0)	I (1)	I (0)	I (1)	I (0)	I (1)
	3.65	4.66	2.79	3.67	2.37	3.2
Model 2	3.02	FTR	FTR	FTR	FTR	FTR
Model 3	10.96	Reject	Reject	Reject	Reject	Reject
Model 4	7.22	Reject	Reject	Reject	Reject	Reject
Model 5	7.48	Reject	Reject	Reject	Reject	Reject

Note: CV = Critical Value at 4 lags; FTR – Fail to reject the null hypothesis of no long run relationship;

The ARDL bounds estimation tests the null hypothesis that no long-run relationship exists. From Table 7, it is observed that the estimated F-statistics in Models 3, 4 and 5 are greater than the upper bounds critical values at conventional levels of significance at 1%, 5% and 10%. This indicates the existence of a long run relationship between economic growth and PIT, CIT and VAT. However, the null hypothesis that there is no long run level relationship is not rejected

for Model 2, thus indicating that taxes in total have no long run relationship with economic growth in South Africa. Considering that the tax types examined make up a significant portion of total taxes, this result is contrary to expectations.

4.6 Regression Results

4.6.1 Long run estimates

The long-run estimates are indicated in the table below. The tax coefficients across all models indicate a positive relationship with growth with PIT having the most significant increase in growth in the long run, at 0.11%, as opposed to the other tax types and total taxes in general, followed by VAT. Of all the control variables, consumption seems to have the most significant impact on growth in the long run where a unit increase thereof results in an average 0.5% increase. This aligns with a number of studies on the relationship between GDP and consumption, concluding on the significance thereof (Anghelache, 2011; Diacon and Maha, 2014). Consistent with the regression results, savings show an inverse yet least impactful relationship to growth, with a 1% unit change therein, resulting in 0.001% decline in growth.

Table 8: Long run coefficients

	Model 2	Model 3	Model 4	Model 5
	<i>Coef</i>	<i>Coef</i>	<i>Coef</i>	<i>Coef</i>
Constant	0.4194 (0.0996)	0.3446 (0.0619)	0.4251 (0.0667)	0.3842 (0.0758)
Tax	0.0843 (0.0881)	0.1191 (0.0437)	0.0136 (0.0071)	0.1011 (0.0446)
Consumption	0.5019 (0.1436)	0.5381 (0.0571)	0.5628 (0.0571)	0.5158 (0.0806)
Savings	- 0.0055 (0.0038)	- 0.0018 (0.0021)	- 0.0013 (0.0008)	- 0.0012 (0.0005)

Note: Standard Errors in parentheses; Tax denotes Total taxes (model 2); PIT (model 3); CIT (model 4); VAT (model 5)

4.6.2 Short run estimates and diagnostics

The evidence of a long-run relationship observed from the cointegration results, suggests the estimation of the error correction terms for each model to assess the speed of adjustment to the

equilibrium long run relationship from the short run. The results of the short run error correction terms are presented in Table 9. In the short run, taxes in general as well as across the different tax types enjoy an inverse relationship with growth. This is however at lower magnitudes as a 1% unit increase in either total taxes, PIT and VAT results in increases of 0.001%, 0.07% and 0.04% in GDP respectively. CIT, however, seems to have no impact in the short run. Consumption has the most impact on growth however inversely, in the short run across all the models. Thus, with a 1% unit increase in consumption, growth declines within a range of 0.21% to 0.53%. Savings also enjoys an inverse relationship to growth as is consistent with the long-run estimates, however at very low magnitudes when compared to the rest of the variables.

