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The examination of the impact of taxation on sub-Saharan African upper middle income countries' gross domestic product

By

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DECLARATION FORM

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Ethical Clearance Number: 00023004

DEDICATION

I dedicate this study project to the tenacious countries of sub-Saharan Africa, whose economies have persevered through several hardships and changes. This study aimed to examine the impact of Taxation on upper middle income sub-Saharan African countries' gross domestic product. This research acknowledges the dynamic cultures, heterogeneous populations, and resolute spirit of advancement characterising these countries and aims to provide insightful information that could guide future policy choices. This dedication is a show of appreciation to the people, academics, and policymakers who diligently work towards sustainable development and are committed to forming a prosperous and just future for sub-Saharan Africa. I hope this study's conclusions will spur thoughtful debate and policy changes, promoting resilience and economic growth throughout the area.

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ABSTRACT

The study's primary objective is to examine taxation's impact on the GDP of sampled sub-Saharan African upper middle income countries, compare their taxation systems, identify challenges and opportunities and propose strategies for enhancing taxation's positive influence on economic performance. The various taxation variables also examined the impact on the Gross Domestic Product (GDP) of sub-Saharan African upper middle income countries, focusing on income tax, corporate tax, international trade tax, social contributions tax, and capital formation. Using secondary data from public sources such as the OECD/AUC/ATAF (2022) and employing a quantitative research methodology, the panel data regression analysis, the research design utilised in this study seeks to answer the following question, "How do different types of taxation (income tax, corporate tax, VAT, property tax, and social contributions) impact GDP growth rates across different countries or regions over time?". The dependent variable is the Gross Domestic Product (GDP) growth rate, and the predicting variables are income tax rate, value-added tax rate, corporate tax rate, property tax rate, trade tax rate, social contributions and excise tax rate. The model further employs four control variables: inflation rate, investment rate (Gross Fixed capital formation), trade openness, and labour force participation rate.

The findings reveal significant and varied relationships between taxation and GDP growth. Utilising legitimacy theory and development state theory as conceptual lenses, the study focused on understanding the current state of taxation, its impact on gross domestic product (GDP), and associated challenges and opportunities.

The study highlights that lagged GDP growth has a positive and significant effect, demonstrating growth persistence over time. While negatively correlated with GDP growth, income tax, corporate tax, and international trade tax are not statistically significant, suggesting other factors may mitigate their effects. Conversely, the social contributions tax positively influences GDP growth, underscoring the potential role of public reinvestment in driving economic activity. Inflation is found to have a positive and highly significant relationship with growth, indicating that moderate inflation may stimulate demand and investment.

On the other hand, the interaction between capital formation and labour participation significantly negatively affects growth, suggesting possible inefficiencies in capital or labour allocation when both factors increase simultaneously. These results indicate the need for a

nuanced approach to tax policy and economic growth strategies, particularly optimizing the balance between capital investment, labour participation, and taxation in sub-Saharan Africa. The study calls for future research to explore qualitative factors influencing capital formation, the optimal balance between consumption and investment, and the complex dynamics between labour and capital in the region.

Keywords: Sub-Saharan African, Gross Domestic Product; Upper middle income countries; Tax Revenue, Economic growth.

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AFTA- Africa Free Trade Agreement

AO- Accounting Officer

AU- African Union

CIT- Corporate Income Tax

IT- Income Tax Act

IMF- International Monetary Fund

LIC- Low Income Countries

PIT- Personal Income Tax

SARS: South African Revenue Services

SSA- sub-Saharan Africa

OECD: The Organisation of Economic Corporation Development

UKZN-University of KwaZulu Natal

CHAPTER 1: INTRODUCTION

1.1 Introduction

The study aimed to examine the impact of taxation on sub-Saharan African upper middle income countries' gross domestic product (GDP). Stiglingh (2003) states that taxation is a fundamental tool for governments in sub-Saharan African upper middle incomes to mobilise resources and redistribute income, which can substantially affect GDP growth.

In Sub-Saharan African upper middle income countries, taxes can be broadly classified into direct and indirect taxes (Levin, 2021). Direct taxes, such as corporate tax, individual income tax, property tax, and social contribution tax, are imposed directly on income, wealth, or profits. According to Naimot (2018), corporate and income taxes, being direct taxes, significantly influence investment decisions and individual disposable income, which in turn impact the gross domestic product (GDP). Bird and Zolt (2014) also emphasize that direct taxes are crucial in shaping business environments and government revenues.

On the other hand, indirect taxes are imposed on goods and services rather than income (Olatubosun, 2024). These include excise tax, value-added tax (VAT), goods and services tax (GST), and trade taxes. According to Olufemi et al. (2018), indirect taxes such as VAT and excise taxes affect consumer prices and demand, influencing economic activity and inflation. OECD/AUC/ATAF (2022) highlights that indirect taxes can raise significant government revenue without directly reducing individual income but may still affect consumption patterns and inflation.

This classification and the relationships between taxes and GDP are critical for government fiscal policy formulation and strategic economic planning (OECD, 2022). The findings and recommendations of this study can be valuable for government fiscal policy by providing insights into how adjustments in tax rates or the tax structure might influence economic growth (African Tax African Forum, 2022). Policymakers could use this analysis to design tax policies that promote sustainable development (IMF, 2020), while stakeholders in the financial sector might rely on this information to make investment decisions (World Bank, 2021).

Revenue tax is a broad term generally referring to taxes imposed on income or revenue generated by individuals, businesses, or other entities (Egbunike, 2018). The corporate tax is a direct tax applied against the profits of corporations or companies (African Tax Forum, 2021). Third, there is a capital gains tax. According to SARS (2023), capital gains tax (CGT) is a component of income tax rather than a distinct tax.

A capital gain arises when you dispose of an asset on or after 1 October 2001 for proceeds that exceed its base cost (SARS, 2020). Furthermore, an excise tax is levied on specific goods and services, often those deemed non-essential or harmful ((IMF, 2019). Income tax is a direct tax on an individual's or entity's income. It can be levied on salaries and wages, business profits, capital gains, and other earnings. Value-added tax is an indirect tax charged at the individual phase of the manufacturing and circulation chain. It is grounded on the cost addition to a product or service at the particular phase of manufacture and circulation (OECD., 2020). Trade tax is a local tax imposed on the income generated by businesses, often at the municipal or regional level (European Commission, 2021). It is separate from corporate income tax and is based on factors like revenue, earnings, or capital. Next, social contribution tax refers to taxes aimed at funding social security programs, and these taxes are often collected to finance social welfare initiatives, including pensions, healthcare, and unemployment benefits (World Bank, 2014).

According to the World Bank's (2021) classification, countries in upper middle income sub-Saharan African countries are those states in the sub-Saharan Africa region with a per capita gross national income ranging from $4,046 to $12,535. The upper middle income countries in sub-Sahara Africa as of 2021 include Botswana, Gabon, Mauritius, Namibia, and South Africa. These countries will then be the focus of this study.

Gross Domestic Product (GDP) is a key economic indicator measuring the total value of all goods and services produced within a country over a specific period, usually annually or quarterly (Timklay, 2021). In studying the impact of taxation on the GDP of upper middle income sub-Saharan African countries, GDP serves as a measure of economic activity and growth, which can be affected by changes in tax policies (World Development Indicators, 2022). Taxes influence disposable income, consumption, investment, and business behaviour, thus having a direct or indirect impact on sub-Saharan African middle-high countries' GDP. High taxation may reduce disposable income and dampen consumption and investment, whereas low taxation can stimulate economic activity. However, an optimal tax policy is

crucial, as sub-Saharan African countries' government revenues from taxes fund public services and infrastructure that drive economic growth (IMF, 2021).

There are several ways to assess how taxes affect a nation's GDP. One strategy is to look at the connection between tax revenue and an increase in GDP. This would entail looking at how much tax revenue has boosted GDP in upper middle income sub-Saharan African nations and how changes to tax laws have affected gross domestic product.

To study the impact of taxation on the GDP of upper middle income sub-Saharan African countries, a thorough analysis of theoretical frameworks and empirical studies is required, as there are vast amounts of research material (4). A rigorous quantitative research methodology that involves data collection, analysis, and policy recommendations is necessary for a comprehensive evaluation of the impact of taxation on GDP in upper middle income sub-Saharan African countries (Mbulaheni, 2022).

Examination refers to a detailed and systematic analysis or investigation of a particular subject or phenomenon (Cambridge Dictionary, 2023). In the context of this study, the examination would involve a thorough review and analysis of the tax policies and practices in upper middle income sub-Saharan African states and the impact of those policies on their GDP.

1.2 Background of the study

Revenue Statistics in Africa 2022 by the Organisation Economic Corporation and Development (2020) offers globally analogous information on tax and non-tax revenues that may be utilised to monitor national means mobilisation progress and guide tax policy analyses and reforms. International Monetary Fund (2021) calculations suggest that domestic taxes in the average Low Income Countries would have to represent 5 percentage points of GDP to raise the additional funds required.

Taxation plays a critical role in shaping the economic landscape of countries, as it directly influences government revenues, individual disposable income, business investment decisions, and overall economic activity. In upper middle income Sub-Saharan African countries, taxation systems have evolved as key instruments for not only raising government revenues but also promoting sustainable economic growth. However, the effects of taxation on economic growth, particularly in relation to the Gross Domestic Product (GDP), remain complex and

multifaceted. This study seeks to investigate the impact of taxation on GDP in selected upper middle income Sub-Saharan African countries—Botswana, Gabon, Mauritius, Namibia, and South Africa. These nations fall within the World Bank's classification of upper middle income countries, defined as those with a per capita gross national income (GNI) ranging from $4,046 to $12,535 (World Bank, 2021).

The research aims to address several key aspects of taxation and economic performance: To examine the impact of taxation on the GDP of upper middle income Sub-Saharan African countries. The core focus of this objective is to analyse how various taxes, including corporate income tax, excise tax, value-added tax (VAT), and capital gains tax, influence the GDP of these countries. GDP serves as a crucial measure of economic growth, and understanding its relationship with taxation provides insights into the fiscal policy decisions of these nations. To compare taxation systems and their effects on economic performance across the selected countries. Taxation systems differ across Sub-Saharan Africa, reflecting variations in tax rates, structures, and the balance between direct and indirect taxes. By comparing these systems, the study aims to highlight the nuances in how taxation affects economic performance in the context of different fiscal policies and economic conditions. To identify the challenges and opportunities related to taxation and propose strategies to enhance its positive impact on GDP. Sub-Saharan African countries often face challenges such as tax evasion, a narrow tax base, and administrative inefficiencies, which may limit the effectiveness of taxation policies. This objective seeks to uncover such challenges while also identifying opportunities for reforms that can maximize the positive impact of taxation on economic growth.

The study was guided by three central research questions. What is the state of taxation in the sampled upper middle income Sub-Saharan African countries, and how does it compare among these countries? This question seeks to understand the tax structures, rates, and revenue generation strategies in each country. Comparisons across these nations will provide insights into how their respective tax systems align with economic performance. How does taxation impact the GDP of the sampled upper middle income Sub-Saharan African countries? The relationship between taxation and GDP is critical for understanding economic growth. This question focuses on identifying how different forms of taxes, both direct and indirect, influence GDP in the context of the selected countries. What are the challenges and opportunities associated with taxation in the sampled upper middle income Sub-Saharan African countries,

and how can these be addressed to enhance the positive impact of taxation on GDP? This question aims to highlight the practical and policy-related challenges these countries face, such as inefficiencies in tax collection or tax evasion. In addition, the study seeks to uncover opportunities to strengthen tax policies and improve their contributions to economic growth.

Regarding the context and relevance of the study, upper-middle-income Sub-Saharan African countries face unique fiscal challenges. Developing economies with relatively higher income levels than their lower-income counterparts need to balance the goals of raising government revenues through taxes while ensuring that such taxes do not hinder economic growth. Taxes like corporate income tax and individual income tax influence investment decisions, disposable income, and business operations (Naimot, 2018). Additionally, indirect taxes such as VAT and excise taxes affect consumption patterns and inflation, further influencing overall economic activity (OECD/AUC/ATAF, 2022).

Understanding the impact of these taxes on GDP is critical for policymakers as they design tax policies aimed at promoting sustainable economic growth. By analyzing the interplay between taxation and GDP, this study will provide valuable insights for governments in Sub-Saharan Africa, enabling them to craft tax policies that optimize revenue collection while minimizing adverse effects on economic growth. Moreover, the findings could inform financial sector stakeholders, helping them make informed investment decisions based on the tax environment in each country (IMF, 2020).

In Sub-Saharan African upper-middle-income countries, taxes can be broadly classified into direct and indirect taxes (Levin, 2021). Direct taxes, such as corporate tax, individual income tax, property tax, and social contribution tax, are imposed directly on income, wealth, or profits. According to Naimot, (2018), corporate and income taxes, being direct taxes, significantly influence investment decisions and individual disposable income, which in turn impact the gross domestic product (GDP). Bird and Zolt (2014) also emphasize that direct taxes are crucial in shaping business environments and government revenues.

On the other hand, indirect taxes are imposed on goods and services rather than income (Olatubosun, 2024). These include excise tax, value-added tax (VAT), goods and services tax (GST), and trade taxes. According to Olufemi et al. (2018), indirect taxes such as VAT and excise taxes affect consumer prices and demand, influencing economic activity and inflation.

OECD/AUC/ATAF (2022) highlights that indirect taxes can raise significant government revenue without directly reducing individual income but may still affect consumption patterns and inflation. The value-added tax applies to the value added at every stage of production and distribution (Cnossen, 2010). It has been demonstrated that the VAT has a neutral or favourable impact on economic development and growth (IMF, 2019). VAT is a broad-based tax that is difficult to evade, and it encourages firms to keep accurate records and improve efficiency. Some studies have found that high VAT rates can be regressive and disproportionately affect low-income households.

1.3 Problem Statement

Sub-Saharan Africa's development economics experience is unsatisfactory (African Development Bank, 2021). A large amount of inter-country variety is also shown in the sub-Saharan African economic growth rates; some sub-Saharan African nations show moderate gains in gross domestic product, while others see notable losses of gross domestic product (Ajakaiye, 2019). In general, the GDP growth rates in sub-Saharan Africa during the two decades preceding the year 2000 are underwhelming (Berry, 2022). However, as stated in the World Economic Outlook Report (2014), Africa had unparalleled development between 1990 and the end of the commodity super cycle in 2014, making it the second fastest expanding area globally behind Asia. This economic growth was attributed to taxation's crucial role in generating government revenue. However, there is a lack of understanding regarding the impact of taxation on upper-middle-income countries' GDP, particularly in upper-middle-income sub-Saharan African countries. It is crucial to examine how taxes impact upper-middle-income sub-Saharan African countries' GDP, considering the distinctive economic, social, and political conditions that exist in these nations.

1.4 Objectives of the Study

1.4.1 The research Objective

1.4.1.1 To examine the impact of taxation on the sampled sub-Saharan African upper middle-income countries' GDP.

1.4.1.2 To compare taxation systems and their effects on economic performance across the selected countries.

1.4.1.3 To identify the challenges and opportunities related to taxation and propose strategies to enhance its positive impact on GDP.

1.5 Research Questions

The inquiries that the project focuses on are as follows:

1.5.1 What is the state of taxation in the sampled upper-middle-income sub-Saharan African countries, and how does it compare among these countries?

1.5.2 How does taxation impact the GDP of the sampled upper-middle-income sub-Saharan African countries?

1.5.3 What are the challenges and opportunities associated with taxation in the sampled upper-middle-income sub-Saharan African countries, and how can these be addressed to enhance the positive impact of taxation on GDP?

1.6 Study Hypotheses

This research aimed to examine the impact of taxation on the sampled sub-Saharan African upper middle-income countries' GDP. The study hypothesis suggests that taxation influences the gross domestic product of these countries, and this effect can be evaluated by studying the connection between tax revenues and GDP. The research question that this hypothesis addresses is whether taxation policies in the sampled upper-middle-income sub-Saharan African countries have a favourable or unfavourable effect on their GDP. This question is important because tax policies shape how resources are distributed within an economy and can impact the motivations of individuals and businesses to invest, save, and spend in a way that can enhance the positive impact on GDP.

1.7 Significance of the Study

The examination of the impact of taxation on sub-Saharan African upper middle-income countries' GDP represents a significant research topic for several reasons, namely:

- Policy Implications: The study's results offer significant policy repercussions for upper-middle-income sub-Saharan African policymakers, as it can help them design effective tax laws and public policies promoting gross domestic product growth.
- Academic Contribution: The study adds to the body of information on how taxes impact upper-middle-income countries in sub-Saharan African countries' GDP.
- Economic Development: The study potentially promotes economic development in upper-middle-income sub-Saharan African countries by identifying the key factors that drive economic growth in these countries. Taxation is an important policy tool that can be used to promote economic development, and this study provides insights into how taxation policies can be designed to achieve this objective.
- Investor Confidence: The study also has implications for investor confidence in upper-middle-income sub-Saharan African countries. Investors need to have confidence in a country's tax system before investing. The study provides insights into the tax policies of sub-Saharan African countries and their impact on GDP, which helps to boost investor confidence in these countries.

1.8 Delimitations (Scope) of the Study

The research immersed an examination of the impact of taxation on sub-Saharan African upper middle-income countries 'gross domestic product for whom data for the thirty years between 1990 and 2020 is available. The 30-year period from 1990 to 2020 is essential for capturing long-term trends and the effects of tax policy changes on GDP in sub-Saharan African upper-middle-income countries. This timeframe also provides a robust dataset, allowing for a comprehensive analysis of taxation's impact on GDP. The goal of the study is to examine the impact of taxation on the sampled sub-Saharan African upper middle-income countries' GDP, compare taxation systems and their effects on economic performance across the selected countries and identify the challenges and opportunities related to taxation and propose strategies to enhance its positive impact on GDP (Stent, 2022).

1.9 Assumptions

To simplify the study's conceptualisation on the impact of taxation on sub-Saharan African upper middle-income countries' GDP based on the theories discussed, namely the Institutional Theory, Public Choice Theory, Developmental State Theory, Legitimacy Theory and Conceptual Theory. The researcher outlined the following assumptions for each theory:

1.9.1 Institutional Theory

The first assumption is that institutions, including legal frameworks, administrative structures, and organisational cultures, shape the design, implementation, and enforcement of tax policies and their impact on GDP in upper-middle-income sub-Saharan African countries (Prichard, 2015). The second assumption is that institutional arrangements influence the behaviour of both state actors (e.g., tax administrators, policymakers) and non-state actors (e.g., taxpayers, interest groups) involved in the tax system (Brautigam, 2008). Thirdly, the study assumed that the effectiveness of tax policies depends on the quality of tax institutions, including their capacity for enforcement, transparency, accountability, and responsiveness to economic development and societal needs (IMF, 2017).

1.9.2 Public Choice Theory

First, the study assumes that individuals and groups act in their rational self-interest when participating in tax policy decision-making processes and impact on GDP (Geys, 2016). The second assumption is that political actors, including policymakers and interest groups, seek to maximise their utility or benefits when formulating and implementing tax policies (Aidt, 2016). The third assumption is that the political process is influenced by lobbying, rent-seeking behaviour, and electoral considerations, which shape taxation outcomes (Acemoglu, 2018).

1.9.3 Developmental State Theory

The first assumption of the study in relation to this theory is that the state plays a proactive role in guiding gross domestic product, including through tax policies, to achieve specific economic developmental objectives (Mazzucato, 2015). The second was that effective state intervention, characterised by strong institutions and strategic policy coordination, can promote sustainable economic growth and social welfare improvements (Evans, 2018). Thirdly, the study assumed

that developmental tax policies prioritise macroeconomic objectives over short-range political thoughts to enhance productive capacities and address structural constraints (Amsden, 2019).

1.9.4 Legitimacy Theory

The first assumption regarding this theory was that tax policies such as the Income Tax Act 58 of 1962 are perceived as legitimate when they align with societal norms, values, and expectations regarding fairness, equity, and social justice (Hackney, 2021). Second, governments seek to maintain or enhance their legitimacy by justifying tax policies through transparent decision-making processes and effective communication with citizens and stakeholders (Dodge, 2016). Assumption three was that legitimacy concerns may arise if tax policies are perceived as benefiting specific interest groups or if there is a lack of trust in the institutions responsible for tax administration (Cowen, 2023).

1.9.5 Conceptual Theory

Conceptual Theory also provides a framework for understanding upper-middle-income sub-Saharan African countries' challenges in tax policy and administration. These challenges include complex tax rules, low tax morale, and widespread tax evasion (Sandmo, 2005). Developmental State Theory helps explain the need for government intervention to address these issues, as taxation is a crucial tool for mobilizing internal resources to spur economic growth (Osho, 2019). Public Choice Theory sheds light on the political and administrative dynamics that lead to ineffective tax systems, where vested interests may undermine tax reforms aimed at improving GDP. Finally, the Legitimacy Theory highlights the importance of establishing trust between the government and citizens. A tax system perceived as legitimate and aligned with social norms encourages compliance and reduces evasion, creating a more robust and sustainable revenue stream that supports long-term economic growth (Reid, 2024).

