ANALYSING THE FISCAL SUSTAINABILITY OF NAMIBIA'S OLD AGE GRANT

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ABSTRACT

Countries across the globe strive to address and achieve the welfare goals, one of which is the right to income security and sufficient social security pension in old age. In Namibia, Article 95 of the Constitution guarantees all senior citizens a regular pension sufficient to maintain a decent standard of living. The provision of a universal non-contributory social pension is critical in addressing elderly poverty. However, this provision comes at a cost and has fiscal ramifications if the necessary parameters are not kept in check and balanced on time.

The thrust of this study is to analyse the fiscal sustainability of Namibia' Old Age Grant. It is concerned with three main objectives; first, to ascertain the relationship between Old Age Grant expenditure and its independent variables namely: benefit cost, funeral benefit and number of beneficiaries; secondly to determine the expenditure of the Old Age Grant for the next 20 years, from 2021 to 2041, and finally to determine whether the projected expenditure is fiscally sustainable. The study employed a quantitative approach with data derived from a number of secondary sources. An econometric model (Old Age Grant Expenditure Model), simulation, and forecasting techniques were used in analysing data in the study.

The main finding of the study is that, 99% of Old Age Grant expenditure variation is explained by the independent variables. On scenarios tested, Old Age Grant is found to be fiscally sustainable in the future provided that future-benefit amount adjustments are informed by the economic situation and with the inflation rate serving as a guide. The results further show that Old Age Grant expenditure as a percentage of government revenue is approaching the doubling point which can impose a fiscal burden on government expenditure. It is recommended that future adjustments of the grant benefit amount be informed by economic conditions, and that no political interference be used to influence the grant amount, as high political influence could render the grant expenditure unsustainable.

Key Words: *Benefit amount, Expenditure, Fiscal sustainability, Forecasting, Grant, Model, Old Age Grant, Namibia, Simulation*

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ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immunodeficiency Syndrome
ADF	Augmented Dickey fuller test
ARDL	Autoregressive Distributed Lag
ARMA	AutoRegressive-Moving-Average
BLUE	Best Linear Unbiased Estimator
ECM	Error Correction Model
MBC	Mathematical Benefit Costing
ILO	International Labour Organization
GA	Generational Accounting
GDP	Gross Domestic Product
GI	Generational Imbalance
HIV	Human Immunodeficiency Virus
ISAIS	Integrated Social Assistance Information System
IMF	International Monetary Fund
OAG	Old Age Grant
OLS	Ordinary Least Square
FBG	Funeral Benefit Grant
MLSW	Ministry of Labour and Social Welfare

MGEPESW	Ministry of Gender Equality, Poverty Eradication and Social Welfare
NSA	Namibia Statistic Agency
NPC	National Planning Commission
MoHSS	Ministry of Health and Social Welfare
MoF	Ministry of Finance
MTC	Mobile Telecommunications Company
USPS	Universal Social Pension Schemes

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DEDICATION

To my loving and wonderful husband, Mr. Salom Kanyama and our beautiful children, Omwa' Etuhole and Omwa'Etuna Kanyama.

DECLARATION

I, **Marta Ndahafa Kanyama**, hereby declare that this study is my own work and is a true reflection of my research, and that no part or this study has been submitted for a degree at any other institution.

Marta Ndahafa Kanyama		April 2022
Name of student	**Signature**	**Date**

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Ensuring income security for people during their old age is a crucial objective among welfare goals that societies seek to realize (ILO, 2018). Old age, in its natural state, poses significant risks of income loss due to wage income loss, retirement policy restrictions on working age, and health decline associated with old age. Therefore, international and national laws recognize the risks of income loss due to old age, and thus the right to income security in old age and to a sufficient social security pension are enshrined in the 1948, Universal declaration of human rights and International Labour Organization (ILO) convention 102. (1952) respectively.

In the context of Namibia, the provision of Old Age Grant (OAG) is provided for in the constitution. Article 95 sub-article (f) requires the state to ensure that "*senior citizens are entitled to and receive a regular pension adequate for the maintenance of a decent standard of living* [...]" (Namibian Constitution, 1990). Namibia's OAG is universal with a flat rate benefit payable to all Namibians aged 60 years and older, who live in the country. The grant is non-contributory and is entirely funded through government revenue. Furthermore, it is non-taxable and eligibility is solely determined by the individual's age and history of citizenship and residency.

Worldwide, economic constraints and demographic changes, accompanied by increased life expectancy and a decline in fertility are putting pressure on the provision for social protection to the elderly. Demographic megatrends, in particular, are being put under the microscope as they have significant implications for providing and sustaining social security for the elderly (Knox-Vydmanov, 2011). Sustainability refers to the current and future capacity of the

economy to bear social security in the long-term (ILO, 2018). Social pensions are regarded as sustainable if their average share to GDP remains approximately constant in the long run (Plamondon et al., 2002; Willmore, 2001 & ILO, 2018). Furthermore, according to the Generational Accounting (GA) framework, fiscal sustainability is achieved when there is fiscal equity between current and future generations (Auerbach & Kotlikoff, 1999).

For Namibia, three studies (ILO, 2014; Bank of Namibia, 2013; Clausen, 2006) have shown contrasting results regarding the long-term sustainability for OAG. The current study is an attempt to interrogate the same question, taking current demographic trends and economic fundamentals and apply scenarios testing that is informed by the grant trend since independence to determine future fiscal sustainability of OAG.

1.2 Problem Statement

Namibia's OAG has grown significantly in absolute terms and coverage over the last three decades, with coverage reaching 98 percent (Ministry of Gender Equality, Poverty Eradication and Social Welfare, 2021). As of 2021, the grant benefit level in absolute value is N$1,300.00, which is twice the national high poverty bound level of N$520.8 (NSA, 2018). Fiscal sustainability is an important factor in the maintenance and continuous delivery of social pensions. The main factors influencing the sustainability of pension systems are demographic and economic changes, as well as a generous level of pension (Mulligan et al., 1999). Future changes in those main factors may have a negative fiscal impact if necessary parameters are not maintained in check and balance. It is thus important that Namibia's OAG is sustainable in order to avoid crowding out investment in other social assistance programmes and that it does not deprive current and future generations of social transfers (Al Sayed & Samir, 2021). As a result, analysing the main variables that affect sustainability to determine Namibia's OAG

sustainability in a long run is critical to allow for timely necessary parametric adjustments if need be.

Clausen (2006) conducted a simulation study for the 1980-2025 period which discovered that the fiscal sustainability of the OAG is not threatened under different scenarios conducted, including high and low real GDP growth and increased benefit levels at various levels of inflation. However, the Bank of Namibia (2013) and ILO (2014) highlight the issue of the ageing demographic in Namibia after 2030 and caution that the future expansion of the grant will only be sustained in the long run, provided there is, among other factors, adequate economic growth and labour absorption.

In addition, Clausen (2006) focused on assessing Namibia's OAG fiscal sustainability in light of changing demographics driven by the high HIV/AIDS prevalence rate during that time. This study aimed to build from Clausen (2006) study by adding service fees and funeral benefit variables that are all elements of OAG expenditure. The changed in economic, demographic, and programme benefit amount over time to assess OAG fiscal sustainability, as well as extending the study period from 2025 to 2041 were also factors. As a result, this study determines the grant's long-term expenditure outlook and assesses its fiscal sustainability.

1.3 Objectives of the Study

The main objective of the study is to analyse the long term fiscal sustainability of Namibia's OAG.

The specific objectives are:

a) To ascertain the relationship between OAG expenditure and its independent variables namely: benefit cost, funeral benefit and number of beneficiaries.
b) To determine the long term fiscal expenditure of Namibia's OAG.
c) To determine if the projected expenditures of OAG is fiscally sustainable

The first specific objective is to establish the relationship between the dependent variable OAG expenditure and the independent variables of benefit cost, funeral benefit, and number of beneficiaries. The objective is addressed by running an econometric model to establish the relationships between the specified variables. The second objective is addressed by simulating the long term fiscal expenditure of Namibia's OAG based on defined scenarios and assumptions setting. Whereas, the third specific objective assessed if the projected OAG expenditure of the tested scenarios is fiscally sustainable as percentage share to projected GDP and government revenue.

1.4 Hypotheses of the Study

In accordance with the aforementioned objectives (a) and (c), the following hypotheses were tested:

Ho_a: There is no positive relationship between OAG expenditure and benefit cost, funeral benefit and number of beneficiaries.

H_{1a}: There is a positive relationship between OAG expenditure and benefit cost, funeral benefit and number of beneficiaries.

Ho_c: OAG' projected expenditures is not fiscally sustainable.

H_{1c}: OAG' projected expenditures is fiscally sustainable.

1.5 Significance of the Study

The study provides a long-term outlook for the OAG expenditure based on different scenarios tested and assessed on the projected expenditure sustainability based on the projected GDP and government revenue. This could aid policymakers with options allowing them to make the necessary parametric adjustments to balance the grant in a timely manner, to ensure the current

and future sustainability of the grant. Finally, the study will add to the existing knowledge and literature on long term sustainability of Namibia's OAG.

1.6 Limitations of the Study

The study is limited by the availability of recent secondary data and long term economic indicators projections. For demographical data, the study resorted to the available 2011 census statistics and the 2011-2041 reports on Namibia Population projections. Whereas, for economic data, the study used the past data series for GDP, government revenue and inflation to inform the forecasting of future values.

1.7 Delimitation of the Study

The study only covered the OAG and not all other non-contributory social grants available in Namibia. It is worth noting that the fiscal sustainability of the OAG is affected by other variables such as political will, government debt, unemployment, increased life expectancy, and decline in fertility, to name a few. However, it is extremely difficult to incorporate all respective variables into a single study. As a result, this study is limited to six variables (benefit cost, funeral benefit, population of eligible beneficiaries, GDP, government revenue, and inflation).

CHAPTER TWO

OVERVIEW OF NAMIBIA'S OLD AGE GRANT

2.1 Introduction

This chapter describes the landscape of the Namibia's OAG. It is divided into four sections: section 2.2 provides a history of the OAG in Namibia, section 2.3 examines OAG administration, section 2.4 depicts the trend of OAG expenditure over time, and section 2.5 summarizes the chapter.

2.2 The History of OAG in Namibia

The origins of Namibia's OAG can be traced back to the colonial era, as far back as during South Africa's Old-Age Pensions Act of 1928 (Durán-Valverde & Pacheco, 2012). Prior to Namibia's independence, the OAG, also known as the "social pension" grant, was highly discriminatory. Residents of Namibia, then known as "South West Africa," were not eligible for the grant in 1928. Only in 1949 was the grant made available to Namibians, but only white[1] residents were eligible (Devereux, 2001). The grant was then extended to coloured Namibians in 1965 (Durán-Valverde & Pacheco, 2012). Following the extension of OAG to white and colored[2] Namibians, a debate in the South African Parliament was tabled on whether or not native Namibians should also be granted OAG eligibility. The South African government's Minister of Bantu Administration and Development, at that time, took a stand and argued in

[1] A white person was defined as a person who in appearance obviously is , or who is generally accepted as, a white person (Devereux, 2001)

[2] A coloured person was defined as a person who is not a white person or a native, while a 'native person' is defined as a member of an aboriginal race or tribe of Africa (Devereux, 2001).

favor of native Namibians (also known as Bantu or Blacks) to be granted eligibility of the OAG. The Minister also proposed that the grant amount be the same for all Bantu pensioners, regardless of where they live in the country, whether they live in cities, towns, or rural areas, citing that a uniform rate will be much easier to administer (Devereux, 2001). Many Members of Parliament (MPs), however, rejected and opposed the idea of extending OAG eligibility to Native Namibians. The MPs contended that it would be unjust to South African taxpayers because the Bantu do not pay tax to the South African government on their income in that territory (Devereux, 2001).

