RESEARCH DEPARTMENT

P O Box 2882, Windhoek, Namibia

Tel: +264-61-283 5111

Fax: +264-61-283 5231

E-mail: research@bon.com.na

AN EMPIRICAL ANALYSIS OF THE SUSTAINABILITY OF NAMIBIA'S CURRENT ACCOUNT

By

Victoria Manuel

Joel Hinaunye Eita

Erwin Naimhwaka[1]

BON Working Paper: WP1- 2018

[1] The team acknowledges Ms. Daisy Mbazima and Mr. Brian Mbazuvara, for their valuable contribution towards the drafting of the paper.

Published by the Research Department of the Bank of Namibia

Enquiries related to this publication should be directed to:
The Chief Economist and Head of Research Department
P O Box 2882
WINDHOEK
NAMIBIA

Tel: +264 61 283 5111
Fax: +264 61 2835231
e-mail: research@bon.com.na

http://www.bon.com.na

ABSTRACT

This paper assessed the sustainability of Namibia's current account position and the main macroeconomic determinants of the current account, over a period of 1990 to 2016 using quarterly and annual data. It also investigated the determinants of current account balance for the same period. The current account sustainability was assessed using the structural analysis approach and the inter-temporal budget constraint framework using the Engle-Granger two steps, VECM and ARDL (DOLS) econometric techniques. These techniques were also employed to assess the main macroeconomic determinants of current account in Namibia. The results from both the structural and intertemporal budget constraint revealed that Namibia's current account is weakly sustainable. The result also shows that there is evidence of twin deficit in Namibia, implying that fiscal deficit is the main determinant of current account. Moreover, financial deepening, investments, commodity prices, capital flow, exchange rate and per capita income are some of the variables contributing to variations in the current account. Based on the findings, the paper therefore recommends strategies to shift the current account to a sustainable path. In this regard, policies strategies such as fiscal curtailing, trade promotion, strategies to increase reserve and expansion of domestic production capacity are recommended.

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1. INTRODUCTION

Current account (CA) sustainability has become one of the most discussed topic in macroeconomics in recent times. Large and persistent CA deficits are among the most serious problems in many developing countries since they may result in economic and currency crises, burgeoning external debt and reduction in international reserves (Deistaings *et al* 2013). Large CA deficits often raise concerns about the sustainability of such deficits and raise questions about their excessiveness, possible effect and adjustments that may result from such imbalances.

A disequilibrium in the CA balance is a global challenge especially in many developing countries, and has been widely discussed both in regional and international economics. Many analyses indicate that the CA balance sustainability is very important for macroeconomic policy changes and decisions. The CA is an important account in the balance of payments, and its balance, is mostly used as a good macroeconomic indicator of economic viability. The CA balance is a useful economic indicator as it represents other important economic variables such as savings, investment and the budget balance, all of which have a direct impact on economic growth, exchange rate and economic competitiveness, (Boljanovic 2012).

There are no empirical studies conducted to investigate the determinants and sustainability of the CA in Namibia. There are many studies that investigated the determinants and sustainability of the external CA in both developed and developing countries, but none in Namibia. Despite the persistent deficit observed in recent years, research studies on the subject in Namibia are limited or non-existent. There are only two studies (Fleermuys, 2005; Eita and Gaomab II, 2012) that came close to investigating Namibia's CA. The focus of Fleermuys (2005) was on the determinants of the overall balance of payments using the monetary approach to the balance of payments in Namibia. Eita and Gaomab II (2012) examined the effect of macroeconomic variables on the balance of payments in Namibia. Both these studies had not dwelled much on the CA sustainability and its determinants. This paper is therefore, the first study to investigate the determinants and sustainability of Namibia's CA balance.

1.1.Objectives

The main objective of this study is to conduct an empirical analysis of the sustainability of the CA in Namibia, and provide related policy advice. As explained above, Namibia has registered persistent CA deficits in recent years, hence, this study seeks to provide an in-depth empirical analysis on sustainability of the Namibian CA imbalances. Large CA deficits have become persistent and have reached worrisome levels, putting pressure on the country's foreign reserves. A widening CA deficit, like the one experienced by Namibia from 2009 to 2016, creates a lot of economic concerns and questions about its sustainability. In this regard, Namibia recently observed a sharp shift in the fiscal policy stance to soften these concerns, through fiscal consolidation to rein in the escalation in the growth of government debt, the budget deficit and decline in foreign reserves. Understanding the causes of the CA deficits is critical in analysing the sustainability of Namibia's external position.

The study aims to fill the gap in the Namibian literature on the subject and also to contribute to the literature regarding the balance of payments (BoP) and CA. The widening of the CA deficit and budget balance together with the identified gaps in the Namibian literature prompted this study, to investigate whether Namibia's CA deficit is sustainable and what the main determinants are that contribute to CA imbalances in Namibia. To date, no empirical analysis has been conducted regarding CA sustainability in Namibia. Hence this study is aimed at filling the gap in the Namibian literature on the subject and also to contribute to the literature regarding BoP and CA. Specifically, the study seeks to provide answers to the following two questions:

