

Assessing the Effect of Domestic Resource Mobilization on Namibia's Economic Development

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of the requirements for the degree of
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by

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LIST OF ACRONYMS

ADF – Augmented Dickey-Fuller

ARDL – Auto Regressive Distributed Lag

ATAF – African Tax Administration Forum (ATAF)

CUSUM – Cumulative Sum

CUSUMSQ – Cumulative Sum of Squares

DRM – Domestic Resource Mobilization

FDI – Foreign Direct Investment

GDP – Gross Domestic Product

NAMFISA – Namibia Financial Institutions Supervisory Authority

NFSS – Namibia Financial Sector Strategy

OLS – Ordinary Least Squares

UN – United Nations

VAR - Vector Autoregression

VECM – Vector Error Correction Model

ABSTRACT

Effective resource mobilization from both domestic and foreign sources is necessary to achieve economic growth. However, the decline in trade and financial flows brought on by the 2009 global financial crisis, together with the unpredictability and volatility of development assistance flows globally, increased the need for more stable and long-term development funding alternatives. Thus, domestic resource mobilization (DRM) has emerged as a crucial instrument for achieving and sustaining rapid growth in developing countries. Since DRM can expand the available budgetary space, encourage quicker economic growth, and lessen poverty. As such, the aim of this study was to empirically measure the impact domestic resource mobilization strategies have had on Namibia's Economic growth in the period 1990 to 2020. The study evaluated and investigated the causal relationship between DRM and economic growth in Namibia using the Harrod and Domar growth model. On specified growth models, the study applied the ARDL Bounds testing approach to cointegration. The study discovered strong evidence for a connection between Namibia's DRM and economic growth. Thus, the study finds with a 98 percent confidence that there would be a long-term, positive causal relationship between tax revenue, domestic savings, and domestic credit. Inferring that domestic savings, taxation, and credit patterns can have a direct and beneficial impact on the pace of growth of the Namibian economy over time. Additionally, the study concludes that government actions through banking sector policies and strategies can have a significant and long-lasting impact on Namibia's economic growth. Therefore, the study recommends that the Namibian government to initiate policies that trigger more savings, and support technology enhancement towards curtailing the economy's capital output ratio.

CHAPTER ONE: INTRODUCTION

1.1 Introduction and background of the study

Economic growth can be achieved by effectively mobilizing required resources from domestic and international sources (Wujung & Aziseh, 2016). Foreign aid, external debt, earnings from currency exchange, and foreign direct investment are examples of international resources, while domestic savings, domestic credit, taxes, and resource rents are examples of domestic resources (Ugwuegbe, Okafor, & Akarogbe, 2016). When funds are invested in socially beneficial projects, domestic resource mobilization (DRM), also known as domestic revenue creation, can help developing nations achieve and maintain high rates of growth (Culpeper & Bhushan, 2008). DRM is vital for the generation of domestic tax revenues and savings in order to allocate them to productive economic and social sectors. DRM can increase the fiscal space and promote faster economic growth and poverty reduction – shared prosperity (Wujung & Aziseh, 2016).

The 2009 global financial crisis' decline in trade and financial flows, along with uncertainty around the world, and volatility in development assistance flows, increased the need for more stable and long-term development funding alternatives (Bhushan & Samy, 2012). Domestic resources are seen as a long-term source of investment for the top priorities of national development (Hujo & Bangura, 2020). DRM was given prominence on the G20 agenda in 2013 because of the Monterrey Consensus on Financing for Growth's 2002 designation of DRM as a high priority for economic development (OECD, 2014). Yet, in Sub-Saharan Africa, DRM has been a generally ignored aspect in the formulation of national development strategies. However, the recent Addis Ababa Action Agenda of the Third International Conference on Financing for Development identified DRM as critical in achieving the Sustainable Development Goals (SDGs) (Sy & Sow, 2016).

With respect to tax revenue mobilization, the importance of DRM has also been recognized by the donor community, as indicated by its support of programs such as the African Tax Administration Forum (ATAF) and the Tax Justice Network-Africa (Mebratu, Leykun, & Lakehal-Ayat, 2020). As a result, there has been growth in a variety of domestic resource sources, including domestic taxes, rents, royalties, and other income. The government of a developing country has access to a variety of financial resources, and each one, regardless of how easily attainable, contributes to economic progress in a special way (Bhushan & Samy, 2012). The African Capacity Report (2015) identified the insufficient collection of tax revenue in the informal and agriculture sectors coupled with high levels of illicit financial outflows as the key challenges to DRM.

Namibia is one of the African nations that has benefited from outside resources in the form of aid and

public debt. It is ranked third among the top 10 tax-collecting nations with good governance at 26.9% of GDP, but eighth among the top 10 emitters of illicit financial flows despite its good political stability at 14.3% of GDP (Sy & Sow, 2016). The difference in the ratings shows that Namibia has great potential to improve its mobilisation of domestic resources by addressing illicit financial flows and remittances. In order to achieve these goals, the Namibian government created the ten-year Namibia Financial Sector Strategy (NFSS) in 2011. This strategy aimed to expand the tax base, limit capital outflows, and strengthen the financial sector. Sy and Sow (2016) pointed out that increasing remittances and stopping illegal financial flows were two further sources of funding that would expand Africa's resource envelope for financing development. Illicit financial flows are illegally removed from Africa, undercutting domestic resource mobilization efforts, and leaving a resource gap that must be addressed with aid and foreign investment (Sy & Sow, 2016).

The effective taxation system Namibia has in place, together with a variety of development finance options, may serve to accelerate the long-term impacts of DRM on the country's economic development. More than 95% of Namibia's domestic resource mobilization comes from taxation, which includes various forms of taxes like value-added, income, and property taxes. The government also receives funds via levies and fees, including the fuel levy, alcohol licenses, fishing licenses, stamp charges, and casino licenses.

The Ministry of Finance and Namibia Revenue Agency (NamRA), an independent organization charged with collecting taxes in Namibia, provide direction and regulation for Namibia's resource mobilization. A crucial role in developing Namibia's financial markets and preventing capital outflows from institutional investors' domestic savings is to be played by the Namibia Financial Institutions Supervisory Authority (NAMFISA), whose mandate includes the supervision of financial institutions. While the domestic credit market and general financial stability of the country are influenced by the Bank of Namibia, which determines market rates and regulates the banking sector in Namibia. Most of Namibia's natural resources are also regulated by the government through laws and policies. The Mineral Act 33 of 1992, which directs and controls the mining industry, is one such law. Other governing bodies, such the Chambers of Mines, are in place to help formulate and support policies for the mining sector in Namibia. The Chamber of Mines is a key participant in the mobilization of domestic resources because mining businesses make the largest tax contributions, with rates of 50% of their profits.

1.2 Problem Statement

The government of Namibia is dedicated to seeing that regional and international accords, such as Agenda 2030 and its 17 Sustainable Development Goals, Agenda 2063, the Paris Climate Change Agreement, and the Addis Ababa Development Funding Agenda, are successfully implemented. In addition

to the necessary number and mix of financial (and non-financial) resources, public, private, domestic, and international funds to be mobilized, the 2030 vision and SDGs also call for the inclusion of full private and public financial management facilities. Greater domestic policy ownership and better congruence with domestic requirements are two benefits of DRM. While it will not be susceptible to the drawbacks associated with FDI and foreign aid tied to the goals of foreign investors and donors, it will make it harder rather than easier for Namibia to attract outside investment. Most developing countries' international and domestic resources decreased because of the 2009 global economic crisis, which was linked to slow economic growth. Therefore, it is crucial to consider Namibia's main DRM factors and how the government may use them to increase the nation's domestic resource mobilization. Figure 1 shows the DRM and economic growth trends from 1990 to 2020, indicating how the country has performed with regards to the three key domestic resource mobilization aspects.

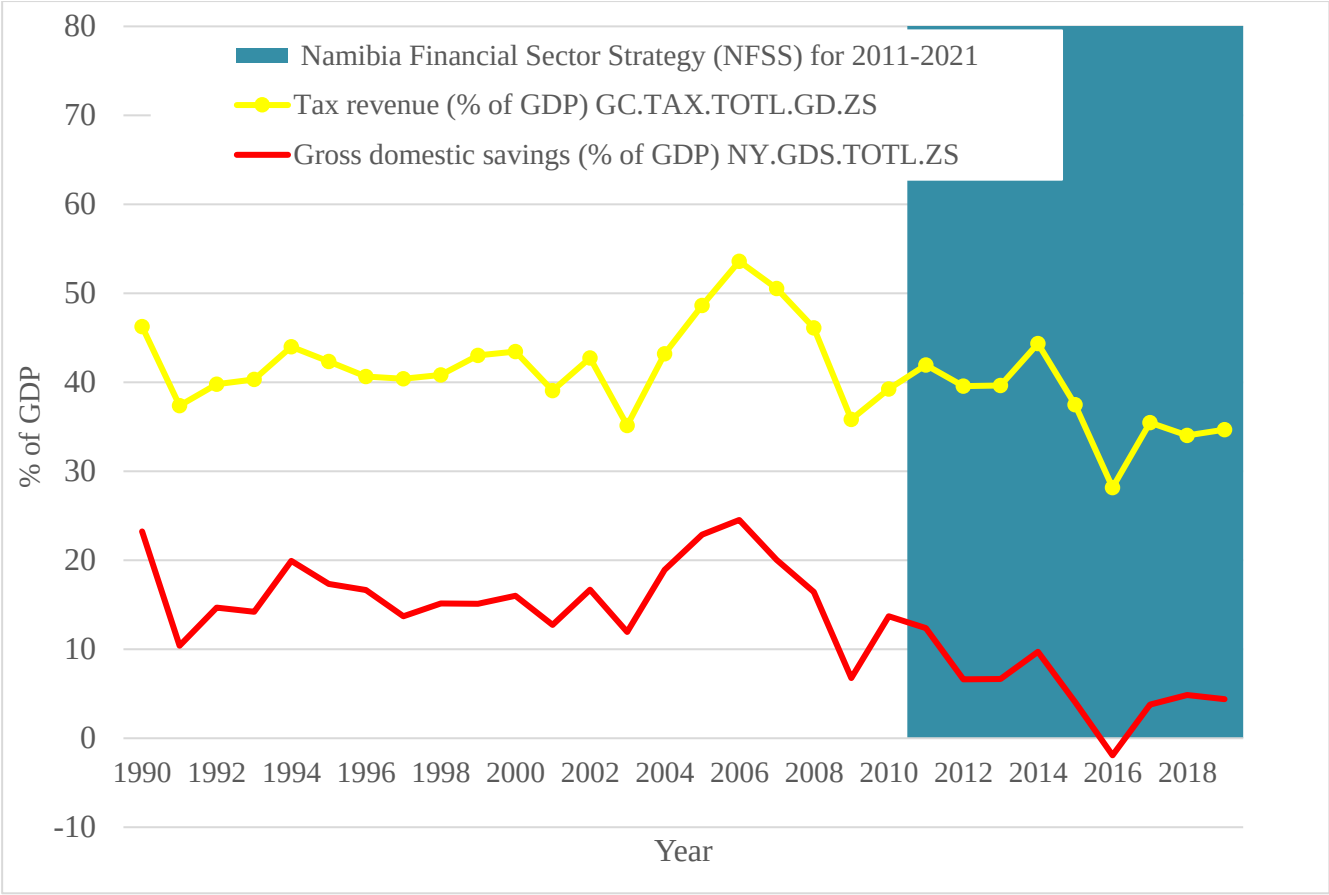


Figure 1: DRM and GDP Trend 1990 to 2019

Figure 1 shows how the DRM aspects and the GDP have performed between 1990 and 2019, the data shows a positive correlation between Tax and GDP ($r = 0.767$), while a negative correlation was observed between savings and GDP ($r = - 0.553$). The trends indicated that Tax Revenue contributed to 58.7% (correlation coefficient squared (r^2)) to the variability in GDP growth, while domestic savings contributed

30.6% (r^2) to the variability in GDP. The positive influence of Tax revenue on GDP was clearly evident between 2002 and 2007, due to the first major financial reforms. However, these gains were short-lived due to the Global financial crisis of 2007 to 2009, which saw both GDP and Tax Revenue declining. The financial reforms improved the financial depth of the Namibian economy allowing for more confidence in the domestic market, which saw the use of domestic savings from Institutional investors such as Pension Funds redirected into local investment and development. The devastating effects of the financial crisis further pushed the Namibian government towards additional financial reforms under the auspices of the ten-year Namibia Financial Sector Strategy (NFSS) for 2011-2021 towards building a positive influence of the DRM aspects on GDP growth (MoF, 2012).

The NFSS policy has, among other things, concentrated on generating domestic resources by broadening the tax base, limiting capital outflows, and expanding the banking sector. The period from 2011 to 2016 illustrates the time of transitional recovery during which the NFSS methods were put into place to make sure that DRM elements have a favourable impact on the variability in GDP growth. Therefore, the study's central issue is: How have DRM and its factors contributed to Namibia's beneficial economic growth? This is a significant issue for Namibia's fiscal system and is essential to completing development initiatives. The aim of the project is to develop an empirical understanding of how to deploy human more effectively, material, and financial resources to boost Namibia's economy.

1.3 Research Questions

The study will address the development challenge articulated above by answering the following research questions:

- Does Domestic Resource Mobilization in Namibia drive Economic growth?
- What policy reforms can be implemented to accelerate the economic growth in Namibia through effective DRM?

1.4 Objectives of the Research

The study's primary goal is to determine the relationship between Namibia's GDP growth and DRM in the long- and short-term. The objectives are to:

- Determine the causal effect of Domestic Resource Mobilization on Economic Growth in Namibia.
- Provide appropriate policy recommendations for improving DRM in Namibia in order to accelerate economic growth.

1.5 Research Hypothesis

The study is therefore designed to test the following hypotheses:

- H_0 : There is no causal relationship between DRM and Economic growth in Namibia;
- H_1 : There is a positive causal relationship between DRM and Economic growth in Namibia

1.6 Significance of the study

Despite the obvious significance of DRM, many developing nations continue to struggle to generate enough money domestically because of a variety of problems with their financial systems. In Namibia, the government created the NFSS for the years 2011 to 2021 to direct the implementation of policy measures aimed at enhancing domestic resource mobilization and its effects on the economy. As such, this study seeks to empirically measure the impact these domestic resource mobilization strategies have had on Namibia's economic growth in the period 1990 to 2020. The research's findings are crucial in developing a list of policy suggestions to promote Namibia's long-term economic growth. Thus, by offering a more recent analysis of the impact that DRM has had on economic growth in Namibia following the global financial crisis and COVID-19, the study adds to the body of existing knowledge. Considering a declining tax revenue base, the study's findings may give managers and policy makers in development finance an empirical understanding of how to raise sufficient domestic resources more effectively through savings and financial deepening. Secondly, the research will control the effect of financial development (proxied as domestic savings) on the impact DRM on economic growth. The significance of this controlled effect provides insights into the effectiveness of the NFSS in driving economic growth in Namibia.

1.7 Organization of the study

The layout of the remaining chapters is as follows: Chapter 2 includes a brief overview of DRM in Namibia, as well as a review of relevant theoretical and empirical research. Chapter 3 provides the research methodology and the sources of data used for the analysis. The results are presented in Chapter 4 along with a discussion of the findings with respect to past studies. The summary of findings, conclusions, and recommendations for future research and policymakers are presented in Chapter 5.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Domestic resources might be considered as one of the sources of financing that can contribute widely to the country's sustainable development (Wujung & Aziseh, 2016). It is essential to mobilize these resources as a result. The term "domestic resources" in this study refers to both financial and fiscal resources produced within the domestic economy. These resources include, for instance, taxes (on earnings, corporations, property, goods, and services), royalties, licenses, tourism revenue, domestic savings, and domestic credit. The government receives these resources in the form of taxes, royalties, and tourist revenue; the private sector receives them in the form of domestic credit; or both (gross domestic savings and tourism revenue) (Wujung & Aziseh, 2016).

Domestic resource mobilization is defined as the domestic generation of revenue that can serve as an important tool with which developing countries can attain and sustain high rates of growth when they are allocated to socially productive investments (Culpeper & Bhushan, 2008). Given the volatility of FDI flows and the reduction in aid budgets, domestic resource mobilization is becoming increasingly important for financing African development. Domestic resource mobilization, which can be done publicly or privately, is the process by which nations raise money locally and use that money to provide for their citizens. African Capacity Report (2015) states that domestic resources like savings and taxes can be used to mobilize domestic resources. Additionally, the better distribution of productive activities, which can be both economic and social, can contribute to the mobilization of domestic resources.

