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EFFECTS OF GOVERNMENT EXPENDITURE ON FOREIGN EXCHANGE RESERVES: EVIDENCE FOR NAMIBIA

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Abstract

The study empirically examined the effects of government expenditure on FX reserves in Namibia. Using quarterly data, the study applied the Autoregressive Distributed Lag (ARDL) cointegration technique to examine the relationship between FX reserves and government expenditure, the nominal exchange rate, external borrowing, current account balance and M2 over the period 2002 to 2020. The results show that an increase in government expenditure reduces FX reserves. Furthermore, increase in foreign debt, current account balance and M2 increases the level of FX reserves, while an appreciation of the nominal effective exchange rate reduces FX reserves. The study, therefore, concludes that high government expenditure and increase in foreign borrowing impact FX reserves. These findings suggest that developments in government expenditure may hinder monetary policy effectiveness. Based on these findings, the study recommends the continuation of fiscal consolidation to reduce fiscal deficits and government debt. Similarly, it is important to ensure macroeconomic balance and appropriate coordination between fiscal and monetary policies.

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1. Introduction

Foreign exchange (FX) reserves are useful to meet international financial obligations of an economy and maintain the peg for countries in fixed exchange regimes. Foreign exchange (FX) reserves are defined as external stock of assets, which is available to the country's monetary authorities to cover external payment imbalances or to influence the exchange rate of the domestic currency through intervention in the exchange market, or for other purposes (IMF, 2021). The level of FX reserves in any country can be one of the useful macroeconomic indicators of financial soundness. In many developing economies, FX reserves are held with the main purpose of supporting monetary and foreign exchange rate policies. For Namibia and many other export-based economies, having adequate FX reserves becomes beneficial in meeting the country's foreign payments of goods and services. Moreover, FX reserves act as a financing option for excessive government expenditures in times of crisis (Akpan, 2016).

Maintaining an adequate level of FX reserves is key for the monetary authorities. According to Osigwe Okechukwu and Onoja (2015), FX reserves provide a cushion at a time when access to the international capital market is difficult or not possible, and an adequate level of FX reserves improves a country's credit worthiness. It also improves the country's reputation by enabling a regular servicing of the external debt and avoiding payment default penalties and charges. Hence, maintaining a good and adequate holding of FX reserves is of utmost importance to the central bank in order to maintain the exchange rate policy and to meet the countries international payment needs.

The macroeconomic effect of fiscal policy on FX reserves generally arises through persistent government budget deficits due to increase in government expenditure. A fiscal deficit is the difference between the government's total receipts (excluding borrowing) and total expenditure. Gupta and Singh (2016) defined the fiscal deficit as 'an economic phenomenon where the government's total expenditure surpasses the revenue generated'. It measures the level of government indebtedness and the extent to which the government exceeds its financial means. There is a view that a fiscal deficit is not necessarily a bad economic phenomenon, as it can be a very important tool to accelerate economic growth in many developing countries, as noted by Aboyomi *et al* (2014). A fiscal deficit is normally beneficial to an economy if the deficit is recorded due to expenditure on investment, particularly capital projects that are envisaged to contribute to employment creation, economic growth and improve the social welfare of a country.

However, persistent and high fiscal deficits over time can result in macroeconomic imbalances and may become unsustainable, these may include depletion of FX reserves.

Additionally, the macroeconomic effects of fiscal deficits on foreign exchange reserve are dependent on how the fiscal deficit is financed. According to Alagidede (2016), in addition to the fiscal consolidation in expenditures and strategy to increase fiscal revenues, there are several ways in which the government can finance a high budget deficit, and these can take a number of forms. Theoretically, the government can use the traditional method of printing money, however, this method is not so common and is discouraged as it can be inflationary. The government can in contrast opt for domestic borrowing, foreign borrowing and can also use FX reserves to finance deficit. The use of FX reserve to finance a deficit can consequently have a significant impact on a central bank's FX reserves management and monetary policy objectives. Although external debt denominated in foreign currency increases FX reserves temporarily, repayment and debt servicing of external loans can become very costly in the long-run and may result in a significant decline in the stock of FX reserves, (Baksay, Karvalits, Kuti, 2012).

Each method of deficit financing can result in various macroeconomic imbalances, including the exhaustion of FX reserves. Drawing down on FX reserves to finance a budget deficit can result in imbalances in the balance of payments. Running down FX reserves instead of printing money, the government may put off the inflationary effects of a deficit, however, financing a fiscal deficit with reserves has limitations. According to Fisher and Easterly (1990), 'the private sector's expectations that the limit is about to be reached can provoke capital flights and may heighten a balance of payments crisis, since exhaustion of FX reserves will be associated with a currency devaluation.

Moreover, public debt dynamics in which foreign debt dominates the domestic debt may have long term negative effects on the government budget and central bank's FX reserves. The composition of public debt in which the share of foreign debt dominates, tends to affect the level of FX reserves drastically. A high share of foreign currency denominated debt may temporarily build-up FX reserves, however, it reduces it overtime through repayments of external debt and may affect the central bank's reserve adequacy targets. On the other hand, a high share of domestic borrowing compared to foreign debt puts pressure on interest rates and can also crowd-out private investment, resulting in low credit extension to the private sector, decreasing investment, economic activity and output, (Baksay *et al*, 2012).

Although foreign debt minimises the crowding out effect and increases the flow of FX reserves, it has a long-term negative effect on government expenditure. A high foreign debt stock increases government expenditure through interest payments and debt servicing payments. The long-term effect of high government foreign borrowing may lead to a persistent record of negative budget balances over the years and this process may become recurring and might instigate a debt crisis if not solved. A government debt dominated with a high share of foreign debt may also expose the country to external vulnerability as perceived by external investors and various credit rating agencies. In addition, foreign borrowing can further have implications on the level of FX reserve through exchange rate, as a depreciation of a local currency may worsen debt servicing costs and ultimately FX reserves may be drawn down in the absence of adequate fiscal space.

One of the current macroeconomic challenges in Namibia is the persistent increase in government expenditure and the level of debt. Government's spending and a negative budget balance has been a subject of concern to the Namibian fiscus. The persistent growth in government expenditure and the fiscal deficit has resulted in an increase in government borrowing to finance the deficit. In this regard, total government debt relative to GDP has increased and exceeded the national threshold of 35 percent set by the Namibian government and has further gone beyond the Southern African Development Community (SADC) threshold of 60 percent (Figure 1). Despite efforts and reforms such as fiscal consolidation to help reduce spending, government expenditure remains high and continues to register a budget deficit. Consequently, high expenditure and rising debt continues to remain a hurdle for Namibian policy makers.

Namibia's FX reserves are comparatively low in SADC given the regional benchmark of 6 months import cover. Despite Namibia's FX reserves historically meeting the international benchmark of 3 months of import cover as well as the CMA benchmark of 4 months. Over the study period, there were times when FX reserves were below the 3 months import cover benchmark (Annex Figure 8). Furthermore, Namibia's FX reserves expressed in months of import cover remained low relative to some selected countries in Southern African Development Community (SADC), such as Mauritius, Angola and Botswana, that held relatively high FX reserves above 10 months of import cover (Annex Figure 9).

This paper therefore studies the relationship between government expenditure and FX reserves in Namibia. The relationship between the fiscal deficit, expenditure and its impact on other macroeconomic indicators such as inflation and economic growth is one of the highly debated topics in the economic literature, however, little is said regarding the persistent high government expenditure and its impact on FX reserves. To date, no empirical study has examined how government spending affects international of reserves in Namibia. This study, therefore, seeks to bridge this gap by empirically investigating the relationship between government expenditure and FX reserves in Namibia.