I. Is the Namibian CA sustainable?

II. What are the macroeconomic determinants of the Namibian CA balance?

2. OVERVIEW OF THE NAMIBIAN CA

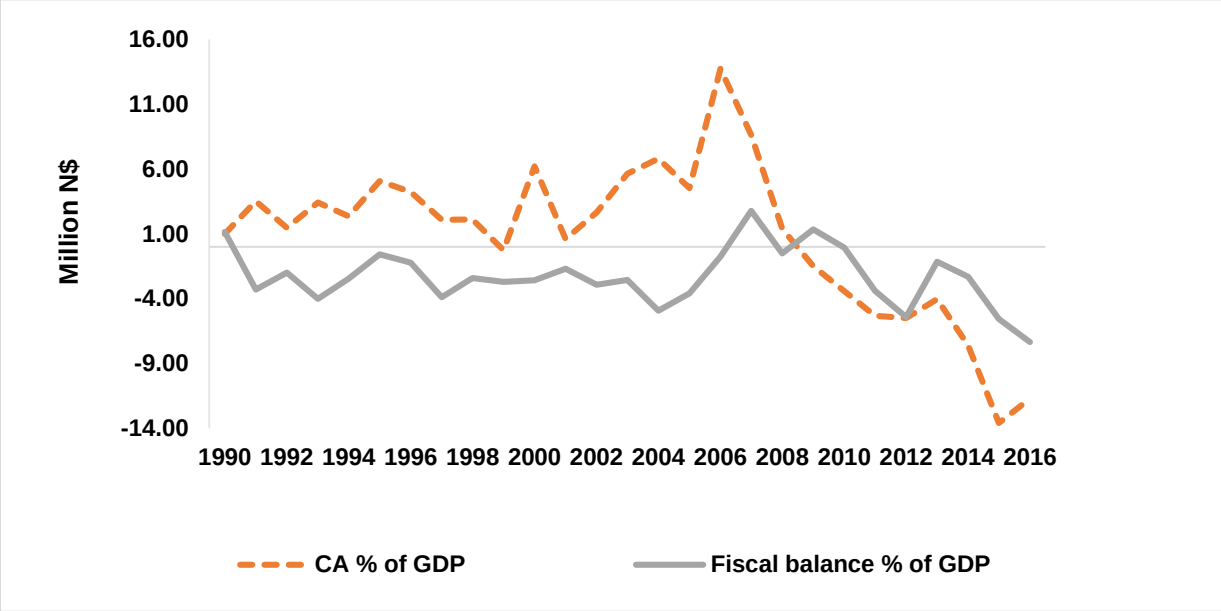
Namibia's CA balance turned negative in 2009 after largely maintaining positive balances since independence in 1990. The recent expansion in economic activity, more specifically in the mining and construction sectors, coupled with slow global economic growth and lower commodity prices, especially from 2015, resulted in large CA deficits in Namibia. Namibia's CA deficit has been widening since 2009, with the deficit peaking at 13.6 percent of GDP in 2015. The deficit stood at 11.3 percent of GDP in 2016 and averaged 6.5 percent between 2009 and 2016 (Figure 1). The rapid increase in Namibia's CA deficit has thus raised questions about the economy's ability to sustain it.

Namibia's CA deficit deteriorated between 2009 and 2016. The CA deficit worsened to about N$8.6 billion on average for the period 2009 to 2016, compared to an average surplus of about N$1.4 billion recorded between 1990 and 2008. This is presented in Figure 2. The deficit observed on the CA was driven by multiple factors such as significant increases in investment, larger budget deficits (mainly through increases in government expenditure), higher private and public consumption and the depreciation of the exchange rate. To elaborate on the fiscal deficit, it has widened over the years as increases in spending surpassed that in tax revenue, with the deficit averaging 5.3 percent of GDP between 2009 and 2016, compared to an average of 1.9 percent of GDP registered between 1990 and 2008 (Figure 1).

Expansion in public expenditure, foreign direct investment (FDI) and private sector credit extension contributed to the CA deficit. The deterioration of the fiscal deficit was underpinned by the rise in the public sector expenditure on capital projects, such as the Targeted Intervention Programme for Employment and Economic Growth (TIPEEG), extension of the port of Walvis Bay, as well as the mass housing programme. The increase in FDI for both exploration and the commissioning of new mines such as Husab and B2Gold resulted in huge increases in capital goods imports over the period 2010 to 2014, and worsened the CA deficit. Furthermore, the tax relief in 2013 as well as the increase in private sector credit extension (PSCE) resulted in increased demand for imports, particularly vehicles, which worsened the trade deficit and ultimately the deficit on the CA.

The depreciation of the local currency and the decline in commodity prices also negatively affected the CA balance. The cost of imports rose due to the depreciation of the local currency during the period 2009 to 2016. The Namibia dollar depreciated, from N$/USD6.18 on average from 1990 to 2008, to N$/US$10.32 on average from 2009 to 2016. Moreover, the last two years of the period has also seen a substantial decline in international commodity prices. Furthermore, increased outflows of investment income in the form of interest as well as dividend payments, a deterioration in the fiscal balance associated with a decline in SACU receipts and a slower economy, and increasing public debt characterised this era. The above factors conspired to fuel a persistent CA deficit in Namibia since 2009.

Figure 1: CA vis-à-vis the fiscal balance as percentage of GDP

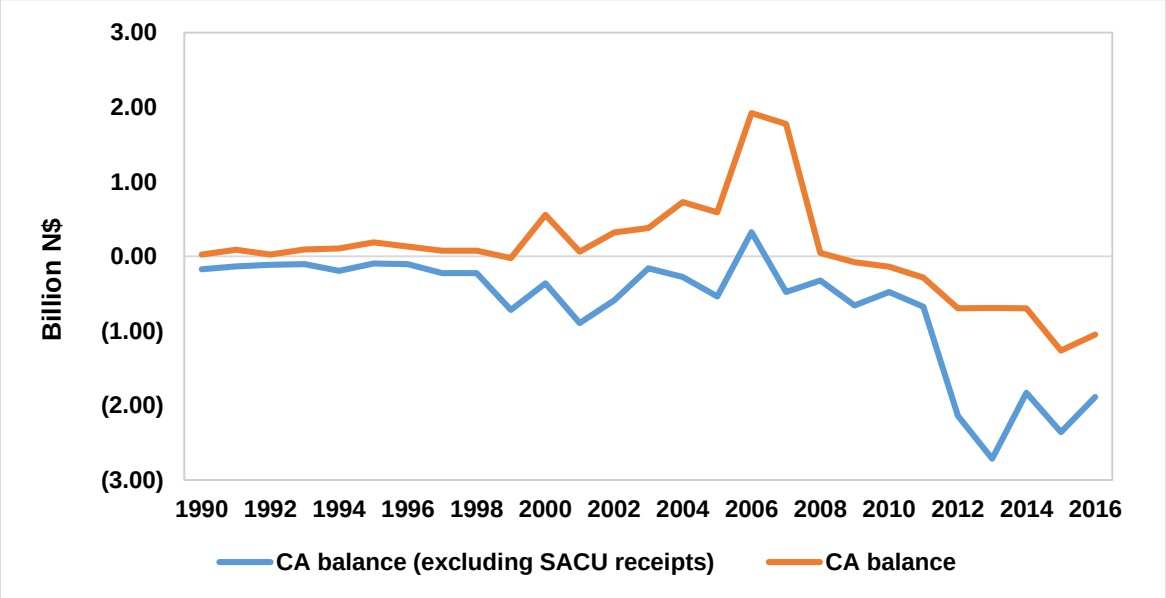


Source: Bank of Namibia

Namibia registered persistent CA surpluses between 1990 and 2008. The CA was largely in surplus since independence in 1990, except for 1999 when the CA balance recorded a marginal deficit of N$62.6 million. Thereafter, the balance returned to surpluses the following year up until 2009, when it turned negative. The surplus observed during this period, was largely due to high current transfer inflows, mostly in the form of SACU inflows and development aid, coupled with inflows of net investment income. The inflows of net investment income during this period were driven by high earnings on portfolio investments, primarily from South Africa. This reflected the high savings rate in Namibia during the same period that allowed the country to build up its stock of income-earning foreign assets. According to Kadhikwa and Shiimi (1999), Namibia's savings

ratio peaked through the 1990s, averaging around 25.0 percent of GDP between 1990 and 1997, mainly due to private sector savings, government savings, contractual institutional savings and development aid. They pointed out that the continued surpluses on the CA, reflected excesses of saving over investment in Namibia. The trade balance (that covers goods only), however, registered persistent deficits since 1990. This is attributed to Namibia being a net importer of goods as a result of low domestic production capacity, particularly for various types of capital goods required to grow the economy and consumer items required to satisfy consumer demand.

