THE RELATIONSHIP BETWEEN ECONOMIC GROWTH AND TAXATION: AN EMPIRICAL STUDY ON OPTIMAL TAXATION IN SUB-SAHARAN AFRICA

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DECLARATION OF ORIGINAL WORK

This page declares that the work produced in this thesis is my own and was conducted whilst completing the degree of Master of Economics whilst at Rhodes University. Any work that is not my own has been credited accordingly. This thesis has not been submitted to other universities, Technikons or colleges for degree purposes.

Signed: Bradley Kent
Date: 03/06/2022

ABSTRACT

The relationship between economic growth and taxation is a complex and highly debated issue, this thesis investigates whether a significant relationship can be identified, and whether it is the level that truly matters for fiscal policies aimed at being growth enhancing. Further investigation examines this relationship, in addition to testing whether there is a threshold below which tax collection may be considered 'growth-enhancing', and above which is negative for economic growth, and if such a threshold exists, to identify the manner in which taxation negatively impacts economic growth. The study makes use of a panel data approach to autoregressive distributed lag modelling and a generalised least squares regression. The study focuses on a panel data sample for seven (7) countries within Sub-Saharan Africa (SSA) between 1997 – 2017. It found that total tax revenue held a positive and significant relationship with economic growth at the SSA level, whilst at the individual tax level; PAYE and property taxes were found to have a negative influence on growth, with no other fiscal variables significantly influencing growth in the long run in SSA test. Whereas, when analysing at the country-specific level it was found PAYE was only significantly influencing growth in South Africa, where the relationship was found to be negative. Corporate tax revealed a similar significant negative relationship in Swaziland and Cameroon. In addition, property taxes revealed a significant and negative relationship in South Africa, yet in Rwanda the influence was positive. Overall, the study found that there is significant relationship between economic growth and taxation in the SSA context. However, when analysing the countries in isolation, no such relationship was found.

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List of Abbreviations

ACCA – Association of Chartered Accountants
AIC – Akaike Information Criterion
APC – Average Propensity to Consume
ARDL – Autoregressive Lag Distribution Model
BIC – Bayesian Information Criterion
CGT – Capital Gains Tax
CIT – Corporate Income Tax
EAC – East African Community
ECOWAS - Economic Community of West African States
ECT – Error Correction Term
EU – European Union
FDI – Foreign Direct Investment
FPE – Final Prediction Error
GDP – Gross Domestic Product
GFCF – Gross Fixed Capital Formation
GFR – Global Financial Crisis
GLS – Generalized Least Squares
GRD – Government Revenue Dataset
GST – General Sales Tax
HMRC – Her Majesty's Revenue Service
HQC – Hannan-Quin Criterion
IMF – International Monetary Fund.
LDC – Less Developed Country
NCA – National Crime Agency
OECD - Organisation for Economic Co-operation and Development
OLS – Ordinary Least Squares
OPEC – Organisation of the Petroleum Exporting Countries
PAYE –Pay as You Earn
PMG – Pooled Mean Group Regression
R&D – Research and Development
SADC – Southern African Development Community
SARS – South African Revenue Service
SSA – Sub-Saharan Africa
UAE – United Arab Emirates

UK – United Kingdom
UNCTAD – United Nations Conference on Trade and Development
USA – United States of America
VAT – Value Added Tax
WAEMU – West African Economic and Monetary Union
WDI – World Development Indicators

CHAPTER 1:

INTRODUCTION

1.1. Background of The Study

The manner in which a tax system is structured is a key determinant of the effectiveness of the revenue collection process and the impact thereof on economic growth. Stoilova (2017) argues that modern tax systems entail a complex diversity of policy objectives, noting that designing a well-balanced tax system requires achieving fiscal objectives in the most efficient manner, minimizing undesirable distortions to economic agents, controlling costs of the revenue collection process, whilst simultaneously bolstering growth, both endogenously and exogenously. Theory on taxation and growth shows that there are various reasons to expect these links between taxation and growth. Such links are both direct and indirect. Taxation plays the role of a revenue-generating tool directly through the tax system, and indirectly is responsible for ensuring that the fiscus does not counteract the economic growth objective of a country.

Myles (2009) states that a change in tax policy changes optimal choices and shifts the equilibrium of the economy, which ultimately affects the growth rate. Exogenous growth theory focuses on capital accumulation as one of the main sources of growth. If the level of savings exceeds the sum of depreciation and population growth, the capital-labour ratio will rise over time and generate growth in output per capita. In equilibrium, the level of investment must equal the level of saving (Myles, 2009: 8).

Both investment and savings are influenced by changes in taxes. Therefore, the economic growth objectives need to balance both the revenue aspect of the fiscus with the implications that taxes have on the private sector's savings and investment patterns. The relationship between economic growth and taxes on capital, for example, is argued by Chamley (1986) and Judd (1985) to be optimal when at zero. Moreover, Chamley (1986) and Judd (1985) state that this zero tax on capital income implies that all taxation must be placed upon labour income (direct taxation). The authors' use of exogenous theory to conclude that capital taxation would be most optimal for economic growth at zero is a much-contested statement as it does not factor in the revenue gain from capital taxes such as: capital gains tax (CGT), estate taxes, donations taxes, property taxes and other forms of wealth taxes.

In contrast, Myles (2009) defines endogenous growth by the AK model which assumes "capital is the only input into production and that there are constant returns to scale" (Myles, 2009:16). According to Barro (1990) endogenous growth occurs whereby capital and labour are assisted by further inputs in the production function. Myles (2009) notes the relationship between government policy and growth is of particular importance when additional public inputs are funded by taxation. Endogenous growth theory states that public inputs hold a positive role for national expenditure and are a tool by which fiscal policy can impact growth. Additionally, the model states that "tax rate changes can increase growth, which represents the gains through the provision of productive public sector inputs" (Myles, 2009:19). This highlights the implications of taxation, particularly that indirect taxation should not disincentive savings and investment as this will lead to capital flight and a fall in investment (exogenous impact) which will hamper the production capabilities of a country (endogenous impact), which will reduce economic output.

Mirrlees (1971) also draws attention to the important issue of a possible negative effect that high taxes may have on productivity and therefore economic growth over the long term. The importance of the level of taxes is also highlighted by Laffer (2004) who stated that there is a complex relationship between the level of taxes collected and economic growth. Laffer (2004) demonstrated this impact graphically, showing

that higher tax rates might disincentivize high-income workers and actually reduce tax collections rather than increase them. The resultant "Laffer Curve" enhances the argument by Mirrlees (1971) by providing a practical illustration of the potential relationship between increasing tax rates, and the extent to which an increase may disincentivize productivity. It therefore shows the importance of understanding the maximum (most efficient) level at which tax increases will prove to be beneficial in terms of revenue generation, and the extent to which they will thereafter be subject to diminishing returns.

McNabb (2018) defines the tax mix as the combination of individual tax components, that together make up the tax system. Tax structure is defined as the manner in which these specific taxes are directed and focused on a desired outcome. This would include raising rates to fund additional expenditure or dropping rates to spur investment and incentivize production. McNabb (2018) found that differences in the tax mix have different impacts on economic growth from country to country. Crucially, McNabb (2018) found that reductions in trade taxes, along with hikes in domestic consumption taxes as proportions of GDP are growth enhancing and this impact was most prevalent in developing, middle-income countries. Yet, the same impact was not found for low-income developing nations where the study found that shifts away from consumption and property taxes toward income taxes result in lower GDP growth in the long-run (McNabb, 2018). Additionally, McNabb (2018) found that personal income taxes and social contributions are the most detrimental components of taxation for long-run economic growth, particularly in SSA. This emphasizes the importance of understanding tax structuring, in particular export taxes and the revenue gains from mineral-rich countries in the context of SSA where minerals are known to be key drivers of exports economic growth. However, Atkinson and Hamilton (2003) reveal that due to poor fiscal structuring and a lack of tax harmonization on exports, mineral resource abundance in the region was found to be negatively correlated to GDP growth. This study is crucial in showcasing the importance of the tax mix and tax rates in SSA.

To further understand the importance of the tax mix, Phiri (2016) studied the growth trade-off effects between direct and indirect taxes in South Africa for the period 1990-2015. The study found the existence of nonlinear growth trade-off effects for both direct and indirect taxes, emphasizing the importance for economic growth of an appropriate balance between direct and indirect taxes in a Sub-Saharan African context. The results showed both indirect and direct taxation are only "significantly correlated to growth when the tax-growth ratio is under the threshold of 10.24 percent" (Phiri, 2016: 246). Below this threshold, indirect taxes were positively linked with GDP, while direct taxes had a negative effect on growth. Phiri (2016) suggests on the basis of these findings that from a growth-enhancing viewpoint, governments in the Sub-Saharan region should shift tax mix toward more indirect taxation.

These results highlight the need for further investigation to establish whether such a threshold can also be found in the Sub-Saharan context and whether or not the current composition and tax rate structure of the region has been beneficial or harmful for economic growth. This need is magnified by the moves to establish regional economic blocs across the continent and the goal of achieving greater tax harmonization within these blocs. MacPhee and Sattayanuwat (2014) found that of all the existent trading blocs in Africa, only three have produced meaningful intra-trade growth. These blocs are SADC, ECOWAS, and EAC. In line with this, Ntara (2016) notes that regional integration has the potential to bolster regional economic growth. However, tax structuring in the form of export taxes and tariffs were identified as major weaknesses.

These developments warrant further research to assess whether a uniform tax threshold can be found that is beneficial for domestic and regional economic growth in the SSA region. The literature on whether SSA should focus more on direct taxation or indirect taxation is mixed and therefore further research on the importance of understanding the optimal tax mix is needed.

1.2 Research Objectives

The goal of this research is to examine whether a relationship exists between economic growth and the level and mix of taxation in Sub-Saharan African countries. The subgoals are: (1) to test whether there is a threshold below which tax collection may be considered 'growth-enhancing', and above which is negative for economic growth; and (2) if such a threshold exists, to identify the manner in which taxation negatively impacts on economic growth.

1.3 Research Methodology

The principal method of research utilised will be quantitative analysis. Given the empirical nature of the research, the paradigm which will be employed is positivist. The research uses an Autoregressive Distributed panel data analysis for nine (9) countries within Sub Saharan Africa (SSA). The data used was utlized from ICTD UNU-WIDER Government Revenue dataset (GRD) and the World Bank's World Development Indicators (WDI) for the period 1997 to 2017.

Since the goal of this study is to examine whether various indirect and direct measures of tax impact on economic growth, the dependent variable of the study is GDP (measure as an annual % change in real terms). The following fiscal variables have been identified as important in the literature; Total Revenue; Resource Taxes; Personal Income Taxes, Property Taxes; Taxes on Payroll and Workforce; Value Added Taxes; Taxes on International Trade. Non-fiscal independent variables that will also be included because of their importance for growth in the literature are Gross Fixed Capital Formation (% of GDP); Trade Openness (exports + imports as % of GDP); Foreign Direct Investment (inflows) (% of GDP), and countries' mineral wealth measured as "Total Natural Resource rents (% of GDP) in the World Bank's database. This final measure provides context by highlighting the structure of many SSA economies where mineral wealth is a large contributor to overall economic activity.

The study also investigates tax rate structuring in the SSA region and examines where coordination in terms of fiscal harmonisation among countries could prove to be mutually beneficial for domestic growth.

1.4 Hypothesis of Study

- H_1: Tax revenue does have a significant impact on economic growth in Sub-Saharan Africa.
- H_2: There is a threshold at which tax revenue optimizes economic growth.
- H_3: Tax harmonisation is beneficial for economic growth in Sub-Saharan Africa.

1.5 Outline of Study

This study is organised as follows: Chapter 2 will contextualise and provide an understanding of the theoretical relationships between economic growth, taxation and tax harmonisation. The relationship between taxation and economic growth in prior studies of both developed and developing countries will be discussed. Relevant literature on the Sub-Saharan African context is also examined. The methodology used in the study follows in Chapter 3, where the data and the research techniques used to test the relevant hypotheses are discussed. Chapter 4 discusses regional trends in the SSA region. Chapter 5 explains the results of the empirical finding. Policy recommendations and conclusions are given in Chapter 6.

CHAPTER 2:

LITERATURE REVIEW

2.1 Introduction

According to the IMF (2015), fiscal policy plays a crucial role in formulating sustainable and equitable growth, amid the backdrop of financial distress. Cottarelli and Keen (2012) highlight that fiscal policy helps ensure macroeconomic stability at the macro level, while at the micro level tax and spending policies are said to bolster growth by changing work and investment incentives, by encouraging human capital accumulation and improving factor productivity. According to the IMF (2015) macroeconomic stability is described as an essential prerequisite for long run resilient growth. The study shows the potential growth enhancing features of fiscal stabilization, which are said to be especially prominent in developed economies. The theory outlined by the IMF (2015) is that the growth success of an economy is largely dependent of its responsiveness to fiscal policy. In contrast, Adam and Bevan (2013) found that for emerging economies, the long run growth benefits of decreasing the deficit disappears below a threshold of 1.5% percent of GDP. The authors state that the degree of growth prospects are dependent on how the deficit is financed. Krugman (1988) tells us that higher levels of public debt tend to hinder growth by spreading uncertainty over forthcoming taxation, crowding out private investment and diminishing a country's resilience to shocks. Important to fiscal policy and growth is monitoring the pace of fiscal consolidation for both the medium and long-term growth (IMF, 2015). In a persistent recession, fiscal consolidation is said to result in an inverse response and negatively impacts growth in the short run. (De long and Summers, 2012).

Accordingly, the IMF (2015) found there to be four main channels through which fiscal policy reform can be influential for medium to long term growth. The IMF (2015) states the tax-benefit system impacts the decision on whether to enter the labour market (extensive response) along with the extent of work (intensive response).

The following section will look to expand on much of the existent literature, particularly the relationship with which taxation shares with economic growth, as well unpacking a regional context of the impact various forms of taxation have impacted growth in SSA.

2.2. TAXATION AND GROWTH: THEORY

2.2.1 Exogenous Growth Theory

Exogenous growth theory as depicted by Solow (1956) in his original model, stated that economic growth was seen as exogenous and therefore external to the economy. Once the economy had reached its steady state, the only driver of per-capita growth is technological progress. Further to this, investment in physical capital does not increase growth into the future, as is the case for investment into human capital, however this was later adjusted in the 'augmented' Solow growth model (Hartwig, 2009). Solow (1956) argues that that productivity growth can only be explained through direct investment, population growth and technological advancements. In this argument, Solow (1956) reiterates that direct investment and population growth only have level effects on growth and thus do not affect the long-run growth rate. Technological progress is seen as the only factor that affects the long run growth of the economy, and consequently accounts for the productivity variations between nations across the globe.
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2.2.1a The Domar (1946) Multiplier Effect Economic Growth Model

Exogenous growth in the neoclassical school was first presented by Evsey Domor in 1946. Domar studied the link between capital accumulation and full employment. According to Chirwa and Odhiambo (2016) the statement put forward by Domar was that an economy was found be in equilibrium when its productive capacity is equal to its national income. Furthermore, Domar held the notion that the labour force and its productivity were key to the economic growth model. His hypothesis was based on the assumption that the growth rate of the national income was a combined effect of the growth of labour and its productivity (Chirwa and Odhiambo, 2016). In the initial approach, Domar (1946) used a general equilibrium theory, where there is a nexus between demand and supply within a closed economy. Chirwa and Odhiambo (2016) highlight the proposition of Domar (1946) stating that in order for an economy to remain in a state of full employment, the actual growth of investment should be equal to the productive multiplier.

2.2.1b The Solow (1956) Exogenous Growth Model

The Solow Growth Model was developed by Robert Solow in response to the shortcomings of the Domar (1946) model. According to Chirwa and Odhiambo (2016) the Solow model introduces labour as a crucial factor used in the production function. In the model, capital and labour are combined in varying proportions. The initial assumptions of the model are that output (*Y*) is a function of both capital (*K*) and labour (*L*)

Equation 1: The Solow Growth Model:

$Y = F(K, L)$ *where* $K, L > 0$……(1)

Chirwa and Odhiambo (2016) note the optimum growth path, where output, consumption and capital are maximized, is found at the intersection where: $sf(K) = (\lambda + \delta)k$.

Moreover, it is stated that the long-run growth rates are determined by exogenous features in a closed economy. Therefore, the transitional dynamics of this model allows the growth to converge at an optimal level, irrespective of whether exogenous shocks are experienced. Solow (1956) argues that changes in the production function which are as a result of variations in the rate of savings, population growth and

technological advancements have temporal level effects. Once the changes to a balanced growth path are made, the economy is said to return to its steady state growth path. There is, however, a limit to which households can save their income in a closed economy. In addition, Solow argues that there is also a limit to which populations may rise or fall. Therefore, Solow's Theory proposes that it is only technological advancements which would continue to generate level-effect economic growth in the long-run per capita income and consumption. Accordingly, then, technological advancements in the Solow Growth model are the only factors of sustained long-run growth, as well as a source of international productivity variations, which impact growth. Given that the model is developed in a closed economy setting, this suggests that the rate of growth driven by technological advancements is determined beyond his model and is independent of any government policy intervention which might be instituted (Chirwa and Odhiambo, 2016).

2.2.2 Endogenous Growth Theory

Endogenous growth theory, as established by Romer (1990) provides a model whereby government spending and fiscal policies can have both a positive and negative long-run impact on growth. Endogenous growth models have been used by Devereux and Love (1994) and Turnovsky (2000) to show how fiscal policy in the form of labour cuts can improve long-run growth by creating a positive labour supply reaction. The taxation of corporate and household income is said to impact investment decisions and the level of private savings. At the individual level, taxes on capital income decrease the rate of return on savings. At the firm-level, profit taxes impeded the rate of return-on-investment projects, while different tax treatments of financing, leans in favour of debt financing. De Mooji and Ederveen (2001) states that this creates inefficiently high debt-equity ratios, which in turn discriminates against innovative firms. Efficient public investments could improve the returns on private investments and ultimately bolster long-run growth. Thus, Devereux and Love (1994) and Turnovsky (2000) use endogenous growth theory to show how capital tax breaks incentivize investment and increase the long run growth trajectory.

According to endogenous growth theory, human capital is one of the main contributors to long-term growth (Lucas, 1998; Barro, 2001). Human capital directly influences growth as an input in the production process, and indirectly benefits growth by enhancing technological innovation with positive externalities. In addition, fiscal policies can help improve capital stock, due to the existence of positive externalities and credit market imperfections. Efficient public investments could improve the returns on private investments and ultimately bolster long-run growth

Furthermore, a vital theoretical underpinning is total factor productivity. In reference to fiscal policy, government intervention in the form of research and development (RandD) can yield positive externalities. According to the IMF (2015), provided RandD is well implemented, these will yield high social returns. Additionally, public infrastructure and services could directly influence private sector productivity and enhance technological progress, which in turn increases government spending on education, ensuring a faster adaptation of new technologies.

Bleany *et al.* (2001) examine that in the neoclassical exogenous growth model of Solow (1956), long-term growth is maintained by population growth and the rate of technological advancements. Bleany *et al.* (2001) extends on this theory by highlighting that in the neoclassical model of growth, provided there are incentives to save or invest in new capital which are impacted by fiscal policy, "this changes the equilibrium capital-output ratio and thus the output trajectory, but not the slope (with transitional outcomes as the economy moves onto its new path)" Bleany *et al.* (2001:38). Barro (1990) and Mendoza, Milesi-Ferreti, and

Asea (1997) argue that fiscal policy can regulate both the growth path level as well as the steady-state growth rate. The authors illustrated this by the following equations.

Equation 2: Steady State Growth Model

$$y = Ak^{1-a}g^{¶} \quad \ldots(2)$$

Barro and Sala-i-Martin (1990) state there are *n* producers, whereby each is able to produce at level (*y*), *k* is the representation of private capital, *g* illustrates a publicly supplied input. Bleany *et al.* (2001) state that the government strives for a balanced budget by increasing a proportional tax on output at rate "*Y*" and lump-sum taxes of "*L"*. The state's budget constraint is thus,

Equation 3: Steady State Growth Model (with Consumption)

$$ng + C + b = L + tny \quad \ldots(3)$$

Here *C* signifies state-provided consumption ('non-productive') goods. The lump-sum, or non-distortionary taxes have no impact on the private sector's incentive to invest in the input good, while the taxes on output do. Barro and Sala-i-Martin (1990) use an isoelastic utility function, which expresses utility in terms of consumption or another economic variable of interest to the decision maker. The isoelastic function is the only class of utility function with constant relative risk aversion (Barro and Sala-i-Martin, 1990). The authors show that the long-term growth rate in their model is (f) which can be expressed as:

Equation 4: Steady State Growth Model (with Consumption and Non-productive spending)

$$f = /(1 - /)(1 - a)A^{1/(1-a)}(g/y)^{a/(1-a)} - n \quad \ldots(4)$$

Where $/$ and n are variables which reveal the parameters of the utility function. *Equation 3* highlights that the growth rate is diminishing in the rate of distortionary taxes and growing in government spending, yet is unaltered by non-distortionary taxes *(L)* or non-productive spending (*C).* Accordingly, Bleany *et al.* (2001) use this theory to test the true impact of public spending, taxation and growth over the long-term and therefore, the model becomes;

Equation 5: Steady State Growth Model (Long Run Equation)

$$ng + C + b = L + tny \quad \ldots(5)$$

With *b* illustrating the budget surplus, where the predicted signs of theses variables in the growth regression would be: t - negative; *g* – positive; *C* and *L* – zero; *b* – zero, under the assumption that Ricardian equivalence prevails with the composition of sending and taxation unaltered (Bleany *et al.,* 2001). The authors used a data set of OECD countries and found when government expenditure is financed by a combination of non-productive expenditures and non-distortionary taxation, productive expenditures increase the growth rate while distortionary taxes diminish it, in line with the model of Barro (1990). In

addition, the results of the study found a high degree of theory-consistency with the more equivocal findings that characterize mainly the previous literature. Moreover, the authors investigated whether, period averaging would be a more common method in testing the long run effects of growth, as opposed to estimating the model on the original data with the addition of long lags. Bleany *et al.* (2001) state that period averaging does not encapsulate the long-term responses fully, yet both methods produced consistent evidence in agreement of the fiscal effect on growth.

2.2.2a Taxes and Factor Output

Lee and Gordon (2004) highlight that changes in fiscal policy alter equilibrium values, creating transitory growth effects. The authors show that transition periods could be analysed in decades, for example "an increase in the years of education chosen by new entrants to the labour force, will have fully altered the average education for the labour force as a whole, only after the first entrants following the policy change have reached retirement age." (Lee and Gordon, 2004:1029). Tax effects on the equilibrium capital stock are said to have a lagged effect, due to the adjustment costs to new investment in an open economy along with the low elasticity of savings rates in a closed economy. Furthermore, they state that in a neoclassical framework, growth and economic activity are largely dependent on the accumulation of human capital, which is a direct result of a well-functioning education system. The authors state that in the long run, various tax structures create an equilibrium capital/labour ratio along with an equilibrium level of knowledge per worker

2.2.3b Taxation and Investment

While the exact relationships between tax policies and economic development are complex and multi-layered, there is little disagreement amongst economists on the inverse relationship of corporate income tax. Corporate tax restricts capital formation, growth and output; therefore, a cut in corporate taxes spurs investment and accelerates growth. Hodge and Hickman (2018) suggest that lowering corporate tax rates incentivises both economic growth and investment decisions. Hodge and Hickman (2018) highlight the negative externality of corporate income taxation; potential investment opportunities have projected pre-tax returns that are far too low for them to be considered worthwhile. Thus after heavy taxes are imposed, there is a below optimal after-tax return. In turn, productivity, wages and economic activity shrink due to lacklustre capital formation (Hodge and Hickman, 2018). According to Hall and Jorgenson (1967), low current effective tax rates on incoming investment (domestic and foreign) suggests faster short-run growth as a result of a surge in investment due to the temporarily lower tax rates. A proxy for this would be a sustained period of lower corporate income tax rates. Periods of increased growth rates could also be a result of periods of increased public infrastructure, in relation to other factor inputs (Lee and Gordon, 2004). This would occur when government tax revenue is unusually high. Moreover, if tax policy is used to react to business-cycle variations, this could likely induce a short-run correlation between tax rates and the growth rate (Lee and Gordon, 2004). Whereas, if public expenditure on infrastructure is found to be funded mainly through borrowing, this would drive up public debt, placing a heavier reliance on tax revenue to make up the short fall. Thus, this theory is seen to be the inverse of a "Keynesian Deficit" whereby large-scale public spending is said to inherently lead to higher growth.

According to the Urban Institute and Brookings Institution Tax Policy Center (TPC) (2020) through influencing incentives, taxes can impact both demand and supply factors. A reduction in marginal tax rates on wages is said to induce a large portion of the workforce to work more. According to the TPC (2020), increasing the earned income tax credit would allow lower skilled workers in the labour market.

Furthermore, in line with Hodge and Hickman (2018) the TPC (2020) states that lower marginal tax rates on the returns to asset will enable an increased behaviour of saving. Whilst tax breaks on research and development (R&D) spurs innovation and leads to further a spill-over effect to the greater economy. Yet, the Urban Institute and Brookings Institution Tax Policy Center (TPC) (2020) highlights that in the U.S., tax cuts are likely to trigger inverse supply side effects. The authors use the theory of the "income effect" to explain how a reduction in after-tax earnings may result in some of the work force choosing to work less, while increasing their leisure time. The "income effect" works against the "substation effect" whereby the lower tax rates at the margin raise the financial incentive of labour (Urban Institute and Brookings Institution Tax Policy Center, 2020). The TPC (2020) explains that in the U.S., tax reductions have been shown to minimize long-term growth by placing a heavier burden on budget deficits. Accordingly, theory shows that at a time the economy is operating near full potential, state lending is funded by repositioning some capital which would have gone to private investment; alternatively, by engaging in loans from offshore investors. Therefore, state borrowing either crowds out private investment, decreasing prospective capacity relative to what it ought to have been, or by minimizing how much future income from that investment ends up in the hands of domestic consumers – irrespective, deficits are seen to impede well-being in the future.

The TPC (2020) stance is a modern stance on budget deficits, and disagrees with the underlying assumptions of Keynesian thought, whereby the idea of running a budget deficit is not only beneficial for long-run growth, but is a necessary factor which drives consumption, investment and ultimately growth. According to Binh and Hong (2013), Keynesians argue that raising government expenditures will drive up aggregate demand, entice investors' confidence on prospective economic developments - in turn bolstering investment and aggregate savings which leads to long-run economic growth. Binh and Hong (2013) note that budget deficits under a Keynesian microscope have the same impact when increased by reducing tax rates to free up household income - this encourages domestic consumption as well as saving. Therefore, the authors argue that a well-timed budget deficit will prove beneficial to the prospective growth of an economy, barring economic shocks (Binh and Hong, 2013).

In addition, Helm (1985) studied the effect of taxes on economic growth, which indicated that at the local and national level, increases in taxes support economic expansion, under the premise that tax revenues are utilized by government to fund improvements in public services as opposed to social transfers. The author states that these services are highly valuable to the labour and business sectors, thereon incentivizing productivity in the long run. Whereas taxes geared more toward social transfers and redistribution of income are found to be negative for long-run growth prospects (Helm, 1985). In a similar study, Yi and Suyono (2014) analysed the implication of a tax structure in Hebei province and found that at the local level, incremental increases in taxes may not be as harmful to growth as many studies suggest. Yi and Suyono (2014) found that fiscal reform on both direct and indirect taxes may be more favourable for growth, in addition to redirecting state spending to factors which promote better standards of living, such as social security and state medical schemes.

However, McBride (2012) analysed twenty-six countries between 1983 – 2012, which examined the impact of taxes on growth. Of the twenty-six studies, twenty of these were noted to have been completed in the last fifteen years, of which all concluded that there was a negative long run relationship held between taxes and economic growth. McBride (2012) highlights that growth is accredited to income and wealth creation, of which taxes disincentivize the investment into these, which constrains the potential for growth. Furthermore, Gale and Samwick (2014) investigated the relationship of taxes to growth by measuring how taxpayers in the upper percentiles of the marginal tax rates are influenced in their investment ad consumption choices. According to Gale and Samwick (2014) once the marginal tax rate exceeds 50%,

taxpayers will convert from investment to consumption. Thus it is said, according to Gale and Samwick (2014), the correlation between the highest marginal tax rate and the ratio of investment to consumption for the upper percentiles of marginal tax rates below 50% is 55%. Thereon, an increase in the tax rates increases the ratio of investment to consumption where tax rates are less 50%. However, the correlation turns negative when the tax rates are above 50%. Therefore, the increase in investment choice positively impacts on economic growth.

The global financial crisis (GFC) initiated a worldwide economic downturn and suppressed GDP targets across Europe. According to Stoilova (2016) this unwillingly brought the issue of budget deficit spending into most EU member states. Stoilova (2016) found that over the period he studied, one expects the average budgetary balance to have cyclical dynamics and fluctuate overtime. However, the evidence showed that the traditional state of this variable is a lower deficit or higher deficit with no surpluses to show, even in the peak of the business cycle. Therefore, Stoilova (2016) concludes that fiscal policy setting in most EU member states does not follow a Keynesian deficit nor a neo-liberal principal for balancing the fiscal budget – with the exception of Nordic countries (Sweden, Finland, Denmark) showing the largest average public expenditure in relation to the largest overall tax burden in the EU, as stated by Binh and Hong (2013). Accordingly, the average EU tax burden lies between 38.5% and 40% of GDP (Stoilova, 2016).

Alves (2019) studied the share of tax revenues in investment outcomes and GDP, by making use of gross-fixed capital formation as a relevant proxy for investment. According to Alves (2019) investment allows sustainable consumption in the long run, by ensuring productive factors in both the old and new economic production procedure. Therefore, it is argued that investment allows for not only increased quantities being exchanged in the market but allows for further opportunities to improve the trade of existent investments. Therein, decisions pertaining to investments have the ability to enhance the existent production procedures by enabling efficiency gains, allowing the creation of further added value (Alves, 2019). Alves (2019) states that revenue generated by levied taxes is utilized through government consumption and investment. Aside from the core purpose that taxes are levied to ensure government has sufficient funding to carry out fiscal policies and responsibilities, taxes are too imposed on economic agents to correct for externalities that occur in the production process (Alves, 2019). Alternatively, macroeconomics argues that taxation can play a positive role on the economy, particularly when investment levels are seen to be beyond the optimal level i.e., they are misaligned with an optimal consumption balanced path – it becomes crucial to influence to reduction of investment choices. According to Alves (2019) this phenomenon occurs when there is a lack of economic dynamic efficiency in the economy, such as, when the rate of return on capital exceeds investment growth rates. As such, a non-optimal level of investment is apparent when the marginal product of capital is below the economic growth rate, as illustrated in exogenous growth theories by Solow (1956). However, when the level of investment is less than the optimal level needed to ensure long term growth, one perspective is that government involvement is a prerequisite, through state level expenditure and a rise in investment. Moreover, Afonso and St. Aubyn (2009) show empirically that an increase in public investment can cause crowding-in effects in the private sector and thus lead to a rise in aggregate investment levels.