2. Research Objective

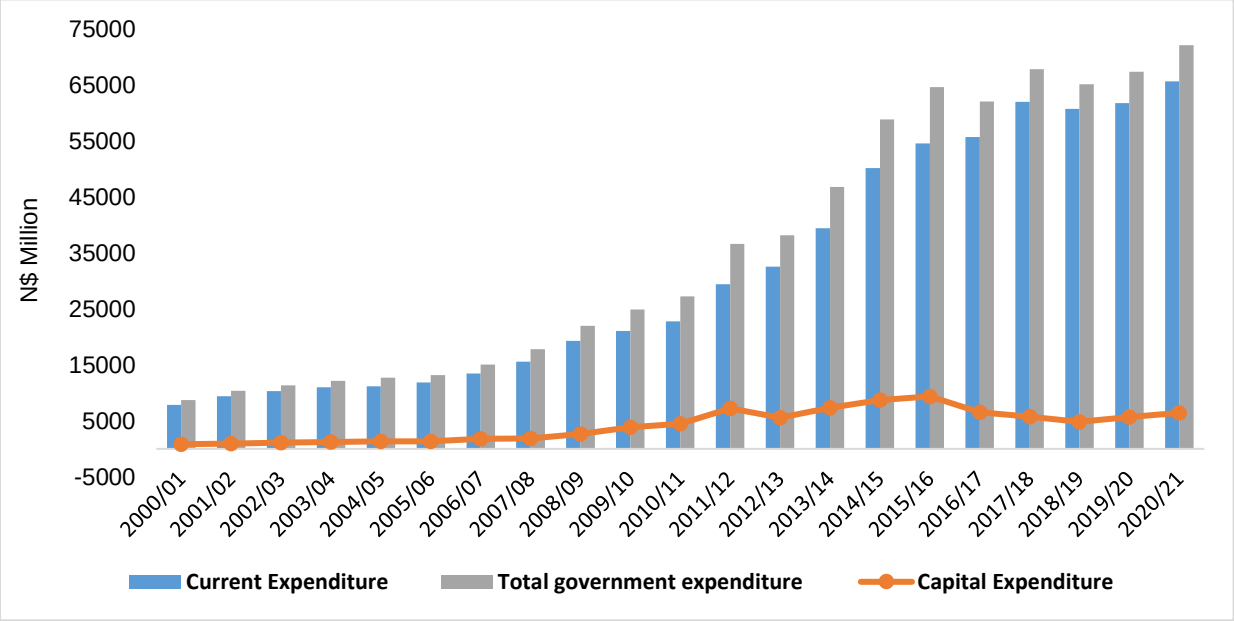
The main objective of this study is to examine the impact of fiscal expenditure on FX reserves in Namibia. The connection between fiscal and monetary policy is one of the complex topics and their effect on various macroeconomic variables are some of the most researched topics by economic scholars. Although the role of each policy is different, the effectiveness of these policies in achieving their respective mandates are highly dependent on proper coordination of the two policies. This study, therefore, aims to empirically investigate the effect of government expenditure on FX reserves in Namibia. The study uses variables such as government expenditure, change in external debt, the current account balance as a share of GDP, money aggregates (M2) and exchange rate as other determinants of FX reserves in Namibia. This study also provides an opportunity to contribute further and enrich the existing literature on the relationship of fiscal policy and FX reserves, by providing evidence from a small developing economy.

The rest of the paper is organised as follows: Following the introduction and research objective, the second section of the paper reviews the Namibian fiscal expenditure and FX reserves, followed by the review of relevant literature in the third section. The fourth section briefly discusses the study's methodology, while the results of the study are presented in section five. The study then concludes with specific policy implications and suggests some policy recommendations.

3. Trend analysis of Government expenditure and FX reserves in Namibia

Namibia has been recording negative budget balances for the past 20 years, except for the period 2006/07 to 2009/10 fiscal years (Figure 2). The deficit reached its highest level of 8.3 percent of GDP recorded in 2015/16, from the lowest of 0.1 percent in the 2005/06 and 2012/13 fiscal years. The rise in the fiscal deficit was mainly attributed to increases in public expenditure compared to revenue, which prompted government to undertake fiscal consolidation initiatives since late 2016. During these periods, government expenditure as percentage of GDP rose from 27.4 percent of GDP in 2000/01 to 30.7 percent in the 2008/09 fiscal year, reaching a peak of 43.4 percent in 2015/16 fiscal year. Government expenditure has remained above 30 percent of GDP since then. The increase in the fiscal deficit in 2015/16 was in line with the trend in government expenditures and government debt level. The persistent negative government budget balance resulted in the escalation of government borrowing from both domestic and foreign sources to finance the deficit.

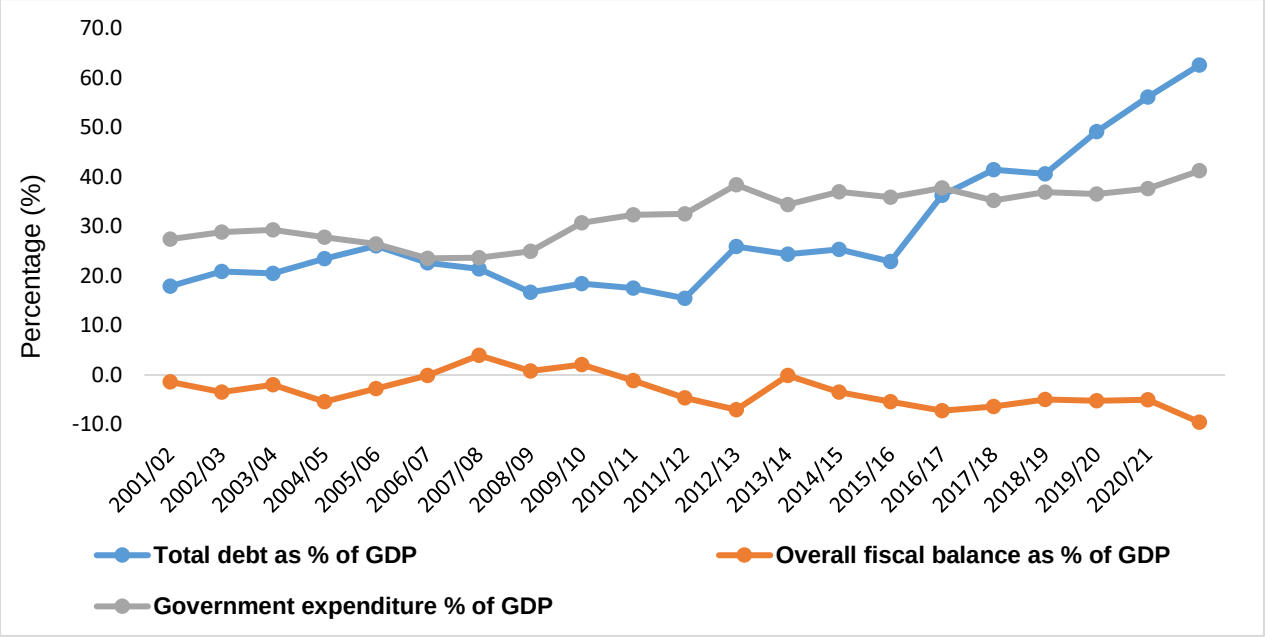
Figure 1: Total government expenditure, current and capital expenditure



Source: Bank of Namibia (2021)

The increase in government expenditure is mainly due to high current expenditure and policy implementation over the study period (Figure 1). Increase in government expenditure can mainly be attributed to high operational government expenditure as a result of high personnel spending. This is mainly due to high wage bill as a result of recruitment of teachers and police officers, as well as civil servants' salary grade restructuring, coupled with subsidies and other current transfers during the study period. In addition, government expenditure from 2009/10 was also accelerated by spending on policy implementations such as the National Development Plans (NDPs), Targeted Intervention Programme for employment and Economic Growth (TIPEEG), Harambe Prosperity Plans (HHP) and free education among others. Moreover, interest and borrowing related charges, are some of the general additional contributing factors to high expenditure by government. The increase in spending since 2020/21 fiscal year was due to the expansion in fiscal spending related to COVID-19 pandemic. Additionally, government expenditure is estimated to increase further beyond 2020/21 fiscal year, as a result of the pandemic.

Figure 2: Total government debt, overall fiscal balance and expenditure (% of GDP)



Source: Bank of Namibia (2021)

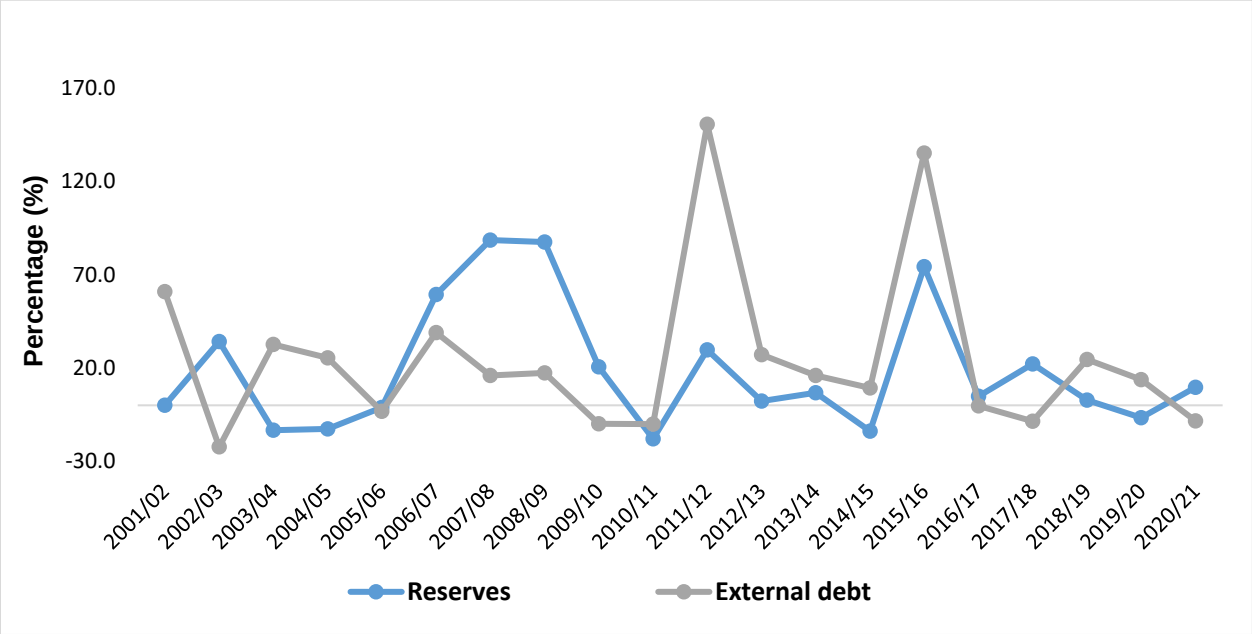
Government total debt increased during the study period, mainly due to the growth in expenditure. Total debt as a percentage of GDP had been relatively low and remained within the limit of 35 percent of GDP, since 2000/01 to 2014/15 fiscal periods. In the 2015/16 fiscal year, the government total debt as a percentage of GDP reached 41.5 percent before increasing further to 43.2 percent in 2016/17, reaching 52.9 percent in the 2019/20 fiscal year (Figure 2). The increase was due to rapid increases in government borrowing to finance the fiscal budget related finances. Public debt as a ratio of GDP rose further to its current and highest-level of 62.0 percent in 2020/21 fiscal year (Figure 2), was attributed to high spending directed to reduce the impact of the COVID-19 pandemic. This level is estimated to increase further to a level above 70.0 percent, as fiscal expenditures related to addressing externalities posed by the COVID-19 pandemic expands. Furthermore, the government debt level has exceeded both the Namibian government debt-to-GDP ratio thresholds of 35 percent and the SADC benchmark of 60 percent. This development, however, is not exclusive to Namibia as the pandemic has exacerbated debt levels of many developing countries.