Domestic resource mobilization, according to a growing body of research, is defined as a country's ability to raise funds locally from the public and private sectors and use them to meet its people's social needs. Domestic resource mobilization tactics can more effectively contribute to economic growth (Nnadozie, Munthali, Nantchouang, & Diawara, 2017). Many scholarly publications have discussed a country's ability to mobilize its own resources rather than relying on other sources of finance. The necessity to focus on the internal conditions of domestic resource mobilization by the government and the private sector through savings and public investment was underlined in a follow-up report of the UN's Monterrey Consensus (Bhushan & Samy, 2012). According to a growing body of research, the ability of a nation to gather money locally from the public and private sectors and use it to address the social needs of its citizens is known as domestic resource mobilization. Utilizing domestic resources more effectively can have a greater positive impact on the economy (Nnadozie, Munthali, Nantchouang, & Diawara, 2017). Numerous academic works have explored a nation's capacity to mobilize its own resources as opposed to depending on outside financial sources. A follow-up report to the UN's Monterrey Consensus emphasized the need to

concentrate on the internal factors affecting the government and private sector's mobilization of domestic resources through savings and public investment (Bhushan & Samy, 2012).

2.2 Theoretical Foundations of the DRM growth nexus

2.2.1 The Harrod-Domar Growth Model

The establishment of the growth theory began in 1939, when a well-known essay on the Dynamic Theory was written by two British economists: Roy Harrod and Domar (Solow 1956). The theory puts the emphasis on the domestic resource mobilization and growth. Furthermore, this model defines the economic mechanism that an increase in investment can cause an increase in growth. The Harrod-Domar growth model was introduced as a standard instrument for analysing economic growth that is driven by capital productivity and savings levels. Friedland and Sanders (1985) states that the Harrod-Domar model consists of three concepts of growth; the actual growth, the natural rate of growth and warranted growth. The actual growth refers to the output changes affected by the actual, while the natural growth rate is the labour force growth rate, demonstrated by the aggregate output changes, and the warranted growth is the growth rate that determines when a firm has a sufficient capital amount and, as a result, their investment levels can remain unadjusted. According to the Harrod-Domar growth model (Harrod, 1939; Domar, 1946), total savings are channelled to investment.

According to a growing body of research, the ability of a nation to gather money locally from the public and private sectors and use it to address the social needs of its citizens is known as domestic resource mobilization. Utilizing domestic resources more effectively can have a greater positive impact on the economy (Nnadozie, Munthali, Nantchouang, & Diawara, 2017). Numerous academic works have explored a nation's capacity to mobilize its own resources as opposed to depending on outside financial sources. A follow-up report to the UN's Monterrey Consensus emphasized the need to concentrate on the internal factors affecting the government and private sector's mobilization of domestic resources through savings and public investment (Bhushan & Samy, 2012).

Harrod-Domar Growth Model, the rationale:

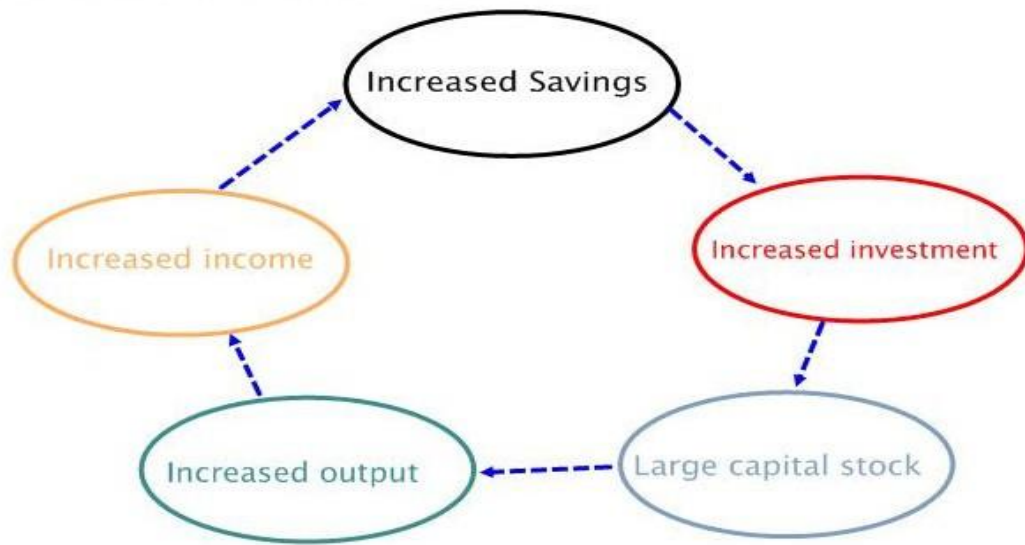


Figure 2: Harrod-Domar growth model, the rationale

Source: Sanaasaluja.wordpress.com

Although the Harrod and Domar models were created independently, their underlying assumptions and results were similar (see Figure 2). In the area of economic growth, this approach is frequently used. It implies that for emerging nations to experience growth, the government must encourage more savings and support technological advancement to reduce the capital output ratio of the economy.

The fundamental equation of the theory used in this investigation is:

$$Y_t = C_t + SAV_t \quad (1)$$

This equation states that income donated by Y_t (at time t) is used by households to consume (C_t) and save (SAV_t)

The equation two is that is familiar in this study is:

$$Y_t = C_t + INV_t \quad (2)$$

Equation two states that income (Y_t) is also a derivation from consumption (C_t) and investment (INV_t). The first question states that income is made up of two components: savings and consumption, however this equation lacks sufficient information to offer a direction for the flow that is incorporated into the equation.

The overall assumption from the preceding framework is that the economy's growth rate has a positive link to the average savings rate (s). The higher the economic savings or investment, the higher the national income growth rate (GDP). Contrarily, GDP growth is correlated with the domestic capital-output ratio; the

higher the ratio, the slower the rate of increase in national income is (GDP). This paradigm's main flaw is mostly dependent on erroneous assumptions, which has considerably limited its general use. However, this conceptual framework offers a suitable route for DRM to absorb savings for economic growth (a form of domestic resource). Additionally, this paradigm allows for the use of a variety of internal resources in the same manner for the purpose of promoting economic growth (Wujung & Aziseh, 2016).

Besides, the positive result of the Harrod-Domar Model, there are obstacles attached to application of this model. According to this idea, the relatively low rate of new capital formation in most emerging countries was the key challenge for them. The capital constraint approach to growth and development also served as the justification in terms of cold war politics for the movement of capital and technical aid from industrialized to underdeveloped countries. According to Kaldor (1956), the growth rate of the economic system is determined by the share between increasing income and savings, which in turn is determined by the growth of the working population and, possibly, the advancement of system technology. The accumulation of capital has also been observed, as has the availability of labour.

Neoclassical economists claimed shortcomings in the Harrod-Domar model – in particular the instability of its solution [5] – and, by the late 1950s, started an academic dialogue that led to the development of the Solow–Swan model.[6][7]

2.2.2 The Wagner Law

The study would adapt Wagner's law (1973) of increasing government activities as a theoretical foundation. Adolf Wagner is honoured by having his law named after him. According to the law, the emergence of an industrial economy will be followed by a rise in the proportion of public spending to GDP (figure 3). It was also mentioned that the government simply cannot disregard the demands that the public makes for various services because there has been a significant increase in money to the governments due to economic improvements over the years. In most cases, the tax rates are increased by the state in order to boost the revenue collection, which will assist in financing government expenditure.

According to Musgrave and Peacock's interpretation of Wagner's Law from 1967, as progressive countries industrialize, the public sector's share of the economy increases steadily. This growth in state spending is required due to social activities of the state, such as administrative and protective measures, as well as welfare functions.

Wagner's Law may be accepted in certain countries but rejected in others, according to a study by Jaén-Garca (2018) entitled Wagner's Law (A Revision and a New Empirical Estimation). Since there is a correlation between domestic resource mobilizations and an increase in revenue, which leads to an increase in government spending, this law is imitated in this study.

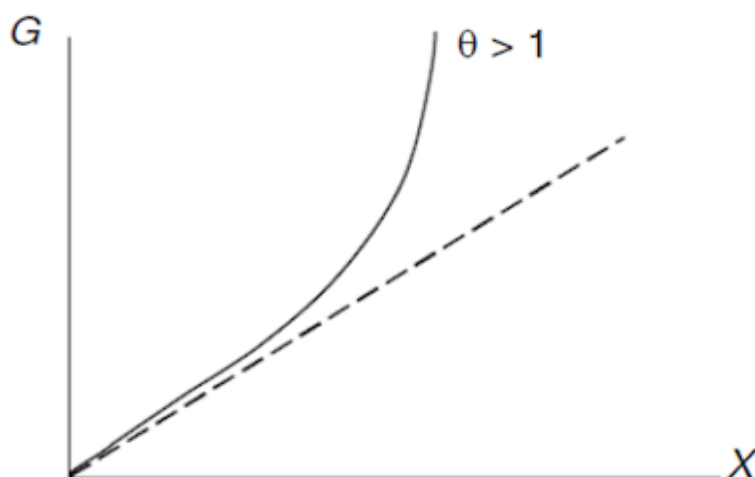


Figure 3: State Expenditure depend on Gross Domestic Product, based on Wagner's Law

2.2.3 Tax mobilization as a source of Domestic Resource Mobilisation

Nandelenga, and Oduor (2020) stated the ability for the country to mobilize more revenue is linked to its development. Procedures to strengthen the tax systems of a country are some of the ways that can enhance the resource mobilization from citizens and firms.

Taxpayers are subject to a necessary financial levy that the government levies to raise money. Although taxes are the main source of funding for the public sector, inefficient tax administration makes it difficult for many developing nations to mobilize domestic resources (Kararach, Besada, & Shaw, 2015). In Namibia, taxes continue to be the main source of funding for the government. These include trade taxes, corporate gains taxes, and income taxes (Mushendami, Manuel, Shifotoka, & Nakusera, 2017). In a review of over 23 papers on taxation and growth, Huang and Frentz (2014) found mixed results, with some studies suggesting a "negative" effect on economic growth, others showing a "neutral" effect, and many others coming to the conclusion that taxation levels have little to no effect on economic growth. This disagreement is brought about by the fact that the impact of tax hikes on growth relies on a wide range of variables, including the type of tax, the nation, the status of the economy, monetary policy, the period examined, and the purpose of the income (Huang & Frentz, 2014).

There are some factors that determine Tax mobilisation. The factors which influence tax revenue have been the topic of extensive research. They demonstrate that the main factors affecting tax revenue include the gross domestic product (GDP) per capita, inflation, capital inflows, trade openness, manufacturing, agriculture (AL-Qudah, 2020; Cung & Son, 2020; Gurdal, Aydin, & Inal, 2020; Jabari, 2020; Nguyen-Phuong et al., 2022). More recently, financial inclusion is also emerging as a key determinant of tax revenues. For instance, Raouf (2022) used a wide dataset of 45 countries in Europe, the Middle East, and

Africa from 2008 to 2019, and a panel threshold regression model to show a nonlinear relationship between financial inclusion and tax revenue. The findings implied that at low levels, financial inclusion has a negative impact on tax collection, whereas, at the high level, financial inclusion has a positive and significant impact on tax revenue.

In support, Lompo (2021) discovered that the ability of the government to raise tax income is positively and significantly impacted by more established financial sectors. They mentioned that low public debt is the only condition under which financial development has a significant beneficial impact on the collection of non-resource taxes, which are taxes derived from sources other than natural resources. The results demonstrate that financial institutions and financial markets play a significant role in tax collection in emerging nations (Lompo, 2021; Rouf, 2022).

Firstly, the openness of the economy. The degree of trade openness might be considered as one of the various determinants of tax value. Taxation can be more affected by structures of international trade compared to domestic activities. The degree of trade openness is measured by the trade share in GDP, these shares are mostly represented by import and export shares, which play a major role in determining tax share (Stotsky & Woldemarian, 1997; Odhiambo & Ziramba 2014).

Another determinant of Tax Mobilisation is tax effort and tax capacity. The tax capacity symbolizes the highest tax income that a certain country might generate, considering features such as economic, social, and institutional. On the other hand, the relationship between the stated tax capacity and actual revenue is called tax effort, and this relationship is determined by a ratio. Therefore, when new taxes or an adjustment in current tax rates are in the implementation process, it is imperative that countries adjust their tax effort. Hence, the increase in tax capacity might lead to an increase in tax revenue, while the decrease in tax capacity might lead to a decrease in tax revenue (Odhiambo & Ziramba, 2014; Pessino & Fenochietto, 2010).

The strengthening of the government's tax allocation, such as policies that eliminate corruption and improve governance, affects tax mobilisation. Hence, it can be considered as another factor that determines tax revenue. Corruption can have a negative impact on tax revenue as corruption can reduce funds allocated to mobilise resources, eventually having a knock-on effect on domestic resource mobilisation. It is vital that the government puts good governance in place to avoid corruption that can negatively affect the country's tax resources. Efficiency in tax administration and great policy plays a major role in corruption reduction and tax evasion, which leads to improvements in tax revenue. A country's development process is highly linked to its governance. A good governance structure should be in place to avoid corruption (Ajaz & Ahmed 2010).

Tax morale can be one of the determinant factors of tax mobilisation. This morale is mostly affected by a lack of awareness or the importance of adhering to tax regulations. A country's head of state should ensure they highlight activities that create awareness of taxation and its regulations and the importance of taxation. In the long run, these activities will assist in boosting citizens' tax morale (International Monetary Fund, 2011). Income levels might be another determining factor of tax resource mobilisations. When it comes to income tax – also known as pay as you earn – which is based on individual levels of income, a reduction in the individual levels of income might result in a reduction in income tax revenue. A rise in individual income levels might lead to a growth in tax revenue (Saibu & Sinbo 2013). A study by Saibu and Sinbo (2013) indicated that the first year's increase in income level might lead to a significant increase in tax revenue compared to the following year. The increase in tax revenue was indicated by 0.63% in the first year and 0.33% in the second year.

Another determinant of tax revenue is population growth. Population growth might affect tax revenue growth. As the population grows, it will lead to an increase in value-added tax. When the country's population increases and the employment rate is high, this growth will affect income tax. A country should drive its activities towards actions such as education. Overall, a more skilled labour force might affect the level of employment, which in turn might affect tax revenue. (Pessino & Fenochietto, 2010).

Poverty reduction is one of the benefits associated with tax mobilization. In the long run, tax mobilization will lead to an increase in total government revenue. The availability of funds towards infrastructure, development, and other sustainable development goals, might accelerate as a result of an increase in total government revenue and the benefits associated with tax mobilisation. Another benefit associated with Tax Mobilization is accelerated Economic Growth. A rise in tax revenue as a result of good policy, and law enforcement in place to ensure there is an improvement in tax mobilisation, might positively affect the GDP, therefore leading to an increase in economic growth. Hence, taxation is one of the vital instruments used to finance the Sustainable Development goals. (International Monetary Fund, 2011; United Nations, 2018).

Improved policy and regulations for the government might be the third benefit associated with tax mobilisation. The process of tax mobilisation and putting policy in place to improve the tax revenue of a country, might in the long run result in the establishment of great policy and regulations that might improve the government establishment at large (International Monetary Fund 2011). The fourth benefit associated with tax mobilisation involves building an effective administration that eliminates intensives and mitigates risks attached to Tax revenue.

2.2.4 Savings mobilization as a source of Domestic Resource Mobilisation

Private and public sector savings make up domestic savings. Mobilizing domestic savings is another issue in DRM. The mobilization of domestic resources includes saving. In their investigation of Namibia's domestic resource opportunities and restrictions for financing growth, DRM was defined by Odhiambo and Ziramba (2014) as the creation of savings from domestic sources, including the public and private sectors, and their allocation to profitable investments within the nation. In addition, they added net current transfers in the form of private remittances into the domestic economy to the difference between gross national income and public and private consumption to define gross savings (Odhiambo & Ziramba, 2014). According to the study, Namibia has had a negative excess of domestic saving over domestic investment since 1990, which suggests that the nation has not historically relied on foreign capital to finance public investments. Domestic savings have regularly outpaced domestic investments.

Shiimi and Kadhikwa (1999) looked at the development of saving and investment in Namibia during a seventeen-year span, from 1982 to 1997, to pinpoint the variables that drove these patterns and their respective ramifications. The study used time series methods from econometrics, such as co-integration analysis and error correction modelling, to determine the long- and short-term implications of Namibia's saving and investment drivers. According to the research, bank deposit rates have little to no impact on private saving in Namibia, and the only factor that significantly affects it is actual income. In Namibia, investment decisions are also influenced by real loan rates, inflation, real income, and government investments. Additionally, the analysis showed that while Namibian savings levels have been adequate by worldwide standards, investment performance has been underwhelming.