2.3 THEORETICAL FRAMEWORKS OF TAXATION

2.3.1 Theory of Optimal Taxation

Mankiw *et al.* (2009) suggest that much of the theory on what constitutes an optimal tax system is based on the empirical findings of Ramsey (1927) and Mirrlees (1971). Mankiw *et al.* (2009) use those findings to note that to establish the most optimal level of taxation, eight pivotal lessons should be considered. These are: "1) Optimal marginal tax rate schedules depend on the distribution of ability; 2) The optimal marginal tax schedule could decline at high incomes; 3) A flat tax, with a universal lump-sum transfer, could be close to optimal; 4) The optimal extent of redistribution rises with wage inequality; 5) Taxes should depend on personal characteristics as well as income; 6) Only final goods ought to be taxed, and typically they ought to be taxed uniformly; 7) Capital income ought to be untaxed, at least in expectation; and 8) In technical, dynamic economies, optimal tax policy requires increased sophistication." (Mankiw *et al.*, 2009:2).

According to Mankiw *et al.* (2009) the standard theory of optimal taxation suggests that a tax system should be selected to enhance a social welfare function subject to a set of constraints. Optimal taxation, they suggest, views the tax-paying citizen as a utilitarian: that is, the social welfare function is aligned to the preferences of individuals in the society. In this regard, what is important is that the notion of optimal taxation must be aligned with the individual perceptions and expectations of those the system serves. (Mankiw *et al.*, 2009). There are more constraints mentioned, however the study identified this as the 'core' constraint.

According to Mankiw *et al.* (2009) in order to allow for easier understanding of the problem facing the tax-paying citizen, it is often presumed that all those in a society have equal preferences over, say, consumption and leisure. ACCA (2015), for example, argue that a tax system should be designed to best reflect the optimal balance of simplicity, certainty and stability. Mankiw *et* al (2009) note that this allows for a more generalized approach in which authors allow room for greater simplicity in their analysis through the assumption the economy is populated by completely homogenous individuals. This simplified approach, as Mankiw *et al.* (2009) warns, is inherently misleading as it does not align with point five of the empirical findings regarding an optimal level of taxation - namely that "Taxes should depend on personal characteristics as well as income" (Mankiw *et* al, 2009:2). In the generalized approach, personal characteristics are ignored and individuals are seen as equal. This is a major drawback as failure to recognize individual characteristics could lead to sub-optimal behaviour by tax system regulators; whereby the tax system is not fully in line with those it is operating for. Therefore, the system could fall short of the ultimate objectives of the tax payers and citizens. i.e., a redistributive approach in comparison with a more growth-orientated approach. ACCA (2015) found that taxes could be calculated and analysed in numerous ways, with differing periods (quarterly, annual etc.) and extensive tax legislation. It is this reason that ACCA (2015) argue that simplicity for the taxpayer is key. This in turn supports the 'simplistic model' originally put forward by Mirrlees (1971). ACCA (2015) believe this simplified approach could reduce the cost of administration, improve accountability, transparency and ensure greater stability in unforeseen circumstances. According to ACCA (2015) technology plays a pivotal role through enabling e-filing procedures. Simplicity can be enhanced through the drafting of more concise tax legislation; the most central driver of simplicity in a tax system is the intended function of tax (ACCA, 2015). A tax system created with the sole purpose of raising public revenue is likely to reduce complexity, as the only constraints are neutrality and efficiency. In contrast, a system which introduces mechanisms for choice will only increase the complexity of the tax system and minimize the likelihood of achieving its main objective (ACCA, 2015). Policy-makers should avoid making one tax do too many things, i.e., "corporate income taxes get used to raise revenue, to redistribute corporate profits from the wealthy (the business owners who would otherwise ultimately benefit from the surplus), and to regulate business activity, through enhanced

deductions for installing 'environmentally friendly' plant and machinery." (ACCA, 2015:5). The additional targets expected of the tax; is what increases complexity and ultimately hampers overall efficiency.

Yet Mankiw *et al.* (2009) note that the social planner's goal is to choose a tax system that enhances the consumers' welfare considering that individuals will respond according to whichever policies incentivize them most, in relation to their social situation. This reiterates the importance of tax system design and the complexity to which policy-makers are faced with. A particular tax system will be designed in a manner in which it strives to achieve positive revenue generation, so as to ensure that the country's growth trajectory is aided by proficient tax collection. However, there will be periods of necessary tax reforms of which maintain an approach balancing growth and minimising the tax burden. According to ACCA (2015) stability is a second requirement for an optimal tax system. For the taxpayer, stability is vital for effective planning and efficient compliance. ACCA (2015) states that stability is crucial in tax rates, the tax base and tax administration stability. This requirement supports point eight by Mankiw *et al.* (2009) 'In technical, dynamic economies, optimal tax policy requires increased sophistication." Mankiw *et al.* (2009:23) refers not to technical complexity but, rather, that tax rates shifts should be embedded across all sectors and in line with all economic agents because sudden shifts in tax rates, in systems where dynamic sector-wide consideration and sophistication is not present, will prove negative for both private business and the consumer in terms of confidence. ACCA (2015) note that tax base stability is in line with tax rate stability; stating that the more frequent the changes are, the likelihood tax costs will rise, resulting in the tax system becoming more progressive.

Mankiw *et al.* (2009) state that the optimal marginal tax schedule could decline at high incomes. This is what is referred to as a regressive tax system, which emphasizes the core principle of equity. In line with this notion Alm (1996) states that income taxes are expected to be higher on those who fall in the upper income bracket, to improve social welfare, further reiterating the element of equity in the optimality argument. In contrast, on the grounds of efficiency, Alm (1996:3) states "marginal tax rates should be lower the more responsive individuals are in their labour choices, the less is the dispersion of individual skills, the less concern regarding equality society will have and the lower the amount of revenue government must collect, furthermore that marginal tax rates on the single richest individual should be zero."

While all eight points outlined by Mankiw *et al.* (2009) are said to be equally important, he argues that the form of taxation closest to being optimal would be a flat tax, together with a universal lump-sum transfer. Mankiw *et al.* (2009) note the complexity and rareness of lump-sum taxes in today's world, the issue being that this tax falls equally upon the rich and poor taxpayer. Previous UK Prime Minister Margaret Thatcher pushed through a lump-sum tax in 1989, which was levied at the local level. The "community charge" was met with huge resistance among the middle and lower classes. Within six months, the tax was revoked, and Thatcher's term of office ended abruptly (Mankiw *et al.,* 2009:12).

In supporting their argument for a universal lump-sum tax, Mankiw *et al.* (2009) use the work of Mirrlees (1971) who stated "marginal taxes should be higher at lower wages than for most of the rest of the distribution." (Mankiw *et al.,* 2009:12) The logic is that high marginal tax rates at low wages will enable there to be large lump-sum transfers to those within the lowest capability levels, whilst not luring high-capability workers to work less and receive these transfers. The high-capability worker therefore contributes their labour market returns, whilst indirectly being deterred from working less and reaping social transfers, through the imposition of the lump-sum tax. Mirrlees (1971) explains that the initial underpinnings of this lump-sum may violate the equity principle, through pushing a heavier tax burden onto the poorer population. The logic is that, through increasing the tax burden onto the poor, the incentive to drain social grants and other government transfers by middle and lower incomes is minimized. Simultaneously

encouraging development of human capabilities and ensuring the poorer community move into the labour market to lessen their tax burden and contribution to an overall growth in the country's output.

2.3.2 The Laffer Effect

Mirrlees (1971) draws attention to the important issue of a possible negative effect that high taxes may have on productivity and therefore economic growth over the long term. Mirrlees (1971) argues that if government excessively taxes those of high ability and earning, this will disincentivize their effort and productivity and they will be discouraged from exerting their full potential due to the adverse effects of the tax. Laffer (2004) demonstrated this impact graphically, showing that higher tax rates might disincentivize high-income workers and actually reduce tax collections rather than increase them.

The "Laffer Curve" enhances this argument by Mirrlees (1971) by providing a graphical and practical illustration of the potential relationship between increasing tax rates and the extent to which an increase may disincentivise productivity. It therefore illustrates the importance of understanding the maximum (most efficient) level at which tax increases will prove to be beneficial in terms of revenue generation, and the extent to which they will thereafter be subject to diminishing returns. The impact of the Laffer Curve is twofold; (1) revenue may fall; (2) growth will be harmed. i.e., this the trade-off between raising tax rates and the effect this has on productivity.

Busato and Chiarini (2013) looked at the connection between tax avoidance, tax evasion, and capital flight and the application of a Laffer curve in a dynamic general equilibrium model. They also examined the consequences of assuming a possibly misleading positive relationship between tax rates and tax revenues and tested whether a tax rate cut might stimulate economic activity and tax revenue and therefore actually decrease government's budget deficit (often referred to as the Laffer Curve Effect) (Busato and Chiarini, 2013). Busato and Chiarini (2013) also test the arguments that suggest a financial austerity/growth trade-off, by looking at why certain countries have extensive fiscal burdens (Busato and Chiarini, 2013).

They conclude that this complex relationship between tax rates and revenues has important policy implications. Busato and Chiarini (2013) determine that the Laffer curve is a highly insightful tool, which allows for a broadened understanding of the tax effects on all major agents (households, firms, government) that is important in any quest to find an optimal tax level. Their framework identified the magnitude of the 'underground tax system' which are described as tax evasion procedures, and how the Laffer curve is shifted much lower in the U.S. than expected, thus not allowing for adequate revenue generation or fair tax rates. Busato and Chiarini (2013) found that through the application of the Laffer curve, they were able to deduce that a lower tax rate would direct more business into the formal economy, thereby enhancing tax revenues. Palumbo (2015) studied the Laffer curve effect in relation to a capital gains tax and showed how in 2003 in the U.S. "people in the lowest 40% of the population, received a capital gains tax cut from 15% to 5%, while the highest brackets had their capital gains cut from 20% to 10%". These cuts did not half government revenue collection, but in fact encouraged more investment through the period. The cuts were said to have paid for themselves and by 2006, revenue had surged 100%, totalling $110 billion in revenue collection from capital gains taxes (Palumbo, 2015).

The Cevik and Miryugin (2018) study questioned if taxation stifles corporate investment at the firm level in ASEAN countries. The authors found that there are significant nonlinearities in the link between taxes and the firm's investment appetite. Accordingly, taxation does not seem to hamper the business investment. Yet this impact turns negative, with an increased tax burden that raises the user cost of capital and alters resource allocations. Furthermore, Cevik and Miryugin (2018) argue that an equitable and efficient tax system is "key to promoting private investment and concurrently raising resources for public

investment" (Cevik and Miryugin, 2018: 6). The authors highlight that a reduction in CIT can spur an increase in entrepreneurial activity, as result of a smaller corporate tax burden and greater opportunity investment growth. However, many countries in the ASEAN region simply had no policy room for such a reduction. Yet, given that many of the ASEAN countries, such as the Philippines, have relatively low tax-revenue to GDP ratios, it becomes crucial to formulate a strategy for corporate fiscal reform. This tax reform should be focused on strengthening tax compliance and broadening the existent tax base, whilst simultaneously decreasing the corporate tax burden.

2.3.3 Progressive Taxation and Growth

A progressive tax system is one which requires a largely incentivized, educated and organized tax administration. According to Elshani *et al.* (2018) this form of taxation is usually more common in countries where there is a low degree of corruption. The application of a progressive tax approach requires a large number of individuals (taxpayers) to participate in the collection process. Elshani *et al.* (2018) state that usually countries which opt for this approach, usually apply progressive tax policies on Personal Income Tax and is only ever experienced in the developed world. However, Elshani *et al.* (2018) note that the developed countries which apply this type of taxation do not experience immediate growth but rather a gradual stable growth pattern - as opposed to developing or less developed countries which apply a linear approach to taxation who experience rapid growth. Progressive taxation increases government revenue by relieving public debt and is said to address inequality without presenting a negative effect on economic growth (Fieldhouse, 2013). The author found that through an econometric analysis, the closest tax system to optimal was a progressive system. This form of tax system makes all citizens sacrifice equally, given the income level and therefore their individual ability to pay. Thus, progressivity in tax states that the wealthy need to contribute more to the fiscus than the poorer portions of the population. Therein, the more income an individual receives, the higher the marginal rate is.

Similarly, Elshani *et al.* (2018) state that when the tax rate increases with the tax base, it said to be a progressive approach. The authors argue that the presence of a progressive tax enables justice in the collection process. Elshani *et al.* (2018) use the work of Dorn (1996) to show that a progressive tax violates the principle of equality before the law. Reiterating that the wealthy are subject to a higher tax rate due to the nonlinear linear relationship between tax rates and income brackets. The authors conclude that this nonlinear relationship exists as higher-income earners use more state goods than the poor. Yet, Jelcic (1983) argues that a progressive tax impacts economic activity as it leads to an increase in resistance to tax payment and therefore negatively impacts taxpayer behaviour.

2.3.4 Linear Taxation and Growth

Linear taxation varies from progressive taxation, as it aims to equalize the actual tax rate by standardising this across all income earners. Elshani *et al.* (2018) state that the core argument behind the linear tax is simplicity. This in turn is said to have an improvement in transparency, administration costs and lead to less complications. According to Elshani *et al.* (2018), these positive indicators are mostly seen in countries with a high degree of tax evasion. The implementation of this form of tax is said to reveal a reduction in tax distortions, which in turn drives economic efficiency. More precisely, the use of a linear tax on Personal Income Tax and Corporate Income Tax enables incentives to work and investment if the tax burden is minimized, as compared to a pre-reform tax. Moreover, Schratzenstaller *et al.* (2005) highlights that with the implementation of a linear tax, the outcome is likely to reveal an increase in investment growth, employment opportunities and a rise in production output.

According to Paulus and Peichl (2009) a linear or flat tax can be described as a tax where there is a form of proportionality instilled in the income tax system, i.e., that incomes are taxed at a unified flat rate irrespective of their level. Tax systems which tax only capital income at a linear and charge a progressive rate on labour are not considered flat systems, but as dual-income systems. Paulus and Peichl (2009) highlight that only a linear tax rate without any tax relief is considered a "pure" linear or flat tax, as the distribution of tax payments to income is constant for the entire income range. Moreover, this form of taxation has only ever been employed as an income tax rate in Georgia and Bulgaria.

2.3.5 Tax Efficiency and Growth

In line with the focus of this study analysing the impact of taxation on economic growth, an important angle is that of the revenue loss caused by inefficiency. While it is important to note that this thesis will not be investigating the presence of inefficiencies in various tax systems, it is necessary to briefly contextualise this form revenue loss. This study will look at interpreting the impact of a sample of fiscal and non-fiscal variables and explaining their impact on growth. Therefore, evaluating whether negative relationships are caused by inefficiencies in respective tax systems is beyond the scope of this research, yet is important for an empirical understanding.

Storm and Coetzee (2017) examine the issue of improving tax efficiency in the U.S., UK, Australia and South Africa by looking specifically at the negative externalities which breed in instances of weak tax policy. These include, but are not limited to, tax evasion and capital flight. To do this they examine the possible impact of tightening tax legislation in an attempt to recoup losses due to poor tax policies. Accordingly, improvements in fiscal legislation and tax efficiency are said to be pivotal in laying the foundations of a tax system, which indirectly encourages growth.

Storm and Coetzee (2017) highlight that one of most detrimental factors to any tax system in recent times is an increasing prevalence of tax resistance. The underlying issue, they suggest, is the fine line between legal avoidance, which is seen to be well-developed schemes to assist individuals and firms minimize their exposure to taxes, and illegal evasion which are illicit forms of tax practices and accounting irregularities. They warn that reforming tax legislation should be done in a delicate manner, as sudden increases in capital gains collections, stringent company tax procedures and proposals of a wealth tax, are likely to unsettle both local and foreign investors. Due to the extremely mobile nature of capital, sudden changes in policies are likely to prove counterproductive as capital will simply move to tax systems more favourable, i.e. tax havens.

Storm and Coetzee (2017) outline what they describe as the main hurdle in efficient tax collection and economic growth; tax evasion. The authors show that the issue of tax evasion is not confined to a select few countries, but rather is a global problem. Furthermore, Storm and Coetzee (2017) argue that the behavioural trait to cheat on tax and act only in self-interest must be overcome before any major strides in the befits of changes in tax legislation are.

The authors note that global regulatory alliances have helped set formal international standards, as well as affording smaller countries, such as South Africa, the ability to benefit from international assistance and shared resources in monitoring tax evasion. To this end, in 2003, the U.S., UK, Australia and South Africa formed "The Tax Justice Network" which aimed at "creating understanding and to promote reform in poorer countries" (The Tax Justice Network, 2011). It was replaced in 2013 by the Global Alliance for Tax Justice, which built on the same fundamentals, emphasizing greater global transparency in both private and public sectors, a more democratic oversight as well as the goal of achieving improvements in wealth redistribution (Storm and Coetzee, 2017). Accordingly, this alliance was pivotal for South Africa, as it

provided government with the necessary guidelines to further enhance tax legislation using international guidelines as a benchmark and as a direct tool to assist in curbing tax evasion.

They authors found that unlike the Tax Justice Network and the Global Alliance for Tax Justice, the core focus of the OECD is to support governments to bolster wealth and combat poverty through economic growth and financial stability. Although South Africa does not hold OECD membership, the OECD has stated that they are actively working more closely with Africa. This has led to the development of the "Global Forum" which grew into the largest global network for international collaboration in relation to tax and the sharing of financial data (Storm and Coetzee, 2017).

The "Global Forum" is an excellent example of a global consensus around tax reform, with a focus on developing nations. This consensus encouraged developing nations to engage in the sharing of tax-various data. Many emergent nations embraced this, and quickly began experiencing the benefits of the newly-formed global network. They found that the success of many of the OECD countries in curbing illegal tax practices, achieved a well-defined constitution and proper execution of relevant tax laws, which in turn lead to an improvement in revenue generation. The United Kingdom is one such example; "Her Majesty's Customs and Revenue" (HMRC) alongside the "National Crime Agency" (NCA) are two government agencies with the sole purpose of constantly reviewing the fine line between tax avoidance and tax evasion. The UK has used these and other agencies to assert one of the most stringent tax systems in the world, through constant legislation reform. The authors found that the UK was successful in simultaneously instilling a heavily-regulated tax system, while also providing incentives for growth to both public and private sectors. Accordingly, the HMRC and NCA were able to increase illegal tax prosecutions by 20% from the period 2010 to 2014.

Schwarzer (2002) notes that transparent and effective tax legislation is crucial as this improves certainty in the taxpayer's behaviour. Complex tax legislation should be avoided as this not only hinders confidence, but increased complexity will drive up administration costs. ACCA (2015) further outlines the importance of certainty, stating that policymakers need to understand the tension that exists between simplicity and certainty. ACCA (2015) concludes that regular guidance from international agencies and adhering to set guidelines will improve certainty within the tax system, thus improving efficiency.

The added assistance from the focused agencies as well as regular constitutional reform on tax practices were seen to improve tax efficiency in the UK. Empirical findings by Storm and Coetzee (2017) found that while many countries are successful in defining tax evasion in their respective constitutions and using law enforcement agencies to combat this and other illegal tax practices; only the US and Australia saw tax evasion as a crime against its government, highlighting a major loophole in the South African Revenue Service's (SARS) mandate. Therefore, the authors recommend for South Africa that a key point that can be considered by the South African Legislature is for inclusion in the Prevention of Organized Crime Act or the Tax Administration Act with suitable penalties.

Cobham and Jansky (2017) investigated global tax revenue losses as a result of tax evasion and found that these losses globally amounted to around US$500 billion annually. Cobham and Jansky (2017) developed a new understanding on the political economy of international corporate tax, and particularly show why some countries were likely to support the reform of the existing corporate tax system. According to Cobham and Loret (2015), profit shifting by US multinationals contributed between US$130 billion to around US$200 billion to this global revenue loss. Furthermore, Fuest *et al.* (2011) found that such revenue losses might be particularly high in developing countries. They find that the effect of the host country's corporate tax rate on the debt ratio of multinationals firms in developing economies is positive and holds a larger effect in emerging nations. This translated to how large multinationals with huge debt burdens were easing their tax liabilities by shifting their operation to emerging nations with less stringent tax procedures.

This therefore illustrates how the home nation of the multinational firm contributes to global tax revenue losses. UNCTAD (2015) also developed a model to quantity global tax revenues losses. UNCTAD (2015) used national-level data returns on foreign direct investment in attempting to quantity revenue losses. UNCTAD (2015) noted that after testing many countries through the model, lower-income countries yielded much higher loss estimates. This is further emphasized by UNCTAD (2015) noting that the growth in 'tax havens' are predominantly found in the developing world.

2.3.6 Fiscal Sustainability and Economic Growth

Fiscal policy is installed in many scenarios by policymakers to be 'growth enhancing', however the attainment of long-run economic growth may not be viable to the fiscus, if debt levels, public expenditure and a shrinking tax base are not taken into consideration. Burger and Calitz (2019) highlight the importance of maintaining sustainable fiscal policies in a South African context. The authors emphasize the wording used by most of the pre-existent literature on fiscal consolidation, which alludes to "durable consolidation" (Burger and Calitz, 2019:2). It is said that fiscal consolidation by means of prudent public spending, increases in revenue, lowering of interest rates and careful consideration of debt leveraging, assist in enhancing fiscal durability. Yet contrary to public spending and tax revenue, economic growth cannot simply be enlarged, although interest rates are used as an indirect monetary policy tool. These need to stay in line with global standards on interest rates to allow capital inflows (Burger and Calitz, 2019). Therefore, Burger and Calitz (2019) argue that decreasing non-interest expenditure or raising tax revenue as the core instruments in attaining fiscal sustainability.

The authors find that much of the studies conducted in an OECD country context, show that fiscal consolidation through cuts in the government wage bill and social welfare transfers had more significant reductions in fiscal deficits; compared with countries which focused primarily on tax rate increases. While in the developing world similar trends were found to be present, the studies all highlighted that significant deficit reductions were attributed to revenue adjustments (Burger and Calitz, 2019). In line with this, Arizala, Gonzalez- Garcia, Tsangarides, and Yenice (2017) revealed that in Sub-Saharan African countries, while fiscal consolidation is seen to have a negative relationship with short-medium term growth rates, the extent of the negative relationship is lessened if done through tax rate hikes and public consumption as opposed to decreases in public investment. Yet, findings by Fatás and Summers (2018) show how the fiscal adjustments post the 2008 financial were 'self-defeating', concluding that fiscal consolidation dampened growth levels, which in turn led to increased debt/GDP ratios.

Empirical evidence by Burger and Calitz (2019) revealed that during the period 1991- 2018, the debt/GDP ratio increased and government's response was a balanced increase to the total revenue/GDP ratio. Yet, the authors note that "total no-interest expenditure/GDP has not reacted to changes in debt/GDP since the second quarter of 2019" (Burger and Calitz, 2019:11). Therefore, it is said that the responses seen in the primary balance/GDP ratio to variations in the debt/GDP ratio in the previous ten years is due to the reaction of tax revenue/GDP and not no-interest public spending. While it is noted that the tax revenue/GDP failed to stabilize debt/GDP over the period, taxation was successful in preventing the debt/GDP ratio from increasing at a much faster rate.

2.4 TAX STRUCTURE AND ECONOMIC GROWTH

2.4.1 Tax System Design

The manner in which a tax system is structured i.e., the design, composition and objectives of a country's fiscal policy overview, is a key determinant in the growth rate and effectiveness of the collection procedure. Stoilova (2016) argues that a tax system today entails a complex diversity of policy objectives. The quest for designing a well-balanced tax system is one which seeks to achieve its fiscals aims in the most efficient manner, by minimizing undesirable distortions to economic agents, controlling costs of the revenue collection process whilst simultaneously bolstering growth, both endogenously and exogenously. According to Stoilova (2016), average budget aggregates across the EU-28 member states over the period of 1996 - 2014, is found to be high – with the average ratio of government spending to GDP between 45 to 50 percent. The most substantial hike in EU government spending was following the shock of the financial meltdown in 2008 (Stoilova, 2016). However, there has been a recent development in the newer member states of the EU (Eastern and Southern EU nations) where there has been a dramatic pullback in government expenditure, coupled with liberal reforms in the political sphere.

Tax system administration needs to be implemented and designed in an efficient way so as to ensure that revenues are collected with low administration costs. According to Brys *et al.* (2016) significant compliance costs for taxpayers are likely to reduce the efficiency of tax reforms, in addition to having an effect on equity principle. Moreover, Brys *et al.* (2016) note that tax systems in which administration is inefficient in minimizing tax avoidance and evasion opportunities, alongside taxable income elasticities, will hamper both the efficiency and equity of tax reforms. Therefore, a tax system that is properly executed, one with a broad base, no loopholes, deductions, and other opportunities for tax avoidance, will often lead to lower taxable income elasticities.

Crucial to the design of a tax system is the tax incidence, which is known as the actual burden which is placed on the taxpayer. Brys *et al.* (2016) state that the ability to move the tax burden onto other taxpayers will impact the distributional effect and the efficiency-equity trade-offs of a tax policy. Those directly affected by the tax may not be the individuals who ultimately bear the burden of the tax. Thus, it is said that the incidence of the tax not only influenced by behavioural responses (market elasticities), but is also dependant on the degree of competition and the linkages across markets (Brys *et al.*, 2016). Therefore, it can be said that a reliance on consumption taxes can be harmful to those of the lower income brackets, particularly in scenarios where zero-rated goods are minimal. While an overreliance on income taxes will prove harmful to all income tiers, dependant on the progressivity of the tax system. The more progressive a tax becomes and the more reliant a government becomes on this approach will ultimately lead to a discouraged middle and upper class. Therefore, balancing the needs of the fiscus and government with that of the country's tax paying population is what will ultimately lead to an efficient collection of revenue, proving beneficial for long term growth.

2.4.1a Empirical Findings on the Relationship Between Economic Growth and Taxation

It is said that any further advances in per capita output are due to exogenous shifts in technology. Takumah and Iyke (2015) study the links between economic growth and tax revenue in Ghana, in particular testing the causality between these two variables to identify which is the dependent variable. Takumah and Iyke (2015) tested for causality, which allowed for a multiple-variable test including capital, labour, government expenditure and inflation to establish the connection with economic growth. The authors conclude that taxation and economic growth have connections both empirically and theoretically. Takumah and Iyke (2015) employed the Toda-Yamamoto test in order to determine causality and avoid pre-testing bias of the Granger test. The authors found evidence of "unidirectional directional causual flow from tax revenue to economic growth in Ghana" (Takumah and Iyke 2015: 20). This finding is in line with the authors' literature

that stated that taxation has an influence economic growth. The downside associated with Ghana is the magnitude of its black market, thus the influence of taxation on GDP is not necessarily a true reflection. Therefore, Takumah and Iyke (2015) identify this as a major drawback for tax policy in developing nations.

Bujang *et al* (2012) studied the individual components of a tax system in relation to economic activity. The authors established which individual forms of taxation are most influential to growth, as well as inflation. Bujang *et al* (2012) highlight the importance of prudent fiscal policy setting, such as in a scenario of the financial crisis. Fiscal policies, which are aimed at stimulating growth, through increased tax revenue needs, would trigger downside inflationary effects. Moreover, inflationary expectations will be the onset to constrained consumption. Bujang *et al* (2012) find statistical significance that the total tax revenue to GDP ratio is more prominent in more developed countries as compared with less developed middle and low-income countries. Additionally, the inflation rate was found to have a direct and significant impact on taxes on goods and services. Furthermore, it was found that taxes on income, profit and capital gains contributed more in total tax revenue, the more developed the countries. While, the Total Tax Rate (TTR) was found to be significant and positive with Foreign Direct Investment (FDI) inflows, the authors argue that an increase in the TRR will decrease both company profits and actual rate of returns for FDI. , Bujang *et al* (2012) argue that a surge in total tax revenue will incentivize domestic savings due to the hike in goods and services taxes, which lessens consumption. Yet, taxes on international trade were found to negatively affect gross domestic savings, of which these international taxes encourage local consumption to rise, as foreign goods and service are too expensive.

2.4.2 The Tax Mix

Mcnabb (2018) defines a tax mix as the combination of individual tax components, which all together make up the tax system. While tax structure is defined as the manner in which these specific taxes are directed, there is a focus on a desired outcome - such as raising rates to further expenditure or dropping rates to spur investment. The author found that the various changes in the tax mix have varied effects from country to country. Crucially, Mcnabb (2018) argues that reductions in trade taxes, along with hikes in domestic consumption taxes emerge as growth-enhancing, as a proportion of GDP. Moreover, the author highlights that this trend appeared most prevalent in developing, middle-income countries. Yet, this impact was not found for low-income developing nations. Moreover, Mcnabb (2018) finds that "revenue neutral shifts away consumption and property taxes, towards income taxes, are categorized by lower GDP growth in the long-run" (Mcnabb, 2018: 199). Additionally, Mcnabb (2018) argues that personal income taxes and social welfare grants are found to be the most detrimental components of taxation in long-run growth.

Mcnabb (2018:a) studied the link between tax structures and economic growth by using data from the International Monetary Fund (IMF) and the Government Finance Statistics (GFS). The study was in the context of globalization, aimed at analysing the impact of the IMF's continued support for increased improvement in value added tax (VAT), goods and services tax (GST) and a decrease in many developing nations reliance on trade tariffs (Mcnabb, 2018:a). Mcnabb (2018:a) presented a dataset of 196 countries over the period of 1980 – 2013. The initial part of the study looked at better understanding the tax ratio and the tax structure concurrently. The author shows various tax subcategories, including income (corporate income and personal income taxes), GST (domestic consumption related taxes, VAT, sales tax and other forms of excise taxes.

Mcnabb (2018:a) discovered that the average tax ratio in OECD countries stood at between 30 and 35 percent of GDP, whilst middle-income countries averaged between 15 to 25 percent with the lower-income nations recording averages of between 10 to 15 percent. The global tax ratio average for the period

stood at 22 percent. Accordingly, Mcnabb (2018) notes numerous explanations for the reasoning behind the middle- and low-income nations tax ratio level; however, reiterates the overwhelming similarities in these countries and the expansion of the informal economy, a high existence of subsistence farming, poor schooling and literacy rates and ultimately a lack of administrative capacity to provide sufficient methods of fiscal efficiency and tax collection. (Mcnabb, 2018:a)

Tax structures are the next point of investigation, whereby Mcnabb (2018:a) reveals an extremely high reliance on international trade tariffs in low-income and low to middle countries, stating that "over the past three decades this reliance has lessened, being replaced mainly by GST and income taxes" (Mcnabb, 2018:a:178). This can be quantified when the highest percentage of total tax revenue is found is be attributed to trade taxes. The dependence of trade tariffs for growth has decreased by over 50% in low-income countries, with a similar trend seemingly apparent in the middle-income countries (Mcnabb, 2018:a). This structural shift is a direct impact of the easing of trade restrictions and removal of trade barriers globally, along with the improved usage of indirect taxes such as VAT. According to (Mcnabb, 2018:a) trade tariffs have been declining both in relative terms (the share of total tax) as well as in absolute terms (as a share of GDP). Moreover, (Mcnabb, 2018:a) emphasizes the "relative stability of the tax structure" (Mcnabb, 2018:a:180) is apparently primarily in the high-income countries over the period studied; these nations, many of whom formed part the European Union, benefitting hugely from the free trade area. Likewise, the author reveals that only the upper-income earning nations are able to generate a substantial revenue from wealth taxes, such as property taxes, averaging between 4 to 5 percent of overall revenue for period. Lastly Mcnabb (2018:a) reveals the relationship between tax and GDP per capita for the period 1980 – 2012. The results suggested an overall positive relationship between income per capita and the tax ratio. This is a huge significance to the study as GDP presented as the annual percentage change and not as a per capita value. This will allow the study to investigate if a similar trend is present when using the annual percentage change variable, and whether this variable proves more insightful in terms of comparing annual changes amongst the SSA sample countries. Mcnabb (2018:a) found that those countries with low tax ratios but high GDP growth rates, were seen to be oil-producing nations exclusively, whilst on the other end of the spectrum it was found that the remainder were countries with a tax ratio of between 30 - 40 percent and relatively low GDP per capita – mainly all former Soviet nations. Therefore, Mcnabb (2018:a) suggests that for most nations, increased per capita GDP coincides with a higher tax ratio, further highlighting that there is only a moderate positive relationship between income and property tax relative to the growth rate. While it was found that GST and VAT held a strong positive relationship with the growth rate, with trade taxes having a negative impact on the growth rate (Mcnabb, 2018:a).