Growth in FX reserves moves in line with the growth in external debt. Growth in foreign borrowing by government is observed to be followed by an increase in the growth of FX reserves. This is mainly evident in 2011/12 when an increase in foreign borrowing by 150 percent, led to a growth in FX reserves by 20 percent (Figure 3). A similar trend is observed in the years through to 2015/16 up to 2017/18 fiscal years, when growth in external debt resulted in an increase in FX reserves following the same trend. The increase in foreign debt during these periods was largely attributed to the issuance of the Eurobond and JSE listed bonds in 2011/12, 2012/13 and 2015/16 fiscal years, respectively. In addition, the increase was partly due to the depreciation of the Namibia Dollar against the US Dollar. These developments resulted in an increase in FX reserves during these periods. Moreover, the increase in FX reserves was further complemented by SACU receipts and the introduction of an asset swap arrangement by the Bank of Namibia with the Government Institution Pension Fund (GIPF).

On the contrary, Namibia observed a marginal decline in FX reserves in 2018 and 2019 (figure 3), despite growth in foreign borrowing, these declines can partly be associated to lower SACU receipts, during the same period. The reduction in FX reserves was also partly driven by higher government foreign payments during 2019, coupled with net sales of rand to commercial banks by the Bank of Namibia. The observed increase in foreign exchange reserves in 2020 was mainly due to foreign debt inflows such as the AfDB loan, higher SACU receipts and

the depreciation of the of the local currency against major international currencies. Furthermore, the higher level of foreign exchange reserve in 2020 was due to a decline in the level of imports as a result of subdued demand, caused by the impact of global economic lockdowns as a result of the COVID-19 pandemic. These trends demonstrate the extent to which fiscal policy such as external deficit financing and high government expenditure can affect the FX reserves level.

Figure 3: Growth rates of foreign debt and FX reserves

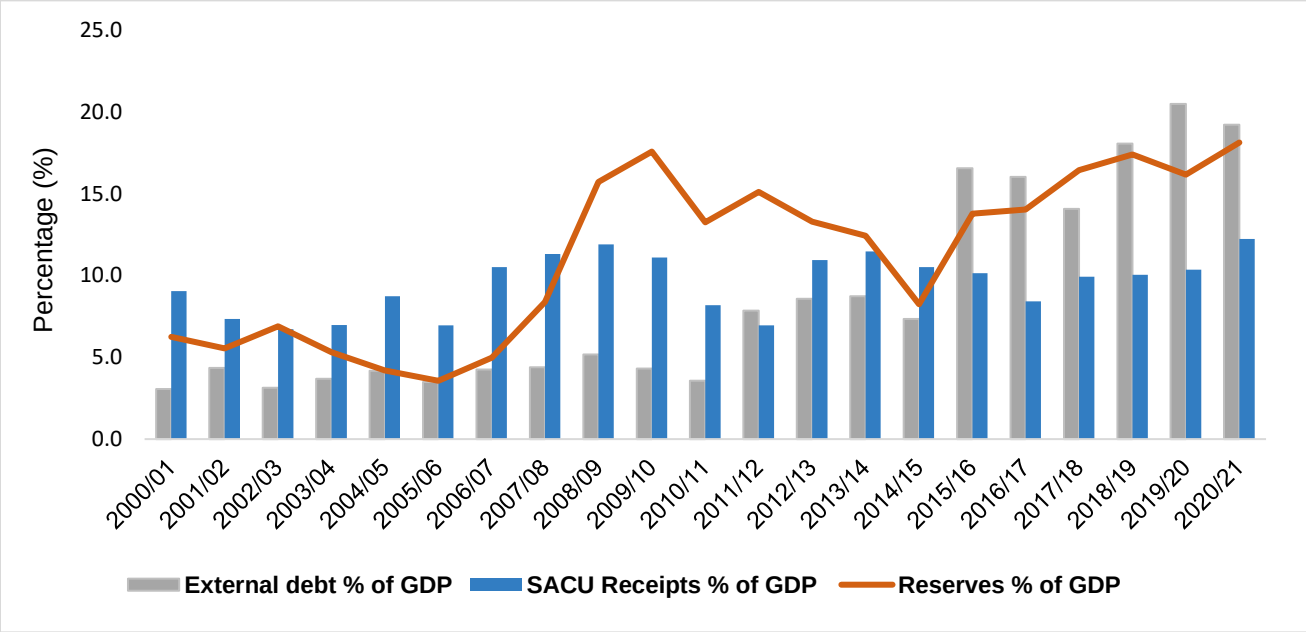


Source: Bank of Namibia (2021)

An increase in SACU receipts contributed to the expansion of government expenditure and FX reservess. From 2000/01 to 2005/06 fiscal years, both FX reservess and SACU receipts were relatively below 10.0 percent of GDP (Figure 4). However, as SACU receipts started increasing from 2006/07 fiscal year, the FX reserves started picking up. Both FX reserves and SACU receipts increased to a level above 10 percent of GDP between 2006/7 to 2009/10 fiscal years. An increase in SACU receipts have prompted an increase in government expenditure during the same period and as a result, imports picked-up during the same period (Figure 5). A sudden pickup in the level of imports in 2008/09 and 2009/10 fiscal year, as well as a reduction in SACU receipts during these periods, placed pressure on FX reserves. These developments resulted in a sharp decline in the growth of FX reserves between 2009 and 2014/15 fiscal year.

An upward trend of foreign exchange reserve from 2014/15 fiscal years is associated to an increase in foreign debt acquired during the same period.

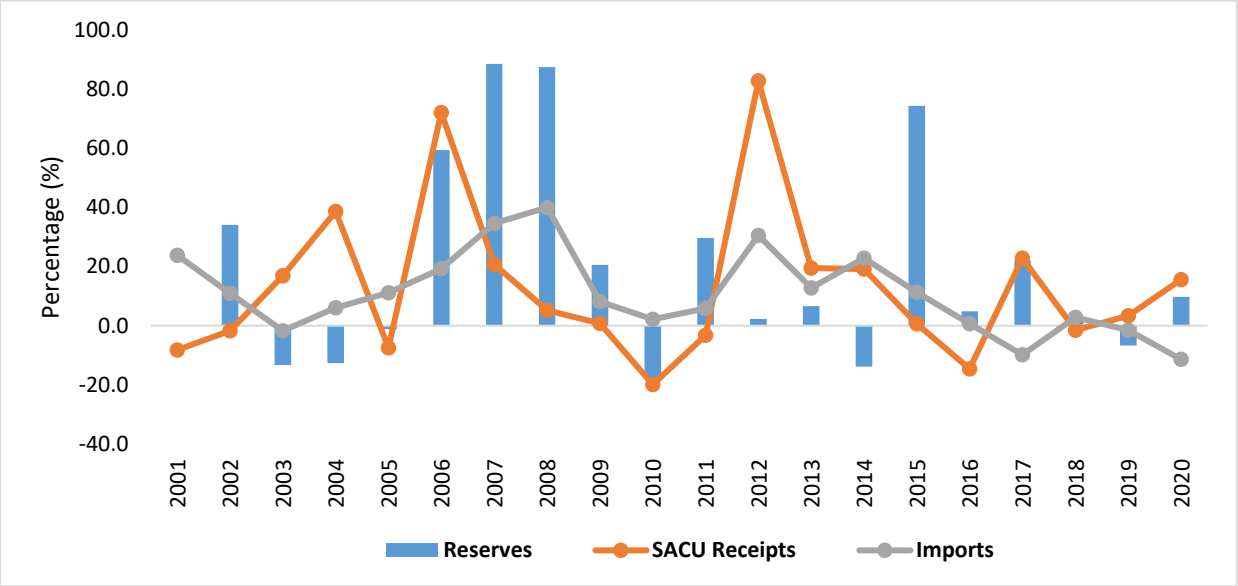
Figure 4: Trends in external debt, SACU receipts and FX reserves (% of GDP)



Source: Bank of Namibia (2021)

There is a high association between FX reserves, government expenditure and external debt. Growth in government expenditure seems to trigger growth in imports of goods. This is because, an increase in expenditure begins with an increase in SACU receipts, and an increase in expenditure of government results in an increase in imports, which theoretically is supposed to reduce reserves as imports are paid in foreign currency. As SACU receipts increased by 72.1 percent in 2006/07 fiscal year, for example, reserves also increased by about 60 percent and government expenditure increased by 14 percent and imports increased by 19.2 percent.