Figure 2: CA balance (including and excluding SACU)



Source: Bank of Namibia

3. REVIEW OF LITERATURE

3.1.Theoretical literature

CA sustainability depends on whether a country is able to honour its foreign debt obligations in the medium to longer term without requiring major policy adjustments. Knight and Scacciavillani (1998) indicate that the movements in the CA are deeply intertwined with and convey information about the actions and expectations of all market participants in an open economy. Mann (2002) asserts that the CA is a manifestation of the general equilibrium interactions between factors such as the domestic rates of saving and investment; economic

growth and trade; international investment and capital flows, prices and rates of return; the exchange rate; fiscal and monetary policies. A variety of approaches and models have therefore been utilised by researchers to analyse the sustainability of the CA across the world.

Milesi-Ferretti (1996) defines sustainability of the CA in terms of the solvency and the excessiveness of the CA deficit. Solvency is defined in relation to an economy's budget constraint in present value terms, where the economy is solvent if its discounted present value (DPV) of future CA surpluses is equal to current external indebtedness, while the excessiveness is measured in terms of predictions about the path of the CA balance. The study, investigated to what degree persistent CA imbalances can be taken as a sign of a probable 'hard landing' or crisis ahead. They concluded that concern must be raised about CA deficit sustainability if the export sector is small, external debt and debt servicing are high, savings are low and the financial sector is poorly regulated. They further added that, a specific threshold on a persistent CA deficit (such as 5 percent of GDP for three to four years) is not in itself a sufficiently informative indicator of sustainability. They argued that the size of CA imbalances should instead be considered in conjunction with exchange rate policy, degree of openness, level of savings and investment and the health of the financial system in the country. They further added that measures of the external burden, such as external debt and interest on such debt, provide a better indicator of sustainability when expressed as fraction of exports than as a fraction of GDP.

Gichuki and Moyi (2013) identify theoretical approaches to evaluate CA sustainability including the accounting approach. The accounting approach to CA sustainability uses the debt-to-GDP ratio in determining the sustainability of the CA and implies that for the CA deficit to be sustainable, it needs to be maintained as a constant fraction of GDP or exports. Furthermore, a CA deficit is regarded as sustainable if the growth rate of the external debt is lower than that of GDP or exports. The study, however, points out that the usefulness of the accounting approach is mainly in assessing the consistency among various macroeconomic policy targets, particularly, in evaluating debt.

Nkuna (2013) outlines the structural approach to assessing CA sustainability by comparing the actual CA and a calculated CA norm. It is based on the estimation of the CA model, using an econometric technique in which the most significant coefficient is interpreted as important factor of the CA sustainability. The CA norm is then multiplied with the coefficients obtained from the econometric model and is compared to the actual CA. If the actual CA deficit is

larger than the norm, it means that the CA deficit is unsustainable and the reverse will mean that it is sustainable. However, in order to determine which of the macroeconomic variables is causing imbalances in the CA, it is important to analyse other macroeconomic variables as recommended by Milesi-Ferreti and Razin (1996).

Intertemporal optimisation models (IOM) have emerged as the main theoretical frameworks for assessing the CA deficit sustainability. Various authors such as Knight and Pacciavilani, (1998), Searle and Mama (2010), Karunaratne, (2010), and Khadaroo and Ramlall (2012), Gichuki and Moyi (2013) and Destaings *et al* (2013), have employed IOM models. They consider the CA balance as a variation in the net foreign assets (NFA) of an economy. According Gichuki and Moyi (2013), large CA deficits need not raise sustainability concerns as saving and investment decisions result from forward looking calculations based on the expected values of various macroeconomic factors.

According to Destaings *et al* (2013), the intertemporal approach can be divided into two streams: The *intertemporal solvency approach* and the *intertemporal sustainability approach*. The intertemporal solvency approach is similar to the accounting approach in that it looks at the ability to repay debts. The intertemporal sustainability approach on the other hand looks at both the ability to repay debts and requires that the policies remain constant in the indefinite future.

The intertemporal approach stresses the CA as the difference between national saving and investment. Accordingly, external deficits or surpluses result from intertemporal investment and consumption decisions by firms, household and the government (Knight and Scaciavillani, 1998). It postulates that consumption expenditure depends upon expected permanent income rather than on current disposable income and in the context of an open market economy, when current income deviates from its permanent level, the economy will find it optimal to borrow and lend in the global capital market (Karunaratne 2010). Consequently, it will result in CA deficits or surpluses in order to smooth out fluctuations in consumption.

3.2.Empirical Literature

The intertemporal approach is also one of the widely used methodologies to analyse CA sustainability. Modification of this approach includes the econometric test of cointegration using the Johansen, Engle Granger and Autoregressive Distributed Lag (ARDL) approaches. This study has extensively reviewed relevant empirical papers that assessed CA sustainability in various developed and developing countries.

Several studies in developed and developing countries have examined CA sustainability using the intertemporal approach. The following studies have found the CA to be sustainable in different countries: Hudson and Stennet (2003) for Jamaica's CA, Ohlan (2013) for India, Hassan *et al* (2016) for Malaysia, Searle and Mama (2010) for South Africa, Heidari *et al* (2012) and Arize (2002) for Iran. On the contrary**,** Nkuna (2013) for Malawi, Khadaroo and Ramlaii (2012) for Mauritius, Deistang *et al* (2013) for Kenya and Djeutem and Nguimkeu (2013) for Cameroom, all found the CA to be unsustainable in their studies.

Moreover, the intertemporal approach has also been applied in many cross sectional studies to analyse the sustainability of CA in panel data. These include; Kalyoncu and Kaplan (2014) and Sissoko and Jozefowicz (2016) for the ASEAN economies, Kunaratne (2010) for Australia and Osakwe and Verick (2007) who analysed CA sustainability over 10 African countries. The results showed that some countries' CA balances were sustainable, while others were not. Most of these studies, however, lacked strategies on how to reduce the CA deficit, nor did they concentrate on the determining factors affecting CA imbalances, more specially in the developing countries, and the remedies thereof.