1.10 Limitations of the Study

The study was limited to sub-Saharan African upper middle-income countries ‘gross domestic product with available data for the period under study. It covered a period of thirty years (1990-2020). The study faced limitations, including the availability and quality of data such as Gabon.

1.11 Organisation of the Study

Chapter 1 outlined the introduction of the study. The study aimed to examine and evaluate the impact of taxation on upper-middle-income sub-Saharan African countries’ GDP. The chapter

contains a description of the problem and research objectives. It also focused on the significance of the study, delimitations and limitations of the study, and outline of the study according to chapters.

Chapter 2 deals with a literature review comprising a theoretical framework and empirical studies on the impact of taxation on upper-middle-income sub-Saharan African countries' GDP.

The methodology outlined in Chapter 3 delineates the approach taken for this study. It encompasses the data collection procedures, methodology adopted, the nature of data utilized, and the evaluation of how taxes impact the GDP of middle-class and high-income countries in sub-Saharan Africa.

Chapter 4 shifts its attention to examining, interpreting, and discussing the outcomes of the quantitative analysis. Quantitative data were analyzed using frequencies and graphs, and secondary data were gathered, scrutinized, and assessed to gauge the influence of taxation on the gross domestic product (GDP) of middle- to high-income countries in sub-Saharan Africa.

Chapter 5 concludes the study by focusing on the outcomes and presents conclusions and recommendations. The chapter also highlights propositions for future studies.

CHAPTER 2. LITERATURE REVIEW

2.1 Introduction

The research objectives set the foundation for the literature review by guiding an exploration of existing studies on the relationship between taxation and gross domestic product performance, particularly in sub-Saharan Africa. The first objective, examining the impact of taxation on GDP, necessitates reviewing theoretical frameworks and empirical evidence on how tax policies influence economic growth. The second objective, comparing taxation systems, requires a deeper look into cross-country analyses of tax structures and their varying effects on economic performance, drawing on comparisons from similar studies across different economies. Lastly, the third objective, addressing the challenges and opportunities related to taxation, calls for a review of literature that discusses the barriers to effective taxation in upper-middle-income countries and proposes strategies for enhancing tax policy to support sustainable GDP growth. Together, these objectives form the basis for a thorough investigation into how taxation interacts with economic outcomes, particularly gross domestic product in sub-Saharan Africa's upper middle-income countries, setting the stage for an informed and comprehensive analysis. This study encompassed a problem statement and research goals. A significant amount of research material was reviewed to examine the conceptual and theoretical frameworks and empirical research on the impact of taxation on upper-middle-income sub-Saharan African countries' GDP.

2.2 Theoretical Framework

2.2.1 Institutional Theory

To understand institutional theory, there is a need to understand taxation as an institutionalised practice within upper-middle-income sub-Saharan African countries. It is equally important to analyse how tax policies align with institutional norms and expectations and whether they contribute to economic stability and growth (Leicht, 2010). According to Vivian and Carpenter (2001), in the extant literature on institutional theory, this idea is known as organisational imprinting. Organisational imprinting is the process through which organisations follow particular procedures implemented when they were first established, not because they were chosen or intended, but because they are accepted as "the way these things are done". Since the establishment of state governmental entities, specific democratic government tax policies, such as tax base, tax structure, and tax incidence, have been recognised as reasonable means of

accounting for public funds (Stiglitz, 2015). As a result, these tax policies tend to endure over time, not because they are socially responsible. The governments impose tax policies on citizens by stipulating them in their statutes and/or constitutions (Keen, 2017).

The institutional approach, which signifies legitimacy and authority, is less effective and more of a cultural and political matter (Benabou, 2016). Certain sustainable goals and practices can improve upper-middle-income sub-Saharan African countries' performance, propel economic growth, and win over the public (UNDP, 2016). Consumers, companies, the public, and the government in upper-middle-income sub-Saharan African countries now need greater faith in the public representative (Alam,2024).

Fotaki (2024) expanded his research on the impact of taxation on GDP by concentrating on the responses of reform-leading transnational institutions to public criticism of purported tax policy reform failures. The researcher also enhanced current thinking regarding these institutions' institutional accountability mechanisms for public funds. The International Monetary Fund (2014) intervened in the economic crisis and the structural adjustment it enforced to bring about economic stability. Helliwell (2018) noted the implications of tax policies on gross domestic product and how the receiving country's well-being has been significantly harmed by these contentious and, by many accounts, ineffective tax policies, which have reduced social cohesiveness and impoverished the most vulnerable populations.

2.2.2 Public Choice Theory

Public choice theory uses rational behaviour and individual self-interest to analyse the economic effects of government decisions, including taxation. It offers perspectives on how political variables impact tax laws (Bryson, 2016). Hettich (2004) enumerates numerous reasons for studying taxation. Taxing citizens is a crucial way to fund the most critical public sector expenditures; it also provides the means for producing social programs like public welfare and economic growth and development.

In addition to analysing how tax structure is influenced by the preferences and interests of various groups and how this affects the GDP of sub-Saharan Africa, Karceski (2017) investigated the political dynamics and decision-making processes that underlie tax policy. According to Torfing (2016), public choice theory is the application of economic theory to the

study of politics and the effects of taxes on middle-class and upper-class countries in sub-Saharan Africa. It begins with the same presumptions as microeconomic theory, where agents are typically rational utility maximisers and self-interested taxpayers. The tax incentive frameworks that businesses operate inside dictate their behaviour. The same kinds of issues that taxpayers ask, such as whether equilibria are stable, Pareto-optimal, and how they are attained, are also posed by public choice theorists.

Therefore, public theorists concentrate on setting up tax incentive systems that deal with politicians and bureaucrats so that their decisions will benefit the public (Hillman, 2009).

A recent example of public choice theory in application is the study by Krasnozhon (2023), which analyzed the impact of Russia's war against Ukraine on the taxation and GDP of upper-middle-income sub-Saharan African nations. The study found that economic improvements in Russia during President Putin's first two terms were correlated with increased political allegiance and a slowdown in tax collection in middle- and upper-class sub-Saharan African nations. However, between Putin's second and third terms, the global economic crisis negatively impacted the standard of living in Russia and several sub-Saharan African countries. The study suggests that Russia's declining economic performance contributed to reduced tax revenue in these African nations and suppressed GDP growth. According to Krasnozhon (2023), Russia's military actions can be interpreted as the country's strategy to strengthen political allegiance, potentially prioritizing this over economic growth and development. The researcher's analysis highlights the geopolitical ripple effects of Russia's aggression, focusing on how it disrupted economic stability in sub-Saharan Africa.

According to Hossain (2023), risk governance is maintained and sustained through strong stakeholder relations to strengthen public choices for the citizens, also known as a social compact. It is associated with the collective perceptions of the upper middle-income countries of sub-Saharan Africa by taxpayers and the public. The ability of governments in upper-middle-income nations of sub-Sahara Africa to finance public spending, particularly promoting economic initiatives aimed at increasing GDP, is jeopardised by malfeasance and a lack of sound tax governance. The performance of tax revenue collection will impact regulations and reputation when there are taxation restrictions in place. This study investigated and assessed the effects of taxes on the GDP of upper-middle-income countries in sub-Saharan Africa.

2.2.3 Developmental State Theory

Developmental state theory focuses on how government action, particularly tax laws, can foster economic progress. It highlights the state's proactive involvement in directing economic growth, which may be pertinent to comprehending the tax laws of sub-Saharan African nations and which influence the GDP. According to O'Brien (2017), it considers the developmental objectives and approaches unique to the setting of developing economies, such as upper-middle-income sub-Saharan African countries.

According to Haggard (2016), the extant literature on the developmental state presented itself as a rival to the neoclassical consensus in development economics that was gradually taking shape. This effort focused on trade and exchange rate policy, market-oriented reforms, and stable macroeconomic policies. The ramifications of this promotion of growth driven by exports were not just found in academia. According to Wade (2009), tax is an instrument that the state can utilise to intervene in the economy. Tax policies are designed to achieve developmental goals and can positively impact the GDP growth in upper-middle-income sub-Saharan African nations.

Like non-pharmaceutical interventions (NPIs) were implemented to manage the epidemic and mitigate its impact on GDP (Navarro & Markel, 2016), tax policies can stimulate or impede economic growth. Just as stricter or lenient NPIs affected local economic activities and the spread of the epidemic, tax policies play a crucial role in promoting or hindering economic performance. Therefore, analyzing how tax rates, collection systems, and enforcement affect GDP can draw lessons from how timely, adaptive public policies like NPIs were implemented to maintain economic stability.

The varied responses to the pandemic across different regions, as illustrated by the differing approaches in Oakland, California, and Des Moines, reflect how local governance and discretion influence gross domestic product and economic outcomes. This mirrors the variations in tax systems across countries, where different taxation frameworks can lead to disparate economic results. By comparing these approaches to pandemic management, one can draw parallels to tax structures, showing how strategic implementation and administration affect a country's overall economic health and GDP growth.

Just as the Oakland mayor's initial minimal-touch strategy shifted to more stringent NPIs under new leadership, tax policies can face governance, enforcement, and policy direction challenges. Non-unified pandemic preparedness highlighted local-level discretion, much like tax policy enforcement in different countries, which can vary due to institutional capacities and leadership. Addressing these barriers—whether in healthcare during a pandemic or in taxation systems—requires strategic oversight to enhance economic performance. The lessons from NPIs show that decisive, well-coordinated interventions can minimize negative economic impacts, just as well-formulated tax policies can support GDP growth in upper-middle-income countries. This alignment draws parallels between the localized responses to a public health crisis and how tax policies must be adaptable and well-structured to influence economic outcomes, especially GDP growth.

The significant economic shock caused by the COVID-19 pandemic, as noted by Zhang (2024), parallels the potential impact of tax policy changes on GDP. Just as the pandemic-induced uncertainty caused market performance to plummet across global financial markets (Nowaka, 2015), poorly designed tax policies can lead to economic instability. Theoretical and empirical research is needed to understand how tax policies—whether increases, decreases, or structural reforms—can cause similar volatility or stability in a nation's GDP, as seen during the market shocks caused by the pandemic.

The global financial market's varying responses to the COVID-19 crisis, with different levels of impact on indices like the FTSE in the UK, DAX in Germany, and Nikkei in Japan (Nowaka, 2015), offer a useful analogy for understanding how different taxation systems impact economic performance across countries. Just as each country's market reacted differently to the pandemic, so do different tax systems produce varied outcomes in terms of GDP growth. A cross-country analysis of taxation can help illuminate these differences, much like studies of financial market responses during the pandemic reveal how diverse economic structures react to global crises.

The challenges posed by the pandemic-induced uncertainty that caused a downturn in market performance (Bischof, 2021) can be compared to the difficulties countries face in designing effective tax policies. The pandemic highlighted how unexpected crises can expose weaknesses in financial and economic systems, just as inefficiencies in taxation can hinder GDP growth in

upper-middle-income countries. Addressing these challenges requires strategic planning, much like how researchers and policymakers have explored ways to stabilize markets after the pandemic. By examining barriers to effective taxation, such as administrative inefficiencies or policy misalignments, countries can develop tax strategies that foster more sustainable GDP growth in the face of expected and unexpected economic challenges. This alignment draws from the financial and market disruptions caused by the pandemic to explain how tax policy changes might similarly affect GDP while also reflecting on the varying effects of different tax systems and the need to address taxation challenges to support sustainable growth.

2.2.4 Legitimacy Theory

Legitimacy theory explores how organisations (including governments) maintain legitimacy through their actions, including tax policies (Kim, 2019). Taxation is the mirror of the relation between the government and the society. On the one hand, this policy gives the government the resources to implement its policies by providing funding. On the other hand, it can jeopardise the stability of the government because it might spark taxpayer's resistance to paying taxes (Whait, Christ, Ortas, & Burritt, 2018). The government may then decide to lower its tax claim to lessen the likelihood that it can pay for its continued existence. One of the state's primary functions is the collection of taxes (Fauvelle-Aymar, 2020). Based on a thorough analysis of a large body of empirical research, researchers believe that clear institutional limits on policymakers' discretion have generally resulted in better policy outcomes. Furthermore, the study's application to the field of positive analysis is ideal, given the close ties between tax policy and political and economic occurrences (Jonung, 2018).

In the context of legitimacy theory, which posits that firms and governments seek to align their actions with societal values and norms to maintain legitimacy, tax policies can be seen as instruments that reflect a nation's cultural, economic, and social priorities. According to Newson (2022), the distinct cultures of sub-Saharan African upper-middle-income countries influence how their governments design and implement tax policies, impacting their respective GDPs. Empirical research on these countries can reveal how cultural factors shape tax policies that either foster economic growth or lead to stagnation, showing how tax systems must be seen to be legitimate and aligned with societal expectations to influence GDP positively.

The cross-country variation in tax structures between sub-Saharan African upper middle-income countries provides a natural setting for comparing taxation systems under the lens of legitimacy theory. Each country's distinct culture may dictate different tax approaches, creating unique effects on economic performance. For instance, Australia's tax policies might focus more on welfare and public goods. At the same time, Singapore could emphasize business-friendliness and low taxes, and South Korea might balance both with progressive taxation. Understanding these differences, rooted in each country's cultural values, can provide insights into how legitimacy in tax systems supports or hinders GDP growth across different economies.

Legitimacy theory suggests that tax policies must be perceived as fair and aligned with societal values to be effective. In sub-Saharan African middle-high countries like South Africa, Namibia, Gabon, Botswana, and Mauritius, where cultural values differ, the challenges to effective taxation will vary. For example, Botswana's progressive tax system may face challenges in gaining legitimacy among high-income earners, while Nambia's lower tax regime might be perceived as favouring businesses over citizens. Addressing these challenges requires culturally sensitive strategies that enhance the legitimacy of tax systems, ensuring that they are viewed as just and equitable, which can, in turn, lead to sustainable GDP growth. Understanding the cultural barriers to effective taxation in upper-middle-income countries is vital to proposing reforms that can enhance the legitimacy and impact of tax policy.

Collins and Mulligan (2014) bring up the issue of legitimacy-seeking behaviour, which is the term used to describe what players in the organisational environment consider to be proper behaviour. This theme emphasises that for an organisation to thrive in its social milieu, it must be believable and socially acceptable. The author places the foundation of legitimacy in super-organisational views of social reality broadly endorsed by influential individuals, placing it outside the confines of a single organisation.

Reid's (2024) argument that tax transparency reporting validates corporate social responsibility (CSR) reporting can be linked to the broader impact of taxation on GDP through legitimacy theory. Companies that voluntarily disclose tax-related information, including compliance with tax laws and transparency in reporting, enhance their legitimacy and can potentially foster a more stable economic environment. This transparency can increase public trust and investor confidence, contributing to economic growth and GDP. Furthermore, well-designed tax

policies encouraging such transparency can enhance corporate accountability, leading to sustainable economic outcomes and gross domestic product.

Metzner, Demers and Marcel's (2024) contention that tax transparency benefits companies financially and improves corporate governance ratings can also be explored through cross-country comparisons of taxation systems. Different countries may have varying levels of tax disclosure requirements and corporate governance standards, which can influence economic performance. For example, countries with stricter tax transparency regulations may foster higher investor confidence and greater public trust in businesses, leading to better economic outcomes. A cross-country analysis could compare how tax policies in different economies (e.g., those requiring tax transparency vs. those that do not) affect both corporate behaviour and GDP growth, highlighting the role of voluntary disclosures and governance in different tax regimes.

The challenges and opportunities related to taxation in upper-middle-income countries can also be framed within Reid's (2024) perspective on legitimacy and voluntary tax disclosures. Tax transparency represents both a challenge and an opportunity: on the one hand, it may require companies to disclose more than what is legally mandated, which could be seen as a burden; on the other hand, it can enhance corporate reputation and legitimacy, leading to financial benefits and higher corporate governance ratings. Countries encouraging voluntary tax transparency may overcome barriers to effective taxation by creating a culture of compliance and trust between businesses, governments, and the public. This, in turn, can support sustainable GDP growth by improving tax collection, reducing evasion, and fostering investor confidence.

2.2.5 Conceptual Theory

Conceptual Theory is central to understanding how tax policies influence GDP by offering insights into the foundational frameworks that guide government decisions. Governments in upper-middle-income sub-Saharan African countries rely heavily on taxation to fund public services and infrastructure, directly impacting GDP (Matthew, 2014). Developmental State Theory, within this conceptual framework, explains that government intervention through taxation can stimulate economic growth, especially in developing economies where raising per capita income and improving living standards are critical goals (Osho, 2019). Furthermore, by

using Public Choice Theory, we can examine how political interests shape tax policies in ways that either hinder or boost economic growth. Governments must justify their tax policies to citizens and stakeholders, which ties into Legitimacy Theory—tax systems that align with societal values foster trust, compliance, and more effective revenue collection, ultimately benefiting GDP (Reid, 2024).

In cross-country analyses, Conceptual Theory helps us understand countries' different approaches to designing tax systems based on their cultural, economic, and political contexts. The complexity of tax rules in upper middle-income sub-Saharan Africa (Matthew, 2014) creates barriers for tax authorities and taxpayers, leading to tax evasion and avoidance (Sandmo, 2005). In contrast, developed countries may have more straightforward, more efficient tax systems, offering a model for comparison. Developmental State Theory suggests that governments in sub-Saharan Africa may have more interventionist tax systems to stimulate economic growth. On the other hand, Public Choice Theory helps explain why taxation systems differ across countries due to varying political and economic interests. Legitimacy Theory is vital here, as countries with more legitimate and transparent tax systems tend to have higher compliance rates, which can positively influence GDP.

Conceptual Theory also provides a framework for understanding upper-middle-income sub-Saharan African countries' challenges in tax policy and administration. These challenges include complex tax rules, low tax morale, and widespread tax evasion (Sandmo, 2005). Developmental State Theory helps explain the need for government intervention to address these issues, as taxation is a crucial tool for mobilizing internal resources to spur economic growth (Osho, 2019). Public Choice Theory sheds light on the political and administrative dynamics that lead to ineffective tax systems, where vested interests may undermine tax reforms to improve GDP. Finally, the Legitimacy Theory highlights the importance of establishing trust between the government and citizens. A tax system perceived as legitimate and aligned with social norms encourages compliance and reduces evasion, creating a more robust and sustainable revenue stream that supports long-term economic growth (Reid, 2024).

Considering the context of upper-middle-income sub-Saharan African sampled countries and the research focus on the impact of taxation on GDP, the most suitable theory appears to be the Developmental State Theory. This theory acknowledges the role of government intervention

in economic development and is particularly relevant for understanding the dynamics of tax policies in emerging economies. It considers both the goals of economic growth and the specific challenges and opportunities these countries face. However, it is essential to complement this theory with insights from the Public Choice Theory and Legitimacy Theory to comprehensively consider the factors influencing tax rules and their impact on GDP in the sub-Saharan African middle-high countries region.

2.2.6 Basic Argument

2.2.6.1 South Africa

According to Tanzi (2001), taxation is a critical factor in any development as it generates revenue for the government and allows it to offer its inhabitants public goods and services. Economic activities, including income, consumption, and production, are subject to taxes and can have both constructive and adverse impacts on economic growth. Samwick (2014) agreed that the effects of taxation on upper-middle-income sub-Saharan African countries' GDP have not been extensively studied in the academic literature. Some scholars contend that extreme taxes can hamper economic growth as they reduce incentives for individuals and businesses to work and invest. On the other hand, others maintain that taxes can encourage economic growth by providing the government with the necessary funds to invest in infrastructure and human capital, which can, in turn, upsurge efficiency and inspire economic activity. In upper-middle-income sub-Saharan African countries, taxation has been identified as a crucial factor for economic development. Despite this, many sub-Saharan African countries struggle to mobilise sufficient revenue from taxes, which limits their ability to invest in infrastructure and human capital (Oyebola Okunogbe, 2022). According to Ibrahim (2000), the effectiveness of tax policies in African countries can be affected by several factors, including weak institutions, corruption, and political instability. These factors can weaken tax revenue collection and restrict the influence of taxation on GDP.

