

**ANALYSING THE EFFECTS OF DEBT FINANCING ON FISCAL  
SUSTAINABILITY OF THE CITY OF WINDHOEK**

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## **ABSTRACT**

Municipalities' capacity to stay financially viable will determine their long-term viability. Well-managed municipalities provide evident positive outcomes that are critical to guaranteeing the continued provision and maintenance of high-quality, affordable services for all residents in their jurisdiction. Municipalities that rely heavily on transfers and grants from the federal government are unlikely to run up huge debts. As a result, they are exposed to financial and sustainability hazards. However, the mounting debt levels reported in the Municipality of Windhoek financials is a source of concern since it may eventually reach unsustainable levels. This study's main objective was to investigate the impact of debt financing on the City of Windhoek's fiscal sustainability. Accordingly, the study explored the factors that influence fiscal sustainability in Windhoek in order to understand the underlying causes of the Windhoek Municipality's rising debt burden. The study adopted a quantitative explanatory research design that used secondary data from financial audit reports for the period 2008 to 2019. The data was then computed into indicators based on literature and transformed into logarithmic ratios using Principal Component Analysis (PCA) and Dendrograms. The study then used temporal causal modelling and ARDL model estimation to establish the nature of relationships between fiscal sustainability and debt burden indicators within the context of financial independence. The study found evidence of both long-term and short-term relationships between fiscal sustainability, debt burden, and financial independence. However, the long-term relationships were not statistically significant. The study concludes that fiscal sustainability in the City of Windhoek is dependent on expenditure coverage ratios, debt burdens related to non-statutory funds, budget deficits, and employee benefit liabilities. The study recommends that the municipality must focus on diversifying their revenue streams and revise their long-term investment strategy.

***Key words:*** *Fiscal Sustainability, Debt Burden, Financial Independence, Municipality, Windhoek*

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## **ABBREVIATIONS AND ACRONYMS**

<b>ACL</b>	Accumulated Loans
<b>ACDEF</b>	Accumulated deficit as of 30 June
<b>ACFUND</b>	Accumulated Funds
<b>ADF</b>	Augmented Dickey- Fuller
<b>ARDL</b>	Autoregressive Distributed Lag
<b>BA</b>	Budgetary Arrears
<b>BE</b>	Overdraft to Deficit
<b>BE_EBL</b>	Budget Efficiency to Liabilities
<b>BF</b>	Betterment Fund
<b>BOD</b>	Bank Overdraft
<b>BON</b>	Bank of Namibia
<b>CAP</b>	Capital Expenditure
<b>CDF</b>	Capital Development Fund
<b>DB1</b>	Funds to Pension ratio
<b>DB2</b>	Debt Burden to Expense
<b>DEF</b>	Deficit for the year
<b>DL</b>	Debt Load
<b>EC</b>	Expenditure Coverage
<b>ED</b>	Endowment Fund
<b>EXP</b>	Total Expenditure
<b>FI</b>	Financial Independence
<b>FS</b>	Fiscal Sustainability
<b>GDP</b>	Gross Domestic Product

<b>GLM</b>	General Linear Model
<b>GOV</b>	Government Grants and Subsidies
<b>LBB</b>	Local Budget Balance to Population
<b>LM</b>	Lagrange Multiplier
<b>LOAN</b>	Loans received in the year
<b>KPSS</b>	Kwiatkowski, Philips, Schmidt and Shin
<b>NSF</b>	Non-Statutory Funds
<b>PEN</b>	Pensions/Employee Benefit liabilities
<b>POP</b>	Population
<b>REV</b>	Total Revenue
<b>SLV</b>	Solvency
<b>UNINT</b>	Unappropriated surplus Interest
<b>UNSUR</b>	Unappropriated Surplus
<b>VIF</b>	Variance Inflation Factor

## **DEDICATION**

I dedicate this work to my family, my partner Dihaar and my son Mikyle for accepting the sacrifices and always standing by my side during the journey which had an inevitable effect on normal family life. Thank you!

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## DECLARATIONS

I, Algiva Hays, hereby declares that this study is a true reflection of my research and that this work or part thereof has not been submitted for a degree in any other institution of higher learning.

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Signature

16.05.2022

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Date

## **CHAPTER 1**

### **1.1 INTRODUCTION**

Gorina (2013) noted that national fiscal sustainability has many definitions, but they usually relate to fiscal policies of a government. Two supporting concepts of sustainability are important at the national level. The first is solvency, which refers to the ability of the government to service its debt obligations in perpetuity without explicit default (Gorina, 2013). Fiscal sustainability at the local level has been defined in several ways, with Wei (2019) defining it as “the long-run capability of a government to consistently meet its financial responsibilities” and identifies three types of pressures that governments face: cyclical, structural, and intergovernmental (Wei, 2019). Cyclical pressures reflect the influence of the business cycle on governmental finance and are often common for all the three levels of government. The purpose of this chapter is to provide a summary of the research study, including the research background, problem statement, research objectives, and research questions. It also includes a description of the study's scope, significance, and limits, as well as the thesis outline.

### **1.2 BACKGROUND OF THE STUDY**

Fiscal sustainability refers to a type of fiscal condition that allows a local government to continue service provision now and in the future without introducing disruptive revenue or expenditure patterns (Gorina, 2013). Well managed municipalities show visibly positive results, such as balanced and

sustainable development, stable and affordable services, and well controlled finances and debts (Freire & Kopanyi, 2018). The future existence of municipalities will be determined by their ability to remain financially sustainable. This is crucial to ensure the continued provision and maintenance of quality and affordable services to all the residents within their jurisdiction (Dean O'Neill, 2016).

Gorina and Maher (2018) defines the fiscal balance of a government as the difference between total revenues and total expenditures. The disparity between general fund receipts and expenditures is referred to as a deficit or a significant deficit. Barbera *et al.* (2017) also differentiates between passive and active financial sustainability of municipal budgets, the former referring to the ability to respond to crises. Active sustainability anticipates threats and prepares for them through socioeconomic development and the creation of new opportunities (Barbera *et al.*, 2017). As a consequence, a local government's approach to sustainable investment and budgeting corresponds with policy goals, with an active budget sustainability focusing on instruments that support territorial socioeconomic development, as well as creating favourable conditions and incentives for growth (Lysiak & Kushnir, 2020).

Santis (2020) argues that socio-demographic and economic factors have an impact on municipalities' local income base, resident preferences for facilities and expenditure demands. Local demographics, such as resident age distribution,

race and ethnicity, as well as the percentage of people living in poverty and their employment status, can be important variables that municipalities take into account when providing social services such as hospital care, income assistance, and public transportation (Vighneswara, 2015).

Balaguer-Coll and Prior (2015) asserts that a major rise in a local government's debt load leads to a significant drop in investments, with costs and taxes mostly remaining constant. Previous studies in Namibia on how to reduce debt loads in local governments and municipalities have not highlighted any of the recommended debt-control approaches. This is despite numerous studies on financial stability, municipal income collection sources and financial frameworks conducted across the world (Wei, 2019; Zhao *et al.*, 2019). There have been a few studies that have focused on the African context (Schoeman, 2011; McClean, 2012; Mbulawa; 2019; Jacobs, 2019; Zhao *et al.*, 2019). The current study seeks to understand the dynamics of fiscal sustainability and debt burden in the municipality of Windhoek.

According to Gomes *et al.* (2016) municipalities that rely heavily on transfers and assistance from the federal government should avoid taking on huge debts. This puts them in financial danger because they are exposed to high interest rates, which make it difficult for towns to service their debt and jeopardises their long-term viability. The post financial crisis funding of local authorities, through government transfers is likely to have contributed to the City of Windhoek's

sustainability challenges. Accordingly, this study seeks to identify the important determinants of Windhoek municipality's long-term fiscal health, and how the increasing debt burden will influence its fiscal sustainability in the long run. Conversely, to the researcher's knowledge, the future impacts of debt options adopted by the city of Windhoek have not been revealed in the studies done in Namibia.

### **1.2.1 Background on the City of Windhoek's Fiscal Sustainability**

The City of Windhoek has seen major changes in its economic dynamics and demography, putting stresses on the municipality's budgetary viability. The population of the City of Windhoek has been growing at an average of 22% per year (CoW, 2021), which has put a strain on the municipality's capacity to provide goods and services. The capacity of the local government to meet its service obligations now and in the future is contingent upon its ability to collect the required income to pay expected costs (Kriz and Funderburg, 2019).

Budgeting patterns in the City of Windhoek showed active budget sustainability in the early years after independence (1994–2007). However, after the global financial crisis of 2009, a passive sustainability method emerged, based on the use of automatic stabilisers, which, at most, ensured a restoration to the pre-crisis financial status of the local budget. In the pre-Global Financial Crisis years, the City of Windhoek had very low budget deficit to debt ratio which was under 5%

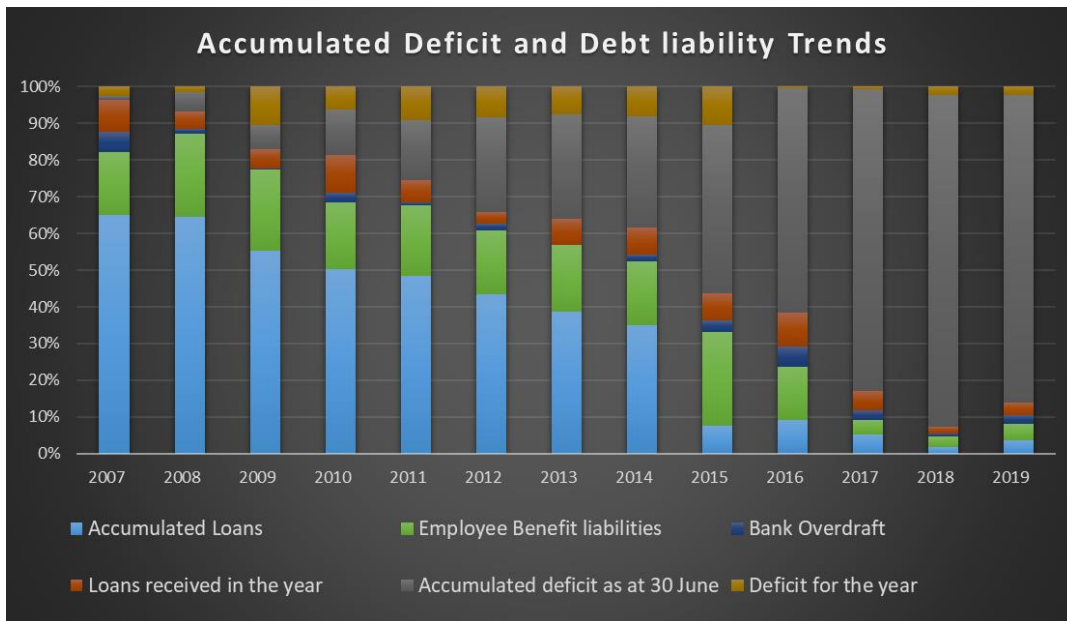
in 2007. Table 1.1 present the trends in the accumulation of budget deficits and loans.

**Table 1.1 Accumulated Deficit to Accumulated Loans Ratios in the Period 2007 to 2019**

<b>Year</b>	<b>Loan Index (Base 2007)</b>	<b>Accumulated Deficit Index (Base =2007)</b>	<b>Deficit to New loan ratio</b>	<b>Accumulated Deficit to Accumulated Loans</b>	<b>Population Index (Base = 2007)</b>
<b>2007</b>	100	1	31%	4%	0%
<b>2008</b>	101	5	34%	2%	3%
<b>2009</b>	105	7	195%	19%	6%
<b>2010</b>	128	18	61%	12%	10%
<b>2011</b>	137	27	145%	19%	13%
<b>2012</b>	141	48	261%	19%	17%
<b>2013</b>	142	60	109%	20%	21%
<b>2014</b>	153	76	109%	23%	25%
<b>2015</b>	28	97	138%	138%	29%
<b>2016</b>	25	98	6%	6%	33%
<b>2017</b>	58	519	14%	14%	37%
<b>2018</b>	52	1469	130%	130%	42%
<b>2019</b>	52	717	64%	64%	46%
<b>Average</b>	<b>94</b>	<b>242</b>	<b>100%</b>	<b>36%</b>	<b>22%</b>

Table 1.1 indicates the trends in the deficits and loans of the City of Windhoek. The trends indicate how the Municipality used a passive sustainability method to that sort to stabilise the rising budget deficits through acquiring internal and external loans. Table 1.1 uses 2007 financial values as baseline figures to indicate the trends in debt accumulation and deficit accumulation. The Audited Financial Statements of the Municipality Windhoek (2007) indicated that the City had a total accumulated debt from both internal and external sources of N\$ 1,197,769,497, while the accumulated budget deficits were only at N\$ 20,881,692 giving a 4% ratio. Over the period 2007 to 2019, the Windhoek

management maintained the deficit to debt ratio at an average of 36%, with ratio peaking in the period 2011 to 2015 where it averaged 153%. During this time the fiscal sustainability of the Municipality was threatened, thus prompting the management of the City of Windhoek to tap into their accumulated funds to offset their accumulated debts which amounted to N\$ 1,827,636,558 (Loan index of 153 for 2014). Figure 1.1 shows how the accumulated loans were offset using the accumulated deficits.



**Figure 1.1 Accumulated Deficit and Debt Liability Offsetting Trends**

### 1.3 PROBLEM STATEMENT

Since 1994 the City of Windhoek has been using both internal and external debt financing to upgrade and extend the existing water supply, sewage, electricity

and road systems (Jason, 2020). The municipality's external debt book was only around N\$11 million in 1994, with negligible budget deficits. By 2007 the accumulated debts from both internal and external loans were approximately N\$ 1.2 billion and by 2015 it had unsustainably grown by 53% to near N\$ 1.9 billion (See **Figure 1.1**). The escalating debt in the Windhoek municipality will increase pressure on its long-term fiscal sustainability strategy. Therefore, better management of revenue, expenditure, and debt burden will be important to its continued fiscal sustainability (Cocker et al., 2015).

McClellan (2012) observes that most municipalities are not self-sustaining due to several challenges facing municipalities, including lack of finance, proper budgeting, proper planning and qualified or capacitated personnel. In 2015, the municipality of Windhoek took significant steps toward self-sufficiency by seeking approval to use accumulated funds from the municipality's non-statutory fund reserves to lower debt to 28% of 2007 levels. This request was granted on the condition that the municipality lessen its reliance on government grants and subsidies (OAG, 2016). By 2019, the total debt had grown to 52 percent of what it had been in 2007, with N\$ 655 million of it sourced at commercial bank rates. This puts them in financial risk because of high interest rates, that make it almost impossible for municipalities to service their debt and threaten their long-term sustainability (Gomes et al., 2016).

A study by Zhao (2019) on municipalities in Namibia did not reveal how the increasing debt burden will influence municipality fiscal sustainability in the long run. Moreover, no studies in Namibia have focused on the impact that heavy reliance on government funding has had for local authority sustainability. Hungwe (2017) asserts that most municipalities are not self-sustaining, owing to a variety of challenges, including a lack of funds, adequate budgeting, proper planning, and skilled or capacitated employees. In Namibia, studies have mostly revealed that municipalities' main challenge is a lack of funds (Zhao, 2019, Kadhila, 2019). Accordingly, this study seeks to fill this research gap by investigating the effects of debt financing as an option for improving the City of Windhoek's fiscal sustainability.