Boljanovic (2012) conducted a study using factor and theoretical analysis to investigate the medium and long-term sustainability of Serbia's CA deficit and it was found that there are various factors contributing to the CA deficit sustainability. Factor analysis showed that a favourable structure of external debt by maturity and by debtors, a high level of foreign exchange reserves accumulated in the previous period, relative stability of the financial system, a low level of short-term portfolio inflows, lower global real interest rates, and the fall in oil prices, all had a positive effect on Serbia's CA sustainability. In addition, application of the Milesi-Ferreti and Razin methodology to test the sustainability of CA, showed that Serbia's actual CA deficit was above the sustainable level. Contrary to these, an unfavourable structure of the CA implied an

unfavourable structure of capital inflows that financed the deficit, economic growth without a healthy basis that slowed down due to the deepening global economic crisis, high levels of external debt relative to GDP, real exchange rate appreciation, lack of openness of the economy, potential political instability, the global recession, and the fact that the cause of the deficit was a high level of consumption rather than increase in investment activity, all had a negative effect on Serbia's CA sustainability.

Nkuna (2013) conducted a study on the sustainability of the CA in Malawi, and concluded that Malawi's CA balance was not sustainable. The study analysed the sustainability of Malawi's CA by using an econometric analysis, structural and solvency approaches using annual data from 1980 to 2010. The results revealed that for Malawi's CA to move towards a sustainable path, more attention needed to be directed to the following factors; real exchange rate, terms of trade, economic growth, external debt, net foreign assets and openness to trade. The study emphasised that policies should ensure that the real exchange rate is not overvalued, growth is enhanced particularly in the export sector and also ensure that external debt is sustainable. The results also showed that Malawi's CA deficits were excessive and unsustainable during 1990 to 2010, with an average deviation of 5.0 percent of GDP.

Furthermore, Osakwe and Verick (2007) investigated the sustainability of CA deficits in a sample of African countries for the period 2000 to 2004. Their study also analysed the determinants of both short and medium-term CA deficits in Africa. They used the 5.0 percent of GDP threshold along with other operational qualitative indicators of the CA identified in the literature. The study identified countries such as Seychelles, Mali, Zambia, Mozambique, Lesotho and Gambia as those in which the CA deficits were sustainable. Countries such as Burundi, Burkina Faso, Rwanda and Togo were identified as those with unsustainable CA deficits. On the determinants of the CA balance, the paper concluded that an increase in real GDP growth, trade and openness, reduce the probability of having a high CA deficit. Conversely, an increase in the ratio of resource exports in total merchandise exports increased the probability of having a CA deficit. Despite Namibia falling in the Sub-Saharan African region, the paper, however, did not include Namibia among the countries analysed.

3.3. Empirical literature on determinants of CA balance

Brissimis *et al* (2010) found banks' private sector credit extension (PSCE) to be one of the main determinants of the CA deficit in Greece. The rise in PSCE due to financial liberalisation in the 1990s contributed to a fall in the private savings rate, which had a negative impact on the CA. They used co-integration analyses to examine the determinants of the CA and external sustainability in Greece for the period 1960 to 2007. In the sustainability analysis, they tested for the long run relationship between imports and exports and showed that for the period 1960 to 1998, Greece's external balance was sustainable. For the period 1998 to 2007, however, they found that the coefficient of imports as percentage of GDP was less than 1.0 and that revealed that Greece's CA was out of balance and the external debt as percentage of GDP was unsustainable. Furthermore, Kueh (2015) also established that increased household indebtedness contributed to the CA deficit in some of the European countries.

Several empirical studies have identified the fiscal balance as one of the key determinants of the CA deficit, thus confirming the presence of the "twin deficit hypothesis". Kueh (2015) used panel data regressions and the General Method of Moments (GMM) approaches for 28 European countries and established the existence of a positive long run relationship between the fiscal deficit and the CA deficit with a coefficient of 0.4. This implied that a 1.0 percent increase in the fiscal balance worsened the CA by 0.40 percent. Bollano and Ibrahimaj (2015) through the variance decomposition exercise showed that between 40 percent and 42 percent of the CA balances were explained by the fiscal deficit. The results were largely consistent with other empirical studies that also showed a positive relationship between the fiscal balance and the CA balance, such as Chinn and Prasad (2003), Kariuki (2009), and Brissimis *et al* (2010). As a result, the studies rejected the presence of Ricardian equivalence in those economies.

Das (2016) considered international commodity prices as one of the CA determinants and found the existence of a negative relationship between the CA and commodity prices for developing economies. He used panel GMM techniques to evaluate the CA determinants for a sample of 106 countries. The study found the existence of a positive relationship between commodity prices, real GDP growth and trade openness in emerging economies, and a negative relationship between the same variables and the CA for the developing nations.

In addition, Kariuki (2009) examined the determinants of the CA balance in Kenya using the intertemporal approach for the period 1970 to 2006. The study includes economic growth, the fiscal balance, terms of trade, trade openness, money supply, dependency ratio, foreign direct investment and macroeconomic stability. The study also included a crisis dummy variable in order to capture effects of external shocks such as the oil crisis of 1973, mismanagement of the coffee boom in 1976/77 and the collapse of the East African Community. The model, based on time series analysis, showed that the terms of trade was the most significant positive determinant of the CA deficit in Kenya. Other positive determinants included the fiscal balance, real exchange rate and economic growth. Money supply, on the other hand, was the most significant negative determinant of the CA balance in Kenya, followed by the dependency ratio and foreign direct investment.

Oshota and Badejo (2015) also examined the determinants of CA balance, using the panel ARDL model for West African countries. The results confirmed that in the long run, GDP per capita, domestic investment, financial deepening and the dependency ratio had a positive impact on the CA balance while the real effective exchange rate had a negative impact on the CA for West African countries. A potentially important standard CA variable, the fiscal balance, was, however, not included in their model.

Despite using different methodologies, many empirical studies found common factors as determinants of the CA balance. The fiscal balance, economic growth, dependency ratio, real effective exchange rate, stage of development, the stock of foreign reserves, real interest rates, terms of trade, openness to trade, financial deepening (using M2 as the proxy), and financial liberalisation (using PSCE as the proxy), have been found to be the main standard determinants of CA imbalances. The relevant studies include those by Chinn and Prasad (2003), Kariuki (2009), Brissmis *et al* (2010), Jovanovic and Unevska (2011), Atoyan *et al* (2013), Bollano and Ibrahimaj (2015), Oshota and Badejo (2016) and Kueh (2015).