Revenue mobilisation has long been a top concern in sub-Saharan African (SSA) countries to help finance the region's significant development demands (Aslam, 2022). Contrary to other regions, tax collections in sub-Saharan Africa are still modest, averaging 15% of GDP as of 2019 before the COVID-19 pandemic. Despite significant recent gains, countries' progress has been unequal and delayed due to lingering structural problems, high levels of informality, and

feeble reform initiatives. Structural issues significantly hinder tax revenue mobilization in sub-Saharan Africa. For example, Nigeria's dependency on oil revenues and weak tax administration systems limit its ability to increase tax collections. Corruption and inefficiencies in bureaucracy exacerbate the problem (Aslam, 2022). Similarly, Angola and Zambia face challenges in diversifying their economies away from natural resources, impacting their tax revenue generation (African Development Bank, 2020).

According to the South African Revenue Services (2020), taxes contribute significantly to South Africa’s GDP. In the 2019/2020 financial year, SARS collected R1.3 trillion in taxes, which accounted for 27.5% of South Africa's GDP (SARS, 2020). According to Dibo (2020), taxes serve additional fiscal purposes beyond financing public expenditures. These goals include addressing externalities, promoting economic stability, and ensuring equitable income distribution. In contrast, taxes on expenditure are objective but regressive. As a result, it is widely believed that a fair tax system that contributes positively to income distribution should increase the proportion of taxes on income and wealth.

South Africa relies heavily on taxation to fund its budget, with tax revenue accounting for approximately 30% of total government revenue (Treasury, 2021). The government's tax policies have been instrumental in generating revenue and funding development projects. The tax system is relatively complex, with various tax exemptions and deductions, and is generally perceived to be inefficient and unfair (Sharma, 2020). However, the government has implemented policies to improve tax collection and reduce tax evasion, contributing to increased revenue collection (Treasury, 2021).

South Africa has executed tax rules to promote investment and economic growth. For instance, the government has implemented a low corporate tax rate of 28%, 27% effective 1 April 2022, among the lowest in Africa (Sharma, 2020). The low tax rate has attracted foreign investment and helped to spur economic growth. In addition, the government has implemented tax incentives to promote investment in specific sectors, such as renewable energy and manufacturing (Treasury, 2021). These policies have contributed to economic diversification and helped decrease the country's dependence on natural resources.

Taxation policies are also critical in supporting public infrastructure and social welfare programs. South Africa's government has implemented tax policies to support these initiatives.

For instance, the government has implemented a value-added tax (VAT) system, which provides a significant source of revenue for funding public capital projects and welfare programs (National Treasury, 2021).

Bird (2014) argues that there is a need for a more comprehensive approach to taxation in upper-middle-income sub-Saharan African countries. Atuahene (2017) also advances the gender dimension argument of taxation in upper-middle-income sub-Saharan African countries, arguing that tax policies often have gendered impacts, which are usually overlooked in policy debates. The paper calls for a more gender-sensitive approach to taxation in the region, considering the different needs and priorities of women and men.

2.2.6.2 Botswana

Botswana, a landlocked country in Southern Africa, has achieved significant economic growth over the past few decades (World Bank, 2021). Property taxation is critical in generating government revenue and supporting the country's development initiatives. Botswana's government relies heavily on taxation to fund its budget, with tax revenue accounting for approximately 90% of total government revenue. The government's tax policies have been instrumental in generating revenue and funding developmental projects (IMF, 2021). The tax system is relatively simple, with a few tax exemptions, and is generally perceived as fair and efficient (Azour, 2022). The government of Botswana has also implemented policies to improve tax collection and reduce tax evasion, which has increased revenue collection (World Bank, 2021).

Botswana's administration has applied tax rules to promote investment and economic growth. For instance, the government has implemented a corporate tax rate of 22%, which is among the lowest in Africa (IMF, 2022). The low tax rate has attracted foreign investment and helped to spur economic growth. In addition, the government has implemented tax incentives to promote investment in specific sectors such as manufacturing and agriculture (World Bank, 2021). These policies have contributed to economic diversification and aided in reducing Botswana’s reliance on diamonds, which historically accounted for a significant portion of the country's GDP.

Phalatse (2021) concurs that taxation policies can also be critical in supporting public infrastructure and social welfare programs in sub-Saharan African countries. Botswana's government has implemented tax policies that aim to support these initiatives. For instance, the government of Botswana has implemented a Value Added Tax (VAT) system (World Bank, 2021). These policies include tax incentives and access to credit, which have helped to support the growth of SMEs (Mbeki, 2020).

The World Bank (2021) reports that Gabon's government relies heavily on taxation to fund its budget, with tax revenue accounting for approximately 75% of total government revenue. The government of Gabon has executed tax rules to improve revenue collection and reduce tax evasion. For instance, it has implemented a value-added tax system that has contributed significantly to revenue collection (International Monetary Fund, 2019). In addition, the government has implemented tax incentives to promote investment in certain sectors, such as tourism and agriculture (World Bank, 2021). Gabon’s governance has implemented economic stability and taxation policies to promote investment and economic growth (International Monetary Fund, 2019). The low tax rate has attracted foreign investment and helped to spur economic growth, with a Corporate Income Tax rate generally set at 22% for most businesses. However, it has been lower for certain sectors, such as mining, where it can be as low as 15%. In addition, the government has implemented tax incentives to promote investment in infrastructure and renewable energy (World Bank, 2021). Taxation policies can also be critical in supporting public infrastructure and social welfare programs. Gabon's government has implemented tax policies that aim to support these initiatives. For instance, it has implemented a tax on mining and oil extraction, which provides a significant source of revenue to fund public infrastructure and social welfare programs (International Monetary Fund, 2019). In addition, the government of Gabon has implemented policies to sustain small and medium-sized enterprises, which are a critical source of employment and GDP growth. These policies include tax incentives and access to credit, which have helped to support the development of SMEs (World Bank, 2021).

2.2.6.3 Nambia

Like many other developing countries, Namibia relies heavily on taxes to support its economic growth and development initiatives (Nkhalamo,2017). Taxes on income, consumption, and

trade are among the most significant sources of government revenue. The impact of taxation on the Namibian GDP has been the focus of many studies. Several researchers have deliberated on the influence of taxation on Namibia's GDP. For instance, Kapika (2017) examined the effect of tax on the Namibian economy from 1990 to 2014. The study found a positive relationship between tax revenue and economic growth. Similarly, another study (Hamweemba, 2020) analysed the effect of tax revenue on the Namibian economy using data from 1990 to 2018. The study found that tax revenue positively and significantly impacts Namibia's GDP (Soric, 2023).

In contrast, other scholars have exposed the negative effect of taxation on Namibia's GDP. For example, Amakali (2016) investigated the impact of grants taxation on the Namibian economy from 1990 to 2013. The study found that grants harm Namibia's economic growth. However, despite the varying results, it is generally established that the tax system is vital in supporting GDP growth and development in Namibia. Effective tax policies and administration can help raise government revenue, finance public investments, and reduce inequality (Brys, 2016).

Furthermore, according to Raphael Lam (2016), the design of Namibia's tax system reflects larger economic and social objectives, including fostering equitable growth and guaranteeing a positive impact on gross domestic product and sustainability of state finances. Indirect taxes, especially excise duties, are essential for regulating consumption patterns and generating revenue from commodities with inelastic demand. In contrast, direct taxes, such as income tax, are necessary for redistributive policies. On the other hand, excessive dependence on some taxes, like excise charges, could have distortionary effects, possibly impeding economic activity and placing an unfair cost on people with lower incomes (Foss, 2017).

Further, the integration of Namibia into regional economic blocs, such as the Southern African Customs Union (SACU), has implications for its taxation policies and their impact on GDP. The interplay between national tax policies and regional trade agreements can enhance or undermine economic growth in sub-Saharan African upper-middle-income countries, depending on how tax revenues are managed and allocated (Soko, 2010).

Finally, the efficiency of Namibia's administrative tax collection must be considered (Sheefeni, 2019). Inefficient tax administration can lead to significant revenue losses from fraud and tax evasion, which reduces the potential GDP boost that taxes could have. However, competent

tax administration can increase the efficacy of the tax system by ensuring that tax revenues are effectively raised and allocated to successful business endeavours that support gross domestic product growth (Moore, 2014).

2.2.6.4 Mauritius

Mauritius has one of Africa's most diversified and open economies, with a strong focus on the services sector, particularly financial services(source). Several studies have been conducted to examine the impact of taxation on Mauritius' GDP. For instance, Chakraborty (2017) studied the impact of taxes on economic growth in Mauritius from 1980 to 2015 and found that tax revenue positively and significantly impacts economic growth in Mauritius. Similarly, another study (Maag, 2013) analysed the impact of tax reforms on GDP growth in Mauritius from 1992 to 2008. It established that tax reforms positively affect the country's GDP growth.

In contrast, other studies have shown that taxation may negatively impact Mauritius' GDP growth. For example, Ramessur (2014) examined taxation's impact on Mauritius's GDP growth from 1980 to 2012. The study found a negative relationship between taxation and GDP growth in Mauritius. Despite the varying results, it is generally agreed that taxation plays a significant role in Mauritius' GDP growth and development. Effective tax policies and administration can help raise government revenue, finance public investments, and promote socio-economic development.

Selecting a tax base and a tax rate schedule are the initial steps in choosing a personal income tax. In reality, though, earnings capacity cannot be tracked for taxation. Labour income is a close, visible indicator of earning potential. Original research on optimum taxation assumed that labour income is the most obvious choice for a tax base, from which the best rate schedule was subsequently determined (Gordon, 2014).

All workers, including independent contractors, were added to the coverage during the 20th century. The system's current structure consists of two pillars: an individual capitalisation fund pillar managed by a private enterprise chosen by the donor and a pay-as-you-go pillar run by the public sector. Even though all workers must contribute, 32% of workers in 2009 did not contribute to social security. Sixty years old (sixty-four years before July 2009) is the minimum age to retire, with a thirty-year minimum (Favreault, 2010). In the benchmark scenario,

contributory pensions are included under market income. The sensitivity analysis includes them under government transfers (Bucheli, 2014).

2.3 Empirical Framework

Several studies have been done to look at how taxes affect the GDP of sub-Saharan African countries. In many of these research studies, the impact of taxes on upper-middle-income sub-Saharan African countries' GDP has been estimated using econometric methods such as panel data analysis. Gbato (2017) conducted a study to examine and evaluate the impact of taxation on upper-middle-income sub-Saharan African countries' GDP and long-term economic development. The results indicate that taxes have a minimal effect on long-term growth. As a result, the region does not warrant the employment of taxation as an intervention tool. Relying solely on economic theory to design fiscal policies may increase economic growth in African countries. In line with Asongu's (2014) argument, investment inflows are crucial for promoting economic dynamism, productivity, and new industrial technologies, as well as for enhancing entrepreneurship and competitiveness, reducing poverty, and generating income for improving public services and creating employment opportunities. However, the impact of investment on economic development and poverty reduction depends on access to financial services. Financial sector reforms implemented in the 1990s have led to substantial growth in the financial sectors of most sub-Saharan African countries, and the ICT sector has played a vital role in supporting this growth.

Using time-series data analysis, Kasekende (2015) examined the impact of tax policy on upper middle income sub-Saharan African countries' GDP in Uganda. The research concluded that taxation had a significant and positive effect on economic growth in Uganda, and this impact was greater in the long term. Macek (2014) first examined the efficiency of government expenditure and its links to GDP through various types of taxation.

A significant contribution may be found in the study of Akinkumi (2017), which sought to identify the impact of taxation on sub-Saharan middle-high countries's gross domestic product. The study employed the neoclassical growth model to analyse the impact of national taxation on the long-term economic growth rate. The findings indicated that national tax policies can significantly affect the average economic growth rate in isolated economies by influencing private incentives for physical and human capital accumulation (Forum, 2023). The second

finding was that the effects of taxation at the federal level also relied on how new human capital is produced in terms of technology. Their third and last finding was that tax policies could affect growth rates over the long term, resulting in a greater quantitative impact on welfare.

The effect of taxes on investment and growth has been the subject of intense discussion in both political and intellectual circles (Dahlby, 2012). Martins (2014) suggests that global tax policy trends are increasingly shaping corporate revenue taxation. The policy debate has been heavily focused on the benefits and drawbacks of tax competition due to the mobility of capital, the global reach of many firms, and the promotion of tax competition via rate reductions or specific tax incentives seen in many nations.

SARS analysed the effect of taxing on South Africa's GDP in a study that was done in 2015. According to the study, taxes boosted the nation's economy, with a 1% rise in tax revenue translating into a 0.56% gain in GDP (SARS, 2015). The study also discovered that tax laws that support business development and employment creation can greatly impact economic expansion. Bonga-Bonga (2017) conducted a study to explore the link between tax revenue and gross domestic product in upper-middle-income sub-Saharan African countries. According to the study's findings, there is a link between tax revenue and economic growth, which suggests that taxes are a key factor in a nation's economic progress. However, some studies have also highlighted the negative impact of taxes on GDP growth in South Africa.

A study by Aregbeyen (2020) investigated the relationship between tax revenue and economic growth in sub-Saharan Africa using panel data analysis. The study found that taxation positively and significantly impacts economic growth in the region. Agbloyor (2014) analysed the effect of taxation on economic growth in 22 sub-Saharan African countries using the Generalized Method of Moments (GMM) estimation technique. The study concluded that taxation positively impacts GDP growth in the region, but the effect varies across different tax types.

A study by Moyo (2019) evaluated the impact of tax incentives on foreign direct investment (FDI) in Mauritius and found that tax incentives positively impact FDI inflows in the country. In a study by Baduel (2016), the author analysed the impact of tax policy on income inequality in Mauritius. The study found that Mauritius's tax system is progressive, reducing income inequality in the country. A study by Mookerjee (2017) analysed the impact of tax evasion on

government revenue in Mauritius. The study found that tax evasion harms government revenue and recommended measures to combat tax evasion in the country.

In contrast, some studies have suggested excessive taxation harms economic growth. For instance, (Oladele, 2022) examined the impact of taxation on economic growth in Kenya and found that an extreme tax burden can decrease private sector investment and hinder economic growth. The authors argued that excessive taxation can discourage private investment and lead to capital flight. Furthermore, a study by (Asante-Addo, 2019) examined the relationship between taxation and economic growth in Ghana. The author found that a well-designed tax system can enhance GDP growth, but the impact depends on the efficiency of tax administration. The study also highlighted the importance of tax compliance in generating revenue for government expenditure.

A study by Jooste (2021) examined the impact of taxation on GDP growth in South Africa. The study used annual data for the period 1994-2019 and employed the vector autoregressive model. The results showed that tax revenue has a positive but insignificant impact on GDP growth in the short term. However, in the long run, the impact becomes significant, indicating that taxation contributes to economic growth in South Africa. Another study by Sekeris (2019) examined the impact of taxation on economic growth in South Africa. The study used quarterly data for the period 1994-2018 and employed the dynamic panel data model. The results showed that taxation has a positive and significant impact on GDP growth in South Africa. The study also found that the impact of taxation on economic growth is stronger when tax revenue is used to finance public investment.

Schussler (2019) also examined the relationship between taxation and fiscal policy in South Africa. The study used annual data from 1994-2017 and employed the vector autoregressive model. The results showed that tax revenue significantly impacts government expenditure, suggesting that taxation plays a crucial role in financing government programs in South Africa. The study also found that the relationship between taxation and government expenditure is asymmetric, with tax revenue having a stronger impact on expenditure during periods of economic expansion.

The literature suggests that taxation is vital in promoting GDP growth and financing government programs in sub-Saharan African countries. While the impact of taxation on GDP

growth may not be immediate, it becomes significant in the long run. The findings also highlight the importance of using tax revenue to finance public investment and the need for a balanced fiscal policy considering the economic cycle.

Belete (2017) examined the impact of tax revenue on economic growth in sub-Saharan Africa. The author used panel ARDL to analyse data from 33 sub-Saharan African countries from 1990 to 2014. The study found that tax revenue significantly positively impacts economic growth in sub-Saharan African countries. The author recommended that policymakers consider increasing tax revenue to promote GDP growth. Idris (2017) investigated the relationship between taxation and economic growth in selected sub-Saharan African countries. The authors used panel data from 13 countries from 1980 to 2014. The study found that taxation positively impacts economic growth in sub-Saharan African countries. The authors recommended that policymakers implement tax policies encouraging investment and promoting economic growth. Mberengwa (2018) examined the impact of taxation on economic growth in Namibia. The author used the Granger causality approach to analyse data from 1990 to 2015. The study found that taxation has a significant positive impact on GDP growth in Namibia.

Tchamyou (2019) examined the impact of taxation on inequality, ICT, and financial access in sub-Saharan Africa. The authors used panel data from 47 countries from 2004 to 2014. The study found that taxation has a significant positive impact on ICT and financial access but a negative impact on inequality in sub-Saharan Africa. The authors recommended that policymakers consider implementing tax policies promoting inclusive growth.

Bleaney (2001) examined the impact of taxation on GDP growth in Africa. The authors used panel data from 38 African countries, including Botswana, from 1970 to 1999. The study found that taxation negatively impacts GDP growth in Africa. The authors endorsed that policymakers should implement tax policies conducive to GDP growth. Mbongo (2016) investigated the impact of taxation on GDP growth in sub-Saharan Africa. The author used panel data from 40 countries, including Botswana, from 1980 to 2014. The study found that taxation adversely impacts GDP growth in sub-Saharan Africa. The authors suggested that policymakers should implement tax rules that are GDP growth-friendly. Mogotsi (2019) examined taxation's impact on Botswana's GDP growth. The authors used time series data from 1980 to 2016. The study found that taxation harms Botswana's GDP growth. The authors

suggested that policymakers should implement tax policies conducive to GDP growth to sustain growth in the sub-Saharan African upper-middle-income countries.

Seleteng (2019) investigated taxation's impact on Botswana's GDP growth. The author used time series data from 1980 to 2017. The study found that taxation positively impacts Botswana's GDP growth. The author suggested that policymakers should implement tax policies that are pro-growth and that encourage investment. Therefore, tax policies must be biased toward economic development to improve the economics of sub-Saharan African middle-high countries.

2.4 Summary

Chapter 2 dealt with a literature review comprising a theoretical framework and empirical review concerning the impact of taxation on upper-middle-income sub-Saharan African countries' GDP. The literature review suggests a mixed relationship between taxation and the GDP increase in upper-middle-income sub-Saharan African countries. While some studies found that taxation harms GDP growth, others found that taxation has a positive effect. Policymakers should implement tax policies conducive to GDP growth and encourage investment. However, policymakers should also be mindful of the latest adverse taxation effect on GDP growth and thus implement measures to address this issue.

The empirical literature suggests that taxation can favour GDP in upper-middle-income sub-Saharan African countries if the tax system is well-designed and the revenue is used for government expenditure. However, the impact of taxation on GDP growth depends on the structure of the tax system and the efficiency of tax administration. Excessive taxation can negatively impact GDP growth by reducing private sector investment and hindering GDP growth. Therefore, upper-middle-income sub-Saharan African countries need to design and implement a tax system that is efficient, effective, and fair and use the revenue generated for government expenditure wisely. Below, Chapter 3 deals with research methodology.

CHAPTER 3. RESEARCH METHOD

3.1 Introduction

The researcher employed a quantitative research method to examine the impact of taxation on the gross domestic product (GDP) of upper-middle-income sub-Saharan African countries. Quantitative research in this context allows for a data-driven analysis of how tax policies affect economic growth, aligning with the first research objective of reviewing theoretical frameworks and empirical evidence on the relationship between taxation and GDP. Ethical considerations in quantitative research often revolve around abstract normative logic, such as effective taxation and tax risk governance (Aslam, 2022). These values are embedded in all aspects of quantitative research, including the observation of tax data, interpretation of economic indicators, and conceptions of objectivity, further supporting cross-country comparisons of tax structures and their varying effects on economic performance, which is central to the second objective (Ogbonna, 2016). The study offers a fresh perspective on effective taxation policies and tax governance in upper-middle-income sub-Saharan African countries, highlighting the need for strategies that enhance tax policy to promote sustainable GDP growth. To achieve this, the researcher rigorously examined how their practices, data collection, and analysis inform the broader goals of economic stability and gross domestic product growth, especially considering the unique challenges faced by sub-Saharan African middle-high countries (Matthew, 2014).

Apuke (2017) suggests that research is concerned with the pursuit of knowledge, including human knowledge, culture, and society. Donley (2012) categorizes research into four primary types. The first type is descriptive research, which describes social phenomena and answers questions like who, what, when, and where. The second type is exploratory research, which focuses on understanding the underlying reasons and motivations for behaviours. The third type, explanatory research, aims to explain why phenomena occur in specific ways, examining cause-and-effect relationships. Finally, evaluation research assesses the effectiveness of policies and programs. In examining the impact of taxation on upper-middle-income sub-Saharan African countries' GDP, the study employed a quantitative research approach. This method allowed for data collection that aligns with the three research objectives. Examining taxation's impact on GDP, the study can systematically review theoretical frameworks and empirical evidence on how tax policies influence economic growth by utilising a quantitative

approach. Descriptive and explanatory research methods are key in understanding the correlation between tax policies and economic performance, providing insights into how these policies drive or hinder GDP growth in sub-Saharan Africa. The quantitative approach enables a cross-country analysis of tax structures in upper-middle-income sub-Saharan African countries, allowing comparisons of how different taxation systems affect economic outcomes. Descriptive and exploratory research aids in identifying patterns, differences, and outcomes by reviewing similar studies across economies.