#### **1.4 RESEARCH OBJECTIVES**

The main objective of the study is to analyse the effect of debt financing on fiscal sustainability of the city of Windhoek. The following specific objectives will guide the study:

- To explore the determinants of fiscal sustainability in the City of Windhoek,
- To determine the factors influencing the increasing debt burden in the Windhoek Municipality,
- To establish the relationship between debt burden and fiscal sustainability in the Windhoek Municipality.

## **1.5 HYPOTHESES**

The study hypotheses are as follows:

- $H_0$ : There is no relationship between debt burden and the determinants of fiscal sustainability
- $H_1$ : There is a significant negative relationship between debt burden and the determinants of fiscal sustainability.

## **1.6 SIGNIFICANCE OF THE STUDY**

This study contributes to the fields of debt financing, public budget management, financial and sustainable development strategies, research, and practice. By investigating the purported link between debt financing and municipal budget sustainability in the context of Namibian municipalities; the findings of the study provide managers and policy makers in local government with a managerial tool for evaluating the effectiveness of various activities within the municipalities. The outcomes of this study provide suggestions that are appropriate for municipalities and local government institutions in general. More significantly, the findings are useful to the government and policymakers in providing support to municipalities and local government authorities throughout Namibia.

## **1.7 LIMITATIONS OF THE STUDY**

Moreover, accessing all documents of the study posed a challenge since some of the documents may not be accessed publicly. In such instances, the study used proxy data variables guided by literature on similar studies. Another limitation

of the study is that the Windhoek Municipality is one of the best run municipalities in the country and the findings may not be generalisable to the rest of the municipalities. However, the findings are used as best practice for the rest of the municipalities in Namibia.

### **1.8 DELIMITATIONS OF THE STUDY**

The focus of the study is to assess the rising debt levels in the municipality with a specific focus on the City of Windhoek. The study focused only on Windhoek municipality, to ensure that the study remained realistic in scope.

### **1.9 THESIS OUTLINE**

The research is organised into five sections: The first chapter contains an introduction, historical background, and motivation. Chapter 2 reviews the relevant theoretical and empirical literature on local fiscal sustainability, fiscal sustainability indicators and fiscal sustainability determinants. The methodological approach used in the study is detailed in Chapter 3. The findings and interpretation of the results with respect to the study's objectives are presented in Chapter 4. The summary of findings, conclusions, and recommendations for future study and policymakers are presented in Chapter 5.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1. INTRODUCTION**

Municipal fiscal sustainability refers to a government's ability to maintain its existing budget and tax policies without jeopardising its solvency or risking default. State laws (constitutional and statutory), local debt administration, and the local economy provide a basis for municipal fiscal health (Lysiak, *et al.* 2020). It is important for municipalities to be fiscally sustainable to keep their operations viable and to meet residents' expectations in terms of service delivery. This chapter presents literature on debt finance and fiscal sustainability. The chapter commences with definitions of terms, debt financing option, national fiscal sustainability. Then the chapter proceeds to local fiscal sustainability, fiscal sustainability indicators and fiscal sustainability determinants.

#### **2.2. CONCEPTUAL DEFINITIONS**

##### **2.2.1. Fiscal Sustainability**

Fiscal sustainability has been defined by several authors, in all the definitions the guiding principle about fiscal sustainability is that whether government or local governments, they must be financial stable and be able to continue offering services. According to Gorina (2013) fiscal sustainability is a form of fiscal condition that enables a government to continue providing services now and in

the future without disrupting revenue or expenditure trends. Pradhan (2019) described fiscal sustainability as a debt-to-GDP ratio or deficit-to-GDP ratio that is stable. The two definitions above all point out to two key principles which are often correlated with the idea of fiscal sustainability. One is about solvency, and the other is about a government's ability to sustain its fiscal status while staying solvent (Lau and Lee, 2021). The underlying concept of the definitions is the government ability to remain viable and be able to provide services to its residence as expected of them.

### **2.2.2. Debt Financing**

Debt financing is the process of borrowing money from businesses and investors to finance a company's operations. It can be done by bonds, banks, or financial institutions (Omoshagba and Zubairu, 2018). Debt financing is the practice of borrowing money from a lender to run a company and repaying it with interest for a fixed period (Obuya, 2017). Debt funding is when a company borrows money from other businesses, banks, or financial institutions to fund its operations to be paid in instalments with interest at agreed period. The balance of the loan is repaid later, with certain interest payments incurred until the debt matures (Cheong and Steve, 2017). The definitions provided by this research all point out to the borrowing money to fund its operations and be able to continue operating. Also, the definitions point out that the money borrowed is to be repaid by the business to the financial lenders at an agreed time. The definition by Omoshagba and Zubairu (2018) does not mention about the interest payments

while (Obuya, 2017, Cheong and Steve, 2017) noted that the money borrowed is to be repaid with interest. This research adopted definition by Obuya (2017) which notes the borrowing of money and paid back at an interest.

### **2.2.3. Debt Financing Options**

There are various debt financing options available for companies and government to explore and companies choose these debt financing options based on their flexibility (Chen, 2021). Several factors are considered by companies when choosing debt financing options these include the repayment terms, repayment years and interest incurred. According to Corporate Finance Institute (2021) they are several debt financings options that companies, institutions and governments must finance their operations these include the following:

### **2.2.4. Bank loan**

Chen (2021) a bank loan is a popular form of debt financing. Banks also evaluate each company's individual financial position before recommending loan sizes and interest rates. Depending on the intent of the loan, bank loans may be short or long term. Bank loans may be arranged to suit the needs of the company, whether they are capital/principal repayment or interest-only (Ward, 2021). Bank loans usually come with a fee, which is usually interest on the amount owed. Depending on the type of loan and the lender, additional fees and charges can apply (Neto, 2020).

### **2.2.5. Debt Financing Over the Short-Term**

Businesses use short-term debt financing to fund their working capital for day-to-day operations. It can include paying wages, buying inventory, or costs incurred for supplies and maintenance. The scheduled repayment for the loans is usually within a year. A common type of short-term financing is a line of credit, which is secured with collateral. It is typically used with businesses struggling to keep a positive cash flow (expenses are higher than current revenues (Corporate Finance Institute, 2021)). Since the maturity period is less than a year, short-term borrowing is referred to as an operating loan or a short-term loan. Short-term debt financing is exemplified by a line of credit (Ward, 2021). Short-term debt funding is available for businesses that are well-known to the bank and have a consistent cash flow (Obuya, 2017).

### **2.2.6. Debt Financing Over the Long-Term**

Businesses seek long-term debt financing to purchase assets, such as buildings, equipment, and machinery. The assets that will be purchased are usually also used to secure the loan as collateral. The scheduled repayment for the loans is usually up to 10 years, with fixed interest rates and predictable monthly payments (Corporate Finance Institute, 2021). Long-term debt financing is described as a loan with a three- to seven-year repayment schedule and an expected useful life of the properties. Set interest rates on long-term loans would most likely result in predictable monthly payments and strong predictability. Long-term debt funding

allows companies to prepare more easily, make consistent monthly payments, and improve their credit score (Ward, 2021). According to Obuya (2017), long-term debt funding puts pressure on companies and local government to boost financial efficiency to meet debt obligations.

### **2.3. NATIONAL FISCAL SUSTAINABILITY**

National fiscal sustainability has several meanings, but they all generally apply to a government's fiscal policies. At the national level, two supporting principles of sustainability are crucial (Gorina and Maher, 2018). The first is solvency, which applies to a government's ability to service its debt obligations in perpetuity without explicitly defaulting. It should be noted that a government is also considered insolvent when its insolvency is already apparent. Bergman, Hutchison and Jensen (2016) indicated that the second principle is a government's ability to adhere to existing policies while remaining solvent. It usually aims to make the best changes to fiscal and monetary policies to prevent insolvency potential.

Fiscal sustainability is a long-term concept that necessitates projections of key macroeconomic variables such as GDP growth, government borrowing rates, exchange rates (in the case of external debt), and budgetary outcomes (Pradhan, 2019). Fiscal sustainability, according to Aslanli (2015), "encompasses government solvency, sustained steady economic development, stable taxation, and intergenerational justice." In other words, a balanced fiscal strategy is one

that can be enforced without significant tax or spending adjustments. The proposal to measure current value of public debt, based on different assumptions of the future of macroeconomic and demographic conditions, has calculated fiscal sustainability. These analyses predict primary balance adjustments based on various forecasts of economic growth, interest rate and public debt services. The analyst needs to select future assumptions from this straightforward approach (Tanner, 2013).

Fiscal sustainability has two major components: fiscal deficit and public debt, both of which are present in all countries. A fiscal deficit, also known as a budgetary deficit, occurs when a government's outlays surpass its revenues in each period, excluding borrowings (Lau and Lee (2021)). When a country has persistent budget deficits, it must borrow to offset the accumulated deficits. Government borrowing funds long-term growth, but debt burden may have a substantial effect. Neto (2020) alluded that debt and deficit are interdependent or closely linked. Fiscal deficits lift public debt levels, allowing potential net deficits to grow because of the need to service higher debt interest payments. This raises debt-service costs and increases government outlays, which could result in higher deficits, creating a potentially vicious spiral in which fiscal policy is deemed unsustainable. As a result, the evaluation of fiscal policy sustainability is often based on a government's solvency, which is determined by estimating total fiscal balances and debt dynamics.

## **2.4. LOCAL FISCAL SUSTAINABILITY**

Wei (2019) defines fiscal sustainability at the local level as "the long-run capacity of a government to reliably fulfil its financial obligations," and distinguishes three forms of stresses that governments face: cyclical, structural, and intergovernmental. Cyclical pressures are widespread in all three levels of government and represent the impact of the business cycle on governmental finances. Demographic shifts, suburbanisation patterns, overall population and business mobility, the structural shift from goods to services consumption, and the emergence of new revenue sources such as e-commerce are all structural pressures that affect fiscal sustainability.

Since certain structural pressures are actionable, structural pressures are probably the most actionable component of fiscal sustainability management. Local government partnerships with other governments generate intergovernmental pressures. Although the federal government and states do not have the authority to impose direct municipal mandates, they do influence local financial conditions through "intergovernmental services with several strings attached" (Pakkies, 2016).

Financial sustainability, according to Sinervo (2020), is characterized as a municipality's ability to meet ongoing financial, capital, and service obligations considering resource flow and stock, as determined by annual financial data. Enough funding is needed for long-term municipal service delivery. This ensures

that local councils must raise sufficient revenue to cover the costs of carrying out their mandate. The path to fiscal consolidation for local governments includes broadening the tax base, cutting spending, and reducing dependency on state funding. The basic aim, on the other hand, is to develop policies that keep local government sustainable and decentralized, with the goal of finding models of approaches that increase the probability of exploiting financial distress in local government (Maher, Majumder, Liao and Liao, 2019).

Fiscal decentralisation is a critical feature of local government fiscal stabilization, with tax autonomy being the most important predictor (Tembo, 2020). When studying financial sustainability of local budgets, an important task is to identify risks and measure their impact on sustainability. In general, the financial sustainability of local budgets is a complex and multifaceted phenomenon, which is influenced by many various factors, both external and internal.

The reasons for the violation of financial sustainability are external to local authorities if they are outside their influence/control. Internal risks include real unsatisfactory factors of influence on the internal local government and the political environment. As a rule, financial risks are aggravated by a combination of both external and internal factors (Capalbo and Grossi, 2014). Financial sustainability analysis is complex, open to many methodological approaches, and often provides many estimates and scenarios. That is, the system for assessing

financial sustainability is not unified; different countries use different sets of indicators at the local level.

Hong *et al.* (2019) in the system of indicators of financial sustainability of municipalities, distinguish the main (mandatory Morgan and Trinh (2016) alluded that fiscal sustainability is viewed as "an forward-looking aspect of economic conditions," defining the fiscal sustainability as "the capacity and willingness of the government to generate resources required for the delivery of current service obligations and financial obligations as appropriate, without transferring financial liabilities to future periods which do not lead to comparable benefits. Schoeman (2011) provides that governments should include in their financial reporting four kinds of projections: cash inflows projections, cash outflows, financial obligations, and debt service projections. In addition, the main intergovernmental services in financial reports should be discussed in a narrative form. Such projections and narratives should assist users in determining local fiscal capacities and capacity of services that are not described in financial statements. Additionally, the three broad dimensions of fiscal sustainability are fiscal capacity, service capacity, and vulnerability (Ward and Dadayany, 2015)

Gorina (2013) noted that local fiscal sustainability is characterized as a state of government finances that enables the government to provide services and fulfil all its obligations on a continuous basis. Fiscal sustainability, as opposed to fiscal situation, has an inter-temporal dimension in that it refers to the government's ability to meet service demands not only now but also in the future. If a

government's fiscal situation is defined as sustainable, it can provide community services and fulfil financial obligations such as debt repayment and pension benefit payments without jeopardizing intergenerational equity or implementing disruptive revenue and spending policies (Gorina, 2013).

#### **2.4.1. Fiscal Health**

The capacity of a government to align its financial commitments with available revenue sources is referred to as fiscal health (Helpap 2016). According to MacDonald (2017) a government is fiscally stable if its finances fulfil its obligations; if it lacks the resources, it may be in fiscal distress. Local governments must preserve their fiscal stability to provide essential services to citizens and protect the viability of their economies, which produce revenue for governments at all levels (Pew Charitable Trusts, 2016).

Wei-Liang Lung (2018) differentiate between short-, medium-, and long-term fiscal health. Short-term fiscal health refers to a government's ability to pay its bills on time; mid-term fiscal health refers to the government's ability to balance its budget's revenues and expenses over a longer period. Long-term fiscal health is described as a government's ability to provide adequate levels of services over an extended period by utilizing its current resource base. According to MacDonald (2017) a municipality's fiscal position can be seen through four separate lenses. These are: (1) the municipality's ability to meet its immediate or short-term financial obligations; (2) the municipality's ability to meet its financial obligations over a budgeted fiscal year; (3) the municipality's ability to meet its

long-term financial obligations; and (4) the municipality's ability to fund the necessary base level programs and services.

According to Bird (2014) there are three keyways to assess fiscal health: revenue-raising capacity, the need for local services or the underlying costs of their provision and need-capacity discrepancies. Local councils' underlying ability to collect revenue from local sources is referred to as revenue raising power. It is calculated using the tax base (property values, indicators of local economic conditions) rather than real taxes, which could represent local rate decisions rather than underlying fiscal conditions. The need-based side of fiscal health provides a calculation of local economic and social characteristics that influence spending on local public services but are outside local officials' direct control (e.g., population density, unemployment, poverty rate).

According to MacDonald (2017) the literature contains hundreds of measurement methods, and many more have been created by practitioners, mostly as an ad hoc version of one from the literature that has been adapted to meet the government's needs. A variety of states have devised their own methods for assessing local governments' financial stability. North Carolina, for example, closely tracks local government audits for signs of distress before approving any debt issuance (Pew Charitable Trusts 2016).

Ladd and Yinger devised a metric that considered a government's ability to collect revenue in relation to its tax burden and spending needs. The Financial

Trend Monitoring System (FTMS) was created by the International City/County Management Association and includes 36 different financial metrics in 11 different regions. In recent years, the FTMS has been revised to include 42 metrics that consider environmental, operational, and financial factors. Despite their usefulness, these methods are difficult to estimate and offer little insight into the government's actual state (MacDonald, 2017).