Figure 5: Growth rates of imports, SACU receipts and FX reserves



Source: Bank of Namibia (2021)

The trend analysis above indicates that a persistent fiscal deficit, high government expenditure, in an import-dependent country such as Namibia, can result in a drastic decline of FX reserves. Given that Namibia is an import dependent country, a persistent increase in the fiscal deficit due to increase in government expenditure as depicted above, can result in a decline of FX reserves, as FX reserves are used to pay for imports. This maybe a cause of concern, especially when imports of consumable goods are higher compared to capital related imports. This is the case for Namibia, whose imports share of consumable goods is more than 20 percent over the study. In the long run, this may result in Namibia not being able to meet its foreign financial obligations. To this end, the crucial question is whether the level of FX reserves is affected by fiscal developments, hence, the objective of this study.

4. Literature Review

The study's review of literature follows two approaches, the first discusses the theoretical framework which relies on a model of foreign exchange reserve determinants and secondly the empirical review, which assesses the connection between fiscal policy, represented by fiscal expenditure, fiscal deficit and external debt and how it relates to FX reserves.

4.1. Theoretical framework

There are several approaches that explains the theoretically determinants of FX reserves. The theoretical explanation of the foreign exchange reserve model is described by two approaches (Huang and Shen, 1999, as cited in Khomo *et al* 2018). The first approach assumes that FX reserves fluctuations respond to discrepancies between the desired reserves and actual reserves held by a country. The demand for international reserves or buffer stock model states that reserves are there to finance international transactions and thus serve as a buffer stock against fluctuations in international accounts.

The alternative approach explains the reserve holdings in terms of the monetary approach to balance of payments. According to this approach a change in reserve holdings is related to the disequilibrium in the domestic money market. FX reserves will increase when there is an excess demand for money, given that domestic credit is constant; and conversely FX reserves will decrease if there is an excess supply of money, Prabheesh, Malathy and Madhumathi (2007).

With the assistance of the IMF (2003) study guidelines, Prabheesh, Malathy and Madhumathi (2007) as well as Khomo *et al.* (2018), identified the empirical determinants of the FX reserves model. These determinants can be grouped into five major categories, namely, economic size, current account vulnerability, capital account vulnerability, exchange rate flexibility and opportunity cost (Table 1). Khomo *et a*l. (2018), however, further emphasised that the choice of potential variables entering the model for each country may be different based on the underlying economic structure, exchange rate policy and external sector. The FX reserves model should follow these theoretical grouping, however, the uniqueness of the underlying factors of the economy that may affect the FX reserves, may result in some minor alterations of the theoretical model of FX reserves.

Table 1: Empirical determinants of FX reserves

Determinants	Explanatory variables
Economic size	Population and per capita GDP
Current account vulnerability	Ratio of imports to GDP, ratio of trade to GDP and ratio of the current account deficit to GDP
Capital account vulnerability	Ratio of the capital account deficit to GDP, ratio of short-term external debt to GDP and ratio of broad money to GDP
Exchange rate flexibility	Standard deviation of exchange rate
Opportunity cost of holding reserve	Interest rate differential

Source: Khomo et al (2018).

In addition, the theoretical link between government expenditure and FX reserves is mainly through financing of the fiscal deficit. According to Abayomi et al (2014), the fiscal deficit may be financed in two ways:

- Firstly, a fiscal deficit can be financed through external net claims, which can be indirectly done through an increase in foreign borrowing or reduction of foreign international reserves.
- Secondly, fiscal deficit could also be financed domestically, by an increase in government debt held by the private economic sector.

The financing of the fiscal deficit through domestic and foreign borrowing is expressed as follows.

$$G-T = \Delta DC^{g} - \Delta NFA^{g} \quad \ldots\ldots (1)$$

Where G-T represents fiscal deficit given as government consumption (expenditure) less Tax, ΔDC represent Domestic credit extended to government and ΔNFA represents a change in FX reserves (as Net Foreign Assets). Hence, persistent record of fiscal deficit or increase in-government expenditure affects ΔNFA.

4.2. Empirical Literature Review

The empirical literature on fiscal policy and exchange reserves in Namibia is non-existent, however, the topic is widely debated on a global and regional level. The empirical studies discussed below established that there are various macro-economic variables that affect FX reserves in advanced, emerging and developing economies.

Annicchiarico, Marini and Piersanti (2007) found a link between fiscal deficits and currency crises which was ultimately because of a decline in FX reserves. In their study, Annicchiarico, Marini and Piersanti (2007) investigated currency and financial crises of the 1990's using an optimising general equilibrium model for the emerging markets. The study focused on some Latin American and Asian countries (Argentina, Brazil, Mexico, Venezuela, Chile, Colombia, Peru, Uruguay, Bolivia, Honduras, Indonesia, Korea, Malaysia, Philippines, Thailand, Turkey, Singapore, China (P. R. Mainland), India, Pakistan and Sri Lanka), using data from 1990 through 2000. The results showed that a rise in current and expected future of government budget deficits which is a result of high government expenditure, may generate a real exchange rate appreciation and a decumulation of external assets, leading up to a currency crisis when FX reserves approximate a critical level.

Likewise, an increase in the government budget deficit (expenditure) led to FX reserves outflows in Pakistan. Chaudhary and Shabbir (2005) investigated the impact of the government budget deficit on money supply, domestic price level, output, balance of payments and international reserves in Pakistan over the period 1965-99. Their empirical evidence led to a conclusion that fiscal and monetary variables are important determinants of economic stability in the external sector of Pakistan. It concluded that money supply was positively related to FX reserves, bank credit and borrowing of the public sector to finance the deficit. The increase in the government budget deficit, financed through excessive expansion in domestic credit, created excessive supply of money over demand and led to FX reserves outflows.

In India, FX reserves accumulation was highly sensitive to capital account vulnerability. Prabheesh, Malathy and Madhumati (2007) estimated the demand for FX reserves for India using a vector error correction cointegration approach, over the period 1983-2005. The study established that the ratio of imports to GDP, the ratio of broad money to GDP, exchange rate flexibility and interest rate differential determine India's long-run reserves demand function. The

study empirically concluded that reserves accumulation in India was highly sensitive to capital account vulnerability and less sensitive to its opportunity cost.

Further empirical evidence on fiscal policy and FX reserve showed that, developing countries with low political risk, countercyclical (procyclical) fiscal policies have higher (lower) FX reserves holdings in economic recessions. Zhou (2009) investigated the link between the pattern of fiscal policy and the demand for FX reserves in developing countries, and how this relationship is associated with political risk and conditional access to global capital markets. The study results indicate that for developing countries with low political risks, FX reserves and fiscal policy have the following relationship: during economic downturns, countercyclical fiscal policies are associated with higher FX reserve holdings, while procyclical fiscal policies are associated with lower FX reserve holdings. This relationship is stronger when the countries with low political risk rely heavily on external financing. The results for developing countries with high political risk, however, did not indicate a clear-cut link between reserve holdings and fiscal policy pattern.

According to Baksay *at el.* (2012), the size and structure of foreign currency-denominated public debt, influenced the optimal level of FX reserves in Hungary. The study analysed the interactions between public debt policy and FX reserves management in the emerging markets-for Hungary. The study applied the Guidotti-Greenspan rule, which states that reserves should cover a country's short-term foreign debt, with the period of analysis ranging from 1990 to 2011. The study found that foreign currency debt issuance contributed significantly to the growth of FX reserves. However, the positive contribution was temporary and could cause serious difficulties in the assessment of FX reserves adequacy, especially during crisis periods when it's difficult to refinance maturing debt at a time when, for various reasons, the reserve requirement may still be rising. Moreover, it could affect the profit-loss of the central bank and may affect the public deficit and debt as well.

Chowdhury, Uddin and Islam (2014) concluded that the exchange rate, remittances, home interest rate, broad money, export and import, as well as per capita GDP have significant long-run effect on FX reserve in Bangladesh. The study conducted an Engle Granger residual-based co-integration analysis of the determinants of FX reserves using annual data for the period of 1972-2011 for variables including remittances (% of GDP), the exchange rate, inflation rate differential, unit price index of imports and export, foreign aid (% of GDP) and per capita GDP.