Another study on the factors that affect saving was carried out in Namibia by Ogbokor (2014). To identify the factors that influenced savings in Namibia between 1991 and 2012, the study used co-integration and error correction techniques. Savings and the explanatory variables used in the study have a long-term relationship, according to the findings. The results show that while population growth has a negative effect on savings, inflation and income have a positive effect. Deposit rates and financial deepening have little effect on savings.

Savings mobilization may be another determinant of foreign capital inflows. In the long and short-run, domestic savings might be positively affected by foreign capital inflows. The determinants of domestic savings in Guinea support the argument that foreign capital inflow can positively affect domestic savings. Aissata, Yushi, and Borojo's (2016) findings concluded that a positive relationship exists between foreign savings and domestic savings. Furthermore, it finds that per capita income has a positive effect on domestic savings in both the long and short run. On the other hand, the effect of inflation and FDI on domestic savings

seems to appear in the long-run only. In the short-run, government consumption expenditure negatively impacts domestic savings, and domestic saving is worsened by the growth rate of per capita income.

Arok (2014), used the co-integration and error correlation for 1971 until 2012, to test the main determinants of Gross Domestic Savings of Gross Domestic Income in Kenya. The findings resulted in a positive relationship between real per capita income and gross domestic savings.

Another determinant of saving is the access to banking facilities. It might be challenging to find banking facilities in locations such as rural areas, which makes it challenging for the poor to save. To increase saving, a country should expand banking services to rural areas (Agriculture Development Finance 2009; Agrawal, Pravakar, & Dash 2011). Real deposit interest rates can also be one of the determining factors of savings. Odhiambo (2007), analysed the determinants of saving in South Africa, using the historical data from 1968 until 2004, the findings revealed that savings increase when there is an increase in real deposit interest rates.

2.3 Empirical Literature on the DRM-growth nexus

The empirical data presented in the domestic resource mobilization literature seems to be generally inconclusive. Many African nations, according to certain surveys, make little attempt to raise taxes. But high DRM has long been understood to be essential to long-term success. The empirical research on the relationship between DRM and growth falls into two categories: one emphasizes the development of DRM along with effective revenue utilization for growth, while the other argues that the growth-enhancing effects of taxes may be constrained by the economic distortions they produce. Regarding taxes and growth, there is no definite consensus. The next subsections examine the empirical analysis of economic growth using domestic savings, domestic credit, and domestic tax income.

2.3.1 Domestic Tax Revenue Mobilisation and Economic Growth

Development Markets

A causality analysed in a case-study of Malaysia (Taha, Colombage, & Maslyuk 2010), to determine the relationship between tax revenue, stock markets and economic growth in Malaysia. The monthly periodical data from 1980 to 2008, were used in the paper. The results as per Granger causality shows that economic growth in Malaysia can be affected by tax revenue and economic growth. Furthermore, the study findings reveal that in order for Malaysia to strengthen the economy, they should focus on methods to boost revenue collection and stock market activities. The findings from a study by Nguyen and Darsono (2022), reveals that there's a negative impact between tax revenue and economic growth. The findings moreover stipulate that when tax revenues are low, it might lead to more government deficit. The government debt might increase and therefore negatively impacting economic growth.

Emerging and developing markets

A simple regression method applied in an emerging markets study, Tsaurai (2021) examined the effects of taxation on the economic growth in emerging markets. Time series data from 2008 to 2018 were used in the pooled ordinary least squares (OLS) as one of the methods of a simple regression model. The paper determined whether finance development plays a role in the effects of increased taxation on economic growth in emerging markets. The pooled (OLS) results in this study indicated a significant positive impact of tax revenue and financial development on economic growth. The author further encouraged emerging markets to strengthen their tax revenue and finance development policies in order to enhance their tax revenue which will eventually contribute to sustainable development. Mkadmi, Bakari, and Othmani (2021), examined the relationship between economic growth and tax revenue. The Co-integration analysis and Vector Error Correction Model were applied. The study findings reveals that the long run relationship exists between Tax Revenue and Economic growth.

Attari, Taha, and Farooq (2014), carried out a Causality Analysis in developing countries such as Pakistan, applied in the paper entitled; *Tax, Stock Market and Economic Growth of Pakistan*. The study determined economic growth by examining the effect of capital market and fiscal policy. The Pakistani historical data from 2003 to 2012 were used. The Granger Causality test was one of the theoretically applied tests, mainly to test the relationship between tax revenue, the stock market and economic growth. One of the purposes of the study was to determine the impact of tax revenue on economic growth. The findings concluded that a bidirectional causality relationship exists between tax revenue and economic growth, further explaining that as the economy of Pakistan grew, it caused a direct increase to tax revenue collection.

Sub-Saharan Africa

In developing markets such as Kenya, a study that applied the regression analysis is *The Effect of Tax Incentives on Economic Growth in Kenya* by Alegana (2014), which examined the relationship between the two variables; tax incentives and GDP growth rate for the years 2003 to 2012. The methods used in the study to analyse the data included descriptive analysis, correlation analysis and regression analysis. It was concluded in this study that there is an inverse relationship between GDP growth rate and tax incentives. These findings are supported by Kimando (2015) in a study titled *The Effect of Value Added Tax on Economic Growth in Kenya*, based on the Ordinary Least Squares tool, which concluded that there is a significant and negative relationship between VAT and economic growth.

Aggrey (2011) also examined Ghana's drivers of tax income in Sub-Saharan Africa using regression analysis and quarterly information from 1988 to 2008. The Auto Regressive Distributed Lag (ARDL) co-integration method was employed in the investigation. During the research period, the analysis showed that

while public spending has a negative impact on fiscal income in the short term, it is essential for eventually producing tax revenues. The paper claims that although government spending is essential for generating long-term tax revenue, it has a detrimental effect on fiscal revenue in the short term throughout the study period. It suggests that increasing government spending is a solid, long-term strategy for raising tax revenue. Additionally, during the study period, real GDP demonstrated a positive influence on tax collection in the short run but a negative impact overall. Furthermore, the analysis showed that, when both the short-run and long-run dynamics were considered, financial deepening had a negative effect on tax income.

Saibu and Sinbo (2013) conducted study on the macroeconomic factors influencing the mobilization of tax income in Nigeria using secondary data from the Nigerian economy for the years 1970 to 2011. They created both long- and short-term correlations between the selected variables using the error correlation mechanism. The primary results were that tax revenues tend to respond considerably to income, currency rate and inflation fluctuations. Tax revenue elasticity demonstrates that the rise in income by one percent is likely to lead to an immediate tax income increase of 0.63 percent, and in the second year up to 0.33 percent. In support, Basirati et al., (2014) analysed the effects of economic variables on total Iranian tax income using Auto Regression Distributed Lag (ARDL). His relationships with imports, value-added industries, and exchange rates for total tax receipts were strong. Nevertheless, a significant negative relationship existed between this and farming's added value. .

Okafor (2012) examined how income tax revenue affects Nigeria's economic expansion. The ordinary least square regression analysis tool was used to determine the relationship between the GDP and some federal government income tax revenue from 1981 to 2007. A positive and significant relationship between tax revenue and Nigeria's economic growth was concluded by the findings in this paper.

An empirical examination of the factors affecting tax income in Ethiopia from 1975 to 2013 was done by Ayenew (2016) using the Johansen maximum likelihood co-integration approach. Inflation had a negative and significant influence on tax revenue, while real GDP per capita income, foreign aid, and the industrial value-added share of GDP all had positive and significant long-term effects. However, the short-term results showed that real GDP per capita income and inflation have a negative impact, whereas the industrial value-added share of GDP has a favourable impact on Ethiopia's tax receipts. The research suggests methods like higher per capita income growth, structural change, the addition of a new tax base, and effective use of foreign aid inflows to enhance tax administration and boost revenue growth.

Considering Sub-Saharan Africa's Causality Analysis in a study published in 2016, Ojong et al., investigated the effects of Nigeria's petroleum profit tax, a source of tax revenue. The Federal Inland Revenue Service and the Central Bank of Nigeria provided secondary data for the study, which covered the

years 1970 to 2010. (FIRS). One of the econometric tests used to analyse the secondary data—obtained from several Nigerian government agencies—is Granger Causality. The results showed that economic growth and the petroleum profit tax have a long-term equilibrium relationship. The research also demonstrates that tax income has an impact on Nigeria's Granger-Causes GDP.

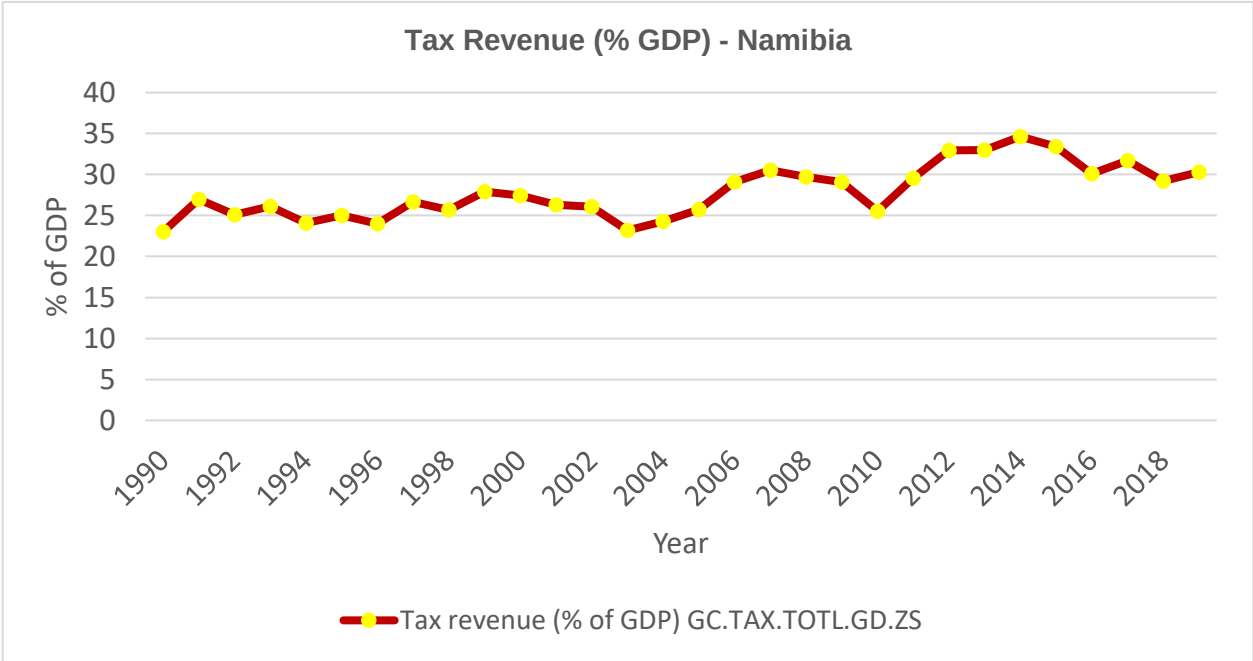


Figure 4: Namibia Tax Revenue Percentage over GDP

(Source: World Bank Indicators)

Figure 4 indicates the movements of the Tax revenue over GDP from 1990 to 2019. It also illustrates the positive contribution of Tax Revenue towards the GDP growth in Namibia. The Figure shows a total tax revenue percentage over GDP of 20 or above in the past 29 years. There is an upward trend from 1990 to 2019, which indicated an increase in Tax Revenue and eventually led to a great effect on Gross Domestic Product. In Africa at large, Value Added Tax and Taxes on goods and services other than VAT contribute more to Tax Revenue as compared to other taxes.

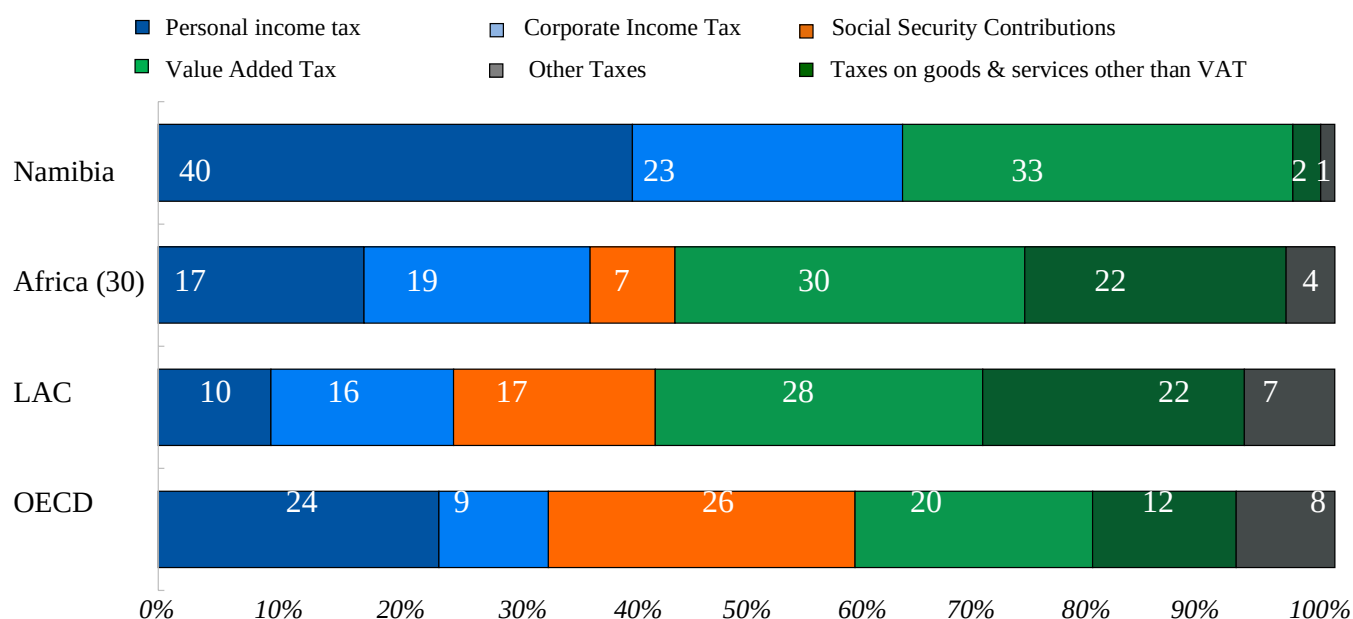


Figure 5: The 2018 Tax Revenue Distribution

Source: www.oecd.org

In 2018, Personal Income Tax contributed 40% of the total tax revenue of Namibia, followed by Value Added Tax with 33%, and Corporate Income Tax with 23%. Figure 4 indicates that Social Security Contributions, taxes on goods and services other than VAT, and other taxes contributed allow percentage on Total tax revenue.

2.3.2 Domestic Credit and Economic Growth

The mobilization of domestic credit is a significant domestic resource which is very closely connected with domestic economies (Wujung & Aziseh, 2016). It has also been scientifically explored in various studies about its effect on or link to growth.

Development Markets

The Simple Regression analysis done in development markets such as Pakistan and India, Pradhan et al., (2017) indicated that a co-integration exists between economic growth and domestic credit, mainly in the private sector and banking sector (Pradhan et al., 2017). For instance, in Pakistan, the causal relationship between domestic credit and economic growth is unidirectional. The autoregressive distributive lag and vector error of correlation models were used in this paper to determine the relationship. Similarly, Camba and Camba (2020), investigated the impact of domestic credit and stock market liquidity on the economic growth of Philippines. The historical data from 1995 to 2018 were used to determine the relationship between these variables. The study findings as per the ARDL demonstrated that domestic credit and stock market liquidity will affect Gross Domestic Product in the long run.

Vaithilingam, Guru, and Shanmugam (2008) applied a Granger Causality test to determine the

relationship between lending by commercial banks and economic growth in Malaysia. This study determined the impact of lending to economic growth. The results indicated that economic development is directly affected by an increment in commercial bank loans, and that an increase in commercial bank loans to the private sector has a direct effect on real income. Acharya (2015) investigated the relationship between domestic credit, exports, and economic growth in Nepal. The Vector Autoregressive Model was applied in this paper, using data from 1975 to 2014. The findings indicated that in the long-run, a boost in domestic credit will positively impact economic growth, as compared to the effects in the short-run.

Camba and Camba (2020) applied the VECM to determine the relationship between domestic credit and economic growth in the Philippines from 1995 to 2018. A long-run causality from domestic credit and stock market liquidity to GDP growth was established by the Vector Autoregressive Model. In the short-run, domestic credit has a significant causal relationship with GDP growth while at first lag a significant causal relationship between stock market liquidity and economic growth was determined in the short run.