Addressing challenges and opportunities in taxation, examination research becomes particularly relevant for assessing the barriers to effective taxation, such as informality and weak tax administration. The study can propose strategies for enhancing tax policy to support sustainable GDP growth by reviewing empirical data. This includes identifying opportunities for improving tax compliance, governance, and efficiency in these countries. Thus, a quantitative research approach is crucial for understanding the complex relationship between taxation and GDP growth, addressing cross-country comparisons, and evaluating the effectiveness of tax policies within the context of upper-middle-income sub-Saharan African nations.

The study used secondary data that are already in the public domain. The work is published under the responsibility of the OECD Secretary-General, the Executive Secretary of ATAF, and the Chairperson of the AUC: OECD/AUC/ATAF (2022), Revenue Statistics in Africa 2022, OECD Publishing, and Paris.

3.2 Research design

Panel Data Regression Model

The research design utilised in this study seeks to answer the following question, “How do different types of taxation (income tax, corporate tax, VAT, property tax, and social contributions) impact GDP growth rates across different countries or regions over time?”. The dependent variable is the Gross Domestic Product (GDP) growth rate. The predicting variables are income tax rate, value-added tax rate, corporate tax rate, property tax rate, trade tax rate, social contributions and excise tax rate. The model further employs four control variables: inflation rate, investment rate (Gross Fixed capital formation), trade openness and labour force participation rate as follows:

Table 1: Control variables in the data

Variable	Description
Inflation rate (Year on Year change in inflation)	To control for economic stability
Investment rate (Gross fixed capital formation)	Gross fixed capital formation as a percentage of GDP
Trade openness	Exports and imports as a percentage of GDP
Labour force participation rate	To account for national/local level employment dynamics

3.3 Data Collection

The use of secondary data sources is a common approach in tax studies, especially in large-scale studies that cover multiple countries over time. Several studies have used secondary data from international organisations and national statistical offices to analyse the relationship between taxation and GDP growth in upper-middle-income sub-Saharan African countries. For example, a study by (Bleaney, 2017) used data from the World Bank and IMF to examine the outcome of tax policy on GDP in developing countries. The authors found that tax policy harms GDP in the short run but has a positive effect in the long run. Another study by (Mok, 2019) used data from the World Bank, IMF, and national statistical offices to analyse the impact of tax policy on GDP in upper-middle-income sub-Saharan African countries. The authors found that tax policy positively affects gross domestic product, but the effect varies depending on the increase in GDP.

3.4 Research Population

The population for this study upper middle income sub-Saharan African countries for whom data for the thirty-year period (1990–2020) were available

3.5 Research Sample

The study focused on the sampled upper-middle-income countries in sub-Saharan Africa as of 2021: Botswana, Gabon, Mauritius, Namibia, and South Africa.

3.6 Data Analysis

Model Specification

$$GDP\ Growth_{it} = \beta_0 + \beta 1 IncomeTax_{it} + \beta 2 CorporateTax_{it} + \beta 3 VAT_{it} + \beta 4 PropertyTax_{it} + \beta 5 SocialContributions_{it} + \beta 6 ExciseTax_{it} + \beta 7 TradeTax_{it} + \beta 8 ControlVariables_{it} + \epsilon_{it}$$

Where:

- i = Country or region index
- t = Time index (years)
- ϵit = Error term

In the estimation method, the fixed effects panel regression model and the random effects panel regression models were run on the data. The Hausman test was used to choose between random and fixed effects models. The random effects (RE) panel regression model is a statistical method used to analyse panel data, which consists of observations over time for multiple entities (such as individuals, firms, or countries) (Wang, 2015). Unlike fixed effects models, which control for all time-invariant differences among entities, the random effects model assumes that individual-specific effects are uncorrelated with the independent variables in the model (Wang, 2015). The RE model allows for unobserved individual-specific effects (random effects) that are constant over time but vary between entities. This is useful for controlling for unmeasured factors that could influence the dependent variable. The random effects model assumes these unobserved effects are randomly distributed and uncorrelated with the explanatory variables (Bhattarai, 2019). This assumption allows for the analysis to include both within-entity (over time) and between-entity (across entities) variations. Because the RE model uses both within- and between-entity information, it is generally more efficient than fixed effects models, particularly when the individual-specific effects are not correlated with the independent variables (Bhattarai, 2019). Random effects models are often used to analyse the impact of various factors (like investment, education, and policy changes) on economic growth across different countries or regions over time, accounting for unique country-specific characteristics. Researchers can assess the effects of government policies (such as tax

incentives or subsidies) on firm performance by controlling for unobserved heterogeneity across firms, making it easier to identify the causal impact of the intervention. The random effects model is more efficient than fixed effects when the random effects assumption holds true (Bhattarai, 2019).

The fixed effects (FE) panel regression model is a statistical method used to analyse panel data, which involves multiple observations over time for the same entities (such as individuals, firms, or countries). The fixed effects model controls for unobserved heterogeneity by allowing each entity to have its own intercept term, effectively removing the influence of time-invariant characteristics that could bias the results (Bhattarai, 2019). The fixed effects model accounts for all time-invariant differences between entities, such as individual traits or characteristics that do not change over time. This helps eliminate potential biases in estimating the effects of independent variables. The model focuses on the variation within each entity over time rather than between entities. This is done by demeaning the data, which centres it around the entity's average, thereby controlling for individual-specific effects (Bhattarai, 2019). Unlike random effects models, fixed effects models assume that the unobserved individual effects are correlated with the independent variables, which justifies their exclusion from the model (Bhattarai, 2019). Researchers can assess the effects of specific policy interventions (like minimum wage laws) on economic outcomes while accounting for unobserved differences among firms or individuals that could affect their responses to the policy (Teixeira and Queirós, 2016). By controlling for all time-invariant characteristics, fixed effects models reduce the risk of omitted variable bias, leading to more reliable estimates of the effects of independent variables.

Hausman test

The Hausman test is a statistical test used to determine whether to use fixed effects (FE) or random effects (RE) models in panel data analysis. It evaluates the consistency of the estimators under the two models, helping researchers decide which model is more appropriate given the data (Bhattarai, 2019). The main purpose of the Hausman test is to test the null hypothesis that the random effects estimator is consistent and efficient, which implies that the unobserved individual effects are not correlated with the independent variables. If rejected, this

hypothesis suggests that the fixed effects model should be used instead, as it provides consistent estimates in the presence of such correlation (Bhattarai, 2019).

In implementing the Hausman test, the fixed and random effects models are first estimated for the same data. The test statistic is derived from the differences in the estimated coefficients from the two models. Specifically, it is calculated as:

$$H = (b_{FE} - b_{RE})' \cdot [Var(b_{FE}) - Var(b_{RE})]^{-1} \cdot (b_{FE} - b_{RE})$$

$$H = (b_{FE} - b_{RE})' \cdot [Var(b_{FE}) - Var(b_{RE})]^{-1} \cdot (b_{FE} - b_{RE})$$

Where b_{FE} and b_{RE} are the coefficient estimates from the fixed effects and random effects models, respectively, and Var(b)Var(b) denotes the variance-covariance matrices of the estimators. The resulting test statistic follows a Chi-squared distribution with degrees of freedom equal to the number of tested parameters. If the p-value associated with the test statistic is less than a specified significance level (commonly 0.05), the null hypothesis is rejected, indicating that the fixed effects model is preferred. If the Null Hypothesis is not rejected indicates that the random effects estimator is appropriate, suggesting that the individual-specific effects are uncorrelated with the explanatory variables. If the Null Hypothesis is rejected, this implies that there is a significant correlation between the individual effects and the independent variables, indicating that the fixed effects model should be used for reliable and consistent estimates.

3.7 Validity and reliability of data measuring instrument

3.7.1 Introduction

The validity and reliability of a data measuring instrument are important considerations when conducting research, as they ensure that the data collected accurately reflects the research question being investigated (source). In examining the impact of taxation on upper-middle-income sub-Saharan African countries' GDP, the source verification was performed using reputable and credible data sources, such as OECD, IMF, World Bank, ATAF). These are official publications from these institutions and are generally well-validated.

3.7.2 Validity

Validity refers to how well the data measures what it is supposed to measure. In the research context, it's about ensuring that the data accurately reflects the impact of taxation on GDP and related variables (Creswell, 2014).

The following types of validity tests were applied: the content validity to ensure the data includes all aspects of taxation and economic growth you intend to study and the dataset's completeness (Saunders, 2019). The construct validity to verify that the variables and constructs in the research, such as "GDP" and "tax revenue," are measured appropriately by the secondary data

3.7.3 Reliability

The concept of reliability pertains to how dependable and consistent the tool used for measuring data is (Kothari, 2004). In examining the impact of taxation on sub-Saharan African middle-high countries' GDP, the data measuring instrument should produce consistent results when applied repeatedly to the same sample population. To ensure reliability, the data measuring instrument should be tested for consistency and stability using a test-retest method. In addition, the research should use a representative sample population that is large enough to ensure that the results are statistically significant (Hair, 2018).

Overall, ensuring the validity and reliability of the data measuring instrument is crucial in ensuring that the research findings accurately reflect the examination of the impact of taxation on upper-middle-income sub-Saharan African countries' GDP.

3.8 Summary

Chapter 3 presented the methods and tools used by the researcher to gather and analyse the data. The research method section will comprise the research design, population, sampling, data collection tool, reliability and validation, and data analysis. The quantitative research methodology was used to identify relevant data sources, such as national statistical agencies, international organisations, and academic databases. Data on GDP, taxation policies, and other relevant economic indicators were collected and analysed the data. The collected data were analysed using statistical tools to determine the correction between tax reforms and economic development growth in the sub-Saharan African region.

Allison (2020) notes that quantitative researchers often approach research ethics by reducing ethical issues to abstract normative logic, such as effective taxation and tax risk governance. Values are deeply ingrained in all aspects of quantitative methods, including observations, facts, and conceptions of objectivity.

Chapter 4 of the study will present, interpret, and discuss the results. Diagnostic test results precede the presentation of the study's main results, allowing the researcher to validate the results.

CHAPTER 4: DATA PRESENTATION, ANALYSIS, AND DISCUSSION

4.1 Introduction

This chapter's offerings construe and deliberate the outcomes of the quantitative examination of the impact of taxation on sub-Saharan African upper-middle-income countries 'gross domestic product. The frequencies and charts were used for quantifiable data. The study used panel data analysis to estimate the effect of taxation on gross domestic product growth in upper-middle-income sub-Saharan African countries. The analysis will use econometric techniques such as fixed effects and random effects models to estimate the effect of taxation on GDP growth. The analysis will also include control variables such as inflation, trade openness, and foreign aid (Gujarati, 2009).

4.2 Panel data model results

In meeting the objectives of the study, national-level historical data on economic indicators such as Gross Domestic Product (GDP) growth rates and various rates of taxation including value-added tax (VAT), property tax, personal income tax, social contributions, national tax revenue, corporate tax rate as well as mediation variables including labour force participation rate, imports and exports, inflation (GDP deflator) are used. These data were extracted from the World Bank World Development/Economic Indicators (World Bank, 2020). Due to missing values on the trend values for most countries, recourse was made to utilise weighted data and not the actual individual rates. Furthermore, some policies institutionalising certain taxation regimes such as VAT, excise taxes and social contributions were implemented much later in other countries than in others. For instance, Namibia implemented a value-added tax in 2000, replacing the previous sales tax system, which implies that there is no data for VAT from 1990 to 1998, which are critical observational periods in the current study. Namibia also does not have a dedicated social contributions tax, although it has the Social Security Act, which was institutionalised in 1994, implying missing data for the earlier periods. In Mauritius, VAT was introduced in 1998, replacing sales tax; thus, earlier periods have no data on VAT. Botswana introduced VAT in 2002, implying a lack of data for earlier periods. The researcher also observed that national tax rates were not linked to GDP, hence the need for taxation metrics linked to GDP. Therefore, recourse was made to utilise tax measurements expressed as a ratio

of GDP and exclude all indicators with missing data across the investigated entities. This can be summarized as follows: Table 2: Institutionalization of some tax regimes across countries in the sample

Country	VAT Implementation Year	Excise Tax	Social Contributions Tax or Equivalent
Namibia	2000	SACU, since 1990	Social Security Act (1994)
South Africa	1991	SACU, long-standing	UIF (2001), Skills Development Levy (1999)
Mauritius	1998	Excise Act (1994)	National Pensions Act (1976)
Botswana	2002	SACU, long-standing	Public Officers Pension Fund (2001)

The implication of missing data is that it is an unbalanced panel data set, and several tests become infeasible during panel analysis (Moundigbaye, Rea and Reed, 2018). Thus, the variables were removed from the analysis for tax categories with high missing values, resulting in VAT, excise and social contributions being eliminated from the analysis for the four countries.

The new data variables used measured corporate tax as a percentage of GDP (INDCORPTAX), income and profit combined as a percentage of GDP (INCPRFTTAX), international trade tax (INTTRADETAX), general tax revenue as a percentage of GDP (TAXREVGDP), gross national investment as ratio of GDP (CAPFORMGDP), GDP growth rate (GDPGrowthRate), social contributions tax (SOCCONTTAX), goods and services tax (GDSSERVTAX), inflation measured using GDP deflator (INFLATION) and labour force participation rate (LABPARTRATE).

Table 3: Summary of missing values

Variable	Missing	Non-missing	Total observations	Min Value	Max Value
INDCORPTAX	21	107	128	2.137	19.739
INCPRFCAPTAX	28	100	128	12.828	57.495

INTTRDTAX	28	100	128	1.139	39.301
TAXREVGDP	28	100	128	8.758	34.629
SOCCONTTAX	16	112	128	14.104	34.735
GDSSERVGDP	14	114	128	0.958	13.859
LABPART	4	124	128	52.267	64.180

Data with the highest rate of missingness was 21.88%. To create a balanced panel, average values were calculated over the three periods (1990-1999), (2000-2009) and (2010-2019) and used for multiple imputation for missing values to create a balanced panel data set. An analysis of the pattern of missingness showed that the data was mostly missing at random, which enabled the multiple imputation using the average values feasible. Multiple imputation is a robust method for handling missing data, especially when data are missing at random (MAR) or missing completely at random (MCAR). The descriptive analysis for the data variables is presented below.