Finally, in 1973, the South African government decided to extend OAG eligibility to Bantu people. The reasons for extending the OAG to Black Namibians are unclear and undocumented (Devereux, 2001). Based on the interviews findings by Devereux (2001), a number of reasons as some of the motivators that drive the South African government to extend OAG to Black Namibians is identified. According to Devereux (2001), one of the interviewers stated that extending OAG eligibility to Black Namibians was a form of compensation for those who had their land taken away by white settlers. The second explanation stated that extending OAG eligibility to Black Namibians was used as a tactic by the South African administration to campaign, win hearts and minds, as its popularity and creditability among Black Namibians was extremely low at the time (Devereux, 2001).

In terms of the grant benefit amount prior to Namibia independence, the eligibility comes with unequal benefit amounts based on ethical groups. For example, in 1989, the Owambo, Kavango, and Caprivi, , collectively known as Bantustan, received the lowest pension of R55, while coloured Namibians received the second highest pension of R192, and white Namibians received the highest pension of R382 (Devereux, 2001).

Following independence, the Namibian government enacted the National Pensions Act, Act No. 10 of 1992, to replace South Africa's Social Pensions Act. The National Pensions Act 10 of 1992 established pension equality across all ethnic groups. The first strategy was to raise the pensions of other ethnic groups to the same level as white Namibian residents, while freezing the top rate at N$382. Following the decision to equalize social pensions, in October 1990 and 1992, a standard rate of N$92 and N$120 were established, respectively. Following that, it was determined in 1992 that further increased in benefit amounts would be fiscally unfeasible. As a result, benefit amounts for white Namibian residents were reduced and a standard benefit rate of N$120 was adopted across all Namibian ethnic groups.

As of present, the National Pensions Act (Act No. 10 of 1992) entitles all Namibian citizens and lawfully admitted permanent residents who are 60 years or older to a basic state pension, which is payable regardless of other income. The Funeral Benefit Grant (FBG) which was introduced by the Namibian's first democratically elected President post-independence Dr. Sam Nujoma in 2001, in the form of a high level directive to the Ministry of Labour and Social Welfare (MLSW), is an additional benefit to the OAG (MLSW, 2002). The purpose of FBG is for the government to provide dignified burials to OAG and Disability Grant (DG) recipients. To cover the insurance costs of OAG and DG recipients, the government pays a monthly premium of N$15 per beneficiary to the insurance company (MGEPESW, 2020).

The FBG benefit is currently N$3200. This amount is not paid in cash to the families of deceased OAG recipients, but rather in the form of a funeral benefits package that includes a standard Citizen Coffin, a Grave site (at a nominal cost), a Funeral Service Programme, Burial & Preparation Services, and Transportation (MLSW, 2002). All costs of the defined funeral benefit package must fall within the FBG benefit amount, and if the family exceeds the FBG benefit amount, they are responsible to pay for the difference (MLSW, 2002).

2.2.1 Overview of the achievement of the OAG

The OAG is extremely important in reducing poverty among the elderly. The benefit of OAG is also transferred to the household level. According to the 2009/10 National Household Income and Expenditure Survey (NHIES), an individual pension of N$500 at the time lifted a person well above the N$378 upper poverty line. (NHEIS 2009/10) has also shown that the elderly use a large portion of their regular income to benefit their grandchildren, particularly their nutrition and education.

2.3 Administration and transfer modality of OAG

The management of OAG is carried out by the Namibian Government Ministry that is mandated with social welfare responsibility. Changing in Ministries' mandates over time has seen the social grants been transferred from the Ministry of Health and Social Welfare in 2004 to the Ministry of Labour and Social Welfare. Then, in 2015, to the Ministry of Poverty Eradication and Social Welfare, and in 2020, to the Ministry of Gender Equality, Poverty Eradication, and Social Welfare as present.

2.3.1 Registration and enrolment process of OAG

From independence to the present day, 2021, the OAG registration process has been done manually. Registration is done at the district and regional levels at the social welfare office. The administrators assist the elderly in completing the grant application form. The applicants must be 60 years old before applying, be a Namibian citizenship / permanent residents if not born in Namibia and should present the national identity document and the applicant must reside in Namibia. The applicant form is verified at the regional level, while the approval is done at the national level. Because the application process is done manually, approved

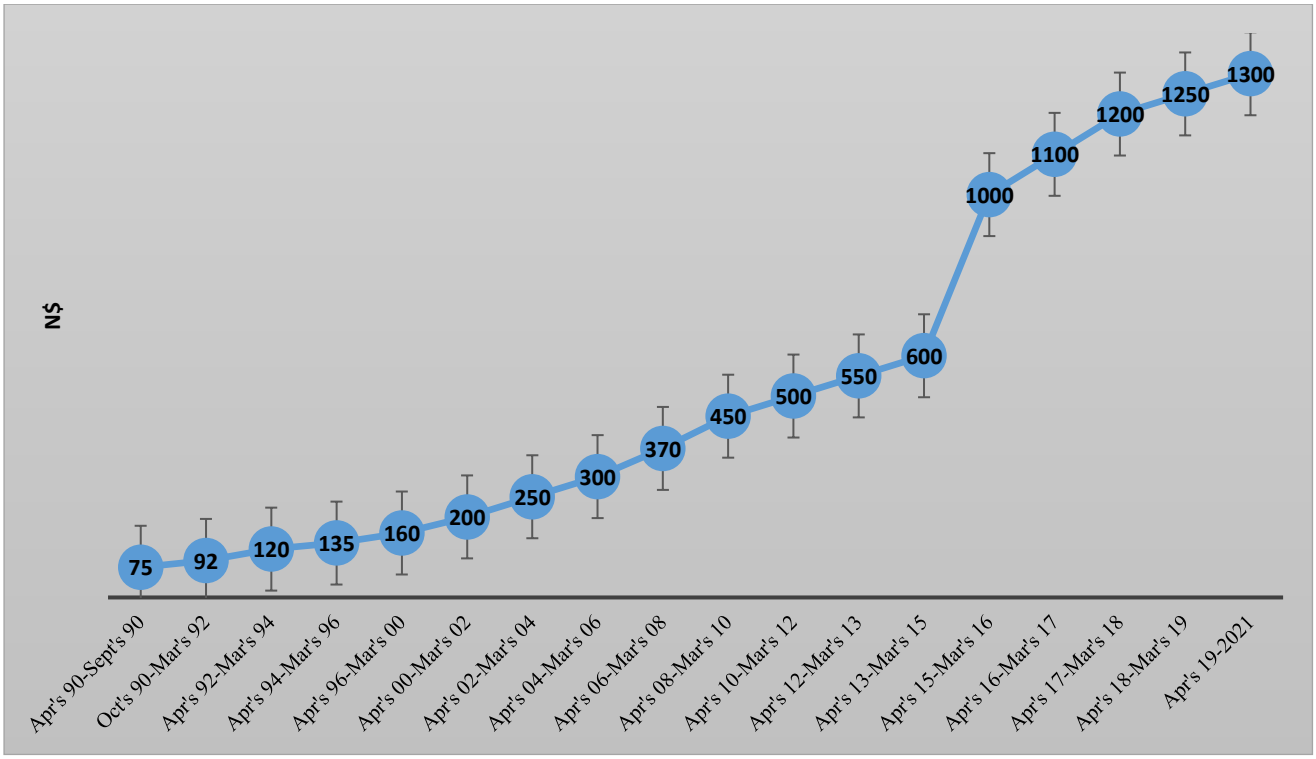
applications are forwarded to the Prime Minister's Office for data administration, distribution, and payment methods.

2.3.2 OAG Benefit amount

The grant benefits amount is determined by Parliament in accordance with State fiscal statutes (National Pensions Act, 1992). The political will and focus of the government's leadership has an influence on the expenditure trends of the OAG. An analyses of the grant benefit amount trend in relation to the terms of the three presidents revealed that during Dr. Sam Nujoma's terms, the grant amount increased by N$32 on average, from N$75 in 1990 to N$300 in March 2005. In comparison to the second Namibian president, Dr. Hifikepunye Pohamba's terms, the grant benefit amount increased by N$60 on average from N$300 in 2005 to N$600 in March 2015. In contrast, during the tenure of the current Head of State, Dr. Hage Geingob, the grant amount has increased by N$140 on average, from N$600 in 2015 to N$1300 in 2021. This demonstrates a more than double average grant increase across the presidents' terms.

The graph below depicts the trend of the OAG grant amount per month per beneficiary from 1990 to 2021.

Figure 1: Old Age Grant Benefit Amount



Source: Compiled by the author based on the Ministry of Finance various Estimates of Revenue, Income and Expenditure budget books from 1990-2020 and Integrated Social Assistance Information system (ISAI) reports, MGEPESW

The monthly grant amount paid to OAG recipients has increased from N$75 in 1990 to N$1300 in 2021, representing a more than 100 percent increase in three decades. The sharp increase is observed during 2015/2016 Financial Year (FY).

2.3.3 Transfer modality of OAG

The OAG Grant is paid out in four ways: first, through cash mobile payment mode, second, commercial banks are used to transfer funds into the accounts of individual beneficiaries. Third, payment over the counter via the REPOST System and Nampost Smart Card Savings Account, and finally, the payment is done to the beneficiary via the institution of care, which distributes the funds to the beneficiaries in their care. As of September 2021, only three pay-out system

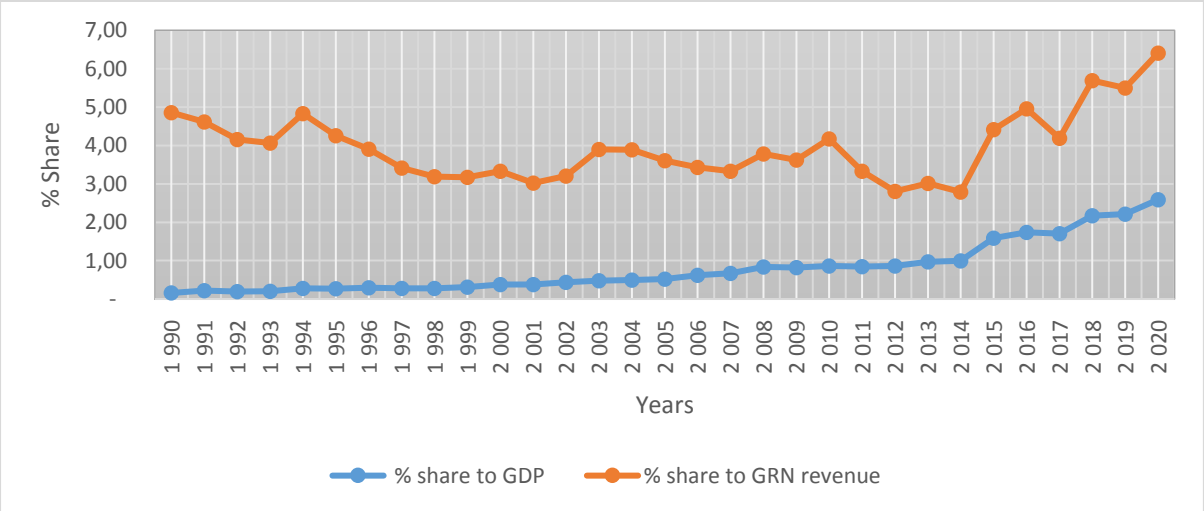
modes are available, as Nampost's over-the-counter payment mode was discontinued (Ministry of Gender Equality, Poverty Eradication and Social Welfare 2021).