Emerging and developing countries

Iqbal et al., (2012) used regression analysis in the context of emerging and developing nations and discovered that national savings and lending to the private sector had a substantial impact on Pakistan's economic growth and development using the ARDL technique and error correction model (ECM). They concluded that both short-term and long-term economic growth are significantly influenced by financing for the private sector. Evans (2013) uses annual time series data from 1970 to 2012 using a multivariate VAR framework to investigate the connection between domestic loans and economic growth in Nigeria. The findings show that there are positive causal relationships between domestic credit and economic growth in Nigeria. In other words, domestic credit not only helps Nigeria's economy thrive, but it also has a big, statistically significant influence.

For instance, in emerging and developing countries such as India, Mishra *et al.*, (2009) examined the direction of causality between the Indian credit market development and economic growth between 1980 and 2008. The study found economic growth to have a positive effect on the development of the credit market. Furthermore, Granger Causality Tests showed that credit market growth was driving India's economic development. These findings are backed by the 2010 study of Cappiello *et al.*, of the Eurozone, which found that the supply of credit, both in terms of volumes and in terms of credit standards applied on loans to enterprises, had a significant impact on real economic activity. In other words, a change in credit growth will have a beneficial effect on GDP.

Sub-Saharan Africa

Wujung and Aziseh (2016) experimentally evaluated the impact of mobilizing different domestic

resource sources on the economic growth of Cameroon in Sub-Saharan Africa. Data from the World Bank's development indicators (WDI), (2014) for Cameroon for the years 1980–2013 were used to conduct the empirical analysis. The data were analysed using descriptive statistics and the Instrumental Variable Generalized Method of Moments (IVGMM). The findings indicate a favourable and strong correlation between Cameroon's economic growth and its diverse local resource sources.

For their part, Ogunsakin (2020) examined the mobilization of domestic financial resources for enhanced Nigerian industrial development in the years 1986 to 2015 using the Error Correction Mechanism (ECM) and Co-integration. The study analyzed the main sources of finance used by the government for raising funds for Nigeria's industrial sector, including sectoral allocation of credit (SAC), government capital expenditure (FGCE), and lending rates (LR). The study found positive long-run relationships between the variables (SAC & LR) and industrial development. A similar study by Adesanya and Ajala (2018) found that agricultural credit was an effective instrument for counter-cyclical agricultural output, non-oil export and GDP stabilization in the Nigerian economy, and that such policies deteriorate with time. The study concluded that agricultural credit, interest rate exchange rates were all important in affecting aggregate output in Nigeria. The study recommended that agricultural credits should be extended for the development of agricultural production because it has causality effect on economic growth (Adesanya & Ajala, 2018).

According the Granger Causality Analysis applied by Akpansung and Babalola (2011) in the paper to determine the relationship economic growth and the banking sector in Nigeria. The historical data from 1970 to 2008 were used in this study. The findings of the study indicate that a unidirectional causal relationship that exists between private sector credit and GDP. This implies that based on the applied historical data, private sector credit has a positive effect on economic growth. On the other hand, interest rates are negatively affected by economic growth. The authors suggest a low lending-interest rate in order to accelerate economic growth and financial policy development to motivate more credit to the private sector.

The historical data retrieved from the World Bank, indicated in figure 6 shows that the contribution of domestic credit toward GDP in Namibia has been increasing over the past years, at an estimate of between 20% and 60%. This might imply that there can be a relationship between domestic credit and economic growth, using GDP as an indicator of economic growth.

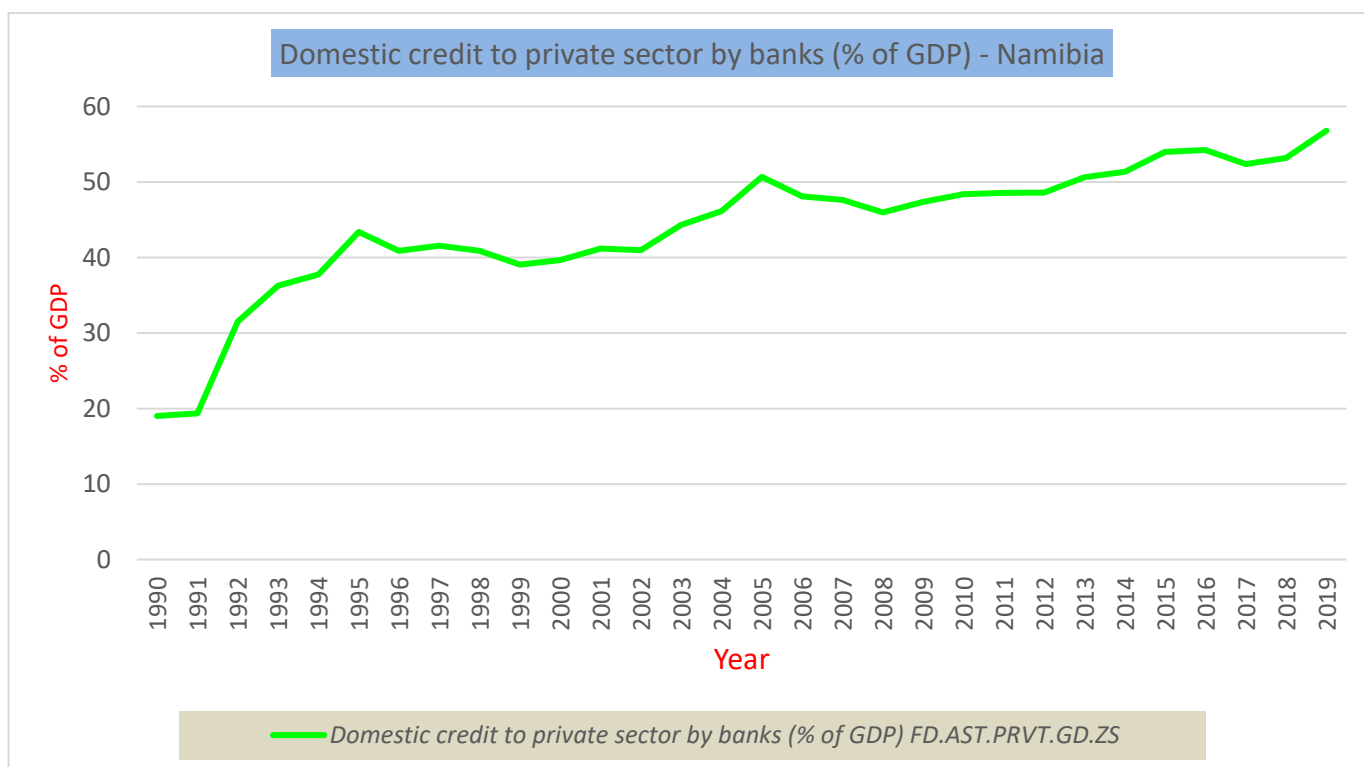


Figure 6: Namibia's Domestic credit to private sector by banks Percentage over GDP

(Source: World Bank Indicators)

2.3.3 Domestic Savings Mobilisation and Economic Growth

There might be a debate in literature when it comes to the link between domestic savings mobilisation and economic growth. Empirical evidence from Cardenas (1998), a study that examines savings determinants in Colombia that is applied to the auto-regression model to determine the relationship between savings rate and growth using the historical data from 1925 to 1994. The study findings state that fluctuations in national savings and fluctuations in investment are perfectly correlated.

Development Markets

Nguyen-Phuong et al., (2022) evaluated the level tax revenue to GDP ratios depending on different consumer behaviours between two groups of nations: ASEAN-7 plus China (referred to as the Eastern) and eight European countries (called the Western), using a Feasible Generalized Least Squares model. According to that study, a strong correlation between tax revenue and the variables of FDI and human capital in every country was observed. Additionally, in the Eastern region, gross savings were found to have a statistically negative impact on tax revenue. While the Western region noted a positive relationship between gross savings and tax revenue. Nguyen-Phuong et al., (2022) suggested enhancing taxation collection for

developing governments in the East through encouraging the broad money - M2 and supporting their citizens' increased consumption rather than saving. While, developed European nations, should work towards lowering broad money - M2, and pushing their citizens to save more.

A Classical Pooled Regression Model as a simple regression analysis was applied in the development markets study that examined the effects of savings on growth in Central and Eastern European countries. The significant effect of domestic savings on the growth rate was concluded by these study findings. Policy recommendations, such as those that assist in accelerating growth rate of total factors productivity, were elaborated in this study (Serhan & Nermin 2010). In support, Govdeli (2022) examined the long-term relationship between gross domestic savings, fixed capital investment and economic growth. The study applied the VECM Granger Causality analysis on historical data of 1992 to 2017 from Caucasus and Central Asian Countries. The finds indicated a causality between domestic savings and economic growth.

Hooi Lean (2009) used the cointegration and causality test to evaluate the relationship between economic growth and acceleration in domestic savings in China. The study covered data from 1955 to 2004.

In a long-run, household savings and enterprise savings can determine economic growth. In level, a short-running bilateral causality relationship between monthly increase in domestic savings and economic growth and long-running unidirectional causality relationship can cause an increase in domestic savings and economic growth.

Emerging and developing countries excluding SSA

There are few studies in literature that focus on domestic savings and domestic resource mobilization in emerging and developing countries, excluding Sub-Saharan Africa. Nevertheless, Nguyen, and Nguyen (2017) investigated the impact of Domestic Savings on Economic Growth of Vietnam, The Autoregressive Distributed Lag (ARDL) model was used to test the data from 1986 to 2015. The findings suggest that domestic savings, domestic investment, and dependency ratio do not affect economic growth. Additionally, the results of this study conclude that in the short-run economic growth might be affect by domestic savings and investment.

Sub-Saharan Africa

Abasimi and Martin (2018) used the Augmented Dickey-Fuller (ADF) test, Cumulative sum of residual, and Autoregressive Distributed Lag (ARDL) models in a later study on the determinants of national savings in four West African countries (Ghana, Togo, Burkina Faso, and Cote d' Ivoire) for the period 1997-2016. The short- and long-run determinants of national savings in the analysed nations were determined using the (ARDL) model analysis. The long-run findings found that GDP per capita income, and real interest rates all

had statistically insignificant positive effects on gross savings, whereas age dependence ratios have a statistically negligible negative effect.

Otiwu, Okere and Uzowuru (2018) evaluated the determinants of private domestic savings in Nigeria for the period 1981-2015, using the vector error correction model. Their study found evidence that per capita income and financial inclusion are the major determinants of private domestic savings in Nigeria. The implication of these results is that the higher the economic position of the households the higher the level of savings. Similarly, a study done in Kenya by Onwuasoeze and Kirori (2016) for the period of 1993-2013 using time series' ordinary least square found that increase in inflation will decrease private savings, contradicting the theory of precautionary motive of saving. This finding suggested that lower inflation rates in Kenya raises growth which in turn increased savings in the country.

Ibrahim, Adam and Musah, (2017) employed the Granger causality in their study to find out if a causal relationship exists between domestic savings and economic growth in ten (10) sub-Saharan African countries. The instantaneous causality test and Toda-Yamamoto approach were used to test the time series data. Based on the results, an existing causality relationship between domestic savings and economic growth exists in five sub-Saharan African countries. Furthermore, the study results concluded that instantaneous unidirectional causality from domestic savings to economic growth exists, which is mostly found in Benin, Mali and South Africa, which implies that an increase in savings can cause acceleration in economic growth.

Lastly, Odhiambo (2009), examines a causality relationship between savings and economic growth in South Africa during the period 1950-2015. Since there was a decrease in South Africa, the author was inspired to write this paper. The other contributing factor for this study was the declining level of the economic growth in the country. Foreign capital inflow was incorporated in the savings and economic growth bivariate model. The Co-integration based error correction model was applied in this study, which resulted in a bi-directional causality between savings and economic growth. The author's recommendation was that policies should be directed towards obtaining higher savings and economic growth, which in the long-run will enhance investors' confidence and will also play a major role in foreign capital inflow.

In the Namibian context, using the historical data retrieved from the World Bank, Figure 7 below shows a downward movement, the gross domestic savings percentage over GDP has been decreasing since 1990. This might imply that gross domestic savings has had a minimal effect on economic growth over the past years.

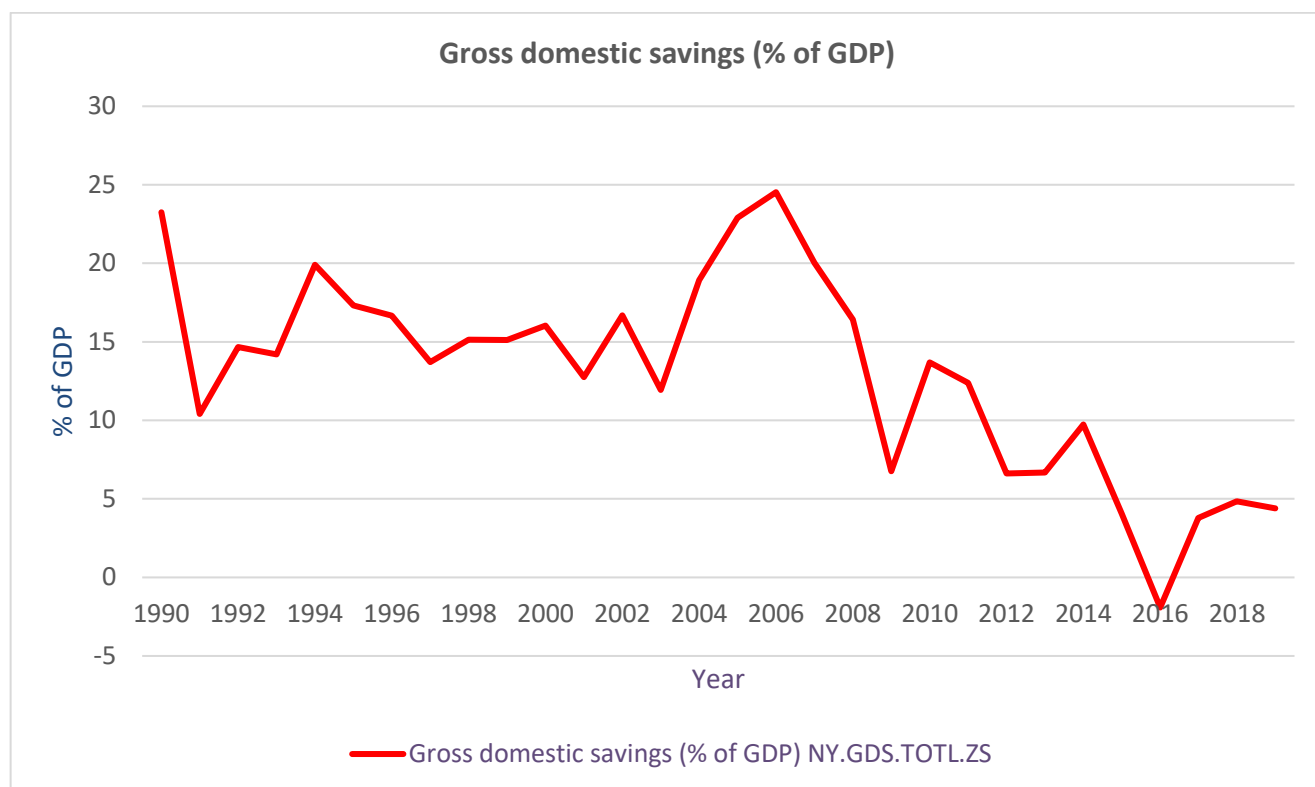


Figure 7: Namibia's Gross Domestic Savings Percentage over GDP

Source: World Bank Indicators

2.4 Summary

The chapter reviewed literature by building a logical flow of ideas on resource mobilisation in the Namibian economy, and conceptualising concepts and theories that guided the study. The chapter further presented empirical literature on domestic resources mobilisation and economic development. In the context of tax mobilization, determining factors might be the openness of the economy, tax effort and tax capacity, tax morale, population growth and the strengthening the government's tax allocation. The chapter also reviewed savings mobilisation as a source of DRM including foreign capital inflows, real per capita income, and access to bank facilities as determining factors. In addition, many empirical studies examined the effect of Domestic Resource Mobilisation (DRM) on economic growth in Africa, and how they employed different methodologies to examine the link between the various forms of domestic resources and economic growth. Some of these studies emphasized taxes and growth, savings and growth, or domestic credit and growth, while others focused on royalties from the exploitation of natural resources and growth. The chapter categorised the empirical literature into development markets, emerging and developing markets and Sub-Saharan Africa, to determine whether the relationship between DRM and economic growth is similar in all markets. Based on the literature in development markets, emerging and developing markets, most studies

reveal that tax revenue affects the economy negatively (Nguyen & Darsono 2022), while in Sub-Saharan Africa, tax revenue positively affects the economic growth. The literature further indicated the casual relationships between domestic credit and economic growth in developing markets, emerging, and developing countries (Iqbal, et al. 2012) (Camba & Camba 2020). Furthermore, in Sub-Saharan Africa and Developments Markets, a positive relationship seems to exist between economic growth and domestic credit. The next chapter presents the research methodology and data used in the study.