Descriptive analysis

Figure 1: Individual and corporation tax

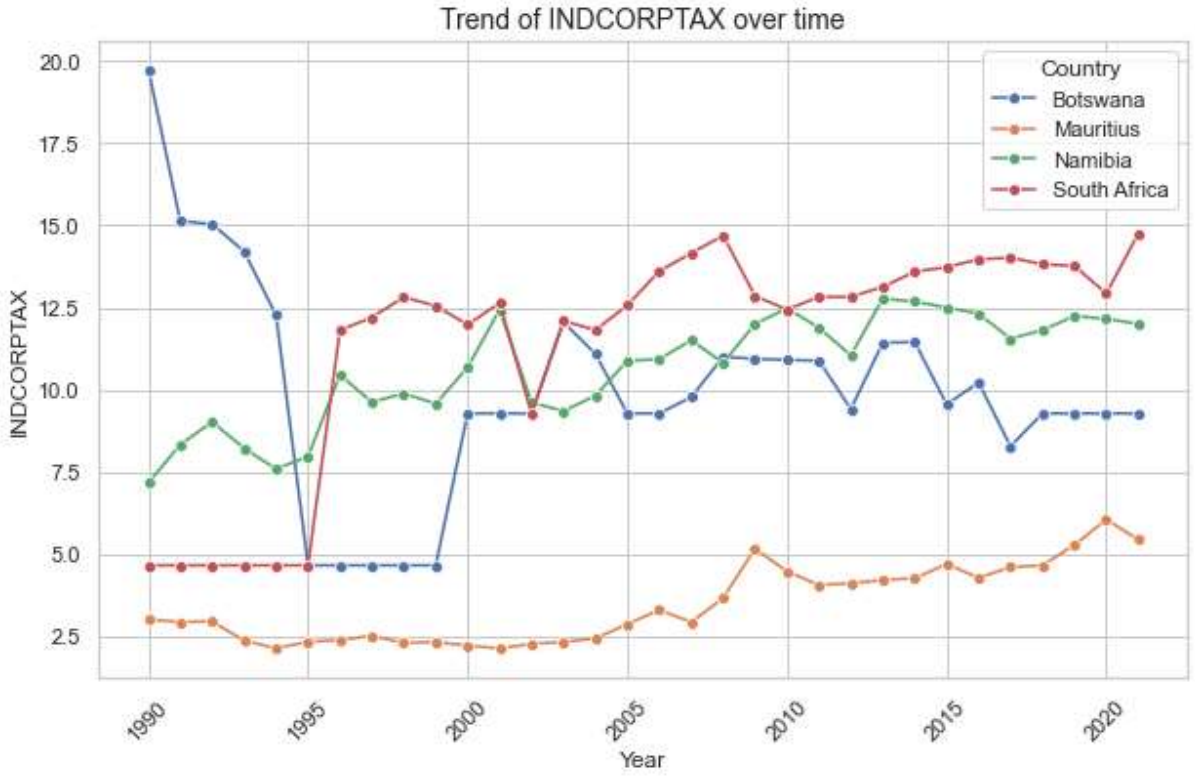


Figure 2: Total tax revenue as percentage of GDP

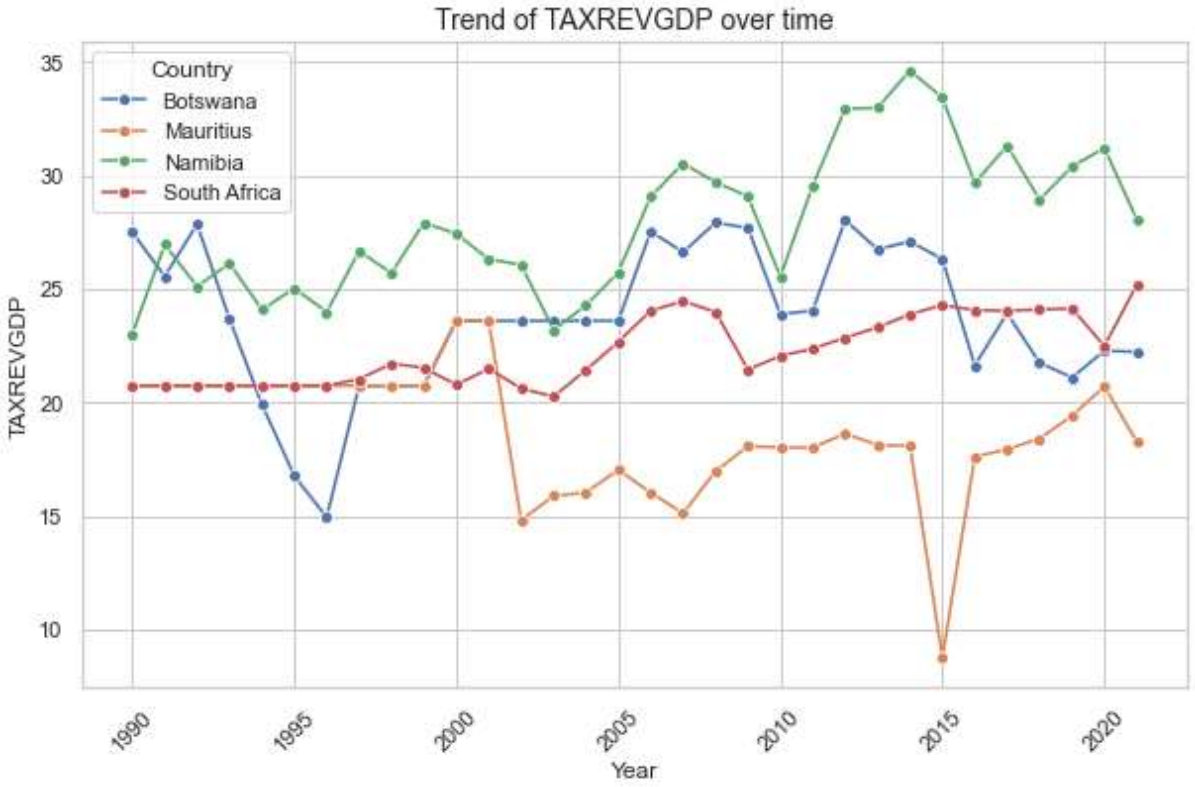


Figure 3: Gross Domestic Growth Rate

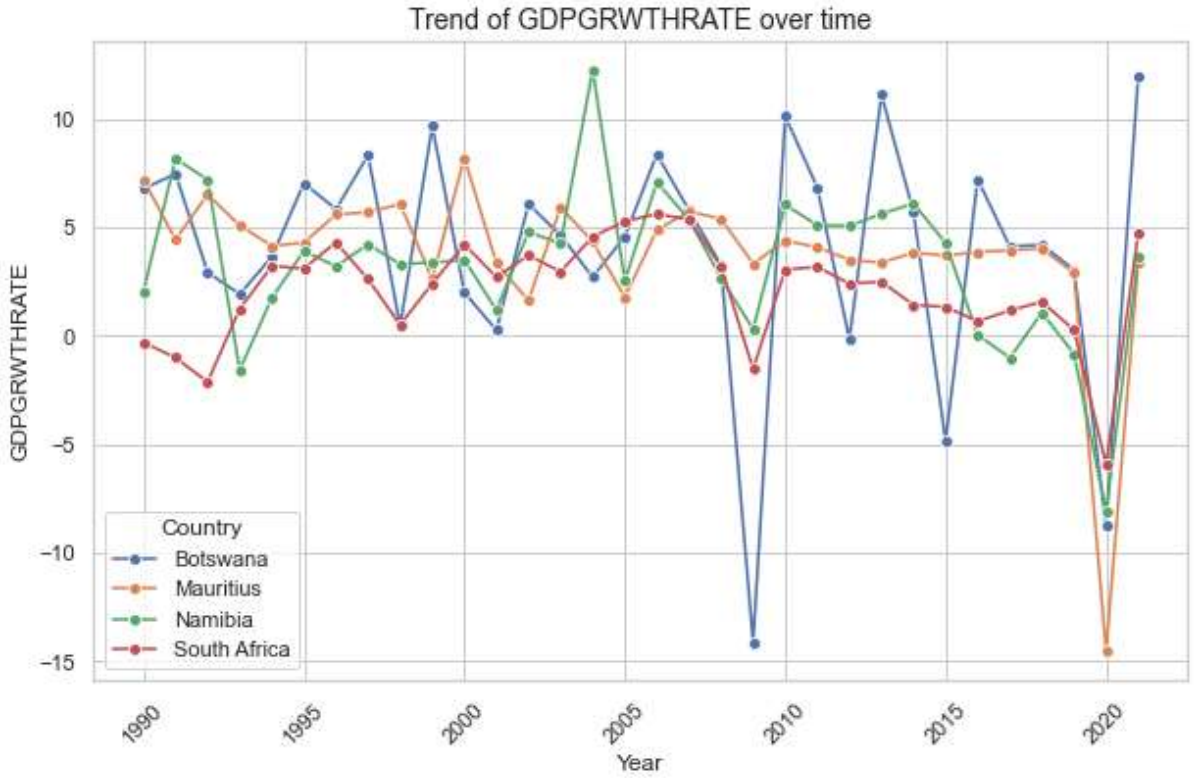


Figure 4: Labour participation

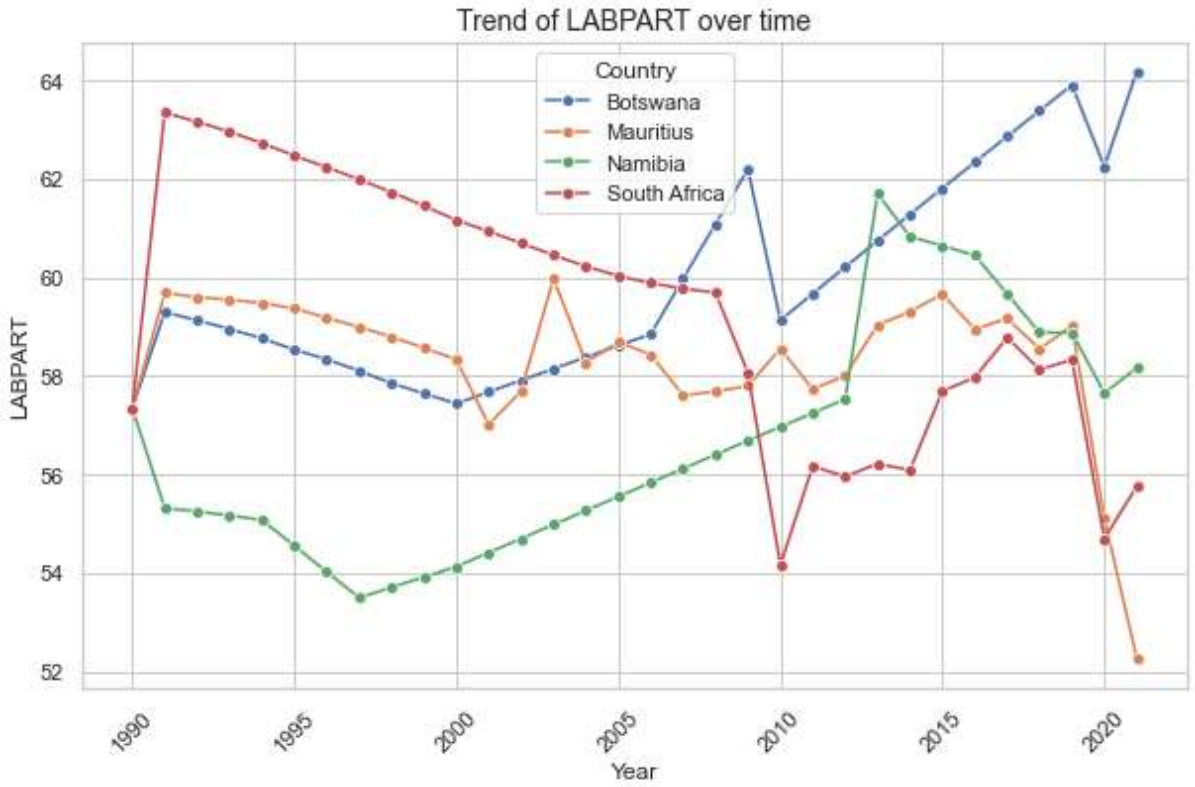


Figure 5: Capital formation GDP

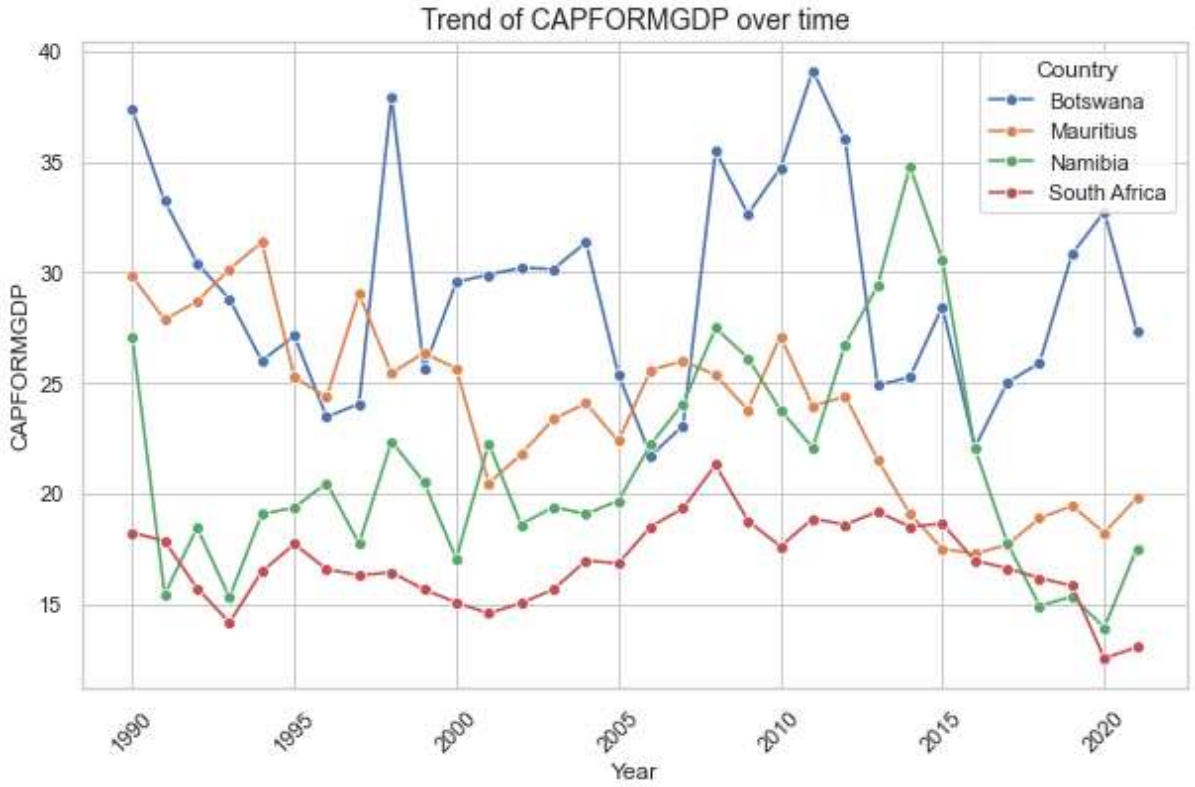


Figure 6: Social contributions tax

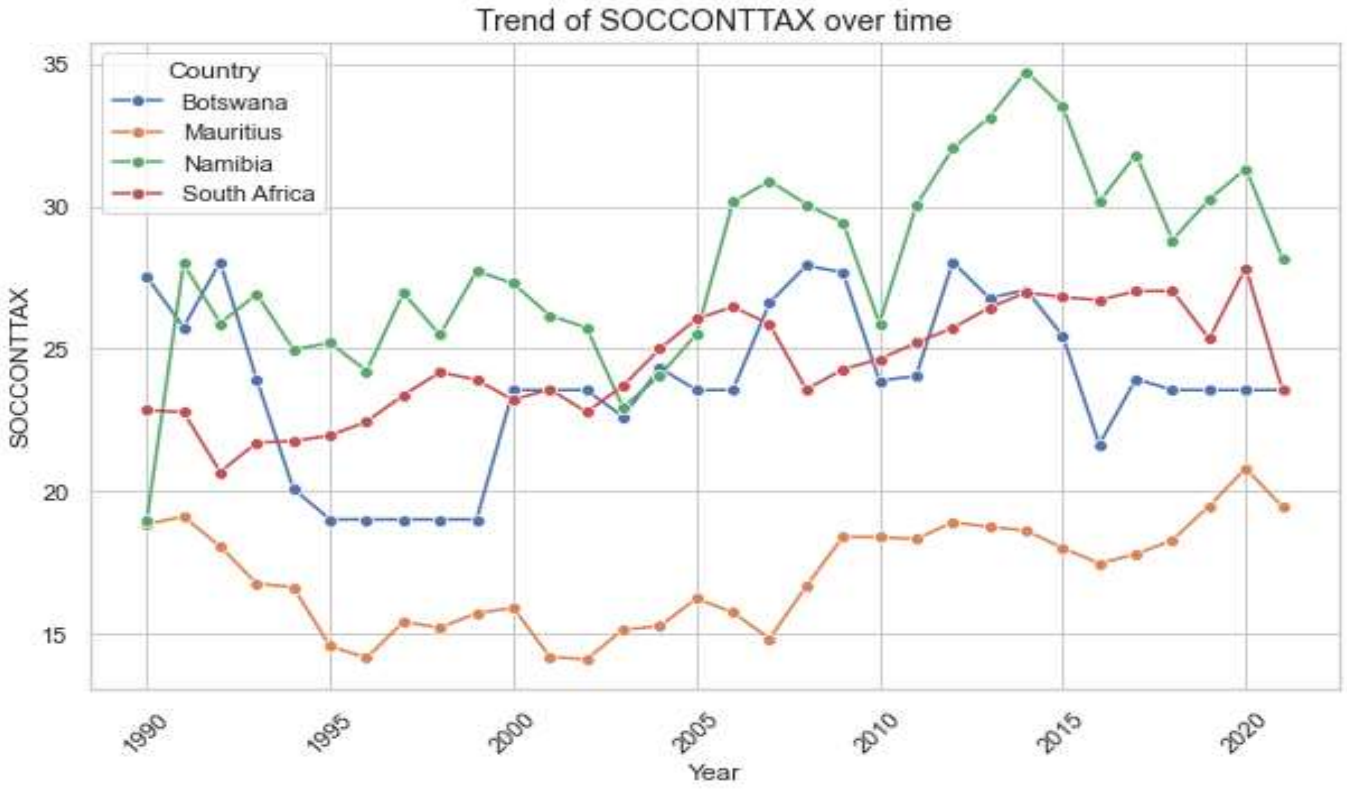
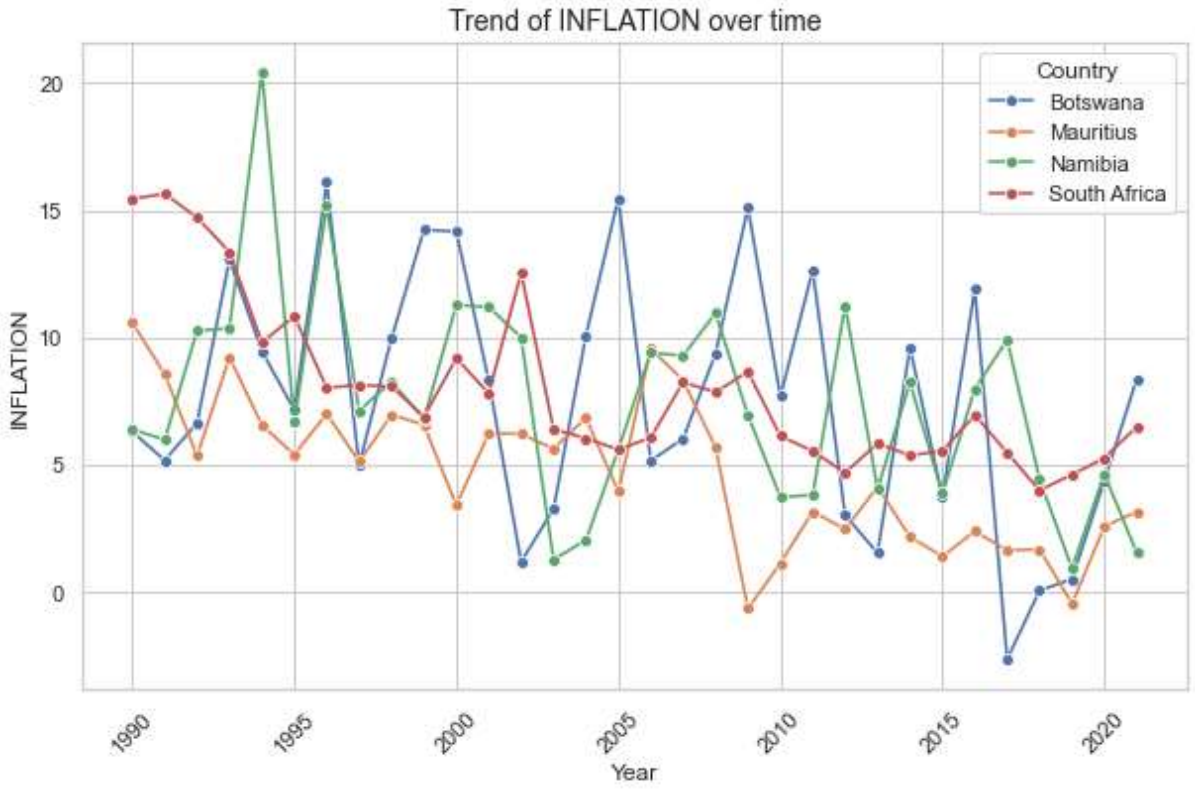


Figure 7: Inflation



4.3 The summary statistics for variables

The summary statistics for the key variables from the dataset across the four countries—Botswana, Mauritius, Namibia, and South Africa—provide insights into their economic and tax trends:

4.3.1Corporate Tax (INDCORPTAX):

- **Botswana** has an average corporate tax rate of 10.01% over the years, ranging from 4.66% to 19.74%.
- **Mauritius** maintains an average lower corporate tax rate of 3.47%, with a minimum of 2.14% and a maximum of 6.06%.
- **Namibia**'s average corporate tax rate is 10.67%, and ranges between 7.17% and 12.77%.
- **South Africa** shows the highest average corporate tax rate at 11.40%, with values between 4.66% and 14.74%.

- **Botswana:** INDCORPTAX experienced a sharp decline from 1990 to 1995, followed by a gradual increase until 2015. Since then, it has remained relatively stable.
- **Mauritius:** INDCORPTAX initially increased from 1990 to 1995, then declined until 2000. After a brief period of stability, it rose again until 2015 and has remained relatively high.
- **Namibia:** INDCORPTAX fluctuated significantly over the period, with no clear upward or downward trend. It experienced peaks in 1995 and 2005, followed by declines.
- **South Africa:** INDCORPTAX remained relatively stable from 1990 to 2000, then declined until 2010. It has since risen steadily.
- Overall, most countries have had a general upward trend in INDCORPTAX. South Africa and Mauritius have experienced the most significant increases. Botswana's initial decline, followed by a gradual increase, is a unique trend. Namibia's fluctuating pattern suggests a lack of consistent policy or economic factors influencing INDCORPTAX. Overall, the chart shows various trends in INDCORPTAX across the four countries, highlighting the complexities of corporate taxation policies and their impact on different economies.
-

4.3.2 Tax Revenue as a Percentage of GDP (TAXREVGDP):

- **Namibia** collects the highest tax revenue relative to GDP, with an average of 27.96%, peaking at 34.63%.
- **Botswana** follows with an average tax-to-GDP ratio of 23.71%, fluctuating between 14.94% and 28.04%.
- **South Africa** has an average tax-to-GDP ratio of 22.29%, with relatively stable values over the years.
- **Mauritius** has the lowest average at 18.64%, fluctuating between 8.76% and 23.60%.
- **Botswana:** TAXREVGDP fluctuated significantly over the period, with no clear upward or downward trend. It experienced peaks in 1990, 2005, and 2015, followed by declines.

- **Mauritius:** TAXREVGDP experienced a steady decline from 1990 to 2010, followed by a slight increase in the last few years.
- **Namibia:** TAXREVGDP experienced a significant decline from 1990 to 1995, followed by a gradual increase until 2010. Since then, it has fluctuated with no clear trend.
- **South Africa:** TAXREVGDP declined from 1990 to 2000, then increased until 2010. It has since fluctuated with no clear trend.
- There is no consistent upward or downward trend in TAXREVGDP for any country. Botswana and Mauritius experienced the most significant fluctuations. Namibia's steady decline is a notable trend. South Africa's initial decline, followed by an increase, is similar to Botswana's.
- Overall, the chart shows various trends in TAXREVGDP across the four countries, highlighting the complexities of tax revenue generation and its relationship to GDP. The lack of a clear overall trend suggests that various factors influence these countries' fiscal performance.

4.3.4 GDP Growth Rate (GDPGRWTHRATE):

- **Botswana** experienced higher variability in GDP growth, with an average of 3.99%, peaking at 16.11%.
- **Mauritius**'s economy grew by an average of 3.83%, with a maximum growth rate of 10.58%.
- **Namibia** grew at an average rate of 3.32%, with a maximum growth rate of 20.46%.
- **South Africa** had the lowest growth rate at 2.06% on average, with relatively stable fluctuations.
- **Botswana:** GDPGRWTHRATE experienced significant fluctuations over the observation period, with positive and negative growth rates. It experienced peaks in the early 1990s and around 2000, followed by declines.
- **Mauritius:** GDPGRWTHRATE generally remained positive throughout the period, with some fluctuations. It experienced a peak in 2010, followed by a decline.

- **Namibia:** GDPGRWTHRATE experienced a significant decline in the early 1990s, followed by a gradual recovery. It experienced a peak in 2000, followed by a decline.
- **South Africa:** GDPGRWTHRATE experienced a gradual decline from 1990 to 2010, followed by a slight increase in the last few years.
- All four countries experienced fluctuations in GDPGRWTHRATE. Mauritius generally had the highest growth rates. Namibia's initial decline, followed by a recovery, is a notable trend. South Africa's long-term decline is a significant concern.
- Overall, the chart shows various trends in GDPGRWTHRATE across the four countries, highlighting the complexities of economic growth. The fluctuations suggest that various factors are influencing these countries' economic performance.