The function for the cash mobile payment mode is performed by a contracted service provider known as the paymaster. It is carried out using a computer-based biometric identification system and well-secured vehicles for cash payments (Devereux, 2001). The vehicles used to distribute funds to OAG beneficiaries are outfitted with high-tech cash-dispensing machines that use a one-of-a-kind biometric identification system. Beneficiaries are registered and enrolled by the paymaster before any payment is made via cash mobile payment mode. Each beneficiary must have the pattern of his or her fingerprint biometrically recorded and stored in the paymaster database. Following that, each beneficiary is given a magnetic identification card that allows them to access the paymaster database at any specific pay point of choice.

2.4 OAG's Expenditure trend

The graph below depicts the OAG expenditure as a percentage share to GDP and Government revenue from 1990 to 2020.

Figure 2: Old Age Grant Expenditure share to GDP and to government revenue



Source: Compiled by the author based on the Ministry of Finance various Estimates of Revenue, Income and Expenditure budget books from 1990-2020

Total OAG expenditure as a percentage of GDP was 0.16 percent in 1990 and raised to 2.59 percent in 2020. Whereas, the total OAG expenditure as a percentage of government revenue was 4.86 percent in 1990 and raised to 6.41 percent in 2020. The increase percentage share to GDP and government revenue is attributed to an increase in benefit amount from N$75 to N$1,300 and increase in coverage from 48 percent in 1990 to 98 percent in 2020. The fluctuation in GDP and government revenue between 2007 and 2020 also contributed to OAG's increased share, as revenue and GDP decreases pushed the OAG share slightly higher.

2.5 The OAG's administrative challenges

The manual process of registering and enrolling OAG beneficiaries is one of the difficulties encountered in administering the OAG. Due to the manual method of registration and enrolment, there are delays in the enrolment process with a waiting period of 90 days (MGEPESW, 2020). Furthermore, the absence of a legal mandate for the funeral benefit and the ungazetted of benefit amounts when increased in accordance with the relevant legislation creates uncertainty and complicates communication to beneficiaries (Devereux, 2001).

2.6 Chapter Summary

The chapter examined the OAG's history from the colonial era to the post-independence period. It further assessed the grant's administration, as well as its coverage and expenditure trend. According to the review, as the coverage and benefit amount increased, so does its percentage share to GDP and government revenue. The review also revealed that the increases in grant amounts were not always driven by inflation and economic status but in some cases, by politics. This shows an increase trend during or immediately after election periods such as a nearly double increase in April 2015, as shown in figure 1.

CHAPTER THREE

LITERATURE REVIEW

3.1 Introduction

Cash transfer programmes aimed specifically for the elderly can be traced back to the 19th century. Denmark introduced a locally administered means-tested scheme for needy citizens over 60 in 1891 (Palacios & Sluchynsky, 2006). Since then, different countries adopted different pension schemes ranging from contributory to non-contributory. The chapter discusses both theoretical and empirical literature on social pension schemes also referred to as OAG. It further summarizes the lessons learned and major findings from the reviewed literature, which served as a guide for the study model formulation.

3.2 Non-contributory pension schemes

Non-contributory pensions play a greater role in ensuring a basic level of protection for all in the case of universal pensions, or for those who do not have adequate pensions from other sources through means-tested pensions. Non-contributory pensions are distinguished by the fact that they are entirely funded by government revenue and that eligibility is solely based on the individual's age and history of citizenship and residency.

Globally, one of the main concerns in providing non-contributory universal OAG is the cost, affordability and sustainability in the long-run that is associated with the financing of the OAG. This chapter looked at the theoretical aspects of OAG sustainability as well as the methods used to analyse OAG sustainability in the literature.

3.3 Theoretical Literature

In several current pension reform debates around the world, sustainability stands out as a key consideration for non-contributory pensioners. Even though fiscal sustainability is a key concern for non-contributory pensions in the global debate, there is no single benchmark or agreed definition of fiscal sustainability in the literature. In their studies, Balassone et al. (2012), European Union (2014) and the IMF (2014) all pointed out the absence of a clear definition of fiscal sustainability in literature.

Fiscal sustainability, as defined by Economic et al. (2014), is the ability to continue current policies now and in the future, with no changes in public services and taxation, and without causing public debt to rise continuously as a share of GDP. In contrast, Balassone and Franco (2012) defined sustainability as the non-violation of arbitrarily predefined parametric standards.

Despite the absence of a single benchmark definition of sustainability, proxy for assessing sustainability are outlined in the literature on fiscal sustainability of social pension. According to the IMF (2014), one of the good proxies for assessing social pension sustainability is a pension system balance as a share of GDP. Sustainability, on the other hand, can be measured in terms of current and future public social pension spending as a percentage of GDP or primary spending (IMF, 2014). Furthermore, a high share is considered unsustainable because it crowds out more productive government spending, such as education or capital expenditure, or results in an unsustainable increase in taxation. According to Auerbach et al. (1991), fiscal sustainability is measured by Generational Accounting (GA), and sustainability is attained if Generational Imbalance (GI) is less than or equal to zero.

3.3.1 Factors that affect fiscal sustainability of social pension

Theoretically, factors that affect sustainability and affordability of the social pension are: population growth, longevity of pensioners' lives, generosity of pension benefit amount and absence of economic growth, high unemployment, which translates into a lower tax base while imposing a growing fiscal burden on the economy (ILO, 2010). Moreover, according to Stewart (2019), the cost of social pension is influenced by the size of the population targeted as well as the benefit amount. Stewart goes on to say that the size of the eligible population is determined solely by the age of eligibility. The benefit amounts, on the other hand, are usually determined by different adequacy benchmarks that are relevant in the national context, such as the poverty line.

On the other hand, Rudolph (2016); and Mulligan and Sala-i-Martin (1999) explained that among the key explanatory factors that drive fiscal sustainability are economic and demographic factors, as these are central variables in determining the sustainability of government spending expansion. In terms of demographic factors, population growth, fertility, and life expectancy at birth are proxies for demographic characteristics (World Bank, 2014). Rapid aging can pose a serious structural challenge to fiscal sustainability as it leads to a shrinking working population, translating into a reduced tax base, and increased government spending on aged-related programs (Rudolph, 2016). Whilst, a growing population is associated with an increase in the tax base and thus with a positive correlation with the likelihood of adopting a social pension (Pallares-Miralles *et al.*, 2012). As for the economic factors, GDP per capita, government revenue, government debt, and inflation all serve as control variables in assessing the social pension fiscal sustainability (Pallares-Miralles *et al.* 2012).

3.3.2 Overview of Namibia's Demographics

Based on the Namibia demographic, the population of the country is generally youthful. According to census population projections, in 2021, people under the age of 15 account for approximately 37 percent of the country's population share, with only about 6 percent aged 60 and above, while 55 percent of the total population is under the age of 25. (NSA, 2014). Long term, declining fertility rates will result in population aging, and the steadily increasing old age dependency ratio will continue to rise. However, because the child dependency ratio will decrease more, the total dependency ratio will decrease. The Namibia 2011 Census Population Projections 2011 to 2041 projected a drop in fertility rates, with fertility rates falling from 5.4 children per woman in the early 1990s to 2.4 children per woman in 2041. (NSA, 2014).

In addition, the old age dependency ratio, on the other hand, is expected to rise from 10.70 percent in 2021 to 13.72 percent in 2041. The child dependency ratio is expected to fall from 64 percent in 2021 to 46.68 percent in 2041. These trends bode well for a cautious expansion of OAG in the long run, but only if there is adequate economic growth and labour absorption (among other things) sustainability can obtained.

3.4 Empirical Literature

Globally, one of the main concerns in providing non-contributory universal social pension is the costs, affordability, and long-term sustainability associated with the financing of the social pension (Knox-Vydmanov, 2011). Several researchers conducted simulation studies based on various scenarios applied for different countries to determine the affordability and sustainability of the non-contributory universal social pension (Knox-Vydmanov, 2011; Stewart, 2009; Ortiz et al. 2017, Nio-Zaraza et al., 2012; Kakwani, 2005 and Clausen 2006).

A costing scenarios study on universal social pension for 50 low- and middle-income countries from 2010 to 2040 was carried out using the simulation technique and mathematical benefit costing model methodology. The results show that universal social pension is affordable by the above mentioned countries now and in the future, provided that cost increases are made when economically and politically appropriate (Knox-Vydmanov 2011). In contrast, Stewart and Yermo (2009) argue that despite the fact that social pensions are affordable in many emerging economies, there is a need for reforming pension system in order to help reduce the fiscal burden that non-contributory schemes place on the population and to avoid burdening future generations.

In support of the view that the non-contributory universal OAG is affordable, Ortiz et al. (2017) used simulation methodology to estimate the cost of a universal pension for people aged 65 and older at 100 percent of the national poverty line. The findings show a 1.6 percent share to GDP in a sample of 57 lower-income countries, ranging from 0.1 percent in Mongolia to 3.9 percent in Bolivia. Similarly, a simulation conducted by Help Age International (2011) and the International Labor Organization (2010) discovered that universal social pensions in African countries would cost around 1 percent of GDP. They also argue that, while not insignificant, the associated cost is manageable and can be justified in light of the benefits of universal social pensions.

Meanwhile, Guven and Leite (2016) argued that the experience of countries with well-established universal pensions shows that their fiscal costs are greater than one percent of GDP, citing Namibia as an example, which spent 1.1 percent of GDP in 2014 on OAG benefit costs only excluding the other cost associated with OAG. This is in contrast to the findings of Help Age International (2011) and the International Labour Organization (2010). Nio-Zaraza et al. (2012), on the other hand stated that a social programme costing 1 percent of GDP would be

difficult to finance, owing to governments' often limited tax base and collection capacity, as well as institutional capacity.

There are however, opposing views on the notion that a non-contributory universal social pension is affordable. These are others such as Kakwani and Subbarao (2005) conducted a study on 15 African countries to determine poverty rates and the costs of implementing universal social pensions. The study used simulation methodology and the findings show that universal pension schemes are too expensive, and that pensions should only be targeted at the poor.

In the Namibian context, the affordability and sustainability of Namibia's OAG has been assessed in the past. According to the results of a simulation study conducted by Clausen (2006) from 1980 to 2025 on the sustainability of Namibia's universal pension grant, the grant is fiscally sustainable under all different scenarios tested. Whereas, in 2013, Bank of Namibia (BoN) stated that the OAG affordability and sustainability is a matter of concern, especially in the context of population growth and longevity of pensioners' lives, as it imposes a growing fiscal burden on the economy.

BoN further argues that high unemployment means the government has a reduced tax base and as coverage increases and people live longer, it will clear means that the long-term sustainability of the programme will be tenuous (BoN, 2013). In addition, BoN indicated that the fiscal sustainability of the programme is also a major concern because of its universal nature and low age cut off point, that of 60 years.

In support of this view, ILO (2014) highlights concerns about sustainability and duplication of benefits for Namibia's OAG pointing out issue with aging demographic in Namibia after 2030 as the rise in the old-age dependency ratio is projected to be larger than the child dependency ratio, pushing up the total dependency ratio. These trends bode well for a cautious the future

decision in adjusting OAG benefit amount to consider economic and demographical variables that have impact on the affordability and sustainability of the OAG.