CHAPTER THREE: RESEARCH METHODOLOGY AND DATA

3.1 Introduction

The purpose of this chapter is to discuss and outline the research methods and empirical model specifications used. To address the research questions and evaluate the research hypothesis, the study employs an exploratory quantitative research design that is based on an empirical estimation model. The study's data sources, variable definitions, empirical model, pre-estimation, model estimating, and post-estimation are all covered in this chapter along with other methods used in the study. The chapter also analyses the study's limitations.

3.2 Model Specification

The study proposes a modified Harrod-Domar growth model which employs a multiple regression technique to estimate the relationship between DRM aspects, financial development and economic growth. The standard growth model is expressed as:

$$Y = f(K_t, H, L_t, I_t) \quad (1)$$

The model expresses aggregate real output (y) as a function of capital stock (k), human capital (h), labour participation (l) and life expectancy (e). Based on the above formulations, the model can be re-written as:

$$Y = \beta_0 + \beta_1 K_t + \beta_2 H_t + \beta_3 L_t + \beta_4 E_t + u_t \quad (2)$$

The study proposes a modified growth model that expresses aggregate real output (y) as a function of capital stock replaced with Investments proxied with Gross capital formation (GCF), human capital replaced with financial development that is proxied with Domestic Savings (SAV), labour participation proxied as Tax Revenue (TAX), life expectancy replaced by consumption and proxied by Domestic Credit (DC). The logarithmic conversion of the equation above yields the modified structural form of production function as:

$$\ln GDP = \beta_0 + \beta_1 \ln GCF_t + \beta_2 \ln SAV_t + \beta_3 \ln TAX_t + \beta_4 \ln DC_t + u_t \quad (3)$$

Where:

β_0 = intercept or constant; β_i for $i = 1$ to 4 are parameters or coefficients of explanatory variables; and u = error term, The *a priori* economic expectations are: $\beta_0 > 0, \beta_1 > 0, \beta_2 > 0, \beta_3 > 0, \beta_4 > 0$

GDP = aggregate real output which is an indicator for economic growth is proxied as Gross Domestic Product (GDP),

GCF = Capital stock proxied as Gross Fixed Capital Formation (GFCF)

TAX = Labour participation proxied as Tax Revenue (TAX);

SAV = Financial Development proxied as Gross Domestic savings (SAV);

DC = Consumption is proxied as Gross Domestic Credit (DC)

Ln = natural logarithm of variables.

U = stochastic or error term.

t = time element to illustrate the time-series structure of the data.

The choice of variables employed is informed by the two mechanism of the function of the Harrod-Domar growth model, combined with the determinants of growth used by Wujung and Aziseh' s (2016) modified double logarithm linear Cobb-Douglas function. The degree of savings and the capital-output ratio, according to the Harrod-Domar growth model, affect an economy's pace of growth (Wujung & Aziseh, 2016). The model maintains that GDP growth will be sustainable if the growth rates of labour and capital markets are equal to the growth rates of income, assuming that investment equals savings, the economy is at full employment, the economy is utilizing its capital stock, and there is no interference from the government. But this approach is logical since it considers saving, which is a long-term DRM for economic growth (Harrold 1939; Domar 1946). Investment (INV_t) and consumption (C_t) are also sources of income (Y_t). Savings and consumption are the two parts of income that are mentioned in the first query, but there is insufficient detail in the equation to indicate the direction of the flow that is mentioned in the equation. As a result, the goal of this study is to determine how this link flows. Additionally, following the introduction of NFSS in 2011, the investments and financial development proxies will look to offer insight on how the financial reforms have stopped the problem of illicit investment flows out of the nation.

3.3 Data Sources

The World Bank Development Indicators (WDI), the Global Financial Development Database (GFDD), the Bank of Namibia, and the Namibia Revenue Authority provided the data for this study (NAMRA). The information contains tax revenue, gross domestic product, gross capital formation, domestic saving, and domestic credit. It spans the years 1990 to 2020 and provides a sample of 30 yearly time series observations. The variables are all expected to have a positive influence on economic growth on the basis of the modified growth model specified. However, the Gross Domestic Savings are expected to have a negative linear relationship because of the financial reforms, that have resulted in regulations enforcing the investment of savings into the local market.

Table 3 1: Sources of Data and the Expected Sign

Category	Code	Description	Source	Expected sign
Real Aggregate Output	GDP	GDP (current US\$)	WB-WDI	
Labour Participation	TAX	Tax revenue (current US\$)	WB-WDI	+
Financial Development	SAV	Gross domestic savings (current US\$)	WB-WDI	-
Consumption	DC	Domestic credit to private sector (current US\$)	WB-WDI	+
Capital Accumulation	GFCF	Gross fixed capital formation (current US\$)	WB-WDI	+

3.4 Estimation Procedure

Wujung and Aziseh (2016) evaluated the dynamic character of development caused by variations in the amount of domestic resource mobilization using the Instrumental Variable General Method of Moments (IVGMM) method. The focus of this study is on short- and long-term repercussions, although this approach does not make that distinction. Therefore, studies in applied econometrics use either the cointegration techniques developed by Granger (1981), Engle and Granger (1987), Autoregressive Distributed Lag (ARDL), or bound tests of cointegration (Pesaran & Shin 1999; Pesaran et al., 2001) or Johansen and Juselius (1990) to ascertain the long run relationship between non-stationary series.

The model estimation technique of this study sets out to establish the nature and mechanism of the relationship between the dependent variables and explanatory variables of the DRM hypothesis, as it relates to the impact of Tax Revenue and Domestic Savings on economic growth. Accordingly, the empirical model is structured into a modified equation, where the Logarithm of GDP is the dependent variable. While the logarithmic values of Tax revenue (labour participation), Domestic Savings (Financial development), Domestic credit to private sector (consumption) and Gross fixed capital formation (Investment) are independent variables. The study uses ARDL and ECM models to determine the short- and long-run relationship between DRM components and economic growth in Namibia. The ARDL model has been adopted in this study because it offers several estimation advantages. According to Wooldridge (2016), the ARDL model approach does not require all variables to be integrated in the same order, i.e., the variables can be integrated in order one or not. The ARDL approach based on bounds allows testing for cointegration when it is uncertain whether the regressors are purely $I(0)$, purely $I(1)$, or mutually cointegrated, whereas other single-equation cointegration techniques only apply under the strict assumption that all the model's variables are integrated of order 1 (Hill, Griffiths, & Lim, 2018).

3.4.1 Unit Root Test

A unit root test in time series analysis determines if a time series variable is non-stationary and has a unit root, commonly known as $I(0)$. It is critical to understand the non-stationarity of variables to choose the best econometric technique for analysis. A non-stationary variable exhibits a random walk with drift, whereby its mean and variance are a function of time that can lead to spurious regression (Hill, Griffiths, & Lim, 2018). This spurious relationship occurs if the statistical summaries are indicating that two variables are related to each other, whilst there is no theoretical relationship between two variables. Most financial time series data, on the other hand, tend to follow a random walk with drift and become stationary at levels, first differences, and so on (Das, 2019). Most financial time series data, on the other hand, tend to follow a random walk with drift and become stationary at levels, first differences, and so on (Das, 2019).

We may simply use the ordinary least squares (OLS) approach when all variables are stationary at levels (Wooldridge, 2016). When we have a set of variables that have become stationary at first difference or above, the methodology shifts away from OLS and toward a method that can accommodate the combined data's stages of stationarity. The outcome of unit root testing is important to the empirical strategy, as most macroeconomic time series data are characterised by non-stationarity. Non-stationary series are considered to become stationary after the first difference, and they are integrated to an order of one or $I(1)$. The $I(0)$ series are integrated of order zero if the series under consideration is stationary at levels (Oni, 2014).

A cointegration test will not be required in this situation because any short-term system adjustment quickly adapts to the long-term (Das, 2019). OLS should only be used to estimate the long-run model as a result (where variables are neither lagged nor differenced). It is the static shape of the model. In essence, no short-run model estimation is needed if the series are $I(0)$. (Adeleye, 2018). Furthermore, non-stationary time series variables have long-run equilibrium relationships, according to popular economic and financial theory. If these variables, are I , then cointegration techniques can be used to replicate these long-run correlations (1). As a result, the cointegration process frequently begins with pre-testing for unit roots (Das, 2019).

The augmented Dickey-Fuller (ADF) test was used for this research. The ADF test examines the null hypothesis that a period of time is characterized by white noise errors as defined by an $AR(1)$. The test's null hypothesis is that the series has a unit root; the alternative hypothesis is that the series is stationary. The hypothesis that there is a unit root is rejected if the absolute value estimated by T-Statistics is greater than the ADF critical value, indicating that the time series is stationary. ADF, on the other hand, has a number of drawbacks and so cannot be utilized in isolation. As a result, alternative methodologies are required to supplement the research and the study used two more-unit root tests: the Phillips-Perron (PP) test (Phillips

& Perron, 1988) and the Kwiatkowski, Philips, Schmidt, and Shin (KPSS) test (Kwiatkowski, et al., 1992).

3.4.2 Cointegration Test

The term "cointegration" describes how a long-run equilibrium links the variables that do not drift further apart (covariance stationary). Cointegration analysis offers a framework for estimate, inference, and interpretation when the variables are not covariance stationary. Before performing an analysis, it is required to ascertain whether the relevant variables are cointegrated if the unit root tests of the relevant variables are not stable at levels or if the variables have varying degrees of stationarity (Hill, et al., 2018).

The most prominent cointegration tests for I (1) series in the literature are the Engle-Granger residual-based test, the Johansen approach and Bounds testing procedure (Wooldridge, 2016). The study employs a limits testing technique to cointegration checks to ensure that the variables are cointegrating in the long run. Only models with I (1) values greater than the Narayan upper critical bound at the 1%, 5%, and 10% significant levels are deemed cointegrated. The boundaries test technique to cointegration is more impartial and efficient than the Johansen cointegration test, especially when working with smaller samples (Hill, et al., 2018). The Wald test technique, which is used to examine the importance of lagged levels of estimated variables in a conditional unconstrained equilibrium correction framework of a generalised Dickey-Fuller regression model, highlights the F-statics in the limits test (Adeleye, 2018). If the series in question are cointegrated, they are linked and may be approximated using a linear model. If there is no cointegration, the estimate can only be a Vector Autoregression (VAR) model in the short term (Wooldridge, 2016).

3.4.3 Diagnostic Tests

The diagnostic tests are then used to determine the estimated model's quality of fit. The residual test is used to see if there is serial correlation, heteroscedasticity, a test for model misspecification, and normality tests, all of which have an impact on the model assumptions (error normality, error non-heteroscedasticity, error non-autocorrelation).

3.4.3.1 Jarque-Bera (JB) Normality test

If the variation from the normal distribution is sufficiently large, statistical tests resulting from such are deemed invalid (Hair et al., 2018). To avoid using a model that fails on the normal distribution requirement for a multiple regression disturbance term, the normality test was employed. The Jarque-Bera (JB) test is used to determine whether the OLS residuals are normal. The Jarque-Bera test is used to see if the disturbance term is distributed normally (Wooldridge, 2016). If the JB statistic result is considerably different from 0, the null hypothesis of normality is rejected. Alternatively, if the JB statistic value is close to zero, the null hypothesis of residual normality cannot be rejected (Hill, et al., 2018).

3.4.3.2. *The Breusch–Godfrey serial correlation LM test*

The term "serial correlation" relates to the idea that the present value of a variable is influenced by all or part of its prior values (Adeleye, 2018). As a result, the study used the Lagrange Multiplier (LM) test, commonly known as the Breusch-Godfrey test, to assess autocorrelation (Wooldridge, 2016). The Autocorrelation Lagrange Multiplier (LM) test presents multivariable LM test results for residual serial correlation up to the specified lag order h , with the null hypothesis of no serial autocorrelation and an alternative hypothesis of autocorrelation's presence (Das, 2019). Finding periodic patterns that repeat themselves might add biases and mistakes that render models useless. In this manner, the LM test was employed to evaluate the reliability of the modelling presumptions involved in the application of regression models. It specifically checks for serial correlation, which should be absent from a proposed model structure and, if present, it often leads to inaccurate inferences from other tests or less-than-ideal estimations of model parameters.

3.4.3.3. *Breusch-Pagan test*

When the variance of the residuals is unequal over a range of measured values, this is referred to as heteroscedasticity. Heteroscedasticity causes an unequal scatter of residuals (also known as the error term) when executing a regression analysis (UCLA, 2019). In model estimation, regression disturbances whose variances are not constant across observations are referred to as heteroscedastic (Hill et al., 2018). Heteroscedasticity causes broader confidence intervals, which leads to mistakes in the t-test and F-test results, as well as the acceptance of inconsequential coefficients (Das, 2019). The Breusch-Pagan (BP)/Cook-Weisberg heteroscedasticity test is preferred over the white test because it holds its power even when the model has many regressors, whereas the white test does not.

3.4.3.4. *The CUSUM and CUSUMSQ test*

To ensure the consistency of the empirical findings, the study used the CUMSUM stability tests, as described by Pesaran and Pesaran (1997). The CUSUM and CUSUMSQ tests were used to determine whether the variables in the model's parameters were stable. The CUSUM and CUSUM of squares tests use recursive residuals to determine if the coefficients of a linear regression model are constant over time. The CUSUM test has more power if the break occurs in the regression equation's intercept. The CUSUMSQ test has greater power when the structural change involves a slope coefficient or the variance of the error term. The coefficient constancy hypothesis is the CUSUM test's null hypothesis, if the CUSUM line deviates from the 5% threshold.

3.5 Limitations

The study focuses predominantly on country specific measurements and data requirements for Namibia. However, reference to studies from other countries are made. Only the Namibia DRM figures were analysed therefore the results may not be applicable to other economies.

3.6 Summary

This chapter has discussed and outlined the analytical techniques that were employed in examining the impact of DRM on economic growth in Namibia. The research is based on yearly time series data from 1990 to 2020. This chapter discussed the research technique, data used in the study, and its source to meet the major goal of this research. It also went over the model formulation, pre-estimate data checks, estimation technique, and diagnostics test. Furthermore, it highlighted the hypothesis testing approach used to address the research objectives and research hypothesis.

CHAPTER 4: PRESENTATION AND DISCUSSION OF RESULTS

4.1 Introduction

This chapter presents and discusses the analysis and findings of the study as per the method highlighted in the preceding chapter. The chapter consists of the five main sections, with the first section covering the descriptive statistics, followed by stationarity tests. Thirdly, the chapter presents the findings from the ARDL Bounds testing approach to cointegration. The fourth section provides empirical results of the ARDL models specified in Chapter 3. The fifth section deals with the hypothesis testing and model's stability of the model (CUSUM, CUSUM of squares) to corroborate the robustness of the results obtained. Lastly, the chapter summary and conclusion are discussed.

4.2 Descriptive Statistics

The study uses secondary time series data from 1990Q1 to 2020Q4 giving a sample of 120 quarterly time series observations, which includes data on labour participation, financial development, consumption, and investment proxied as Tax revenue (TAX), Gross Domestic Savings (SAV), Domestic credit to private sector (DC) and Gross fixed capital formation (GFCF) respectively. Table 4.1 presents the descriptive statistics of the variables used in the study.

Table 4 1: Summary Statistics

Variable	LGDP	LNTAX	LNDC	LNGCF	LNSAV
Mean	22.58	25.90	26.34	25.61	25.67
Median	22.66	25.88	26.54	25.58	25.65
Maximum	23.34	26.79	27.31	26.80	26.38
Minimum	21.75	24.89	24.69	24.45	24.89
Std. Dev.	0.56	0.65	0.77	0.69	0.42
Skewness	0.01	0.07	-0.38	0.10	0.05
Kurtosis	1.33	1.36	2.02	1.59	1.80
Jarque-Bera	13.91	13.62	7.62	10.13	7.29
Probability	0.00	0.00	0.02	0.01	0.03
Sum	2709.53	3108.10	3160.38	3073.32	3080.22
Sum Sq. Dev.	37.03	49.98	70.21	56.84	20.74
Observations	120	120	120	120	120

Table 4.1 presents the descriptive statistics of the logarithmic values of the current US dollars prices of the study variables. Transforming the data into logarithms provides more stability to the data, and leads to

normality of residuals and thus, meeting the regression assumptions for the linear model which requires that the residuals be normally distributed. The results in Table 4.1 show through statistics for the measures of central tendency and normality indicators of the variables that the logarithmic transformed data meets these regression assumptions. The results show that the variables were all normally distributed with kurtosis and skewness values of less than the recommended 2.5, as well as having statistically significant Jarque-Bera values with probabilities less than 0.05. The next section presents the stationarity tests of the natural logarithm variables transformed in line with model specification, presented in section 3.2.