Table 9: Short run estimates and diagnostics

	Model 2	Model 3	Model 4	Model 5
	<i>Coef</i>	<i>Coef</i>	<i>Coef</i>	<i>Coef</i>
D (GDP)	0.1944 (0.9678)	0.7060 (3.7666)	0.1385 (0.5620)	-0.0331 (-0.1727)
D(Taxes)	-0.0012 (-0.0358)	-0.0654 (-3.4795)		-0.0425 (-4.1294)
D (Consumption)	-0.2144 (-2.8613)	-0.5310 (-5.6302)	-0.3774 (-3.1832)	-0.3434 (-3.2512)
D (Savings)	0.0023 (2.4507)	0.0012 (1.6640)		
CointEq (-1)	-1.0042 (-4.1350)	-1.8489 (-7.8646)	-1.3397 (-3.9210)	-0.9835 (-4.2380)
<i>F-stat</i>	219.2771	203.9995	259.3120	253.7557
<i>P-value</i>	0.0000	0.0000	0.0000	0.0000
<i>R-sq</i>	0.9915	0.9900	0.9879	0.9890
<i>Adj R-sq</i>	0.9870	0.9851	0.9841	0.9850
<i>DW</i>	2.0351	1.9420	1.4692	2.2304

Note: T-ratios are in parentheses Tax denotes Total taxes (model 2); PIT (model 3); CIT (model 4); VAT (model 5)

The cointEq coefficient is considered significant when it is negative in value and its t-ratio and p-value are significant. From the results in Table 9, it is evident that the cointEq coefficient is negative in each model and the t-ratio significant. As the cointEq indicates the speed at which

the long run disequilibrium is corrected, model 3 for the PIT tax type is corrected at the fastest rate, followed by CIT then VAT, at rates 185%, 134% and 98% respectively, when assessing the differentiated tax types. For total taxes in general, this rate is at 100%. As these amounts are quite high, they could be considered to be indicative of immediate adjustment within the period.

The diagnostic statistics indicate normality and good predictability power across the three tax types as well as total taxes models, based on high R-squared and adjusted R-squared values, within the range of 98% to 99%, high F-stat values, within the range 204 to 259, low p-values at 0, and Durbin-Watson values within the acceptable 1.5 to 2.5 range considered relatively normal.

In addition to the diagnostic statistics above, the cumulative sum of recursive residuals (CUSUM) and the CUSUM of square (CUSUMSQ) tests were performed for all four models. This is to ensure good predictability power of models specified based on parameter stability. Dufour (1982) in her evaluation of the various tests employed on the recursive analysis of the stability of linear regression relationships, emphasises the importance of parameter stability in good predictive models. The paper concludes that the Brown et al (1975) CUSUM and CUSUMSQ tests examined, provide a good basis for analysis of parameter stability, among other basic tests performed in conjunction thereto. Appendix Figs. A1 and A2, plot the results for CUSUM and CUSUMSQ tests where stability is indicated by the plot falling within the critical bands at the 5% level of significance. The results obtained indicate the absence of any instability of the coefficients.

4.7 Causality

Based on cointegration results, vector error correction causality was assessed using the Granger test to establish the direction of the relationships as depicted in Table 10 below. The null hypotheses of total taxes, PIT, CIT and savings not “granger-causing” growth and growth not “granger-causing” consumption cannot be rejected, respectively.

Table 10: Granger test results

Null Hypothesis:	F-Statistic	Prob.	Test	Result
TAXES does not Granger Cause GDP	1.81355	0.14630	FTR	
PIT does not Granger Cause GDP	2.08061	0.10250	FTR	
CIT does not Granger Cause GDP	3.31515	0.02000	FTR	
VAT does not Granger Cause GDP	4.28927	0.00580	Reject	VAT causes GDP
CONS does not Granger Cause GDP	4.84990	0.00290	Reject	Consumption causes GDP
SAVINGS does not Granger Cause GDP	1.65179	0.18140	FTR	
GDP does not Granger Cause TAXES	9.44126	0.00002	Reject	GDP causes total taxes
GDP does not Granger Cause PIT	3.86590	0.00990	Reject	GDP causes PIT
GDP does not Granger Cause CIT	12.22390	0.00000	Reject	GDP causes CIT
GDP does not Granger Cause VAT	17.70090	0.00000	Reject	GDP causes VAT
GDP does not Granger Cause CONS	1.27530	0.29670	FTR	
GDP does not Granger Cause SAVINGS	4.16982	0.00680	Reject	GDP causes Savings

Null hypothesis when F-stat < 3.84 and p-value > 0.05; FTR - fail to reject

From Table 10, it is observed that the null hypotheses that VAT and consumption not “granger-causing” growth and growth not “granger-causing” total TAXES, PIT, CIT, VAT and savings is rejected, respectively. Thus changes in economic growth led to changes in each of the variables total taxes, PIT, CIT, VAT and savings, supporting the demand-following hypothesis. This suggests that increases in taxation and its components are driven by economic growth whereas changes in VAT and changes in consumption led to changes in growth, thus following on the supply-leading hypothesis previously discussed. Thus it could be concluded that total taxes, PIT, CIT, VAT and savings are a component of GDP whereas VAT and consumption are determinants of GDP.