In addition, Ranganathan (2017) conducted research on the assessment of public expenditure requirements and fiscal sustainability of India's Universal Social Pension Schemes (USPS) from 1994-1995 to 2016-2017. The study results show that the tested USPS scenarios are fiscally sustainable in the short and long term, but it is sensitive to five parameters: productive growth, inflation, discount rate, income elasticity, public pension expenditure, and income elasticity of health expenditure. The study used simulation and scenario setting techniques to determine long-term public expenditure requirements, as well as generational accounting to determine USPS's long-term fiscal sustainability (Ranganathan, 2017). Overall, the study concluded that the nature and magnitude of old-age pension expenditures are expected to rise as India's population ages over the course of the century.

The Generational Accounting Framework methodology used by Ranganathan (2017), is developed by Auerbach and Kotlikoff in 1999. The framework's goal is to quantify the distributional effects of current fiscal policy on current and future generations. It answers a number of critical questions, such as how much of a fiscal burden existing policy implies for future generations, and a best tests of whether fiscal policy is sustainable without significant reductions in government purchases (Al Sayed & Samir, 2011).

The generational accounting method attempts to address the shortcomings of traditional fiscal indicators. It contains information on the effects of fiscal policies on intergenerational distribution, as well as contingent liabilities, making it an appropriate indicator for assessing long-term fiscal sustainability (Leibfritz, 2017). The GA approach does not go without criticism. According to Haveman (1994), there is some ambiguity in selecting the appropriate

discount rate when executing. Added to the critics, the Congressional Budget Office (1995) states that not all government expenditures were factored into GA models.

3.4.1 Instruments to manage fiscal sustainability of social pension

A number of instruments, including the size of the monthly pension benefit amount and the age at which the pension is first paid, can be used to ensure that social pension expenditures are affordable (IMF, 2014). The IMF also stated that the pension could be subjected to an affluence test, so that the wealthiest retirees do not receive the benefit. In addition to the instruments, Stewart (2009) stated that the government can influence the cost by adjusting benefit levels over time and discounting the option of cutting benefits by keeping the benefit constant in monetary terms, indexing the benefit to price inflation, or indexing the benefit to wages/average income.

Across the globe, different countries have employed different parametric or instruments to manage social pension fiscal sustainability. The study by (Economic *et al.*, 2014) outlined strategies employed by some European countries to manage the fiscal sustainability of the first pillar pension scheme that is referred to as social pension. In 2014 Luxembourg and Malta implemented early retirement restrictions by aligning retirement age or pension benefits amount with changes in life expectancy. In contrast, the Czech Republic promotes older workers' employability and review the pension indexation mechanism. Denmark, on the other hand, used three strategies to attain fiscal sustainability of its social pension system by; shifting the financing of new noninsurance/extraneous benefits to tax revenues, increasing incentives for later retirement, and expanding coverage in second and third pillar pension schemes.

3.4.2 Simulation and model assumptions

To determine the cost and affordability of social pension, scholars such as Knox-Vydmanov (2011); Stewart (2009); Ortiz et al. (2017), Guven (2016), Nio-Zaraza et al. (2012); Kakwani (2005), and Clausen (2006) used the simulation method and mathematical benefit costing methodology. The simulation method is commonly used to forecast future expenditure of social pension using mathematical benefit costing methodology. The basic idea behind this method is to first document the current profile or status of the social pension, as well as the associated benefit expenditure experience (Scholz et al., 2000). The evolution of the membership profile is then projected forward year after year using actuarially assumed transition probabilities against the estimated benefit level. This cycle is repeated until the projection period ends. The simulations are then required to show the cost progression with an expanded population base and projected economic trend (ILO, 2018).

The Social Budget Model simulations necessitate a set of demographic, economic, and policy assumptions. The key assumptions of demographic are related to the population, whereas economic scenarios are assumed future paths of development of basic economic variables (Scholz *et al.* 2000). In addition, policy scenarios are assumed future developments in some selected parameters such as age of eligibility, income test, asset test, citizenship, residency and pension-tested and other policy changes.

Earlier studies such as Knox-Vydmanov (2011); Stewart (2009); Ortiz *et al.* (2017); Guven (2016), Nio-Zaraza *et al.* (2012); Kakwani (2005) and Clausen (2006) used both demographic, economic, and policy assumptions. The studies used economic assumptions in three scenarios to estimate the future size of government revenue as a percentage of GDP: low, average, and high. To determine the future benefit amounts, the studies employed three options by indexing the level of benefits to price changes over the analysis with no indexation which was

based on the consumer price index and indexation by a rate that establishes a constant ration of benefit to GDP per capita.

3.5 Chapter Summary

This section reviewed both theoretical and empirical literature related to the subject matter. Different methods used in the assessment of fiscal sustainability of OAG were reviewed. The simulation method and Mathematical Benefit Costing framework is widely used to forecast future costs and investigate the long-term viability of social pensions. In addition, very limited studies used the Generational Accounting Framework to assess social pension's fiscal sustainability. The literature review established that the main variables driving the sustainability of social pension are demographic, economic, and policy factors. According to the literature, the variables and their effects on social pension may differ country to country. As a result, it is critical to examine the effects of demographic, economic, and policy factors on the long-term fiscal sustainability of Namibia's OAG.

CHAPTER FOUR

METHODOLOGY

4.1 Introduction

The third chapter reviewed theoretical and empirical literature on the long-term fiscal sustainability of social pension. The methodology and techniques reviewed in chapter three informed the methodology and techniques employed in this study. The chapter is broken down into six sections: Section 4.1 is the introduction, Section 4.2 discusses research design and approach, Section 4.3 outlines the model specification used in the analysis, Section 4.4 focused on diagnostic tests to test for the fitness of the model, Section 4.5 discusses data sources and variable definitions, and Section 4.6 outlined the ethical considerations observed in the study.

4.2 Research design and approach

The study adopted a quantitative research approach using Eviews software to establish the relationship between government expenditure on old age and its dependent variables. The study employed annual observations covering the period 1990 to 2020, where three (3) determinants of government expenditure on old age were used to estimate the OAG expenditure model. Secondary data used was collected from a population of survey reports by the Namibia Statistic Agency (NSA) and the Ministry of Finance national budget books. The data were all obtained in million Namibian Dollars and were converted into logarithm to avoid heteroskedasticity in the residuals.

Through desktop research, literature was reviewed from different sources such as: books, journals, articles and annual reports to analyse the theoretical framework and empirical approach that is used to determine the relationship between old age expenditure and its dependent variables, thereafter assess fiscal sustainability of universal social pension. Descriptive statistic was used to studied the past expenditure trends and its relation to percent share to government revenue and GDP. The historical trend is then used to forecast OAG's future expenditure and assess its fiscal sustainability. The quantitative approach using descriptive method is used because it provides a baseline trend that informs the future outlook on which the assessment is based, to analyse the OAG's fiscal sustainability.

The process of collecting and analysing numerical data is defined as quantitative research, the general purpose of quantitative research is to evaluate a specific topic or activity through the quantifiable measurement of variables. Furthermore, the quantitative approach seeks to develop a general understanding of behaviour and other phenomena across the variables under consideration. The quantitative uses numerical data collection and analysis to describe, explain, predict, and control variables and phenomena of interest (Gay at al., 2019).

According to Gay at al., (2019), the quantitative method has a number of advantages. Firstly, because the approach employs data computing equipment, it is possible to process large data sets and analyse data quickly. Secondly, it enables the clear communication of quantitative results through the use of unbiased statistics. Finally, the quantitative method is used because the study goals and design are established from the start allowing the researchers to put their initial theory to the test and compare the results.

Despite the benefits provided by quantitative research, some drawbacks have been identified. One disadvantage is that quantitative research is sometimes insufficient to explain complex

research topics because it is limited by superficiality, narrow focus, structural bias, and a lack of context. The methods used by the study to conduct quantitative research are descriptive. According to Mertler (2014), descriptive aims to describe and interpret the current state of individuals, settings, conditions, or events.

4.3 Model Specification

In order to find the relationship between OAG expenditure and benefit cost, funeral benefit and number of old age beneficiaries, the Autoregressive Distributed Lag (ARDL) Model was used to establish the short and long run relationship between the dependent (old age expenditure) and independent variables (benefit cost, funeral benefit and number of beneficiaries).The model was informed by the Mathematical Benefit Costing framework used by Willmore (2001) in his study on universal pensions in low-income countries, as well as by the ILO (2017)'s study on costing estimates and affordability of social pensions in 57 low-income countries.

4.3.1 Old Age Grant Expenditure Model

In view of the discussed theoretical and empirical reviewed, the old age expenditure function is specified as follows:

$$loag = f(lfb, lbc, lnbenefiaries)$$

The function can also be presented in a log-linear econometric format thus:

$$loag_t = \alpha_0 + \alpha_1 lfb_t + \alpha_2 lbc_t + \alpha_3 lnbeneficiaries_t + \varepsilon_t$$

Where:

oag =represent the old age grant expenditure,

fb = is funeral benefit,

bc =is old age benefit cost,

$nbeneficiaries$= is number of beneficiaries,

α_0 =is the constant term,

t=is the time trend and

ε= is the random error term which is assumed to be normally distributed with a zero mean and constant variance.

The study used the Eviews software to analyse the collected data on the main variables. Various Diagnostic tests such as Normality test, LM test (to test for autocorrelation), heteroskedasticity and Stability test were done following Gauss–Markov conditions to ensure that the model is BLUE (Best Linear Unbiased Estimator) and can be used for predictions.

4.3.2 Unit Root Test

Given that most time series data is non-stationary, using it in the model may result in spurious regression. As a result, the time series properties of the data used in the study is first determined to see if the series are stationary. For the purpose of this study, unit root test for all variables was conducted based on Augmented Dickey-Fuller (ADF).ADF is an augmented version of the original Dickey-Fuller test, this was done in 1984 to accommodate more complex model with unknown orders (Moffatt, 2019). If all series are not stationary in levels, they should be stationary in the difference with the same level of lags. It is critical to note that the time series properties of the data set used in the estimation of the equations presented above in sub section 4.3.1 are -tested for unit root in order to avoid the problem of spurious regression. The ADF model can be mathematically presented as:

$$\Delta y_t = \alpha + \beta t + \gamma y_{t-1} + \delta_1 \Delta y_{t-1} + \cdots . + \delta_{p-1} \Delta y_{t-p+1} + \varepsilon_t$$

Where: α is a constant, β is the coefficient at time, p is the lag order of the autoregressive process and Δ is the differencing term which represent a change between ADF and Dickey-Fuller test.

4.4 Diagnostic Tests: Residual Diagnostics

4.4.1 Normality Test

To determine if the data is normally distributed, the study used Jarque-Bera statistic test. The Jarque-Bera test is performed in order to check the normality of each series. The approach is used because as it tests whether data used have the skewness and kurtosis matching a normal distribution based on its P values. The general model in testing for normality using Jarque-Bera statistic is expressed as;

$$\frac{N}{6}\left(S^2 + \frac{(K-3)^2}{4}\right) \ldots\ldots \{3\}$$

With S, K, and N denoting the sample skewness, the sample kurtosis, and the sample size, respectively.

4.4.2 Stability Test

The study employed the CUSUM test based on the cumulative sum of the recursive residual in order to test for stability. Stability test is important as it guarantee the stable status of the tested model and to check if the model performance meets intended results. In testing for stability, a classical regression equation is employed.

$$y_t = \beta_1 + \beta_2 X_{2t} + \cdots + \beta_k X_{kt} + u_t, \; t = 1, \cdots, T \ldots\ldots \{4\}$$

When this equation is estimated, it is assumed that the model parameters β are constant over the entire sample period. This is the assumption of parameter constancy or stability.