4.3. Unit root tests

To estimate the models specified, the study uses the ARDL model of Shin et al., (2014) which requires that all the variables should be integrated order zero (I (0)) or one (I (1)). Additionally, the stationarity tests were used to verify that none of the variables were integrated of order 2. In determining the stationary properties of the variables, the unit root test was carried out using three methods, namely the Augmented Dickey-Fuller (ADF), Phillips-Perron (PP), and Kwiatkowski et al., (KPSS). The standard unit root test results are shown in Table 4.2 and indicate the results for the test undertaken using the constant or intercept.

Table 4 2: Stationarity Tests

Variable	Integration order	ADF	PP	KPSS	Interpretation
LNGDP	Level	-1.34	-1.24	1.25***	I (1)
	First Difference	-3.71***	-11.33***	0.151	
LNTAX	Level	-0.798	-1.05	1.23***	I (1)
	First Difference	-4.33***	-11.26***	0.11	
LNSAV	Level	-2.33	-2.35	0.680**	I (1)
	First Difference	-10.96***	-11.7***	0.065	
LNDC	Level	-2.17	-2.11	1.27***	I (1)
	First Difference	-4.00***	-11.54***	0.242	
LNGFCF	Level	-1.86	-1.41	0.16**	I (1)
	First Difference	-4.53***	-11.06***	0.34	

***, ** and * represents stationary at 1%, 5% and 10% level of significance respectively

Table 4.2 shows the unit root tests for ADF, PP, and KPSS. The null hypothesis is that the data are non-stationary or contain unit root, whereas the alternative hypothesis is that they are stationary or have no unit root. The bolded values with stars represent the decision to reject the unit root null hypothesis. The study also utilized the non-parametric PP test for comparison, which uses the same estimating scheme as the ADF test. The results for both ADF and PP tests were based on the significance threshold of 0.05. The KPSS test,

whose null and alternative hypotheses are diametrically opposed to the ADF and PP tests, was also utilized to confirm the research variables' stationarity. Based on the significance threshold of 0.05 and the p-value of the KPSS test, evidence for rejecting the null hypothesis in favour of the alternative was offered. The findings from the three tests indicated that all variables were stationary at first difference $I(1)$. Thus, fulfilling the precondition of the ARDL model that requires, all variables were non-stationary and integrated at the first order, $I(1)$. In terms of lag length, the generated the ARDL model was estimated using the constant ARDL model, the model lag order was automatically estimated during analysis.

4.4. Bounds Test for Cointegration

Cointegration is defined statistically as the existence of a linear combination of non-stationary variables $[I(1)]$ that follows a stationary process $[I(0)]$. If two variables have the same stochastic trend over a long period of time, then they are said to be cointegrated. The study employed the ARDL bounds testing approach to cointegration which is not size sensitive, because the sample size of 30 is considered small for time series analysis (Alimi, 2014). Moreover, the growth model specified in Chapter 3 includes regressors that are endogenous. Consequently, using the ARDL Bounds testing approach takes into consideration the presence of these endogenous explanatory variables, by using a single equation ARDL estimator that offers highly consistent estimates of the long-run parameters and valid t-ratios when the variables are cointegrated.

The study used the ARDL Bounds testing approach to cointegration, together with results of the Variance Inflation factors to determine the best possible ARDL model estimators guided by the growth model specification and the research hypotheses. The study relied on EViews 10 Statistical program in automatically selecting the appropriate lag length and specification for the ARDL models. The ARDL models were estimated using a recursive search approach that resulted in a model that met the pre- and post-diagnostic statistical requirements. The study relied on the omitted variables-Likelihood test and the redundant variable-Likelihood tests to statistically justifying the validity of equation A $[LNGDP = f(LNTAX, LNDC)]$. The redundancy test was used on LNSAV (proxy for financial development) in Equation B $[f(LNGDP/LNTAX, LNSAV, LNDC)]$, while the omitted variable test justified the omission of the GFCF (proxy for investment) in both equations [A & B]. The findings are presented in Table 4.3.

Table 4 3: Bounds Test for cointegration

Variables		Equation	F-statistic	K	No/Cointegration
F (LNGDP/LNTAX, LNDC)		A	6.61***	2	Cointegration
F (LNGDP/LNTAX, LNSAV, LNDC)		B	11.38** *	3	Cointegration
Equation	Critical Value Bounds (significance)	Lower Bound (I (0))		Upper Bound (I (1))	
A	1%	4.13		5.00	
B	1%	3.65		4.66	
Post Diagnostic Tests		Variable	F-Statistic	df	Probabili ty
Redundant Variables Test -Likelihood Ratio		LNSAV	0.110	(1, 13)	0.745
Omitted Variables Test – Likelihood Ratio		LNGFCF	0.786	(1, 12)	0.393

*** denote cointegration at the 1% significance level based on Pesaran et al.,s (2001) critical bounds table.

As shown in Table 4.3, the estimated F-statistics for the two equations had values that were higher than the upper bound critical value at 1% significance level. The F-statistics were compared to a computed F-critical value using Pesaran et al., (2001)'s technique to see if there was any cointegration. The null hypothesis is not rejected if the computed F-statistic is less than the lower bound value; otherwise, it indicates the presence of a long-run relationship. Thus, by indicating that a unique long-run relationship exists between the variables in both equation A and B, it provides sufficient grounds to reject the null hypothesis of no long-run relationship at the 1% significance level, implying the existence of cointegration among the analysed equations. After establishing the presence of cointegration in our variables, post diagnostic tests were done to further confirm the validity of the equations using the redundant variables test and the omitted variable test.

The redundant variables test was applied to equation B to test the hypothesis that the coefficients of LNSAV was zero and might thus be deleted from the equation. The F-statistic (0.110, $p = 0.745 > 0.05$) was not significant, therefore we reject the null hypothesis that LNSAV does not belong to equation B at a 5% significance level. The omitted variables test enabled the researcher to add the LNGFCF variable to

equation B and test whether it makes a significant contribution to explaining the variation in the dependent variable (LNGDP). The null hypothesis was that the LNGFCF was jointly significant. The findings in Table 4.3 suggested that we reject the null hypothesis that LNGFCF (Investment) significantly contributed to explaining the variation in LNGDP in equation B at a 5% significance level (F-statistic = 0.786; $p = 0.393 > 0.05$). The next section presents the empirical results estimated for the two equations that are used to explain the relationship between DRM components of Tax revenue, Domestic Savings and Domestic Credit on Economic growth.

4.5. Empirical Results

The presentation and interpretation of the ARDL estimating models are done against the original objectives and the research hypothesis in order to discuss if the research challenge has been addressed.

4.5.1 The Effects of Tax Revenue and Domestic Credit on Economic Growth

The ARDL model was derived by a recursive search using the Akaike Information Criterion (AIC) to find the ideal number of lags, which resulted in an optimal lag of 1 for Equation A [$LNGDP = f(LNTAX, LNDC)$] calculated as ARDL (1,1,1). The findings are presented in Table 4.4.

Table 4 4: Effect of Tax Revenue and Domestic Credit on Economic Growth

Long Run				Short Run			
Variable	Coefficient	t-Statistic	Prob.	Variable	Coefficient	t-Statistic	Prob.
LNTAX	0.45	2.65	0.01	D(LNTAX)	0.61	9.54	0.00
LNDC	0.17	2.60	0.02	D(LNDC)	0.24	6.99	0.00
C	3.06	2.03	0.05	CointEq (-1) *	-0.43	-5.47	0.00
Adjusted R-squared		0.88		Durbin-Watson stat (DW)		2.02	
Breusch-Godfrey Serial Correlation LM Test (χ^2_{sc})				Heteroskedasticity Test: Harvey (χ^2_{HET})			
F-statistic	0.12	Prob. F (2,21)	0.89	F-statistic	1.31	Prob. F (5,23)	0.29
Obs*R-squared	0.32	Prob. Chi-Square (2)	0.85	Obs*R-squared	6.43	Prob. Chi-Square (5)	0.27
EC = LGDP - (0.4477*LNTAX + 0.1693*LNDC + 3.0640)							

Note: ***, ** and * significant at 1%, 5% and 10% respectively.

Table 4.4 results indicates the ARDL estimation result for the effect of DRM components, Tax revenue and Domestic Credit on Namibia's GDP in the period 1990 to 2020. The two variables account for 88 % (Adj. R-sq. 0.88) variability in LNGDP. In addition, the coefficient of error correction term (lagECM) of -0.43 (t = -5.47, p = 0.00 < 0.05) is negative and significant, and thus explaining a moderate (43%) disequilibrium rate between the short-run to long-run equilibrium in each period. Table 4.4 also presented the Durbin Watson (DW) test statistic above the recommended 2 (DW = 2.02) indicating that the model does not suffer from autocorrelation. While the Serial Correlation test (χ^2_{sc}) statistic of 0.12 (p = 0.89 > 0.05) is implies that the model is free of serial autocorrelation. While the heteroscedasticity test (χ^2_{HET}) with observed chi-square probability value [F (5,23)] of 0.29 > 0.05. These diagnostic tests imply a valid, reliable and consistent model.

The findings in Table 4.4 indicate that both Tax Revenue and Domestic Credit have significant positive long- and short-run effects on Economic Growth in Namibia. The results implies that an increase in Tax revenue by 1% leads to 0.61% increase in the Economic growth in the short run, which dynamically changes to a long-run increase of 0.45% at the disequilibrium rate of 43% in the year. Similarly, a 1% shock on Domestic Credit will result in an incremental shock on Economic growth of 0.24% and 0.17% in the short-

and long-run respectively. Additionally, the study used a stepwise approach to add the Domestic Savings and Investment (GFCF) variables to determine their significant effects on economic growth in line with the growth model assumptions. The findings are presented in the next sub-section.

4.5.2 Financial Development Effects on the Domestic Resource Mobilisation and Economic Growth Relationship

An additive ARDL model was estimated by adding the Domestic Savings variable to the equation of Tax Revenue and Domestic Credit using a recursive search and guided by similar post-diagnostic tests presented in the previous sub-section. The model involving Domestic Savings was found valid, but when Gross Fixed Capital Formation was added the diagnostic tests were unreliable, suggesting an inconsistent and invalid model. Accordingly, the model estimations were then restricted to only Tax Revenue, Domestic Savings and Domestic Credit. The valid estimate for equation B was selected as ARDL (1, 4, 3, 1), where LNGDP had a lag of 1, LNTAX (lag of 4), LNSAV (lag of 3) and LNDC (lag of 1). The empirical results and post-diagnostic tests are presented in Table 4.5, together with the comparison of changes in the effects of Tax Revenue and Domestic Credit on the inclusion of Domestic Savings in the equation. The post-diagnostic tests in Table 4.5 shows the model as valid, reliable, and consistent, as the model does not suffer from autocorrelation ($DW = 2.36$), is free of serial autocorrelation ($\chi^2_{SC} = 0.64$; $p = 0.55 > 0.05$) and heteroscedasticity ($\chi^2_{HET} = 0.74$; $p = 0.26 > 0.05$).

Table 4.5 results indicated that the inclusion of Domestic Savings resulted in a 10% increase in Adjusted R-squared from 0.88 in equation A to 0.98 in equation B. Thus, implying that Domestic Savings may explain 10% of the variability in Economic growth in the period 1990 to 2020. The findings also indicated that in the short run that three-year lags of Domestic Savings had a significant negative effect on Economic Growth, which implies that 10% of the variability in Economic growth was due to the successive reduction in Domestic Savings. These findings are consistent with the financial strategy employed by the Namibian government of using Domestic Savings from Institutional Investors such as Pension Funds and Insurance Companies to drive economic growth. The control effect of financial development (proxied as domestic savings) on the impact of DRM on economic growth is highlighted by the changes between the two equations.

Table 4 5: Domestic Resource Mobilisation Effects on Economic Growth Results

Long Run					Short Run				
Variable	Coefficient		T-Stat	Prob.	Variable	Coefficient		T-Stat	Prob.
LNSAV	0.12	***	4.11	0.00	D(LNSAV)	0.01		0.52	0.61
LNTAX	0.22	***	3.15	0.01	D (LNSAV (-1))	-0.14	***	-8.30	0.00
LNDC	0.54	***	9.08	0.00	D (LNSAV (-2))	-0.13	***	-7.29	0.00
C	-0.53		-1.27	0.23	D (LNSAV (-3))	-0.12	***	-6.61	0.00
Post-Diagnostic Test					D(LNTAX)	0.28	***	6.87	0.00
Breusch-Godfrey Serial Correlation LM Test:					D (LNTAX (-1))	0.13	***	4.29	0.00
F-statistic	0.64	Prob. F (2,11)		0.55	D (LNTAX (-2))	0.10	***	2.86	0.01
Obs*R-squared	2.70	Prob. Chi-Sq. (2)		0.26	D(LNDC)	0.65	***	18.26	0.00
Heteroscedasticity Test: Breusch-Pagan-Godfrey					CointEq (-1) *	-0.99	***	-8.63	0.00
F-statistic	0.74	Prob. F (12,13)		0.69	Adjusted R-squared 0.985				
Obs*R-squared	10.58	Prob. Chi-Sq. (12)		0.57	Durbin-Watson stat 2.36				
Equation B: EC = LGDP - (0.1194*LNSAV + 0.2183*LNTAX + 0.5445*LNDC -0.5273)									
Equation A: EC = LGDP - (0.4477*LNTAX + 0.1693*LNDC + 3.0640)									
Changes in the Variables of interests between the two equations									
Variable	Equation A		Equation B		Changes	% Change			
LNTAX	0.45		0.22		-0.23	-51%		Decrease	
LNDC	0.17		0.54		0.38	222%		Increase	
C	3.06		-0.53		-3.59	-117%			
Adj R-sqd	0.88		0.98		0.10	11%			

Note: Sample years: 1990 – 2020 (N=30); ***, ** and * significant at 1%, 5% and 10% respectively.

Table 4.5 results indicated that financial development (proxied as Domestic Savings) reduces the Tax revenue (DRM) effect as a positive driver of economic growth by at least 51%, when comparing the coefficients of Tax Revenue in the two equation models. Additionally, the findings also indicated that financial development strategies that sought to use Domestic Savings from Pension Funds as local investments resulted in 222% increase in Consumption (proxied as Domestic Credit to private sector). According to Pension Fund Regulations of 2018 (G.N No. 211 of 2018), the regulation of Pension Funds progressively restricted any investment of domestic assets outside Namibia from 30% of the market value of its total assets from 1 January 2014 to 10% of the market value of its total assets by 1 January 2018. Additionally, the Pension funds were compelled to invest in unlisted investments between 1.75 and 3.5% of the market value of its total assets.

These reforms have resulted in a significant negative relationship between Domestic savings and economic growth in the short run, which saw 1% reduction in the three-year lags of Domestic Savings resulting in between a 0.12 and 0.14% increase in Economic Growth. while supporting positive economic growth. In addition, the coefficient of error correction term (lagECM) of -0.99 is negative and significant, and thus explaining a very fast (99%) speed of adjustment from a short-run out-of-equilibrium position to the long-run equilibrium. The long-run effect of Domestic savings was shown to be significant and positive (beta = 0.12, t =4.11, p=0.001), which implies that in the financial development has a positive long-run effect on Economic growth.

4.5.3 Testing the Research Hypothesis

This section presents the results against the research hypothesis. Equation 4 presents the summary of the significant relationship and the interpretations of these findings against the research hypotheses.

$$\mathbf{LnGDP} = -\mathbf{0.5273} + 0.1194 * \mathbf{LnSAV}_t + 0.2183 \mathbf{LnTAX}_t + 0.5445 * \mathbf{LnDC}_t + \mathbf{0.99} \quad (4)$$

Equation 4 shows the final estimation model based on the economic growth model assumptions. The findings indicate evidence to suggest that we reject the null hypothesis, in favour of the alternative hypothesis that there is a positive causal relationship between DRM and Economic growth in Namibia. The findings show evidence to suggest that, at the 98% confidence interval, there is a positive causal relationship between Tax Revenue, Domestic Savings and Domestic Credit in the long run. The findings are consistent with and support the assumptions of the Harrod-Domar growth model, which state that the growth rate of an economy is dependent on two important factors: the savings level and capital-output ratio of the economy (Wujung & Aziseh, 2016). The study findings also support the assumption of investment equals savings, in

that the financial reforms implemented in Namibia used domestic savings as its capital stock, while the Tax Revenue represented the level of employment in the economy. Accordingly, the study model maintains that GDP growth was sustainable if the growth rate of capital markets is financed by a small percentage of domestic savings and labour is equal to the growth rate of income.