Theory and empirical work by Mcnabb (2018:a) and the IMF (2011, 2015, 2016) concluded that a decreased dependence in trade tariffs, offset by a growth local consumption taxation appears to be the most effective growth enhancing strategy globally. In building on the work of Mcnabb (2018), this study will seek to test whether the above statement is applicable to the SSA region. Crucially, these findings suggest this strategy would be particularly successful in driving growth in middle-income countries, however no such impact was found in low-income countries. Therefore, reiterating the importance of trade liberalization in low income as a key growth-driven, as well as an important indirect fiscal policy measure to improve trade; which in turns creates an increase in availability of resources, allowing for increased revenue generation in consumption taxes. Moreover, the empirical findings suggested that a hike in property taxes is not positive toward growth as previous literature notes. The study concluded that increases in property taxes may be somewhat beneficial to high-income countries, the same is not true for low-income nations. In fact, the study projects that increases in such forms of wealth-taxing will have damaging effects on the term growth trajectory of a developing nation.

Avila and Strauch (2008) used the endogenous growth model to show that taxation had a negative effect on investment and led to sluggish growth. This was shown by significant and negative coefficients of tax in relation to investment**.** Similarly, Bujang *et al.* (2013) used this theory to assess if a long-run relationship exists between economic growth and tax revenue. Additionally, the long-run relationship was consistent among OECD countries and developing nations. The authors' use the Solow (1956) model on exogenous growth to test various indicators., in addition to various panel unit root tests to establish the order of integration of these variables.

Additionally, more recent research has found significant trends in OECD countries, with regards to tax structure changes and economic growth. Tosun and Abizadeh (2005) state that many of the OECD countries have experienced relatively high GDP average growth rates during much of the 1980's; the period categorized by sluggish global growth. For the period 1980 – 1982, the OECD countries were 0.8% higher than the global growth at the time (Tosun and Abizadeh, 2005). The authors note this surge in economic growth compared with growth averages prior to 1980 coincided with considerable modifications in their tax structures, in particular 1997 - 1999. Tosun and Abizadeh (2005) claim that any changes in economic growth are followed by changes in the tax structure in OECD countries. The authors further claim that these changes are due to the variations in the relative importance of the various types of taxes in the overall tax revenue**.** The findings suggest that the structure and mix of the fiscus are what ultimately drive efficiency, which in turn leads to total revenue positively influencing growth levels. The results found that GDP per capita had a significant impact of the tax mix in OECD countries. Yet, the study failed to find significance across all tax categories, such as no significant relationship to growth by either corporate taxes or international trade taxes shares (Tosun and Abizadeh, 2005). Conversely, personal income taxes and property taxation have seen a rise in their contribution to total tax revenue in response to GDP growth. The authors conclude by noting that GDP per capita had a sufficiently large impact on personal income taxes as well as goods and services taxes (Tosun and Abizadeh, 2005).

Bujang *et al.* (2013) extend on the work of Tosun and Abizadeh (2005) by investigating the long run connection between tax structure and GDP and other economic variables through panel analysis and cointegration. Bujang *et al.* (2013) highlight on that literature by Kerr and Monsigh (1998) who argue that there is a significant inverse link between indirect and direct taxes and the level of savings. In order to test the long-run connection between tax revenue and economic variables.

The study by Bujang *et al.* (2013) showed that for OECD countries, a long-run cointegrating relationship was found between tax structures, GDP, gross-saving and FDI. Bujang *et al.* (2013) argue that tax policies implemented by high-income countries were impacting the movement of long-term growth. Nonetheless, the results showed no significant relationship with tax structure and international trade. On the contrary, Bujang *et al.* (2013) noted that for developing countries there is long-run cointegrating relationship between international trade and taxes, yet no evidence to suggest a link with gross-saving. Therefore, Bujang *et al.* (2013) argues that different tax policies conducted both categories of countries have given an opposite long-term impact on economic variables among these nations. In line with this, Mcnabb (2018) studied the relationship between various tax structures and economic growth across a sample of 100 countries.

2.4.2a The Consumption Function and Taxation

Pressman (1997) expanded on the work of Keynes (1973) who outlined the importance of tax policy as a function of income, highlighting the importance of disposable income, which ultimately drives consumption patterns and leads to growth through a multiplier effect. Keynes (1973) found that "if fiscal

policy is used a direct tool for the more equal dispersion of income, its effect impact in increasing the propensity to consume is, all the greater" (Keynes, 1973: 95). Therefore, Keynes promoted high tax rates on unearned income, capital gains, estates and other forms of income, which put the wealthy in an inequitable advantage over the majority of a country. On the contrary, Pressman (1997) notes that many modern economists reject this theory, stating that it is savings rather than consumption which determines the investment path and thereby long-run growth. Moreover, modern economic theorists tend to neglect income distribution as key driver for growth, due to the lifecycle hypothesis and the permanent income hypothesis. According to Keynesian theory, consumption is only function of disposable income (YD), therefore;

Equation 6: Disposable Income Equation

$$C = \alpha + bYD \quad \text{.....(6)}$$

C = Consumption
YD = Disposable Income
b = *Level of income*
α = *Constant*
W = wealth

Equation 7: APC Equation

Further deriving what is known as the, average propensity to consume, APC.

$$\frac{C}{YD} = b + YD \quad \text{.....(7)}$$

Assuming the consumption function is linear, with *b* remaining constant as YD rises. The rise in YD over time means that $\frac{\alpha}{YD}$, and therefore the APC is expected to fall. However, Pressman (1997) states that if the function is non-linear, then $\boldsymbol{b}$ is expected to fall with increasing incomes, and there are two reasons for the diminishing APC. In both scenarios, the APC should decline over time with rising incomes and alongside economic growth. The issue is that economists have struggled to prove this empirically, as Pressman (1997) highlights so for the United States. The author used findings by Kuznets (1961), which found that APC is the U.S. held constant over time – directly refuting the simple Keynesian consumption function. This shortfall is over by the permanent income and life cycle theories, which provides a solution to the problem with an additional factor – wealth or future earnings, which in turn impacts consumption and leads to APC rising over time;

Equation 8: APC Equation (with wealth)

$$C = \alpha + bYD + cW \quad \text{.....(8)}$$

Whereby,

Equation 9:Finalised APC Derivation (with wealth and consumption)

$$APC = \frac{C}{YD} = b + \frac{\alpha}{YD} + \frac{cW}{YD} \quad \text{.....(9)}$$

Accordingly, if the growth rate of cW over time surpasses the rate of growth of YD, the final term in the equation rises and balances the fall in *a*/YD. Thus, the APC remains fairly constant.

The success of the life cycle and permanent income theories of consumption, coupled with the case against income distribution explaining the stable APC, has resulted in distribution of income being neglected in fiscal policy frameworks. Furthermore, Pressman (1997) states that one must not ignore the fact that accepting a positive correlation between income inequality and consumption would have profound policy implications. According to Pressman (1997) in periods of large unemployment – common for largely capitalist economies - the suitable policy response would be tax cuts geared to lower-income earners. However, this is largely unfavourable to politicians and the rentier class and explains the extreme complexity of trying to use income distribution to understand growth (Pressman, 1997).

2.4.2b Impact of Direct and Indirect Taxes on Consumption

Steindel (2001) highlights theory on permanent income in relation to taxation, to study the effects of changes in tax policies and how these impact consumer spending. According to Steindel (2001) consumers are more prone to change their spending pattern, if they perceive a tax change as a long-term change. Thus, most of the literature is in agreement that consumers are forward-looking; stating that individuals will begin to adjust their consumption patterns immediately after the tax is passed into law or prior in expectation of the change. Furthermore, Steindel (2001) concludes that consumer patterns will not vary until a tax change impact take–home pay. As individuals measure the size of tax by the immediate impact of tax payments, as opposed to its impact on tax liabilities. Therefore, consumer expenditure will respond more sternly to a permanent change than to a temporary change.

Milesi-Ferretti and Roubini (2010) study how labour income; capital income and consumption taxes impact resource allocation and growth. The authors show how the effects of taxation are dependent on "(i) the specialization of leisure, (ii) the structure of the human capital accumulation sector, and (iii) its tax treatment" (Milesi-Ferretti and Roubini, 2010: 3). The authors agree with Lee and Gordon (2004) on the importance of technology, for human capital accumulation, as well as the nature of the leisure activity in revealing the results of capital, labour and consumption taxation. Milesi-Ferretti and Roubini (2010) found that an indirect tax, such as a consumption tax, holds one key distortionary feature – it has an impact on the choice between time-productive actions (labour and education) and on leisure activities, proving more time spent in latter, which ultimately hinders growth. This decision is impacted in a similar manner by income taxes, yet these also include additional distortionary features that decrease capital accumulation and GDP. According to Milesi-Ferretti and Roubini (2010) "unrestricted optimal taxation exercises yield (in general) zero taxation of both factor incomes and consumption in the long term, with accumulation of government assets along the transitional path." (Milesi-Ferretti and Roubini, 2010: 739). Therefore, the authors focused on the growth-enhancing choice of factor income taxes and found that it is heavily dependent on the relative capital intensity of the goods and education sector.

2.4.3 The Importance of Managing Tax Levels and Tax Collection

Vasiliauskaite and Stankevicius (2009) state that the issue of the optimal tax burden is a prerequisite for an efficient tax system. The authors study the nature of interdependence of GDP changes and tax burden in EU countries. Moreover, the study analysed how the variations in the tax system influence economic

development. According to Liebman (2006) the goal of an ideal tax system should be to regulate the tariffs which would make it possible to achieve full-employment and balance the budget. According to Vasiliauskaite and Stankevicius (2009) the changes in GDP per capita illustrates the level of national economic development accurately. Evidence by Vasiliauskaite and Stankevicius (2009) shows that the variation of GDP is influenced by the tax burden. Rapid GDP growth crucially raises internal consumption, which in turn results in inflation. Farrel (2008) notes that when the level of working efficiency does not keep up income being obtained, the function of taxes in this scenario is to adjust consumption and safeguard against runaway inflation.

Tax burden management theory reveals that a small tax burden is usually typical for countries facing radical transformation, high inflation and/or lacking economic stability (Vasiliauskaite and Stankevicius, 2009). In contrast, EU countries have large tax burdens, showcasing large-scale social security and an economy characterized by long-term stable growth, high employment and high effective tax rates. According to Vasiliauskaite and Stankevicius (2009) the EU tax burden (link between all tax income and GDP) stood at 39.6% in 27 member states in 2005, which was roughly 13 percent higher than the U.S. and Japan. Yet, the authors state that these findings are not applicable to all EU countries, in reference to almost all Scandinavian states. Vasiliauskaite and Stankevicius (2009) reveal that only in the Scandinavian states, was an increase in the tax burden seen to have a negative impact on growth, while only the "wealthier" EU countries held a positive relationship with the tax burden increase and GDP growth. Hence a correlation relationship between changes of tax burden and GDP per capita, was found to be stronger in countries with historically high tax burdens and a stable tax system. Therefore, Vasiliauskaite and Stankevicius (2009) conclude that high burden is justifiable in countries with a high level of technology, high level of efficiency and a culture of transparent tax compliance. The hike in tax rates over the period 2004 – 2007 across most of Europe, showed that the direction of EU countries into tax decreases is largely over. Furthermore, that the tax burden is being shifted from taxes of labour force to taxes of public goods, while total tax burden is increasing steadily, giving rise to a trend of higher consumption taxes. The authors highlight those EU countries with a higher level of taxation are less likely to introduce short-run tax reform. In addition, the analysis of economic conditions in EU-various countries allows for a greater understanding of how GDP of certain countries with "lower" tax rates has significantly increased, yet no trends of stable economic development in the long-term could be found (Vasiliauskaite and Stankevicius, 2009).

Koch *et al.* (2005) examines the relationship between total taxation, the tax mix and economic growth in South Africa. The authors analysed the growth rate in relation to the tax mix, as well as subsequent fiscal policies frameworks at the time. Koch *et al.* (2005) noted that the tax burden for the period 1960 - 1990 rose gradually from 0.10 to 0.24. After 1990, the tax burden took a slump down to 0.21, thereafter returning and later surpassing the 0.21 peak by 2001. The tax mix had fluctuated from 0.37 to 0.84, of which averaged 0.61 for the period 1960 - 1990. Koch *et al.* (2005) highlight that since 1994, the tax mix has declined from 0.76 to 0.60, showcasing SARS's success at the time in collecting income tax, as well as the addition of zero-rating for VAT-related products. Furthermore, results suggest that increased tax burdens are associated with lower potential economic growth, whilst surges in the tax mix are found to be negative with potential economic growth - this in contradiction to findings by Skinner (1987). Moreover, Koch *et al.* (2005) analysed that the elasticity of the tax mix was negative at -0.22, implying that a 5 percent rise in the tax mix results in a 1 percent reduction in growth. Essentially, the authors found their results were in line with the literature suggesting that higher taxes are significantly correlated with reduced economic growth; the findings also concluded that recent decreases in the tax mix were beneficial for growth. Koch *et al.* (2005) emphasise that the economic impact of tax policy changes is vastly different when analysing a developing

and developing economy; a key difference is that developing economies like South Africa show a negative tax mix elasticity.

Karagianni *et al.* (2012) ran two non-linear causality tests to analyse the presence on non-linear causality from four tax burden ratios; total tax burden, tax burden on production and imports, tax burden on personal income and the tax burden of corporate income tax, in relation to economic growth. The study revealed a clear non-linear relationship across all forms of the tax burdens. However, an alternative model was run to account to heteroskedasticity: a slight correlation between corporate income tax and the tax burden was found. From a fiscal policy standpoint, when a country seeks to influence its GDP growth through taxation, it is wiser to reconsider taxing imports and corporate income taxes rather than personal income. Yet, Karagianni *et al.* (2012) note that taxing personal income would be best suited when a country is focusing on GDP growth stability, as tax changes geared more toward corporate taxation would place a larger burden on the business sector, thereby destabilizing the initial level GDP growth. This opinion by Karagianni *et al.* (2012) is crucially important, as it encapsulates the core analysis of this thesis, investigating why certain tax systems are designed in differing ways. Moreover, it is argued that certain direct taxes such as corporate taxation, could enable growth in an OECD economy. Whilst a large focus on corporate taxation could weaken a developing country's quest for economic stability.

2.4.4 VAT and Economic Growth

According to Onwuchekwa *et al.* (2014) Valued Added Tax (VAT) is consumption tax, imposed at various stages of the production chain, of which the final incidence is borne by the final consumer. This form of taxation is relatively easy to administer and difficult to evade. VAT is the most popular tax, used worldwide to boost revenue equitably and efficiently. Michael and Ben (2007) investigated the causes and effects of the dispersion of VAT. The author's findings comprised of a panel study of 143 countries over a period of 25 years. The results stated that VAT had a significant but mixed impact (Michael and Ben, 2007). Therefore, the study implies that while certain countries gained tax revenue from VAT, others received a reduction in revenue as a result of the subsequent tax. Furthermore, Michael and Ben (2007) found the inclusion of VAT had a long-run surge in overall tax revenue to GDP ratio of approximately 4.5 percent.

Denis (2010) studied the relationship between VAT and GDP in Nigeria. The study revealed that VAT is not an effective revenue earner; Nigeria mostly relies on resource taxes as revealed by the fact that non-resource taxes as a share of GDP are around only 10 - 12%. This has nothing to do with ineffectiveness of VAT, but instead shows a weak tax effort by government as it receives alternative revenues from resources. A similar study by Saeed and Zamam (2012) researched the revenue effect of VAT in the SAARC region. The study made use of panel data from 1995 - 2010 across an array of macroeconomic variables which highlight the true extent of VAT. The results suggested that VAT was instrumental for both tax revenue and economic growth in SAARC region (Saeed and Zamam, 2012). Additionally, Bikas and Rashkauskas (2011) studied the impact of "VAT standard tariff, reduced tariffs and the shadow economy on income from this tax" (Bikas and Rashkauskas, 2011:64). The study focused on the Lithuanian VAT structure, the fundamentals of income from this tax, and legislative adjustments in the law on VAT in relation to shrinking and broadening the tax base. The results showed that adjustments in legislation pertaining the law of VAT, broadening and shrinking the tax base had significant impact on overall economic activity. Bikas and Rashkauskas (2011) concluded that there was a positive and significant relationship correlation between GDP growth and VAT. McGowans and Billings (1997) investigated the recent progression trend of VAT in European Union (EU) countries to determine if the presence of VAT has caused a surge in the overall tax burden. The authors made use of an Ordinary Least Square (OLS) and

Seemingly Unrelated Regression (SUR). McGowans and Billings (1997) found that VAT has regularly been criticised for being a revenue-generating machine for government, moreover that the nature of the tax is overtly regressive. Conversely the authors' findings illustrate that "VAT can be put into practice without becoming money-generating machines for government" (McGowans and Billings, 1997:65). The authors conclude by stating that VAT in EU countries is used to substitute numerous indirect taxes and not to increase the overall tax burden, which given the effectiveness of VAT as a revenue generator, is a positive influence on tax revenue.

Poterba, Rotemberg and Summers (1986) studied the United States and United Kingdom's economy closely, to show the economic impact the shift from direct to indirect taxes had on the economic activity, over the periods 1964 Q3 to 1993 Q4. The study uncovered that for UK, the change to indirect taxes reduced real output, pushed up prices and after-wages in the short run, yet had no significant long-run effect. The study found very similar findings in the U.S. Masanga (2007) found a significant and negative relationship between indirect taxes and economic growth, moreover that a % change in indirect taxes would hamper growth by 0.53%. Using a variation of the Auto-Regressive Lag Distribution Model (ARDL), the study ran a test between various indirect taxes in Nigeria, whilst holding economic growth as the constant. The findings revealed that the ratio of total indirect tax to total tax revenue revealed a negative and insignificant impact on economic growth in Nigeria. Additionally, the study found that the investment to GDP ratio held a positive and significant relationship. Concluding that total tax and tax revenue showed a significant and positive relationship at the 1% level of confidence.

2.4.5 Excise Taxes and Economic Growth

According to Owino (2019) the performance of the Kenyan economy during the period 1963 - 1972, was resilient with growth averaging around 6.6% for the period. Kenya suffered its initial fiscal crisis largely due the international oil shock in the early 1970's, thus prompting the Kenyan government to gear its fiscal policies more toward indirect taxes in contrast to direct taxes (Owino, 2019). According to Owino (2019) the goal was to enable a sustainable tax system that would generate sufficient revenue for economic growth. Subsequently, excise taxes and customs duties have increased in the period 1973 - 2010, albeit this increase occurring along subdued growth. Therefore, Owino (2019) notes an important observation, would be how influential the raise in indirect taxes is on economic growth.

Preece (2013) states that customs and excise duties are the most established forms of taxation. The term "excise" refers to a form of taxation, which is placed on a specific base of goods and services, which normally have a level of burden determined by consumption (Preece, 2013). An excise duty is a tariff, which is charged selectively on various commodities such as tobacco, alcohol, so as to coerce users of these commodities to internalize the externalities that are involved with these commodities. Additionally, this form of taxation is an excellent revenue generator, due to the issue of addition (Preece, 2013). Conversely, customs duties are taxes imposed generally on the weight or any form of measurement of the product, which a government will use as a criterion for imports and exports to and from the country.

International studies looked at the link between tariff protection and economic growth. Azam (2011) used a model to test this relationship, which revealed that the relationship between tariffs and economic growth is not easily observable. Dinopoulos and Syropoulos (1997) ran a similar model, with their results revealing a similar relationship. However, the authors found that if the country has a technologically-efficient export sector, higher tariffs decrease economic growth by discouraging labour from Research and Development in the exporting sector. However, a country with a technologically-efficient domestic production sector, higher tariffs would lead to higher levels of growth. Schularick and Solomou (2009)

compiled a panel data study of several OECD countries, which assessed the relationship between custom duties and economic growth for the period 1870 - 1914. The findings proposed that the relationship between customs duties and economic growth was insignificant, however, there was evidence to show a negative relationship. Yet, Gober and Burns (1997) studied the link between tax structure and various economic indicators for OECD countries, of which their findings concluded that customs and excise duties were highly significant, with a position correlation with GDP.

Dejong and Ripoll (2006) analysed the connection between customs duties and GDP in panel study of over 60 countries for the period 1975 - 2000. The authors focused primarily on the level of economic development. The research found there to be a negative and significant relationship with growth among the world's wealthiest nations. In addition, the study found a positive and significant correlation with growth among the poorest nations. The second finding is of particular importance to this study. As a research objective of this study includes showcasing how tax harmonisation in the SSA region may prove mutually beneficially for trade-related growth.

2.4.6 Corporate Income Tax and Personal Income Tax

Following the financial crisis of 2007/08, many governments of the world, in particular the South African government, had begun to implement various recommendations of the Davis Tax Committee (DTC), which sought to cut down the reliance on direct taxes such as corporate income tax and personal income tax to indirect taxes, such as excise taxes and VAT (Phiri, 2016). The DTC states the current tax system in South Africa cannot bolster higher economic growth due to the heavy reliance on corporate taxes and income taxes. Essentially, if policymakers were to remain reliant on direct taxes for the purpose of increasing government revenue, then tax hikes would push adverse effects on economic growth. Moreover, Phiri (2016) states that by raising indirect taxes, less tax incidence will be borne by individuals and firms, in turn producing an environment conducive for domestic savings and foreign investment.

Phiri (2016) concludes by showing the growth trade-off effects between direct and indirect taxes through the use of interpolated quarterly time series data for the period 1990 Q1 to 2015 Q2. The study for South Africa found the existence of nonlinear growth trade-off effects with both direct and indirect taxes. Additionally, the results showed both indirect and direct taxation are only "significantly correlated to growth when the tax-growth ratio is under the threshold of 10.24 percent" (Phiri, 2016: 246). The author found that under this threshold, indirect taxes were positively linked with GDP, whereas direct taxes were seen to have an inverse effect on growth. Phiri (2016) suggests that from a growth viewpoint in the South African fiscal climate, based on the study's findings, government should shift its fiscal objectives toward more indirect taxation. This would ensure a greater potential for equitable growth in the long run.

Gale and Samwick (2014) state that the positive impact which tax rate reductions have arisen is due to the fact that lower tax rates increase the after-tax incentive to working, saving and investing. The tax reductions create higher work effort, levels of saving and investment through the substitution effect. According to Gale and Samwick (2014) a key impact of direct breaks is that these measures should reduce the value of existing tax distortions and create an "efficiency-improving shift" (Gale and Samwick, 2014:2) in the structure of economic activity. Furthermore, the authors highlight that a reduction in income taxes would incorporate all of the aforementioned features. Accordingly, income tax breaks increase the labour supply through the substitution effect. In addition, income tax reductions are said to raise the disposable income of the consumer, inducing further spending, which in turns drives up aggregate demand and economic growth, through a multiplier effect (Gale and Samwick, 2014).

Masika *et al.* (2014) found a significant link between direct taxation and economic growth, specifically Corporate Income Tax (CIT) and Personal Income Tax (PIT). Furthermore, the study found that with a thriving economy, both local and foreign investments would lead to the formation of employment for attraction of PIT and CIT for corporate tax income (Masika *et al.* 2014). Conversely, the author found that when there is sufficient revenue collection in the economy, it would decrease the burden of borrowing thereby bolstering public expenditure that incentivizes investment, enhancing individuals' welfare and in turn deterring tax avoidance. Masika *et al.* (2014) found that the Kenyan government and other developing nations governments should look to expand the tax bracket of PIT, so as to generate greater revenue to finance fiscal spending, as opposed to borrowing; as PIT positively effects economic growth. Additionally, a reduction in borrowing incentivises economic growth, as huge debt will trigger the possibility of a future financial crisis, of which will discourage foreign inflows and ultimately weaken economic activity. Masika *et al.* (2014) used an Ordinary Least Square (OLS) method to assess the link between economic growth and direct taxes; thereafter the correlation matrix showed that the variables were highly correlated at level. Moreover, Masika *et al.* (2014) ran a Granger causality test and found that "a unit rise in CIT, PIT and labour force would expand GDP by 0.93 for CIT, 0.14 for PIT and 1957.4 Kenyan million pounds for labour force output" (Masika *et al.*, 2014: 42). Additionally, Masika *et al.* (2014) found that a one-percentage point increase in investment would decrease economic growth by 0.25 Kenyan million pounds, this due to negative impact of capital flight and tax avoidance procedures. A fall in investment impacts tax collection indirectly. As inflows as well as local investment in the country fall, the opportunities for employment falls, which ultimately shrinks the tax base as less citizens contribute to taxes (such as PIT).

2.4.7 Property Taxes

According to Brys et al. (2016) in a working paper from the OECD, many of these OECD countries impose a variety of property taxes which include taxation on immovable property, inheritance, gift and property transaction taxes. Further to this, Brys et al. (2016) found immovable property to be the least detrimental in terms of long economic growth, as opposed to consumption taxes, corporate and personal income taxes and other forms of property taxes. The authors found that recurrent taxes charged to households were seen to hold fewer adverse effects than those imposed on businesses. This is in line with much existent literature on recurrent immovable property taxes and growth. Brys et al. (2016) state that taxes on immovable property of households can be an effective measure of taxation and that, given the tax base, usually land is extremely immovable and therefore there is a fairly limited behavioural change to the tax. The authors find that property transactions taxes are extremely distortionary and therein negatively impacted growth of the OECD countries in their study. This is in line with Mirrlees (1971) who found that taxation of intermediate transactions in not efficient.

2.5 TAX HARMONIZATION IN AFRICA

Crucial to the focus of this paper is the understanding of the tax harmonization and the extent to which such a policy is impacting the Sub-Saharan African (SSA) region. Ade, Rossouw and Gwatidzo (2017) published findings which looked primarily at the effect of tax harmonization on Foreign Direct Investment (FDI) in the South African Development Community (SADC) region. The authors use panel data modelling to show how harmonization with two main variables - value added tax (VAT) and corporate income tax. The study found there to be a causal relationship between tax harmonization and FDI in the SADC area. Furthermore, the paper highlights the importance of how the region can benefit from such fiscal policies, which promotes a reduction in tax rate disparity and thereby resulting in foreign inflows. AEO (2013) and Hannson and Olofsdotter (2010) highlight the many regional economic communities (RECs) in the world and particularly in Africa are focusing advanced tax harmonisation as a key driver in improving local investment, foreign direct investment as well as regional integration.

According to Sudsawasd and Mongsawad (2011) taxation is not often at the forefront of multinational companies' considerations when venturing into new countries, particular Africa. The authors highlight considerations such as quality of infrastructure, market size, regulations and return of on investment. Yet, the authors highlight the important role of taxation in spurring investment and improving regional economic integration (Sudsawasd and Mongsawad, 2011). This study found that a movement away from unified tax policies will inevitably impact investment, including FDI which would thereon lead to a need for some co-ordination within the fiscal space. Regional integration and the benefits of the positive sum investments within regions is placing more emphasis on African countries finding common ground with regards to taxes.

Sudsawasd and Mongsawad (2011) note that although the SADC region is heterogeneous with a multitude of characteristics on a country-specific level and vastly different tax systems, tax harmonisation in conjunction with clearly defined objection could prove beneficial for growth on a regional level. Similarly, Gastanga *et al.* (1998) empirically analyse the impact of various types of fiscal variables including corporate income tax and FDI, by means of a pooled cross-section data for 49 less developed countries (LDCs) over the period 1970 - 1995. The authors found that with a fair level of tax policy harmonisation and low corporate-income tax rates, it would result in significant inflows of FDI to host countries, as firms are seen to maximise the advantages of location in these countries.

Sudsawasd and Mongsawad (2011) further analysed the effects of tax harmonisation on FDI and total investment shares of a country. The study used panel data from over a hundred countries including most SADC countries from 1995 to 2006. The empirical findings suggest that an increase in harmonisation of a CIT and import duty impacts positively on FDI and total share of investment inflows. The authors state that the impacts are seen to be significant only in developed countries, this in line with the existence of a negative relationship between taxation and certain components of investment. The study showed that a developed country with less variation in policy from the average of the group, attracts more FDI net inflows and vice versa. Similarly, Deveroux (2006) constructed a model which looked at the various decisions which are made by multinational enterprises when deciding on a new investment. The model consisted of four stages, namely; investing abroad or at home (as well as exporting), location, size of investment and reallocation of profit-sharing among locations. It was found that all four decisions are influenced heavily by the relevant country's tax system coordination. Moreover, Hansson and Olofsdotter (2010) studied the impact of tax harmonisation on FDI in the European Union (EU). The study outlined the benefits of enhanced tax coordination in line with improved FDI inflows. These findings are in agreement with Mbakile-Moloi (2006) who concluded that there is evidence of increased levels of coordination and fiscal

mimicking behaviour (in setting VAT rates) and copycat behaviour in SSA (including the SADC), enhancing economic activities. Ade, Rossouw and Gwatidzo (2017) concluded that the harmonisation of certain taxes in the SADC region have led to a rise in foreign inflows. The study found a causal relationship in the harmonisation of VAT and corporate income tax and FDI in the SADC region. Ade, Rossouw and Gwatidzon (2017) further highlight that governments should encourage national policies aimed at improving the SADC regional tax harmonisation objectives, so as to reduce disparity in tax rates and improve the existent of tax co-movement. Secondly, policies aimed at harmonising VAT in the SADC should be enhanced, given the regressive nature and the important revenue-generating potential, provided the policy is well-designed. Thirdly, Ade, Rossouw and Gwatidzon (2017) state SADC member countries should encourage a tax policy focused on enhanced coordination, mitigating corporate income tax (CIT) leakages (through tax evasion), consolidate revenue and improve on FDI, as this in turn leads to an increase in regional economic growth.