4.3.4 Capital Formation as a Percentage of GDP (CAPFORMGDP):

- **Botswana** leads in capital formation, with an average of 33.21% of GDP.
- **Namibia** follows at 27.06%.
- **Mauritius** averages 29.81%, and **South Africa** has the lowest, averaging 18.23%.
- **Botswana:** CAPFORMGDP experienced a significant decline from 1990 to 1995, followed by a gradual increase until 2010. Since then, it has fluctuated with no clear trend.
- **Mauritius:** CAPFORMGDP fluctuated significantly over the period, with no upward or downward trend. It experienced peaks in 1990, 2005, and 2015, followed by declines.
- **Namibia:** CAPFORMGDP experienced a steady decline from 1990 to 2015, followed by a slight increase in the last few years.
- **South Africa:** CAPFORMGDP declined from 1990 to 2000, then increased until 2010. It has since fluctuated with no clear trend.
- Overall, the chart shows various trends in CAPFORMGDP across the four countries, highlighting the complexities of capital formation and its relationship to GDP. The lack of a clear overall trend suggests that various factors influence these countries' economic development.

4.3.5. Social Contribution Taxes (SOCCONTTAX):

- **Namibia** has the highest social contribution taxes, averaging 28.02%.
- **Botswana** averages 23.83%, followed by **South Africa** at 24.49%.
- **Mauritius** has the lowest average at 17.04%.
- Botswana: SOCCONTTAX fluctuated significantly over the period, with no upward or downward trend. It experienced peaks in 1990, 2005, and 2015, followed by declines.
- Mauritius: SOCCONTTAX experienced a steady decline from 1990 to 2010, followed by a slight increase in the last few years.
- Namibia: SOCCONTTAX experienced a significant decline from 1990 to 1995, followed by a gradual increase until 2010. Since then, it has fluctuated with no clear trend.
- South Africa: SOCCONTTAX declined from 1990 to 2000, then increased until 2010. It has since fluctuated with no clear trend.
- Overall, the chart shows various trends in SOCCONTTAX across the four countries, highlighting the complexities of social contributions and taxes. The lack of a clear overall trend suggests that various factors influence these countries' social welfare systems and fiscal performance.

4.3.6. Inflation:

- **South Africa** has the highest average inflation rate at 7.98%, with a maximum of 15.65%.
- **Botswana** follows closely with an average of 7.56%.
- **Namibia** averages 7.49%, while **Mauritius** has the lowest inflation, averaging 4.75%.
- Botswana: Inflation experienced significant fluctuations over the observation period, with both high and low rates. It experienced peaks in the early 1990s and around 2000, followed by declines.
- Mauritius: Inflation generally remained relatively low throughout the observation period, with some fluctuations. It experienced a peak in 2010, followed by a decline.

- Namibia: Inflation experienced a significant decline in the early 1990s, followed by a gradual recovery. It experienced a peak in 2000, followed by a decline.
- South Africa: Inflation experienced a gradual decline from 1990 to 2010, followed by a slight increase in the last few years.
- All four countries experienced fluctuations in inflation. Mauritius generally had the lowest inflation rates. Namibia's initial decline, followed by a recovery, is a notable trend. South Africa's long-term decline is a significant achievement.
- Overall, the chart shows a variety of trends in inflation across the four countries, highlighting the complexities of price stability. The fluctuations suggest that various factors are influencing these countries' economic performance.

4.3.7 Labour force participation rate

- Botswana: LABPART experienced a slight decline from 1990 to 1995, followed by a gradual increase until 2010. Since then, it has fluctuated with no clear trend.
- Mauritius: LABPART experienced a steady decline from 1990 to 2010, followed by a slight increase in the last few years.
- Namibia: LABPART experienced a significant decline from 1990 to 1995, followed by a gradual increase until 2005. Since then, it has fluctuated with no clear trend.
- South Africa: LABPART declined from 1990 to 2000, then increased until 2010. It has since fluctuated with no clear trend.
- There is no consistent upward or downward trend in LABPART for any of the countries.
- Botswana and Mauritius experienced the most significant fluctuations.
- Namibia's steady decline is a notable trend.
- South Africa's initial decline, followed by an increase, is similar to Botswana's.
- Overall, the chart shows various trends in LABPART across the four countries, highlighting the complexities of labour participation. The lack of a clear overall trend suggests that various factors influence these countries' labour markets.

4.3.8 Observations:

- **Botswana** and **Namibia** demonstrate high tax revenue relative to GDP, which suggests effective tax collection, but Botswana's corporate tax rates are relatively low compared to the others.
- **South Africa** exhibits lower GDP growth and relatively high inflation, which may impact economic stability and tax revenue.
- **Mauritius** has low corporate taxes and inflation, possibly making it more attractive for businesses but yielding lower tax revenue relative to GDP.

The table above is a summary of the key variables in the model individual and corporate tax as a percentage of GDP (INDCORP_X), income and profits tax (INCPROTAX), international trade tax (INTTRADETAX), aggregate tax revenue as a ratio of GDP (TAXREVGDP), GDP growth rate (GDPGrowthRate), gross capital formation (CAPFORMGDP), social contributions (SOCCONTTAX), goods and services tax (GDSSERVTAX), inflation (INFLATION) and labour force participation rate (LABPART). The overall mean, between and within mean values are presented for each variable.

The average mean value of individual and corporate tax income as a fraction of GDP is 8.88 across the four countries, with individual countries being 1.37% above or below it, as shown by the between standard deviation. Looking at each country, individual and corporate tax values fluctuate around this mean value by +/- 3.84%.

The average value of income and profit tax rate is large at 32.976. Across the countries, the value fluctuates from this average value by +/- 3.93%, and variability over time is quite large at 10.62%. International trade tax is also highly variable within countries over time, with a standard deviation 12.31.

Tax revenue as a fraction of GDP has an overall mean value of 23.14, with differences across countries having a standard deviation of 1.41 and within countries of 4.09. Thus, trade tax shows large differences within countries when compared to between countries.

Across the four countries, the labour force participation rate, that is people who are liable to taxation and recorded as active in the labour market account for an average 58.55% of the

respective populations. Across countries, the difference is +/- 0.87 while within countries due to changes in employment patterns, the standard deviation over time changes by +/- 2.33.

4.4 Panel data models

Table 4: Summary of Variables

Variable		Mean	Std. dev.	Min	Max	Observations	
INDCOR~X	overall	8.884137	4.075178	2.136961	19.73886	N =	128
	between		1.371571	4.908807	10.49749	n =	32
	within		3.843215	1.898749	19.97357	T =	4
INCPRF~X	overall	32.97551	11.30919	12.82772	57.495	N =	128
	between		3.931235	24.12107	39.99672	n =	32
	within		10.62112	9.987936	56.07898	T =	4
INTTRD~X	overall	15.6329	12.75739	1.13867	39.30088	N =	128
	between		3.37834	9.276556	21.31588	n =	32
	within		12.3129	-2.221458	38.66608	T =	4
TAXREV~P	overall	23.14878	4.327404	8.758006	34.62869	N =	128
	between		1.408759	20.10012	25.92099	n =	32
	within		4.097402	8.710762	33.37514	T =	4
CAPFOR~P	overall	22.78703	6.05795	12.53754	39.11812	N =	128
	between		2.415026	18.96566	28.11621	n =	32
	within		5.56814	12.90206	36.162	T =	4
GDPGRW~E	overall	3.30285	3.945791	-14.54654	12.26955	N =	128
	between		2.979336	-9.335012	6.476599	n =	32
	within		2.627262	-7.823565	9.635746	T =	4
SOCCON~X	overall	23.34416	4.73834	14.1041	34.73553	N =	128
	between		1.906181	19.96009	26.85451	n =	32
	within		4.347893	13.62783	31.22518	T =	4
GDSSER~P	overall	7.359862	2.893496	.9579903	13.85917	N =	128
	between		1.490545	4.51179	9.511795	n =	32
	within		2.490598	2.581408	12.39283	T =	4
INFLAT~N	overall	6.945783	4.059932	-2.649919	20.45909	N =	128
	between		2.598782	1.395396	11.57813	n =	32
	within		3.144665	-1.224213	15.83225	T =	4
LABPART	overall	58.54867	2.484316	52.267	64.18	N =	128
	between		.8720054	57.2055	60.118	n =	32
	within		2.330106	53.22217	65.13517	T =	4

4.4.1 Random Effects Model

Table 5 Results of the Random Effects Panel Data Model

_GDPGRWTH RATE	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
_INDCORPTAX	-.025	.175	-0.14	.887	-.368	.318	
_INCPRFCAPTAX	.032	.054	0.60	.552	-.073	.137	
_INTTRDTAX	.033	.04	0.81	.417	-.046	.112	
_TAXREVGDP	-.044	.161	-0.28	.783	-.36	.271	
_CAPFORMGDP	.041	.068	0.61	.542	-.092	.175	
_SOCCONTTAX	-.14	.19	-0.74	.461	-.513	.233	
_GDSSERVGDP	-.253	.147	-1.72	.085	-.541	.035	*
_INFLATION	-.211	.086	-2.44	.015	-.38	-.042	**
_LABPART	-.083	.119	-0.70	.486	-.318	.151	
Constant	.135	.078	1.73	.084	-.018	.288	*

Mean dependent var	0.033	SD dependent var	0.039
Overall r-squared	0.084	Number of obs	128
Chi-square	16.676	Prob > chi2	0.054
R-squared within	0.151	R-squared between	0.031

**** p<.01, ** p<.05, * p<.1*

The table shows the results from a random effects panel data regression model, which is used to examine the relationship between several independent variables (tax rates as a share of GDP, capital formation, social contributions, etc.) and the dependent variable (_GDPGRWTHRATE), which is the growth rate of GDP. Each coefficient represents the estimated effect of the independent variable on the GDP growth rate. A positive coefficient indicates that an increase in the independent variable is associated with an increase in the GDP growth rate. A negative coefficient indicates that an increase in the independent variable is associated with a decrease in the GDP growth rate.

Independent Variables: INDCORPTAX (Corporate Income Tax): Coefficient = -0.025, p = 0.887

- The negative coefficient suggests that higher corporate income tax slightly reduces GDP growth, but it is not statistically significant ($p > 0.05$).

_INCPRFCAPTAX (Personal Income/Capital Tax): Coefficient = 0.032, p = 0.552

- A positive effect is suggested, but this result is not statistically significant.

_INTTRDTAX (International Trade Tax): Coefficient = 0.033, p = 0.417

- A small positive association is suggested, but again this result is not statistically significant.

_TAXREVGDP (Total Tax Revenue to GDP): Coefficient = -0.044, p = 0.783

- The negative coefficient suggests that an increase in total tax revenue as a percentage of GDP reduces GDP growth, but it is not significant.

_CAPFORMGDP (Capital Formation to GDP): Coefficient = 0.041, p = 0.542

- A positive effect, indicating that higher capital formation is associated with higher GDP growth, but it is not significant.

_SOCCONTTAX (Social Contributions Tax): Coefficient = -0.140, p = 0.461

- The negative coefficient suggests that higher social contributions tax might reduce GDP growth, but the result is not significant.

_GDSSERVGDP (Goods and Services as % of GDP): Coefficient = -0.253, p = 0.085

- This negative coefficient indicates that higher output from goods and services relative to GDP decreases the GDP growth rate, and it is marginally significant ($p < 0.1$).

_INFLATION: Coefficient = -0.211, p = 0.015

- A statistically significant ($p < 0.05$) negative coefficient, suggesting that higher inflation significantly reduces GDP growth.

_LABPART (Labour Participation Rate): Coefficient = -0.083, p = 0.486

- A negative coefficient indicates a potential decrease in GDP growth with higher labour participation, but it is not significant.

Constant: Coefficient = 0.135, p = 0.084

- The constant is marginally significant (*p < 0.1*), and it represents the expected GDP growth rate when all independent variables are equal to zero.

4.4.2 Model Fit Statistics

- Mean dependent variable: The mean value of the dependent variable (GDP growth rate) is 0.033, indicating an average growth rate of 3.3%.
- Overall R-squared (0.084): Only 8.4% of the variation in GDP growth is explained by the independent variables, suggesting a weak model fit.
- Within R-squared (0.151): This shows the variation within entities (e.g., countries) over time, as the model explains.
- Between R-squared (0.031): This shows the variation between entities (e.g., differences in GDP growth rates across countries) that the model explains.
- Chi-square (16.676), Prob > chi2 (0.054): This suggests that the overall model is marginally significant at the 10% level, implying the independent variables, as a group, have some impact on GDP growth.

4.4.3 Fixed Effects Model

Table 6: Results of the fixed effects model

_GDPGRWTH RATE	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
_INDCORPTAX	-.071	.181	-0.39	.697	-.43	.288	
_INCPRFCAPTAX	.041	.057	0.71	.48	-.073	.154	
_INTTRDTAX	.037	.043	0.88	.383	-.047	.122	
_TAXREVGD	-.104	.167	-0.63	.533	-.436	.227	

P							
_CAPFORMGDP	.053	.073	0.73	.467	-.091	.197	
_SOCCONTTAX	-.036	.201	-0.18	.86	-.436	.365	
_GDSSERVGDP	-.212	.16	-1.33	.187	-.529	.105	
_INFLATION	-.268	.094	-2.87	.005	-.454	-.083	***
_LABPART	-.067	.124	-0.54	.592	-.313	.18	
Constant	.114	.083	1.38	.171	-.05	.278	

Mean dependent var	0.033	SD dependent var	0.039
R-squared	0.159	Number of obs	128
F-test	1.823	Prob > F	0.010
Akaike crit. (AIC)	-571.511	Bayesian crit. (BIC)	-542.991

*** *p<.01*, ** *p<.05*, * *p<.1*

The fixed effects panel data regression model results provide insights into the relationship between various independent variables (e.g., taxes, capital formation, inflation) and the dependent variable, _GDPGRWTHRATE (GDP growth rate). Fixed effects models account for time-invariant characteristics within entities (such as countries), focusing on the effects of time-varying variables. As before, each coefficient represents the estimated impact of an independent variable on GDP growth rate. Positive coefficients indicate a positive relationship between the independent variable and GDP growth. Negative coefficients indicate a negative relationship.

4.4.4 Interpretation of key variables

_INDCORPTAX (Corporate Income Tax): Coefficient = -0.071, p = 0.697

- The negative coefficient suggests that an increase in corporate income tax could reduce GDP growth, but the effect is not statistically significant ($p > 0.05$).

_INCPRFCAPTAX (Personal Income/Capital Tax): Coefficient = 0.041, p = 0.48

- The positive coefficient suggests that higher personal income/capital tax could increase GDP growth, but it is not statistically significant.

_INTTRDTAX (International Trade Tax): Coefficient = 0.037, p = 0.383

- This variable shows a small positive association with GDP growth, though it is not statistically significant.

_TAXREVGDP (Total Tax Revenue to GDP): Coefficient = -0.104, p = 0.533

- The negative coefficient suggests that higher total tax revenue as a percentage of GDP is associated with lower GDP growth, but this result is not statistically significant.

_CAPFORMGDP (Capital Formation to GDP): Coefficient = 0.053, p = 0.467

- The positive coefficient suggests that higher capital formation as a share of GDP is associated with higher GDP growth, but the result is not statistically significant.

_SOCCONTTAX (Social Contributions Tax): Coefficient = -0.036, p = 0.86

- A negative coefficient suggests a potential reduction in GDP growth with higher social contributions tax, but this effect is not statistically significant.

_GDSSERVGDP (Goods and Services as % of GDP): Coefficient = -0.212, p = 0.187

- This negative coefficient suggests that an increase in goods and services output relative to GDP is associated with a reduction in GDP growth. However, the result is not statistically significant.

_INFLATION: Coefficient = -0.268, p = 0.005

- A statistically significant negative effect ($p < 0.01$) shows that higher inflation is strongly associated with lower GDP growth. For every unit increase in inflation, GDP growth decreases by 0.268 units.

_LABPART (Labour Participation Rate): Coefficient = -0.067, p = 0.592

- The negative coefficient suggests that higher labour participation could slightly reduce GDP growth, but the result is not statistically significant.

Constant: Coefficient = 0.114, p = 0.171

- The constant term represents the predicted GDP growth rate when all independent variables are equal to zero. This result is not significant.

Model Fit Statistics

- R-squared (0.159): The independent variables in the model explain about 15.9% of the variation in GDP growth. This is a moderate fit, though it suggests that other factors not included in the model might be influencing GDP growth.
- F-test (1.823), Prob > F (0.010): The F-test examines whether the independent variables, taken together, are statistically significant in explaining GDP growth. Since $p < 0.05$, the model is statistically significant, meaning the variables as a group contribute to explaining GDP growth.
- Akaike Information Criterion (AIC) (-571.511) and Bayesian Information Criterion (BIC) (-542.991): Lower AIC and BIC values indicate better model fit. These values are useful for comparing this model with other models.

Inflation is the only variable with a statistically significant negative impact on GDP growth ($p < 0.01$). Other tax variables (corporate, income/capital, trade) show no significant impact on GDP growth. The overall model fit is moderate, with some explanatory power (R-squared = 15.9%). The model as a whole is statistically significant (Prob > F = 0.01), meaning that the independent variables collectively have an effect on GDP growth.

4.4.5 Hausman test: Fixed Effects versus Random Effects

Table 7 : Hausman test for model fit

	Coef.
Chi-square test value	5.922
P-value	.748

The Hausman test is used to determine whether to use a fixed effects (FE) or random effects (RE) model in panel data analysis. Specifically, it tests whether the random effects model is appropriate or the fixed effects model should be preferred. The null hypothesis (**H0)** states that the random effects model is appropriate, i.e., the differences between the coefficients of the fixed effects and random effects models are not systematic. If the null hypothesis is accepted, the random effects model is preferable.

The alternative hypothesis (Ha) proposes that the fixed effects model is appropriate, i.e., the differences between the coefficients are systematic, and the fixed effects model should be used. The Chi-squared value (chi2(9) with 9 degrees of freedom is 5.92. This measures how different the fixed and random effects model coefficients are. The Prob > chi2 = 0.7477: The p-value is 0.7477, well above 0.05. This means the test fails to reject the null hypothesis (H0). Since the p-value is 0.7477, the null hypothesis cannot be rejected. This suggests no significant systematic difference between the fixed and random effects coefficients. Therefore, the random effects model is more appropriate for this dataset. Therefore, the random effects model is more efficient and appropriate in modelling the effect of taxation rates on GDP growth rate.

4.4.6 Breusch-Pagan Lagrangian Multiplier (LM) test

The Breusch-Pagan Lagrangian Multiplier (LM) test is used to determine whether a random effects model is appropriate compared to a simple pooled OLS regression. It tests whether there is significant variance across entities (in your case, across years or countries), justifying the use of random effects.

Table 8: Breusch Paran Lagrangian Multiplier Random Effects vs Pooled OLS Model

Estimated results:

	Var	SD = sqrt(Var)
_GDPGRW~E	.0015569	.0394579
e	.0008477	.029116
u	.0006854	.0261805

Test: Var(u) = 0

chibar2(01) =	33.90
Prob > chibar2 =	0.0000

The null hypothesis (H0) posits that variance across entities (countries or years) is zero, i.e., Var(u)=0. In this case, the pooled OLS model would be appropriate. The alternative hypothesis (Ha) states that variance across entities is different from zero, indicating that a random effects model is more appropriate. Since the p-value is 0.0000 (very small), the null hypothesis that Var (u)=0 is rejected. This means that there is significant variance across entities (countries/years), and the random effects model should be preferred over the pooled OLS model. The **Breusch-Pagan test strongly suggests** that the random effects model is more appropriate than the pooled OLS model, as significant variance across entities must be

accounted for. With the results of these tests, the random effects model is the more appropriate panel data model for modelling GDP growth using the outlined predictors.

4.4.7 Cross-sectional dependence

Testing for **cross-sectional dependence** in a panel data model is important to check whether residuals across entities (such as countries, firms, or regions) correlate. Cross-sectional dependence can arise due to unobserved common factors affecting all panel entities. The Pesaran test is used to check for cross-sectional dependence in panel data models, particularly in cases where the number of time periods (T) is larger than the number of entities. To test for cross-sectional dependence, the residuals for the random effects model are calculated and used to predict the incidence of cross-sectional dependence. The absolute correlations are calculated, with a significant p-value indicating cross-sectional dependence. Table 9: Cross-sectional dependence (RE Model)

```
Average correlation coefficients & Pesaran (2004) CD test

Residual series tested: re_resid
                              Group variable: YEAR
                            Number of groups: 32
                   Average # of observations: 4.13
                                    Panel is: unbalanced
```

Variable	CD-test	p-value	corr	abs(corr)
re_resid	19.74	0.000	0.443	0.546

```
Notes: Under the null hypothesis of cross-section
       independence CD ~ N(0,1)
```

The p-value of the Pesaran model is statistically significant, showing cross-sectional dependence. This implies that unobserved common factors affect entities in the panel.