4.5.4 Model Stability

Finally, we checked the structure stability in the model using the Cumulative sum (CUSUM) and CUSUM of squares (CUSUMSQ) tests and illustrated in Figure 8.

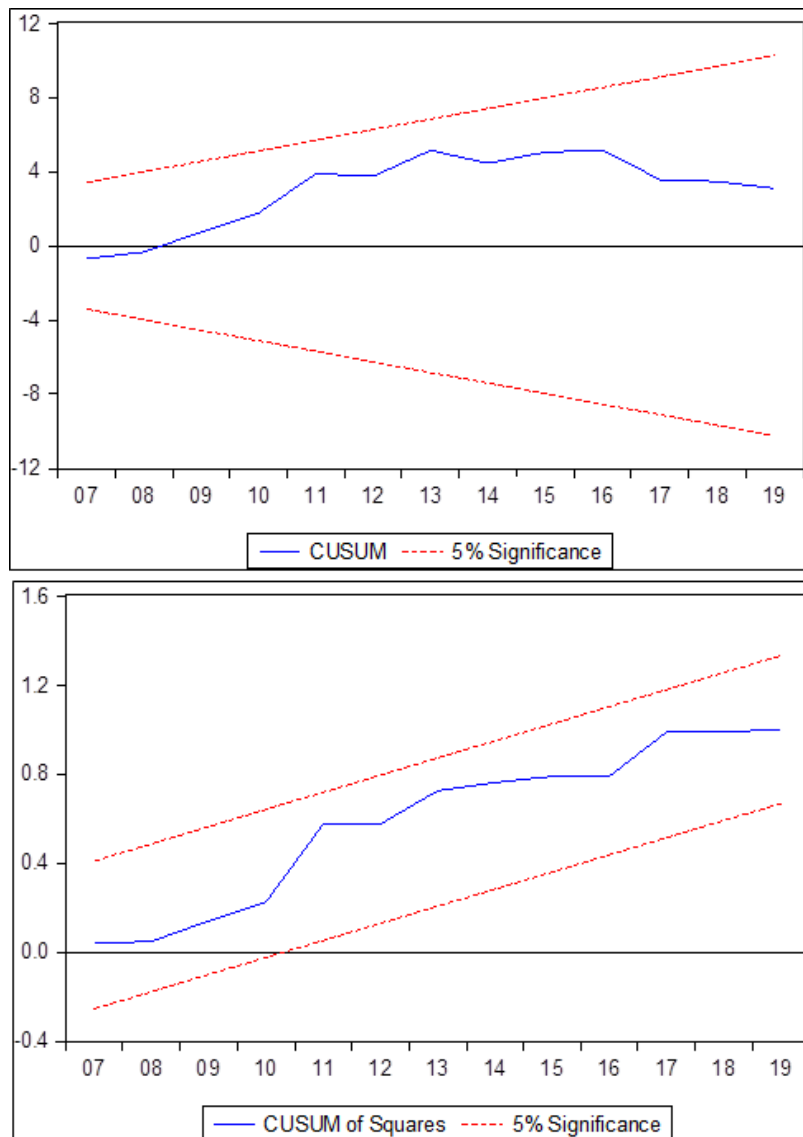


Figure 8: Cumulative sum (CUSUM) and CUSUMQ square test for stability

To ensure the consistency of the empirical findings, the study used the CUMSUM stability tests, as described by Pesaran and Pesaran (1997). The CUSUM and CUSUMQ statistics are displayed against the

break points in a recursive manner, with the null hypotheses for all coefficients in the supplied regression are stable and cannot be rejected if the plotted points for the CUSUM and CUSUMQ statistics stay within the critical boundaries of a 5% level of significance. Figure 4.1 results show that the CUSUM and CUSUMQ plotted points remain within the critical bound of the 5% significance level. Therefore, the null hypothesis that all the coefficients are stable cannot be rejected, and we conclude that all coefficients in the ARDL error correction model are stable.

4.6 Summary

The chapter presented the analysis and discussed the findings of the study, starting with the descriptive statistics, followed by stationarity tests and ARDL Bounds testing approach to cointegration. The chapter also presented the empirical results of the ARDL models specified in Chapter 3 and tested the hypotheses and model's stability to corroborate the robustness of the results obtained. The findings from the ARDL model estimation provided empirical evidence to suggest the existence of a direct positive long-run relationship between DRM and economic growth in Namibia in the period 1990 to 2020. While a negative short-run relationship was observed between the three-year lags of Domestic Savings and Economic growth, indicating the control effects of government intervention through regulating Pension Funds toward using their savings develop the domestic capital market and drive economic growth. The findings also revealed that Gross Fixed Capital Formation becomes an insignificant factor when domestic savings are used to drive economic growth in Namibia. The findings were consistent with existing literature on the standard growth model assumptions. The next chapter presents the conclusion, policy implications, and areas for further study.

CHAPTER 5: CONCLUSION, POLICY IMPLICATIONS AND FUTURE RESEARCH

5.1. Introduction

Based on the findings from earlier chapters, this chapter offers a review of the results, a conclusion, and policy recommendations. It also identifies potential study fields. The study's results are summarized in Section 5.2. The study's key findings and policy suggestions are highlighted in Section 5.3. Finally, Section 5.4 summarizes the study's limitations and proposes potential areas for further investigation.

5.2. Summary of Findings

The reduction in trade and financial flows caused by the global financial crisis of 2009, along with global unpredictability and volatility in development assistance flows, heightened the demand for more reliable and long-term development financing alternatives (Bhushan & Samy, 2012). Accordingly, DRM became an important policy tool that is essential for generating domestic tax revenues and savings that can be distributed to economically and socially productive sectors. Since DRM can increase the fiscal space and promote faster economic growth and poverty reduction.

The study's observed relationships show that domestic savings accounted for 30.6% of GDP, while tax revenue accounted for 58.7% of GDP growth variability. The first significant financial reforms made between 2002 and 2007 made it clear how tax income was positively affecting GDP. However, due to the 2007–2009 global financial crisis, which witnessed a decline in both GDP and tax revenues, these improvements were only momentary. Namibia has strived to effectively draw the benefits from its policies, governance, and political stability to improve its mobilisation of domestic resources. In doing so, the Namibian government created the ten-year financial strategy that was anchored in its need for an expanded the tax base, limited capital outflows, and a strengthened financial intermediation industry.

By encouraging institutional investors, such as pension funds, to reinvest domestic savings in local investment and growth, the financial reforms strengthened the financial stability of the Namibian economy and raised domestic market confidence. The damaging impacts of the financial crisis further encouraged the Namibian government to implement further financial reforms under the ten-year Namibia Financial Sector Strategy (NFSS) for 2011–2021 to strengthen the DRM's positive impact on GDP growth. The empirical results of the study provided support for the existence of a direct, long-term relationship between DRM and economic growth in Namibia from 1990 to 2020. The three-year lags between domestic savings and economic development were shown to have a negative short-run connection, demonstrating the government's ability to manage pension funds' use of their resources to expand the domestic capital market and stimulate economic growth. The results also showed that when domestic savings are used to fuel Namibian economic expansion, gross fixed capital formation becomes a negligible component. The results

agreed with the assumptions made in the existing literature regarding the standard growth model that puts the emphasis on the domestic resource mobilization and growth.

5.3. Conclusion, Implications and Recommendations

The study sought to empirically measure the impact domestic resource mobilization strategies have had on Namibia's Economic growth in the period 1990 to 2020. Using the Harrod and Domar growth model the study estimated and tested the hypothesis on the causal relationship between DRM and Economic growth in Namibia. Based on the results, the study found significant evidence to suggest that we reject the null hypothesis in favour of the alternative hypothesis of a positive causal relationship between DRM and Economic growth in Namibia. Therefore, the study concludes with a 98% of confidence that in the long run a positive causal relationship exists between Tax Revenue, Domestic Savings and Domestic Credit. Thus, implying that the growth rate of the Namibian economy over time can be directly and positively influenced by the trends in domestic savings, tax revenue and domestic credit.

Moreover, the study concludes that government interventions through policies and strategies in the financial sector. As the study findings shows evidence of financial reforms implemented having direct and proportional effects on the gross capital formation and domestic savings balance and its impact on economic growth in Namibia. The study recommends that the Namibian government initiates policies that trigger more savings, and support technology enhancement towards curtailing the economy's capital output ratio. In addition, the government should continue its policies of using the Domestic Savings from Institutional Investors such as Pension Funds and Insurance Companies to drive economic growth, as the effects will eventually produce positive gains. For instance, the NFSS policy can be further expanded to concentrate on generating domestic resources that will broaden the tax base, limit capital outflows, and expand the financial technology sector. Lastly, considering the declining tax revenue base, the study's findings give managers and policy makers in development finance an empirical understanding of how to raise sufficient domestic resources more effectively through savings and financial deepening.

The study recommendations are of particular interest to the Ministry of Finance and Namibia Revenue Agency (NamRA), as the findings can be used to provide direction on the effects of growth induced regulations towards the domestic credit market, general financial stability and improving Namibia's domestic resource mobilization initiatives. Greater domestic policy ownership and better congruence with domestic requirements are the key takeaways from this study.

5.4. Limitations and Areas of Future Research

The study focuses predominantly on country specific measurements and data requirements for Namibia. However, reference to studies from other countries are made. Only the Namibia DRM figures were analysed

therefore the results may not be applicable to other economies. A key limitation associated with the current study was related to a general lack of long-time series data. As such, the study applied the Autoregressive Distributed Lag Model (ARDL) to compensate for this lack of data. However, there is a need to capture monthly economic data to better develop strategies that will deal with short-term shocks on the country's economy.

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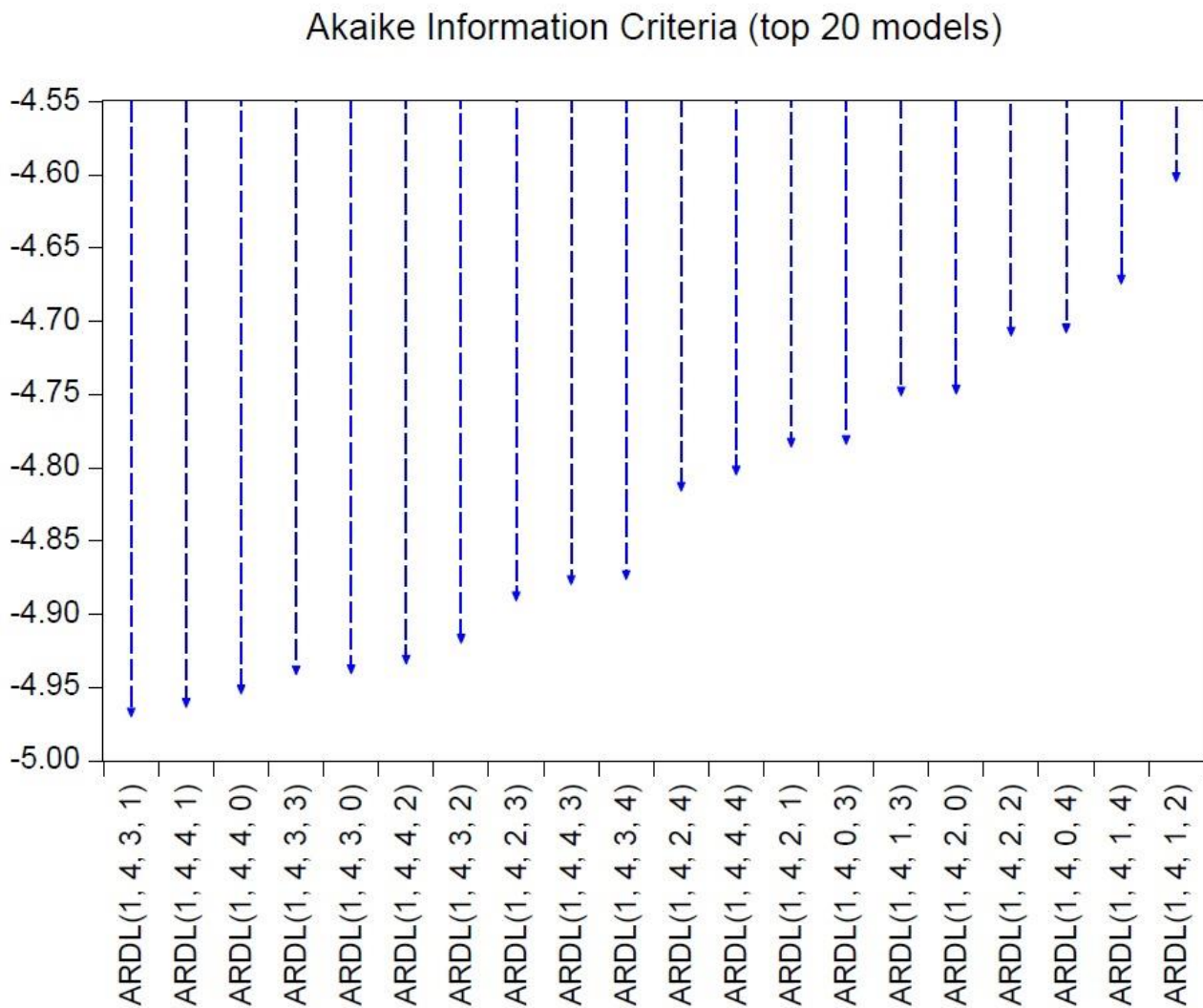
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APPENDICES

1: Savings Model Selection



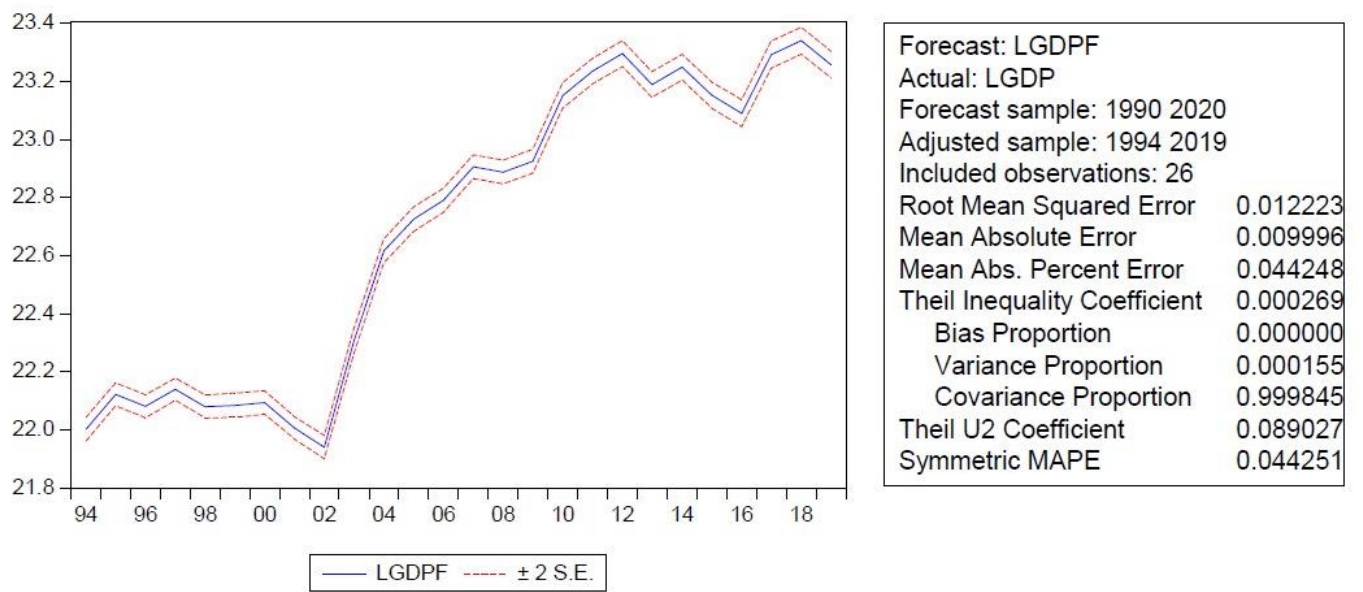
2: Long Run Bounds Test

ARDL Long Run Form and Bounds Test Dependent Variable: D(LGDP) Selected Model: ARDL(1, 4, 3, 1) Case 2: Restricted Constant and No Trend Date: 01/11/22 Time: 10:37 Sample: 1990 2020 Included observations: 26				
Conditional Error Correction Regression				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.522476	0.445251	-1.173441	0.2617
LGDP(-1)*	-0.990933	0.158929	-6.235063	0.0000
LNSAV(-1)	0.118366	0.029537	4.007336	0.0015
LNTAX(-1)	0.216338	0.093494	2.313924	0.0377
LNDC(-1)	0.539558	0.088217	6.116243	0.0000
D(LNSAV)	0.006232	0.018749	0.332369	0.7449
D(LNSAV(-1))	-0.136692	0.022664	-6.031140	0.0000
D(LNSAV(-2))	-0.128552	0.022485	-5.717199	0.0001
D(LNSAV(-3))	-0.115202	0.021540	-5.348228	0.0001
D(LNTAX)	0.276484	0.070571	3.917809	0.0018
D(LNTAX(-1))	0.130475	0.044464	2.934412	0.0116
D(LNTAX(-2))	0.100365	0.050964	1.969315	0.0706
D(LNDC)	0.649253	0.048626	13.35196	0.0000
* p-value incompatible with t-Bounds distribution.				
Levels Equation Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNSAV	0.119449	0.035180	3.395347	0.0048
LNTAX	0.218317	0.074015	2.949655	0.0113
LNDC	0.544495	0.062781	8.672869	0.0000
C	-0.527257	0.481008	-1.096149	0.2929
EC = LGDP - (0.1194*LNSAV + 0.2183*LNTAX + 0.5445*LNDC -0.5273)				
F-Bounds Test Null Hypothesis: No levels relationship				
Test Statistic	Value	Signif.	I(0)	I(1)
Asymptotic: n=1000				
F-statistic	11.38052	10%	2.37	3.2
k	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66
Finite Sample: n=35				
Actual Sample Size	26	10%	2.618	3.532
		5%	3.164	4.194
		1%	4.428	5.816
Finite Sample: n=30				
		10%	2.676	3.586
		5%	3.272	4.306
		1%	4.614	5.966