#### **2.4.2. Fiscal Stress**

Fiscal stress, is a term that attempts to quantify the degree to which a local government is in danger of a fiscal crisis that would necessitate state intervention, especially acts that would restrict local control (Goldberg and Neiman, 2014). According to Kim, Aldag, and Warner (2017) fiscal stress is a difference between estimated revenues and expenses that can be short-term in the case of temporary economic shocks or long-term in the case of structural budget imbalance. Such systemic imbalances can be caused by a variety of causes, including repeated economic shocks. Similarly, Morgan, and Trinh (2016) described fiscal stress as a short-term or long-term difference between projected revenues and expenditures, which can be caused by transitory economic shocks or a structural budget imbalance.

Political tensions among budget decision-makers, demographic changes, particularly when high-income households or businesses leave a jurisdiction, a lack of budgetary restrictions, and borrowing are potential structural imbalance

sources (Delisle, 2015). When short-term borrowing is used to relieve temporary tension, it can be both a cause of and a response to a fiscal crisis. When revenue streams regularly fail to cover spending, governments are forced to make tough choices: raise revenue, cut programs, borrow long-term, or delay payments/costs/expenditures into the future (Mbulawa, 2019).

Local revenue sources differ greatly depending on the form of local government. While counties and cities rely heavily on property and sales taxes, water and sewer districts are largely financed by service fees and, as a result, have faced less financial pressure than counties and cities. Local governments have encountered less fiscal uncertainty due to a relatively secure stream of funds that accounts for just over a quarter of overall revenues (Kim, Aldag and Warner 2017).

Fiscal stress in local governments can be caused by various factors, including poor economic conditions or poor fiscal management. Local official preparation and public knowledge will contribute to better management practices and, as a result, a more desirable fiscal picture in a short period (Delisle, 2015). The situation becomes more complicated when the local economic picture is one of long- or even short-term decline. Many of the state's cities, for example, are struggling with continuing population decline and property value stagnation (DiNapoli, 2015) eluded that while fiscal stress can restrict a local government's ability to meet residents' service preferences, it can also be a useful disciplining tool.

Gorina, Maher, and Joffe (2018) stress testing helps us investigate the future and determine what existing revenue and expenditure patterns and uncertainty about them mean about the probability of a jurisdiction experiencing fiscal distress in the future. According to Kriz (2019) stress testing tackles two problems that have troubled the literature on fiscal sustainability/financial well-being. For instance, it enables the development of more complex models that analyse a full model of variables of interest rather than just a few indicators.

Revenues and expenses are viewed as aggregates in most of the literature on fiscal sustainability. This aggregation could mask uncertainty in underlying revenue streams and investment demands, which could indicate potential sustainability issues. This is related to the second advantage of stress testing. Attempts to quantify sustainability in the past have mostly ignored the temporal dimension and viewed metrics as static. There is a temporal dimension of sustainability. At any given point in time, sustainability is determined by what those indicators will or may not suggest about how they will evolve over time (Kriz, 2019).

According to DiNapoli (2015) fiscal stress cannot be calculated by a single indicator since certain variables would be more important for certain forms of local government or for local governments. Many metrics track various aspects of the same issue: a lack of revenue to cover expenses. Large or continuing operating deficits will result in lower fund balances, and lower fund balances will make it more difficult to maintain large or continuing operating deficits. Lower

fund balances, even if not budgeted for the year, decrease the amount of cash on hand on any given day, potentially necessitating short-term borrowing. High fixed costs indicate that local governments may have little room to manoeuvre in terms of limiting expenditures (DiNapoli, 2015).

Fiscal monitoring, according to the Pew Charitable Trusts (2016) will assist state governments in detecting early signs of local fiscal distress and assisting local governments in resolving issues before they become unmanageable. Early detection can allow states to aid in less intrusive ways than might be required in the event of a full-fledged fiscal crisis. Local governments that lack the capacity or ability to identify, evaluate, or resolve fiscal issues on their own may benefit from fiscal monitoring, especially in smaller municipalities, rural areas, or places where it may be more difficult to recruit job candidates with strong financial backgrounds.

## **2.5. FISCAL SUSTAINABILITY INDICATORS**

### **2.5.1. Pension Liability Funding**

According to Weeden (2019) Pension commitment applies to the cumulative pension benefits received by current workers and retirees, as well as the benefits those current employees are expected to accrue in the future. It reflects a state's financial obligation or liability. Pension liability obligations are long-term promises by governments to pay pension benefits to pensioners. Pension liability

obligations are the highest legally binding and consequently the most important form of local government responsibility (Lenney, Lutz and Sheiner, 2019).

Giertz (2015) alluded to the fact that state public pension funds' performance has a significant impact on state budgets, but that the relationship is far more ambiguous than in the private sector. States have the authority to select the timing of their pension payments. Pension underfunding is a type of tacit borrowing against potential government revenues. In either case, good performance of pension fund assets decreases potential taxpayer burdens, while weak performance has the opposite effect. Additionally, Ponds, Severinson and Yermo (2015) noted that most countries have a different pension scheme for public sector workers. Since the government is typically the main employer, pension promises in the public sector tend to be reasonably generous, and future contributions must be made either from government taxes (pay-as-you-go) or from sponsored schemes (pension funds) the future fiscal burden of these plans may be high. Many states and counties are having difficulty financing their defined benefit pension programs. About every state adopted a mix of reduced benefit accruals and higher employer or employee contributions to boost their pension status. However, underfunding issues have not gone away, and they are likely to worsen in the future, placing more strain on state and local spending systems and taxes (Krupnik, 2016).

Weeden (2019) eluded that pension plans are largely financed by three sources of revenue: state/employer contributions, employee contributions, and

investment gains on plan assets, according to the study. Pension systems rely on investment returns for revenue growth the most of these three sources. States have a strong interest in making investment decisions that result in steady asset growth because they depend on investment returns to finance their pension obligations. If investment returns generate more growth in trust fund assets, state and employee contributions may be increased at a slower pace or not at all. Volatility in the stock market, coupled with increased allocations to riskier asset classes, has resulted in more volatile and lower-than-expected investment returns, leading to state pension funds' underfunding. (Krupnik, 2016).

### **2.5.2. Debt Burden**

László (2019) debt is defined as something owed to someone else, particularly money, or the state of owing something that can be expressed in monetary value. Since local governments choose loans, bonds, notes, and mortgages, which are all common forms of debt, the definition of money should be broad. Xiaolin (2016) posit that the key problem of local government debt, according to this argument, is the long-term and sustainable negative impact of budget deficits, which translates as local government debt. As a result, future fiscal revenue would be ineffective and insufficient, resulting in an inability to adequately conduct government functions and, finally, rendering the fiscal activity unsustainable.

Wassmer and Fisher (2015) revealed that historically, determining the size of a state or local government's debt has involved comparing overall debt (a "stock") or components of the total debt (such as long-term debt) to different annual indicators of fiscal and economic capacity (called "flows"). There are three indicators of relative state and local debt burden: (1) real debt per individual (debt adjusted for inflation divided by population) (2) debt as a percentage of the jurisdiction's gross domestic product, and (3) debt as a percentage of sufficient annual government revenue).

Balaguer-Coll and Prior (2015) indicate that a large increase in the debt burden of a local government results in a significant reduction in its investments but leaves expenses and taxes mostly unchanged. When local government debt exceeds a certain threshold, it discourages private investment, adds to the debt burden, and slows economic growth. For example, in China, local government debt has been steadily increasing for the past decade, posing a serious threat to the country's economic and financial stability (Zhao, Tian, Boadu and Ren, 2019). When a local government must expand its infrastructure to meet growing citizen demands, this debt burden, if not properly handled, will threaten its long-term viability. In effect, long-term infrastructure growth necessitates not only a manageable debt load, but also the ability to fulfil ongoing debt-service obligations (Padovano, Rescigno and Ceccatelli, 2018).

Galinsky (2015) suggest that approaches to the debt control system in local government can be grouped into four broad categories: The primary emphasis on

market discipline principle assumes several factors, including a free and open financial market, complete access to the borrower's financial information, no perceived risk of lenders bailing out in the event of imminent default, and current institutional mechanisms in the borrower that ensure sufficient policy responsiveness to market signals before reaching the point of default.

Secondly, a cooperative approach to debt controls assumes that local governments play an active role in determining macroeconomic and fiscal parameters (e.g., revenues, expenditures, deficit, and so on) that must be met. It is presumptive that both bilateral and multilateral talks will take place. This form of inter-governmental dialogue can ensure macroeconomic policy coordination (Galinsky, 2015).

Third, there are legal regulations both in terms of its level and intent for rules-based approaches to subnational debt management. The debt is primarily constrained by complex ratios, in which the debt is compared to certain key budget variables (for example, revenues) or even calculated by economic indicators (General Government Debt, Gross Domestic Product). Fourth, administrative control may take several forms, such as enforcing annual caps on individual subnational jurisdictions' total debt, banning certain types of borrowing (e.g., external) evaluating and approving individual credit operations, or centralizing all public finance borrowing. Administrative procedures place tight limits on local government credit operation while ensuring budgetary flexibility (Vallee, 2021).

### **2.5.3. Reasons Leading to Increased Debt Burden**

State and local governments borrow money for three reasons: (1) to provide cash-flow for short-term spending or special projects of limited duration; (2) to fund infrastructure public capital improvements or public services (such as highways and bridges, schools and other public buildings, water and sanitation facilities, parks, and recreation facilities, and so on); and (3) to provide cash flow for short-term spending or special projects of limited duration. Then (3) support and finance private activity including private mortgages, student loans, and industrial or commercial expansion (Wassmer and Fisher, 2015).

Padovano *et al.* (2018) noted that the various forms of state and local government bonds relate to the various factors for borrowing by state and local governments. Most bonds issued have a maturity period of more than one year, making them long-term assets. Long-term debt is the form of debt used to finance public capital projects and private-sector operations. Long-term funding is especially well suited to financing capital projects because the loan term can be tailored to match the asset's expected life. In comparison, short-term debt (taken on for less than a year) is commonly used to smooth cash flows (Sauvagnat and Vallée, 2021).

### **2.5.4. Budgetary Balance**

Budgetary balance is characterised as the condition in which revenues available for government operations are greater than or equal to outlays at the beginning, middle, and end of the fiscal year or budget period, resulting in a zero or positive

balance (surplus) rather than a deficit (Schafer and Yilmaz 2018). According to Ammons and Fleck (2010) a budget is simply a strategy for revenues and expenses. A budget is not deterministic in this respect. Sales surpasses expenses, the surplus is directed to a contingency fund, specifically the unrestricted portion. When a country has a deficit at the end of the year, the contingency fund is tapped to cover the deficit. If the balance in unreserved funds falls year after year, it typically suggests a trend of consistent operating deficits.

Sinervo (2020) A healthy municipal economy, it was deduced, can be characterized as one that has sufficient resources to provide the services provided by its residents; this definition should be related to the value citizens receive for the taxes they pay. As a result, the emphasis of financial sustainability should be on both taxes to meet public expectations and future shifts in municipal spending trends.

Sound financial performance is described as "a municipality's ability to meet its financial obligations and to fulfil its service obligations to its residents, both now and in the future". To ensure "fiscal sustainability" in the public sector, three requirements must be met: (1) Deficits should be a one-time event that tends to stabilize the economic cycle; (2) as a result, debt should be constant over the cycle, (3) unless the debt is backed by an asset of at least equal value as leverage. The "golden law" is a phrase used to describe these situations (Sinervo 2020).

Gorina and Maher (2018) established measurements of a government's fiscal balance: the difference between total revenues and total expenses, a deficit, a severe deficit; the difference between general fund revenues and expenditures, a general fund deficit, a general fund severe deficit; and the difference between general fund revenues and expenditures, a general fund deficit, a general fund severe deficit.

## **2.6. FISCAL SUSTAINABLE DETERMINANTS**

Barbera *et al.* (2017) distinguishes between passive and active financial sustainability of local budgets. According to them, passive sustainability is the ability to respond to crises, that is, the ability to return to the original state, while active sustainability is the ability to anticipate threats and cope with them through socio-economic development and the creation of new opportunities. A certain type of budget policy corresponds to active and passive budget sustainability – active (using tools to stimulate the socio-economic development of territories, creating favourable conditions and incentives for development) and passive (using automatic stabilizers, which, at best, will ensure a return to the pre-crisis financial condition of the local budget) (Lysiak and Kushnir, 2020).

### **2.6.1. Demographic and Economic Factors**

Santis (2020) indicated that the local tax base, resident preferences for facilities, and spending needs are all influenced by socio-demographic and economic factors. The capacity of local governments to collect money from local resources

is determined by the well-being of the people who pay taxes and use public fee-based services. The use of per capita income as a measure of service demand is a common practice among public finance researchers. Residents' priorities for local government budgets also influence local service provision. The local government's ability to continue to fulfil its service commitments now and in the future depends on their ability to secure the necessary revenues to cover anticipated expenses (Kriz and Funderburg, 2019).

Local governments' willingness to tap into their property tax bases rises as residents' incomes rise. According to Pedro *et al.*, (2015) the results are based on market theory, with residents' incomes serving as the expenditure constraint. Residents' incomes affect their preferences for various bundles of private and public goods and services, as well as their ability to pay higher property taxes to fund the provision of additional goods and services. Local demography, such as resident age distribution, race, and ethnicity, as well as the percent of people living in poverty and their job status, can be important variables that municipalities consider when delivering social services including hospital care, income assistance, and public transportation (Vigneswaran, 2015).

### **2.6.2. Revenue Diversification**

Local taxes such as the property tax, sales tax, and less commonly the income tax and other smaller taxes, sources other than taxes such as usage fees and charges, and intergovernmental payments are the three primary sources of revenue for city

governments. In the local revenue budget, their relative value varies (Mabugu and Monkam, 2013). The willingness of municipalities to collect their own revenue is a vital determinant of their financial sustainability. That is, the ability of municipalities to generate income from their own sources is often highlighted as a significant determinant of their financial viability (Mulamba, 2015). Despite this important policy statement, most municipalities still struggle to produce their own income. This creates a vertical imbalance between these municipalities' organisational obligations and the financial capital needed to fund them.

Vigneswaran (2015) even though property tax remains an important and sometimes sole source of revenue for many local governments, the trend toward revenue diversification has been quite noticeable in the last three decades. According to Bolivar *et al.* (2015) diversification of revenue can be an important technique for reducing fiscal tension and tax burden. At the same time, depending on the sources of revenue used to diversify and the state of the economic base, it may increase or decrease revenue volatility.

### **2.6.3. Intergovernmental Aid**

The federal and state governments offer two forms of assistance to cities: mandated grants that are intended for a particular reason (usually education or transportation in the case of federal grants) and discretionary grants that are distributed on an annual basis and can be used by city governments for a wide variety of purposes. Most of the intergovernmental assistance is distributed by states to local governments (Martinez, 2015). The impact of state financial

assistance on local financial structure and fiscal stabilization can be seen in two ways. Transfers of state assistance can be used as supplementary tools to help improve the financial status of local governments. State assistance is meant to compensate for gaps in local fiscal capability (Morgan and Trinh, 2016)

A municipality's ability to contribute to poverty reduction and economic growth is determined by its revenue and expense management capability. Any shortcomings in these areas are likely to represent the presence of other governance issues in the municipality, forcing central governments to offer grants and subsidies to local governments unable to compensate for their shortcomings (Papcunová *et al.*, 2020). Furthermore, governments have different formulas for allocating funds to local municipalities; the larger the city or town, the more funds it receives in comparison to others (Fandel *et al.*, 2019). In other countries the formula in allocations of funds to municipality is based on their performance especially in European countries (Sarah, 2015).