The empirical results confirmed that there exists a strong relationship among FX reserves, exchange rate, remittance, home interest rate, broad money, unit price index of export and import, and per capita GDP. The paper concluded that the exchange rate, a strong remittance related policy, quality items of exports, and sustainable GDP can play a substantial and feasible role with retaining a healthy amount of FX reserves for Bangladesh. The study, however, did not include any fiscal variables in their study.

Likewise, Bosnjak, Bilas and Kordic (2020) found the exchange rate and money supply (M2) as significant determinants of FX reserves in North Macedonia and Serbia. The paper applied a quantile regression approach to explore the determinants and properties of FX reserves in Serbia and North Macedonia, using quarterly data for the period 2005q1–2019q1. The results revealed quantile-dependent determinants of FX reserves and enabled a comparison between the two countries, showing co-movements between monetary policy and economic fluctuations. The study concluded that for North Macedonia, the FX reserves were significantly determined by the real effective exchange rate, monetary aggregates M2/GDP, and the level of GDP. In Serbia the level of real exchange rate and monetary aggregate M2/GDP are significant determinants of FX reserves.

Foreign debt, exchange rates, inflation, and exports significantly affected the fluctuation of FX reserves in Indonesia. Andriyani, Marwa, Adnan and Muizzuddin (2020) analysed the factors that affect FX reserves in Indonesia. Using variables such as external debt, exchange rate, inflation, and exports as explanatory factors, the study employed the ARDL cointegration approach to do the analysis. The findings from this research revealed that that foreign debt, exchange rates, inflation, and exports significantly affected the simultaneous fluctuation of FX reserves in Indonesia. Partially, foreign debt had a significant and positive effect on FX reserves. The exchange rate had a significant and negative effect on FX reserves, while inflation did not significantly affect FX reserves in Indonesia. Exports had a significant and positive effect on FX reserves.

In Africa, fiscal deficits which are a result of high government spending tend to affect FX reserves. This was confirmed by Fasoranti and Amasoma (2013), who found evidence that running a fiscal deficit led to a long-run deterioration in external reserves accumulation and the exchange rate. Their study examined the effects of and the causation between fiscal deficits and the external sector performance in Nigeria between 1961 and 2011. They employed a bi-variate

granger causality technique and the error correction modeling techniques to examine the causation effects. The study confirmed the existence of a long-run relationship among the variables. There also existed a bi-directional causality between budget deficits and external sector performance in the long-run while a one-way causation existed from the external sector performance to budget deficits in the short-run with no feedback on the fiscal deficit. Further, the results also showed that fiscal deficit did not significantly affect external sector performance in the short-run. The cross-correlation coefficient indicated that fiscal deficits lead to a long-run deterioration in external reserves accumulation and the exchange rate.

Similarly, a relationship between government expenditure and FX reserves was established in Nigeria. Using data for the period from 1981 to 2014, Aboyomi *et al* (2014), examined the effect of fiscal deficits on external reserves in Nigeria over the period 1981-2012. Employing a cointegration and error correction econometric technique, the study examined the relationship between capital expenditure, recurrent expenditure, and external reserves. The study found a long-run relationship among the variables and evidence that capital and recurrent expenditures significantly affect the level of FX reserves in Nigeria. These findings implied that FX reserves can be determined, in the long-run, by recurrent and capital expenditures.

In addition to government expenditure, exchange rate, exports, external debt and inflation were also found to be additional macroeconomic determinants of FX reserves in Nigeria. In addition to government expenditure being a determinant of FX reserves in the Nigerian economy, Osigwe *et al* (2015), evaluated the other macroeconomic determinants of FX reserves in the Nigerian economy. Their study applied the cointegration econometric methodology using variables such as GDP, oil exports, exchange rate, foreign direct investments (FDI), lending rate inflation and non-oil exports, over the period 1970 to 2013. The exchange rate and inflation were found to be negative determinants of FX reserves while oil exports and FDI were positive determinants of reserves in Nigeria. The rest of the variables were found to be insignificant in determining FX reserves. Osigwe *et al* (2015), concluded that exchange rate, exports, external debt and inflation were found to be the main macroeconomic determinants of FX reserves in Nigeria.

Sanusi, Meyer and Hassan (2019), found import, export, exchange rate, inflation and capital inflows as the determinants of FX reserves in ten Southern African countries. They applied the ARDL approach within a panel econometric framework using annual data sets over the period from 1990 to 2015. The FX reserve model included variables such as capital inflows, exports, inflation, exchange rate and imports. They found a long-run relationship among variables, with exports, inflation rate, exchange rate and imports being the significant determinants of foreign reserve holdings. All variables have positive effect on reserve in the long run apart from import demand. On the contrary, capital inflows were found to be a non-significant determinant of reserve holdings in the long-run. The short-run findings showed that all the independent variables, except for exchange rate, did not significantly determine reserve holdings. The study concluded that the "fear of floating" rather than "fear of capital" is a significant driver or determinant of FX reserves in Southern African countries. No fiscal variables such as government expenditure nor external debt or fiscal deficit was included in this study.

In the common monetary area (CMA), Eswatini found evidence that government expenditure, current account, exchange rate and per capita income have significant effect on FX reserves. Using the ARDL bounds testing cointegration methodology, Khomo, Mamba and Matsebula (2018) investigated the behaviour of Eswatini's FX reserves over the period 1990 -2014. The study concluded that FX reserves in Eswatini were driven by GDP per capita, developments in the current account, government expenditure and movements in the exchange rate. The study recommended the need for policy makers to increase efforts to build reserves and support confidence in the currency peg between Eswatini and South Africa and hence maintain financial stability.

Evidence show that fiscal balance has a significant impact on the level of reserve in Namibia. Mushendami, Manuel, Shifotoka and Nakusera (2017), examined the possibility of the monetary approach to balance of payment, by employing the Vector Error Correction Model (VECM) with quarterly data ranging from 1991 to 2015. The study found that, an increase in domestic credit had a negative effect on the Net foreign assets (NFA) and improvement in government budget balance improved the NFA in the short-run. Other macroeconomic variables such as interest rate, exchange rate, GDP and CPI were found to be insignificant. Furthermore, evidence of uni-directional causality from GDP, fiscal balance, exchange rate and domestic credit to NFA was also established in the study. The study, therefore, concluded that, monetary

variables were not the only factors causing variations in NFA in Namibia, as fiscal balance, had significant contributions to changes in the NFA.

Empirical literature shows that that there are various factors affecting FX reserves and evidence shows that government expenditure and fiscal balance variables are among the determinants. Although the reviewed literature above included developing economies, countries in a fixed exchange rate, Southern Africa and even the CMA, no evidence is available for Namibia on the link between government expenditure and FX reserves. Research studies on the fiscal policy and its relation to FX reserves has received little attention in the Namibian economy. To our knowledge, no research has come close to investigating fiscal policy and FX reserves Namibia. This study is the first attempt to assess and therefore contribute to the empirical literature between fiscal policy and FX reserves in Namibia.

5. Methodology

The ARDL cointegration method by Pesaran *et al* (2001) was adopted. To examine the impact of the fiscal deficit financing on FX reserves, a cointegration methodology was employed to analyse the long-run relationship between these variables. The autoregressive distributed lag (ARDL) method was used to establish cointegration relationships among the variables using Eviews. Several steps and procedures were conducted as required by the methodology. The F-test was used to test for cointegration, which tests for the presence of a long-run relationship among the variables. The F-statistic value is used to compare with the critical value in the lower bound and upper bound (Pesaran et al, 1999).

The ARDL bound cointegration equation is specified as follows:

$$\Delta\, lnres = \delta_0 + \sum_{i=1}^{n} \mu_{1i}\, \Delta gx_{t-p} + \sum_{i=1}^{n} \mu_{2i} \Delta lnm2_{t-p} + \sum_{i-1}^{n} \mu_{3i} \Delta ca_{t-p} + \sum_{i=1}^{n} \mu_{4i} \Delta neer + + \sum_{i-1}^{n} \mu_{5i} \Delta ed_{t-p} + \gamma_1 res_{t-1} + \gamma_2 gx_{t-1} + \gamma_3 m2_{t-1} + \gamma_4 ca_{t-1} + + \gamma_5 neer_{t-1} + \gamma_6 ed_{t-1} + \varepsilon_t \quad \text{..... (2)}$$

Where l*nRes* is the log of FX reserves, *gx* is government expenditure as a share of GDP, lnM2 is the log of aggregate money demand, *ca* is current account as a share of GDP, *ed* is change in external debt, whereas *neer* is nominal effective exchange rate. δ_0 represents the intercept; μ_i are short-run parameters, γ_i are long-run coefficients and Δ is first difference operator and ε_t is an error term.