3: Ganger Causality

Pairwise Granger Causality Tests Date: 01/11/22 Time: 10:31 Sample: 1990 2020 Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
LNDC does not Granger Cause LGDP LGDP does not Granger Cause LNDC	29	0.79735 5.16311	0.4621 0.0136
LNTAX does not Granger Cause LGDP LGDP does not Granger Cause LNTAX	28	0.65007 7.82799	0.5313 0.0026
LNSAV does not Granger Cause LGDP LGDP does not Granger Cause LNSAV	29	1.07696 3.07936	0.3565 0.0645
LNTAX does not Granger Cause LNDC LNDC does not Granger Cause LNTAX	28	1.38335 2.19988	0.2708 0.1336
LNSAV does not Granger Cause LNDC LNDC does not Granger Cause LNSAV	29	0.10226 1.51039	0.9032 0.2411
LNSAV does not Granger Cause LNTAX LNTAX does not Granger Cause LNSAV	28	0.08968 2.88242	0.9145 0.0764

4: GDP Forecast from Savings Model



Test Savings

Ramsey RESET Test
Equation: UNTITLED
Specification: LGDP LGDP(-1) LNSAV LNSAV(-1) LNSAV(-2) LNSAV(-3) LNSAV(-4) LNTAX LNTAX(-1) LNTAX(-2) LNTAX(-3) LNDC LNDC(-1) C
Omitted Variables: Squares of fitted values

	Value	df	Probability	
t-statistic	1.045060	12	0.3166	
F-statistic	1.092151	(1, 12)	0.3166	

F-test summary:

	Sum of Sq.	df	Mean Squares	
Test SSR	0.000325	1	0.000325	
Restricted SSR	0.003901	13	0.000300	
Unrestricted SSR	0.003576	12	0.000298	

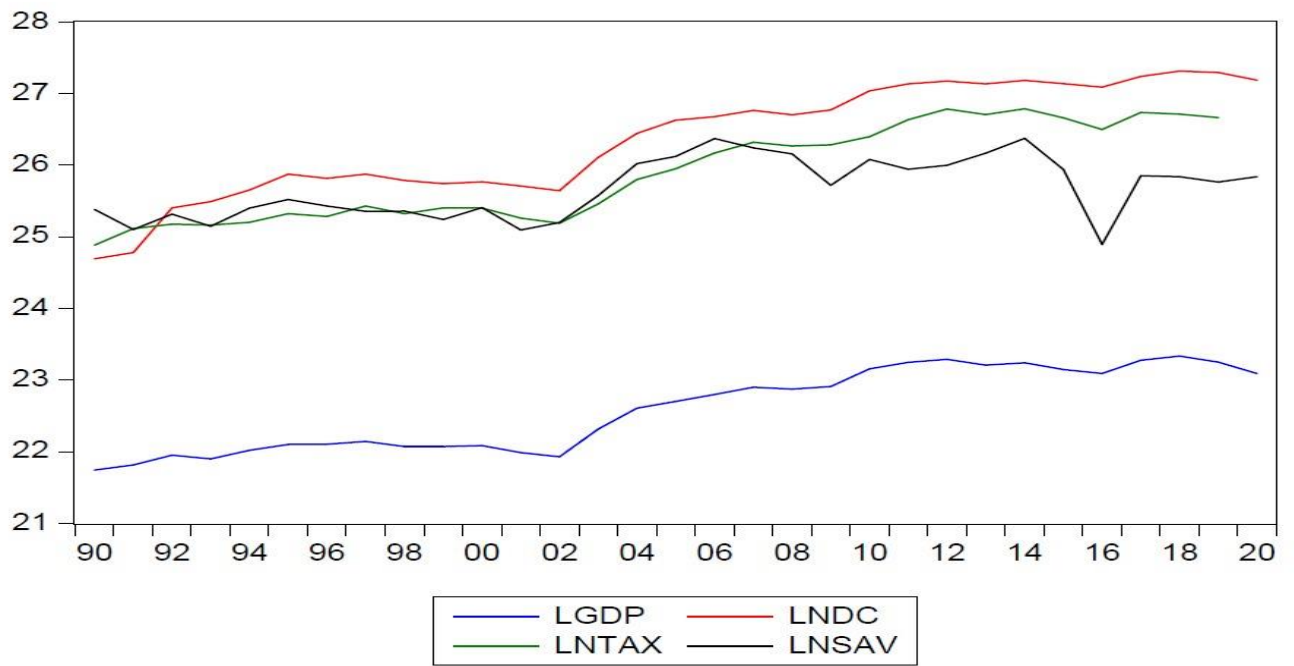
Unrestricted Test Equation:
Dependent Variable: LGDP
Method: ARDL
Date: 01/11/22 Time: 10:45
Sample: 1994 2019
Included observations: 26
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic):
Fixed regressors: C

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LGDP(-1)	-0.103829	0.191705	-0.541610	0.5980
LNSAV	-0.015100	0.027672	-0.545699	0.5953
LNSAV(-1)	0.056818	0.079738	0.712561	0.4897
LNSAV(-2)	-0.006258	0.021177	-0.295486	0.7727
LNSAV(-3)	-0.019307	0.034679	-0.556732	0.5879
LNSAV(-4)	-0.216297	0.317931	-0.680326	0.5092
LNTAX	-0.516162	0.761722	-0.677625	0.5109
LNTAX(-1)	-0.103445	0.189465	-0.545985	0.5951
LNTAX(-2)	0.051122	0.094125	0.543127	0.5970
LNTAX(-3)	0.168293	0.262042	0.642235	0.5328
LNDC	-1.148786	1.721194	-0.667435	0.5171
LNDC(-1)	0.223611	0.331518	0.674508	0.5128
C	32.90293	31.98727	1.028626	0.3239
FITTED^2	0.062666	0.059964	1.045060	0.3166

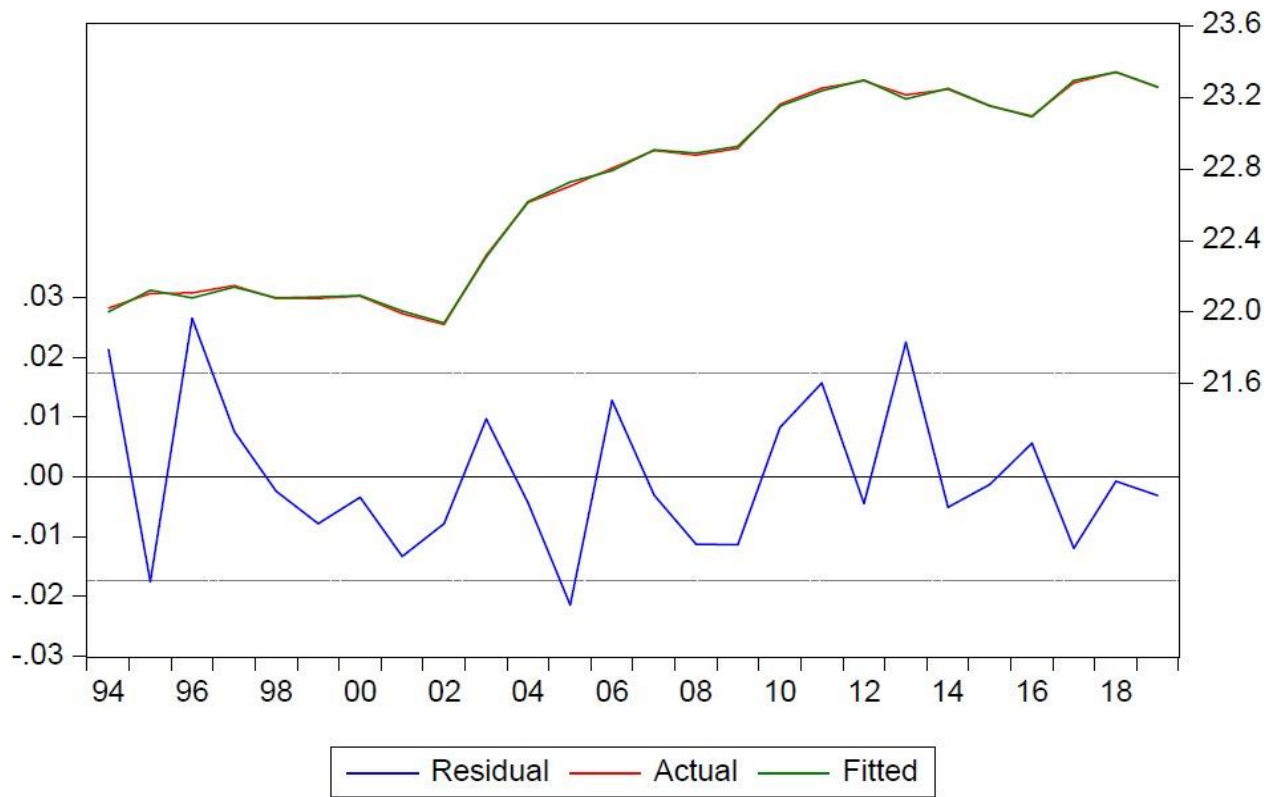
R-squared	0.999476	Mean dependent var	22.69059
Adjusted R-squared	0.998909	S.D. dependent var	0.522499
S.E. of regression	0.017262	Akaike info criterion	-4.976938
Sum squared resid	0.003576	Schwarz criterion	-4.299501
Log likelihood	78.70019	Hannan-Quinn criter.	-4.781860
F-statistic	1761.089	Durbin-Watson stat	2.701429
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

5: EViews output for the Savings Equation



6: Savings Fitted Model



7: Error Correction Form

ARDL Error Correction Regression				
Dependent Variable: D(LGDP)				
Selected Model: ARDL(1, 4, 3, 1)				
Case 2: Restricted Constant and No Trend				
Date: 01/11/22 Time: 10:38				
Sample: 1990 2020				
Included observations: 26				
ECM Regression				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNSAV)	0.006232	0.011924	0.522629	0.6100
D(LNSAV(-1))	-0.136692	0.016470	-8.299250	0.0000
D(LNSAV(-2))	-0.128552	0.017626	-7.293260	0.0000
D(LNSAV(-3))	-0.115202	0.017417	-6.614237	0.0000
D(LNTAX)	0.276484	0.040247	6.869632	0.0000
D(LNTAX(-1))	0.130475	0.030449	4.285081	0.0009
D(LNTAX(-2))	0.100365	0.035103	2.859133	0.0134
D(LNDC)	0.649253	0.035552	18.26192	0.0000
CointEq(-1)*	-0.990933	0.114875	-8.626188	0.0000
R-squared	0.989477	Mean dependent var	0.051998	
Adjusted R-squared	0.984525	S.D. dependent var	0.121770	
S.E. of regression	0.015148	Akaike info criterion	-5.274447	
Sum squared resid	0.003901	Schwarz criterion	-4.838952	
Log likelihood	77.56781	Hannan-Quinn criter.	-5.149040	
Durbin-Watson stat	2.363918			
* p-value incompatible with t-Bounds distribution.				
F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	11.38052	10%	2.37	3.2
k	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66

8: Raw Data of the Log Time Series

Year	LGDP	LNGCF	LNSAV	LNGNE	LNTAX	LNDC
1990	21.75	24.66	25.38	26.39	24.89	24.69
1991	21.82	24.45	25.11	26.47	25.12	24.78
1992	21.96	24.84	25.32	26.60	25.18	25.41
1993	21.90	24.83	25.15	26.52	25.17	25.49
1994	22.02	24.88	25.40	26.62	25.20	25.65
1995	22.10	25.08	25.52	26.73	25.32	25.87
1996	22.11	25.14	25.43	26.75	25.28	25.82
1997	22.15	25.00	25.36	26.79	25.43	25.87
1998	22.08	25.09	25.36	26.75	25.32	25.79
1999	22.08	25.09	25.24	26.73	25.41	25.74
2000	22.09	24.89	25.41	26.71	25.40	25.77
2001	21.99	25.03	25.10	26.69	25.26	25.71
2002	21.93	24.93	25.20	26.56	25.19	25.64
2003	22.32	25.27	25.58	26.99	25.46	26.11
2004	22.61	25.53	26.02	27.22	25.80	26.44
2005	22.70	25.63	26.12	27.28	25.95	26.63
2006	22.80	25.87	26.37	27.38	26.17	26.68
2007	22.90	25.98	26.24	27.55	26.32	26.77
2008	22.88	26.09	26.16	27.59	26.27	26.70
2009	22.91	26.23	25.72	27.70	26.28	26.77
2010	23.16	26.38	26.08	27.86	26.40	27.04
2011	23.25	26.36	25.94	27.95	26.64	27.13
2012	23.29	26.54	26.00	28.08	26.79	27.18
2013	23.21	26.65	26.17	28.02	26.71	27.14
2014	23.24	26.80	26.38	28.07	26.79	27.18
2015	23.15	26.58	25.94	27.99	26.66	27.14
2016	23.10	26.18	24.89	27.92	26.50	27.09
2017	23.28	26.17	25.85	28.02	26.74	27.24
2018	23.34	26.16	25.84	28.04	26.71	27.31
2019	23.25	25.99	25.76	27.96	26.67	27.29
2020	23.09	25.69	25.84	27.78		27.19

9: Durbin Watson and Adjusted Rsqd Savings

Dependent Variable: LGDP Method: ARDL Date: 01/11/22 Time: 10:42 Sample (adjusted): 1994 2019 Included observations: 26 after adjustments Maximum dependent lags: 1 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): LNSAV LNTAX LNDC Fixed regressors: C Number of models evaluated: 125 Selected Model: ARDL(1, 4, 3, 1)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LGDP(-1)	0.009067	0.158929	0.057052	0.9554
LNSAV	0.006232	0.018749	0.332369	0.7449
LNSAV(-1)	-0.024558	0.017232	-1.425087	0.1777
LNSAV(-2)	0.008140	0.016141	0.504308	0.6225
LNSAV(-3)	0.013350	0.015092	0.884548	0.3925
LNSAV(-4)	0.115202	0.021540	5.348228	0.0001
LNTAX	0.276484	0.070571	3.917809	0.0018
LNTAX(-1)	0.070329	0.091137	0.771677	0.4541
LNTAX(-2)	-0.030110	0.053270	-0.565238	0.5815
LNTAX(-3)	-0.100365	0.050964	-1.969315	0.0706
LNDC	0.649253	0.048626	13.35196	0.0000
LNDC(-1)	-0.109695	0.090788	-1.208254	0.2485
C	-0.522476	0.445251	-1.173441	0.2617
R-squared	0.999428	Mean dependent var	22.69059	
Adjusted R-squared	0.998901	S.D. dependent var	0.522499	
S.E. of regression	0.017323	Akaike info criterion	-4.966755	
Sum squared resid	0.003901	Schwarz criterion	-4.337706	
Log likelihood	77.56781	Hannan-Quinn criter.	-4.785611	
F-statistic	1894.327	Durbin-Watson stat	2.363918	
Prob(F-statistic)	0.000000			
*Note: p-values and any subsequent tests do not account for model selection.				