CHAPTER V:

CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter provides a summary of the study, the conclusion and the policy recommendations based on the findings from the empirical analysis.

As hypothesised, taxes have a positive relationship with growth, distinctly at tax type level over the long run, in South Africa. This is consistent with the demand-following theory in the case of taxes in general and PIT and CIT in particular whereas this is also supply-led in the instance of VAT. VAT may thus be viewed as promoting economic growth and should rather be the focus of current tax reforms in promoting economic growth, whereas PIT and CIT are a result of economic growth and thus by-products thereof. Thus VAT, in line with consumption, brings about economic growth which in turn results in increases in direct taxes, PIT and CIT. These two tax types would thus be proponents for setting public expenditure budgets, which should result in alignment to the objectives of the latest growth strategy (National Development Plan).

5.2 Summary of key findings of the study

The purpose of this study was to establish whether taxes have an impact on economic growth in the South African context, over the period 2003 to 2016. It was further examined if the same conclusion could be reached, by assessing at tax type level for the three main tax types being personal income tax, corporate income tax and value added tax, over the same period. The ARDL bounds framework was employed to establish cointegration and whether a long run relationship exists between taxes in total and at tax type level and economic growth. The results established a cointegration relationship at tax type level for all three tax types examined however this was not the case for the taxes in total model. Disequilibrium in the short run model for total taxes was 100%, thus indicative of high speed with which an adjustment to long run equilibrium will take place. Unidirectional causality was established to run from growth to

taxes in total and tax types PIT and CIT. In the instance of VAT, bi-directional causality to growth was established. It may thus be concluded that there is an impact on taxes in general and at tax type level, by growth. VAT, however, seems to be a product of and a cause for economic growth.

5.3 Recommendations

This paper only examined the causal relationship between taxes and growth. A further study into the impact of the tax mix on economic growth, within the context of results obtained, would add value to the South African context, building on prior studies performed in this area of focus. Another further study could be conducted adding other economic variables to the model that may provide additional information on the increase in economic growth, such as technology, trade (exports and imports) and investments. This study could also be extended to the Southern African or even Sub-Saharan African region, as the economies in these regions are usually analysed and viewed in conjunction with each other.

Another important consideration in future studies would be the general usage of tax revenues when it comes to public spending, and thus a reduction therein in promoting economic growth, rather than tax increases.

In the revision of current tax policy per the Davis Tax committee investigations, it may be considered more prudent for the promotion of economic growth in South Africa to not increase taxes in general due to their demand-following trait in relation to economic growth. Should it be determined that tax increases are necessary, VAT should rather be targeted for increases as opposed to the other tax types to have the most impact on economic growth. This would need to go together with stimulation of consumption.