4.4.8 Breusch Pagan (LM) test for Cross-sectional dependence

This test is typically used for panels where the number of entities (N) is large and the time dimension (T) is small. A statistically significant p-value indicates that there is cross-sectional dependence. This demonstrates a joint influence in the data explaining the variation in the dependent variable.

4.4.9 Final Model: Random Effects

The tests conducted above have demonstrated consistently that the dynamic relationship between the dependent variable (GDP growth rate) and the independent variables can best be modelled using a random effects panel data model. As stated earlier, the random effects model is particularly useful when unobserved individual-specific effects correlate with the outcome variable. The model assumes the existence of unobserved heterogeneity, that these individual specific effects influence the outcome variable, and that they are random variables drawn from a common distribution. Furthermore, the unobserved effects are assumed to be independent of the explanatory variables. The model focuses on variation in the outcome variable within individuals over time.

Table 10: Random Effects Model (Final)

_GDPGRWTH RATE	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
_INCPRFCAP TAX	.025	.041	0.62	.538	-.055	.105	
_INTTRDTA X	.029	.037	0.78	.434	-.043	.101	
_CAPFORMG DP	.035	.063	0.56	.578	-.088	.158	
_SOCCONTT AX	-.177	.114	-1.55	.12	-.401	.046	
_GDSSERVG DP	-.245	.14	-1.75	.08	-.519	.029	*
_INFLATION	-.207	.082	-2.52	.012	-.369	-.046	**
_LABPART	-.078	.117	-0.67	.503	-.307	.151	
Constant	.132	.076	1.73	.083	-.017	.281	*

Mean dependent var	0.033	SD dependent var	0.039
Overall r-squared	0.086	Number of obs	128

Chi-square	17.010	Prob > chi2	0.017
R-squared within	0.149	R-squared between	0.036

**** p<.01, ** p<.05, * p<.1*

Income from corporate taxes (_INCPRFCAPTAX):

- Coefficient: **0.025,** p-value: **0.538** (insignificant)
- Interpretation: Corporate taxes have a small positive but statistically insignificant effect on GDP growth. This suggests that the effect of corporate tax on economic growth is unclear, and further investigation might be required (such as using lags or exploring non-linear relationships).

International trade taxes (_INTTRDTAX):

- Coefficient: **0.029,** p-value: **0.434** (insignificant)
- Interpretation: International trade taxes have a small positive but statistically insignificant effect on GDP growth.

Capital formation (_CAPFORMGDP):

- Coefficient: **0.035,** p-value: **0.578** (insignificant)
- Interpretation: Capital formation (investment) has a small and statistically insignificant effect on GDP growth.

Social contributions tax (_SOCCONTTAX):

- Coefficient: **-0.177,** p-value: **0.120** (marginally insignificant)
- Interpretation: Social contributions tax has a negative effect on GDP growth, but the result is not statistically significant at the 5% level. The direction indicates that higher social contributions may potentially slow down GDP growth.

Goods and services as % of GDP (_GDSSERVGDP):

- Coefficient: **-0.245,** p-value: **0.080** (significant at 10% level)
- Interpretation: This variable has a negative effect on GDP growth, suggesting that a higher share of goods and services in GDP might be associated with slower economic growth. This result is statistically significant at the 10% level.

Inflation (_INFLATION):

- Coefficient: **-0.207,** p-value: **0.012** (significant at 5% level)
- Interpretation: Inflation has a negative and statistically significant impact on GDP growth. For every unit increase in inflation, GDP growth decreases by about 0.207 percentage points. This is consistent with the economic theory that high inflation hurts economic growth.

Constant:

- Coefficient: **0.132,** p-value: **0.083** (significant at 10%)
- Interpretation: The constant term represents the base GDP growth rate when all explanatory variables are zero.

Model Fit Statistics:

- **Overall R-squared**: **0.086**: This suggests that the model explains about 8.6% of the variance in GDP growth across all countries and years, indicating that there are possibly important variables missing from the model that could explain more of the variation.
- **R-squared within 0.149**: Within-entity variation (how much variation within individual countries over time is explained by the model) is 14.9%.
- **R-squared between 0.036**: Between-entity variation (how much variation across countries is explained by the model) is 3.6%, which is quite low.

Chi-Square Statistic:

- **Chi-square**: **17.010, Prob > chi2**: **0.017** (significant at 5%)
- Interpretation: The overall model is statistically significant at the 5% level, meaning that the independent variables, taken together, significantly explain the variance in GDP growth. However, the low R-squared values suggest that the model's explanatory power is weak.

The model explains only about 8.6% of the total variance in GDP growth. The predicting variables in the model account for a very small part of the variation in GDP growth rate. Tax rates can possibly affect GDP indirectly through variables such as government spending, foreign direct investment (FDI), exports and imports as a share of GDP, human capital

(education and health indicators) and technology adoption or innovation indicators, which are beyond the scope of the present investigation.

Adjusting for lags in tax response

In practice, some of the relationships (e.g., tax variables) have **lagged effects** on GDP growth. This is assessed by including lagged versions of key variables. To adjust the random effects model, these policy lags were included by taking lagging all the predicting variables, including the lagged values of the dependent variable. The model with lagged values is presented in Table 7 below.

Table 11: Accounting for lagged responses of taxes on GDP Growth Rate

_GDPGRWTH RATE	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Lg_INCPRFCAPTAX	-.114	.059	-1.92	.055	-.231	.002	*
Lg_INTTRDTAX	-.075	.036	-2.08	.038	-.145	-.004	**
Lg_CAPFORMGDP	-.022	.067	-0.33	.74	-.154	.11	
Lg_SOCCONTTAX	.1	.105	0.95	.342	-.106	.306	
Lg_GDSSERVGDP	-.322	.118	-2.73	.006	-.554	-.091	***
Lg_INFLATION	.036	.073	0.49	.625	-.108	.18	
Lg_LABPART	-.011	.156	-0.07	.943	-.316	.294	
Constant	.087	.094	0.93	.353	-.097	.271	

Mean dependent var	0.031	SD dependent var	0.033
Overall r-squared	0.130	Number of obs	96
Chi-square	19.276	Prob > chi2	0.007

R-squared within	0.223	R-squared between	0.079

*** p<.01, ** p<.05, * p<.1*

Accounting for lags in policy response does capture additional variation as shown by improved overall model significance.

_INCPRFCAPTAX (Lagged Income/Corporate Tax per Capita)

- **Coefficient**: -0.114, **Standard Error**: 0.059, **t-value**: -1.92, **p-value**: 0.055 (significant at the 10% level), **95% Confidence Interval**: [-0.231, 0.002]

The lagged income tax per capita coefficient is negative (-0.114) and marginally significant at the 10% level (p = 0.055). This suggests that a one-unit increase in lagged income tax per capita is associated with a 0.114 percentage point decrease in GDP growth rate, holding other factors constant. The relationship is relatively weak but could imply that higher income taxes may slightly dampen economic growth.

_INTTRDTAX (Lagged International Trade Tax)

- **Coefficient**: -0.075, **Standard Error**: 0.036, **t-value**: -2.08, **p-value**: 0.038 (significant at the 5% level), **95% Confidence Interval**: [-0.145, -0.004]

The coefficient for lagged international trade tax is negative (-0.075) and statistically significant at the 5% level (p = 0.038). This suggests that a one-unit increase in lagged international trade taxes is associated with a 0.075 percentage point decrease in GDP growth rate. This result indicates that increasing international trade taxes may negatively affect economic growth.

_CAPFORMGDP (Lagged Capital Formation as % of GDP)

- **Coefficient**: -0.022, **Standard Error**: 0.067, **t-value**: -0.33, **p-value**: 0.74 (not significant), **95% Confidence Interval**: [-0.154, 0.11]

The coefficient for lagged capital formation is negative (-0.022), but the result is not statistically significant (p = 0.74). This suggests that changes in capital formation do not have a significant effect on GDP growth in this model.

_GDSSERVGDP (Lagged Goods and Services as % of GDP)

- **Coefficient**: -0.322, **Standard Error**: 0.118, **t-value**: -2.73, **p-value**: 0.006 (significant at the 1% level), **95% Confidence Interval**: [-0.554, -0.091]

The coefficient for lagged goods and services as a percentage of GDP is negative (-0.322) and statistically significant at the 1% level (p = 0.006). This suggests that a one-unit increase in goods and services as a percentage of GDP is associated with a 0.322 percentage point decrease in GDP growth rate. The strong negative relationship indicates that this variable has a significant and substantial impact on economic growth.

Model Fit and Diagnostics

- **Overall R-squared**: 0.130 — This suggests that approximately 13% of the variation in GDP growth rate is explained by the independent variables in the model. While this is a low R-squared value, it is not uncommon in macroeconomic models, where many external factors can influence growth.
- **Chi-square**: 19.276, **p-value**: 0.007 — The overall model is statistically significant (p = 0.007), indicating that, collectively, the independent variables explain a significant amount of variance in GDP growth.
- **R-squared within**: 0.223 — This indicates that the model better explains within-individual variation in the GDP growth rate (across time) compared to between-individual variation, which is captured by the lower **R-squared between** the value of 0.079.

While the overall model is statistically significant, the low R-squared suggests that other factors not included in the model could explain GDP growth. This shows that while adjusting for lags in taxation policy responses, the model still requires much improvement in including factors that account for GDP growth, which may act as mediators for the influence of taxation.

Panel Data Model (Interaction Effects)

The impact of taxation on GDP growth rates may depend on the level of capital formation (investment) and labour force participation. This aligns with the propositions of the endogenous growth theory, which argues that technology is labour-augmenting, with increased investment in labour augmenting technology/capital, increasing overall output. The interaction term of

labour force participation and capital formation is included to capture this possible relationship. The results are shown in the model below.

Income from Corporate Taxes (_INCPRFCAPTAX):

- Coefficient: **-0.125,** p-value: **0.037** (significant at 5%)
- Unlike the previous model, where the effect of corporate taxes was insignificant, it now shows a statistically significant negative effect. This means that higher corporate taxes are associated with a reduction in GDP growth, and the result is robust in the new model.

Goods and Services as % of GDP (_GDSSERVGDP):

- Coefficient: **-0.264,** p-value: **0.035** (significant at 5%)
- Similar to the previous model, a higher share of goods and services in GDP continues to have a negative and statistically significant effect on GDP growth. The magnitude of this effect has increased slightly from -0.245 to -0.264.

Concerning the interaction term: The larger coefficients of capital formation and labour participation suggest that the interaction between these two variables might be important for explaining GDP growth. Although neither is individually significant, their joint effect (through interaction) may help explain the variation in GDP growth. The larger coefficients of capital formation and labour participation suggest that the interaction between these two variables might be important for explaining GDP growth. Although neither is individually significant, their joint effect (through interaction) may help explain the variation in GDP growth.

Model Fit Improvements:

Overall R-squared:

- New Model: 0.178 (17.8%)
- Previous Model: 0.086 (8.6%)
- Improvement: The overall R-squared has more than doubled, from 8.6% to 17.8%, indicating that the new model explains more of the total variation in GDP growth.

R-squared within:

- New Model: 0.219 (21.9%)
- Previous Model: 0.149 (14.9%)
- Improvement: The R-squared within has also improved, suggesting that the new model better explains variation within individual countries over time.

R-squared between:

- New Model: 0.179 (17.9%)
- Previous Model: 0.036 (3.6%)
- Improvement: The R-squared between has significantly improved, from 3.6% to 17.9%, indicating that the new model is much better at explaining variation across countries, which is crucial in panel data models where cross-sectional differences can be important.

Chi-Square:

- New Model: 21.376 (p-value = 0.006, significant)
- Previous Model: 17.010 (p-value = 0.017, significant)
- Interpretation: The overall significance of the model has improved, with a higher chi-square value and a stronger model fit.

Explanatory Power:

- The new model explains more of the variation in GDP growth compared to the previous one, both overall and within countries, indicating that including the interaction term between labour participation and capital formation has improved the model's ability to capture the dynamics of GDP growth.

The inclusion of the interaction term has changed the significance and magnitude of several variables: Corporate taxes are now significant and negative, indicating their importance in explaining GDP growth. The effect of capital formation and labour participation is more pronounced, suggesting their combined impact on growth, even though individually they remain insignificant.

Inflation: In the previous model, inflation had a significant negative impact, but in the new model, its effect is positive and insignificant. This suggests that the interaction between labour participation and capital formation might have diluted inflation's direct effect on GDP growth.

The new random effects model that includes the interaction term between labour participation and capital formation has improved the model's fit and explanatory power. Key changes include the significance of corporate taxes and a larger effect of capital formation and labour participation. However, further improvements can still be made by addressing the insignificance of the interaction term and potentially exploring other relevant economic variables.

Table 12: Random Effects Model with interaction term between Labour Force Participation and Capital formation.

_GDPGRWTH RATE	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Lg_INCPRFC APTAX	-.125	.06	-2.09	.037	-.242	-.008	**
Lg_INTTRDT AX	-.051	.039	-1.31	.191	-.128	.026	
Lg_CAPFOR MGDP	2.342	1.651	1.42	.156	-.895	5.579	
Lg_SOCCON TTAX	.102	.105	0.97	.33	-.103	.308	
Lg_GDSSERV GDP	-.264	.125	-2.11	.035	-.508	-.019	**
Lg_INFLATI ON	.044	.073	0.59	.553	-.1	.188	
Lg_LABPART	.915	.668	1.37	.171	-.394	2.223	
C	-3.989	2.786	-1.43	.152	-9.449	1.471	
Constant	-.466	.399	-1.17	.243	-1.249	.316	

Mean dependent var	0.031	SD dependent var	0.033
Overall r-squared	0.178	Number of obs	96
Chi-square	21.376	Prob > chi2	0.006
R-squared within	0.219	R-squared between	0.179

**** p<.01, ** p<.05, * p<.1*

Addressing Cross-Sectional Dependence

The initial model showed the existence of cross-sectional dependence. Cross-sectional dependence occurs in panel data when observations from different cross-sectional units (e.g., individuals, firms, or countries) correlate. In this model, this may be caused by various factors, such a s spatial dependence (where proximity or geographic location can influence correlations between observations). Countries such as South Africa, Namibia, and Botswana have a shared tax regime in the customs union (SACU), which may influence trade-related taxation variables. Unobserved heterogeneity is another possible factor where common factors not explicitly included in the model affect multiple units. Cross-sectional dependence leads to model misspecification due to a violation of the underlying assumption of independence, which affects the model's overall validity.

Table 14: Panel regression with Driscoll—Kray Standard Errors—with interaction terms

```
Regression with Driscoll-Kraay standard errors   Number of obs     =        96
Method: Random-effects GLS regression            Number of groups  =        32
Group variable (i): YEAR                         Wald chi2(7)      =     16.49
maximum lag: 1                                   Prob > chi2       =    0.0210
corr(u_i, Xb) = 0 (assumed)                      overall R-squared =    0.1297
```

_GDPGRWTHRATE	Coefficient	Drisc/Kraay std. err.	t	P>|t|	[95% conf.	interval]
Lg_INCPRFCAPTAX	-.114275	.0526937	-2.17	0.162	-.3409977	.1124477
Lg_INTTRDTAX	-.0746673	.041241	-1.81	0.212	-.252113	.1027785
Lg_CAPFORMGDP	-.0223624	.0387454	-0.58	0.622	-.1890702	.1443454
Lg_SOCCONTTAX	.0998617	.1070432	0.93	0.449	-.3607079	.5604314
Lg_GDSSERVGDP	-.3222068	.0453504	-7.10	0.019	-.5173336	-.12708
Lg_INFLATION	.0358973	.0492158	0.73	0.542	-.1758614	.247656
Lg_LABPART	-.0110631	.0471897	-0.23	0.836	-.2141041	.191978
_cons	.0872159	.0131959	6.61	0.022	.0304385	.1439933
sigma_u	.023197					
sigma_e	.02228265					
rho	.52009649	(fraction of variance due to u_i)				

```
Regression with Driscoll-Kraay standard errors   Number of obs     =        96
Method: Random-effects GLS regression            Number of groups  =        32
Group variable (i): YEAR                         Wald chi2(8)      =     26.40
maximum lag: 1                                   Prob > chi2       =    0.0009
corr(u_i, Xb) = 0 (assumed)                      overall R-squared =    0.1368
```

_GDPGRWTHRATE	Coefficient	Drisc/Kraay std. err.	t	P>|t|	[95% conf.	interval]
Lg_INCPRFCAPTAX	-.1278119	.0401543	-3.18	0.086	-.3005821	.0449583
Lg_INTTRDTAX	-.0604087	.0397898	-1.52	0.268	-.2316105	.110793
Lg_CAPFORMGDP	-.1577849	.3361253	-0.47	0.685	-1.604015	1.288446
Lg_SOCCONTTAX	.1499133	.036565	4.10	0.055	-.0074132	.3072399
Lg_GDSSERVGDP	-.2304708	.0853114	-2.70	0.114	-.5975361	.1365946
Lg_INFLATION	.0299658	.0290332	1.03	0.410	-.094954	.1548857
Lg_LABPART	.4000554	.6881407	0.58	0.620	-2.560775	3.360886
Lg_CAPFORMGDP	2.377502	1.545072	1.54	0.264	-4.270408	9.025412
Lg_LABPART	.6240158	1.077771	0.58	0.621	-4.01326	5.261292
c.Lg_CAPFORMGDP#c.Lg_LABPART	-3.85119	2.196645	-1.75	0.222	-13.30259	5.60021
_cons	-.7267028	.4228413	-1.72	0.228	-2.546042	1.092636
sigma_u	.02266168					
sigma_e	.02242808					
rho	.50518066	(fraction of variance due to u_i)				

Dynamic panel data model

In a dynamic panel data model, it is assumed that lagged values of the dependent variable have an influence on the dependence variable like every other predicting variable in the model. The Arellano-Bover/Blundell-Bond (System GMM) estimator is used to account for lagged values of the dependent variable. This approach handles potential endogeneity of the lagged dependent variable and other regressors by using instrumental variables derived from lagged values of the dependent variable.

Table 14: Dynamic Random Effects Panel Regression Model

```
Regression with Driscoll-Kraay standard errors   Number of obs     =        96
Method: Random-effects GLS regression            Number of groups  =        32
Group variable (i): YEAR                         Wald chi2(9)      =    123.04
maximum lag: 1                                   Prob > chi2       =    0.0000
corr(u_i, Xb) = 0 (assumed)                      overall R-squared =    0.3358
```

_GDPGRWTHRATE	Drisc/Kraay Coefficient	std. err.	t	P>|t|	[95% conf.	interval]
Lg_GDPGRWTHRATE	.304866	.0774675	3.94	0.059	-.02845	.6381819
Lg_INCPRFCAPTAX	-.1309883	.0608887	-2.15	0.164	-.3929711	.1309945
Lg_INTTRDTAX	-.01182	.0303916	-0.39	0.735	-.1425846	.1189446
Lg_CAPFORMGDP	-.0645201	.2647899	-0.24	0.830	-1.203819	1.074779
Lg_SOCCONTTAX	.0916739	.0122213	7.50	0.017	.03909	.1442577
Lg_GDSSERVGDP	-.1307076	.1309454	-1.00	0.423	-.6941203	.4327052
Lg_INFLATION	.0670361	.0026443	25.35	0.002	.0556583	.0784138
Lg_LABPART	.1883483	.4342776	0.43	0.707	-1.680197	2.056894
Lg_CAPFORMGDP	3.301661	.9949223	3.32	0.080	-.9791447	7.582466
Lg_LABPART	1.111336	.6515867	1.71	0.230	-1.692215	3.914887
c.Lg_CAPFORMGDP#c.Lg_LABPART	-5.480491	1.368048	-4.01	0.057	-11.36672	.4057425
_cons	-.7221454	.1698081	-4.25	0.051	-1.452771	.0084798
sigma_u	0					
sigma_e	.02120653					
rho	0	(fraction of variance due to u_i)				

This is a dynamic panel data regression model with Driscoll-Kraay standard errors, which correct for cross-sectional dependence in panel data. The model is estimated using random-effects Generalized Least Squares (GLS) regression with 96 observations and 32 groups (based on the variable "YEAR").

Model Statistics

- Wald chi2(9) = 123.04: The Wald test statistic for the overall model is significant, with a p-value of 0.0000. This indicates that the model, as a whole, significantly explains the variation in the dependent variable (_GDPGRWTHRATE).
- Overall R-squared = 0.3358: The model explains 33.6% of the variance in the GDP growth rate, indicating a moderate fit.
- Driscoll-Kraay standard errors: These are robust standard errors that account for autocorrelation and heteroskedasticity, particularly relevant for panel data where there may be cross-sectional dependence.