4.4.3 Serial Correlation Test

The study used a serial correlation diagnostic statistic. The LM test was employed to test for serial correlation in the residual. Furthermore, The LM test is used to test for higher order ARMA errors and is applicable whether there are lagged dependent variables or not. The LM form of the statistic, based on the R2 from this auxiliary regression, is expressed by the below equation:

$(T - p)R^2 \sim^a \chi^2 (p)$ …. ………………………………………………………….. {5}

Whereas; p = 1 for annual data.

4.4.4 Heteroskedasticity Test

To test for general heteroscedasticity of unknown form, the residual from the regression were used to test for heteroskedasticity using the Breusch-Pagan Godfrey which tests the null hypothesis of no heteroskedasticity or homoscedasticity. It is based on a regression of the squared residuals e^2_i on all (non-redundant) cross the regressors XjiXli, for all j = 1, · · · , k, and l = 1, · · · , k. The auxiliary regression takes the form:

$e^2_i = \gamma_1 X^2_{1i} + \gamma_2 X_{1i}X_{2i} + \cdots + \gamma_k X_{1i}X_{ki}$ ……………………………………………… {6}

$+\gamma_{k+1} X^2_{2i} + \gamma_{k+2} X_{2i}X_{3i} + \cdots + \gamma_{2k-1} X_{2i}X_{ki} + \gamma_{k(k+1)/2} X^2_{ki} + u_i$ ……... .{7}

The test statistic is based on the R2 from this auxiliary regression and is given by:

$nR^2 \sim^a \chi^2_{k(k+1)/2-1}$ ………………………………………………………………… {8}

4.5 Forecasting and Simulation Techniques

The study employed Microsoft Excel to forecast future values of Old Age Grant Expenditure, GDP and Government Revenue from 2021 to 2041 informed by historical time series of the

respective variables of the period from 1990 to 2020. The simulation was carried out at 95 percent confidence intervals and automatic detection of seasonality was applied.

The study employed three scenarios to determine future expenditure cost of OAG. The three scenarios tested are:

a) Scenario (1) was based on census population projections of the eligible aged 60 and up.
b) Scenario (2) was based on the actual number of Old Age beneficiaries. The actual number informed the projection of the grant beneficiaries' number by adding the difference between the actual number of grant beneficiaries and the census aged 60+ population projection of the 2020 period to inform the future beneficiaries' number.
c) Scenario (3) used Microsoft Excel forecasting sheet based on historical time series of Old Age Grant expenditure of 1990 to 2020.

A combination of assumptions was used to simulate the OAG expenditure as follow:

a) The number of people receiving the old age pension was kept at a constant rate of 98 percent coverage rate, which was the coverage rate of OAG during 2020/2021 financial year and the past three years.
b) The development level of the old-age pension is kept at an average inflation rate of 4 percent effected every after 2 years, this is informed by the observed benefit increment trend.
c) The service fees cost per transaction is kept at N$23 dollar and assuming that 75 percent of the projected beneficiaries will use mobile payment mode (cash vehicle). The assumption is informed by the actual share of beneficiaries using mobile payment mode to redeem the benefit as of 2021/2022 financial year.

d) In terms of funeral cost, an average insurance rate of N$11 is assumed over the simulation period. The assumption is informed by the average rate of funeral insurance rate.

To determine the fiscal sustainability, the study assessed the projected OAG as a percentage share of the GDP and GRN revenue.

4.6 Data Sources and classification

The study relies on secondary sources of data for the period of 30 years (1990 to 2020) as a baseline to project future expenditure of OAG and to determine its fiscal sustainability for the next 20 years from 2021 to 2041 that the study covered. Annual time series data was obtained from various institutions such as, Namibia Statistics Agency, Ministry of Finance, Ministry of Gender Equality, Poverty Eradication and Social Welfare and Bank of Namibia.

The study used two broad categories of variables, namely: demographic variables and economic variables. In order to project the number of pensions, the study used demographic variables to project future cohort components by age focusing on age 60+. Demographic trends are influenced by changes in fertility, migration, mortality, and life expectancy, as well as changes in the labour force. In general, population aging leads to increased pension expenditure; thus, an increase in the targeted population is expected to have a negative impact on OAG expenditure (Narayana 2017). The main economic variable used is GDP and government revenue, which measures a country's income level. The ability of a country to spend on social pensions is determined by its income level. GDP in general is expected to have a positive sign because increases in GDP and government revenue generally result in more available resources to spend (Narayana, 2017).

4.7 Research Ethics

The study strictly adhered to the University of Namibia ethical considerations. The data collected is not distorted in any way, and the results are not falsified or fabricated in any way. The integrity of reporting was upheld. The study did not deal with personal information because it used secondary and administration data that is collected at a macro or programme level and not disaggregated to individual basis, hence no consent or confidentiality issues were addressed. All sources used in the study are cited and acknowledged using Harvard referencing style, with no changes to the research findings.

CHAPTER FIVE

RESULTS AND FINDINGS

5.1 Introduction

This chapter presents the estimated results based on the empirical model specified in Chapter Four. In addition, unit root tests and diagnostic tests were performed to determine the model's fitness. The objectives of the study are captured by using econometric model referred to as OAG expenditure model, forecasting, and simulation techniques.

5.2 Model Estimation, Results and Interpretation

5.2.1 Unit root test

Firstly, before estimating the model, it is required to examine the stationarity of the variables to ensure that the mean and variance of the series are constant through time and the auto covariance of the series is not time varying (Enders, 2004).

The Augmented Dickey fuller test (ADF) was performed to check whether variables are stationary or non-stationary. Existence of unit root is problematic, if variables have a unit root, as they cause unpredictable or spurious results. To ensure that the model is good and that it can be used for predictions, the study first performed unit root test to test whether there is a unit root or not. The study used ADF in testing the properties of unit root for all variables used in the model. ADF was used because it can handle more complex models and consider as a powerful model, however, like any other model used for unit root tests, it is used with caution because it has a relatively high type 1 error rate (Stephanie, 2016).

Table 1 shows Unit root test results using ADF test at level and at the first difference. The ADF test was performed on logarithm- transformed data in both levels and first difference with intercept.

Table 1: Unit root test results

		Loag	lfb	lbc	lnbeficiaries
Level	ADF test statistic (Intercept)	0.371501	3.777802	0.317060	1.786032
	Prob	0.9019	0.0081	0.9752	0.3799
	CV	3.670170 2.963972 2.621007	3.689194*** 2.971853** 2.625121*	3.679322 2.967767 2.622989	3.670170 2.963972 2.621007
1st Difference	ADF test statistic (Intercept)	7.694335	4.907109	8.120236	12.96319
	Prob	0.0000	0.0005	0.0000	0.0000
	CV	3.679322*** 2.967767** 2.622989*	3.689194*** 2.971853** 2.625121*	3.679322*** 2.967767** 2.622989*	3.679322*** 2.967767** 2.622989*
	Results	I(1)	I(0)	I(1)	I(1)

Notation: ADF=Augmented Dickey - Fuller test
***, **, * denotes the rejection of null hypothesis of unit root at the 1%, 5% and 10% significance levels respectively.

When performing ADF test on variables in levels with intercept, the null hypothesis of unit root cannot be rejected at 5% critical value for loag, lbc and lnbeneficiaries. The results shows that funeral benefit (lfb) is greater than the critical values at all significance levels, the null hypothesis of unit root is therefore rejected and conclude that log funeral benefit(lfb) is stationary in level. Further analysis of unit root was performed on all variables at 1st difference with intercept. By comparing the ADF test statistic with the critical value at all levels of significance, the null hypothesis of unit root was rejected for OAG benefit cost (loag), Service Fees (lbc) and Number of beneficiaries (lnbeneficiaries) and concluded that the 3 variables are all stationary at first difference with intercept.

In addition, another way used was to look at the probability value, if the corresponding probability is greater than 5% the null hypothesis cannot be rejected and vice versa. The results are displayed in above table, whereby I (0) represent stationary at level while I (1) indicates stationary at 1st difference.

5.2.2 Model estimation: Old Age Grant Expenditure

From the Unit root test results, one variable was stationary at levels while the rest were stationary at first difference (Mixed variables). In this case, the Autoregressive Distributed Lag (ARDL) model will be appropriate. ARDL model is an Ordinary Least Square (OLS) based model, used for both non-stationary data as well as for time series with mixed order of integration.

According to Shrestha and Bhatta (2018), Error Correction Model (ECM) is derived from the ARDL model which integrates the short-run dynamics with the long-run equilibrium without losing long-run information and avoids problems such as spurious relationship resulting from non-stationary time series data.

Table 2: Long-run equilibrium relationship

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	26.22083	10%	2.37	3.2
k	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66

The model result shows that there is a long-run equilibrium relationship between the dependent variable(loag) and the independent variables (lfb, lbc and lnbeneficiaries) because the F-

statistic as displayed in the F-bound test results is 26.2, which is greater the 5% lower bound (2.79) and upper bound (3.67). In other words, the model has passed the cointegration test at 5% level of significance.

5.2.2.1 Short run ARDL results

The short-run ARDL results shows that, individually most variables are statistically significant in explaining OAG Grant expenditure (OAG) in the short run at 5% level of significance except the 2 variables, D(loag (-3)) and D(lbc(-3)) whose probability are greater than 5% at 18.66% and 11.98% respectively.

What is crucial here is the Error Correction Term, which is negative, less than 1 and statistically significance. The results shows that there is high speed of adjustment from short-run to the long-run. If there is disequilibrium in the system, it takes an average of 97.6% to adjust back from the short-run to the long-run.

The model is also a good fit in explaining old age grant expenditure with R-squared of 99% which implies that 99% of variation in old age grant expenditure is explained by benefit cost, number of beneficiaries and funeral benefits.

The Durbin-Watson (DW) statistic in the regression analysis results is used to test for autocorrelation in the residuals. According to Kenton (2021), the DW statistics value always range from 0 to 4, the results from 0 to less than 2 indicates positive autocorrelation, while from 2 to 4 indicates negative autocorrelation.

Table 3: Short run ARDL results

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOAG(-1))	0.562464	0.068816	8.173473	0.0001
D(LOAG(-2))	0.290136	0.064894	4.470943	0.0029
D(LOAG(-3))	0.079454	0.054275	1.463918	0.1866
D(LFB)	0.362656	0.035159	10.31460	0.0000
D(LFB(-1))	-0.062280	0.022432	-2.776367	0.0274
D(LFB(-2))	0.057182	0.020810	2.747899	0.0286
D(LFB(-3))	0.174901	0.024483	7.143728	0.0002
D(LBC)	0.739293	0.037278	19.83191	0.0000
D(LBC(-1))	-0.239956	0.058348	-4.112517	0.0045
D(LBC(-2))	-0.190787	0.053768	-3.548339	0.0094
D(LBC(-3))	0.072464	0.040907	1.771446	0.1198
D(LNBENEFICIARIES)	-1.602491	0.165122	-9.704893	0.0000
D(LNBENEFICIARIES(-1))	-0.966292	0.192332	-5.024081	0.0015
D(LNBENEFICIARIES(-2))	-1.294877	0.202838	-6.383799	0.0004
D(LNBENEFICIARIES(-3))	0.568379	0.096945	5.862916	0.0006
CointEq(-1)*	-0.975679	0.067975	-14.35342	0.0000

R-squared	0.990484	Mean dependent var	0.125458
Adjusted R-squared	0.977508	S.D. dependent var	0.121025
S.E. of regression	0.018151	Akaike info criterion	-4.892975
Sum squared resid	0.003624	Schwarz criterion	-4.125071
Log likelihood	82.05516	Hannan-Quinn criter.	-4.664637
Durbin-Watson stat	1.974393		

A value of 2 indicates that there is no autocorrelation in the sample. The DW shows from the analysis is 1.97, an indication that there is no autocorrelation detected from the sample.