Similarly, Quak (2018) studied tax coordination and tax harmonisation within the regional economic communities in Africa. The author notes that compared to other trading blocs, the West African Economic and Monetary Union (WAEMU) is one of the most advanced tax coordination systems in the world. Yet, the system is found be ineffective in crucial areas. The framework instilled has seen a successful convergence in surrounding tax systems, especially statutory tax rates, which has led to positive revenue flows in WAEMU. However, some literature reveals that there is a large disparity between de jure and de facto coordination, as WAEMU has been unable to equip its regional institutions with the required resources to oversee effective compliance (Mansour and Rota-Graziosi, 2013). As a result, there has been ineffective enforcement and undermined the credibility of the coordination.

According to Quak (2018), in the West African region, two regional economic entities have engaged in regional tax coordination and harmonisation both on tax rates and tax policy. The West African Economic and Monetary Union (WAEMU) has for many years shown a push for tax coordination and harmonisation policies beginning in 1994. The member countries (Benin, Burkina Faso, Côte d'Ivoire, Mali, Niger, Senegal, Togo and later, Guinea-Bissau) share a single currency. The CFA Franc (Franc de la Communauté Financière Africaine) form a trading bloc, and have had extensive tax coordination and harmonisation focus in domestic taxes. It is said that more than 80 percent of member countries' tax (including tariffs) revenues are as a result of taxes that are subject to regional directives or regulations (Mansour and Rota-Graziosi, 2013, p.3). Following the devaluation of the CFA in 1994, member states signed the WAEMU treaty. The creation of the customs union with a common external tariff (CET) was concluded in 2000; guidelines on value-added tax (VAT) and excise taxes were put in place in 1998; and, by 2009, the members finalised a set of guidelines on capital income taxes. Furthermore, Quak (2018) notes the WAEMU tax treaty surpasses anything found in the EU. In addition to coordinating the setting of various rates and maintaining bases for the major taxes through regional guidelines, it stipulates the convergence of the tax revenue-to-GDP ratio to at the least 17%, and the convergence of tax structures (Mansour and Rota-Graziosi, 2013, p.4). The tax system structure is part of the so-called "transition fiscale" (tax transition), under which WAEMU countries must implement tax and tariff measures which, over time, enable them to shift their revenue structure from trade to domestic taxes.

2.5.1 Trade Duties Harmonisation in Western Africa

According to Quak (2018), in 2000 the WAEMU countries came to an agreement of a CET with four rates: "0% on essential and social goods; 5% on primary goods; 10% on capital and intermediate goods; and 20% on final consumption goods" (Quak, 2018, p.5). Since January 2015, the CET of the 15-member states of

the ECOWAS, of which WAEMU is part, became successful in liberalising trade within ECOWAS and abolishing common and existent legalisation on CET of the WAEMU nations. Further to, VAT coordination proved crucial in WAEMU region.

2.5.2 VAT Harmonisation in Western Africa

The VAT guidelines in the WAEMU were introduced in 1998, with a key area of the VAT directive being to assist countries in compensating the revenue leakage induced by the reduction of tariff rates on trade, with a more effective tax apart decreasing sales taxes - which pre-dated the VAT structuring in several WAEMU countries. The author highlights that the key directives of the VAT harmonisation in the region were the following; In 1998, it implemented a single positive tax rate to which member countries could set between 15 and 20%; Additionally, in 2009, came the introduction of a lower positive VAT rate, with the range of between 5 and 10% for a limited list of items, which included: bottled and powder milk, sugar, all types of pasta, flour, rice, wheat, and other grains; agricultural equipment (including rental and maintenance services); food for livestock and poultry; computers; solar energy equipment; and tourism-related services, including restaurants.

Crucially, Quak (2018) revealed that in 1998, WAEMU agreed to set a VAT registration threshold for all member states in the CFA Franc 30 and 50 million for the supply of goods and between 15 and 25 million for the supply of services. In 2009, the upper-bound of the registration threshold was increased to CFA Franc 100 million for goods, and to 50 million for services.

2.5.3 Excise Tax Harmonisation in Western Africa

In line with VAT harmonisation, the WAEMU member states have adopted a similar approach with regards to mutually beneficial regional tax policies. The author notes that excise tax directives are set with a wide spectrum. Three adjustments were introduced to the directive in 2009: minimum and maximum rates on alcohol and tobacco were increased by 5% (alcoholic beverages have an excise tax between 15 and 50%, and tobacco products between 15 and 45% after 2009); in addition, five items were introduced to the optional list; and member countries were limited to excise no more than six items from the optional list. The core argument in support of coordinating the setting of excise taxes in a uniform market with fiscal borders is to decrease intra-community cross-border shopping and smuggling (Quak, 2018).

Further to this, a separate directive issued in 2001 covers excises and other taxes on petroleum products (namely aviation gasoline, premium fuel, regular gasoline, kerosene, gas oil, fuel oil, and butane) with the goal of harmonising prices, ensuring more transparency and a more business conducive environment within the region. The author notes that the derivative mandated a "specific excise" (per kilo or litre) but did not impose a fixed constraint on the tax rate - the lower bound was set at 0% but imposed no constraint on the upper bound. The objective was the abolishment of subsidies, which placed a heavy burden of the respective states' fiscus.

2.5.4 Corporate Income Tax Harmonisation in Western Africa

As of 2008, there were two directives in WAEMU which related to corporate income tax: the initial directive defines a common corporate tax base, whilst the second directive highlights the range for a single rate between 25 and 30 %. The harmonisation of the tax rates and tax bases has been put in place across all the countries in the region. However, Quak (2018) notes there are numerous exemptions in place, such as, a holding company regime which was initiated in 2011 exempting the holding company from corporate

income tax, dividends distribution and capital gains realised on the sale of their shares. This exemption was an incentive to venture capital companies in the region.

Furthermore, a mining directive was introduced in 2003. It states that firms are liable to the general tax laws of member states, and to a royalty, whereby base and rates will be determined later by application rules. The legislation was implemented for stability of the tax regime, both for taxes imposed at the national level as well as the royalty which was to be fixed regionally. In relation to tax incentives, the directive provided for the exemption of virtually all taxes and fees during the research and development phase. The key incentives provided during the production phase are "accelerated depreciation, and a three-year tax holiday from profit and payroll taxes; the modalities for the coverage and calculation of accelerated depreciation have not been issued" (Mansour and Rota-Graziosi, 2013, p.16).

2.5.5 VAT Harmonisation in Southern African Development Community (SADC)

Quak (2018) states that The Southern African Development Community (SADC) aims to minimise and ultimately to eliminate tax competition which hinders the region's revenue mobilisation efforts.

The SADC VAT and Excises guidelines were established in 2016. These outline the design, administration, and exchange of information, in addition to mutual assistance in the VAT and Excise tax realm. According to Quak (2018) various studies identified that the existence of differences in rates of VAT and Excise played a contributing role in the smuggling of beverages and cigarettes from countries with low tax rates to countries where rates are higher. The guidelines were put in place to establish a centralised overview of the region's fiscal policy, including the coordination of VAT and excise rates across the SADC area, ensuring hamonisation of administrative aspects, including definitions, incidence, exemptions, and quality standards. The guidelines are also crucial to placing bans on the production of goods for export to another member state which do not adhere to the standard in that member state.

Similar to the harmonisation guidelines introduced in WAEMU, the long-term approach of the fiscal coordination is the gradual replacement of trade taxes with more indirect taxes by expanding the tax base of indirect taxes. Moreover, this is said to develop conditions for SADC member countries to sign bilateral agreements with each other, based on the SADC Model Tax Agreements, to agree on the exchange of information on VAT and excise, sales, and provision of mutual assistance on the collection of revenues. The key purpose of ensuring bilateral trade agreements are signed by SADC members, is to promote mutually beneficial trade and allow for domestic growth to expand with each participating country.

It must be noted that there is little literature which details the progress of tax harmonisation in many of the other trade blocs and regions in Africa. Therefore, due to the lack of literature on tax coordination in regional economic communities, it can be said that there are no recent developments to be reported on the topic such as the African Maghreb Union (AMU), the Economic Community of Central African States (ECCAS), and the Community of Sahel-Saharan States (CEN-SAD).

2.6. ECONOMIC GROWTH THEORY: NON-FISCAL VARIABLES

In order to understand the full extent of taxes on economic growth, this study will incorporate various tax variables in addition to various non-fiscal variable. The aim of the inclusion of the non-fiscal variables is to showcase commonly known variables which hold predefined relationships with economic growth, and how these relate to the correlations with various fiscal variables.

2.6.1 GDP and Investment

According to Anwer and Sampath (1999), there is a common understanding across all nations that economic growth and investment/capital formation are closely linked. It is noted that both the neo-classical and Marxist economists highlight a core emphasis on capital accumulation as the key driver of economic growth. A crucial factor of capital is to raise the production of capital-intensive goods, which in turn leads to the growth of income through accumulation and encourages growth of income (Sundrum, 1993). As detailed previously, all growth models focus on capital as one of two core factors in establishing the rate of economic growth. The term 'investment' refers to all economic activity which involves the use of resources to produce goods and services. Moreover, Anwer and Sampath (1999) note that investment in infrastructure is especially crucial for the development of developing countries. Access to more infrastructure allows firms to use modern technology and by introducing modern technology to these firms, infrastructure expansion directly boots productive activities.

Empirical research by Khan and Reinhart (1990) made use of a simple growth model to investigate the effects of private and public investment on economic growth for 24 developing countries. The study found that private and public investment have mixed effects in the long-run rate of economic growth. However, the authors highlight that private and public investment plays a larger and more significant role in economic growth than public investment. Yet, Potiowsky and Qayum (1992) researched the effects of domestic capital formation and foreign assistance on the rate of economic growth for 58 developing countries. The authors' findings suggest no significant effect of domestic capital formation on per capita rate of growth over the period 1970 – 1980.

Despite mixed results, all authors highlight that investment does play a significant role in economic growth by the core principle of increasing productive capital and improving technological progress, which in turn drives growth. The casual relationship is not fully agreed upon in the literature and therefore the extent of economic growth and investment will vary.

2.6.2 GDP and Trade Openness

According to Silajdzic and Mehic (2018) the relationship between openness in terms of international trade and economic growth is a crucial topic in the policy space, particularly in terms of the fiscal aspects in relations to openness. Differing growth rates are largely due to how liberal a country's trade policies are, however, this is very country-specific. Further to this, Silajdzic and Mehic (2018) highlight the complexity of this relationship stating that there are no simple theoretical explanations on the impacts of trade restrictions and economic growth, therefore empirical studies have revealed mixed results and inconclusive evidence. According to Yanikkaya (2003) trade restrictions, by means of tariffs and trade taxes, are seen to be positively associated with economic growth. The study analyses a large sample of both developing and developed countries. In addition, Rodriguez and Rodrik (2001) find that trade barriers are said to be distortive and detrimental to growth, whilst further finding that the average tariff growth rates positively impacted total productivity growth for a sample of 46 countries over the period 1980 – 1990.

Silajdzic and Mehic (2018) state that contemporary trade theories, which are integrated in endogenous growth models, suggest that trade may be positive for economic growth with fundamental mechanisms including: economies of scale, technology transfer and increased competitiveness among countries. It is said that these mechanisms are expected to hold a positive impact on productivity of local firms and industries, further rising incomes and value added in the economy. The theoretical framework of trade openness is said to be an extension of neoclassical trade and growth theories. Assumptions are made and it is accepted that the differences in the levels of industrial development and technological capabilities across countries could be associated with possible different outcomes of trade openness, in essence the size and technological proficiency of industrial diversification will dictate the impact on economic growth. Similarly, Silajdzic and Mehic (2018) argue that in infant industries with latent-defying comparative advantages, imperfect markets and endogenous growth patterns of knowledge creation in underdeveloped markets, are likely to pursue a combination of import substitution and export industrialization; which, if employed correctly, may impact comparative advantages of local industries which in turn can drive economic growth in the long run. Furthermore, Silajdzic and Mehic (2018) argue that trade openness, in the form of neutrality of the economy, may present a positive effect on economic growth in the short term through an enlarged trade sector. It said that trading-related investments into the economy boost imports via increases in aggregate demand and income. However, the correlation between trade openness and economic growth in the long term is influenced by multiple variables, including the ability of local industries to cope and adjust with international output levels and their capacity to develop imitative and absorptive capabilities which will enhance economies of scale and innovation. The magnitude of a possible 'crowding-out' effect on local companies and industries through trade openness is dictated by the degree and presence of substantial differences in skills and endowment of trading partners. If significant differences present themselves, trade openness by means of passive trade liberalisation, may lead to weakened potential to establish comparative advantage capabilities of local firms/industries (Silajdzic and Mehic, 2018).

The authors run a regression analysis between trade openness and economic with various European countries. The study made use of multiple trade openness measures to show the full extent to which trade volumes affect growth performance, in addition, the effectiveness of trade liberalization policies in improving economic growth in the respective countries. The findings suggested trade intensity measures are positively correlated with economic growth, further revealing that the benefits of trade integration are not only from exports, but largely due to increasing imports of technological innovation into less advanced economies (Silajdzic and Mehic, 2018).

2.6.3 GDP and Natural Resource Rents

Natural resource rents and the relationship this shares with economic growth is a fundamental non-fiscal variable to investigate, given the focus on tax harmonisation in the Sub-Saharan African (SSA) context. Important to this is the 'resource curse paradox' which describes the nexus between resources and economic growth, whereby countries with an abundance of natural resources have encountered stagnant and, in some cases, negative growth. This is important to note as much of Sub-Sharan Africa consists of mineral and resource-rich countries, however, economic growth rates are generally lower than most of the developed, resource-scarce world. Sachs and Warner (2001) explain that the natural resource extraction processes use up resources that could otherwise be allocated into industries, such as manufacturing or services which are said to promote long-run economic growth. Further to this, Sachs and Warner (2001) state that global pricing of natural resources are volatile, and therefore have a destabilising effect on exporting economies. In addition, it is found that due to the concentrated nature of many of the natural

resource supplies facilities rent capture via non-inclusive governments, whose policies and institutions favour the retention of political power, as opposed the advancement of economic growth. Gylfason (2001) states that the resource curse tends to occur when countries prioritise its energies, time and capabilities into one sector i.e., mining, and ignore other key productive sectors.

Effective resource management of a country's extractable minerals can enhance economic growth. However, in the SSA context, mismanagement of resources, coupled with low growth rates, social unrest, political instability and inequality have only further worsened the resource paradox. However, a study by Haggard and Tiede (2011) shows that institutional efficiency spurs economic growth in developed nations, yet the same was not found in developing nations. The authors found that institutional efficiency may even impact growth negatively in the developing country framework.

2.7 Conclusion

Chapter 2 is an extensive literature on both the economic theory and empirical findings on economic growth and the tax revenue. The chapter set out to contextualize the core underpinnings of the main growth concepts, namely endogenous and exogenous growth theory, thereon the chapter unpacked existing findings and theory on the tax revenue and the relationship this shares with economic growth. Further context was given to the literature by focusing on the SSA region, in particular tax harmonization and the various non fiscal variables. The non-fiscal variables are important as they showcase that growth is influenced by many other endogenous and exogenous factors. These non-fiscal factors will form an important role in the ARDL modelling done, as they act as constants which will be tested in conjunction with the various direct and indirect tax measures.

CHAPTER 3:

METHODOLOGY

3.1 Introduction

This chapter discusses the methods and research techniques used to test the hypotheses outlined. The chapter provides a detailed understanding of the data used, the sources of this data and therein the research design and model specifications.

The research aims to evaluate whether tax revenue influences growth in SSA, as well as investigating optimal tax levels for different tax heads. Lastly, to show how tax rate structuring can be used to improve tax harmonisation and promote regional and domestic growth.

3.2 Data Sources and Description

The study focuses on a panel data for seven (7) countries within Sub-Saharan Africa (SSA). The sample which is used has excluded some SSA countries, largely due to limited and/or unavailable data specific to the variables chosen for analysis. The data used was taken from ICTD UNU-WIDER Government Revenue dataset (GRD) and the World Bank's World Development Indicators (WDI) from 1997 to 2017. Table 1 provides the list of countries used for the model whilst Table 2 lists the variables used for analysis. However, due to missing observations in variables such as VAT, the sample was selected to include the most populated dataset in order to improve reliability and accuracy in the regression analysis. Therefore, due to the importance of VAT as the largest indirect tax measure, a descriptive statistical analysis is done to compare this measure amongst the other tax heads, however this variable is not included in the regression analysis due to an incomplete dataset.

Table 1: Country Names and Codes

Country	**Country code**	**Country ID**
Eswatini	SWZ	1
Cameroon	CAM	2
Mauritius	MUS	3
Rwanda	RWA	4
Senegal	SEN	5
South Africa	ZAF	6
Uganda	UGA	7

Table 2: Variable Names and Descriptions

Variable	**Description**	**Unit of measurement**
(Log) Gross domestic product (GDPt)	A proxy for economic growth	Annual percentage change in growth rate
Total revenue (Total Rev)	Summation of all revenue collected by the fiscus (including social contributions and grants) as a percentage of GDP	Percentage of GDP
Taxes (Tax Rev)	Summation of all taxes collected as a percentage of total revenue	Percentage of total revenue
Personal income tax (PIT/PAYE)	Taxes on income, profit and capital gains	Percentage of Total Tax Revenue

Corporate income tax (CIT)	Total income and profit taxes on corporations, including taxes on resource firms.	Percentage of Total Tax Revenue
Property taxes (Prop Taxes)	Total taxes on property	Percentage of Total Tax Revenue
VAT (VAT)	Total of value-added taxes	Percentage of Total Tax Revenue
Taxes on international trade (Trade Taxes)	Total taxes on international trade, including both import and export taxes.	Percentage of Total Tax Revenue
Trade openness (Trade Open)	Sum of exports and imports	Percentage of GDP
Net foreign direct investment inflows (FDI)	Total direct investment equity flows in an economy	Percentage of GDP
Gross capital formation (GFKF)	Total additions to the fixed assets of the economy plus net changes in the level of inventories	Percentage of GDP
Total natural resource rents (Resource Rents)	Summation of oil, gas, coal, mineral and rents rents.	Percentage of GDP

3.3 The Autoregressive Distributed Lag Model: Panel Data Analysis

The methodology makes use of a panel data approach to autoregressive distributed lag modelling and a generalised least squares regression. The panel ARDL modelling strategy was chosen to encapsulate the lagged effects of fiscal policy setting the delays which these have on growth. Moreover, this type of modelling will also allow for the regression to combine both long run and short run dynamics in the evolution of the growth-tax relationship over time. In particular, it can be that in some countries there will be a long run relationship while for other countries there might be only a short run relationship.

The core of the methodology will be Autoregressive Distributed Lag (ARDL) panel data analysis to assess the impact of the various tax measures on growth across the country sample whilst allowing for the addition of lagged values. The model factors in time lags, which are crucial when analysing fiscal policy impacts, which are not usually felt contemporaneous with investment and economic growth. Gujarati and Porter (2009) state time series ARDL modelling will demonstrate both linear and nonlinearities involved in the relationship between economic growth and the tax variables. The tax component of the model will include some nonlinear specification, in particular those which have been identified in the Laffer Curve (2004) theory. It can therefore be said that there is a quadratic relationship between economic growth and taxes. The model also has the ability to isolate common components, of which the long run relationship and the country-specific component are the error correction term plus short run coefficients. This will allow for a threshold comparison across the various SSA countries. Thereafter, an analysis will be conducted to assess if differing optimal levels are present for each country in relation to a SSA average, which will be of particular importance given that each country's tax system is structured differently and are all at varying levels of development. Equations 10, 11, 12 and 13 are derived using the lag specification found in annex A table 1.

The first two equations will layout the ARDL modelling prior to any unit root testing, thereafter the ARDL equations will showcase the cointegration which is found by way of unit root tests. The full unit root tests are performed later in table 5. As such the initial two equations do not assume cointegration between the variables.

Equation 10: Total Tax ARDL Equation (Simple Model Specification)

$$lnGDP_{i,t} = \beta_0 + \sum\beta_j lnGDP_{i,t-j} + \sum\beta_s TAXRev_{i,t-s} + \sum\beta_s FDI_{i,t-s} + \sum\beta_s GFCF_{i,t-s} + \sum\beta_s Open_{i,t-s} + \sum\beta_s Rents_{i,t-s} + \mu_{i,t}$$

where;

$\Delta lnGDP_{i,t}$ = Change in logarithm of GDP

β_0= Intercept

$\sum\beta_j lnGDP_{i,t-j}$ = GDP

$\sum\beta_s TAXRev_{i,t-s}$ = Total Tax Revenue

$\sum\beta_s FDI_{i,t-s}$ = Foreign Direct Investment

$\sum\beta_s GFCF_{i,t-s}$ = Gross Fixed Capital Formation

$\sum\beta_s Open_{i,t-s}$ = Trade Openness

$\sum\beta_s Rents_{i,t-s}$ = Natural Resource Rents

Equation 11: Individual Tax Variables ARDL Equation (Simple Model Specification)

The individual tax heads model is shown as follows:

$$lnGDP_{i,t} = \beta_0 + \sum\beta_j lnGDP_{i,t-j} + \sum\beta_s CIT_{i,t-s} + \sum\beta_s PAYE_{i,t-s} + \sum\beta_s Prop_{i,t-s} + \sum\beta_s TRTAX_{i,t-s} + \sum\beta_s FDI_{i,t-s} + \sum\beta_s GFCF_{i,t-s} + \sum\beta_s Open_{i,t-s} + \sum\beta_s Rents_{i,t-s} + \mu_{i,t}$$

where;

$\Delta lnGDP_{i,t}$ = Change in logarithm of GDP

β_0= Intercept

$\beta_j lnGDP_{i,t-j}$ = GDP

$\beta_s CIT_{i,t-s}$ = Corporate Tax

$\beta_s PAYE_{i,t-s}$ = Pay-As-You-Earn

$\beta_s Prop_{i,t-s}$ = Property Tax

$\beta_s TRTAX_{i,t-s}$ = Trade Taxes

$\beta_s FDI_{i,t-s}$ = Foreign Direct Investment one year lagged term

$\beta_s GFCF_{i,t-s}$ = Gross Fixed Capital Formation one year lagged term

$\beta_s Open_{i,t-s}$ = Trade Openness one year lagged term

$\beta_s Rents_{i,t-s}$ = Natural Resource Rents one year lagged term

Equation 12: Total Tax ARDL Equation

The total tax revenue model is shown as follows:

$$\Delta lnGDP_{i,t} = \beta_0 + \sum \alpha_s \Delta TAXRev_{i,t-s} + \sum \alpha_s \Delta FDI_{i,t-s} + \sum \alpha_s \Delta GFCF_{i,t-s} + \sum \alpha_s \Delta Open_{i,t-s} + \sum \alpha_s \Delta Rents_{i,t-s} + \theta ECT_{i,t-1} + \mu_{i,t}$$

where;
$\Delta lnGDP_{i,t}$ = Change in logarithm of GDP
β_0= Intercept
$\alpha_s \Delta TAXRev_{i,t-s}$ = Total Tax Revenue one year lagged term (short run component)
$\alpha_s \Delta FDI_{i,t-s}$ = Foreign Direct Investment one year lagged term (short run component)
$\alpha_s \Delta GFCF_{i,t-s}$ = Gross Fixed Capital Formation one year lagged term (short run component)
$\alpha_s \Delta Open_{i,t-s}$ = Tarde Openness one year lagged term (short run component)
$\alpha_s \Delta Rents_{i,t-s}$ = Natural Resource Rents one year lagged term (short run component)
$\theta ECT_{i,t-1} + \mu_{i,t}$ = Error correction term

Equation 13: Individual Tax Variables ARDL Equation

The individual tax heads model is shown as follows:

$$\Delta lnGDP_{i,t} = \beta_0 + \alpha_s \Delta CIT_{i,t-s} + \alpha_s \Delta PAYE_{i,t-s} + \alpha_s \Delta Prop_{i,t-s} + \alpha_4 \Delta TRTAX_{i,t-s} + \alpha_5 \Delta FDI_{i,t-s} + \alpha_s \Delta GFCF_{i,t-s} + \alpha_s \Delta Open_{i,t-s} + \alpha_s \Delta Rents_{i,t-s} + \theta ECT_{i,t-1} + \mu_{i,t}$$

where;
$\Delta lnGDP_{i,t}$ = Change in logarithm of GDP
β_0= Intercept
$\beta_s lnGDP_{i,t-s}$ = GDP one year lagged term
$\alpha_s \Delta CIT_{i,t-s}$= Corporate Tax one year lagged term
$\alpha_s \Delta PAYE_{i,t-s}$ = Pay-As-You-Earn one year lagged term
$\alpha_s \Delta Prop_{i,t-s}$ = Property Tax one year lagged term
$\alpha_s \Delta TRTAX_{i,t-s}$ = Trade Taxes one year lagged term
$\alpha_s \Delta FDI_{i,t-s}$ = Foreign Direct Investment one year lagged term
$\alpha_s \Delta GFCF_{i,t-s}$ = Gross Fixed Capital Formation one year lagged term
$\alpha_s \Delta Open_{i,t-s}$ = Trade Openness one year lagged term
$\alpha_s \Delta Rents_{i,t-s}$ = Natural Resource Rents one year lagged term
$\theta ECT_{i,t-1} + \mu_{i,t}$ = Error correction term

3.4 Determination of Optimal Tax Level

Equation 14: Optimal Tax Level Determination

The optimal tax level equations make use of the standard tax measure i.e. tax revenue, as well as the square term of this value. These equations Illustrate a partial derivative which allows the paper to arrive at a value, which is most optimal for economic growth. This derivation is crucial as it speaks to second part of the null hypothesis, which looks at the level of taxation. Furthermore, these equations are formulated in this manner due to the nature of the data, the measure of tax variables are show as % of GDP and tax revenue not marginal tax rates percentages. This derivation therefore ensures that the 'level' is shown as measure of GDP and not as a marginal tax rate percentage.

$$Growth = \beta_1 Tax\ Rev + \beta_2 Taxrev^2 \quad \text{.....(14)}$$

$$\frac{\partial Growth}{\partial Taxrev} = \beta_1 + 2\beta_2 Taxrev = 0 \quad \text{.....(14.1)}$$

$$\beta_1 + 2\beta_2 Taxrev = 0 \quad \text{.....(14.2)}$$

$$2\beta_2 Taxrev = -\beta 1 \quad \text{.....(14.3)}$$

$$Taxrev = \frac{-\beta 1}{2\beta_2} \quad \text{.....(14.4)}$$

This differentiation showcases how the optimal tax level can be calculated by using a partial derivative of growth, whereby a first order derivative with respect to tax revenue is evaluated. The above equation uses total tax revenue to illustrate this. The Laffer Curve model by Laffer (2004) states that β_2 holds a negative relationship with growth. According to Walshaw (2018) the Laffer Curve formula is derived from the notion of excess burden, through the use of a single parameter acquired from the theoretical link between the average excess burden ratio and the square of the average tax ratio. Accordingly, Walshaw (2018) defines the excess burden as a loss of economic activity due to the imposition of a tax compared to a free market with no tax. Walshaw (2018) notes that in the Laffer Curve, the maximum point can be derived, in the same principles as the equation above.

3.4 Optimal Lag Determination for the Panel ARDL

The estimation of the lags is crucial to the model. There are two scenarios whereby the lags are either specified, known as the finite distributed-lag model. In addition, those where the length of the lag is not known, which is termed as an infinite lag model. Since the explanatory variable *Xt* assumed to be non-stochastic, or at least uncorrelated with the disturbance term of *Ut, Xt -1 , Xt – 2* and so forth are said to also be non-stochastic (Griliches, 1967). Thus, in practice, the ordinary least squares (OLS) can be applied to the equation. Griliches (1967) suggests that one may proceed sequentially, which is to first regress Yt on Xt then regress Yt on Xt and Xt-1 and so on. This sequential procedure stops when regression coefficients of the lagged variables start becoming statistically insignificant and/or the coefficients of one of the variables changes signs from positive to negative, vice versa (Gujarati and Porter, 2009).

However, there are immediate concerns with this method. Gujarati and Porter (2009) note that a key problem with this method of lag determination is that there is no a priori guide as to what the maximum length of lags is. Similarly, the authors note that in time series data, recurrent lags tend to be highly

correlated, which brings into question the issue of multicollinearity. This leads to an imprecise estimation of the coefficients, that is, that the standard errors tend to be greater than the estimated coefficients.
According to Liew (2004) the determination of an autoregressive lag length for a time series is vitally important in economics studies. The author held a study which tested the various selection criterion, to show which was most applicable to apply in certain studies when determining lag length. The various lag length selection criterion included Aikaike's information criterion (AIC), Schwarz information criterion (SIC), Hannan-Quinn criterion (HQC), final prediction error (FPE) and Bayesian information criterion (BIC). Liew (2004) found that HQC outperforms the other criterion in accurately identifying the true lag length. According to Schawrz (1978) the test can measure the efficiency of the parameterized model in terms of predicting the data. Additionally, it penalizes the complexity of the model where complexity refers to the number of parameters in model. The selection criterion is approximately equal to the minimum description length criterion but with negative sign.

By contrast, AIC and FPE was noted as a more suitable choice for smaller sample. In addition, AIC and FPE were found to present the least probability of under estimation among all criteria in the study. Lastly, the problem of over-estimation, however, is minimal in all scenarios. As many econometric testing methods such as unit root tests, causality tests, cointegration tests and linearity tests involved the determination of autoregressive lag lengths, the findings of Liew (2004)'s study revealed that the SIC would be most applicable in determining the optimal lags, given the sample size of the panel data.

3.5 Conclusion

This chapter outlined the methodology process that was used, the initial process consisted of data collection and extrapolation of various tax and GDP data point from the ICTD UNU-WIDER Government Revenue dataset (GRD) and the World Bank's World Development Indicators (WDI), thereon a detailed explanation of the various models used and their relevance to the paper is conducted. The ARDL model is expanded upon with careful detail put on the on the individual tax measures; more specifically the squared values of these, which were used to create a partial derivative which is used in the later chapters to establish the optimal level of taxation for the various countries.

CHAPTER 4:

REGIONAL TREND ANALYSISIS

4.1 Introduction

This chapter gives an overview of general trends which were identified in each of the individual countries. In addition, this chapters serves to briefly contextualize each country's fiscal environment, whilst providing an overview of the key divers of growth in the various economies.

4.2. Eswatini

A small, landlocked kingdom, Eswatini is bordered in the north, west and south by the Republic of South Africa and by Mozambique in the east. Eswatini is largely dependent on South Africa for its major exports and imports. According to a report compile by Moody's Analytics, Eswatini's currency is pegged to the South African rand, in essence relinquishing Eswatini's monetary policy to South Africa. The government relies heavily on customs duties from the Southern African Customs Union (SACU) for almost half of its revenue (Moody's Analytics, 2021).

The manufacturing sector diversified in the 1980s and 1990s, but manufacturing has seen little growth in the last decade. Accordingly, sugar and soft drink concentrate are the largest foreign exchange earners, although a drought in 2015 - 2016 decreased sugar production and exports. Overgrazing, soil depletion, drought, and floods are persistent problems, alongside a decline in the importance of its mining sector in recent years. Coal, gold, and diamond mines are done on a small scale, with the only iron ore mine having closed in 2014 (Moody's Analytics, 2021). The small kingdom has an unemployment rate of 28% as at 2021, moreover, on 1 January 2015, Eswatini lost its eligibility for benefits under the US African Growth and Opportunity Act, due to an inability to adhere to benchmarks relating to workers' rights (Moody's Analytics, 2021).