At present, no study has directly investigated Namibia's CA sustainability. Fleermuys (2005) applied the monetary approach to the balance of payments for the period 1993 to 2003 and found that monetary variables did not play an overwhelming role in determining Namibia's balance of payments. The study concluded that imbalances in the balance of payments were not caused purely by monetary variables. Eita and Gaomab II (2012) investigated the macroeconomic determinants of the balance of payments in Namibia for the period 1999 to 2009 and identified

the fiscal balance, GDP and interest rate as main drivers of the balance of payments. They posit that the positive effect of GDP on the balance of payments suggests that exports (the production of which is included in GDP) had a positive impact on the CA and the overall balance of payments.

Most of the studies reviewed in this section identified gaps. A wide range of literature is available for economies which have complete different economic structures than that of Namibia, which makes it difficult to apply as a benchmark for Namibia. African empirical studies, such as Osakwe and Verick (2007) and Nkuna (2013), did not include Namibia in their analysis, despite Namibia falling in the same region covered in their respective studies. Furthermore, despite Namibia recording a persistent CA balance deficit for the past 7 years, little is known about the cause and sustainability of CA imbalances in Namibia. Therefore, this study attempts to unravel these questions.

4. METHODOLOGY

4.1. An assessment of Namibia's CA sustainability using the criteria of Roubini *et al* (1997).

Sustainability in this paper refers to the sustainability of the source that finances the CA deficit. It further refers to the ability to maintain investment at a higher level than national savings.

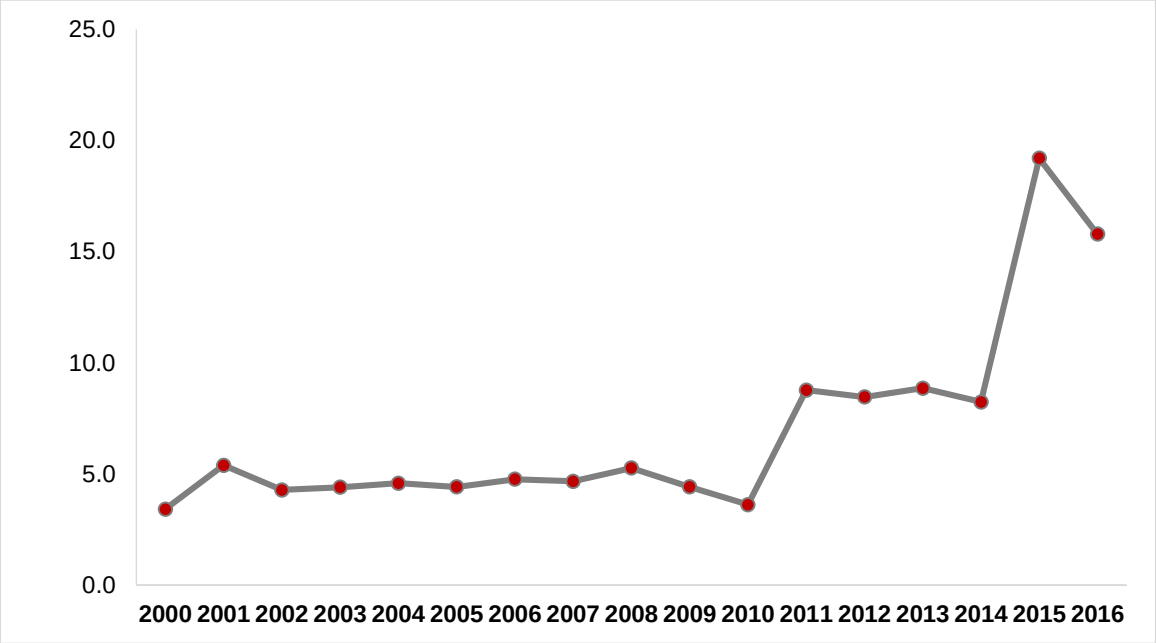
There are no direct measures or benchmarks available to reach a conclusion on whether or not the CA deficit is sustainable. Roubini *et al* (1997), however, came up with criteria that can be used to determine the sustainability of the CA balance. They stress that BoP crises can be related to one or more of the macroeconomic factors in the economy. This section provides an analysis of structural factors in the Namibian economy, which may indicate whether the Namibian CA is sustainable or not.

Criteria of CA sustainability include the following:

1) **Non-increasing ratio of foreign debt to GDP.** This criterion utilises a country's ability and willingness to repay its debt. Milesi-Ferretti and Razin (1996) added that sustainability of a country's CA depends on the country's willingness to pay and also on the creditors' willingness to lend. A high ratio of foreign debt to GDP may be an indication of a debt crisis, culminating in inability to meet external debt obligations. In Namibia, foreign debt relative

to GDP was 4.6 percent on average between 2000 to 2009 period. This share increased gradually and averaged 10.4 percent during the period 2010 to 2016. The highest ratios recorded were 19.2 and 15.8 percent in 2015 and 2016 respectively, following the issuance of the Johannesburg Stock Exchange (JSE) bond and the Eurobond (Figure 3). This rising trend, according to Roubini *et al* (1997), can be one indication to be concerned about the CA sustainability.

Figure 3: Foreign debt to GDP ratio (percentage)