5.2.2.2 Long run equation

The long run equation is used to explain the relationship between OAG expenditure and the 3 independent variables which are: funeral benefit, benefit cost and number of beneficiaries.

Table 4: Long run equation

Levels Equation
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LFB	0.520870	0.097572	5.338330	0.0011
LBC	0.565251	0.052262	10.81567	0.0000
LNBENEFICIARIES	0.806228	0.186721	4.317834	0.0035
C	-9.176268	1.355757	-6.768373	0.0003

EC = LOAG - (0.5209*LFB + 0.5653*LBC + 0.8062*LNBENEFICIARIES - 9.1763)

The analysis shows that there is a positive relationship between old age expenditure and all 3 variables. This means that a 1 % increase in either funeral benefit, benefit cost or number of beneficiaries will increase expenditure in old age expenditure by the government. If funeral benefit increase by 1 %, old age expenditure will increase by 0.52 %. A 1 % increase in benefit cost will increase old age expenditure by 0.56 %. Whereas, a 1 % increase in number of beneficiaries will increase old age expenditure with 0.80 %. Looking at probability in the table, individually all variables are statistically significant in explaining old age expenditure at 5% level of significance.

5.2.3 Diagnostic Tests: Residual Diagnostics

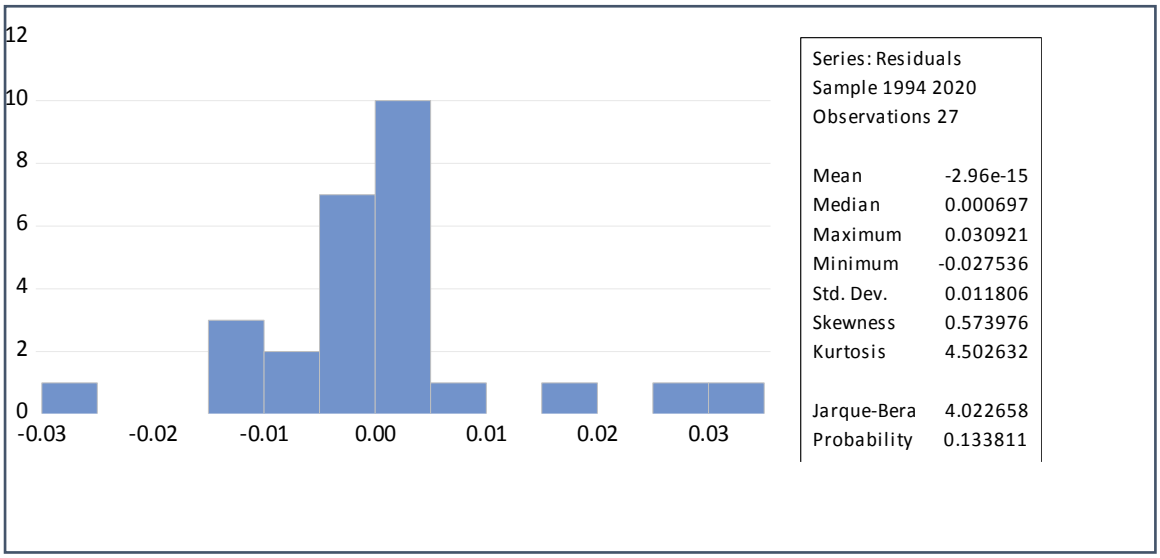
It is very crucial to perform diagnostic test after estimation to verify the validity of the regression model. The diagnostic tests are required to verify the reliability of the estimated coefficient. These tests include normality test, stability test, serial correlation and heteroskedasticity test.

5.2.3.1 Normality test

Below is the histogram and descriptive statistics, using Jarque - Bera statistic for testing normality. The null hypothesis of normally distributed errors cannot be rejected because the

probability of 13.4% is greater than 5% that means that the residual in the regression is normally distributed.

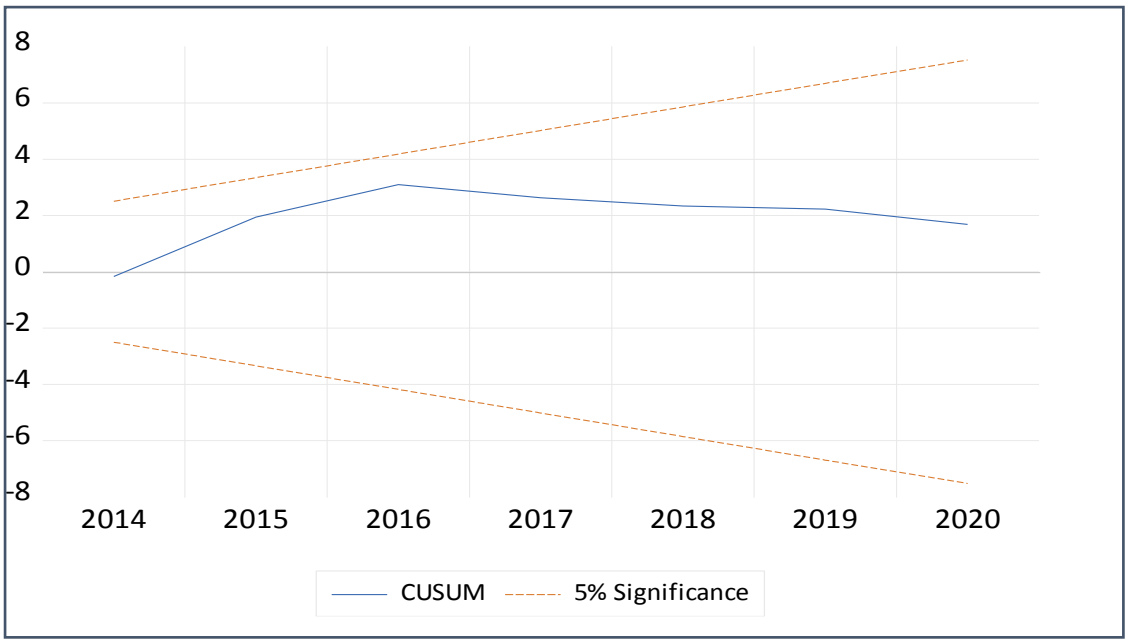
Figure 3: Normality test



5.2.3.2 Stability test

In order to test for stability, the CUSUM test based on the cumulative sum of the recursive residual was used. This test gives a plot with cumulative sum together with 5% critical lines. The residuals are not stable if the cumulative sum goes outside the area between the two critical lines. The movement of the recursive individual within critical lines suggests coefficient stability based on the CUSUM results presented on the figure 4 below.

Figure 4: Stability test



5.2.3.3 Serial correlation test

The LM test was used to test for serial correlation in the residual. The LM test is used to test for higher order ARMA errors and is applicable whether there are lagged dependent variables or not. The null hypothesis of the LM test is that there is no serial correlation. In this analysis, the null hypothesis cannot be rejected because the probability chi-square is greater than 5%.

Figure 5: Serial correlation test

Breusch-Godfrey Serial Correlation LM Test:			
Null hypothesis: No serial correlation at up to 1 lag			
F-statistic	6.38E-05	Prob. F(1,6)	0.9939
Obs*R-squared	0.000287	Prob. Chi-Square(1)	0.9865

5.2.3.4 Heteroskedasticity test

The residual from the regression were used to test for heteroskedasticity using the Breusch-Pagan Godfrey which test the null hypothesis of no heteroskedasticity or homoskedasticity.

Figure 6: Heteroskedasticity or Homoskedasticity test

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	1.976326	Prob. F(19,7)	0.1814
Obs*R-squared	22.75759	Prob. Chi-Square(19)	0.2482
Scaled explained SS	2.678918	Prob. Chi-Square(19)	1.0000

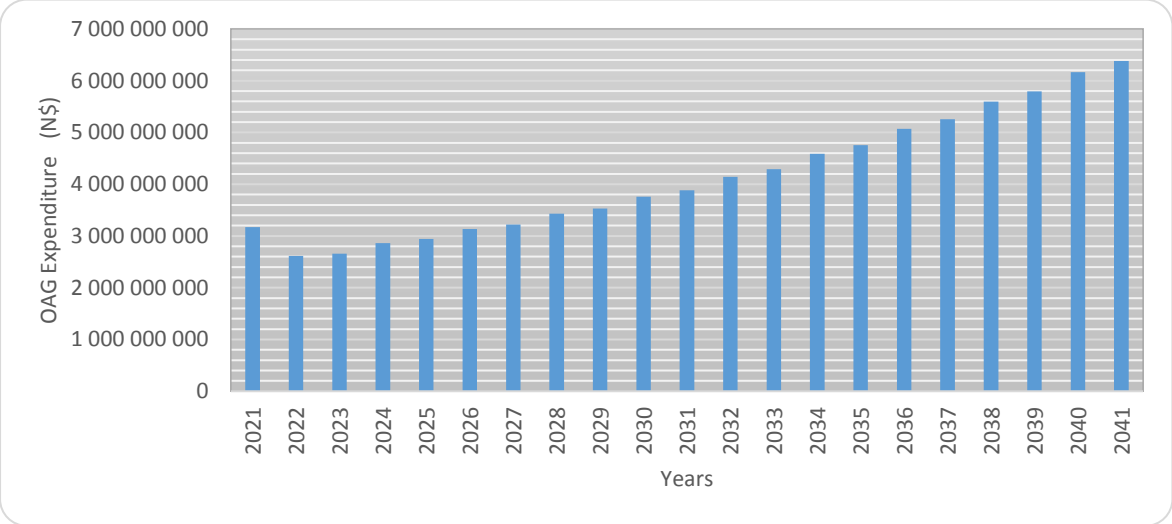
Based on the results, the Observed R-squared with its corresponding probability Chi-Square of 24.8 % is greater than 5%. The null hypothesis cannot be rejected and conclude there is no heteroskedasticity in the residual or there is homoskedasticity in residuals.

In conclusion, the model has passed all the diagnostic test, meaning that it is a good model and can be used to forecast government expenditure on OAG.

5.3 Old Age Grant Expenditure Simulation

The study used a combination of assumptions informed by OAG variables actuals of 2020/2021 and 2021/2022 financial years to simulate future OAG expenditure. The study then ran three scenarios: first, based on census population projections of people aged 60 and up; second, based on the current number of OAG beneficiaries, which is 24.9 percent of the census population, and third, based on Microsoft Excel forecasting based on historical time series of OAG expenditure.