## **2.7. FACTORS DETERMINING LOCAL GOVERNMENT COST OF DEBT**

### **2.7.1. Current revenues, current expenditures, and operating balance**

When determining the issuer's liquidity risk, the two most significant financial considerations to consider are the issuing local government's current revenues and current expenditures. The difference between current revenues and current expenses (current balance) will reveal whether the local government is generating or absorbing financial resources because of its operations, and whether this flow

of resources can be used to pay principal and interest. As a result, the higher the current surplus, the greater the issuer's ability to meet debt repayment obligations (Sauvagnat and Vall´ee, 2021).

### **2.7.2. Level of short-term liabilities, short-term debt outstanding**

Padovano *et al.* (2018) suggests a variety of financial position metrics focused on various categories of measures (revenues, assets, and other resources; expenses and liabilities; net financial condition balance and solvency) divided into dimensions representing the attribute or properties (future/current, less controllable/more controllable, external/internal, stable/volatile). Cash solvency (the capacity to pay for short-term liabilities) and liquidity are described by (Padovano *et al.* 2018).

### **2.7.3. Level of diversification of revenues**

Xiaolin (2016) alluded that the calculation of a local government's fiscal or financial situation often detects several other financial measures that may be linked to the cost of debt. The level of revenue diversification, for example, is important. According to the study, the calculation of a local government's fiscal or financial situation often detects several other financial measures that may be linked to the cost of debt. The level of revenue diversification, for example, is important.

## 2.8. CHAPTER SUMMARY

Under their problem statement, Gomes *et al.* (2016) argued that the municipalities which are highly dependent on transfers and grants from central government should not incur large debts. This exposes them to financial risk, as they are vulnerable to high-interest rates that pose a challenge for municipalities to repay their debt, affecting their sustainability. The studies in Namibia which have focused on fiscal sustainability in municipalities did not focus on the impact of reliance on government funding for sustainability. In addition to the gaps as indicated by Hungwe (2017) most municipalities are not self-sustaining due to several challenges facing municipalities, including lack of finance, proper budgeting, proper planning and qualified or capacitated personnel.

In Namibia the studies have only indicated that lack of finance is the main challenge of municipalities (Zhao, 2019, Kadhila, 2019). In these studies, the focus was to give debt financing options which local governments may adopt to finance their operations, leaving out other challenges such as proper budgeting and proper planning, as noted by Hungwe (2017) in his study in Zimbabwe.

Macdonald (2017) revealed that governments and local governments need to be financially stable for them to be able to provide services to their residents. The city of Windhoek has noted that the debt book has been growing to unsustainable levels from around N\$ 11 million in 1994 to N\$655 million in 2017 (CoW Annual Report, 2018). This has affected their operations, resulting in them opting

for debt financing to upgrade and extend the existing water supply, sewage, electricity, and road systems (Jason, 2020). Conversely, the future impacts of debt options adopted by the city of Windhoek have not been revealed in the studies done in Namibia. Morgan and Trinh (2016) described fiscal stress as a short-term or long-term difference between projected revenues and expenditures, which can be caused by transitory economic shocks or a structural budget imbalance. At the time of carrying out this study, the imbalances in revenue in the municipalities of Namibia had not been revealed in any study. This study aimed to fill this literature gap.

Balaguer-Coll and Prior (2015) indicated that a large increase in the debt burden of a local government results in a significant reduction in its investments but leaves expenses and taxes mostly unchanged. The increasing debt at the city of Windhoek has been escalating since 1994. A study by (Zhao 2019) of municipalities in Namibia did not reveal how the increasing debt burden will influence municipality fiscal sustainability in the long run. Galinsky (2015) suggested that approaches to the debt control system in local government can be grouped into four broad categories: market discipline principle, cooperative approach, legal regulations, and administrative control. These methods of debt control have not been suggested by previous studies in Namibia on how to control debt in firms, local government, and municipalities. The next chapter presents the research methods that were adopted in collecting and analysing data for the current study.

## **CHAPTER 3**

### **RESEARCH METHODOLOGY**

#### **3.1. INTRODUCTION**

In this chapter, the methods used in this work are explained in detail. The chapter starts with an outline of the research design used within this research. Data sources and description follows, providing the justification of the sample and choice of variables. The study adopted a causal research design which required that a model specification be done before the empirical estimation. The chapter continues by providing the econometric techniques used, as well as the pre- and post-diagnostic tests. The chapter ends with a discussion of the research limitations and ethics.

#### **3.2. RESEARCH DESIGN**

The study uses a quantitative research method that involves adopting an explanatory research design to analyse the effects of debt financing on fiscal sustainability in the city of Windhoek. The causal research approach, also known as explanatory research, is a method of determining if two separate conditions have a cause-and-effect relationship (Bryman & Bell, 2015). Researchers construct experiments to obtain statistical proof of the relationship between the conditions since many different factors might contribute to cause-and-effect (Bandalos & Finney, 2018). Accordingly, the study used the causal research

approach to establish the relationship between debt burden and fiscal sustainability in the Windhoek Municipality. This, allowed the research to find ways in to improve the effectiveness of the Windhoek municipality's fiscal sustainability strategy.

### **3.3. DATA SOURCES AND SAMPLE**

The study used secondary data, sourced from publicly available databases of the Office of the Auditor General website (OAG, 2021) for audit reports for the period 2008 to 2019 (CoW, 2021). The study adopted the financial indicators calculated in the OAG Audit reports for the Windhoek Municipality to ensure consistency and reliability of the data. The data covers a period of 12 years (2008 to 2019). The demographic and macro-economic variables were accessed from the Namibia Statistics Agency (NSA).

### **3.4. DATA DESCRIPTION**

The choice of explanatory variables and sampling time frame was informed by both the literature and the availability of data. Literature (Schick, 2006; IPSASB, 2011; Lucianelli *et al.*, 2018) suggests that when determining financial sustainability at the local and regional level, one should take into consideration key financial and non-financial information on current economic and demographic conditions. These conditions include productivity, relative competitiveness of the national or local economy (IPSASB, 2011) demographic changes in population, life expectancy, income, education, and mortality

(IPSASB, 2011). Lucianelli *et al.* (2018) also noted quality of public services; cost effectiveness; optimal debt obligations and intergenerational integration as key financial and non-financial information on current economic and demographic conditions to be considered when determining financial sustainability. Schick (2006) identified solvency, growth, stability and equity to characterise financial sustainability of local self-government as other factors to consider.

In terms of data availability, the audited financial statements were accessed from both the OAG and CoW websites. However, the data from 2015 to 2019 was different from 2007 to 2014 data collected from the OAG annual audited reports. The OAG report (2016) noted that the City of Windhoek (CoW) adopted accrual basis International Public Sector Accounting Standards (IPSAS) on the 1<sup>st</sup> of July 2015. The CoW financial reports for 2007 up to 2014 were prepared on the accrual basis accounting standards of the Institute of Municipal Financial Officers (IMFO) (OAG, 2008 – 2015).

The adoption of accrual basis IPSASs saw a change in the structure of the financial statements. Accordingly, the study computed financial indicators and proxies to use in an analytical model that ensures reliability and validity of the data. The study adopted financial sustainability indicators of the local budgets suggested by Lysiak, Kachula, Hrabchuk, Filipova and Kushnir (2020). The accumulated deficits and accumulated funds values changed, as the non-statutory funds that were used in providing internal loans to the municipality were used to

offset the ballooning accumulated deficits. Table 3.1 presents the variables adopted for the study.

**Table 3.1 Description of Variables**

Description	Variables	Code	Proxy Data Variables	Source
<b>Fiscal Sustainability</b>	F	AcDef	Accumulated deficit as of 30 June	OAG Reports 2007 - 2016, CoW AFS 2017-2019
		AcFund	Accumulated Funds	
<b>Debt Burden</b>	Debt load and Debt Service ratios	AcL	Accumulated Loans	
		Pen	Employee Benefit liabilities	
<b>Budgetary Arrears</b>		BoD	Bank Overdraft	
		Loan	Loans received in the year	
<b>Local Budget Balance</b>	Budget Coverage, Budget sustainability and Expenditure coverage ratios	Rev	Total Revenue	
		Exp	Total Expenditure	
		Cap	Capital Expenditure	
<b>Financial Independence</b>	Budget dependence, State dependence, Income base stability	Gov	Government Grants and Subsidies	
		Tipeeg	Government-TIPEEG	
		BF	Betterment Fund	
		CDF	Capital Development Fund	
		ED	Endowment Fund	
<b>Budgetary Efficiency</b>	Budget deficit ratio, Budget revenue stability	NSF	Non-Statutory Funds	
		Def	Deficit for the year	
<b>Solvency</b>		UnSur	Unappropriated Surplus	
		UnInt	Unappropriated surplus Interest	
	Cash	Cash at Hand (Cash and Cash Equivalents - Bank Overdrafts)		
<b>Demography</b>	Demography	Pop	Population	NSA (2007 to 2019)

*Source: Author's Own Construct (2021)*

### 3.5. MODEL SPECIFICATION

The study adopted a temporal causal model that attempts to discover key causal relationships in time series data. In using the temporal causal model, the researcher specifies a set of target series and a set of candidate inputs to those targets (IBM SPSS, 2020). In the context of temporal causal modelling, the term causal refers to Granger causality, where a time series X is said to "Granger cause" another time series Y if regressing for Y in terms of past values of both X and Y results in a better model for Y than regressing only on past values of Y.

Accordingly, the study adopts a system of indicators for assessing the fiscal sustainability of local budgets and aims to estimate the granger causality of these indicators towards developing weighted guidelines for assessing the level of debt that can ensure the fiscal sustainability of the Windhoek Municipality. The study makes use of indicator definition of ratios used by Liubov *et al.* (2020) to assess the fiscal sustainability of local budgets. While Liubov *et al.* (2020) used a summation approach to develop the indicators, this study starts specifying an estimation model that makes use of Liubov's Fiscal Sustainability indicators as follows:

$$FS = a_1 SLV_t + a_2 DB_t + a_3 LBB_t + a_4 FI_t + a_5 BE_t + a_6 BA_t + c$$

Where:

FS is the logarithm of Fiscal Sustainability,  $c$  is the intercept, SLV is a vector of logarithm of Solvency indicators; DB is a vector of Debt Burden indicators, and LBB is a vector of Local budget balance indicators, FI is a vector of financial independence indicators, BE is a vector of Budget efficiency indicators, and BA is a vector of Indicators of budgetary arrears. While, A1 to A6 represents the coefficients of regression which measures the magnitude and direction of the relationships.

### **3.6. EMPIRICAL ESTIMATION**

This study belongs to the General Linear Model (GLM) which requires certain conditions before applying it. The conditions include building an autoregressive temporal causal model using the fiscal sustainability indicators, as well as using tests for normality, stability, stationarity, multicollinearity, autocorrelation and heteroscedacity as follows:

#### **3.6.1. Building Temporal Causal Model**

The empirical procedure starts by exploring the statistical properties of the raw financial data, and its subsequent transformations into the Liubov fiscal sustainability indicators. The indicators will then be converted into logarithms, which are then inputted into SPSS version 26, to identify the endogenous and exogenous variables that provide the best model fitness statistics. The identified fiscal indicators are then used to estimate an autoregressive time series model for

the valid endogenous variables (FS) and includes only those exogenous variables that have a causal valid relationship with the target.

This approach differs from traditional time series modelling, which requires the researcher to explicitly specify the predictors for a target series. As it instead only specifies the homogenous grouping of the indicators of interest, while the indicators that were finally used as proxy for Fiscal sustainability was determined using Principal component analysis. Since temporal causal modelling typically involves building models for multiple related time series, the result is referred to as a model system (IBM SPSS, 2020).

Traditionally, studies in applied econometrics use either Granger (1981) Engle and Granger (1987) Autoregressive Distributed Lag (ARDL) cointegration technique or bound test of cointegration (Pesaran and Shin 1999; Pesaran *et al.* 2001) or Johansen and Juselius (1990) cointegration techniques, when determining the long run relationship between non-stationary series. Similarly, this study used these model estimation techniques to establish the nature and mechanism of the relationship between the dependent (endogenous) variables and explanatory (exogenous and control) variables of the fiscal sustainability and debt burden hypothesis, as it relates to the Municipality of Windhoek. Accordingly, the temporal causal model was structured into a modified equation, where the Logarithm of Fiscal Sustainability or Debt burden as the dependent variable was estimated with several explanatory variables to come up with a valid model. The study uses ARDL and ECM models to determine the short and long

run relationship between fiscal sustainability indicators and debt burden in the Municipality of Windhoek.

The ARDL model has been adopted in this study, because it offers several estimation advantages. Olayeni (2019) notes that the ARDL bounds approach allows one to test for cointegration even when it is not known with certainty whether the regressors are purely I (0) purely I(I) or mutually cointegrated. The ARDL bounds testing approach to cointegration is not size sensitive and will provide valid results even for a sample size of 13, which is considered small for time series analysis (Adeleye, 2018). Whilst other single equation cointegration techniques apply just under the restrictive assumption that all the model's variables are integrated of order 1.

### **3.6.2. Principal Component Analysis**

Principal components analysis models the variance structure of a set of observed variables using linear combinations of the variables (Bandalos & Finney, 2018). The combination coefficients, or loadings, are utilised to interpret the components, and these linear combinations, or components, can be employed in further analysis. To reconstruct the original variance structure, we usually hope to account for most of the original variability using a relatively small number of components (Bandalos & Finney, 2018). The study makes use of Pallant (2016)'s factor analysis procedure using IBM SPSS version 26.

### 3.6.3. Unit Root Test

In time series analyses, it is imperative that one tests for the stationarity of the time series. When all variables are stationary at levels, one can just adopt the ordinary least squares (OLS) method (Wooldridge, 2016). However, when one has a combination of variables that have become stationary at first difference and or / above, the methodology moves away from OLS to a method that can accommodate the stages of stationarity of the combined data. The outcome of unit root testing is important to the empirical strategy, as most macroeconomic time series data is characterised by non-stationarity.

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. To determine the stationary properties of the time series, the unit root test was carried out using two methods, namely: The Augmented Dickey-Fuller (ADF) and Kwiatkowski, Philips, Schmidt and Shin (KPSS).

The unit root test is based on the null hypothesis that the data is non-stationary or contains unit root, with the alternative hypothesis being that the data is stationary/no unit root (Adeleye, 2018). The decision of failing to reject the null hypothesis of a unit root is indicated by the asymptotic probability values less than 0.05. The null and alternate hypothesis of the KPSS test is opposite that of the ADF test. On this basis, when the p-value of KPSS test is at a significance level of 0.05, the decision is to reject the null hypothesis in favour of the

alternative (Das, 2019). While these series that are non-stationary are assumed to become stationary after first difference, they are integrated to an order of one or I (1).