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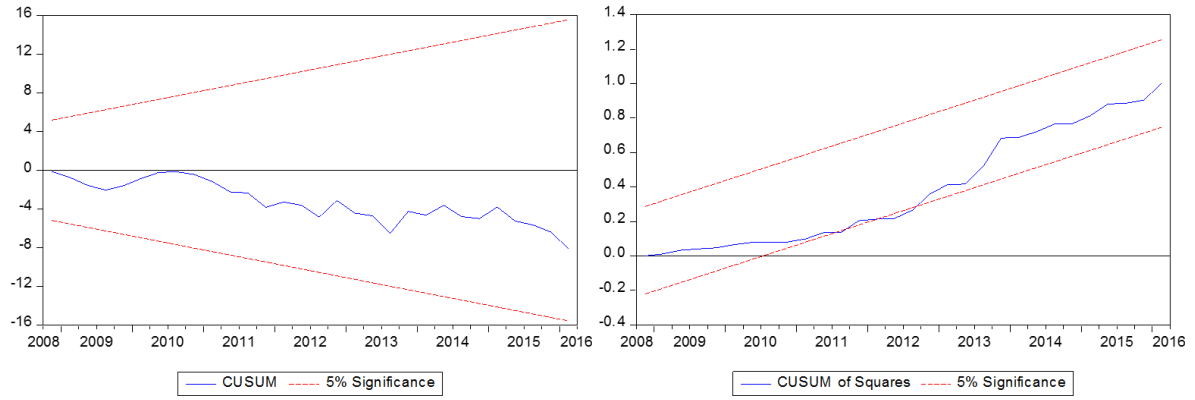
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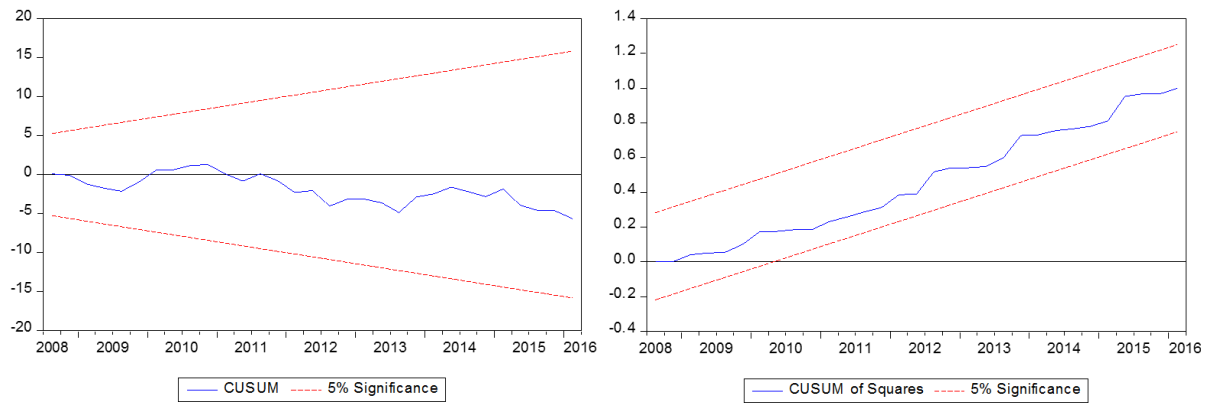
Appendices

Fig. A1 – Plots of CUSUM and CUSUMSQ graphs

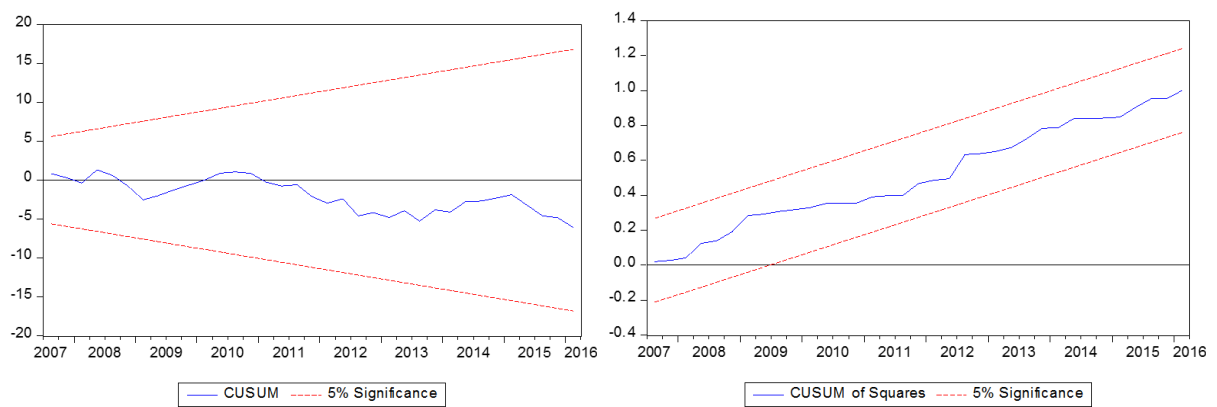
Model 2 – Total taxes



Model 3 – PIT



Model 4 – CIT



Model 5 – VAT