Equation (1) null and alternative hypotheses are derived as follow:

$H_0: \gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = \gamma_5 = \gamma_6 = 0$ ……. *(Null Hypothesis)*

$H_\alpha: \gamma_1 \neq \gamma_2 \neq \gamma_3 \neq \gamma_4 \neq \gamma_5 + \gamma_6 \neq 0$ …… *(Alternative Hypothesis)*

The conditions are that the null hypothesis of no co-integration would be rejected, if the estimated F-statistics are greater than the upper bound value and vice versa if the F-statistic value is lower than critical bound value. This indicates the existence of long-run relationship among the variables. Failure to reject the null hypothesis implies that there is no cointegration, the opposite indicates that the variables in equation (1) have a long-run relationship. The error correction model is then developed to derive the error correction term (ECT) which corrects for any deviations and adjusts it back to the long-run equilibrium in the model.

This methodology is preferred over other methodologies due to its several comparative advantages. Firstly, the ARDL method works well with a small sample size which is the case for this study. Secondly, it is more preferred because of its flexibility to work well with the mixed order of cointegration associated with economic variables. Thirdly, a dynamic unrestricted error correction model (UECM) can be derived from the ARDL bound testing through a simple linear transformation. The UECM integrates the short-run dynamics with the long-run equilibrium without losing any information for the long-run.

To study the impact of government expenditure on FX reserves in Namibia, the study adopts a similar theoretical model by Khomo *et al* (2018). This study adopts Khomo *et al* (2018) FX reserves model. In addition to the variables applied by Khomo *et al* (2018), this study incorporated fiscal variables which include government expenditure and government foreign debt. Hence the model in this study includes the following variables: external debt, current account, government expenditure and the exchange rate.

Given the above theoretical understanding of both fiscal expenditure and FX reserves, the model in this study is then specified as follows:

$RES = f(\ ED, CA, GX, XR$, m2…….. (3)

Re-specifying equation… (3) in a regression form, will obtain equation (4) as follows:

$RES = \beta_1 + \beta_2\, ED_t + \beta_3 CA_t + \beta_4 M2_t + \beta_5 GX_t + \beta_7 NEER_t + \varepsilon_t)$…….. (4)

The Coefficients $\beta_2 \; to \; \beta_6$can be estimated to get the effects of each variable on FX reserves. β_1 is a constant and ε_t is an error term.

Data, variables and prior expectations

The analysis in this study covers the period between 2002Q1 to 2020Q4. The study is conducted using quarterly time series with secondary data sourced from the Bank of Namibia. Data on FX reserves, M2 and changes in external debt are expressed in natural logs, government expenditure and current account are expressed as ratios to GDP, while nominal effective exchange rate is an index.

- ***FX reserves:*** It is the dependent variable.
- ***M2:*** Like Khomo, Mamba and Matsebula (2018)[1] , this study included broad money (M2) variable in the model, due to the fact that Namibia is in a fixed exchange rate with South Africa through the CMA, together with Eswatini and Lesotho. Since the bilateral arrangement under CMA requires that currency in circulation must be fully backed by FX reserves, it was imperative to include this variable in the reserve model. Others such as Madhumati (2007), Chaudhary and Shabbir (2005), Chowdhury, Uddin and Islam (2014), Bosnjak, Bilas and Kordic (2020) and others, have also included the broad money supply (M3[2]) as a variable that introduces capital account vulnerability. Based on the above, the study expects a positive relationship between M2 and FX reserves, as FX reserves holdings will increase as the demand for money increases.
- ***External Borrowing:*** represents borrowing by the government from the external market. It is expected that; change in external borrowing will increase FX reserves in the short-run and reduce it in the long-run due to debt servicing and repayments of foreign denominated loans.
- ***Government expenditure*****:** refers to government expenditure on goods and services in a given period. It is expected that an increase in expenditure will reduce FX reserves. This is because an increase in expenditure will result in higher imports which will be paid using FX reserves. Additionally, Namibia who is a member of the Southern African Customs

[1] Included broad money supply in the foreign exchange reserve model for Eswatini due to the economy being in a fixed pegged exchange rate policy to the South African rand.
[2] Namibia does not currently compile M3.

Union (SACU), receives payments from SACU. SACU inflows increase FX reserves and from experience, this increases government expenditure, which later reduces FX reserves (Khomo et al, 2018).

- ***Nominal effective exchange rate:*** The weighted average of the Namibia dollar in relation to an index of other major trading countries' currencies. An appreciation of the Namibia dollar will result in a decline of competitiveness. Exports will decline and imports will increase. Hence, an appreciation will reduce FX reserves, while a depreciation will increase FX reserves.
- ***Current account balance***: according to the IMF BPM6[3] definition, an account of the Balance of Payment (BoP) which shows the flows of goods, services, primary income and secondary income between resident and non-resident units. An increase in current account is theoretically expected to have a positive effect on FX reserves, while a decrease in current account means imports are higher than exports and will reduce FX reserves.

5. Results

Unit root test

As per the methodological requirements, it is necessary to test the order of cointegration of the data used in the model. Testing for unit roots in the data is very crucial, as data which is cointegrated of order 2 contradicts or violates the ARDL methodology. Hence, performing such tests at the beginning of any analysis is necessary as results may be spurious and misleading if variables integrated of order I (2) and more are included in the regression.

[3] Balance of Payments and International Investment Position Manual

Table 2: Phillips-Perron Unit root Test

Phillips-Perron Unit root Test					
Variable	**Level**		**First Difference**		**Conclusion**
	Intercept	*Intercept & Trend*	*Intercept*	*Intercept & Trend*	
	Phillips-Perron test statistics and Probability				
GX	0.066855 (0.9611)	-2.744319 (0.2225)	-9.856144*** (0.0087)	-9.833125*** 0.0293	I (1)
Current account	-3.775559** (0.0047)	-4.593313*** 0.0022			I (0)
Reserve	-0.737929 (0.8301)	-1.893365 (0.6481)	-9.500039*** 0.0000	-9.886955 *** (0.0000)	I (1)
Foreign debt	-1.258332 0.6448	-0.137273 0.9933	-3.567196** 0.0088	-3.722321*** 0.0269	I (1)
M2	-0.549648 0.8742	-1.553676 0.8012	-9.235417*** (0.0000)	-9.243699*** (0.0001)	I (1)
Neer	-0.216244 0.9309	-3.035911 0.1296	-6.798416*** (0.0000)	-6.927683*** (0.0000)	I (1)

*Notes: *; **; *** denotes significance at 10%, 5% and 1% respectively. values in parentheses represent the probability*

The unit root tests presented in Table 2 reveal that all variables except for current account were stationary after first difference. The study applied the Phillips-Perron Unit root test, to evaluate the order of cointegration and whether the data is stationary to conform with the cointegration ARDL method. The results of the unit root test presented in Table 2 indicate that all variables are I (1), as they only became stationary after taking first difference. The current account is, however, stationary in levels, which implies that it is an I (0) variable. The order of integration of the variables used in the study conform with the ARDL methodology requirements, which tolerates the use of I (0) and I (1) cointegration combination.

ARDL Cointegration test

Table 3: Cointegration test (bound test)

	Lower Bound (I0)	Upper Bound (I1)	F-statistics
Significance levels	***Critical value bound***		
10%	2.08	3.00	*3.83*
5%	2.39	3.38	
2.5%	2.70	3.73	

The results confirmed that there is indeed cointegration among variables. The null hypothesis of no co-integration is rejected at all levels of significance, which implies that there is a long-run relationship among these variables. This is because the estimated F-statistics value is greater than the upper critical bounds value at all levels of significance based on Pesaran *et al* (2001) (Table 3). A confirmation of cointegration in this study proves that there is a long-run relationship between FX reserves, external debt, exchange rate, government expenditure and the current account. Furthermore, the existence of cointegration relationships in the model means that, a short-run Error Correction Model (ECM) of foreign exchange rate can be further investigated.

The study further confirms that growth in government expenditure and external borrowing have long-run effects on the level of FX reserves in Namibia. As expected, the coefficient of government expenditure exhibits a negative effect on FX reserves. This means that a percentage increase in government expenditure will reduce FX reserves by 0.15 percent. This finding is consistent with the findings of Khomo *et al* (2018) who also found a negative effect of government expenditure on FX reserves, in Eswatini. Moreover, the results show that growth in foreign debt is positively related to FX reserves, this is reflected by a positive coefficient which is statistically significant. All other things being equal, a percentage increase in government foreign debt will increase FX reserves by 0.52 percent. This is theoretically true and in line with prior expectation that, growth in government external debt instantly increases FX reserves. This is mainly attributed to the effects of external debt reserve shocks, which often increases the level of FX reserves as a result of foreign debt transfer through to the central bank. In general, however, high external debt, has a long-term negative effect on FX reserves, as it puts pressure on government expenditure due to increased repayments and foreign debt servicing thereof. These results

conform to the theory of capital flows, which explains that borrowing money from other countries will lead to a temporary increase in foreign capital flow, increasing FX reserves (Andriyani *et al*, 2020).