#### **3.6.4. Bounds Cointegration Test**

If the series under analysis are stationary at levels, then the I (0) series are integrated of order zero, thus dismissing the need for a cointegration test, as any change to the system in the short run quickly adjusts to the long run (Das, 2019). Consequently, only the long run model should be estimated using OLS (where variables are neither lagged nor differenced). It is the static form of the model. In essence, the estimation of short run model is not necessary if series are I (0) (Adeleye, 2018). Moreover, economic and finance theory often suggests the existence of long-run equilibrium relationships among non-stationary time series variables. If these variables, are I (1) then cointegration techniques can be used to model these long-run relations. Hence, pre-testing for unit roots is often a first step in the cointegration (Das, 2019).

#### **3.7. RELIABILITY AND VALIDITY**

The diagnostic tests are then carried out to test for the goodness of fit of the estimated model. The diagnostic checks carried out include the residual test to detect whether serial correlation, heteroscedasticity, test for misspecification of the model and normality tests, which affect the model assumptions (error normality, error non-heteroskedasticity, error non-autocorrelation).

### **3.7.1. Ramsey Regression Equation Specification Error Test (RESET) test**

RESET is a general specification test for the linear regression model. It was used to test whether non-linear combinations of the fitted values help explain the dependent variable. The intuition behind the RESET test is that if non-linear combinations of the explanatory variables have any power in explaining changes in the dependent variable, the model is mis-specified. The F-test is used to see if the model is mis-specified and test the null hypothesis that all coefficients are equal to zero.

### **3.7.2. Jarque-Bera (JB) Normality test**

In multiple regression, the assumption requiring a normal distribution applies only to the disturbance term. Accordingly, the study tests for normality using the skewness and kurtosis of the residuals. The study uses the Jarque-Bera (JB) test to test the normality of the OLS residuals. The Jarque-Bera test is used to test whether the disturbance term is normally distributed (Wooldridge, 2016). The null hypothesis of normality is rejected if the value of the JB statistic is very different from 0. Alternatively, if the value of the JB statistic is close to zero, then the null hypothesis of normality of residuals cannot be rejected (Hill, *et al.*, 2018).

### **3.7.3. Serial correlation LM test**

Serial correlation refers to the fact that the value of a variable, at the current time depends on all or some of the values of that variable at previous times (Adeleye,

2018). The study tests autocorrelation using the Lagrange Multiplier (LM) test, also known as the Breusch-Godfrey test (Wooldridge, 2016). The Autocorrelation Lagrange Multiplier (LM) test reports on the multivariable LM test statistics for residual serial correlation up to the specified lag order  $h$ , with the null hypothesis that there is no serial autocorrelation, and an alternative hypothesis of the existence of autocorrelation (Das, 2019).

#### **3.7.4. Autocorrelation**

Autocorrelation problem appears in the model when two following observations are correlated in a way that affects the validity of the model in which the independent variables affect the dependent variables to a high degree. To test the presence of that correlation Durbin Watson (D-W) test was used.

#### **3.7.5. Multicollinearity**

The strength of the general linear model depends on the independency of each independent variable used in the model. If this condition was not met, then the linear model is not considered to be good to be applied and used (Hill, Griffiths, & Lim, 2018). To test the independency of the independent variables, to measure the tolerance of each independent variable, the Collinearity Diagnostics Test was used (Das, 2019). The computation of the Variance Inflation Factor (VIF) was also used in measuring the effect of correlation between the independent variables (Gujarati, 2009). If the value of (VIF) is more than (10) that indicates

that there is a problem with the multicollinearity of the measured independent variable.

### **3.7.6. Homoscedasticity**

When using linear regression models and Ordinary Least Squares (OLS) variance of random error should be constant and the average of it should equal zero. When these conditions are simultaneously present, it is said that the model has homoscedasticity. If the variance is not constant, conversely, it is said that the model has heteroscedasticity. The presence of heteroscedasticity would result in wider confidence intervals that consequentially leads to inaccuracies in the t-test and F-test results, and the acceptance of insignificant coefficient (Das, 2019). The Breusch-Pagan (BP) / Cook-Weisberg test for heteroscedasticity is recommended over the white test for heteroscedasticity because it retains its power even when the model has numerous regressors, whereas the White test does.

### **3.7.7. Testing of Research Hypothesis**

After estimating the empirical model and testing for goodness of fit of the model through diagnostic tests, the testing of hypotheses is then carried out through statistical inference of the model (Das, 2019). Hypothesis testing is a statistical process to test the likelihood of the claims or ideas about a population based on a sample drawn from it (Das, 2019). The interpretation of the results involves the

testing of the study hypothesis by making statistical inferences from the estimated empirical model.

### **3.8. LIMITATIONS**

The limited availability of data on fiscal sustainability in Namibia is a major constraint in assessing the impact of debt financing on the fiscal health of local government. This lack of data restricted the study to a shorter time series, which was then combined into indicators.

### **3.9. RESEARCH ETHICS**

Conducting research implies the acceptance of ethical responsibilities. The researcher sought for approval from the UNAM Postgraduate Research Committee, after receiving a clearance certificate from the committee, and then the researcher proceeded to conduct the research. The researcher resorted to using publicly available databases and reports, thus removing the need to also obtain a written permission from city of Windhoek municipality.

### **3.10. SUMMARY**

This chapter has presented the research approach and the econometric data analysis techniques needed to empirically analyse the effect of debt financing on the fiscal sustainability of the city of Windhoek. The study was based on annual series data adopted from audited financial statements available from the OAG. To achieve the primary objective of this research, this chapter presented the

research methodology, the data employed in the study and its sources. It also explored the development of a temporal causal model and the use of PCA in reducing the dimensionality of the data for time series analysis. The time analysis involved the adaptation of key econometric tests that were important in hypothesis testing of temporal causal models. The following chapter presents, interprets, and discusses the empirical results of the study.

## **CHAPTER 4**

### **EMPIRICAL FINDINGS AND INTERPRETATION OF RESULTS**

#### **4.1. INTRODUCTION**

The chapter presents the findings and interpretation of the empirical analysis of the study. The chapter is structured into three main parts. The first section presents the data preparation and processing. The second section looks at the use of inferential statistics to develop appropriate variables for addressing the research objectives. The third section involves the empirical analysis of the time series data on the computed fiscal sustainability indicators. Finally, the chapter gives an interpretation of the results and discusses the implications of the findings in line with extant theory and empirical evidence.

#### **4.2. DATA PREPARATION AND PROCESSING**

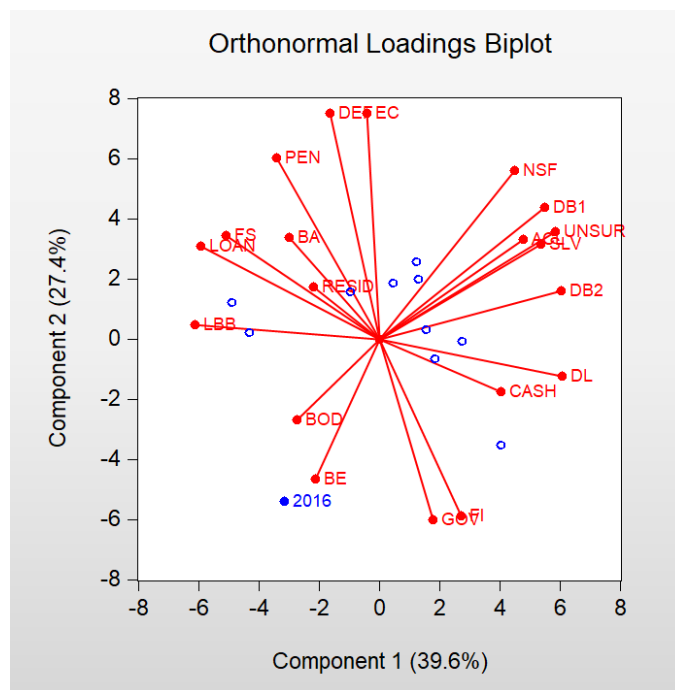
The study used secondary data, sourced from publicly available databases of the Office of the Auditor General website (OAG, 2021) for audit reports for the period 2007 to 2016 and the City of Windhoek Annual Reports for 2017 to 2019 (CoW, 2021). However, the research faced data processing challenges with respect to the way the CoW's Audited Financial Statements were presented. The data from 2015 to 2019 was different from 2007 to 2014 data collected from OAG annual audited reports. The OAG report (2016) noted that the City of Windhoek (CoW) adopted accrual basis International Public Sector Accounting Standards (IPSAS) on 1 July 2015. The CoW financial reports for 2007 up to

2014 were prepared on the accrual basis accounting standards of the Institute of Municipal Financial Officers (IMFO) (OAG, 2008 – 2015).

The financials were audited in terms of the provision of Section 85 of the Local Authorities Act (GRN, 1992) and in line with Section 25 (1) (b) of the State Finance Act, (GRN, 1991). CoW Management is responsible for the preparation and fair presentation of these financial statements in accordance with Section 86 of the Local Authorities Act, 1992 (Act 23 of 1992) and since 2016 their statements were also prepared in compliance with the International Public Sector Accounting Standards (IPSAS). The shift to IPSAS standards caused a material change to the financial statements that made it difficult to carry out the time series analysis. As a result, the researcher explored ways in which the financial data can be converted to fiscal sustainability indicators that can be used to compare historical data and be used for further managerial decision making by the CoW. Accordingly, the researcher first collected the financial statements data in the read only Adobe pdf format and manually inputted and collated the data into MS Excel Spreadsheet (See Appendix 1).

The adoption of accrual basis IPSASs saw a change in the structure of the financial statements. The accumulated deficits and accumulated funds values changed, as the non-statutory funds that were used in providing internal loans to the municipality were used to offset the ballooning accumulated deficits. The variables were explored using Principal Component Analysis (PCA) in SPSS version 26 using data transformed into logarithms. The variables with

correlations above 0.8 were converted into ratios and the ratios which loaded on the same factors were converted to financial sustainability indicators suggested by Lysiak, *et al.* (2020). Figure 4.1 presents the orthonormal loadings biplot of the final the computed fiscal indicators, while the code book for the computed logarithms, ratios and indicators are presented in Appendix 2.



**Figure 4.1: The PCA Grouping of Fiscal Sustainability and Debt Burden Indicators**

*Source: Author's Computations in EVIEWS 10 (2021)*

Figure 4.1 indicates the factor loadings that were used to come up with log ratios, the Deficit is represented by Log ratio of Expenditure Coverage (EC). The dependence on government funding (Gov) is represented by the Financial Independence (FI). While the Cash is associated to Debt Load (DL =

LOAN/AcDef). The Unappropriated surplus (UNSUR) Non-Statutory Funds (NSF) and Accumulated Loans (ACL) is represented by the DB1 (NSF to PEN ratio) and DB2 (ACL to Expenses ratio) indicators. Thus, reducing the issues related to multicollinearity, which is the occurrence of high intercorrelations among two or more independent variables in a multiple regression model (See Appendix 2 on the Correlations of the variables).

### 4.3. DESCRIPTIVE STATISTICS

The study uses secondary time series data from 2007 to 2019 giving a sample of 13 annual time series observations, which was transformed into logarithmic data of Lysiak, *et al.*'s (2020) ratios on Fiscal Sustainability, Debt Burden, Budgetary Arrears, Local Budget Balance, Financial Independence, Budgetary Efficiency, Solvency respectively. Table 4.1 presents the descriptive statistics of the variables used in the study.

**Table 4.1 Summary Statistics**

Variable	Description	Mean	Med	Max	Min	Std. Dev.	Skew	Kurt	Jarque-Bera
FS	Fiscal Sustainability	-1.09	-0.71	0.21	-3.93	1.13	-1.32	4.09	4.42
SLV	Solvency	-3.01	-2.04	-0.19	-6.63	2.15	-0.70	1.92	1.70
DB1	Funds to Pension ratio	0.33	0.93	1.43	-2.68	1.22	-1.36	3.76	4.33
DB2	Debt Burden to Expense	-0.99	-0.55	0.10	-2.47	0.96	-0.47	1.50	1.69
BA	Budgetary Arrears	-2.26	-2.26	-1.67	-3.16	0.41	-0.60	2.90	0.78
BE	Overdraft to Deficit	-1.69	-1.01	2.33	-13.88	3.99	-2.33	7.99	25.22
LBB	Local Budget Balance to Population	8.84	8.92	9.30	8.19	0.35	-0.47	2.01	1.02
FI	Financial Independence	5.77	5.68	6.71	4.39	0.77	-0.20	1.80	0.86

DL	Debt Load	-1.38	-1.42	2.01	-3.89	1.54	0.46	3.10	0.47
BE_EBL	Budget Efficiency to Liabilities	-1.25	-0.88	-0.12	-3.27	0.89	-1.14	3.31	2.89
EC	Expenditure Coverage	0.11	0.12	0.19	0.00	0.06	-0.53	2.04	1.10

The descriptive statistics of the logarithmic values of the ratio's computed indicators are presented in Table 4.1. The data was transformed into ratios to provide an easier metric for comparative purposes. Additionally, the ratios were further transformed to logarithms to allow for easy interpretations of the relationships when linear models are estimated. The findings on the descriptive statistics indicates that the transformed data is normally distributed, with kurtosis and skewness values less than the recommended 2.5 (Bandalos & Finney, 2018). While, the Jarque-Bera values are all close to zero. The only variable of concern is the BE (Overdraft to Deficit) variable with a kurtosis of 7.99 and Jarque-Bera value of 25.22. The variable as flagged for possible omission during the modelling stage. After having determined that the data met the conditions for estimating a linear regression model. The study moved to carrying out the stationarity tests that are presented in the next section.

### 4.3. UNIT ROOT TEST

The unit root test was used to determine the stationary properties of the variables, and three approaches were used: Augmented Dickey- Fuller (ADF) Phillips-Perron (PP) and Kwiatkowski, Philips, Schmidt and Shin (KPSS). The stationarity tests were run to see if the variables satisfied the requirements for applying the ARDL model estimation, which require the data to be integrated at

either order one (I (1)) or zero (I (0)) with no integration order of two. The results of the traditional unit root test are shown in Table 4.2, which provides the results of the test using the trend or intercept.

**Table 4.2 Unit Root Tests**

Variable	Integration order	ADF	PP	KPSS	Interpretation
FS	Level	-3.024	-3.617*	<b>0.155**</b>	I (1)
	First Difference	<b>-7.384***</b>	<b>-7.384***</b>	0.14*	
SLV	Level	-0.199	-0.168	0.54*	I (1)
	First Difference	<b>-3.35***</b>	<b>-3.36***</b>	0.161	
DB1	Level	-1.81	-1.70	0.396*	I (1)
	First Difference	<b>-5.33***</b>	<b>-5.91***</b>	0.137	
DB2	Level	-1.088	-2.41	0.11	I (1)
	First Difference	<b>-3.45**</b>	<b>-4.99**</b>	<b>0.50***</b>	
BA	Level	-1.01	-0.07	<b>0.50**</b>	I (1)
	First Difference	<b>7.51***</b>	<b>-764***</b>	0.36*	
BE	Level	-3.03	-3.01	0.12*	I (1)
	First Difference	<b>-5.24***</b>	<b>-8.60***</b>	0.091	
LBB	Level	-2.43	-3.06	<b>0.19**</b>	I (1)
	First Difference	-4.40**	-5.47***	<b>0.346***</b>	
FI	Level	-0.74	-1.09	0.394*	I (1)
	First Difference	<b>-3.59***</b>	<b>-6.67***</b>	<b>0.50***</b>	
DL	Level	-0.274	-2.64	<b>0.541**</b>	I (1)
	First Difference	<b>-3.90***</b>	<b>-8.97***</b>	<b>0.50**</b>	
EC	Level	-2.94	-2.99	0.13*	I (1)
	First	<b>-6.76***</b>	<b>-7.01***</b>	<b>0.50***</b>	
BE_EBL	Level	-2.61	-2.51	0.16	I (1)
	First	<b>-4.13***</b>	<b>-5.24***</b>	<b>0.50**</b>	

Note: t-stat-t-statistic; \* p < 0.1, \*\* p < 0.05, \*\*\*p < 0.01.