Eswatini's national development strategy, which ends in 2022, has prioritized matters such as increases in infrastructure, agriculture production, and economic diversification; whilst aiming to consolidate government expenditure. Eswatini's revenue from SACU receipts are more likely to continue decreasing as South Africa pushes for a new distribution scheme, making it more difficult for the government to maintain fiscal balance without introducing new sources of revenue (Moody's Analytics, 2021). According to the Eswatini Ministry of Finance (2021) the country held a CIT rate of 30% from 2010 to 2013 and reduced this to its current level of 27.5%. Descriptive statistics show a peak of 3.09% of tax revenue, with the growth rate in 2014 of 0.91%, shifting upward to 2.03%. This suggests that the shock caused by the tax rate reduction was positive for growth.

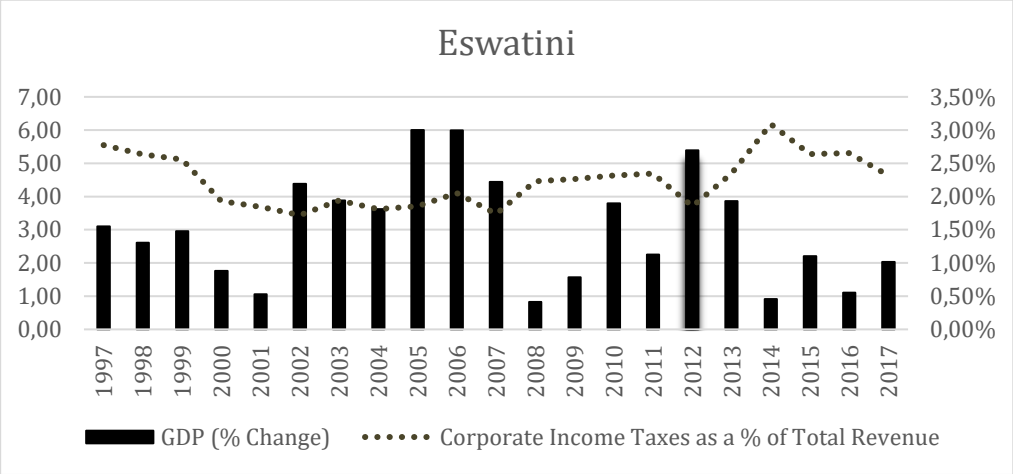

Figure 1: Graph showing GDP in relation to CIT as a % of Total Revenue in Eswatini.

Overall, there appears to be a mixed relationship between economic growth and corporate taxes, as is graphically illustrated from 1997 to 2001. The growth rate change fell from 3.10 % to 1.05%, with the CIT % falling from 2.77% to 1.72% suggesting a possible positive correlation. Yet, from 2002 to 2006, the CIT share of tax revenue increased from 1.72% to 2.05%, alongside a growth rate surge over the same period of 4.38% to 5.99%. This illustrating a mixed relationship between tax and growth.

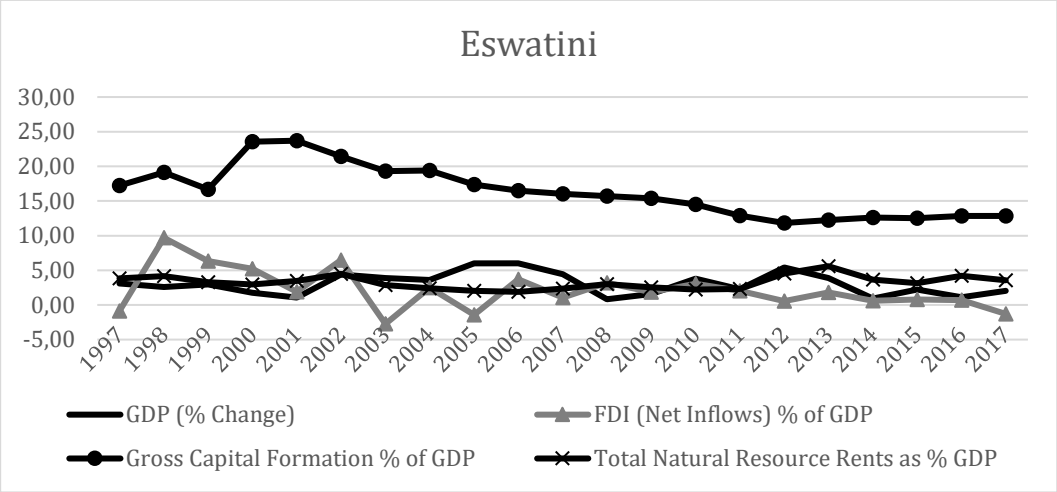

Figure 2: Graph showing non-fiscal variables as a % of GDP in Eswatini

The average percentage of GFCF in relation to GDP was 16.23%, therefore it can be argued that fiscal variables and structuring of various tax rates are not the sole contributors to weakened growth. The high level of GFCF coincides with an inverse relationship with growth. It is not clear that GFCF is directly negatively impacting growth, however it is apparent that over the period studied, the percentage of GFCF has declined over time, while the growth rate has fluctuated over time from 2.6% in 1997, to 6% in 2005, through to 2% in 2017.

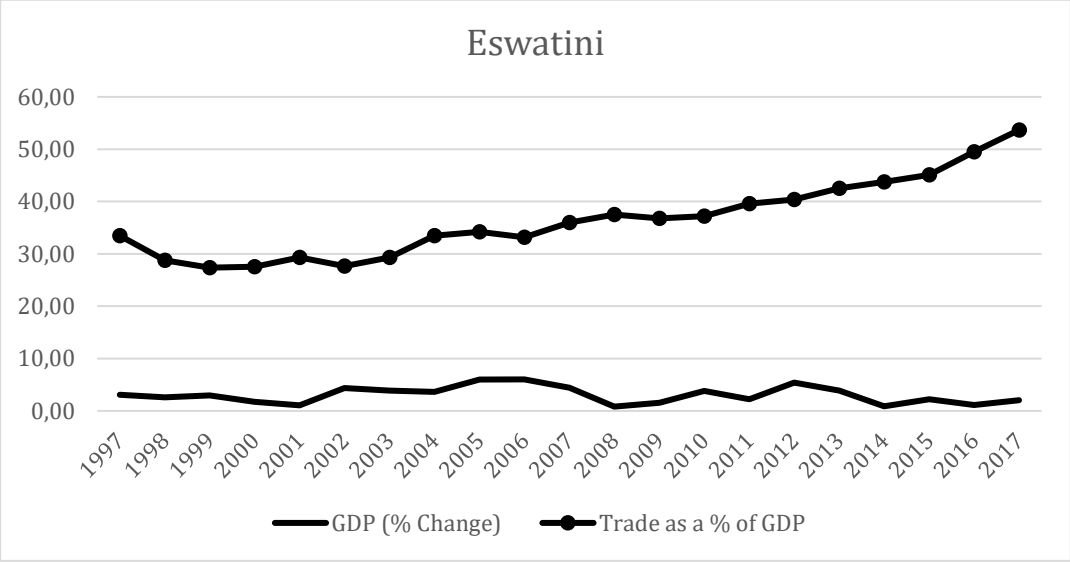

Figure 3: Graph showing Trade Openness as a % of GDP in Eswatini

Figure 3 depicts the upward trajectory of trade openness (as a percentage of GDP) from 33.47% in 1997 to 53.68% in 2017, while the annual growth rate change in 1997 was 3.10%, declining to 2.03% in 2017. The above is a visual representation of Eswatini's reliance on its export market for economic activity, as a small landlocked nation, most of the major imports as of 2019 include, Refined Petroleum ($202M), Gold ($76.1M), Electricity ($67.6M), Motor vehicles ($46.9M), and Scented Mixtures ($40M), importing mostly from South Africa ($1.31B) (OEC, 2019). According to OEC data, imports into Eswatini from South Africa accounted for 66.7%, 6.82% from China and 5% from the United Arab Emirates - highlighting the strong correlation between both trade and economic growth and the correlation with the growth of the South African economy.

4.3. Cameroon

Cameroon's market-based economy is made up of core contributing sectors including, oil and gas, timber, aluminium, agriculture, mining and the services sector. According to a report by Moody's Analytics, oil is still Cameroon's largest export commodity, and despite weakening global oil prices, still accounts for nearly 40% of exports. Cameroon's economy suffers from factors that often impact underdeveloped countries, such as stagnant per capita income, a relatively inequitable distribution of income, a top-heavy civil service, endemic corruption, continuing inefficiencies of a large parastatal system in key sectors, and a generally unfavourable climate for business enterprise (Moody's Analytics, 2021). From 1990 onwards, the national government has prioritised various IMF and World Bank programs aimed at igniting business investment, improving efficiency in agriculture and trade, in addition to recapitalizing the nation's banks. The IMF continues to press for economic reforms, including increased budget transparency, privatisation, and poverty-reduction programs. Cameroon's government provides many subsidies for electricity, food, and fuel which has placed increased pressure on the federal budget and has shifted funding away from crucial budgets such as education, healthcare, and infrastructure projects; which have resulted lower revenues (Moody's Analytics, 2021).

Moody's 2021 report on Cameroon found that a significant number of resources were invested into various large national infrastructure projects, which include a deep seaport in Kribi and the Lom Pangar Hydropower Project. Cameroon's energy sector continues to diversify, recently opening a natural gas-

powered electricity generating plant. The country continues to rely heavily on foreign investment to improve its inadequate infrastructure, create jobs, and improve its economic footprint. However, the political instability and business environment is riddled with red tape and remains a significant deterrent for foreign investment.

Descriptive statistics revealed the country's average growth rate was recorded at 4.32%, which is in line to that of the SSA average of 4.36%, suggesting that overall, the country has not experienced particularly subdued growth in relation to regional average. According to the World Bank (2021a), Cameroon is the most successful economy in the Central African Economic and Monetary Community (CEMAC), an area undergoing an economic crisis instilled by a sharp fall in oil prices. Alongside its CEMAC partners, Cameroon has restructured various fiscal measures, to adjust the terms of trade shock and restore macro-stability and confidence in the common currency.

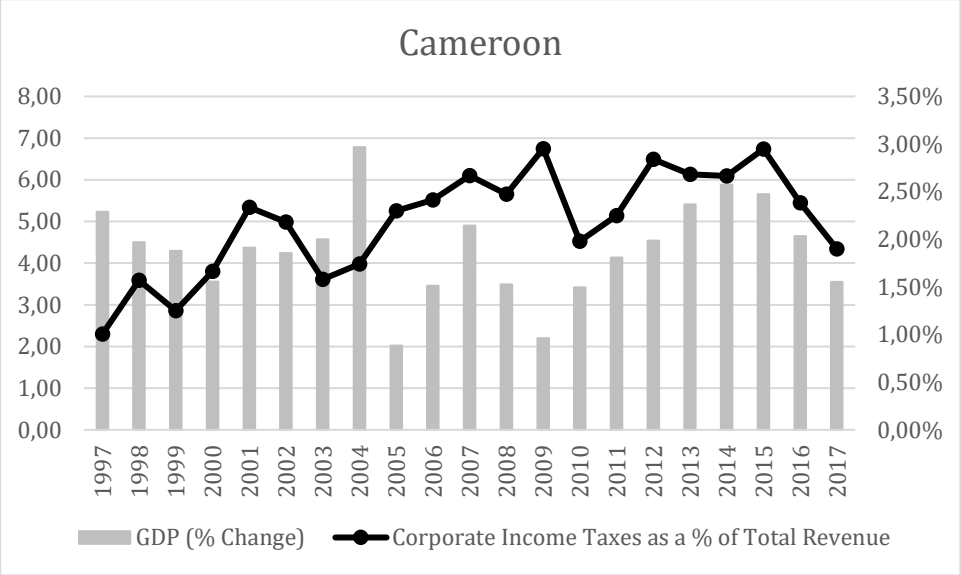

Figure 4: Graph showing GDP in relation to CIT as a % of Total Revenue in Cameroon

Figure 4 depicts a positive correlation between CIT and growth, as the two variables appear to follow a similar trend. According to the World Bank (2021a) Cameroon had a corporate tax rate of 38.5% from 2004, however in 2014 this was reduced to its current rate of 33%. Descriptive statistics reveal that this has caused a slump in CIT share of tax revenue, in addition to constraining growth levels.

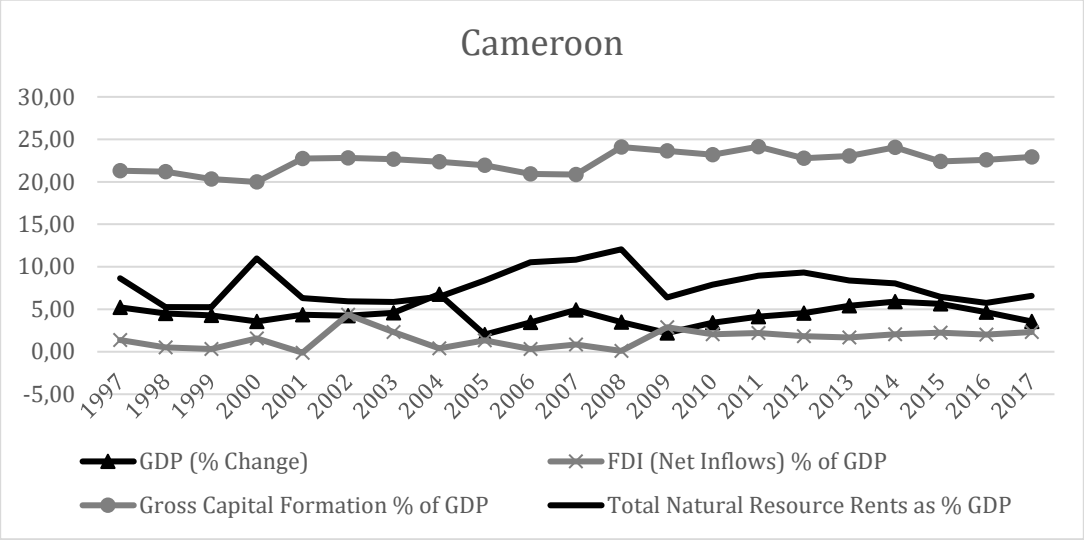

Figure 5: Graph showing non-fiscal variable as a % of GDP in Cameroon

As noted in the overview of Cameroon's economy, there is an abundance of natural resources. These include oil and gas, mineral ores, and high-value species of timber, in addition to agricultural products, such as coffee, cotton, cocoa, maize, and cassava (World Bank, 2021a). Therefore, it can be argued that given the resource abundance and a growing industrial sector, the country has seen a rise in growth attributed to strong export-led developments.

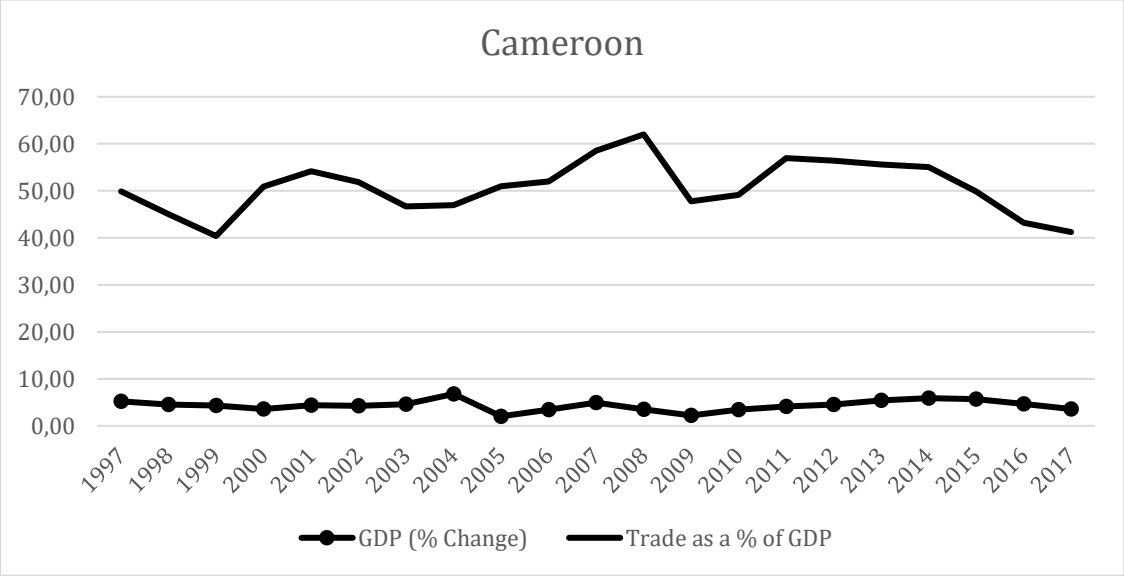

Figure 6: Graph showing Trade Openness as a % of GDP in Cameroon

Figure 6 illustrates the relationship between GDP and trade openness over the period 1997 – 2017 where trade openness held a large contribution to GDP of between 40% and 60%. This highlights the strength of the Cameroonian trade sector, since GDP was at its lowest at 2.2%. This growth rate in the context of neighbouring countries shows the resiliency of the economy as other SSA countries experienced periods of negative growth. The global financial crises suggested a positive relationship between these two factors, from 2007 – 2009 growth fell from 4.90% to 2.20%, trade openness declined from 58.49% in 2007 to

47.77% in 2009. There is insufficient evidence to prove causality between these variables, however, it can be noted that both followed a similar pattern following an economic shock.

4.4. Mauritius

Mauritius gained full independence in 1968 and has since undergone extensive economic transformation from a low-income, agriculturally-based economy to a diversified, upper middle-income economy with an expanding industrial and financial sector and a thriving tourism industry. According to Moody's Analytics (2021) Mauritius has maintained steady growth over the last several decades, resulting in a more equitable income distribution, increased life expectancy, lowered infant mortality, and a much-improved infrastructure.

Moody's Analytics (2021) found that Mauritius has attracted over 32,000 offshore entities, many aimed at increasing trade with India, South Africa, and China. Investment in the banking sector alone has surpassed $1billion. The country's textile sector has reaped the benefits of the Africa Growth and Opportunity Act, a preferential trade agreement that ensures duty-free access to the U.S. market, with Mauritian exports to the U.S. growing by 40% from 2000 to 2014 (Moody's Analytics, 2021).

Descriptive statistics revealed that Mauritius' improved economic policies and prudent banking practices helped minimise negative effects following global financial crisis in 2008-09. GDP averaged around 3-4% per year from 2010 to 2017; in addition, the country continues to increase its trade and investment outreach around the globe. Mauritius continues to be categorized as one of the most business-friendly environments on the African continent, and in 2017 the country passed a Business Facilitation Act aimed at maintaining international competitiveness and prioritising long-term growth prospects (Moody's Analytics, 2021).

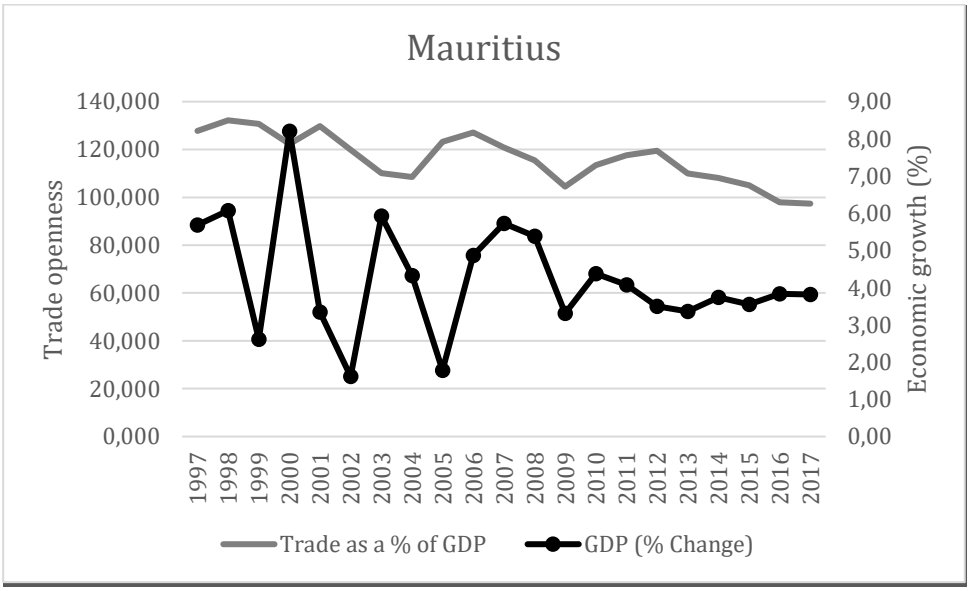

Figure 7: Graph showing Trade Openness as a % of GDP in Mauritius

Figure 7 illustrates the relationship between economic growth and trade openness, in particular the high level of export led growth in the country. From 1997 – 2016, the share of trade in relation to economic growth exceed 100%, this is indicative of a small-scale highly productive economy. Due to the size of the Mauritian economy, as opposed to striving to be a self-sufficient nation that produces all the products its

population needs, the country specialized in few highly-profitable industries, such as textiles. This and other core industries could have produced more revenue from exports than the entire domestic economy. Therefore, all the revenue generated from exports, has the potential for Mauritius to purchase imports in excess, far beyond that which the domestic market could support. According to Woldekidan (1992), in the early 1970s, more emphasis was given to an export-led strategy in the country. An export processing zone was developed, focusing on the creation of goods for export. This trend strengthened over the years and over the period studied, as growth appeared to be influenced by strategical influential exporting sectors.

4.5. Rwanda

The Rwandan economy, similar to many of its neighbors is reliant on the subsistence economy, tea and coffee exports and tourism. Mining plays a pivotal role in the economy: the country is one of the largest producers of tantalum, a key material in the manufacturing of mobile phones (Santander, 2021).

Agriculture is the most accessible and widely used economic activity of the Rwandan people, contributing 62% of the total population with employment (World Bank, 2021b). According to Satander (2021) this segment of the economy accounts for 23.5% of GDP and accounts for around 80% of offshore income from exports of coffee, tea, hides and skins. About 61% of the Rwandan soil is fertile enough for large-scale agriculture, however food production often does not meet demand, resulting in imports (Satander, 2021)

The industrial sector is dominated by the processing of primary agricultural products. This sector accounts for 18.9% of GDP and 9% of employment. According to a report compiled by PWC in 2015, personal income tax has three brackets, 0 – 30000 RWF (0%), 30001 – 100000 RWF (20%) and 100000 RWF + (30%). Moreover, the report states that the standard corporate tax rate in Rwanda is 30%, however there are many tax incentives in place to decrease this rate. Interestingly, certain companies are eligible to pay 0% corporate tax provided these companies are venture capital firms registered with the Capital Markets Authority in Rwanda, investment entities that operate in a Free Trade Zone or foreign companies that have their headquarters in Rwanda.

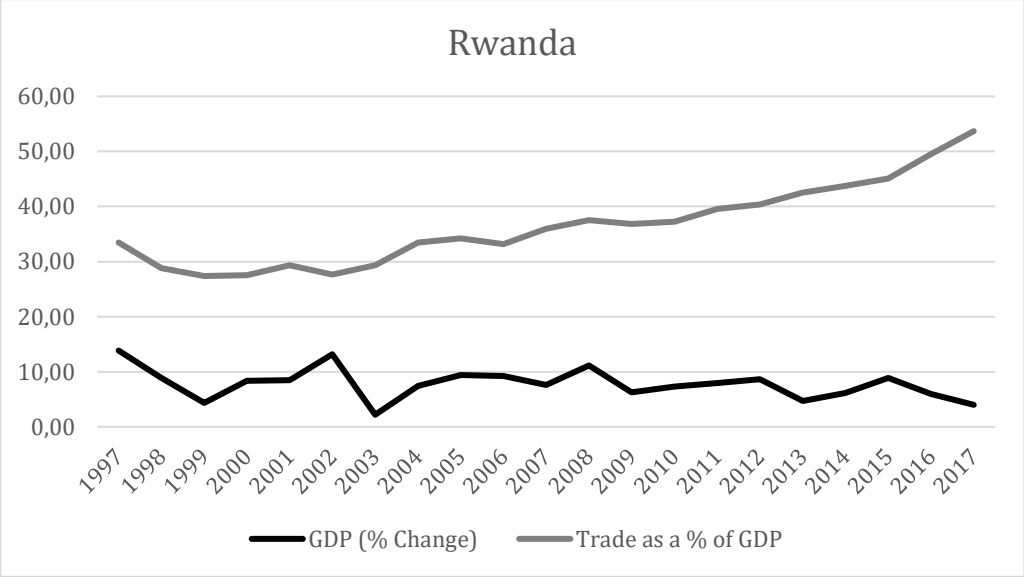

Figure 8: Graph showing Trade Openness as a % of GDP in Rwanda

Rwanda has experienced a steady expansion in its trade level from 33.47% in 1997 to 53.68% in 2017, while growth has fallen and levelled out from a peak of 13.85% in 1997 to a modest 3.98% in 2017 - the overall coefficient reveals a negative relationship.

According to OEC (2019), Rwanda is a net importer, with its largest exports being gold, refined petroleum and tin ore. However, the country's largest is oil from the United Arab Emirates (UAE) and Saudi Arabia. This causes a resource-curse effect, as Rwanda exports most of its petroleum and is then made to import it back from the UAE in accordance with stringent OPEC production policies. Interestingly, Resource Rents did not significantly influence growth, suggesting that a possible resource curse could be a result of the country's terms of trade, as opposed to weakened growth caused by resource exploitation.

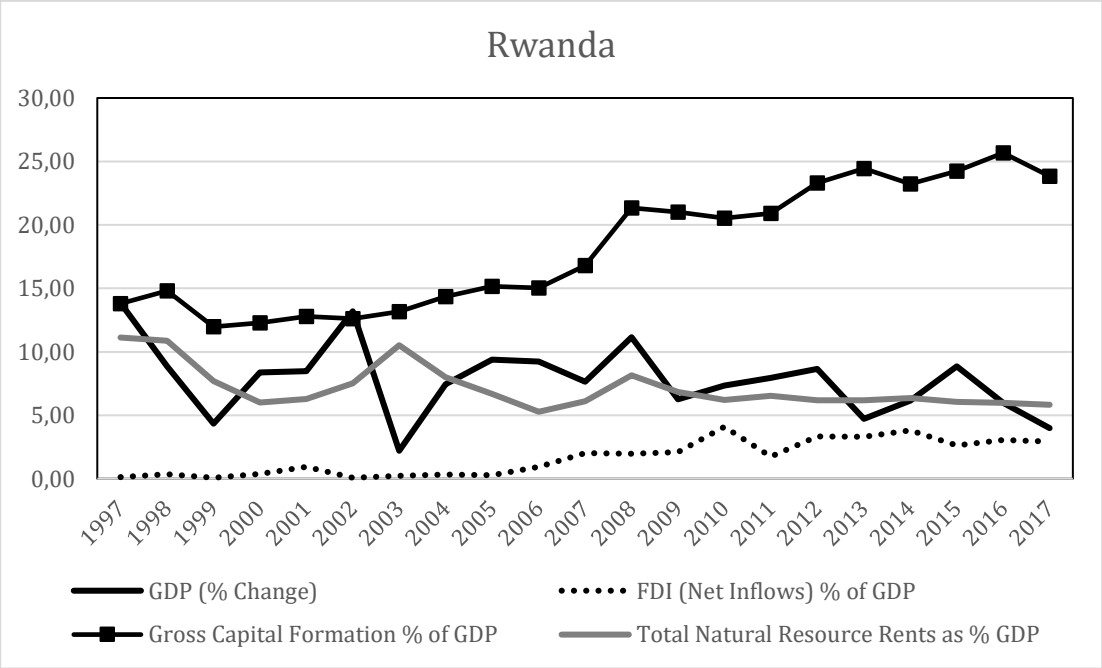

Figure 9: Graph showing non-fiscal variables as a % of GDP in Rwanda

Therefore, it can be argued that investment in the form of fixed assets is a key driving force for growth in Rwanda, indicating that these investments were growth-enhancing. Figure 9 shows how over the period studied, GFKF has increased from 13.80% in 1997 to 23.83% in 2017, while the growth rate has declined from 13.85% in 1997 to 2.91% in 2017, showing that although GFKF has been positive toward growth over the period, the growth rate indicates alterative influencing variables, those not used in this study.

4.6. Senegal

According to Lloyd's Bank (2021), despite Senegal being significantly poor in natural resources, the nation is rich in minerals, especially phosphates and iron ore. Senegal is one of the world's leading phosphate producers, and has significant deposits of zirconium, titanium, marble, gold, and limestone, as well as several types of precious stones. Although only 16.62% of the land is arable, agriculture employs 30% of the workforce and has added to 14.8% of GDP.

Lloyd's Bank (2021) found that the industrial sector contributed to 24.4% of the GDP in 2020 and employs 13% of the workforce. This is largely due to the production of fertilizers and phosphoric acid -

which is sent to India, peanut processing (oil and cattle meal) as well as seafood processing. Further insights revealed the most crucial industrial segment is food production, followed closely by textiles and chemical industries.

The services sector contributed to around 51.4% to GDP and employed 57% of the workforce as of 2020. It is said this success came from the country's well-developed telecommunications infrastructure, which has attracted investment in tele-services and the internet realm. Lloyd's Bank (2021) noted this sector has been expanding steadily over the last 10 years and with it, tourism has also grown.

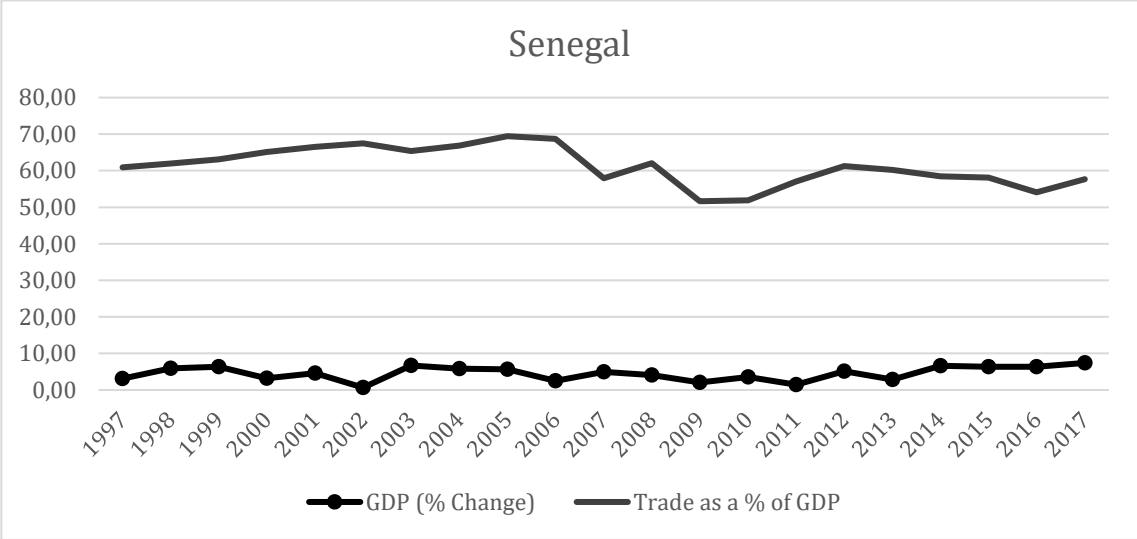

Figure 10: Graph showing Trade Openness as a % of GDP in Senegal

Figure 10 reveals that over the period studied, trade openness remained stable, the peak of 68.5% in 2006 is in line with a global uptick in trade a year prior to the global financial crisis. The lowest point of trade openness is in 2009 at 51.6%, whereon trade levels begin to move up to pre-GFC levels. It is worth mentioning that trade openness was the only variable which significantly impacted growth in Senegal from 1997 – 2017, therefore it can argued that in a similar trend to that of Mauritius, Rwanda, Cameroon and Eswatini, growth has been largely dependent on the export market.