The exchange rate and current account vulnerability both have a long-run effect on FX reserves in Namibia. As expected, an exchange rate appreciation has an inverse relationship with the level of FX reserves, as the coefficient of nominal exchange rate on FX reserves came out negative and statistically significant. Moreover, a depreciation of local exchange rate against foreign currency results in higher levels of FX reserves when expressed in Namibia dollar. The result implies that an increase in real exchange rate (appreciation) by one index point reduces foreign reserve by 3.88 percent and vice versa. This is also linked to the theoretical expectation of the link between exchange rate and trade. As the exchange rate appreciates, export will decline while import increase which ultimately reduces foreign exchange receipts, however as the exchange rate depreciates it will increase FX reserves through increase in export receipts.

The exchange rate result is in line with the result of current account, whose coefficient came out positive and statistically significant. These results confirm that an increase in current account which is an improvement in export earnings increases FX reserves, while a decline in current account reduces FX reserves. The long-run results of capital account vulnerability variable proxied by M2, showed that it has a positive relationship with FX reserves. Meaning, a one percent increase in the broad money supply will result in FX reserves holdings to increase by 2.94 percent in the long-run. This is true for Namibia and other CMA members in which the money circulation in the economy should be backed by the equivalent amount of FX reserves.

$$\boldsymbol{lnres = -4.51 - 3.88reer + 2.94m2 + 0.11ca - 0.15gx + 0.52ed} \ldots\ldots\ldots\ldots\ldots \textbf{(5)}$$

[-1.04] [-3.15] [9.65] [2.93] [-4.81] [2.64]

The estimated model's error correction term (ECT) was negative and significant and has a strong convergence back to long-run equilibrium level (Table 4, annex). The lagged ECT of the ARDL cointegration exhibits a negative coefficient of 0.43 and was statistically significant. This result implies that the selected ARDL model adjusts all the short-run error (shocks) back to its long-run equilibrium at an adjustment speed of 43 percent. All short-run disequilibrium in the FX reserves model is corrected back to its long-run equilibrium every quarter. In the short-run, current

account foreign debt, government expenditure and exchange rate have effects on FX reserves in Namibia, except for broad money (M2). These are supported by the significant coefficients, while broad money is insignificant.

Various diagnostic tests were conducted to test how good the fitness and the stability of the estimated model was. The Autoregressive Conditional Heteroscedasticity (ARCH) test, Breusch-Godfrey serial correlation LM and the Jarque-Bera tests were used to test for heteroscedasticity, serial correlation, and normality of the series in the model, respectively. The results displayed in Table 5 shows that the residuals are normally distributed and there is no autocorrelation. It further shows that the model does not suffer from heteroscedasticity, this means that the estimated model is well specified.

Table 5: Diagnostic Tests

Tests Results		
Breusch-Godfrey Serial Correlation LM Test	Obs*R-squared 0.403632	Prob.Chi-Square (4) (0.9395)
Heteroskedasticity Test: ARCH	Obs*R-squared 0.254379	Prob.Chi-Square(3) (0.9684)
Normality Test)	Jarque-Bera (5.50)	Probability (0.06364)
Durbin-Watson stat	2.083288	

Based on the recursive cusum test, the study conclude that the residuals are stable. The study used both the Ramsey reset and recursive cusum tests to test for stability. The results are displayed in Figure 6 and 7 as well as Table 5 in the annex. The study failed to reject the null hypothesis of the stability by at least one test (Ramsey reset) and assumed that the residuals are stable based on the recursive cusum test**. (**Cusum test, is based on the residuals from the recursive estimates, that also helps detect the systematic changes and sudden changes in regression coefficient. Both the Cusum and the Cusum of squares test showed in Figure 6 and 7 (Annex) reveal that, the estimated model is stable as the fitted line lies within the 5 percent critical region. All diagnostic tests, prove that the estimated model results are fit and reliable and can be referenced for policy use.

6. Conclusion and Policy Implications

The study concluded that government expenditure has a negative effect on FX reserves in Namibia. The study examined the effect of government expenditure on FX reserves in Namibia, by empirically testing the long-run relationship between FX reserves, foreign debt, government expenditure, exchange rate, current account vulnerability and broad money supply. The long-run relationship was tested using the ARDL bound test for the period 2002: Q1 to 2020: Q4. Empirical test results revealed that there is a long-run relationship between FX reserves and foreign debt, government expenditure, exchange rate, current account, and broad money supply. The study found that an increase in government expenditure reduces FX reserves, while foreign debt accumulates reserves. The study also confirmed that, an appreciation of nominal exchange rate reduces FX reserves in Namibia, while both the current account and broad money supply were found to have positive relationship with FX reserve holdings.

This conclusion is in line with the findings from other scholars. The conclusion of this study is consistent with the findings of Khomo *et al* (2018) and Aboyomi et al (2014), who also found evidence that FX reserves in Eswatini and Nigeria, were determined by changes in government expenditure. Similarly, the findings regarding the effect of government external debt on reserves, is also in agreement with Baksay *et al* (2012), Fasoranti and Amasoma (2013) who both concluded that the size and structure of foreign currency denominated public debt have an impact on the level of FX reserves.

The conclusions and findings in this study have policy implications. These results trigger necessary policy changes toward a reduction of government expenditure and therefore the fiscal deficit. The review of literature and the empirical results from the study both confirmed that, government expenditure which results in persistent fiscal deficits, usually results in high government borrowing, which impact FX reserves. Persistent fiscal deficits can, therefore, be seen to gradually erode the function of the central bank of safeguarding FX reserves, to maintain the one-to-one link between the Namibia dollar and the South African Rand and hence compromise its credibility in the long run. Annicchiarico, Marini and Piersanti (2007), reiterate this concern by asserting that a deterioration in FX reserves because of a persistent fiscal deficit may hinder monetary policy effectiveness and may result in a currency crisis.

7. Policy Recommendations

- **Based on the findings, the study recommends the continuation of fiscal consolidation.** While there is a dire need of government expenditure in order to cushion the effects of the COVID-19 pandemic on the economy, the study stresses the need for the fiscal authority to continue with prior consolidation policy measures. The reduction and prioritisation of targeted government expenditure to reduce the fiscal deficit will facilitate the attainment of sustainable debt levels going forward.

- **Effort should be put in place to reduce spending, while simultaneously, expanding revenue generation measures under NamRA.** In the wake of the highlighted challenges associated with the persistent negative budget balance, government under the new revenue collection agency (NamRA), is encouraged to prioritise and implement measures that will widen tax base, especially to economic agents in the informal sector that may qualify and contribute towards expanding tax revenue. This must be complemented by the privatisation, outsourcing and if necessary, the liquidation of non-performing SOE's. This will reduce expenditure burden on transfers to SOEs and contribute to the rebuilding of fiscal buffers.

- **Facilitation of private sector led growth and development.** In order to ensure that debt is brought under a sustainable trajectory over a reasonable time, and ultimately reduce the pressure on reserves, government needs to rededicate its commitment to ensure a conducive environment for private sector led growth and investment.

- **The study further recommends that policy makers develop and/or enhance the existing strategies of FX reserves accumulation and management.** Doing this will help Namibia increase its FX reserves buffers and manage it effectively, so as to maintain the fixed exchange rate peg to the South African Rand. This will also allow Namibia to meet the regional requirements of at least a minimum of six months of import cover.

- **Continued coordination of monetary and fiscal policies is encouraged**. As empirically proven by this study and by many other scholars on this topic, the operation of fiscal and monetary policies cannot operate independently. While the role of each policy is different,

the effectiveness of achieving the overall objective of macroeconomic stability requires the continued coordination of both policies.