*Source: Author's computations using EViews 10 (2021)*

Table 4.2 shows the unit root tests for ADF, PP, and KPSS. The null hypothesis for ADF and PP is that the data have a unit root, versus an alternative hypothesis

that they are stationary. The bolded values with stars represent the decision to reject the null hypothesis and conclude that the variable is stationary at first difference (I (1)). In addition, the KPSS test, which uses diametrically opposed null and alternative hypotheses to those of ADF and PP tests, was used to support stationarity of the data. The finding reveals that at the significance level of  $p < 0.05$ , all the variables were stationary at first difference I (1) and shows that ARDL model can be used to estimate a temporal causal model from the data.

Accordingly, the study computed indicators based on literature definitions of fiscal sustainability and debt burden, to use these indicators to empirically address the research objectives. The unique nature of the study variables required innovative ways to explore and determine the model estimation that could provide the best model quality statistics, align with the model specified in Chapter 3 and address the research objectives. However, the study faced key data availability constraints, where the only financial data publicly available was from Audited Financial Statements of the Municipality of Windhoek from 2007 to 2019.

Moreover, the number of indicator variables computed were more than the number of time observations, which was limited to only 13 annual observations. There was an option to impute and transform the data from annual to higher frequency monthly data using EViews 10, which would have increased the sample from 13 to 156. However, this approach has been heavily criticized by economists as biased and not a true representation of the original data, as the

imputation uses a quadratic function that introduces an element of biases on the stationarity of the data. As such, the researcher settled on using an ARDL model which provides valid estimates even for small sample data. Accordingly, the next section presents a summary of the top temporal causal models that were used selected for use in the ARDL model estimation.

#### **4.4. TEMPORAL CAUSAL MODEL SELECTION**

This section presents the summary of model quality of the fiscal sustainability and debt burden indicators that were first ran using SPSS version 26's forecasting algorithm, which estimates and summarises the top-quality temporal causal models and their related statistics. Temporal causal modelling is used by decision makers to uncover causal relationships within a large set of time-based metrics that describe the business (IBM SPSS, 2020).

In this study, the analysis was used to identify a few controllable indicators, that have the largest impact on key endogenous variables of interest. The endogenous variables are further into three main categories, which includes Fiscal sustainability, debt burden and financial independence indicators. These indicators will provide a temporal causal modelling system that helps in empirically establishing the nature of relationships between fiscal sustainability and debt burden indicators, within the context of local governments. Table 4.3 presents the findings computed in SPSS version 26 software.

**Table 4.3: Fit Statistics for Top Temporal Causal Models**

<b>Role</b>	<b>Classification</b>	<b>Model for Target</b>	<b>RMSE</b>	<b>RMSPE</b>	<b>AIC</b>	<b>BIC</b>	<b>R-Square</b>
<b>Exogenous</b>	<b>Debt Burden</b>	BA (Budgetary Arrears)	0.47	0.09	- 11.06	- 10.59	0.67
		DL (Debt Load)	1.06	0.27	1.9	2.37	0.59
		DB2 (Debt Burden on Expenses)	1.07	0.57	2.02	2.5	0.55
		<b>BE_EBL (Budget Efficiency on Liabilities)</b>	<b>1.35</b>	0.54	5.66	6.13	<b>0.44</b>
<b>Endogenous</b>	<b>Fiscal Sustainability</b>	<b>EC (Expenditure coverage)</b>	<b>0.06</b>	0.21	- 43.61	- 43.13	<b>0.74</b>
		LBB (Local Budgetary Balance per capita)	0.11	0.01	- 34.59	- 34.11	0.84
		FS (Accumulated deficits to Accumulated Funds)	0.29	0.28	-18.8	- 18.32	0.79
<b>Control</b>	<b>Financial Independence</b>	FI (Government Dependency per capita)	0.56	0.05	-8.28	-7.8	0.83

		<b>DB1 (Non-Statutory Funds to Employee Pensions)</b>	0.94	0.5	-0.08	0.39	0.87
		SLV (Solvency through Unappropriated Surplus to Accumulate loans ratio)	1.32	2.09	5.38	5.85	0.92

RMSE = Root Mean Squared Error, RMSPE = Root Mean Squared Percent Error, AIC = Akaike Information Criterion, BIC = Bayesian Information Criterion

Table 4.3 presents the fit statistics of the fiscal sustainability indicators such as EC, LBB that are log ratios of total expenditure to total revenue in the current year (EC) and the total revenue in the current year over the population of the municipality in the current year (LBB). The FS indicator was initially chosen as a proxy for fiscal sustainability in the Windhoek municipality but using it as an indicator of fiscal sustainability proved problematic because the Audited Financial Reports from 2015 onwards reappropriated accumulated funds to offset the accumulated deficits. Thus, posing a challenge to the reproducibility of such an indicator in other local government settings, and any recommendations based on the FS variable will only be historical and pre-2015.

Similarly, debt burden indicators and financial independence indicators that posed a similar challenge, also resulted in additional fiscal sustainability indicator. The EC model that was selected as the main model due to its excellent RMSE value of 0.06, which between the recommended 0.06 to 0.08 range

stipulated by Gaskin and Lim (2016). Accordingly, the ARDL Bounds test for cointegration was done for the EC model as follows:

#### **4.5. BOUNDS TEST APPROACH TO COINTEGRATION**

The section summarises and discusses the results of the ARDL Bounds testing technique to cointegration, as well as defining the research equations in accordance with the study's objectives. The study employed the EViews 10, which chose the right lag duration for the ARDL models automatically. The ARDL model was derived from diagnostic statistics and a recursive search for the optimal number of delays using the Akaike Information Criterion (AIC). The relationships between fiscal sustainability, debt burden and financial independence were estimated using the EC model from Table 4.3, which was used Expenditure Coverage (EC) as a dependent variable to a function of the best lag distribution of one independent variable (Debt burden) and one control variable (financial independence):

$$\text{Expenditure Coverage (EC)} = f(\text{BE\_EBL}, \text{DB1})$$

To check for the presence of Bounds cointegration, the researcher employed the F-statistics test statistic. Pesaran *et al.* (2001) used the Pesaran *et al.* (2001) approach to compare the F-statistics to a calculated F-critical value. The null hypothesis is not rejected if the computed F-statistics is less than the lower bound value; otherwise, it indicates the presence of a long-run link between the researched variables. Finally, if the estimated F-statistics are in the lower limit

and higher bound ranges, the long-term relationship between the variables is equivocal (Martin and Abasimi, 2018). Table 4.4 present the results of the ARDL bounds test for the two equations.

**Table 4.4 ARDL bound test for cointegration**

Variables		F-statistic	K	Cointegration
F (EC/BE_EBL, DB!)		<b>-3.14</b>	2	No Cointegration
<i>Pesaran F-critical/ T-critical</i>	<i>Critical Value Bounds(significance)</i>	<i>Lower Bound (I(0))</i>	<i>Upper Bound (I(1))</i>	
	10%	-1.62	-2.68	
	5%	-1.95	-3.02	
	2.50%	-2.24	-3.31	
	1%	-2.58	-3.66	

\*\*\* denotes cointegration at the 1% significance level based on Pesaran critical bounds table.

The results in Table 4.4 show that the calculated F-statistics for the Expenditure Coverage ( $F = -3.14 < F\text{-critical}$ ) was of a lower magnitude than the upper bound critical value at 5% significance level. Thus, giving sufficient reasons to reject the null hypothesis of no long-run relationship at 5% significance level for the EC model variables. Thus, implying evidence of at least one pair that has evidence of cointegration, therefore both long and short run relationships were considered.

After establishing the presence of cointegration in our variables, post diagnostic tests were done to further confirm the validity of the equation variables using the variance inflation factors, redundant variables test and the omitted variable tests. The next section presents the empirical results estimated for the valid equation of the EC model, which was then used to explain the relationship between fiscal

sustainability, debt burden and financial independence on the municipality of Windhoek.

#### 4.6. ARDL ESTIMATION OF THE EXPENDITURE COVERAGE

##### EQUATION

This section presents empirical findings from the ARDL the Long run and short run coefficients of the EC temporal model, where EC was the dependent variable. The ARDL model was estimated from a recursive search of the optimal number of lags through the Akaike Information Criterion (AIC) and from the diagnostic statistics. The long-and short-run analysis using the ARDL cointegration model ARDL (1, 1, 1) was selected by using the maximum possible lags from the Akaike Information Criterion (AIC). Table 4.5 presents the estimated long- run and short-run results of the ARDL model.

**Table 4.5 Results of the ARDL (1, 1, 1) regression model of Expenditure Coverage**

Description	Regressor	Coef.	Std. Err.	t-statistic	P>t
<b>Adjustment</b>	<b>ECT</b>				
Error correction term	EC (-1)	<b>-0.078**</b>	0.03	-3.14	0.02
<b>Long Run</b>	<b>LR</b>				
Non-Statutory Funds to Employee Pensions ratio	DB1	0.161	0.15	1.022	0.34
Budget Efficiency on Liabilities	BE_EBL	0.088	0.17	0.521	0.61
<b>Short Run</b>	<b>SR</b>				
Non-Statutory Funds to Employee Pensions ratio	D(DB1)	- <b>0.026***</b>	0.006	-3.99	0.005

Budget Efficiency on Liabilities	D(BE_EBL)	<b>0.089***</b>	0.007	12.84	0.001
<b>Diagnostic Tests</b>					
Durbin-Watson stat (DW)	<b>2.875</b>	Adjusted R-squared			<b>0.856</b>
Serial Correlation test ( $\chi^2_{SC}$ )	<b>1.517</b>	Prob. F (2,5)			<b>0.305</b>
Heteroscedasticity test ( $\chi^2_{HET}$ )	<b>2.307</b>	Prob. F (5,6)			<b>0.169</b>

Note: Sample years: 2007 – 2019 (N=13); \*\*\*, \*\* and \* significant at 1%, 5% and 10% respectively; SR - Short Run; LR – Long Run.

*Source: Author's computations (2021)*

Table 4.5 shows that the long run coefficients result of the determinants of Expenditure Coverage as a proxy for Fiscal sustainability were not statistically significant. The findings show that the indicators for Debt burden and financial independence did not provide any evidence of a long run relationship with Fiscal sustainability. Additionally, the model's error correction term (ECT) which indicates the speed of adjustment from short-run dynamics to the long-run equilibrium path in the model, indicated a lagged error correction term ( $\alpha = -0.078$ ). The findings imply that the coefficient of error correction term or the speed of the adjustment (lagECM) is negative and significant as expected. Based on these findings, the deviation from the long run equilibrium to the short run dynamics is adjusted slow at 8% of the disequilibrium in a period of one year.

#### **4.6.1. Diagnostic Tests**

The outcomes of the ARDL model were validated by post-estimation tests in the research. The residual test was one of the diagnostic tests used in the study to see if serial correlation and heteroscedasticity were a severe concern in the model.

Breusch-Godfrey Serial Correlation Lagrange Multiplier (LM) test and Breusch-Pagan-Godfrey Heteroskedasticity Test were utilized in this study.

The findings in Table 4.5 presented the Durbin Watson (DW) test statistic, which was above the recommended 2 (DW = 2.88) indicating that the model does not suffer from autocorrelation. While the Serial Correlation test ( $\chi^2_{SC}$ ) statistic of 1.517 ( $p = 0.31 > 0.05$ ) implies that the model is free of serial autocorrelation. While the heteroscedasticity test ( $\chi^2_{HET}$ ) with observed chi-square probability value [F (5,6)] of  $0.169 > 0.05$ . These diagnostic tests imply that the EC model is a valid, reliable, and consistent temporal causal model. Therefore, the valid findings were those of the short run relationships, which were statistically significant. Table 4.5 results indicated a significant negative relationship between EC and DB1 (beta = -0.026;  $p < 0.01$ ) while a significant positive relationship was revealed between EC and BE\_EBL (beta = 0.089;  $p < 0.01$ ).

#### **4.6.2. The Effect of Non-Statutory Funds to Employee Pensions on Expenditure Coverage**

The findings suggest that 1% shock in the Non-Statutory Funds to Employee Pensions ratio (Mean= 2.10, S.D =1.29) would result in a negative short-run effect of 0.026% on the Expenditure Coverage ratio (Mean = 1.1, S.D = 0.07). The findings imply that the Municipality of Windhoek should use their sustainable investments target guided by the ratio the returns from the non-statutory funds (NSF) the Employee Benefits Plan liabilities Fund (PEN). These

empirical findings provide the municipality with investment guidelines on how to plan and manage their Defined Benefit Plan fund for their employees (PEN) and investment returns from the three main NSF funds.

These results are in line with Sinervo's (2020) assessment of a municipality's capacity to fulfil ongoing financial, investment, and service obligations based on resource flow and stock as determined by annual financial data. Adequate funding is needed for long-term municipal service delivery and the sustenance of its employee benefit plan liabilities. This assures that local governments must earn enough cash to meet their mandatory expenditures such as employee benefits. Accordingly, the municipality should use returns from their Non-statutory Funds to broaden their revenue base, decreasing expenditure, and reducing reliance on state funds through a fiscal consolidation strategy that is based on the ratio of NSF and Employee benefits.

#### **4.6.2.1. Non-statutory funds (NSF)**

The three main contributory funds to the NSF include the Capital Development Fund (CDF) the Betterment Fund (BF) and the Endowment Fund (EF). The CDF was established to pay general expenditures, mostly through low-interest internal loans. It is funded via budgeted over actual capital expenditure savings, as well as income, interest generated on money invested, and internal loans issued, as well as any contributions that the Windhoek City Council may vote on (OAG, 2020). The BF, on the other hand, is used to fund future municipal asset

renovations and includes profits from land sales as well as income gained on internal loans and investments. While the EF provides for future erven subdivision and accumulation of money received from the earnings of erven subdivision of municipal land and properties.

Following recommendations by Barbera *et al.* (2017), the NSF provides the municipality with a means for pursuing a passive fiscal sustainability approach that is effective for responding to crises. Accordingly, the findings indicated a negative relationship between NSF and Expenditure coverage (beta = -0.026,  $p < 0.01$ ), which supports the effectiveness of NSF in reducing expenditures and increase the revenue through diversified investments that seek to reduce the debt burden, mandatory liabilities, and annual expenses.

Lysiak and Kushnir, (2020) noted that municipalities such as the City of Windhoek can adopt a passive sustainability policy that relies on automatic stabilizers that at best ensures a return to the pre-crisis financial condition of the local budget. As a result, the findings of this study explain why the City of Windhoek switched from an active budget sustainability strategy from 1994 to 2007 to a more passive one following the global financial crisis of 2009.