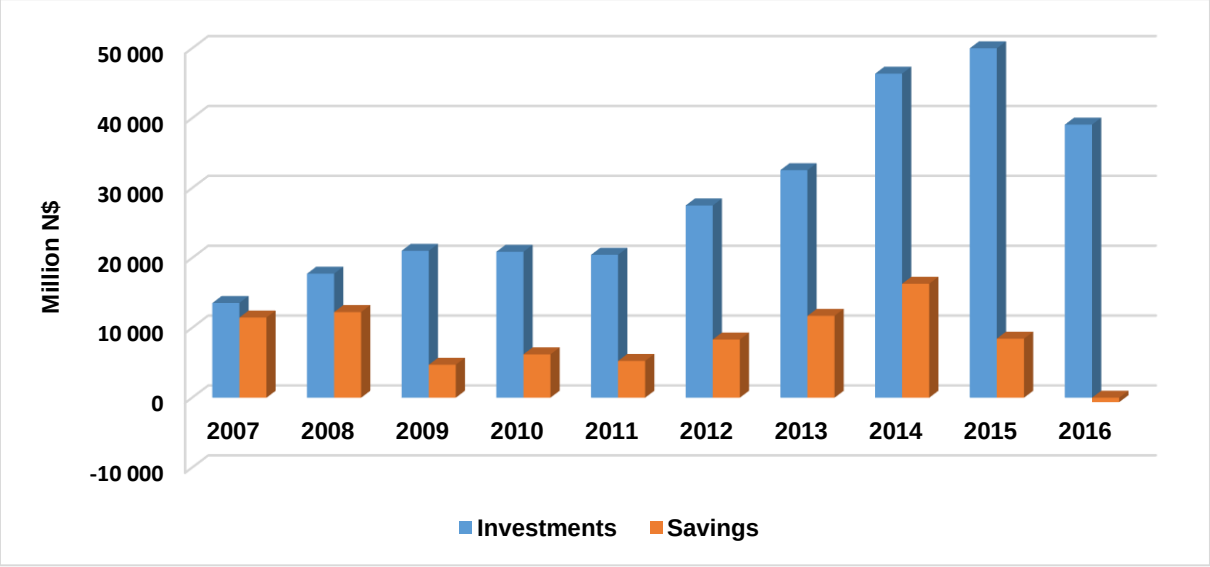
Source: Bank of Namibia

2) **It is theoretically accepted that a CA deficit which is over a certain threshold is an indication of unsustainability.** Milesi-Ferretti and Razin (1996) and Searle and Mama (2010) suggest that a CA deficit above 5.0 percent of GDP over a number of years is alarming, especially if the deficit is financed by incurring short-term debt or working down foreign exchange reserves. Under this criterion, it is important to analyse the underlying source of the deficit. According to Roubini *et al* (1997), a CA deficit is more likely to be unsustainable if the deficit is large relative to GDP and is caused by a reduction in the national saving rate, rather than by an increase in the national investment rate. It is more likely to be sustainable if the deficit is caused by an increase in investment. High investment in an economy may result in a short run CA deficit; however, the investment is expected to increase productivity, exports and economic growth in the long run.

a) **Namibia's CA deteriorated as investment increased, especially during the period 2005 to 2015.** In Namibia, an increase in investment has almost always resulted in a deterioration of the CA. This is more evident during the period 2005 to 2015 when investment rose sharply and the CA started deteriorating. Namibia's CA deficit increased and averaged 6.6 percent between 2009 and 2016. Under this criterion, Namibia would have experienced an unsustainable CA for the six-year period, from 2011 to 2016 (Figure 4), when the CA deficit as ratio of GDP exceeded five percent.

b) **A CA deficit and its sustainability can also be a result of a fall in savings.** During the time Namibia experienced a higher CA deficit, it is observed (Figure 4) that, investment increased more than savings, which according to Roubini's *et al* (1997) criteria, Namibia's CA is likely to be sustainable. A CA deficit which is accompanied by a decline in savings is viewed as less sustainable than a CA deficit which is accompanied by an increase in investment, however, caution needs to be implored as to the type of investment associated with the CA sustainability criterion.

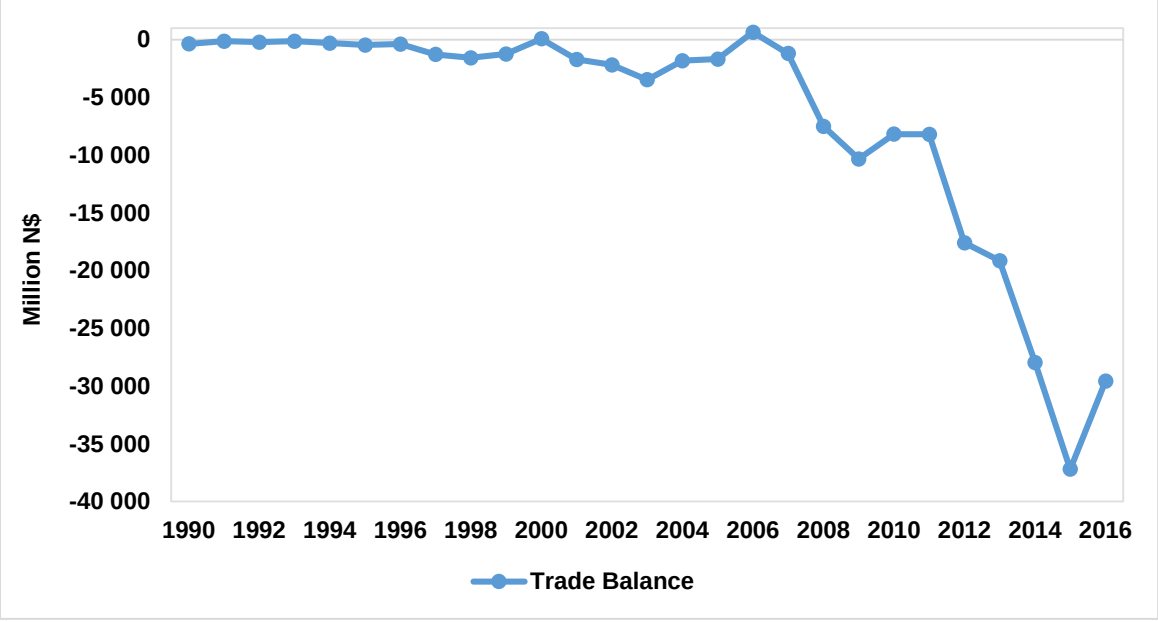
Figure 4: Investment and savings from 2007 to 2016 (N$ million)



Source: Bank of Namibia

3. **According to Mancellari and Xhepa (2003), the sustainability of the CA deficit can also be determined by the composition of the CA deficit**. The CA is less likely to be sustainable, if its deficit is mainly caused by a high trade deficit, as this is a sign of structural problems relating to competitiveness in the economy. In this case, the trade balance and export to GDP ratios are used as indicators of CA sustainability. Exports as percentage of GDP in Namibia averaged about 20.0 percent during the period in which the CA was in surplus, and 51.7 percent during the period when it was in deficit. Import as percent of real GDP averaged about 22.0 percent between 1990 to 2008. The ratio grew tremendously and averaged 72.0 percent between 2009 and 2016, with the highest ratio of 94.0 percent of GDP observed during 2015 and again in 2016. The trade deficit started widening since 2007 (Figure 6) mainly as a result of major construction projects from 2007 to 2015, which resulted in a high import bill. To the contrary, a slowdown in economic activity, especially in the construction sector in line with fiscal consolidation, led to a decline in the import bill during 2016 and improved the trade balance. The high ratio of imports to GDP as compared to exports indicates a structural weakness in the Namibian economy; this may result in the CA being unsustainable going forward.