Figure 7: Scenario 1- Old Age Grant Expenditure Forecast

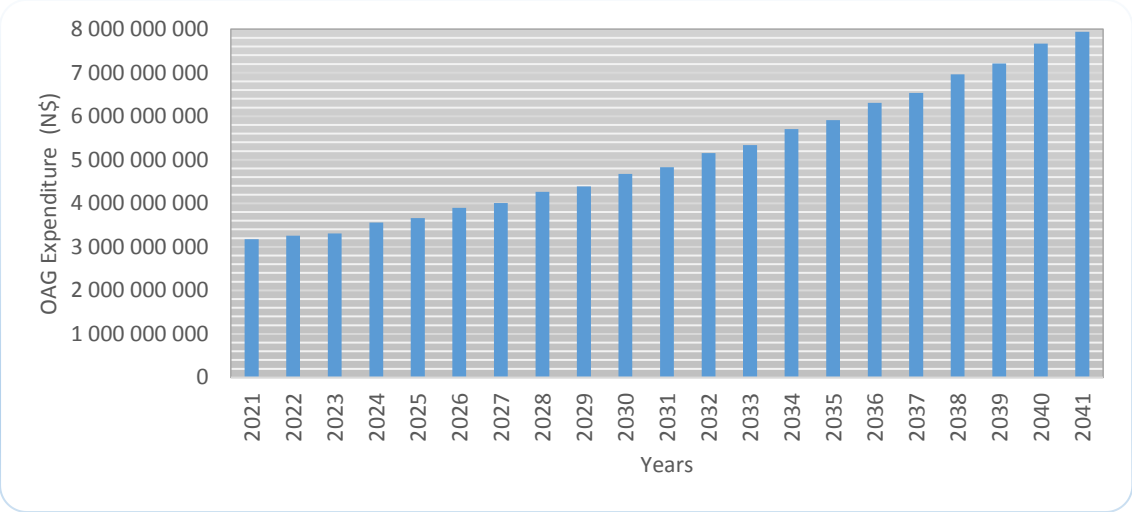


Source: Compiled by the author based on the forecasting technique used.

The census age 60+ population shows that people aged 60+ are 156,225 in 2021 (NSA 2014) while the actual number of OAG beneficiaries in 2021 stood at 195,054 (MGEPESW 2021). The disparity in the number of OAG beneficiaries is due to a number of residents of neighbouring countries, primarily Angola, Zambia, and South Africa, being OAG beneficiaries and, in some cases, deceased beneficiaries not reported on time.

The projected OAG expenditure shows that if OAG beneficiaries are strictly limited to the census population number and the grant administration system is improved and strengthened, OAG grant expenditure in 2022 will be 17.55 percent lower than in 2021. The forecasted results also show that by 2022, the OAG's projected expenditure will be N$2, 6 billion, rising to N$6.4 billion in 2041, with a gradual increase in expenditure observed over the years.

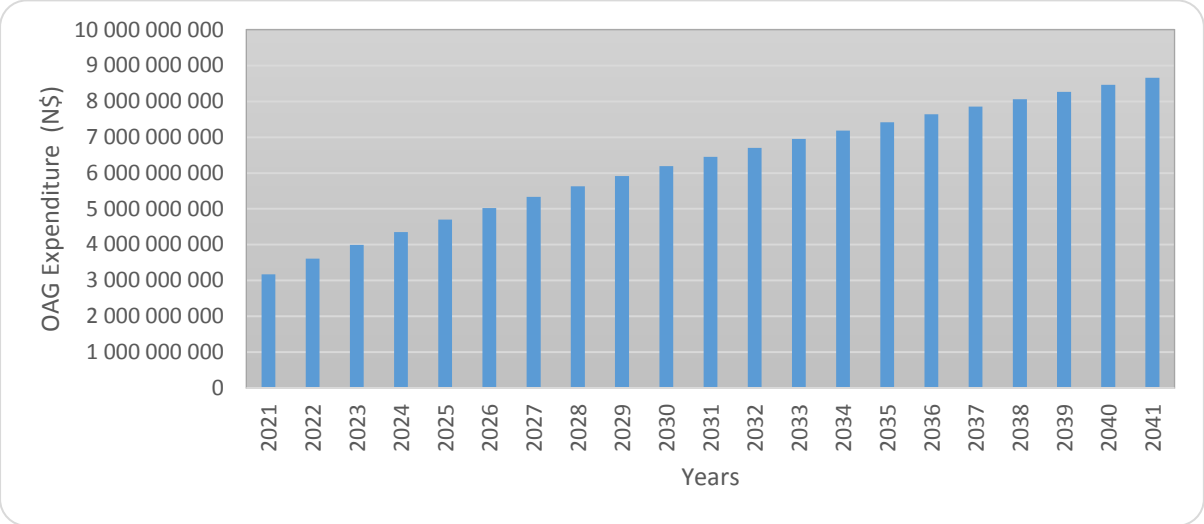
Figure 8: Scenario 2 -Old Age Grant Expenditure Forecast



Source: Compiled by the author based on the forecasting technique used.

Scenario 2 of OAG expenditure is informed by the baseline actual numbers of beneficiaries and in 2022 the grant expenditure is projected to N$3.3 billion, rising to N$7.9 billion in 2041. The main driver of the increased OAG forecasted expenditure is an increase in beneficiary numbers from 195,055 in 2021 to 367,740 in 2041. Furthermore, a significant expenditure trend is observed from 2021 to 2041

Figure 9: Scenario 3- Old Age Grant Expenditure Forecast



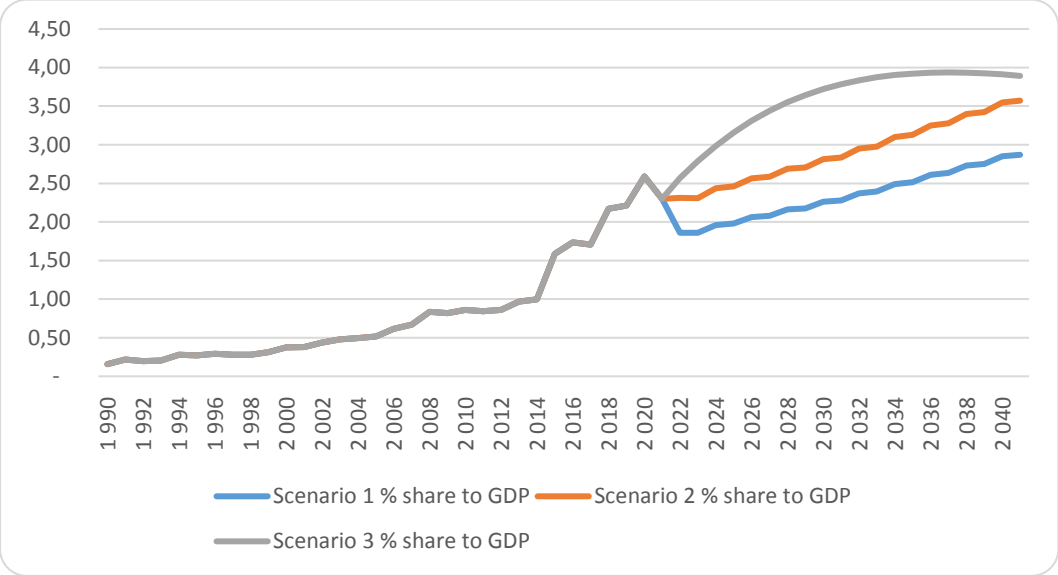
Source: Compiled by the author based on the forecasting technique used.

The forecasted OAG expenditure based on the historical data shows an increase from N$3.2 billion to N$8.7 billion in 2041. Over the forecasted period, the main drivers of OAG expenditure are the cost of grant benefits and the size of the eligible population. According to the model results in section 5.2, the two stated drivers of OAG expenditure are significant at 97.52 percent and 37.99 percent, respectively.

5.4 Old Age Grant expenditure as share to GDP and Government revenue

To determine the sustainability of OAG future expenditure, the projected fiscal expenditure of OAG is plotted as a percentage share of the projected GDP and government revenue. The GDP and government revenue are forecasted using Microsoft Excel based on historical time series of GDP and government revenue from 1990 to 2020 to forecast the future values of the two variables from 2021 to 2041 at a 95% confidence interval.

Figure 10: Old Age Grant expenditure as percentage share of GDP



Source: Compiled by the author based on the forecasting technique used.

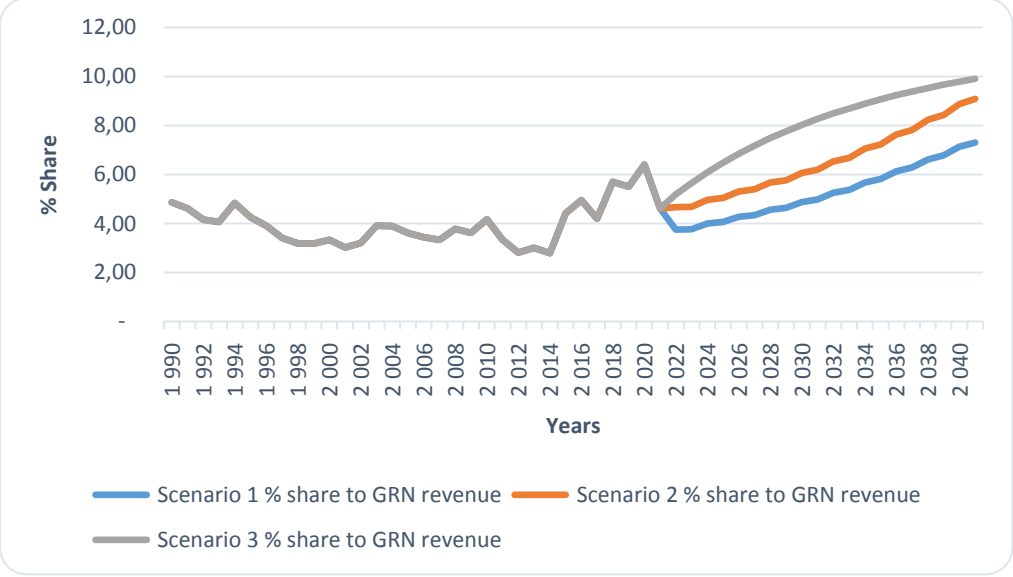
The future fiscal expenditure of OAG is simulated at eligible age 60+ based on census population projections (scenario 1). The results show a consistent increase in OAG expenditure as a percentage share of GDP, rising from 2.59 percent in 2020 to 2.87 percent in 2041, indicating a consistent percentage share growth. Based on the scenario 1 results, the steady increase is driven by a low number of eligible elderly people, with the eligible age group population as a percentage share of the country population projected to rise only from 6.13

percent in 2021 to 8.55 percent in 2041. (NSA 2014).Furthermore, a low projected fertility rate of 2.4 percent by 2041, as well as low future projected benefit costs increased at a 3.85 percent average inflation rate, account for the steady increase in the grant expenditure share of GDP.

Scenario 2 results, on the other hand, show an immediate drop in percentage share in 2022 as a result of a decrease in service fees, as the MGEPESW abolished the NAMPOST cash on counters in September 2021, leaving only one line of service fees, mobile cash payment through a paymaster. Furthermore, future projected OAG expenditure as a percentage of GDP shows an increase much higher than scenario 1 due to large projected beneficiaries population that is primarily due to disparities between the OAG's actual beneficiaries' trend and census eligible population . According to the findings, a significant increase in the number of beneficiaries is expected to begin in 2032.

Similarly, Scenarios 3 show a greater increase in percentage share when compared to scenarios 1 and 2, but due to the projected GDP growth in 2041, the percentage share shows a decrease of 3,89 during the same period.

Figure 11: Old Age Grant expenditure as percentage share of Government Revenue



Source: Compiled by the author based on the forecasting technique used.

The OAG expenditure as a percentage of government revenue results for scenario 1 shows a minimal increase from 6.4 percent in 2020 to 7.30 percent in 2041, whereas scenarios 2 and 3 show a greater increase of 9.09 percent in 2041 and 9.91 percent, respectively. Scenarios 2 and 3 share is nearly double that of 2020, indicating that the projected fiscal expenditure of OAG is increasing at a faster rate in comparison to government revenue and this will mean OAG expenditure will consume a larger portion of the projected government revenue by 2041.