#### **4.6.2.2. Employee Benefits Plan Fund (PEN)**

The CoW's Accounting Policy on Employee Benefits Plan, through which the municipality gets actuarial assessments of its Defined Benefit Plan Liabilities, governs the PEN fund. Post-retirement Health Benefit Responsibilities, Long-

service Awards, and Severance Pay Liability were designated as the municipality's defined benefit obligations (OAG, 2020). The expected liabilities are reported according to IPSAS 25 standards. Accordingly, the empirical findings in this study have significant implications on the fiscal sustainability of the CoW and its ability to meet all its liabilities on an annual basis and in their short to midterm tactical plans.

According to the findings, NSF and PEN are essential automatic stabilisers that aim to maintain a very low expenditure coverage ratio and budgetary balance. The automatic stabilisation strategy can be employed at the beginning, middle, and end of the fiscal year or budget period, to ensure that the revenues available for the municipal operations are higher than or equal to expenditures, resulting in a zero or positive balance (surplus) rather than a deficit (Schafer and Yilmaz 2018).

Ammons and Fleck (2010) noted that when sales surpass expenses, the surplus is directed to a contingency fund, specifically the unrestricted portion. Accordingly, when the municipality has a deficit at the end of the year, the contingency fund is tapped to cover the deficit. Over time, the balance of unreserved funds continues to fall, which typically suggests a trend of consistent operating deficits. However, the use of automatic stabilisers can help maintain a healthy fiscal balance for the municipality.

According to Weeden (2019), pension systems are primarily funded through three sources of revenue: state/employer payments, employee contributions, and investment profits on plan assets. Investment returns are the most important source of revenue growth for pension systems. Municipalities have a strong interest in making investment decisions that result in steady asset growth because they depend on investment returns to finance their pension obligations. If investment returns generate more growth in trust fund assets, the municipality and its employee contributions may be increased at a slower pace or not at all. Thus, reducing the growth in the employee liabilities each year (Krupnik, 2016).

#### **4.6.3. The Effect of Budget Efficiency on Liabilities Ratio on Expenditure Coverage**

The findings suggest that 1% shock in the Budget Efficiency on Employee Benefit Plan Liabilities Ratio [Deficit to PEN ratio] (Mean= 0.37, S.D = 0.22) would result in a statistically significant positive short-run effect of 0.089% on the Expenditure Coverage ratio (Mean = 1.1, S.D = 0.07) at the 95% confidence interval. The findings suggest that funding the city of Windhoek's budget shortfall with internal loans from employee pension funds will have a detrimental impact on the city's fiscal sustainability. In other words, funding budget deficits with internal loans from the Defined Benefit Plan Liabilities Fund will increase Total Expenditure due to interest on the internal loan and reduce Total Revenue due to lost income returns from investing the PEN funds in activities outside the scope of municipal operations.

The findings in this study, suggests that the municipalities have the potential to adequately collect the necessary funds to sustain their operations in the long run. Yet, there seem to be a general lack of strategies and guidance on how the municipalities can leverage their assets to diversify their own revenue and ensure financial sustainability (Mulamba, 2015). According to Vigneswaran (2015), a trend toward revenue diversification has been visible during the previous three decades. Diversification of revenue, according to Bolivar et al. (2015), might well be a valuable tool for easing fiscal stress and the debt burden of municipalities. At the same time, income volatility may rise or decrease depending on the revenue sources employed to diversify and the status of the economic base.

The capability of a municipality's revenue and expense management determines its capacity to improve to poverty reduction and economic progress. Any deficiencies in these areas are likely to be indicative of broader governance concerns in the municipality, necessitating central governments to provide grants and subsidies to local governments unable to compensate for their failings (Papcunová et al., 2020). Furthermore, governments use different formulae to distribute cash to local governments; the larger the city or town, the more funds it receives in contrast to other cities or towns (Fandel et al., 2019).

The findings suggests that during the period 2007 to 2019, the average total revenue collected per capita (REV/POP) was N\$7, 2181.51 (S.D = 2326.94). The revenue per capita in the city has increased from N\$ 3594.38 per person in 2008

to N\$ 10,934.56 per person, which translates to an average growth of 10.2% over the 13-year period. Moreover, considering the Expenditure Coverage ratio (EXP/REV) with an average ratio of 1.10 :1, which implies that the City of Windhoek's total expenditure per capita (EXP/POP) was on average 10% more than the Total revenue generated in a single year. The average total expenditure for 2019 stood at N\$ 11,912.29 per capita, indicating that over the years, the cost of living in Windhoek has risen and to nearly N\$ 12,000 per person per year.

Sinervo (2020) deduced that a healthy municipal economy, can be characterized as one that has sufficient resources to provide the services provided by its residents. Thus, enhancing the municipality's ability to meet its financial obligations and to fulfil its service obligations to its residents, both now and in the future. Sinervo (2020) specified three golden law standards that must be followed in order for the municipality's budgetary sustainability to be ensured. To begin with, deficits should be a one-time occurrence that tends to return the economy to balance. Second, debt should stay constant throughout the cycle unless it is backed by an asset of at least equivalent value to leverage.

However, municipalities can only have assets to leverage when they collect their own revenues, that are independent from central government. In the case of the municipalities in Namibia, the local revenue budget, comprises of property taxes, sales taxes, and fees and charges and intergovernmental payments. Additionally, the municipalities have other income from the returns from investments that are made with their NSFs. Hungwe (2017) asserts that most municipalities are not

self-sustaining, owing to a variety of challenges, including a lack of funds, adequate budgeting, proper planning, and skilled or capacitated employees. In Namibia, studies have mostly revealed that municipalities' main challenge is a lack of funds (Zhao, 2019).

#### **4.7. SUMMARY**

This chapter presented, interpreted, and discussed the empirical findings of the study. The chapter started with descriptive statistics, correlation analysis and the unit root test. The bounds cointegration tests then followed, leading up to the estimation of the ARDL regression. The results for the ARDL estimation were presented and interpreted for the two specified models. The next chapter presents a summary of the findings, conclusions, policy implications and areas for further study.

## **CHAPTER 5**

### **CONCLUSIONS AND RECOMMENDATIONS**

#### **1.1. INTRODUCTION**

This chapter concludes this research and provides key contributions of the research using the findings from the econometric tests, in line with the stated research problem and objectives. Following the presentation and discussion of the empirical results in the previous chapter, this chapter provides a summary of the entire study, draws conclusions, outlines policy implications of the findings, makes policy recommendations, and offers suggestions for further research.

#### **1.2. SUMMARY**

The study's main objective was to investigate the impact of debt financing on the city of Windhoek's fiscal sustainability. As a result, the study explored the factors that influence fiscal sustainability in Windhoek and understanding the underlying causes behind the Windhoek Municipality's rising debt burden. The study was motivated by the Windhoek municipality debt book, which has been growing to unsustainable levels from around N\$ 11 million in 1994 to N\$655 million in 2017 (CoW Annual Report, 2018). As a result, the municipality of Windhoek's escalating debt will put further strain on its long-term fiscal sustainability approach. Furthermore, the purpose of this research was to determine the key factors of Windhoek municipality's long-term fiscal health, as well as how the growing debt load would affect its long-term fiscal viability.

The study adopted a quantitative research method that involved adopting an explanatory research design to analyse the effects of debt financing on the fiscal sustainability of the city of Windhoek. However, the study faced key data availability constraints, where the only financial data publicly available was from Audited Financial Statements of the Municipality of Windhoek from 2007 to 2019. Additionally, the City of Windhoek (CoW) adopted accrual basis International Public Sector Accounting Standards (IPSAS) in 2015, which saw a change in the format and definitions of key data variables. For instance, the accumulated deficits (AcDef) and accumulated funds (AcFund) values changed, as the non-statutory funds (NSF) that were used in providing internal loans to the municipality were used to offset the ballooning accumulated deficits (AcDef).

Accordingly, the study computed indicators based on literature definitions of fiscal sustainability and debt burden. This was supported by Principal Component Analysis (PCA) in SPSS version 26 and this assisted in reducing the dimensions into three unique composition indicators. The research then used a few controllable indicators from each factor, to identify the relations that were statistically significant. The factors included Fiscal sustainability as the dependent, debt burden as the independent variable and financial independence as the control variable. The study used temporal causal modelling and ARDL model estimation to establish the nature of relationships between fiscal sustainability and debt burden indicators, within the context of financial independence.

The study found evidence of a long-run relationship of Fiscal sustainability Debt burden and financial independence; however, the relationships were not statistically significant. This was attributed to the small sample size, given a higher frequency data, these long run effect can be assessed. The study found statistically significant short run relationships between Fiscal sustainability (proxied by Expenditure Coverage) and Financial Independence (proxied by Non-Statutory Fund and Employee Liabilities). This, implying that the sustainability of the City of Windhoek is heavily dependent on their ability to manage the largest liability, which is the Employee Benefit Plan liabilities. Moreover, the findings also indicated that all things being equal, total expenditure was inversely proportional to the growth in the Non-Statutory Funds (NSF). This has implications on how the Municipal financial strategies for investments should be directed.

### **1.3. CONCLUSIONS**

The main conclusions of this work are drawn together and presented in this section. The conclusions are presented based on the research objectives outlined below:

#### **1.3.1. To explore the determinants of fiscal sustainability in the City of Windhoek**

The study concludes that the determinants of Fiscal sustainability in the City of Windhoek were Expenditure Coverage, Local Budgetary Balance per capita and

the rate at which annual deficit and non-statutory funds accumulated over time. Therefore, the key financial statement items to focus on in the City of Windhoek Audited Financial statements include the Deficit for the year ending the 30<sup>th</sup> of June of each year, the total revenue collected per capita (REV/POP) total expenditure per capita (EXP/POP) the ratio of accumulated yearly deficits and the accumulated Non-Statutory Funds. The three main contributory funds of interest to the NSF were the Capital Development Fund (CDF) the Betterment Fund (BF) and the Endowment Fund (EF).

### **1.3.2. To determine the factors influencing the increasing debt burden in the Windhoek Municipality**

The study concludes that the factors influencing the increasing debt burden in the Windhoek Municipality were Budgetary Arrears (BA) Debt Load (DL) Debt Burden on Expenses (DB2) and Budget Efficiency on Liabilities (BE\_EBL). Therefore, the key debt burden factor items to consider include, the current loans for the year, the accumulated loan book value, employee liabilities, the ratio of internal loans representing funds borrowed from the NSF versus the internal loan funds borrowed against or using the employee benefit liabilities.

### **1.3.3. To establish the relationship between debt burden and fiscal sustainability in the Windhoek Municipality**

The study concludes that fiscal sustainability in the City of Windhoek, is dependent on the ratio of expenditure and revenue (EC) the ratio of NSF to

Employee Liabilities (DB1) and the ratio of Budget Deficit/Surpluses to Employee Liabilities ratio (BE\_EBL). The study established the existence of a long run relationship of Fiscal sustainability, Debt burden and financial independence. While, concluding that the existence of valid short run relationships between Fiscal sustainability (proxied by Expenditure Coverage) and Financial Independence (proxied by Non-Statutory Fund and Employee Liabilities). Based on these findings, the study concludes that the sustainability of the City of Windhoek was heavily dependent on their ability to sustain their Employee Benefit Plan liability commitments in the short term. Thus, requiring the adaptation of a passive sustainability strategy in the short term and an active sustainability approach in the long run.

#### **1.4. RECOMMENDATIONS**

Based on these findings, the City of Windhoek officials are recommended to focus on:

- Increasing the Total Revenues collected by the city annually, through diversifying their revenue sources by making investments that focuses on reducing the expenditure and increasing revenues. Additionally, any investments by the city should put a high weighting on their high expenditure items like Employee liabilities.

- The city can use the NSF to ensure that the returns from infrastructure investments provide higher returns and have a long-term revenue guarantee.
- Make the Employee Benefit Plan more sustainable through creative investments that will provide enough returns to self-fund and sustain the benefit plan without drawing into the operational revenues.
- Develop clear investment and debt burden guidelines that do not expose the City of Windhoek to avoidable risk. The high debt burden in the Municipality of Windhoek was attributed to internal loans from funds in the non-statutory funds (NSF) which include the Capital Development Fund (CDF) the Betterment Fund (BF) and the Endowment Fund (EF).
  - The CDF was established to pay general expenditures, mostly through low-interest internal loans. However, this is not sustainable. There is need for clear thresholds and limits to ensure that the loan accumulations related to such a fund follow the IPSAS guidelines.
  - The BF which is used to fund future municipal asset renovations and includes profits from land sales, should be the one spearheading the construction of low-cost housing, instead of selling municipal land to developers. This, at it raises the cost of properties in Windhoek, which in turn reduce the buying power of the residents of Windhoek, resulting in unsustainable bad debt accounts, further resulting in reduced revenue inflows.

In conclusion, the study achieved its set objective of establishing the relationship between debt burden and fiscal sustainability in the Windhoek Municipality. The conclusions and recommendations of the study provide managers and policymakers in the City of Windhoek, with clear and actionable guidelines for using debt financing in municipal budget sustainability towards achieving financial independence.

### **1.5. RECOMMENDATIONS FOR FUTURE RESEARCH**

There is need for further research on the applicability of the fiscal sustainability indicators computed in this study at a local, regional, and national level. More importantly, there is need for research on linking fiscal sustainability with decentralisation and devolvement of government services from central government to towns and local government authorities across Namibia.