Figure 6: Trade balance during 1990 to 2016 (N$ million)

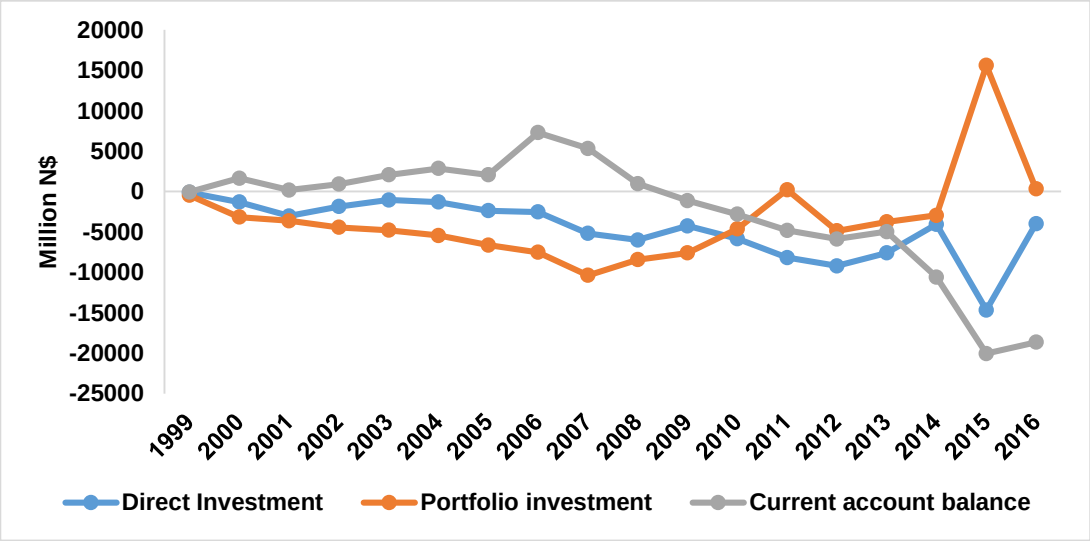


Source: Bank of Namibia

4. **Another measure of CA sustainability is the size of foreign capital inflows**. Foreign direct investment is a particular way of financing a CA deficit. According to Roubini *et al* (1997), 'short-term capital inflows and loans are riskier, while long-term flows and equity inflows are more stable than debt-creating inflows'. This implies that a CA deficit which is financed by high inflows of FDI, is more likely to be sustainable than a deficit which is financed by more short-term capital inflows, which Roubini *et al* (1997) refers to as 'hot money'. This may, however, enhance sustainability in the short-term as they finance the CA imbalance, but may be problematic over time. High foreign inflows may result in currency appreciation which may reduce competiveness and hence affect export earnings and contribute to unsustainability of the CA, unless capital inflows which result in an increase in foreign reserves are sterilised, according to Roubini *et al* (1997).

A closer look at the Namibian capital flows reflects a CA which was financed mostly by flows from portfolio investment during the period in which the CA balance was in deficit. During the period 1999 to 2009, portfolio investment flows were lower than direct investment. However, during the period in which the CA experienced deficits, portfolio investment flows were higher than direct investment inflows (Figure 7). A CA deficit which is financed by high portfolio investment flows, is more likely to result in CA unsustainability in the future compared to the one accompanied by FDI.

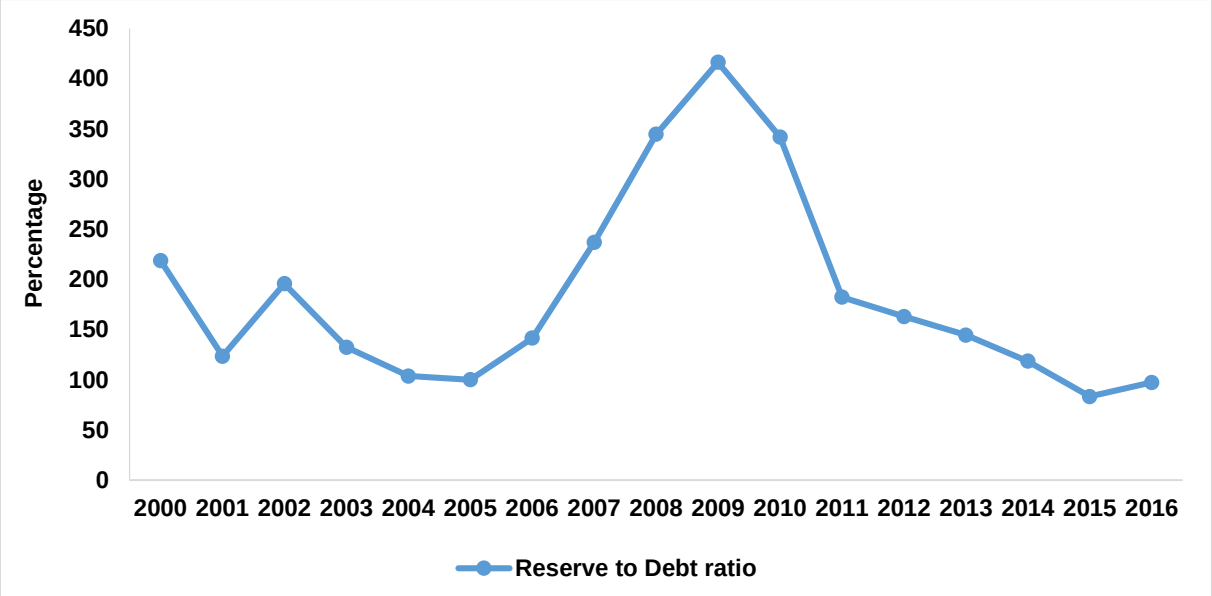
Figure 7: Portfolio versus direct investment between 2009-2016 (million N$)



Source: Bank of Namibia

5. **The sustainability of a CA deficit is also influenced by the ratio of foreign reserves to the debt stock.** Since the CA is mostly financed by foreign capital inflows and accumulation of debt, the ability to repay will be affected by an economy's stock of international reserves. If international debt and debt servicing is very high compared to the stock of reserves, it becomes difficult to finance a CA deficit. A high level of foreign reserves and a smaller external debt burden is more likely to result in a more sustainable CA deficit. According to Mancellari and Xhepa (2003), a higher ratio of foreign reserves to debt stock is an indication of a higher degree of CA deficit sustainability. In addition, a high import cover ratio is also an indicator of sustainability. It can be observed in Figure 8 that Namibia's ratio of foreign reserves to debt stock has generally exceeded one, and it peaked at four times in 2009. During the time the CA deficit started widening, the ratio started getting smaller reaching 83.2 percent and 97.2 percent in 2015 and 2016 (Figure 8), respectively. This will then imply that Namibia's CA was not sustainable. (Import cover was 3.1 months on average during the period 2000 to 2016, which was slightly above the international benchmark of three months.)