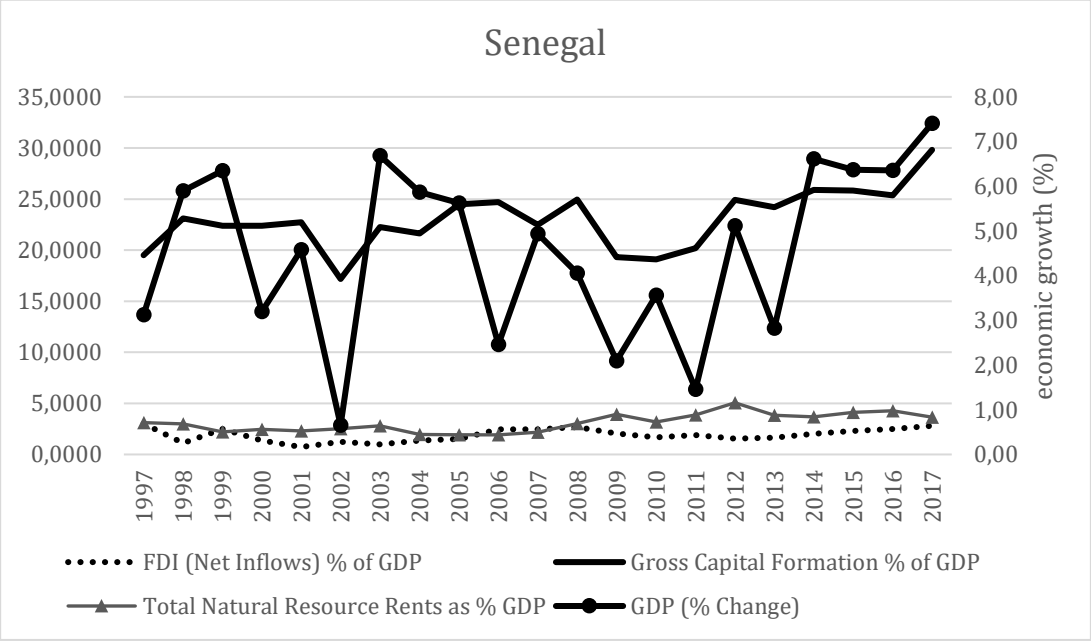

Figure 11: Graph showing non-fiscal variables as a % of GDP in Senegal

The rise in investment from 1997 of 19.49% to 29.81% in 2017 was likely to have provided an increase in the employment level. The increased employment opportunities may in turn have led an increase in the output level of firms, which could have coincided with a gradual rise in the growth rate over the period. GDP rose steadily from 3.12% in 2007 to 7.41% in 2017, suggesting a strong relationship between investment and growth over the period.

4.7. South Africa

According to the 2018 Budget Review, South Africa has in recent years seen a slump in tax buoyancy, which is described as the relationship between tax revenue growth and economic growth. According to the South African National Treasury (2018), a buoyancy of 1 means the pace of revenue growth is matching that of GDP growth. Interestingly, it was found that from 2010/11 to 2015/16, tax revenue grew at a quicker rate than that of the economy. With respect to the substantial tax increases made in 2016/17 and 2017/18, this trend was predicted to continue, however revenue growth subsequently slowed, effectively matching the pace of economic growth. This brought a decreased estimated buoyancy of 0.96 for 2017/18. Treasury found this was partly due to a shift in dividend withholding tax revenue to the previous year, as some taxpayers aimed to avoid paying the higher rate introduced in the 2017 Budget. In conjunction with these temporary effects, lower-than-estimated nominal imports constrained import VAT and customs duties, additionally personal income tax collections fell short of projections (National Budget Review, 2018).

The National Budget Review for 2018 found that South Africa's personal income tax burden had grown steadily from 8.3% of GDP in 2010/11 to 9.8% in 2017/18. In 2017, the South Africa government implemented a new additional top income tax bracket of 45% for those earning above R1.5 million. This also followed a one-percentage-point increase in personal income tax rates which impacted all but the lowest-income tax bracket in 2015/16, as well as below-inflation adjustments to tax brackets in 2015/16 and 2016/17. This resulted in the tax burden on individuals continuing through 2017. Lastly, effective rates of capital gains tax have also been increased over time in order build on the progressive nature of the tax system (National Budget Review, 2018).

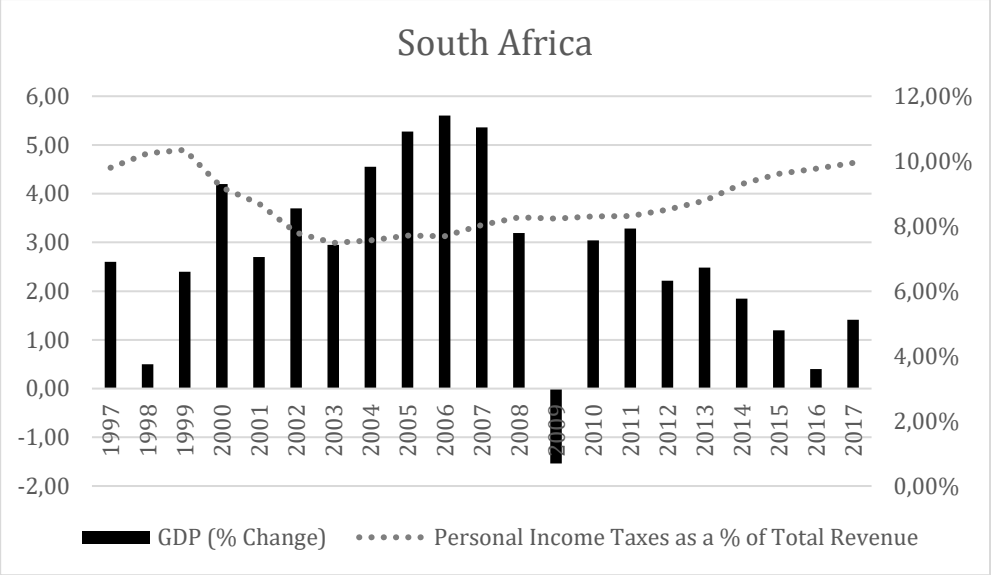

Figure 12: Graph showing Personal Income Taxes as a % of Total Tax Revenue in South Africa

Figure 12 highlights a sharp plunge in GDP into negative territory in 2009 (-1.54%) following the global financial crisis. Yet, from 2010 onward, the PAYE percentage contribution rises steadily from 8.30% in 2010 to 9.95% in 2017, while over the same period the country experienced lackluster growth of 3.04% in 2010 to 1.41% in 2017. Suggesting a constraining impact on disposable income, consumption, and a resultant decline in growth levels.

Figure 12 further illustrates a mixed relationship between PAYE and growth, showcasing the complexity and composition of the country's economy. South Africa is the only country in the sample which revealed personal income taxes were significantly impacting growth. Given the progressive nature of the tax system, PAYE is stratified and charged on a percentage basis in accordance with a particular income bracket. This makes interpretation more complex as this form of taxation is not a uniform fixed rate. Moreover, in a country with one of the world's highest levels of inequality and an ever-shrinking tax base, policymakers are constantly faced with the difficult balancing act of personal income tax structuring and tax incidence on the various income brackets.

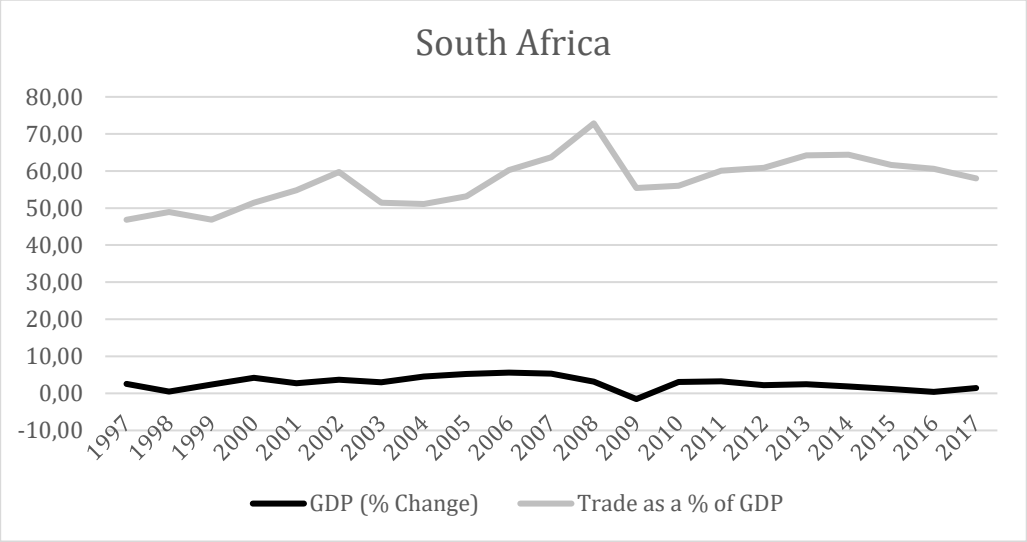

Figure 13: Graph showing Trade Openness % of GDP in South Africa

The above graph illustrates the gradual upward trend of trade as a percentage of GDP through to 2008, whereby trade fell drastically from 72.87% in 2008 to 55.42% in 2009, largely accredited to impact of the global financial crisis. As previously highlighted by Silajdzic and Mehic (2018), modern trade theories which are integrated in endogenous growth models suggest that trade may be positive for economic growth with fundamental mechanisms including, economies of scale, technology transfer and increased competitiveness among countries. The authors argue that these mechanisms present a positive impact on productivity of local firms and industries, further rising incomes and value added in the economy. The South African economy is the largest exporting nation in the SSA sample, with a variety of sectors holding international competitive advantage, ranging from precious metals, coal, agriculture and automobile manufacturing. The Trade Openness figure showed a positive coefficient, highlighting that exports were larger than imports and that the country could be termed as a net exporter as the terms of trade were favourable for growth.

Therefore, trade in South Africa is huge contributor to growth, averaging above 50% of GDP, however unlike Mauritius, this figure does not exceed 100% - showing that the country is not solely dependent on exports and imports for the development of its economy. Yet, trade taxes in South Africa were not found to be significantly impacting growth over the period suggesting that these could be restructured in order to emphasise the optimal level of trade taxes at 4% of total tax revenue.

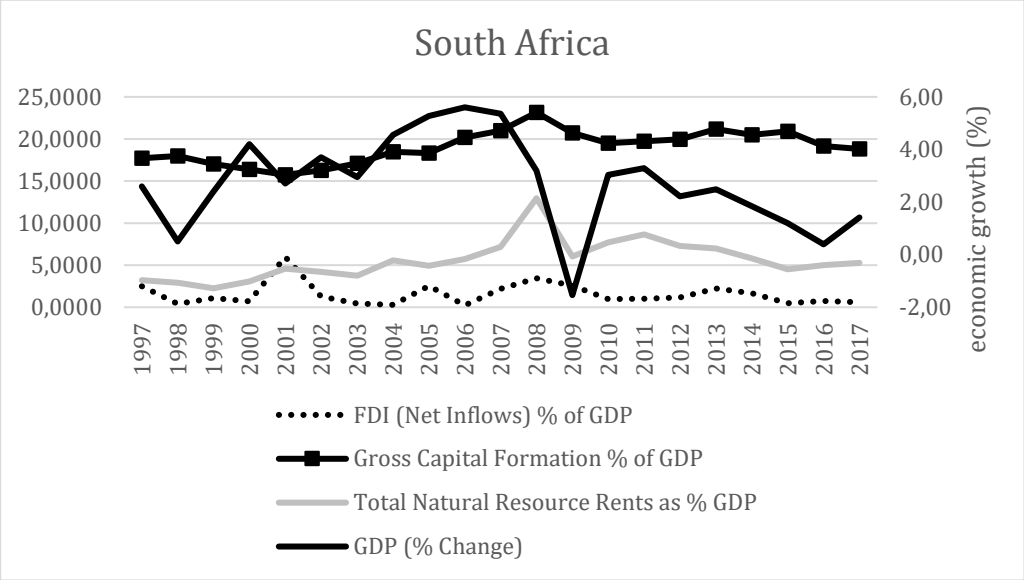

Figure 14: Graph Showing non-fiscal Variables as a % of GDP.

Despite weakened growth following the global financial crisis, state-level investment and spending proved beneficial for growth. This is indicative that a Keynesian approach to increasing investment, as opposed to constraining investment, has proved successful in the case of South Africa. However, GFKF declined from 20.91% in 2015 to 18.80% in 2017, with growth rising steadily from 0.48% in 2015 to 0.59% in 2017 showing an implementation of austerity measures to curb rising public expenditure. Surprising, this has been met by a gradual improvement in growth. Suggesting that supply-side policies, particularly in the fiscal policy space, could be beneficial for growth.

4.8. Uganda

According to Moody's Analytics (2021) Uganda has an abundance of natural resources, including fertile soils, consistent rainfall, significant reserves of recoverable oil, and small deposits of copper, gold, and other minerals. Agriculture is a crucial sector of the economy, employing 72% of the work force (Moody's Analytics, 2021). The country's export market, which suffered a large-scale decline following the outbreak of conflict in South Sudan, has now recovered, largely due to record coffee harvests and increasing gold exports. Uganda has a small industrial sector that is dependent on imported inputs such as refined oil and heavy equipment. Productivity is kept low due to several supply-side constraints, including insufficient infrastructure, underinvestment in agriculture, rudimentary technology, and corruption (Moody's Analytics, 2021).

Uganda's economic growth has slowed since 2016, with the growth rate dropping from 5.7% in 2015 to 4.4% in 2017. In 2016/17, revenue collections dropped by 4%, as public debt increased from 33.3% of GDP in 2015 to 40% in 2017. Uganda relies on foreign donations and international support to finance long-term growth drivers, such as agriculture, health, and education.

Oil revenues and taxes will become a larger source of government funding in the near future when oil production begins in the next three to 10 years. Foreign investors are planning to invest $9 billion in production facilities projects, $4 billion in an export pipeline, and $2 - 3 billion in a refinery to produce petroleum products for the domestic and East African Community markets. Furthermore, the government

is looking to build several hundred million dollars' worth of highways to connect the oil region to the rest of the country. However, this study found that none of the fiscal and non-fiscal variables held a significant influence of growth over the period 1997 - 2017. Therefore, supporting commentary by Moody's Analytics (2021) on Uganda, found that key drivers of growth are not sufficiently funded by the Ugandan government, in addition to weakened supply-side factors has resulted in sub-optimal growth and a dependence for foreign funding.

4.8 Conclusion

The following chapter unpacked a regional contextualisation of various trends with the SSA region. The chapter looked at focusing on and graphically illustrating those variables which were found to be significantly impacting economic growth. The chapter contextualised both fiscal and growth trends in the various countries and assisted the reader with understanding the overall economy these countries. The trend analysis is purely descriptive and not econometrically tested, however the chapter does unpack the necessary trends which lead into the later chapters, thereon these trends are tested using various ARDL models.

CHAPTER 5:

RESULTS AND INTERPRETATION

5.1 Introduction

This chapter is an interpretation and discussion of the results derived from the empirical analysis. The section contains an analysis of the descriptive statistics, pairwise correlation, unit root tests, cointegration as well as the long and short run estimates. The chapter then presents both pooled mean group regressions (PMG) ARDL tests, in addition to country specific ARDL tests. Lastly, proceeding with a partial derivative which is used to calculate optimal levels of respective tax variables.

5.2 Descriptive Statistics

A summary of the descriptive statistics is presented in Table 4. This table is a summarized table of the averages of each country and each variable, the full descriptive analysis of each country is located in *Appendix C*. The average growth rate is of particular importance to this study as it will be used as benchmark for which each respective country will be compared with. The SSA annual percentage change in growth for the sample used was found to be 4.70% over the period 1997 - 2017. Accordingly, VAT has the largest share in tax revenue of all the individual tax heads at an average of 5.08%, of which the average total tax revenue share of GDP is found to be 16.87%. Therefore, the average contribution from VAT in GDP was found to be 0.86%.

The range of the growth rate over the period is 15.4, showing the regional sample exhibited a volatile annual growth % rate over the period, when comparing the range of 15.4 to the mean growth rate of 4.70%. Furthermore, the standard deviation of growth 2.2, shows that there is a mild variability from the various growth rates in comparison to the regional average of 4.70%. While trade openness with a standard deviation of 27.03 which showcases extreme variability between each country's trade proxy.

Table 3: Descriptive Statistics

Statistic/Variable	*Growth*	*TotalRev*	*TaxRev*	*Paye*	*Corptax*	*Proptax*	*VAT*	*Tradetax*	*Tradegdp*	*Fdigdp*	*Gfcfgdp*	*Resourcerents*
Mean	4.70	22.34	16.87	3.10	2.47	0.26	5.08	3.73	56.76	2.09	20.70	5.74
P50	4.34	21.35	14.94	2.02	2.16	0.04	4.94	2.09	50.85	2.04	21.02	5.25
Min	-1.54	13.64	9.65	0.66	0.84	-0.09	3.19	0.257	27.38	-2.74	11.82	0.00
Max	13.85	37.77	30.97	10.35	7.91	1.47	7.31	23.88	132.20	9.69	30.95	21.79
Skewness	0.77	0.90	0.91	1.43	1.86	1.55	0.26	2.41	1.45	0.88	-0.33	0.87
Kurtosis	4.22	2.86	2.45	3.96	6.10	3.83	1.71	8.29	4.20	5.35	2.67	3.68
Standard Deviation	2.20	6.14	6.14	2.59	1.44	0.44	1.15	4.62	27.03	1.73	4.09	4.35
Number of Obs.	147	147	147	147	147	147	147	147	147	147	147	147

*Note: * indicates p-value <0.05*
Source: Author's own calculations

In understanding the shape and distribution of the data, extreme kurtosis and skewness are an indication that the data is not normally distributed. Skewness is a measure which is used to test how symmetrical the

data is around the mean; a symmetrical normal distribution is expected to have a value close to zero. VAT (0.26) and GFCF (-0.33) are the only variables which suggest a normal and distribution. GFCF has a negative value which depicts a distribution as having a left tail, while VAT has a positive value and therefore depicts a right tail.

Furthermore, when analysing kurtosis for a standard normal distribution, the acceptable benchmark is 3 (Kallner, 2018). The higher this value is, the more pronounced the peak is, therefore it can be said that this measure is a depiction of the volatility of the data. Accordingly, Total Revenue (2.86), Total Tax Revenue (2.45), Property Tax (3.83), Resource Rents (3.68) and GFKF (2.67) are seen to show a relatively normal distribution, while outliers such as Corporate Tax (6.10), FDI (5.35) and Trade Taxes (8.29) reveal a much steeper peaks, therefore showing more volatility in these variables. Meanwhile, VAT (1.71) exhibited a much flatter curve compared with the rest of the data.

Table 4: Pairwise Correlation Matrix

Variable	**growth**	taxrev	paye	corptax	proptaxrev	vat	tradetax	tradegdp	fdigdp	Gfcffgd	resosrents
growth	1.00										
taxrev	-0.49*	1.00									
paye	-0.38*	0.83*	1.00								
corptax	-0.29*	0.71*	0.80*	1.00							
proptaxrev	-0.38*	0.55*	0.71*	0.79*	1.00						
vat	-0.40*	0.67*	0.52*	0.52*	0.40*	1.00					
tradetax	-0.18*	0.38*	0.02	-0.19	-0.28*	-0.33	1.00				
tradegdp	-0.18*	0.08	-0.15	-0.03	-0.02	-0.68*	-0.22*	1.00			
fdigdp	0.04	-0.07	-0.07	-0.04	-0.19*	-0.19*	-0.04	-0.09	1.00		
gfcgdp	0.06*	-0.30*	-0.23*	0.16*	-0.09	-0.09	-0.38*	0.40*	0.31*	1.00	
resosrents	0.23*	-0.34*	0.08	0.10	0.05	-0.53*	-0.23*	-0.57*	0.14	-0.01	1.00

*Note: * indicates p-value <0.05*

Source: Author's own calculations

The initial test which is run is the pairwise correlation matrix. The correlation coefficient (r) is a linear measure of the strength and direction of association that exists between two continuous variables. The correlation coefficient measures the degree of linear association between any two variables. Therefore, values can range from -1 for a perfect negative linear relationship to +1 for a perfect positive linear relationship. A value of 0 (zero) indicates no relationship between two variables.

Therefore, this test is crucial in outlining whether the relationships hold correlate with economic theory highlighted in the previous chapter. The test helps the study to access the presence of severe multicollinearity, as well as assessing whether there is non-conformance or conformance with theory in relation to the sign of the correlation coefficient. Furthermore, the strength of association between variables is analysed to comment on the correlating relationship between variables. The above pairwise correlation matrix reports the coefficient as pooled correlations, not an individual country-specific coefficient. This is done to give an overview of each variable in relation to growth for the SSA region. The country-specific tests are run in an ARDL format and are analysed further on. From the above, tax revenue is statistically significant and negative to growth by a correlation coefficient of -0.49. This reveals that overall, for the region, tax revenue has not conformed with most theory stating that tax revenue should hold a positive relationship with economic growth. Furthermore, PAYE (personal income tax) shows a statistically

significant and negative relationship with a correlation coefficient of -0.38, in addition to property taxes that showed a -0.38 relationship correlation with growth. Corporate tax was also found to hold a significant and negative correlation of -0.29. Interestingly, much of the literature on corporate taxes, highlights the disincentivising nature of this tax particularly on firms output levels. This highlights that while tax revenue for the region was found be negative for growth, the individual components of personal income tax, property tax and payroll taxes give an outline of the tax structuring in the region. However, these results are purely for interpretive purposes, to give an overviewed understanding of the correlations of each variable in relation to growth for the region. The Autoregressive Lag Distribution models will provide a more detailed approached in testing each variable in a lagged regression model and not purely a correlation approach.

Moreover, the correlation matrix found gross-fixed capital formation to have a positive and statistically significant relationship with growth. This suggests that local investment in the region had proved beneficial, outweighing the actual initial investment creating long term returns, which bolstered growth as a result. The correlation found that gross-fixed capital formation had a 0.06 positive correlation toward growth. In addition, it was found that resource rents had a 0.23 positive correlation with growth. Total natural resource rents are said to be the summation of oil, gas, coal, and mineral rents in the region. This variable is of particular importance to the study as it reveals the extent of the so-called 'resource curse' of mineral-rich countries, particularly in Africa, is present. This demonstrates that previous arguments of mineral-rich developing countries falling victim to larger developed nations' resource exploitation is highly debatable. It is worth reiterating, the above interpretations do not infer causation, instead focusing on the sign of coefficients and whether these associations agree with existent theoretical and empirical underpinnings.

5.3 Unit Roots Tests

Unit root testing is employed to test for stationarity. This study makes use of Im, Pesaran and Shin (2003) and Levin and Lin (1993) as these methods take care of possible autocorrelation in the error terms and are also easily applied. The null hypothesis of the tests is that a time series has a unit root.

Given the nature of this study and the use of panel data and autocorrelation lag modelling, literature by Gujarati and Porter (2009) state that the most applicable stationarity tests are both the Im, Pesaran and Shin (2003) and Levin and Lin (1993). Additionally, the unit root tests that the statistical software 'EViews' provides, generally test the null hypothesis against the one-sided alternative. In some cases, the null is tested against a point alternative.

Where the null and alternative are:

$H_0: \rho = 1$

$H_1: \rho < 1$

5.3a) Levin and Lin (2003) unit root test for panel data

The initial stationarity test which was run in the ARDL panel analysis was the LLC test. The null hypothesis is defined as follows:

The LLC hypothesis test is defined as testing non-stationarity for all individual variables, in addition to the heterogenous alternative.

$Ho: \rho = 1$ for $i = 1, \dots, N,$ against the *homogenous* alternative $H_1^1: -1 < \rho_i = \rho < 1 \; for \; i, \dots, N.$

The authors developed a procedure using pooled t-statistic of the estimator to evaluate hypothesis that each individual time series contains a unit root against the alternative hypothesis that each time series is

stationary. Thus, LLC assumes homogeneous autoregressive coefficients between individual, i.e., $\rho_i = \rho$ for all i, and test the null hypothesis $H_0 : \rho_i = \rho = 0$ against the alternative $H_a: \rho_i = \rho < 0$ for all i. Imposing a cross-equation restriction on the first-order partial autocorrelation coefficients under the null, this procedure leads to a test of a much higher power than performing a separate unit root test for each individual. The LLC model specification is that the model tests individual effects, time trends as well as heterogenous serial correlation structure of the errors.

The LLC test is a pooled test, which is more applicable for a panel of a moderate sample size ($10 < N < 250$ and $25 < T < 250$), of which there is said to be a loss of power when time trends are included. A core advantage of this test is that unbalanced panels are allowed but further simulations are required in order for accurate results. Yet, disadvantages include that an infinite number of groups are required, additionally all the groups are assumed to have the same type of nonstochastic components.

The LLC test has further limitations, such as the fact that the test is crucially dependent upon the independence assumption across individuals, and hence not applicable if cross-sectional correlation is present. However, the major limitation is that the autoregressive parameters are considered to be identical across the panel. The null makes sense under some circumstances, but as Maddala and Wu (1999) pointed out, the alternative is too strong to be substantiated in any empirical cases. This limitation has been overcome by IPS (Im, Pesaran and Shin, 1997, 2003) which proposed a panel unit root test without the assumption of identical first order correlation under the alternative.

5.3b) Im, Pesaran and Shin (2003) unit root test for panel data

Im, Pesaran and Shin (2003) *IPS* thereafter, using the likelihood framework, suggest a new, more flexible and simple unit root testing procedure for panels (which is referred as *t*-bar statistic), that allows for simultaneous stationary and non-stationary series. Moreover, this test allows for residual serial correlation and heterogeneity of the dynamics and error variances across groups. Further to this, Im, Pesaran and Shin (2003) note the inconsistency of pooled estimators in dynamic heterogeneous panel models has been demonstrated in previous seminal work by Pesaran and Smith (1995:a), and Pesaran and Smith (1995:b). The authors present a paper which builds on these findings and considers the problem of testing for unit roots in such panel data modelling. Advancements of panel unit root tests have been investigated by Quah (1992, 1994) and Levin and Lin (1993). The methodology proposed by Quah (1992) does not factor in heterogeneity across groups such as individual-specific effects and varying patterns of residual correlations. The test by Levin and Lin (1993) is the more commonly used and widely accepted test, as it allows for individual-specific effects as well as dynamic heterogeneity across groups and requires $N/T \rightarrow 0$ as both N (the cross-section dimension) and T (the time series component) tend to infinity. Therefore, the IPS hypothesis test shares similarities with the LLC test by testing non-stationarity for all individual variables, in addition to the heterogenous alternative. This test is an averaged t-test, of which there is a loss of power when time trends are included, however, the IPS is said to be more powerful than the LLC and Fisher tests.

Table 5: Unit Root Tests Across All Variables

Variable	Levin, Lin and Chu Test (Levels)	Levin, Lin and Chu Test (First Difference)	Im, Pesaran and Shin Test (Levels)	Im, Pesaran and Shin Test (First Difference)
Corp Taxes	-2.719** (0.003)		-1.381 (0.084)	-9.554* (0.000)
FDI	-3.421* (0.000)		-3.886* (0.000)	
GDP	-6.244* (0.000)		-5.250* (0.000)	
GFCF	-1.202 (0.114)	-8.730* (0.000)	-0.270 (0.394)	-8.987* (0.000)
PAYE	-0.861 (0.195)	4.321* (0.000)	0.620 (0.732)	-4.836* (0.000)
Property Taxes	-3.416* (0.000)		-3.240* (0.000)	
VAT	-1.564** (0.059)	-7.635* (0.000)	-0.720 (0.236)	-5.680* (0.000)
Trade Taxes	-6.806* (0.000)		-7.688* (0.000)	
Total Revenue	-1.102 (0.135)	-12.51* (0.000)	-0.662 (0.254)	-11.046* (0.000)
Trade Openness	2.936 (0.998)	-6.536* (0.000)	1.405 (0.920)	-6.481* (0.000)
Resource Rents	-2.910* (0.001)		-1.516*** (0.065)	-11.540* (0.000)
Taxes as % of Total Revenue	0.027 (0.5112)	-5.673* (0.000)	1.289 (0.901)	-6.776* (0.000)

*Note: * indicates p-value <0.05; **indicates p-value <0.010*
Parenthesis: Standard error
Source: Author's own calculations

Table 5 illustrates the stationarity test which were run for all variables in the study. The LLC and IPS were found to be the most applicable tests for the ARDL panel analysis, therefore both sets of results were used prior to running the various ARDL regression. Accordingly, corporate tax, FDI, GDP, property taxes, trade taxes and resource rents were all found to be stationary in levels at the 1% level of significance under the LLC test, while GFC, PAYE, total revenue, trade openness and taxes as a % of total revenue were found to be stationary at first difference at 1% level of significance. VAT was found to be significant in level at the 10% level of significance, however this study used only identified variables less than or equal to a 5% level of significance; and there under the LLC test, VAT was found to be stationary of first difference.

In relation to the IPS tests, FDI, GDP, property taxes and trade taxes were found to be significant at the 1% level of significance when running the variables at levels. The variable of corporate taxes, GFCF, PAYE, VAT, total revenue, trade openness and taxes as a % of total revenue were found to be significant at the 1% level when running the IPS test at first difference. Similar to VAT in the LLC test, resource rents

were found to be significant at levels, however this was at the 10% level and therefore could not be included; once running resource rents at first difference in the IPS test is seen that the variable was significant at the 1% level.

5.5 Generalized Least Squares Test

As an alternative to the ARDL test, the GLS regression was run to evaluate the relationship of overall tax revenue in relation to growth. The generalized least squares test is performed to assess the robustness of the data, in part particular the time effects of a variable over time. The GLS test was run under the following assumptions: heteroscedasticity across panels, as well as panel-specific serial correlation. This test assigns various dummy variables to simulate the changes in growth from one year to another, starting from 1997 (y2). The detailed GLS test for growth is found in *appendix A,* while the summary of this test is in Table 6 below. The GLS test was run using the consolidated variable of tax revenue as opposed to the tax heads, to illustrate the time effects which growth shares with tax revenue; to indicate fiscal policy changes with addition to growth rate variations over time. Therefore, through a dummy variable analysis of 1997 (y2) – 2017 (y21), tax revenue had a negative impact on growth on a yearly basis of 0.69-percentage points for the SSA sample.

This model exhibits an anti-Laffer relationship - this is true as the squared value of tax revenue in Table 7 is not negative. The squared term of tax revenue must have a negative sign for an inverted U-shape to occur, following the basic Laffer Curve principle.