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## **APPENDICES**

## APPENDIX 1: COLLATED FINANCIAL STATEMENTS DATA FOR COW 2007-2019

Variables	2007	2008	2009	2010	2011	2012
Revenue	1,008,131,197	1,266,873,680	1,428,623,502	1,614,677,507	1,890,066,658	2,618,931,960
Expenditure	1,085,310,062	1,296,815,421	1,664,433,985	1,803,346,348	2,199,286,441	2,945,853,543
Cash at Hand (Cash and Cash Equivalents - Bank Overdrafts)	17175402	172,828,430	147,258,868	132,639,461	256,759,916	229,539,624
Deficit for the year	47,581,200	29,941,739	235,810,484	188,668,841	309,219,783	326,921,583
Unappropriated Surplus	<b>203,937,659.0</b>	158,378,875	197,897,632	192,195,490	246,680,522	186,003,583
<b>BankBalance</b>	17,175,402	2,718,528	(62,369,791)	(69,015,464)	776,079	30,527,292
Bank Overdraft	102128346	25,804,023	5,264,654	80616478	25,557,666	78,055,695
Capital Expenditure		556,986,374	380,975,148	152,790,972	96,143,387	
Employee Benefit liabilities	317447084	425,081,849	506,660,020	557,967,886	657,607,609	679,444,901
Government Grants and Subsidies	215,598,509	218,560,821	86022534	90002893	25557666	267528403
Government-TIPEEG		20,000,000				110000000
Loans received in the year	155861618	89283724	121,209,384	308,598,044	212,761,816	125,040,686
Accumulated Loans	1,197,769,497	1,214,226,785	1,256,798,347	1,531,524,767	1,646,801,159	1,692,479,651
Accumulated deficit as at 30 June	20,881,692	96,143,387	152,790,972	380,975,148	556,986,374	1,004,302,421
<b>Accumulated Funds</b>	1,063,181,821	1,084,063,513	1,193,400,751	1,476,573,513	1,684,214,082	2,041,739,238
Betterment Fund	266,457,745	398,238,803	444632019	568199608	713576405	967188301
Capital Development Fund	554,974,115	598,083,526	642354015	698612063	764299981	829,492,328
Endowment Fund	15780459	18355085	19216160	23531656	24708811	24096648
GeneralAccumulatedFunds	119303748	-96143387	-152790972	-380975148	-556986374	-1004302420
Population	280474.1311	289168.8292	298133.0629	307375.1879	316903.8187	327361.6447

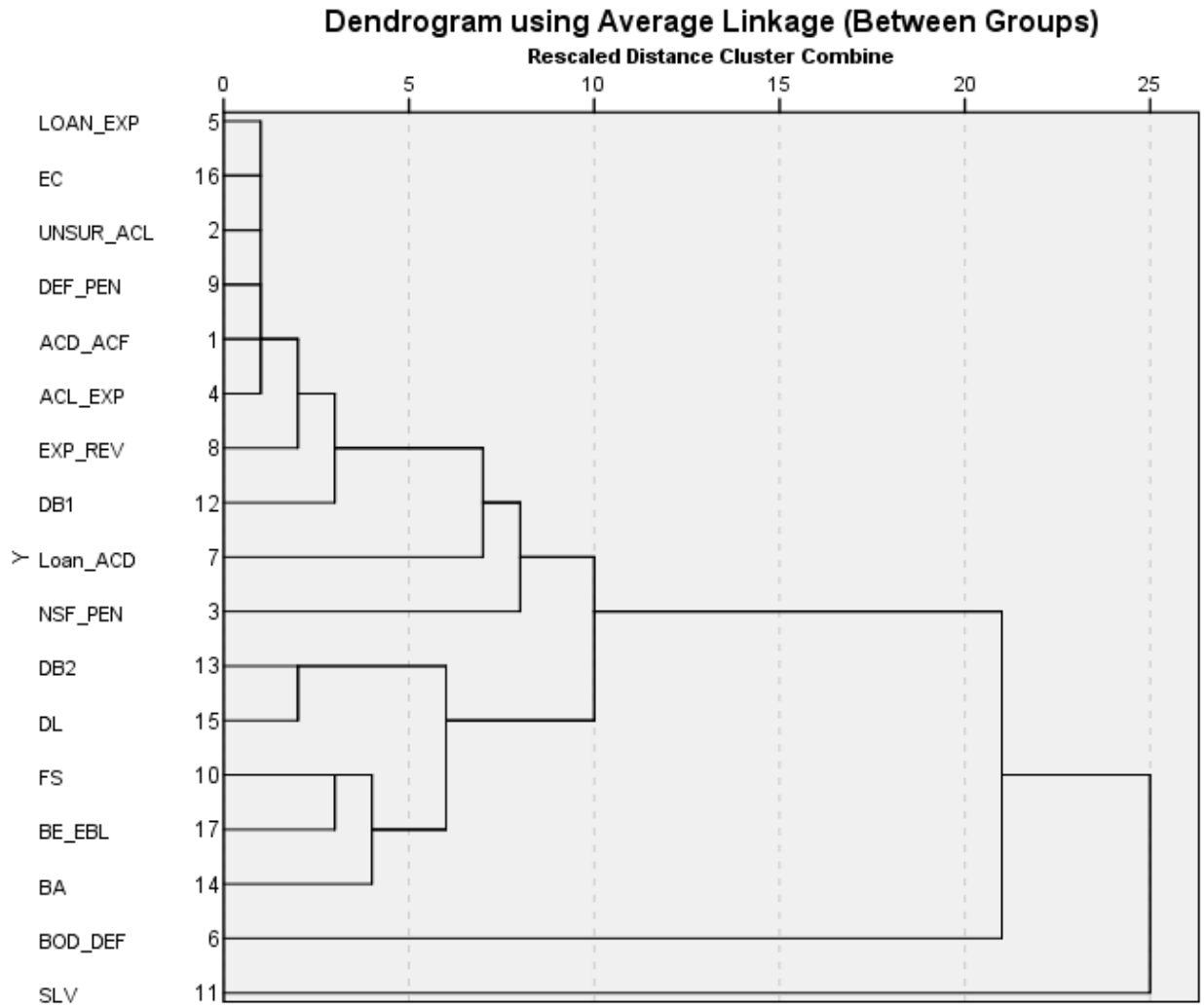
  

	2013	2014	2015	2016	2017	2018	2019
	2,527,259,438	2,527,259,438	2,990,809,910	3,601,327,702	3,575,831,751	3,896,632,271	4,492,947,612
	2,947,527,786	2,947,527,787	3,446,551,825	3,592,859,641	3,673,916,597	4,711,070,350	4,894,690,950
	23,078,246	175,028,233	221,094,295	145836360	(33,645,769)	29,514,477	7207317
	335,218,271	420,268,348	455,741,915	18,556,486	98,171,633	814,436,079	401,743,338
	373,354,567	379,890,362	271,840,804	1,112,228	914,709	1,060,220	2,914,997
	6,938,124	(141,822,664)	(119,996,751)	(50,667,568)			
	313	89,491,805	<b>141,822,664</b>	189,840,937	338,023,100	295,183,887	410,932,583
	812,120,004	911,369,367	1,126,499,054	489,719,788	522,364,244	920,309,324	827,798,603
	105000000	83307000	62461378	243,805,934	265,041,448	53,070,336	61,909,495
	105000000	83307000	23066673	116642775			
	307034178	384,939,920	330,277,906	304,751,365	693,935,753	628193018	627945719
	1703720159	1,827,636,558					
	1,257,081,818	1,592,300,090	2,024,067,895	2,052,712,806	10,843,979,972	30,669,317,967	14,976,110,242
	2,351,160,336	2,587,440,838	2,824,841,214	4,670,744,360	8,783,718,569	47,821,396,738	16,750,324,845
	1191463873	1305773021	1,433,226,248				
	899,021,421	974,890,933	1,055,022,593				
	26176658	30308125	30,754,779	33,591,407			
					304 377 632	295,183,887	410932583
	338164,579	349,324	360851,7024	372759,8086	385060,8823	397767,8914	410894,2318

## APPENDIX 2: CODEBOOK FOR THE LOGS, RATIOS AND FISCAL SUSTAINABILITY INDICATORS

Stages	Code	Logged Variables	N	Mean	Std.Dev	Max	Min
<b>Logged Values</b>	AcDef	Accumulated Deficit (log)	13	20.80	2.07	24.15	16.85
	AcFund	Accumulated Funds	13	21.89	1.15	24.59	20.78
	AcL	Accumulated Loans	13	20.69	0.62	21.33	19.54
	Pen	Employee Benefits Liabilities	13	20.27	0.36	20.84	19.58
	BoD	Bank Overdraft	13	17.33	3.68	19.83	5.75
	Loan	Loans received in the year	13	19.42	0.67	20.36	18.31
	Rev	Total Revenue	13	21.57	0.47	22.23	20.73
	Exp	Total Expenditure	13	21.68	0.48	22.31	20.81
	Def	Deficit for the year	13	19.02	1.16	20.52	16.74
	Gov	Government Grants and Subsidies	13	18.50	0.74	19.40	17.06
	Cash	Cash at Hand (Cash and Cash Equivalents - Bank Overdrafts)	13	18.22	1.22	19.36	15.79
	Pop	Population	13	12.73	0.12	12.93	12.54
	UnSur	Unappropriated Surplus	13	17.68	2.51	19.76	13.73
NSF	Non Statutory Funds (logs)	13	20.60	1.26	21.76	17.33	
<b>Ratios</b>	ACD_ACF	Ratio of AcDef to AcFund	13	0.49	0.34	1.23	0.02
	UNSUR_ACL	Unappropriated Surplus to Accumulate loans ratio	13	0.16	0.21	0.82	0.00
	NSF_PEN	Non Statutory Funds to Employee Benefits ratio	13	2.10	1.29	4.16	0.07
	ACL_EXP	Accumulated Loans to Total Expenditure ratio	13	0.52	0.36	1.10	0.08
	LOAN_EXP	Current loans to Total Expenditure ratio	13	0.11	0.04	0.19	0.04
	BOD_DEF	Bank Overdraft to AcDef ratio	13	1.49	2.81	10.23	0.00
	REV_POP	Revenue to population ratio	13	7281.51	2326.94	10934.56	3594.38
	GOV_POP	Government Expenditure to population ratio	13	411.71	277.97	817.23	80.65
	Loan_ACD	Current loans to Accumulated Deficits	13	0.88	2.00	7.46	0.02
	EXP_REV	Total Expenditure to Total Revenue Ratio	13	1.11	0.07	1.21	1.00
	DEF_PEN	Deficit to Employee Benefits Liabilities Ratio	13	0.37	0.22	0.88	0.04
<b>Indicators</b>	FS	Fiscal Sustainability = LN(ACD_ACF)	13	-1.09	1.13	0.21	-3.93
	SLV	Solvancy = LN(UNSUR_ACL)	13	-3.01	2.15	-0.19	-6.63
	DB1	Funds to Pension ratio = LN(NSF_PEN)	13	0.33	1.22	1.43	-2.68
	DB2	Debt Burden to Expense = LN(ACL_EXP)	13	-0.99	0.96	0.10	-2.47
	BA	Budgetary Arrears = LN(LOAN_EXP)	13	-2.26	0.41	-1.67	-3.16
	BE	Overdraft to Deficit ratio = LN(BOD_DEF)	13	-1.69	3.99	2.33	-13.88
	LBB	Local Budget Balance to Pop ratio = LN(REV_POP)	13	8.84	0.35	9.30	8.19
	FI	Financial Independence = LN(GOV_POP)	13	5.77	0.77	6.71	4.39
	DL	Debt Load = LN(Loan_ACD)	13	-1.38	1.54	2.01	-3.89
	EC	Expenditur Coverage = LN(EXP_REV)	13	0.11	0.06	0.19	0.00
	BE_EBL	Budget Efficiency to Liabilities Ratio = LN(DEF_PEN)	13	-1.25	0.89	-0.12	-3.27

**APPENDIX 3: DENDROGRAMS, CORRELATIONS AND PREDICTORS OF THE VARIABLES**



### Correlations

Spearman's rho  
Correlation Coefficient

	EC	FI	BE	BE_EBL	DL	DB2	DB1	SLV	LBB	FS
EC	1.000									
FI	-.624*	1.000								
BE	-.830**	0.346	1.000							
BE_EBL	.741**	-.582*	-0.527	1.000						
DL	-0.139	0.302	-0.170	-0.511	1.000					
DB2	0.017	0.302	-0.214	-0.214	.857**	1.000				
DB1	0.092	0.341	-0.390	0.011	.615*	.714**	1.000			
SLV	0.357	-0.082	-.604*	-0.088	.571*	0.335	0.396	1.000		
LBB	0.031	-0.352	0.258	0.379	-.956**	-.934**	-.709**	-0.527	1.000	
FS	0.164	-0.374	0.077	0.385	-.863**	-.780**	-.566*	-0.275	.852**	1.000
BA	0.031	-0.170	0.319	-0.049	-0.088	0.088	-0.170	-0.198	0.104	0.291

\*. Correlation is significant at the 0.05 level (2-tailed).

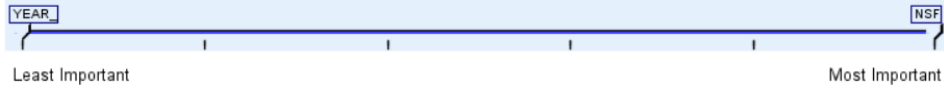
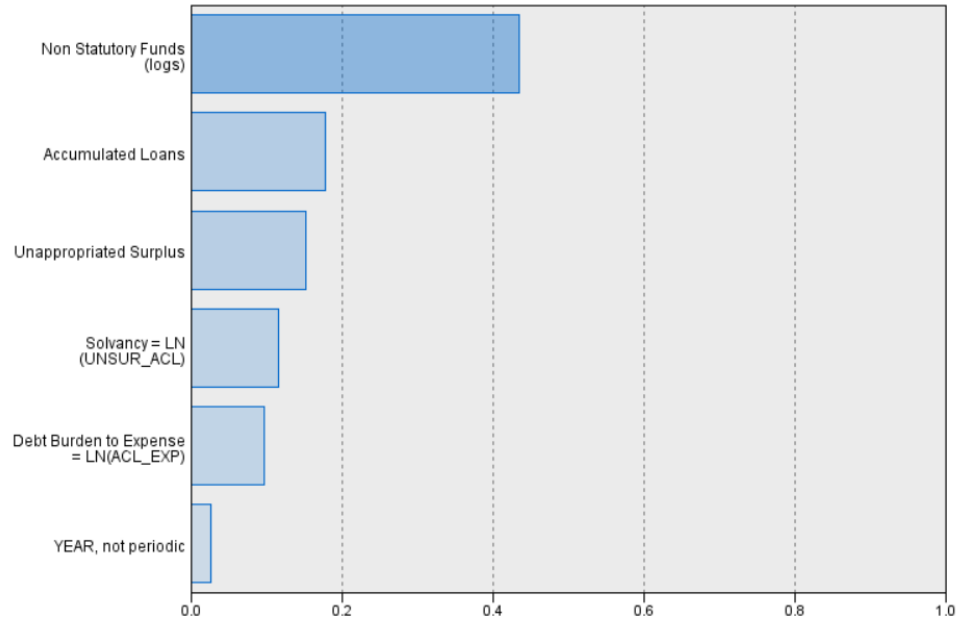
\*\* . Correlation is significant at the 0.01 level (2-tailed).

#### Equation construction options based on correlations

<b>EC</b>	FS	LBB	SLV	BA		DB2	DB1	DL
<b>FS</b>			SLV		BE_EBL	FI	BE	EC
<b>LBB</b>			SLV	BA	BE_EBL	FI	BE	EC
<b>SLV</b>	FS	LBB		BA	BE_EBL	DB2	DB1	
<b>BE_EBL</b>	FS	LBB	SLV	BA		DB2	DB1	DL

### Predictor Importance

Target: Deficit for the year



## APPENDIX 4: LANGUAGE EDITING CERTIFICATE



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### LANGUAGE & COPY-EDITING CERTIFICATE

1<sup>st</sup> February 2022

**RE: LANGUAGE, COPYEDITING AND PROOFREADING OF ALGIVA HAYS' THESIS FOR THE MASTER OF BUSINESS ADMINISTRATION DEGREE OF THE NAMIBIA BUSINESS SCHOOL OF THE UNIVERSITY OF NAMIBIA**

This certificate serves to confirm that I copyedited and proofread **ALGIVA HAYS'** Thesis for the **MASTER OF BUSINESS ADMINISTRATION DEGREE** entitled: **ANALYSING THE EFFECTS OF DEBT FINANCING ON FISCAL SUSTAINABILITY OF THE CITY OF WINDHOEK**

I declare that I professionally copyedited and proofread the thesis and removed mistakes and errors in spelling, grammar, and punctuation. In some cases, I improved sentence construction without changing the content provided by the student. I also removed some typographical errors from the thesis and formatted the thesis so that it complies with the University of Namibia's guidelines.

I am a trained language and copy editor and have edited many Postgraduate Diploma, Masters' Thesis, Dissertations and Doctoral Dissertations for students studying with universities in Namibia, Zimbabwe, Eswatini, South Africa and abroad. I have also copy-edited company documents for companies in the region and abroad.

Please feel free to contact me should the need arise.

Yours Sincerely,

A handwritten signature in black ink, appearing to read "Dr. Greenfield Mwakipesile".

The Rev. Dr. Greenfield Mwakipesile



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