5.5 Discussion of results findings

To analyse the fiscal sustainability the study employed OAG expenditure model. The model results show that the independent variables of benefit cost, number of beneficiaries, and funeral benefits are statistically significant in explaining OAG expenditure in both the short and long run. The model results show that if the funeral benefit, benefit cost, and number of beneficiaries increase by percent, the OAG expenditure will increase by 0.52 percent, 0.56 percent, and 0.80 percent, respectively, showing a positive relationship between OAG expenditure and all three independent variables. In addition, the diagnostic tests used by the study to verify the validity of the regression model show that the model passed all of them, indicating that it is a good model that can be used to forecast government expenditure on OAG.

The results of the OAG expenditure model estimation are consistent with the theoretical literature, as evidenced by studies by ILO (2010), Stewart (2019), Rudolph (2016), and Mulligan and Sala-i-Martin (1999), World Bank (2014) and the IMF (2014). These scholars stated that the number of beneficiaries and the level of benefit amount are two of the main cost drivers of social pensions. This explains the study model findings of 99 percent R-squared, which means that benefit cost, number of beneficiaries, and funeral benefits explain 99 percent of variation in OAG expenditure. Furthermore, the projected fiscal expenditure of OAG

demonstrates the relationship between the dependent variable and the independent variables. As the cost of benefits and the number of beneficiaries increase, so do the projected costs of OAG expenditure.

Empirical research on universal social pension costing scenarios for 50 low- and middle-income countries from 2010 to 2040 discovered that universal social pension is affordable in the studied countries now and in the future (Knox-Vydmanov, 2011). Similarly, Clausen (2006)'s study on the fiscal sustainability of Namibia's universal pension grant from 1980 to 2025 results showed that the grant was fiscally sustainable under all scenarios tested. This study's findings are conforming to those studies' findings, hence the result of this study show that in both scenarios tested, expenditure as a percentage of GDP and government revenue will not double in the future. In addition, the study's findings are conforming to Plamondon et al., (2002), Willmore (2001), and ILO (2018), who regard social pensions sustainable if their average share to GDP remains approximately constant in the long run.

Despite the fact that the study results shows that the OAG expenditure of the scenarios tested as a percentage of government revenue does not double, its proximity to the doubling point may pose a fiscal burden to government expenditure. Despite the fact that social pensions are affordable in many emerging economies, pension system reform is needed to help reduce the fiscal burden that non-contributory schemes place on the population and to avoid burdening future generations (Stewart & Yermo, 2009).

CHAPTER SIX

CONCLUSIONS AND POLICY RECOMMENDATIONS

6.1 Introduction

The study's overarching goal was to examine the fiscal sustainability of Namibia's OAG. As a result, the study developed the OAG expenditure model to ascertain the relationship between the variables thought to be the drivers of OAG expenditure. The diagnostic tests were also used in the study to assess the model's validity and fitness. Similarly, the study used three scenarios to project OAG expenditures from 2021 to 2041 by making four assumptions about coverage, benefit amount, service fees, and funeral benefit insurance rate. The study further calculated the projected OAG expenditure as a percentage of the projected GDP and Government revenue to assess for the grant fiscal sustainability.

6.2 Main findings

The study's findings indicated that the OAG expenditure model is appropriate for explaining OAG expenditure, as evidenced by a 99 percent R-squared, implying that 99 percent of variation in OAG expenditure is explained by independent variables such as benefit cost, number of beneficiaries, and funeral benefits. The model also shows a short-run and long-run equilibrium relationship between the dependent and independent variables. In the same vein, the model results show that increasing the percentage of the independent variables causes an increase in OAG expenditure.

The results of the scenarios run show a steady increase in OAG expenditure as the number of beneficiaries' increases, resulting in a higher OAG expenditure when compared to a lower

number of beneficiaries. This is demonstrated by contrasting scenario 1 (based on census projections) with scenario 2 (informed by beneficiaries' 2020/2021 actual).

Overall, the study findings revealed that the projected OAG expenditure as a percentage of projected GDP shows a constant growth. This implying that the OAG is sustainable under the tested scenarios. In comparison to 2020, projected OAG expenditure as a percentage of government revenue is close to doubling in 2041. This translates into a possible fiscal burden that OAG expenditure is likely to impose on government revenue as per the scenarios tested.

6.3 Policy recommendations

While the scenarios tested demonstrated a fiscally sustainable trend, future adjustments to the OAG benefit amount should be made in accordance with the economic situation, with the inflation rate serving as a guide. Political intervention tactics should not be used to adjust grant benefit amounts because strong political influence will drive grant expenditure into unsustainable territory. As well as, increase fiscal burden on government revenue that is at the verge of doubling based on scenarios tested results.

A 24.9 percent disparity between actual OAG beneficiaries and the census eligible age 60+ population has resulted in a significant increase in projected OAG expenditure. Policymakers should devise strategies to ensure that beneficiaries who do not reside in the country for the specified period as per the National Pensions Act have their benefits withdrawn. Furthermore, the grant implementing institutions should improve the security features of the OAG system to ensure timely death reporting. This can be done through a data sharing agreement between MGEPESW and the Ministry of Home Affairs, Immigration, Safety and Security to obtain timely data from the national population system.

Despite a low level of significant that service fees has on OAG expenditure, OAG implementers should consider more innovative ways to pay out the grant to remote areas than the traditional mode of mobile cash vehicle. Given Namibia's high level of mobile network coverage of 95 percent (MTC, 2017), it is recommended to the policy maker that consideration should be made for pay mode option such as mobile money and encourage more increase in the use of commercial banks. This will not only reduce the service fees but will also contribute to financial inclusion.

Last but not least, it is recommended that the OAG system be automated from registration to enrolment in order to increase efficiency and reduce enrolment waiting period. Furthermore, it is recommended that the grant-implementing Ministry facilitate the provision of funeral benefits to be legally mandated and for benefit amounts to be gazetted in accordance with the relevant legislation to create certainty.

6.4 Areas for Future Research

There is a need to investigate the impact of political influence on the sustainability of the OAG in Namibia, as trend analyses of OAG benefit amounts in relation to the three countries' leadership revealed an inconsistent OAG expenditure trend. Furthermore, a study to analyse OAG fiscal sustainability using a Generational Accounting framework methodology is recommended as a future research area in order to quantify the distributional effects of the current OAG programme on current and future generations and determine the fiscal burden existing OAG programme implies for future generations.

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APPENDIX A: ACTUAL TIME SERIES (1990-2020)

Years	OAG Expenditure	GDP at Constant prices	GRN revenue	Inflation	Age 60+ population
1990	78 941 480	50 153 341 599	1 624 503 512	12,00	78 000
1991	117 498 100	54 248 669 101	2 544 099 675	11,96	79 000
1992	115 219 800	58 148 791 763	2 771 561 853	17,86	79 000
1993	117 000 000	57 230 308 790	2 876 718 984	8,55	81 000
1994	163 710 000	58 220 324 206	3 387 929 900	10,74	82 000
1995	163 785 524	60 490 342 933	3 850 980 026	10,06	83 000
1996	182 056 000	62 420 785 935	4 658 999 867	8,00	85 000
1997	182 056 000	65 055 005 753	5 330 021 514	8,85	86 000
1998	189 000 000	67 196 346 882	5 921 290 025	6,19	85 000
1999	218 000 000	69 460 378 958	6 866 360 833	8,65	86 000
2000	270 235 200	71 886 062 731	8 120 037 413	9,25	87 000
2001	275 000 000	72 732 843 704	9 097 852 338	9,30	91 000
2002	333 160 000	76 215 773 211	10 397 251 831	11,30	94 000
2003	380 530 000	79 447 165 211	9 754 127 029	7,28	98 000
2004	442 783 920	89 194 973 359	11 387 768 150	4,18	101 000
2005	472 531 000	91 450 948 463	13 107 713 098	2,26	105 000
2006	603 926 000	97 919 434 362	17 593 374 456	5,06	110 000
2007	688 784 000	103 181 668 019	20 688 617 098	6,72	112 000
2008	884 057 344	105 915 788 249	23 398 454 020	10,33	117 000
2009	870 462 866	106 229 268 209	24 016 000 151	8,84	120 000
2010	969 633 317	112 644 718 749	23 243 585 132	4,48	124 000
2011	996 031 942	118 379 842 247	29 922 071 891	5,00	148 867

Years	OAG Expenditure	GDP at Constant prices	GRN revenue	Inflation	Age 60+ population
2012	1 067 117 948	124 371 853 517	37 986 875 937	6,72	147 215
2013	1 276 039 743	132 004 415 400	42 376 034 088	5,61	146 074
2014	1 393 760 000	140 046 809 673	49 967 021 111	5,36	145 448
2015	2 313 177 422	146 018 650 059	52 423 629 166	3,40	145 371
2016	2 536 629 894	146 067 996 315	51 162 077 826	6,72	145 861
2017	2 465 049 135	144 567 511 620	58 828 440 186	6,16	146 895
2018	3 169 750 000	146 169 390 621	55 669 480 115	4,29	148 440
2019	3 212 008 090	145 283 478 759	58 411 660 976	3,73	150 504
2020	3 461 824 334	133 684 708 562	54 029 283 958	2,21	153 101

APPENDIX B: PROJECTIONS (2021-2041)

Years	OAG Expenditure	Government Revenue	GDP at Constant prices	Age 60+ population
2021	3 222 463 038	68 765 896 169	139 331 622 175	156 225
2022	3 612 752 765	69 696 434 530	142 081 207 066	159 891
2023	3 990 596 024	70 626 972 891	144 776 598 458	162 505
2024	4 352 721 251	71 557 511 251	147 611 351 388	168 648
2025	4 697 584 332	72 488 049 612	150 640 230 337	173 496
2026	5 025 242 609	73 418 587 973	153 880 766 622	178 544
2027	5 336 803 581	74 349 126 333	157 337 042 822	183 733
2028	5 633 822 395	75 279 664 694	161 007 593 495	189 113
2029	5 917 888 434	76 210 203 055	164 888 551 896	194 780
2030	6 190 425 286	77 140 741 416	168 975 046 428	200 880
2031	6 452 631 136	78 071 279 776	173 261 862 168	207 498
2032	6 705 487 169	79 001 818 137	177 743 764 931	214 664
2033	6 949 790 126	79 932 356 498	182 415 660 339	222 350
2034	7 186 188 359	80 862 894 859	187 272 668 678	230 464
2035	7 415 213 638	81 793 433 219	192 310 155 594	238 892
2036	7 637 306 850	82 723 971 580	197 523 739 387	247 535
2037	7 852 837 947	83 654 509 941	202 909 286 000	256 404
2038	8 062 121 180	84 585 048 301	208 462 897 793	265 530
2039	8 265 426 676	85 515 586 662	214 180 899 461	274 920
2040	8 462 989 251	86 446 125 023	220 059 822 992	284 583
2041	8 655 015 152	87 376 663 384	226 096 392 673	294 534

APPENDIX C: PERMISSION LETTER

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UNAM
UNIVERSITY OF NAMIBIA

22 November 2021

Research project: Marta N Kanyama

To whom it may concern

I write this letter to confirm that Marta N Kanyama is a registered student Masters in Development Finance program at the University of Namibia (student number: 201407736) and is required to submit a research project in the final year of study at the Department of Economics. Her chosen topic for the research project is "**Analysing the fiscal sustainability of Namibia's Old Age Grant**"

In order to complete this project, she requires certain information from the Ministry of Gender Equality , Poverty Eradication and Social Welfare. She requires data on trends in expenditure on the Old Age Grant, as well as the number of beneficiaries. The study will be conducted in an ethical way and the data that will be used solely for academic purposes.

Please do not hesitate to contact me if you need any more information.

Yours sincerely

Dr. J.A. de Beer
Lecturer and course coordinator : MSC in Développent Finance
Department of Economics
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