Table 6: Generalized Least Squares Test.

GDP	Coefficient	Std. Err	Z	P > |Z|	[95% Conf. Interval]	
Tax Revenue	-0.69*	0.31	-2.10	0.04	-1.29	-0.46
Tax Revenue Squared	0.01**	0.00	1.69	0.09	-0.00	0.03
Trade Openness	0.00	0.00	0.36	0.72	-0.01	0.01
FDI	0.03	0.07	0.48	0.63	-0.11	0.19
GFCF	0.06	0.06	1.15	0.26	-0.05	0.17
Resource Rents	0.07	0.06	1.20	0.23	-0.05	0.19
Year	-0.00	0.03	-0.03	0.98	-0.06	0.06
Constant	11.48	64.92	0.18	0.86	-115.76	138.74

*Note: * indicates p-value <0.05; **indicates p-value <0.010*
Source: Author's own calculations

5.6 Total Tax Revenue Regional Analysis

Total Tax Revenue used to show the impact of total revenue collected on growth in SSA. This measure is therefore a summation of the individual tax components, shown as a percentage of GDP. This is useful as it illustrates the general trends to which tax revenue in the region experiences. Moreover, it allows the study to investigate the extent to which the individual components have on the overall tax revenue trend. This can give further insight into the structuring and level of the respective tax systems, by assessing whether the current weightings and levels of the individual components are following in line with the Laffer Curve theory.

Table 7: The Wald Test Analysis.

Wald Test:			
Test Statistic	Value	df	Probability
F-statistic	4.984914	(2, 85)	0.0090
Chi-square	9.969828	2	0.0068
Null Hypothesis: C(1)=C(2)=0			
Null Hypothesis Summary:			
Normalized Restriction (= 0)		Value	Std. Err.
C(1)		1.076708	0.341047
C(2)		-0.027519	0.008996
Restrictions are linear in coefficients.			

Source: Author's own Eviews Calculations

According to Korn (1990), the Wald Test is a statistical test of estimated parameters in a model, with the null hypothesis being that a set of parameters is equal to some values. In the default case where the null hypothesis value of the parameters is 0, if the test fails to reject the null hypothesis, removing the variables from the model will not substantially ruin the fit of the specified model. Similarly, this test computes a test statistic which tests for the joint significance of the coefficients. The test will ascertain whether the joint impact of tax revenue and the squared value of tax revenue have a significant influence on economic growth. The variables are denoted as follows: C (1) = Tax Revenue, C (2) = Tax Revenue squared. The null hypothesis is stated as: Tax revenue has a non-linear effect on economic growth. Therefore, after running the Wald Test it can be said that since the p-value of the F-statistic is less than 0.05, we reject the null hypothesis and conclude that tax revenue has a significant non-linear effect on GDP growth.

5.7 Pooled Mean Group Regressions (ARDL Models)

Table 8: ARDL Test Comparison

Variable	**Model 1 ARDL – Individual Tax Components**	**Model 2 ARDL – Total Tax**
Ln(GDP)	Long Run Equation	
TAXREVGDP		1.0767* (0.3410)
TAXREVSQD		-0.0275* (0.0090)
CIT	0.1196 (0.2410)	

PAYEGDP	-0.833244* (0.1654)	
PROPTAX	-3.646931* (1.3261)	
TRADETAX	-0.155011 (0.1809)	
FDI	-0.603342* (0.1259)	-0.242761 (0.1810)
GFCF	0.182404* (0.0609)	-0.090007 (0.0736)
OPENNESS	-0.030083 (0.0267)	0.003853 (0.0327)
RENTS1	-0.258367* (0.1018)	-0.382348 (0.0811)
	Short Run Equation	
COINTEQ01	-0.784781* (0.1770)	-0.689020* (0.1626)
D(TAXREVGDP)		0.385486 (4.7013)
D(TAXREVSQD)		-0.057119 (0.1340)
D(CIT)	-0.959991 (0.7225)	
D(PAYEGDP)	0.583327 (0.6161)	
D(PROPTAX)	38.04858 (25.5083)	
D(TRADETAX)	-0.344897 (0.5357)	
D(FDI)	0.460203* (0.1690)	0.082958 (0.1396)
D(GFCF)	-0.025189 (0.1945)	0.194499 (0.1838)
D(OPENNESS)	-0.049864 (0.1263)	-0.236510 (0.1717)
D(RENTS1)	-7.382016 (7.4107)	-11.24052 (11.3367)
C	7.867165 (2.6586)	0.133606 (1.083173)

*Note: * indicates p-value <0.05*
Parenthesis: Standard error

Source: Author's own calculations

The model was run with a one-year lag structure of ARDL (1,1,1,1,1,1) according to the SIC criterion. Additionally, it was found that lags above one year did not allow the model to run due to high multicollinearity. This ARDL structure was chosen by using the Schawrz Information Criterion (SIC). This selection criterion was used as the study has a very small sample size and in terms of the time dimension is the most appropriate method. The coefficient of the error correction term is -0.785 and is statistically significant. This means that the variables in the ARDL model are cointegrated. The result implies that 78.5% of the equilibrium error in the previous period is corrected in the current period. This is a high speed of adjustment to the long run. The ARDL Pooled Mean Group Regression (PMG) as displayed in the table above, shows both the long and short coefficients. This model allows studies to further investigate individual tax measures by using those which were found to be statistically significant in the long run equation and running individual country-specific ARDL regressions in relation to growth. Model 1 reveals that corporate taxes, although found be to be insignificantly impacting growth, does not conform with theory used by Hodge and Hickman (2018) stating that corporate taxes are found be inherently negative toward growth. Corporate taxes exhibit a positive coefficient in the long run suggestive that there is positive relationship with growth, however the coefficient is not significant at the 5% level. Moreover, in the short run, it is found that corporate taxes hold a negative relationship with growth, in line with expectations, however the coefficient is insignificant. Therefore, there is no conclusive evidence to suggest that there is a definitive impact of corporate taxes on growth.

The only fiscal variables which were found to be significant were, PAYE and Property taxes. In the long run, PAYE impacted growth by -0.84-percentage points (this coefficient was significant at the 5% level). Whereas, in the short run PAYE exhibited a positive effect on growth, however the short run coefficient was not significant at the 5% level. In accordance with existent theory and evidence on PAYE and growth, Schratzenstaller *et al.* (2005) highlight that in a developing-world context such as SSA, the implementation of a linear tax system is the most commonly used practice as opposed to progressive taxation. The authors state that in a developing nation context, this approach is the most equitable and likely to reveal an increase in investment, growth, employment opportunities and see a rise in production output. However, the negative coefficient of PAYE does not conform as the results find PAYE to be negative in relation to growth over the long run. Property taxes were found be to significantly impacting growth with a negative coefficient of -3.65 in the long run, while the short run coefficient is seen to be positive and insignificant toward growth. The standard error in the short run is extremely high at 25.08, however over time this stand error decreases in addition to the sign of coefficient shifting to negative and significant. Therefore, it is apparent from Model 1 that property taxes held a negative and significant impact the further into the long run the model ran. This states that although the short run effect is positive and insignificant, there is a long run trend which highlights a significant and negative influence.

Trade taxes were found to have insignificantly impacted growth; both the long and short run equations exhibit an insignificant negative coefficient. There is mixed literature of the impact of excise taxes on economic growth. Gober and Burns (1997) and Dejong and Ripoll (2006) found the impact to be significant in an OECD context. While Azam (2011) and Schularick and Solomou (2009) found the impact negative and difficult to conclusively state a casual effect.

Furthermore, it is found that the non-fiscal variables of; FDI, GFCF and Resource Rents significantly impacted growth over the long run. Interestingly, this model specification found the non-fiscal variables of natural resource rents and FDI were negatively impacting growth over the period. Natural resource had a 0.258-percentage point impact on growth over the period, which aligns with the literature on Africa's ever-

present resource curse and therefore warrants a possible policy change to counter resource exploitation from the developed world. In line with the underlying relationship, sign of GFCF in Table 8, GFCF is seen to be positively impacting growth in the region by 0.182-percentage points. While the non-fiscal variable of FDI defies the positive relationship sign found in Table 8. Although FDI is seen to negatively impact growth in the long run by -0.603-percentage points, in the short run the relationship is positive and seen to be influencing growth by 0.460-percentage points.

To comment on the Laffer relationship, the variables of tax revenue and tax revenue squared will be analysed simultaneously. Model 2 highlights a positive impact on tax revenues on growth, as depicted by the positive coefficient, while the squared term of tax revenue has a negative coefficient demonstrating a diminishing effect over time. Therefore, both tax revenue and the squared term together exhibit an inverted U-shaped relationship, in line with the predications by Laffer (2004). The table further illustrates that there is a significant and positive relationship between total tax revenue and GDP. Tax revenue held a long run relationship of 1.07-percentage points, which is in line with most literature outlined previously. Provided tax revenue collection is operating efficiently and structured in the correct manner, tax revenue has the potential to be a positive contributor toward growth. Moreover, the table reveals that resource rents have a negative long relationship, decreasing growth by 0.38-percentage points. This suggests that the arguments of the resource curse could be a possible explanation, particularly in the minerally-wealthy countries found in the study's sample, such as South Africa and Uganda. The cointegration equation coefficient is said be significant when this value is negative as well as the t-ratio and p-value being significant. Model 2 shows that the cointEq is negative at 0.69 with a highly significant t-ratio and p-value. This measure shows the speed at which the long run disequilibrium will correct itself. The overall cointEq for all tax measures and the non-fiscal measures is 68.90%, which is considerably high and indicates immediate adjustment over the period of 1997 – 2017.

Table 9: Full ARDL (Total Tax Revenue and Non-fiscal Variables).

	SWZ	CAM	MUS	RWA	SEN	ZAF	UGA
$\Delta\, ECT_{\,t-1}$	-0.596 (0.000)	0.733 (0.000)	-0.549 (0.041)	-1.622 (0.000)	-0.526 (0.001)	-0.453 (0.002)	-0.328 (0.070)
$\boldsymbol{\Delta\, Taxrev_{\,t-1}}$	-0.341* (0.506)	-9.599* (0.005)	5.460 (0.389)	13.090* (0.000)	13.602 (0.175)	-21.138* (0.049)	6.804 (0.199)
$\boldsymbol{\Delta\, Taxrev\ Squared_{\,t-1}}$	-0.007 (0.480)	0.389* (0.007)	-0.174 (0.372)	-0.498* (0.000)	-0.444 (0.195)	0.393* (0.045)	-0.213 (0.312)
$\Delta\, Trade\ Open_{\,t-1}$	-0.309* (0.033)	0.165* (0.004)	-0.059 (0.257)	-1.162* (0.000)	-0.358 (0.000)	-0.019 (0.826)	0.104 (0.312)
$\Delta\, FDI - GDP_{\,t-1}$	-0.130 (0.209)	-0.425* (0.001)	0.463** (0.085)	-0.794* (0.000)	0.0246 (0.951)	-0.119 (0.426)	0.469 (0.385)
$\Delta\, GFCF_{\,t-1}$	-0.291* (0.038)	-0.270 (0.149)	-0.232 (0.217)	1.109* (0.000)	-0.783* (0.000)	-0.183 (0.604)	-0.566 (0.798)
$\Delta\, Resource\ Rents_{\,t-1}$	0.332 (0.257)	-0.486* (0.000)	-40.369 (0.730)	0.856* (0.008)	-0.530 (0.256)	0.443** (0.087)	-0.333* (0.036)
Optimal Level of Tax Revenue	**24.28%**	**12.34%**	**15.69%**	**13.14%**	**15.32%**	**26.89%**	**15.97%**
Constant	-1.831 (0.257)	0.627 (0.706)	-2.302 (0.303)	5.914 (0.155)	-1.480 (0.276)	-1.080 (0.353)	1.198 (0.390)

*Note: * indicates p-value <0.05*
Note: Parenthesis show p-value
Source: Author's own calculations

Table 9 illustrates the overall relationship with which each individual country shows between GDP growth and total tax revenue. As alluded in previous chapters, this measure highlights a general trend of tax revenue and fiscal policy, in addition whether the individual tax components used in this study are significant in their own impact on growth. Table 9 shows that Tax Revenue in Eswatini, Cameroon and South Africa has a significant and negative relationship with growth. These countries exhibit an anti-Laffer relationship between them, however there is insufficient evidence to suggest that tax policy has been detrimental to growth. Therefore, the individual tax head ARDL will explore whether specific tax variables used in this study are the major constraining variables. Additionally, Rwanda was found to have a significant and positive relationship between total tax and growth, warranting further investigation as this trend is not in line with the majority of the SSA sample countries.

Table 9 also indicates the level at which total tax revenue is most optimal for growth. This figure suggests that overall tax revenue should not exceed this level, to avoid the diminishing returns of fiscal policy and growth, as previously outlined in the Laffer Curve Theory. Moreover, the ARDL test found that only Eswatini exhibited a Laffer relationship and distribution, whilst Cameroon and South Africa showed that tax revenue in their respective countries had an anti-Laffer relationship in relation to economic growth.

Table 10: Standardised Coefficients.

Variable	Coefficient	Standardised Coefficient	Elasticity at Means
PAYE	-0.83*	**-0.86**	0.55
Corporate Taxes	-0.12	0.07	-0.06
Property Taxes	-3.64*	**-0.65**	-0.21
Trade Taxes	-0.16*	**-0.29**	-0.12
Trade Openness	-0.03	-0.32	-0.36
FDI	-0.60*	-0.41	-0.27
GFCF	0.18*	0.30	0.80
Resource Rents	-0.26*	-0.45	-0.32

*Note: * indicates p-value <0.05*
Parenthesis: Standard error
Source: Author's own calculations

Table 10 reports scaled coefficients and elasticities of the full PMG ARDL model. The standardised values reveal which tax variables are most important and should therefore be targeted for growth purposes. Further, the elasticity explains the extent to which growth responds to changes in the various tax variables. The standardised values will be used to develop policy inferences in chapter 6. The importance of these variables are analysed in absolute terms and are compared in the same unit of measurement. Therefore, PAYE is shown to be the most important variable, followed by Property Taxes and Trade Taxes, in terms of fiscal measures impacting growth in the SSA sample. Interestingly, PAYE was the only tax variable which

was significant and positively responded to growth over the period by 0.55%. A more detailed analysis of these coefficients and their importance to policy measures, will be expanded on in chapter 6.

Table 11: Full Panel ARDL (Individual Tax Components Squared Terms).

	SWZ	CAM	MUS	RWA	SEN	ZAF	UGA
Variables							
$\Delta\ PAYE_{t-1}$	5.005	32.137	-3.943	1.989	13.302*	14.844*	14.704
	(0.586)	(0.057)	(0.648)	(0.709)	(0.059)	(0.007)	(0.011)
$\Delta\ PAYE\ Squared_{t-1}$	0.496	15.700*	0.549	-0.510	3.320*	-0.872*	-2.436*
	(0.663)	(0.053)	(0.861)	(0.624)	(0.030)	(0.003)	(0.016)
$\Delta\ Corp.Taxes_{t-1}$	-6.231	-4.741	-13.255	-2.952	-9.698	-7.013*	-6.866
	(0.246)	(0.136)	(0.121)	(0.698)	(0.681)	(0.024)	(0.476)
$\Delta\ Corp.Taxes\ Squared_{t-1}$	0.595	0.940	2.396	0.817	4.480	0.546*	0.716
	(0.599)	(0.197)	(0.147)	(0.660)	(0.632)	(0.038)	(0.754)
$\Delta\ Prop.Taxes_{t-1}$	95.562*	2.002	7.991	-126.358	29.570	48.047*	-533.393*
	(0.036)	(0.299)	(0.821)	(0.317)	(0.540)	(0.027)	(0.036)
$\Delta\ Prop.Taxes\ Squared_{t-1}$	-1090.62*	-2.952*	-83.314	9684.65*	-77.718	-21.680*	18220.97*
	(0.022)	(0.048)	(0.748)	(0.017)	(0.725)	(0.014)	(0.030)
$\Delta\ Trade\ Taxes_{t-1}$	0.306	-53.543	0.819	-3.227	-2.108	6.186	-7.299
	(0.407)	(0.222)	(0.384)	(0.404)	(0.554)	(0.554)	(0.222)
$\Delta\ Trade\ Taxes\ Squared_{t-1}$	-0.009	12.535	0.586	1.253	0.308	0.773	1.605
	(0.444)	(0.239)	(0.001)	(0.101)	(0.538)	(0.886)	(0.146)
Optimal PAYE Level	**5.04%**	**1.02%**	**3.59%**	**1.95%**	**2.00%**	**8.51%**	**3.01%**
Optimal CIT Level	**5.24%**	**2.52%**	**2.77%**	**1.81%**	**1.08%**	**6.42%**	**4.55%**
Optimal Prop.Tax Level	**0.04%**	**0.34%**	**0.04%**	**0.01%**	**0.19%**	**1.11%**	**0.01%**
Optimal Trade Tax Level	**17.00%**	**2.14%**	**0.70%**	**1.29%**	**3.42%**	**4.00%**	**2.27%**

*Note: * indicates p-value <0.05*
Note: Parenthesis show p-value
Source: Author's own calculations

Table 11 introduces the individual tax heads into the ARDL model, to derive the optimal level of taxation for each measure. As shown in Table 9 (tax revenue squared table) the optimal level is derived to reveal the percentage of GDP in which each tax variable is most optimal for GDP growth. The squared term is included to derive the optimal level percentage as well as to be able to comment of the Laffer relationship each variable exhibits. Therein, Mauritius is the only nation which shows anti-Laffer relationship in relation to PAYE, whilst all countries were found to present an anti-Laffer relationship between corporate taxes and economic growth. Therefore, the average shape of the corporate tax variable does not follow an inverted U-shape. Furthermore, Rwanda and Uganda reveal anti-Laffer distribution in relation to property taxes, while Cameroon, Rwanda and Senegal showcase an anti-Laffer relationship with trade taxes.

Table 12: Full Panel ARDL (Individual Tax Components).

	SWZ	CAM	MUS	RWA	SEN	ZAF	UGA
Variables							
$\Delta\, ECT_{t-1}$	-0.356*	-0.303	-0.690*	-1.447*	-0.734*	-1.410*	-0.541*
	(0.026)	(0.224)	(0.005)	(0.000)	(0.000)	(0.000)	(0.004)
$\Delta\, PAYE_{t-1}$	-0.346	0.948	-1.748	1.378	-0.344	-2.167*	2.181
	(0.714)	(0.710)	(0.556)	(0.332)	(0.895)	(0.000)	(0.530)
$\Delta\, Corp.Taxes_{t-1}$	-2.433*	-3.447*	-1.213	0.542	2.468	-0.714	-1.459
	(0.007)	(0.058)	(0.448)	(0.332)	(0.461)	(0.128)	(0.541)
$\Delta\, Prop.Taxes_{t-1}$	1.562	1.666	-7.514	170.943*	6.784	-4.189*	77.355
	(0.938)	(0.440)	(0.378)	(0.000)	(0.541)	(0.008)	(0.533)
$\Delta\, Trade\ Taxes_{t-1}$	-0.031	-2.058	0.428	1.853	-0.881	-2.051	-0.428
	(0.720)	(0.357)	(0.738)	(0.109)	(0.273)	(0.282)	(0.816)
$\Delta\, Trade\ Open_{t-1}$	-0.239*	0.232*	-0.118*	-0.589*	-0.322*	0.332*	0.189
	(0.059)	(0.024)	(0.019)	(0.000)	(0.000)	(0.000)	0.066
$\Delta\, FDI - GDP_{t-1}$	-0.113	-0.365	0.278	-0.580*	0.686	-0.040	0.051
	(0.215)	0.093	(0.313)	(0.019)	(0.244)	(0.693)	(0.922)
$\Delta\, GFCF_{t-1}$	-0.437*	-0.564	-0.310	0.745*	0.771*	0.606*	-0.012
	(0.013)	(0.104)	(0.148)	(0.000)	(0.000)	(0.003)	(0.965)
$\Delta\, Resource\ Rents_{t-1}$	0.117	-0.600*	-22.178	0.351	-0.170	-0.701*	-0.618
	(0.740)	(0.006)	(0.864)	(0.215)	(0.842)	(0.000)	(0.812)
Constant	3.176*	2.481	2.219	15.114*	4.085*	20.552*	6.995*
	(0.010)	(0.178)	(0.070)	(0.000)	(0.005)	(0.000)	(0.008)

*Note: * indicates p-value <0.05*
Note: Parenthesis show p-value
Source: Author's own calculations

The full panel ARDL model results show various components in relation to the dependent variable of growth, all at a one-year lag. The summarized results show that not all variables are significantly related to growth. In addition, the table shows that Mauritius, Cameroon, Côte d'Ivoire, Senegal, South Africa, and Uganda have no fiscal variables which impact growth significantly. While Swaziland, Madagascar and Senegal showed that fiscal measure was impacting growth.

This section is a continuation of the country specific ARDL test, however emphasis is now placed on interpreting on the statistically significant variables in relation to calculated optimal rates on a country basis. This is done to contextualize the possibilities of the outcomes and to further explain the extent of each nations average growth rate in relation the variables which are found to be impacting growth.

Eswatini Analysis

The error correction term is significant at the 5% level with a negative sign, showing that there is convergence in the long run. Therefore, the error correction term states that if the relationship between tax and growth is disturbed in the short run, in the form of a fiscal shock. Thus, in the preceding period around

36% of that shock will be corrected to ensure the variable return to their respective long run relationship. Therefore, the error correction term for Eswatini conforms with econometric expectations.

Eswatini is the smallest nation in the study's SSA sample, and over period of 1997 - 2017 experienced an average annual growth rate change of 3.03%. Moreover, a one-percentage-point increase in the corporate tax level resulted in a -2.43% fall in GDP growth on average, ceteris paribus. Important to note that the coefficients are not actual tax rates, as the data is presented as percentages of GDP and percentages of total revenue. Finding the optimal level for taxation as a percentage of GDP is obtained through application of calculus to the estimated regression. The findings suggest that corporate taxes in Swaziland are not set at a level which is encouraging local and foreign business and that the structure is hindering growth. Accordingly, the optimal rates for the individual tax sampled were found to be PAYE (5.04%), CIT (5.24%) and Property Taxes (0.04%). The measure of trade taxes in Eswatini contained missing data, therefore the optimal rate of 17.00% is misleading and should not be taken into consideration when analysing the optimal levels of the various tax heads. Additionally, it was found that the overall optimal level at which taxes would significantly impact growth was found to be 24.28% of GDP. The ARDL analysed the entire period of 1997 - 2017 and found that irrespective of improved growth levels from 2014 – 2017 and a lower CIT rate, the overall relationship was negative and significant toward growth.

Gross fixed capital formation was found to have a negative and significant relationship with growth, it must be noted that this measure includes both private and public sector GFCF. This relationship goes against Keynesian economics which states that spending at the state level will inevitably lead to an improvement in growth, due to the Keynesian multiplier. Swaziland experienced a 0.44-percentage point fall in GDP over the period due to unproductive investments. Gross fixed capital formation in the form of government and private lead investments, were unsuccessful in overcoming the initial investment costs and did not result in sufficient returns which positively impacted growth.

Additionally, Trade Openness was found to be significant and negative for growth, by 2.39-percentage points. Chapter 4 highlighted that Eswatini is a net importer whereby local production is dominated predominantly by neighboring South Africa. Thus, the ARDL results highlight that trade is the largest constraining factor for growth. Figure 3 revealed the upward trajectory of trade openness (as a percentage of GDP) from 33.47% in 1997 to 53.68% in 2017, and the subsequent growth rate in 1997 was 3.10%, declining to 2.03% in 2017.

Cameroon Analysis

The error correction term for Cameroon conforms with econometric practice by having a negative coefficient, however it is not significant at the 5% level. This suggests that there is no long run relationship between taxes and growth. However, the ARDL models revealed that Cameroon's growth rate was negatively impacted by CIT. This measure showed that a one-percentage-point increase in CIT resulted in a 3.45-percentage point fall in GDP over the period. Additionally, trade openness and resource rents influenced the growth output significantly. The optimal rates for the individual taxes were PAYE (1.02%), CIT (2.52%) and Property Taxes (0.34%), while it was found that the overall optimal level at which taxes would significantly impact growth was 12.34% of GDP. Therefore, suggesting that VAT and other taxes not included in this regression are likely to have had a considerable impact on the share of tax revenue to GDP, as the three variables tested account for just over a quarter of the proposed optimal level of total tax revenue percentage.

Chapter 4 noted that there was a reduction in the country's CIT rate from 38.4% in 2013 to 33% in 2014. The 5.5% reduction was felt with a one year as suggested by the ARDL modelling and could therefore

explain the negative coefficient which CIT revealed. Therefore, the negative relationship could have been exacerbated by the structural break which caused a shock in the CIT's share of tax revenue. The CIT tax rate reduction goes against findings by Hodge and Hickman (2018) who highlighted that corporate taxes were predominately negative for growth. The reduction with a one-year lagged regression still revealed an overall negative relationship with growth, revealing that unlike in Eswatini where a CIT reduction led to an improvement in growth, Cameroon with a lowered CIT rate experienced lower growth levels following this policy adjustment.

Natural resource rents are of particular significance as the country is an oil producer. This measure revealed a -0.51-percentage point fall in GDP over the period was caused by an inability to maximise the benefits or resource rents, likely at the cost of wealthier nations with stronger currencies. Moreover, the ARDL results showed a positive and statistically significant relationship between trade openness and growth. Accordingly, it was found that trade openness had a 0.22-percentage point positive influence on growth over the period, suggesting that periods of increased growth are largely due to Cameroon's experience as a strong exporting nation.

Mauritius Analysis

Mauritius revealed an error correction term (ECM) which was significant at the 5% level with a negative sign, suggesting that there is convergence in the long run. Therefore, similarly to Eswatini, the ECM states that if the relationship between tax and growth is disturbed in the short run, in the period prior around 69% of that shock will be corrected to ensure the variable returns to its respective long run relationship. However, unlike Eswatini which revealed a significant fiscal variable which impacted growth, this is not so for Mauritius. Therefore, the error correction term for Mauritius does conform with econometric expectations, however it cannot be concluded that any specific tax head substantially influenced growth levels over the period. Irrespective of the level of significance, the optimal rates for the specific taxes sampled were found to be PAYE (3.59%), CIT (2.77%), Property Taxes (0.04%) and Trade Taxes (0.70%). Further, the overall optimal level at which taxes would significantly impact growth was found to be 15.69% of GDP.

Mauritius is a case example of a SSA country which is heavily involved in a wide array of international trade, whereby the combined value of their imports and exports exceeds their entire GDP (as shown by a trade openness value greater than 100). According to Woldekidan (1992), in the early 1970s more emphasis was given to an export-led strategy in the country. An export processing zone was developed, focusing on the creation of goods for export. The 'Export Processing Zone' was used as a theoretical concept as opposed to being created as a geographical area. Woldekidan (1992) stated this proved hugely innovative at the time, resulting in Mauritius having a trade openness percentage above 100% until 2016 where this dropped to 97%. Therefore, it is apparent that growth is dominated by export-led measures as opposed to the fiscal policies having a substantial influence in relation to international trade.

Rwanda Analysis

The ARDL test revealed that the error correction term is significant at the 5% level with a negative sign (-1.45) highlighting that there is convergence in the long run. Rwanda therefore follows the same trend as Eswatini and Mauritius with regards to a long run adjustment toward equilibrium. However, unlike these

nations, Rwanda revealed a ECT greater than 1. In essence, the ECT gives a magnitude of speed with which the cointegrating variables return to the long-run traverse following any short-run distortion. Therein, the value at the outset should be negative, indicative that the divergence is reducing. As seen previously, if the value is equal to -1, the error correction takes place in one period only, while a value of less than -1 would indicate that it takes a fair amount of time to correct the divergence between the variables.

The ARDL test revealed that trade taxes were hugely significant, however this figure is misleading as almost all property taxes in Rwanda were on average 0.00% of GDP. Therefore, this figure is not an accurate reflection of the data, instead is a regression error. Moreover, the derivative for the optimal level of property taxes in Rwanda is 0.01%, highlighting that this form of taxation does not contribute significantly to total tax revenue and therefore should not be placed above a level of 0.01%. Although CIT and PAYE are significantly impacting growth, these taxes were shown to have a more influential influence of total revenue with their respective optimal levels of CIT (1.81%) and PAYE (1.95%).

Trade openness was found to a have a negative and significant impact of growth, by 0.59-percentage points. Additionally, the ARDL test revealed non-fiscal variables of GFKF and FDI were found to be significantly influencing growth. FDI was found to impact growth negatively by 0.59-percentage points, this is indicative of a developing nation with a considerably high growth rate, as shown in 2002 (12.61%). Yet, one year later in 2003, the growth fell almost 10% to 2.21%. This highlights the extreme volatility in Rwanda's growth rate and could suggest that this, coupled with political uncertainty, leads to foreign investment pulling funds when instability arises, whilst pouring investments in when the economy's growth rate, interest rates and fiscal climate are more stable and attractive to foreign capital.

Furthermore, GFKF had a positive and statistically significant relationship with growth, which is in line with most of the literature on state-level investment and its link with economic growth. GFKF influenced growth by 0.74-percentage points over the period.

Senegal Analysis

Senegal revealed a negative and significant error correction term of -0.73, highlighting that taxes and economic growth hold a long run relationship. Senegal therefore conforms with the expectations that there is long run convergence between growth and taxes. Further, it can be said that the speed of adjustment is 73% from one period following a disturbance in the tax rate. Moreover, the ARDL test found none of the fiscal variables were significantly influencing growth indicating that tax revenue in Senegal is either operating sub-optimally or suggesting non-fiscal variables play a larger role in GDP growth. Accordingly, the optimal levels were calculated as, 2.00% for PAYE, 1.08% for CIT, 0.19% for property taxes and 3.42% for trade taxes.

The global financial crisis led to a drop in the GDP growth rate from 4.06% in 2008 to 2.09% in 2009. In addition, trade fell from 62.04% in 2008 to 51.64% in 2009, while the ARDL test revealed over the period 1997 - 2017, trade openness held a negative relationship with GDP. The results showed that trade openness had a significant negative impact on growth, showing a 0.32-percentage point reduction in GDP. This measure suggests that Senegal is a net importer, whereby the exports are unable to outweigh imports into the country. This is in line with the findings by OEC (2019) in Chapter 4 which highlighted the prominence of Senegal mineral exports, yet the country's terms of trade are negatively impacted by the dependence of oil imports.

This measure suggests that Senegal is a net importer, whereby the exports are unable to outweigh imports into the country. Following a very similar trend to Rwanda, Senegal is a considerable importing and exporting nation of refined petroleum. According to OEC (2019) the country's largest exports include

Gold, Refined Petroleum, Phosphoric Acid and Non-fillet Frozen Fish. While the country's largest imports are dominated by Refined Petroleum and Crude Petroleum. It can be argued that this is due to the resource curse phenomenon, as Senegal is unable to compete with its more developed oil-producing partners. OEC (2019) highlights that Senegal's largest importing partners are China, France, and Russia, with the largest import being refined petroleum. Trading agreements in place would suggest that Senegal is unable to solely produce and utilise its own oil. However, OEC (2019) shows that the terms of trade of this vital factor of production are not favorable for Senegal, as exports of oil are predominately to African countries, with developed countries holding a very small percentage of exports. Therefore, the weakening of the local currency further constrains, as a direct result of trade.