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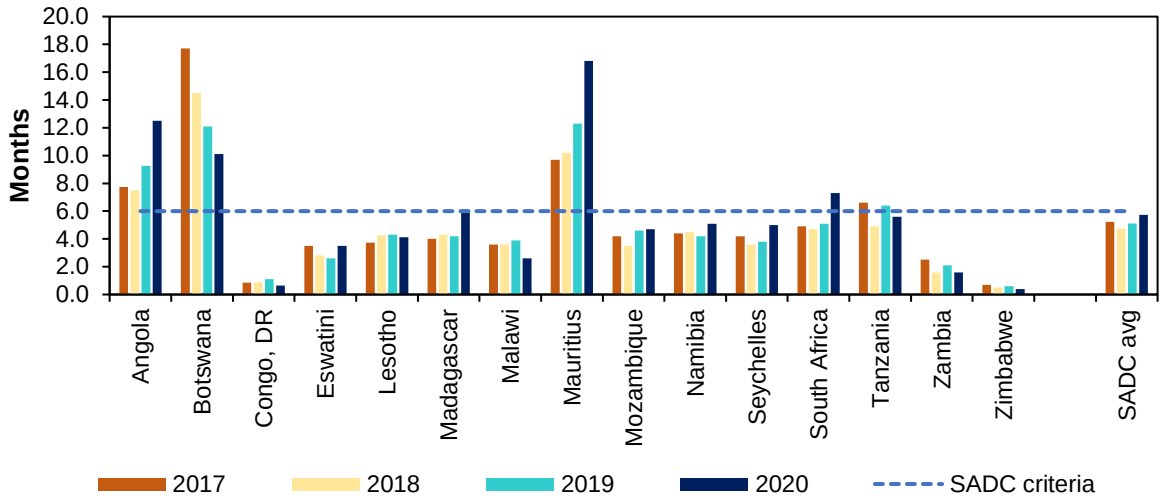
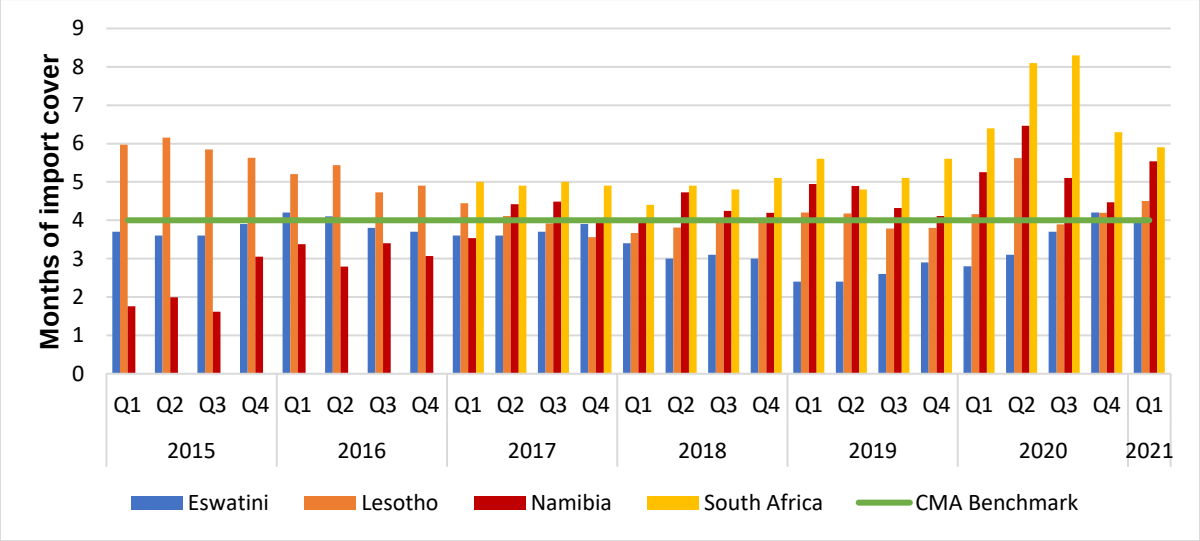
8. Annex

Figure 8: Reserve in months of import cover in selected countries in SADC



Source: SADC (2021)

Figure 9: Reserve in months of import cover in CMA



Source: author's own calculations

Table 4: ARDL Error Correction Regression (1,1,3,0,2,3)

Variable	*Coefficient*	*t-Statistic*	*Prob.*
LNRES(-1)	0.566016	3.501539	0.0009
LNM2	0.898223	3.690506	0.0005
LNM2(-1)	0.379323	1.051043	0.2977
GOV_EXPY	-0.076862	-2.316745	0.0241
GOV_EXPY(-1)	0.103412	1.826355	0.0730
GOV_EXPY(-2)	-0.051666	-1.092097	0.2794
GOV_EXPY(-3)	-0.037977	-1.345808	0.1837
CURNSA_GDP	0.045981	2.199191	0.0319
LNRER	-2.352901	-2.691688	0.0093
LNRER(-1)	2.388218	2.512303	0.0148
LNRER(-2)	-1.717117	-2.712060	0.0088
LNEXT_DEBT	-0.037075	-0.160069	0.8734
LNEXT_DEBT(-1)	0.361270	1.157243	0.2520
LNEXT_DEBT(-2)	-0.407665	-1.480601	0.1442
LNEXT_DEBT(-3)	0.307046	1.363573	0.1781
C	-1.958560	-0.927988	0.3573
CointEq(-1)*	-0.433984	5.445822	0.0000

Figure 6: Cusum test of Stability

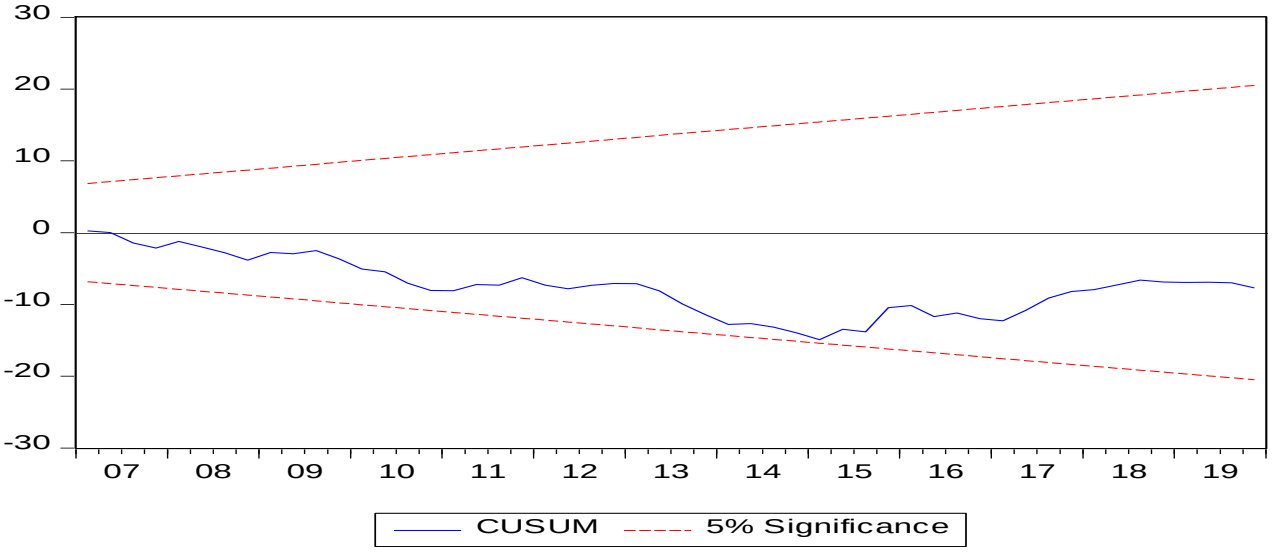


Figure 7: Cusum of square test of stability

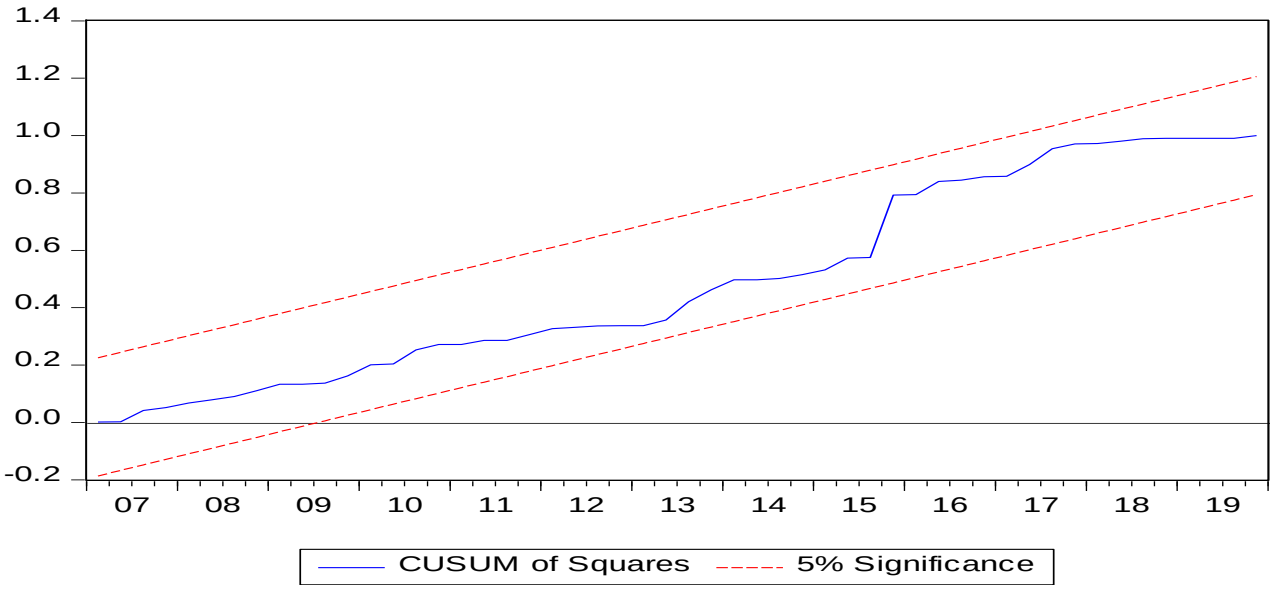


Table 5: Ramsey Reset Test of stability

	Value	df	Probability
t-statistic	2.455610	56	0.0172
F-statistic	6.030022	(1, 56)	0.0172