Lagged GDP Growth Rate (_Lg_GDPGRWTHRATE)

- **Coefficient**: 0.3049, **Standard Error**: 0.0775, **t-value**: 3.94, **p-value**: 0.059 (significant at the 10% level), **95% Confidence Interval**: [-0.028, 0.638]

The coefficient for the lagged GDP growth rate is positive (0.3049) and significant at the 10% level (p = 0.059). This suggests that past GDP growth positively affects current GDP growth, indicating some degree of persistence in GDP growth over time.

Lagged Social Contributions Tax (_Lg_SOCCONTTAX)

- Coefficient: 0.0917, Standard Error: 0.0122, t-value: 7.50, p-value: 0.017 (significant at the 5% level), 95% Confidence Interval: [0.0391, 0.1443]

The positive and statistically significant coefficient suggests that higher social contributions tax is associated with increased GDP growth. This could indicate that government revenues from social contributions are reinvested in ways that stimulate growth.

Lagged Inflation (_Lg_INFLATION)

- Coefficient: 0.0670, Standard Error: 0.0026, t-value: 25.35, p-value: 0.002 (significant at the 1% level), 95% Confidence Interval: [0.0557, 0.0784]

Lagged inflation has a positive and highly significant effect on GDP growth. This result may suggest that moderate inflation levels can stimulate economic growth by increasing aggregate demand.

Interaction Terms and Cross-Effects

Coefficient: -5.4805, Standard Error: 1.3680, t-value: -4.01, p-value: 0.057 (significant at the 10% level), 95% Confidence Interval: [-11.367, -0.406]

The interaction term between capital formation and labour participation is negative and significant at the 10% level. This suggests that the combined effect of these two variables is associated with a significant decrease in GDP growth, possibly indicating diminishing returns when both are high simultaneously.

Model Diagnostics

- **sigma_u = 0** indicates no significant group-specific (year-specific) effects in the model. R**ho = 0**: This model has no unobserved heterogeneity, meaning that the random-effects assumption holds.

Lagged GDP Growth Rate is a significant predictor, showing that GDP growth exhibits some persistence over time. **Social Contributions Tax and Inflation are po**sitively and significantly associated with GDP growth. **The interaction between Capital Formation and Labour Participation** significantly negatively affects GDP growth, suggesting complex dynamics between these variables. Other predictors, such as income/corporate tax, international trade tax, and goods and services, are not statistically significant.

Summary of results of the final form of the model

The dynamic panel data model with random effects, utilising Driscoll-Kraay standard errors, provides a robust understanding of the predictors influencing GDP growth rate. After running a series of models, the final functional form that accounts for the temporal dynamics of GDP growth and the various economic variables of interest was achieved. The adjusted final form of the random effects is dynamic and accounts for the effect of lagged predicting variables on the dependent variable and the presence of interactions among the variables. This dynamic panel data model accounts for joint influence on the dependent variable from the predicting variable. Understanding GDP growth rates involves the direct relationships of factors such as gross capital formation that directly influence GDP. It also accounts for the nature of Gross capital formation; for instance, the influence of the interaction between labour force participation and gross capital formation shows the possible labour's augmenting effect on capital. Thus, labour force participation might indirectly affect GDP growth through gross capital formation.

The final functional form of the model is specified as follows

The final functional form of the random effects model is as follows:

$$GDPGRWTHRATE_{it} = \alpha + \beta1Lg\_GDPGRWTHRATEi(t-1) + \beta2Lg\_INCPRFCAPTAXit + \beta3Lg\_INTTRDTAXit + \beta4Lg\_CAPFORMGDPit + \beta5Lg\_SOCCONTTAXit + \beta6Lg\_GDSSERVGDPit + \beta7Lg\_INFLATIONit + \beta8Lg\_LABPARTit + \beta9(Lg\_CAPFORMGDP \times Lg\_LABPART)it + ui + \epsilon it$$

Where:

GDPGRWTHRATEit is the GDP growth rate for group ii at time tt,

Lg_GDPGRWTHRATEi(t−1) is the lagged value of GDP growth rate,

Lg_INCPRFCAPTAX is the log of income/corporate tax per capita,

Lg_INTTRDTAX is the log of international trade tax,

Lg_CAPFORMGDP is the log of capital formation as a percentage of GDP,

Lg_SOCCONTTAX is the log of social contributions tax,

Lg_GDSSERVGDP is the log of goods and services as a percentage of GDP,

Lg_INFLATION is the log of inflation,

Lg_LABPART is the log of labour participation rate,

(Lg_CAPFORMGDP×Lg_LABPART) is the interaction term between capital formation and labour participation,

u_i is the unobserved random effect, and

ϵ_{it} is the error term.

4.5. KEY FINDINGS AND IMPLICATIONS:

Lagged GDP Growth Rate: Positive and significant, the positive coefficient for lagged GDP growth indicates that past GDP performance has a positive effect on current growth, suggesting persistence in growth over time. This implies that economies with strong growth in prior periods are more likely to maintain or build on that momentum.

Income/Corporate Tax per Capita: **Negative but not significant**: Although the coefficient is negative, indicating that higher income/corporate tax could reduce GDP growth, the lack of statistical significance means that this result should be interpreted with caution. This may imply that income taxes do not have a clear, direct impact on growth or that other factors mitigate their effects.

International Trade Tax: **Negative but not significant**: The model does not show a significant impact of trade taxes on GDP growth. This suggests that variations in international trade tax levels may not directly affect economic performance, or their effects may be offset by other macroeconomic factors.

Capital Formation as a Percentage of GDP: **Negative and not significant**: The capital formation variable was not significant, indicating that changes in investment levels as a percentage of GDP do not have a clear, direct impact on short-term growth rates. This finding suggests that the relationship between investment and GDP growth may be more complex and possibly nonlinear.

Social Contributions Tax: **Positive and significant**: Social contributions taxes positively influence GDP growth, implying that revenues from these taxes could be reinvested in public

goods or services that stimulate economic activity. This supports the notion that social security systems and government redistributive measures, funded by these taxes, may promote growth.

Goods and Services as a Percentage of GDP: **Negative but not significant**: The negative coefficient suggests that an increasing share of goods and services in GDP might reduce growth, but the lack of significance means that the impact is not strong enough to draw firm conclusions. The relationship between consumption and growth in this context may need further exploration.

Inflation: **Positive and highly significant**: The positive coefficient for inflation suggests that moderate inflation levels are associated with higher GDP growth. This may imply that some degree of inflation stimulates demand and investment, supporting economic expansion.

Labour Participation: **Positive but not significant**: While the coefficient is positive, suggesting that higher labour participation could increase GDP growth, it is not statistically significant. This might indicate that labour market dynamics are influenced by other factors, or that the relationship between labour participation and growth is mediated by structural conditions in the economy.

Interaction between Capital Formation and Labour Participation: **Negative and significant**: The significant negative coefficient for the interaction term indicates that high levels of both capital formation and labour participation together might reduce GDP growth. This may suggest diminishing returns when both variables increase simultaneously, pointing to possible inefficiencies in capital or labour allocation.

Model Implications for Understanding GDP Growth Predictors:

Persistence of growth: The significant effect of the lagged GDP growth rate highlights the importance of past performance, reinforcing the idea that countries experiencing economic growth tend to maintain that trajectory.

Fiscal and tax policy: The negative, though insignificant, effects of income/corporate tax and trade tax underscore the complex role of fiscal policy in economic growth. However, the positive effect of social contributions tax suggests that when tax revenues are allocated toward social security and welfare, they can stimulate economic activity

4.6. Summary

Chapter 4 presented, interpreted and discussed the findings from the quantitative analyses conducted to assess the impact of taxation on the GDP of the upper middle-income sub-Saharan African countries. The analysis focused on Botswana, Gabon, Mauritius, Namibia, and South Africa, based on their classification by the World Bank as upper middle-income countries with gross national income (GNI) per capita between $4,046 and $12,535 as of 2021. Utilizing secondary data, panel data analysis was employed, complemented by graphical representations and frequencies to display key trends. Diagnostic tests were conducted before presenting the main results, ensuring the robustness of the findings. Descriptive statistics were reported, including the mean, standard deviation, and coefficient of variation for each tax regime.

The findings revealed that the lagged GDP growth rate positively and significantly impacted current economic growth, indicating that countries with strong past performance are likely to maintain momentum in their growth trajectory. In contrast, income or corporate tax had a negative but not statistically significant effect on GDP growth, suggesting that its influence on economic performance is not direct or clear. This could imply that income taxation does not significantly influence growth in the short term or that other macroeconomic factors dilute its effects. Similarly, international trade taxes exhibited a negative but insignificant relationship with GDP growth. This may indicate that trade taxes might not substantially affect economic performance or other external variables neutralise their influence.

Regarding capital formation as a percentage of GDP, the analysis showed that its impact on short-term growth was not statistically significant, underscoring the complexity of the relationship between investment and GDP growth. This finding suggests that while investment is crucial for long-term development, its immediate effects on growth rates may be more intricate and influenced by other structural factors. On the other hand, social contributions taxes were found to positively and significantly influence GDP growth. This highlights the potential for tax revenues, particularly those directed towards social welfare systems, to stimulate economic activity by improving public services and redistributive measures that drive economic participation.

The analysis also revealed a negative but insignificant relationship between the share of goods and services in GDP and economic growth. This finding suggests that increasing the proportion

of goods and services may reduce growth, but the effect is not strong enough to draw definitive conclusions. Conversely, inflation had a positive and highly significant impact on GDP growth, indicating that moderate inflation could foster economic expansion by stimulating demand and encouraging investment. Although the relationship between labour participation and GDP growth was positive, it was not statistically significant, hinting that the dynamics of labour markets may depend on other factors or structural conditions in the economy.

Finally, the interaction between capital formation and labour participation revealed a significant negative relationship, suggesting that when both variables increase simultaneously, they may reduce GDP growth due to capital or labour allocation inefficiencies. These results imply that while capital and labour are vital for growth, managing their interaction effectively is essential to avoid diminishing returns.

In conclusion, the study's findings underscore the persistence of economic growth, with strong past performance playing a key role in sustaining future growth. Although income and trade taxes did not significantly affect GDP growth, social contributions taxes had a positive impact, highlighting the importance of redistributive measures. Additionally, moderate inflation appeared to support economic expansion, while the effective allocation of labour and capital resources emerged as a critical factor for optimizing growth outcomes.

Chapter 5 below presents a summary of the findings. It also focuses on conclusions and recommendations. The chapter also presents suggestions for further studies.

CHAPTER 5: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

Data were presented and analysed in the previous chapter. The current chapter summarises the study's findings and presents conclusions and recommendations. The chapter also highlights suggestions for future studies.

5.2 Summary of the Study

The study aims to examine taxation's impact on upper-middle-income sub-Saharan African countries' GDP. A thorough analysis of theoretical frameworks and empirical studies was conducted to study the effect of taxation on the GDP of sub-Saharan African upper-middle-income countries. A rigorous quantitative research methodology that involves data collection, analysis, and policy recommendations was necessary for a comprehensive examination of the impact of taxation on GDP in this region (Bell, 2011).

Taxation is the mirror of the relation between the government and the society. On one hand, this policy gives the government the resources to implement its policies by providing funding. On the other hand, it can jeopardise the stability of the government because it might spark resistance. The government may then decide to lower its tax claim to lessen the likelihood that it will be able to pay for its continued existence. Put another way, the source of political power is taxes, but the scope of this power determines the amount of income. Taxation is one of the state's primary functions (Fauvelle-Aymar, 2020). Upper-middle-income sub-Saharan African countries rely on taxation as a major revenue source, and it significantly impacts GDP.

5.3 Conclusion

This research examines the impact of various taxation variables on the Gross Domestic Product (GDP) of sub-Saharan African upper middle-income countries, focusing on income tax, corporate tax, international trade tax, social contributions tax, and capital formation. The findings reveal significant and varied relationships between taxation and GDP growth by using secondary data from public sources such as the OECD/AUC/ATAF (2022) and employing a quantitative research methodology. Utilising legitimacy theory and development state theory

as conceptual lenses, the study focused on understanding the current state of taxation, its impact on gross domestic product (GDP), and associated challenges and opportunities.

The study highlights that lagged GDP growth has a positive and significant effect, demonstrating growth persistence over time. While negatively correlated with GDP growth, income tax, corporate tax and international trade tax are not statistically significant, suggesting other factors may mitigate their effects. Conversely, the social contributions tax positively influences GDP growth, underscoring the potential role of public reinvestment in driving economic activity. Inflation is found to have a positive and highly significant relationship with growth, indicating that moderate inflation may stimulate demand and investment.

On the other hand, the interaction between capital formation and labour participation significantly negatively affects growth, suggesting possible inefficiencies in capital or labour allocation when both factors increase simultaneously. These results suggest the need for a nuanced approach to tax policy and economic growth strategies, particularly in optimizing the balance between capital investment, labour participation, and taxation in sub-Saharan Africa.

The study calls for future research to explore qualitative factors influencing capital formation, the optimal balance between consumption and investment, and the complex dynamics between labour and capital in the region.

5.4 Recommendations

Based on a literature review, research findings, and secondary analysis undertaken during this study, key recommendations for successful and effective tax policy implementation that influences GDP in upper-middle-income sub-Saharan African countries include:

- Lagged GDP Growth Rate: Positive and significant, the positive coefficient for lagged GDP growth indicates that past GDP performance positively affects current growth, suggesting persistence in growth over time. This implies that economies with strong growth in prior periods are more likely to maintain or build on that momentum. Tax policies should aim to sustain growth momentum through long-term economic planning, as strong historical

performance can drive future GDP growth. Governments should focus on continuity in successful policies and avoid abrupt changes that might disrupt economic stability.

- Income/Corporate Tax per Capita: Negative but not significant: Although the coefficient is negative, indicating that higher income/corporate tax could reduce GDP growth, the lack of statistical significance means this result should be interpreted cautiously. This may imply that income taxes do not have a clear, direct impact on growth or that other factors mitigate their effects. Tax reforms could be considered to create a more growth-friendly environment while ensuring other macroeconomic factors support this.

- International Trade Tax: Negative but not significant: The model does not show a significant impact of trade taxes on GDP growth. This suggests that variations in international trade tax levels may not directly affect economic performance or other macroeconomic factors may offset their effects. International Trade Tax: Given the non-significance of trade taxes, policymakers should focus more on improving trade facilitation and reducing non-tariff barriers to boost international trade rather than adjusting tax levels. Trade agreements and efficient customs processes may be more effective for fostering GDP growth.

- Capital Formation as a Percentage of GDP: Negative and not statistically significant: The capital formation variable was not significant, indicating that changes in investment levels as a percentage of GDP do not have a clear, direct impact on short-term growth rates. This finding suggests that the relationship between investment and GDP growth may be more complex and possibly nonlinear. Capital Formation as a Percentage of GDP: Since capital formation does not show a significant impact on short-term growth, investment policies should be carefully examined. Emphasis on the quality of investments, targeting sectors with higher returns, and fostering innovation may yield better long-term results.

- Social Contributions Tax: Positive and significant: Social contributions taxes positively influence GDP growth, implying that revenues from these taxes could be reinvested in public goods or services that stimulate economic activity. This supports the notion that social security systems and government redistributive measures, funded by these taxes, may promote growth. Governments should prioritize efficiently allocating social contribution taxes towards public goods and services that enhance economic activity.

Strengthening social safety nets and investing in public infrastructure could boost economic growth by improving the labour force's productivity.

- Goods and Services as a Percentage of GDP: Negative but not significant: The negative coefficient suggests that an increasing share of goods and services in GDP might reduce growth. However, the lack of significance means the impact is not strong enough to draw firm conclusions. The relationship between consumption and growth in this context may need further exploration. Further investigation into the role of consumption in economic growth is recommended. Policymakers could consider balancing consumer spending with investment in productive sectors to ensure sustainable growth, possibly through fiscal policies that stimulate demand without discouraging productive investment.
- Inflation: Positive and highly significant: The positive coefficient for inflation suggests that moderate inflation levels are associated with higher GDP growth. This may imply that some degree of inflation stimulates demand and investment, supporting economic expansion. Policymakers should aim to maintain moderate levels of inflation, which could help stimulate growth by encouraging consumption and investment. Effective monetary policies are crucial to avoiding excessive inflation while promoting healthy economic expansion.
- Labour Participation: Positive but not statistically significant: While the coefficient is positive, suggesting that higher labour participation could increase GDP growth, it is not statistically significant. This might indicate that other factors influence labour market dynamics or that structural conditions in the economy mediate the relationship between labour participation and growth. Labour Participation: Although not significant, enhancing labour participation could still benefit long-term growth. Policies focusing on labour market reforms, skills development, and inclusion could lead to a more productive workforce, indirectly contributing to economic growth.
- Interaction between Capital Formation and Labour Participation: Negative and significant: The significant negative coefficient for the interaction term indicates that high levels of capital formation and labour participation might reduce GDP growth. This may suggest diminishing returns when both variables increase simultaneously, pointing to possible capital or labour allocation inefficiencies. Interaction between Capital Formation and Labour Participation: The negative interaction suggests potential inefficiencies when both variables are high. Policymakers should aim to optimize the balance between capital

investment and labour force utilization. Targeted investments that enhance labour productivity and avoid redundancy in capital deployment may yield better growth outcomes.

5.5 LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

5.5.1 Limitations

The study was self-funded, and financial difficulties impacted its timely completion. The study was also delayed by late HREC approval and a lack of data from Garbon.

5.5.*2* Suggestions for future research

This study examined the fundamental literature and research on the numerous theories entrenched in the impact of taxation on upper-middle-income sub-Saharan African countries' GDP. The study identified literature confirming the impact of taxation on the GDP of upper middle-income countries of sub-Saharan Africa. The study aimed to present the key findings from the literature on the influence of taxes on GDP to date and make suggestions for further investigation and analysis. The information acquired is potentially very helpful in enhancing the tax system and promoting sustainable gross domestic product growth.

The study concludes that more research is required to fully understand how tax risk management, leadership, and governance impact the GDP and living standards of the public. The study findings reveal that more exploration of socioeconomic and political risks at the national and international levels is desperately needed. The focus of research could also be on how these risks impact the country's tax collection and, consequently, its capacity to fund public services.

- Growth Persistence: Future research could explore factors that sustain or disrupt the persistence of GDP growth over time, particularly in sub-Saharan African upper-middle-income countries.
- Income/Corporate Tax Impacts: Investigating the indirect effects of income and corporate tax policies on growth and mediating factors such as business environment and public services may offer more profound insights.

- Trade Taxation and Growth: Future studies could examine non-tax factors, like trade policies and barriers, that might more directly influence GDP growth in the region.
- Capital Formation: Research could focus on the qualitative aspects of capital formation, such as the type and efficiency of investments, to better understand their relationship with GDP growth.
- Social Contributions and Economic Growth: Further analysis could investigate the channels through which social contributions taxes are reinvested to stimulate growth, exploring their role in enhancing productivity and public welfare.
- Consumption vs. Investment: Future work could delve into the relationship between consumption, investment, and growth, identifying optimal levels of goods and services in GDP for sustained economic performance.
- Inflation-Growth Nexus: Research could explore the thresholds of inflation that positively stimulate growth without leading to instability, particularly within the context of African economies.
- Labour Participation: More studies on labour market dynamics, structural conditions, and workforce productivity could help clarify the relationship between labour participation and GDP growth.
- Capital-Labour Interaction: Future research could focus on the optimal allocation of capital and labour to prevent inefficiencies and explore how different industries or sectors are affected by this interaction in terms of economic growth.

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LIST OF APPENDICES

1. Ethical Clearance: The examination of impact of taxation on sub-Saharan African upper middle income countries' gross domestic product.

28 October 2024

Mr Sakhiwo Nelani (223098106)

School Of Acc Economics&Fin

Westville

Dear Mr Sakhiwo Nelani,

Original application number: 00023004

Project title: The examination and evaluation of impact of taxation on sub-Saharan African middle-high income countries 'gross domestic product

Amended title: The examination of the impact of taxation on sub-Saharan African upper middle income countries gross domestic product

Exemption from Ethics Review

In response to your **amendment** application received on 28 October 2024, your school has indicated that the amendment has been granted **EXEMPTION FROM ETHICS REVIEW.** Any alteration/s to the exempted research protocol, e.g., Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through an amendment/modification prior to its implementation. The original exemption number must be cited.

For any changes that could result in potential risk, an ethics application including the proposed amendments must be submitted to the relevant UKZN Research Ethics Committee. The original exemption number must be cited.

In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours sincerely,

[redacted]

Prof Claire Lauren Vermaak

Academic Leader Research

School Of Acc Economics&Fin

2.Turnitin Report 8%t: 223098106, Sakhiwo Nelani's Masters of Taxation Dissertation

223098106 Sakhiwo Nelani Masters of Taxation Dissertation (correcting) Final Version-Examiners comments -18 October 24 QK V2 1710 edited Turnit.docx

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