GFCF was found to be significant and positively impacting growth, suggesting that state-level spending was growth-enhancing. The ARDL test stated that a one-percentage-point rise in the level of GFCF, resulted in a 0.77-percentage point rise in GDP. While a causal relationship has not been identified here, it can be concluded that investment is an important factor in explaining the growth pattern of the Senegalese economy.

South Africa Analysis

The ARDL test revealed that the error correction term is significant at the 5% level with a negative sign (-1.41) highlighting that there is convergence in the long run. South Africa therefore followed the same trend as Rwanda by having an ECT greater than -1. Similarly, in South Africa's case a value greater than -1 shows that the underlying series are explosive, given the coefficient has a value of -1.41%, the overcorrection is therefore 0.41%.

South Africa is the largest economy is the study's sample and the second largest economy in Africa. The ARDL revealed that various tax heads were significantly influencing growth, namely PAYE and Property Taxes. PAYE was found to have a negative impact (-2.17%), while Trade Taxes showed a -4.19% impact. Accordingly, PAYE was found to have a -2.17-percentage impact on growth over the period, or a one-percentage-point rise in the level of PAYE lead to a -2.17-percentage point drop in GDP. The optimal level of PAYE was calculated at 8.51% of total tax revenue, which shows the extent to which the South African economy is reliant on personal income taxes for growth purposes. Yet, the ARDL coefficient revealed a negative impact over the period studied, suggesting that inefficient revenue collection, mismanagement as well as improper tax bracket structuring has acted more as a disincentive for the taxpayer, than as a catalyst for economic growth.

In addition to PAYE, the ARDL test found that property taxes were found to have a negative and significant impact on growth over the period. The ARDL results found that one-percentage-point rise in the level of property taxes resulted in a 4.19 drop in GDP. Similar to the structure of PAYE, property tax is levied at varying rates, depending on the value of the property. Transfer duties range from 0%, properties with a value under 1 million South African Rand, to 13% for properties valued at 11 million South African Rand and above. Therefore, the ARDL results suggest that from 1997 - 2017, the transfer duty structuring in South Africa was not optimal. These suboptimal or above optimal levels could have caused an inverse affect in the housing market, discouraging new potential homeowners away from owning property, which may have driven down housing prices and further negatively impacted growth.

The ARDL test further revealed that non fiscal variables; Trade Openness and GFCF significantly impacted growth. Trade openness positively impacted growth by 0.33-percentage points. In a similar scenario to trade openness, GFCF exhibited a positive and significant impact on growth, showing that a one-percentage-point rise in the level of GFCF caused a 0.61-percentage point rise in GDP growth.

Yet Natural Resource Rents were found to be significantly negative toward growth. This measure showed that a one-percentage-point rise in the level of Natural Resource Rents resulted in a 0.70-percentage point reduction in GDP. Suggesting that the natural resource curse is prevalent is South Africa, given that the country's major exports are mineral resources, and its two largest trading partners are China and the UK (OEC, 2019). While the ARDL found that trade openness was positively impacting growth, the South African Rand is an extremely volatile currency and considerably weaker to that of its major exporting partners. Therefore, mineral resources which are extracted in South Africa are subject to extreme volatility in commodity prices and variations in exchange rates. This is not an uncommon issue is SSA, however the size of the South African economy alongside a natural resource dominated exporting sector has the potential to leave local growth subject to resource exploitation as the country's currency weakens relative to the developed world.

Uganda Analysis

The ARDL test found that of the variables used, both fiscal and non-fiscal were insignificant in impacting economic growth in Uganda. Therefore, it can be argued that economic growth is influenced largely by other factors, those of which were not tested in this study. However, the study was able to estimate the optimal levels for each of the fiscal measures. Therefore, for these tax variables to be at the growth enhancing level, percentages should not be lower than those derived in Table 14. Yet the complexity of the results reveals inconclusive evidence to suggest that fiscal measures will lead to a significant impact on growth. However, Table 14 showed that Uganda does have a negative ECT of -0.541 and a p-value of 0.004. This reveals that while the tax samples tested do not have a significant impact on growth, there is still a long run relationship found between taxes and economic growth in Uganda. Similar to the relationship of Eswatini, in the preceding period, around 54% of an economic shock will be corrected to ensure the variable return of its respective long run relationship. Therefore, the error correction term follows the same outcome by conforming with econometric expectations, however the main difference is that there are no variables (fiscal and non-fiscal) which conclusively impacted growth over the period.

5.8 Conclusion

This chapter revealed the results and highlighted various interpretations, the initial stages consisted of simple descriptive statistics, which set out a useful metric known as a pairwise correlation to provide the reader with an overview of possible pre-existing relationships. This correlation highlighted the relevant sign of the relationship, i.e., positive or negative amongst the various variables used. Stationarity tests were conducted in order to establish if the variables had unit roots at levels, first or second difference. The reader is then lead into a series of complementing tests, the first being the general least squares test. the GLS regression was run to evaluate the relationship of overall tax revenue in relation to growth. The generalized least squares test was performed to assess the robustness of the data, in part particular the time effects of a variable over time. This model found an anti-Laffer relationship - this is true as the squared value of tax revenue in Table 7 was not negative. The squared term of tax revenue must have a negative sign for an inverted U-shape to occur, following the basic Laffer Curve principle. The crux of this chapter was the ARDL modelling, The ARDL Pooled Mean Group Regression (PMG) as displayed in the table above, showed both the long and short coefficients. This model allowed this study to further investigate individual tax measures by using those which were found to be statistically significant in the long run equation and running individual country-specific ARDL regressions in relation to growth. Corporate taxes exhibited a positive coefficient in the long run suggestive that there is positive relationship with growth, however the coefficient is not significant at the 5% level. Moreover, in the short run, it was found that corporate taxes

held a negative relationship with growth, in line with expectations, however the coefficient is insignificant. Therefore, there is no conclusive evidence to suggest that there is a definitive impact of corporate taxes on growth. The only fiscal variables which were found to be significant were, PAYE and Property taxes. In the long run, PAYE impacted growth by -0.84-percentage points (this coefficient was significant at the 5% level). Whereas, in the short run PAYE exhibited a positive effect on growth, however the short run coefficient was not significant at the 5% level.

Model 2 highlighted a positive impact on tax revenues on growth, as depicted by the positive coefficient, while the squared term of tax revenue has a negative coefficient demonstrating a diminishing effect over time. Therefore, both tax revenue and the squared term together exhibited an inverted U-shaped relationship, in line with the predications by Laffer (2004).

Table 11 introduced the individual tax heads into the ARDL model, to derive the optimal level of taxation for each measure. As shown in Table 9 (tax revenue squared table) the optimal level is derived to reveal the percentage of GDP in which each tax variable is most optimal for GDP growth. The squared term was included to derive the optimal level percentage as well as to be able to comment of the Laffer relationship each variable exhibits. Therein, Mauritius is the only nation which showed anti-Laffer relationship in relation to PAYE, whilst all countries were found to present an anti-Laffer relationship between corporate taxes and economic growth. Therefore, the average shape of the corporate tax variable does not follow an inverted U-shape. Furthermore, Rwanda and Uganda revealed anti-Laffer distribution in relation to property taxes, while Cameroon, Rwanda and Senegal showcase an anti-Laffer relationship with trade taxes.

CHAPTER 6:

CONCLUSION AND POLICY RECOMMENDATIONS

6.1 Introduction

This chapter gives an overview of key findings and provides policy recommendations in response to the results outlined in Chapter 4. The policy section (section 6.3) will initially provide policy suggestions in an SSA context, broadly focusing on total tax revenue in the region. Thereafter, the policies suggested will be outlined at a country-specific level, focusing on the individual tax policies in the respective countries. The key focus is on how these country-specific measures could be used to bolster domestic economic growth.

6.2 Key Findings

This study investigated the relationship between individual types of taxation as well as at the level of total tax collection and economic growth in several SSA countries. The goal was to assess whether the level of the respective taxes played a significant role in enhancing/reducing economic growth. The expectation was that there would be a significant positive relationship between total tax revenue and economic growth. This relationship was anticipated because the vast majority of the literature revealed a positive sign. For example, Helm (1985) noted that the relationship was found to be positive but warned that the tax system needed to focus more on taxes which support investment and economic expansion, such as advancements in public services as opposed to taxes geared toward social welfare. Similarly, Takumah and Iyke (2015) found evidence of a unidirectional causal relationship between taxes and economic growth in Ghana. Mcnabb (2018) found that decreases in trade taxes, along with hikes in domestic consumption taxes as a proportion of GDP were growth-enhancing, Crucially, Mcnabb (2018) found that this trend appeared most prevalent in developing, middle-income countries, but was not found for low-income developing nations. Moreover, Mcnabb (2018) finds that "revenue neutral shifts away consumption and property taxes, towards income taxes, are categorized by lower GDP growth in the long-run" (Mcnabb, 2018: 199). Additionally, Mcnabb (2018) argues that personal income taxes and social welfare taxes are found to be the most detrimental components of taxation in long-run growth.

In Chapter 4 it was found that total tax revenue held a positive and significant relationship with economic growth at the SSA level. The Laffer relationship was a key underpinning of all tests and was used as theoretical guide, Model 2, highlighted a positive impact of tax revenues on growth, whilst the squared term of tax revenue had a negative coefficient demonstrating a diminishing effect over time. Therefore, the squared term together exhibited an inverted U-shaped relationship, which is in line with the predications by Laffer (2004). Alongside this, it was found that PAYE and property taxes had a negative influence on growth, with no other fiscal variables significantly influencing growth in the long run.

FDI and resource rents were non-fiscal measures in the model which revealed a significantly negative long run relationship at the SSA level, whilst GFCF exhibited a significant positive long run relationship with growth. Moreover, at the individual level, total tax as well as individual taxes were found to have no impact on growth in the short run. The only variable which had a short run influence on growth was FDI, which impacted growth positively.

The analysis at the individual country level revealed that Swaziland, Cameroon and South Africa all had negative and significant relationships between total tax and growth. However, once these variables were squared across all countries, Cameroon and South Africa exhibited a positive and significant relationship between total tax and growth. Rwanda showed a negative and significant relationship for total tax in the initial and squared results.

Analysing the data using a panel ARDL approach showed the impact of individual types of taxes in the respective countries is mixed, highlighting the importance of the tax mix in the structuring of a tax system which supports local and regional growth. It was found that PAYE significantly influences growth only in South Africa, where the relationship was found to be negative. Corporate tax revealed a similar significant negative relationship in Swaziland and Cameroon. Property taxes have a significant and negative relationship in South Africa, yet in Rwanda they positively influence growth. However, the Rwandan result may be spurious due to the large amount of missing data for this tax measure. In terms of trade taxes, no countries exhibited a significant relationship with economic growth.

At the country level, trade openness was found to positively impact growth in South Africa and Cameroon. The literature is mixed around economic growth and trade openness; however, it is noted that this finding is in line with economic theory regarding strong exporting nations. But Swaziland, Mauritius, Rwanda and Senegal revealed a negative relationship, implying that their trade openness measure was dominated by imports. Foreign direct investment did not positively impact growth in any of the countries in the study, while Rwanda showed a negative and significant. FDI was expected to hold a significant relationship, particularly in South Africa. GFCF was found to have a positive influence on growth in Rwanda, Senegal and South Africa, while Swaziland was the only country to reveal a negative and significant GFCF coefficient. GFCF was used as a proxy for investment in this study. Although the relationship between GFCF and growth was not significant for all countries, it can nonetheless be said that the investment in the SSA region is a positive influencer on growth. Therefore, it can be argued there is space in policy setting to encourage greater investment in the region.

The final non-fiscal variable used of natural resource rents attempted to understand the impact of mineral wealth on growth in the SSA region. It was expected that at least one country (South Africa) would exhibit a positive relationship between natural resource rents and economic growth. However, no countries were found to have held a positive and significant relationship with growth. In fact, the relationship for Cameroon and South Africa was found to be negative, suggesting that being a resource rich nation in SSA is not beneficial for growth. These findings suggest the resource curse may still be present in some SSA countries.

At the country level, the individual tax measures used in this study revealed at the country level, the individual tax measures used in this study sometimes revealed a negative relationship to growth, contradicting the positive relationship between total tax and growth found at the regional level. This suggests that the tax mix is crucial at the country-specific level if tax policies are to be growth-enhancing. However, whilst the relationship for total tax was uniform at the regional level, the contradictory results at the country level suggest that a 'one-sized fits all' approach to tax collection cannot be implemented in the SSA region.

The optimality determination equation was implemented across both the total tax ARDL test and the individual tax head test. While the equation did not give exact marginal rates for the various types of taxes, it uses the premise of the Laffer Theory by analysing the tax level, shown by percentage of total tax revenue for the individual tax components model and as a percentage of GDP for the total tax revenue model. The optimal level analysis found that the level of taxes is crucial for growth as various countries showed significant relationships between total tax revenue and growth. These countries included Eswatini,

Cameroon, Rwanda, and South Africa, which exhibited optimal levels of tax as a percentage of GDP of 24.28% (Eswatini), 12.34% (Cameroon), 13.14% (Rwanda) and 26.89% (South Africa). At the individual tax component level, the error correction analysis found that Swaziland, Mauritius, Rwanda, Senegal, South Africa and Uganda have long run relationships between CIT, PAYE, Property taxes and Trade taxes in relation to economic growth. As mentioned, corporate tax was found to negatively impact growth in both Swaziland and Cameroon, the optimal levels for corporate tax (as a percentage of total tax revenue) were 5.24% (Swaziland) and 2.52% (Cameroon).

These finding suggest various policy reforms and changes to the structure of tax collection and the level of individual tax measures that would positively influence the impact which taxes have on economic growth in SSA.

6.3 Recommendations

6.3.1 Optimum Tariff Targeting

This study found that trade openness negatively impacted growth in Eswatini, Mauritius, Rwanda, and Senegal. Similar to the optimal percentage level of individual tax heads outlined in chapter 4, the optimum tariff is the rate which maximizes the net benefit resulting from the improvement in a country's terms of trade (Salvatore, 2014: 242). Eswatini, Mauritius, Rwanda and Senegal all hold different terms of trade and have a variety of trading partners, predominantly from the developed world. The results of this study suggest that these nations should target the optimum tariff rates across all major exports and imports. Restructuring trade taxes with a focus on the optimal tariff rate for these countries should be conducted within a SSA trading bloc agreement. This should be done to expand regional trade strength and minimise reliance on foreign markets.

6.3.2 Increasing Gross Fixed Capital Formation (Investment)

While this variable is a non-fiscal measure, the results of the study suggest that a positive relationship exists between investment and growth in several SSA countries, namely, Rwanda, Senegal, and South Africa. Increased investment will lead to continued improvements in housing and commercial infrastructure, as well as procurement of innovative technology which results in higher growth. The literature highlighted that much of the SSA region's growth is predominantly consumption-lead growth. By increasing investment, consumption is indirectly influenced by means of job creation, increased skills development and improvements in disposable income.

The results suggest that fiscal policy should promote the expansion of net investment for the region rather than solely relying on consumption. The results show that increasing capital gains taxes, corporate taxes, and property taxes within one year of GFCF positively impacting on growth, would stifle these gains and discourage growth in the subsequent period.

6.3.3 Improving Property Tax Legislation

Most of the countries in the study did not have consistent and complete data on property taxes, suggesting these taxes are underutilized. This is largely due to poor legislation around property rights and the tax implications for property owners. Improvements are necessary as property taxes are an effective wealth tax, which if designed correctly, can appropriately tax wealth accumulation, without discouraging property owners.

It is often argued that this form of taxation would leave regions such as SSA grappling with the complexity of implementation. Yet there are forms of property taxes in some of the countries studied, although their contribution to the fiscus is negligible. Property taxes were the second highest variable in the standardized coefficients test, suggesting that this variable, although negative toward growth, should be targeted to increase its contribution to the fiscus.

Most crucial to improving the effectiveness of property taxes in SSA is simplifying valuation methods. By rationalising and streamlining the number and variety of rates across property types and geographic areas the tax base and means of collection can be strengthened, clarified and made more consistent across local areas. Basing the tax on the land value or improved site value (including buildings), could prove beneficial for ease of collection. Providing for the powers to collect or withhold the tax from occupiers as opposed to the owners solely, may also strengthen administration (Granger, 2019).

Two key methods should be highlighted for valuation purposes. The first method is the Discrete Valuation Method, whereby trained valuation professionals are tasked with making site inspections and using market data to arrive at fair valuation. While this is often the most popular and widely accepted method, the drawbacks are that the valuation is expensive and relies on a well-established property market with accompanying institutions of ownership (Granger, 2019). Alternatively, the Computer Aided Mass Appraisal System (CAMA) is a newly developed software system which uses a variety of adjustment factors (i.e., location, ethnicity, income, access to amenities) to calculate an estimate value for each property. The valuations are ever-changing and vary as the factors which influence the outputs are updated. However, the CAMA method relies extensively on town planning and market data, which increases complexity when dealing with poorly documented and less formal areas.

A regional approach to property valuation in the SSA region which aims to simply register households and commercial properties will reduce the risk that property owners move their establishments to neighboring SSA countries as all countries will be engaged in a unified registration process. This policy will also look to improve tax efficiency in the property tax space in SSA, which indirectly could improve growth as property taxes were shown to be an extremely underutilised tax measure.

6.3.4 Simplify Tax Collection Through Smartphone Application Use

Direct taxes in the form of PAYE and Corporate taxes were found to negatively impact growth when analysing the SSA in a consolidated ARDL model. Tax rates and the negative impact on growth could be reduced, however, if the tax base is expanded using smartphone technology. According to a report by GSMA (2020), the SSA region by the year 2025 will contain 475 million smartphone users. Essentially, if tax collection is more efficient rates could fall and any negative externalities could be reduced. Simplicity and tax base expansion can be achieved through a regionally designed smartphone application, in which direct taxes such as PAYE and Corporate taxes can be filed, queried, and paid over to the respective tax authority through an application which can be accessed on a smart device. The South African Revenue Service (SARS) launched such an e-filing application in 2012 that is extremely user-friendly and is available for free download across all major app stores. More efficient tax collection paved the way for lower tax rates than can enhance economic growth.

6.3.5 Expanding the Use of Consumption Taxes

The OECD 2010 Report on Growth-Orientated Fiscal Policies, states that an increase in tax revenue is likely to occur as a result of a gradual shift toward consumption taxes. Consumption-based taxes do not

disincentivize savings and investment. Due to an inconsistent dataset regarding consumption taxes, the ARDL model was unable to test the impact of consumption taxes on growth in SSA. Policy recommendations are nonetheless necessary as consumption taxes have the largest reach in terms of tax base and are often the least discriminatory. Indirect taxation is a highly effective way of capturing lower income households who do not contribute significantly through Personal Income Taxes.

Although consumption taxes were not tested in the ARDL analysis, the correlation matrix found that VAT in the SSA sample had a negative correlation with growth. Therefore, a possible long-run solution would be to impose specific VAT exemptions on a regional basis. In creating a regional consensus on zero-rated goods, the regressive nature of VAT will begin to decline. This will indirectly improve the negative impact on poorer, more vulnerable households.

Crucially, changes to consumption taxes need to be permanent and long-run focused, as opposed to short-run shock responses. This is to ensure that consumption does not decline or shift in a manner which is negative toward growth. Empirical findings by Steindel (2001) highlighted that consumption patterns would not vary until tax changes impacted take–home pay. Therefore, in line with the work of Steindel (2001), consumer expenditure in SSA will respond more to a permanent change than to a temporary change. Thus, a consensus on VAT-exempt goods and possible VAT harmonisation within the SSA region has the potential to raise disposable income, which would enable consumption to drive a portion of growth for SSA countries.

A possible solution would be legislating a VAT threshold range within which countries in SSA are able to set VAT rates.

6.3.6 Maintain Countercyclical Fiscal Policy

Fiscal policy can be used as an effective response mechanism in which to stabilise growth, smooth the business cycle and return an economy to equilibrium. Countercyclical fiscal policy should rely on "automatic stabilizers," that is, on spending and revenue that adjusts to the ups and downs of the economic cycle. This policy response is applicable to all countries in this study. While countercyclical; fiscal policy is more prevalent in South Africa, maintaining a counter-cyclical approach to fiscal policy allows countries not to become overly reliant on monetary policy when dealing with economic shocks. Furthermore, using tax measures could prove more effective, as indirect taxes in a SSA context have the potential to impact on segments of society which are unreachable through monetary policy.

6.3.7 Establish a Region-Wide Tax Incentive System

This study found the impact of taxation on growth in the SSA region was largely significant, although the SSA ARDL test revealed the total tax impact to be positive as opposed to a negative relationship. As such, the impact of taxation on the region had proven beneficial for growth over the period studied. Maintaining this positive impact can be achieved through policies which indirectly encourage growth, such as tax incentives which positively impact on factors such as investment, taxpayer behavior, public participation and the Small to Medium Enterprise (SME) sector. Tax incentives can be useful if they offset some form of market failure, most notably those involving externalities (economic impacts which are beyond the specific beneficiary of the tax incentive). For example, tax incentives targeted to promote high-technology industries that aim to promote significant positive externalities on the rest of the economy are usually legitimate.

The most effective policy in support of granting targeted incentives is by meeting the regional development needs of the SSA countries studies. The regional ARDL test highlighted that FDI had an

overall negative impact on the region. In addition, the country specific ARDL test revealed that corporate income tax was negative for growth in all countries, apart from Rwanda and Senegal level. These findings highlight the need for regional incentives to ensure the impact of FDI and corporate taxes on growth turn positive. According to Tanzi and Zee (2001), offering tax incentives in the form of 'accelerated depreciation' is the most effective mechanism of encouraging investment in a developing country context and has fewer shortcomings than the tax holiday approach, commonly used by the developed world. A core advantage of the accelerated depreciation system is that the approach allows SME's and larger firms to receive a higher deduction immediately. Through receiving a higher depreciation rate faster than simple straight-line depreciation, the businesses can reduce their current tax bill. This will improve cash flows of smaller businesses. Crucially, if the acceleration is made available only as temporary measure, this could induce a significant short-run surge in investment, which leads immediately to more rapid regional and country-specific growth rates.

6.4 Conclusion

The thesis found that the total tax revenue does have a significant influence on economic growth when analysing at the SSA level and looking exclusively at total tax. Whereas at the individual tax level the relationship differed, this brought to light what the literature noted as the importance of both the tax mix and tax rate structuring of various tax systems. Conclusively, it can be said that tax does in fact share a significant influence on growth in SSA region. Therefore, when dealing with this relationship, the level of taxes does matter for growth as shown by the optimality equations. Therefore, policymakers will need to factor in the level, mix and structure when creating policies that are aimed at being growth-enhancing at either the regional or country level.

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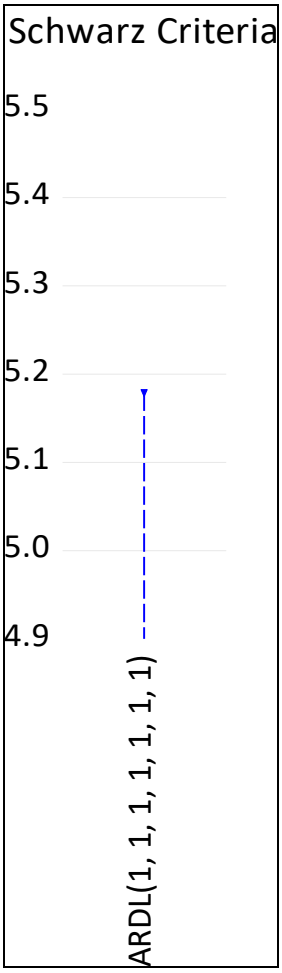
Appendix A

Table 1: Schwarz Criteria Selection



Source: Eviews (Authors own calculations)

Table 3: Wald Test

Wald Test:
Equation: Untitled

Test Statistic	Value	Df	Probability
F-statistic	4.984914	(2, 85)	0.0090
Chi-square	9.969828	2	0.0068

Null Hypothesis: C(1)=C(2)=0
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.

C(1)	1.076708	0.341047
C(2)	-0.027519	0.008996

Restrictions are linear in coefficients.

Source: Eviews (Authors own calculations)

Appendix B

Unit Roots

Panel unit root test: Summary
Series: GDP
Date: 06/01/21 Time: 16:06
Sample: 1997 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 2
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	-6.24481	0.0000	7	138
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-5.25068	0.0000	7	138
ADF - Fisher Chi-square	52.9083	0.0000	7	138
PP - Fisher Chi-square	71.1186	0.0000	7	140

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: LNGDP
Date: 06/01/21 Time: 16:11
Sample: 1997 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	-7.94040	0.0000	7	137
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-7.13246	0.0000	7	137
ADF - Fisher Chi-square	72.0353	0.0000	7	137
PP - Fisher Chi-square	98.3895	0.0000	7	138

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: FDI
Date: 06/01/21 Time: 16:08

Sample: 1997 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	-3.42158	0.0003	7	137
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-3.88698	0.0001	7	137
ADF - Fisher Chi-square	43.3493	0.0001	7	137
PP - Fisher Chi-square	51.9405	0.0000	7	140

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: CIT
Date: 06/01/21 Time: 16:09
Sample: 1997 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	-2.71909	0.0033	7	139
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.38063	0.0837	7	139
ADF - Fisher Chi-square	18.7296	0.1755	7	139
PP - Fisher Chi-square	17.3265	0.2392	7	140

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: D(CIT)
Date: 06/01/21 Time: 16:09
Sample: 1997 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	-11.4114	0.0000	7	133
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-9.55447	0.0000	7	133

ADF - Fisher Chi-square	95.4045	0.0000	7	133
PP - Fisher Chi-square	105.493	0.0000	7	133

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: D(CIT)
Date: 06/01/21 Time: 16:09
Sample: 1997 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	-11.4114	0.0000	7	133
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-9.55447	0.0000	7	133
ADF - Fisher Chi-square	95.4045	0.0000	7	133
PP - Fisher Chi-square	105.493	0.0000	7	133

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: GFKF
Date: 06/01/21 Time: 16:10
Sample: 1997 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	-1.20295	0.1145	7	140
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.27006	0.3936	7	140
ADF - Fisher Chi-square	13.5166	0.4863	7	140
PP - Fisher Chi-square	13.1533	0.5145	7	140

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: D(GFKF)
Date: 06/01/21 Time: 16:10
Sample: 1997 2017
Exogenous variables: Individual effects

Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 4
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	-8.73050	0.0000	7	128
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-8.98716	0.0000	7	128
ADF - Fisher Chi-square	92.0669	0.0000	7	128
PP - Fisher Chi-square	125.743	0.0000	7	133

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: OPENNESS
Date: 06/01/21 Time: 16:12
Sample: 1997 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 2
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	2.93637	0.9983	7	134
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	1.40533	0.9200	7	134
ADF - Fisher Chi-square	16.3593	0.2919	7	134
PP - Fisher Chi-square	11.3115	0.6614	7	140

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: D(OPENNESS)
Date: 06/01/21 Time: 16:12
Sample: 1997 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 4
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	-6.53580	0.0000	7	122
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-6.48146	0.0000	7	122
ADF - Fisher Chi-square	66.2107	0.0000	7	122

PP - Fisher Chi-square	90.9573	0.0000	7	133

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: PAYEGDP
Date: 06/01/21 Time: 16:13
Sample: 1997 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 2
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	-0.86109	0.1946	7	137
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	0.62023	0.7324	7	137
ADF - Fisher Chi-square	11.3941	0.6548	7	137
PP - Fisher Chi-square	4.80776	0.9883	7	140

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: D(PAYEGDP)
Date: 06/01/21 Time: 16:13
Sample: 1997 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 2
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	-4.32174	0.0000	7	128
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-4.83612	0.0000	7	128
ADF - Fisher Chi-square	53.3173	0.0000	7	128
PP - Fisher Chi-square	84.6555	0.0000	7	133

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: PROPTAX
Date: 06/01/21 Time: 16:13
Sample: 1997 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0
Newey-West automatic bandwidth selection and Bartlett kernel

Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	-3.41618	0.0003	7	140
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-3.24049	0.0006	7	140
ADF - Fisher Chi-square	33.9730	0.0021	7	140
PP - Fisher Chi-square	33.7214	0.0023	7	140

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: RENTS1
Date: 06/01/21 Time: 16:14
Sample: 1997 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 4
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	-2.91030	0.0018	7	136
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.51577	0.0648	7	136
ADF - Fisher Chi-square	21.1740	0.0973	7	136
PP - Fisher Chi-square	26.7563	0.0207	7	140

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: D(RENTS1)
Date: 06/01/21 Time: 16:14
Sample: 1997 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 3
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	-11.5402	0.0000	7	128
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-11.2966	0.0000	7	128
ADF - Fisher Chi-square	114.278	0.0000	7	128
PP - Fisher Chi-square	119.288	0.0000	7	133

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: REVGDP
Date: 06/01/21 Time: 16:15
Sample: 1997 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	-1.10244	0.1351	7	139
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.66164	0.2541	7	139
ADF - Fisher Chi-square	18.8829	0.1695	7	139
PP - Fisher Chi-square	18.4755	0.1860	7	140

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: D(REVGDP)
Date: 06/01/21 Time: 16:16
Sample: 1997 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 4
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	-12.5137	0.0000	7	128
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-11.0464	0.0000	7	128
ADF - Fisher Chi-square	113.826	0.0000	7	128
PP - Fisher Chi-square	114.685	0.0000	7	133

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: TAXREVGDP
Date: 06/01/21 Time: 16:17
Sample: 1997 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 4
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				

Levin, Lin and Chu t*	0.02798	0.5112	7	135
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	1.28948	0.9014	7	135
ADF - Fisher Chi-square	8.67371	0.8514	7	135
PP - Fisher Chi-square	12.0571	0.6017	7	140

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: D(TAXREVGDP)
Date: 06/01/21 Time: 16:17
Sample: 1997 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 4
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	-5.67380	0.0000	7	128
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-6.77646	0.0000	7	128
ADF - Fisher Chi-square	67.4069	0.0000	7	128
PP - Fisher Chi-square	79.4389	0.0000	7	133

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: TRADETAX
Date: 06/01/21 Time: 16:18
Sample: 1997 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	-6.80591	0.0000	7	139
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-7.68766	0.0000	7	139
ADF - Fisher Chi-square	82.6607	0.0000	7	139
PP - Fisher Chi-square	93.1404	0.0000	7	140

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: VAT
Date: 06/01/21 Time: 16:18

Sample: 1997 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 2
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	-1.56467	0.0588	7	96
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.71988	0.2358	6	93
ADF - Fisher Chi-square	15.3523	0.3545	7	96
PP - Fisher Chi-square	16.9022	0.2614	7	101

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: D(VAT)
Date: 06/01/21 Time: 16:19
Sample: 1997 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	-7.63577	0.0000	6	91
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-5.68023	0.0000	6	91
ADF - Fisher Chi-square	56.2049	0.0000	6	91
PP - Fisher Chi-square	56.6090	0.0000	6	92

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.