Figure 8. Ratio of foreign reserve stock to foreign debt stock



Source: Bank of Namibia

6. **In addition to the criteria listed above, the sustainability of the CA deficit also depends on the stability of the domestic financial system.** According to Roubini *et al* (1997), sustainability is also influenced by a country's financial system stability, especially that of the banking system as capital inflows and foreign investment in the domestic economy will require the participation of the domestic financial system and the willingness of the domestic banks to hold foreign deposits. Moreover, the occurrence (or not) of external sector crises, such as foreign currency crises or debt crises, political stability and the predictability of policies and economic developments are important factors to be considered.

The criteria analysed above raises concerns regarding CA sustainability in Namibia. The increasing ratio of foreign debt to GDP, a suddenly high CA deficit to GDP ratio, a large trade deficit and a declining ratio of foreign reserves to debt all signal serious concerns regarding sustainability, specifically during the period 2014 to 2016. Although the observed widening CA deficit is associated with increasing investment as observed in Figure 4 and 5, it is still worrying. The criteria analysed do not provide precise indications of CA deficit sustainability; however, when two or more of these criteria provide similar signals, this combination provides a more plausible indication of un/sustainability. The empirical confirmation of the sustainability or otherwise of Namibia's CA balance will be further tested and discussed in the next section.

4.2. Empirical Model, Estimation Techniques and Data

To empirically assess the sustainability and determinants of CA in Namibia, this study employed the intertemporal budget constraint approach and cointegration testing. The study used quarterly data covering the period from 2000 to 2016 for sustainability testing, and annual and quarterly data for the period 1980 to 2016 to investigate the determinants of the CA balance. The paper also used recent econometric techniques to test for stationarity and cointegration, which allow for testing of the sustainability hypothesis as applied by Destaings *et al* (2013). According to Destaings *et al* (2013), CA stationarity is vital for two reasons: 1) Since a stationary CA balance is consistent with the sustainability of the CA, and an indication that a country will not default on its international debt obligation; 2) the stationarity of the CA balance also agrees with the implications of the modern intertemporal approach to the CA and thus supports its validity. Data is sourced from Bank of Namibia, Namibia Statistics Agency (NSA) and the International Monetary Fund (IMF).

4.3.Empirical model of the Intertemporal Budget constraint

Cointegration between imports and exports entails a long run relationship between the two variables and establishes sustainability. Following Destaings *et al* (2013) and Searle and Mama (2010), this paper also applied the framework used by Husted (1992) that assumes a long-run relationship between exports and imports. The adaption of this framework is to establish the existence of a long run relationship between Namibia's exports and imports. If imports and exports are integrated of the same order, it implies that cointegration exists between them and it is assumed to be a sufficient condition to support CA sustainability, meeting the intertemporal budget constraint approach.

The budget constraint methodology tests the behaviour of the external debt stock, to determine a country's intertemporal budget constraint (the ability to pay back debt). Husted (1992) assumes that an individual economy faces the following budget constraint in the current period, t:

$$\mathbf{C_t = Y_t + B_t - I_t - (1+r)\, B_{t-1}} \qquad (1)$$

Where $\mathbf{C_t}$ is consumption, $\mathbf{Y_t}$ is national output, $\mathbf{B_t}$ is International borrowing, $\mathbf{I_t}$ represents investment and **r** is the interest rate in period one, which is assumed to be stationary. r is exogenous, and $\mathbf{(1+r)\, B_{t-1}}$ represents the initial size of debt. This budget constraint should hold for all periods according to Hassan *et al* (2016).

Since equation (1) should hold for every period to satisfy the Intertemporal budget constraints approach, equation (1) is further transformed to the following:

$$B_t = \sum_{t=1}^{\infty} \gamma_t \, (X_t - M_t) \lim_{n \to \infty} \gamma_{n\, B_n} \qquad (2)$$

Where X_t is exports, M_t= is imports: $X_t - M_t$ is $\mathbf{= Y_t - I_t - C_t,}$ which is the trade balance in period **t** and $\boldsymbol{\gamma_t}$ is the discounting factor. The equation above explains that, the amount that any economy lends or borrows from the international market is equal to the discounted present value of the future trade surplus or deficit, if the last term is equal to zero. If it is not equal to zero, according to Hassan *et al* (2016), then an economy is making 'bubble financing' or rather Pareto inferior decisions. In order to derive a testable empirical model, equation (1) is expressed as follows, according to Hassan *et al* (2016):

$$Z_t \; + \; (1 + r) B_{t-1} = X_t + \; B_t \qquad (3)$$

Where $Z_t = M_t + (r_t + r)B_{t-1}$ (4)

$X_t = \alpha + \beta MM_t + \mu$ (5)

X_t denotes total exports of goods and services, MM_t is the sum of imports of goods and services, net transfers and additional interest payment on international debt, which depends on whether the world rate is below or above its long-run mean value, Hassan *et al* (2016). To satisfy the intertemporal budget constraint, the value of β should be equal to one ($\beta = 1$) and the error term (μ) should be stationary.

The following criteria are applicable when testing the sustainability of the CA using the intertemporal budget constraints approach.

1) The CA is not sustainable if there is no cointegration
2) The CA is sustainable if there is co-integration with $\beta = 1$,
3) When there is co-integration with ($\beta < 1$) , then CA may not be sustainable, implying that the growth in total exports is slower relative to imports of goods and services. In this regard, the CA would be deemed weakly sustainable.

Kalyoncu and Kaplan (2014), further explained Hakkio and Rush (1991) scenarios which states that, 'in the context of government finance also, if MM_t and X_t are non-stationary variables in level, the condition $0 < \beta < 1$ is a sufficient condition for the budget constraint to be obeyed. However, when X and MM are expressed as a percentage of GDP or in per capita terms, it is necessary to have $\beta = 1$.

4.4.Empirical model for the determinants of the CA balance

Following a review of the theoretical and empirical literature, the empirical model for determinants of CA is specified in five variations as follows:

$$CABDGDP_t = \alpha_0 + \alpha_1 INVGDP_t + \alpha_2 EXCH_t + \alpha_3 FBGDP_t + \alpha_4 RESBAL_t + \alpha_5 POPU_t + \alpha_6 DUMIND + \varepsilon_t \quad (6)$$

$$CABDGDP_t = \alpha_0 + \alpha_1 INVGDP_t + \alpha_0 EXCH_t + \alpha_3 FBGDP_t + \alpha_4 RESBAL_t + \alpha_5 POPU_t + \alpha_6 CABGDP_{t-1} + \varepsilon_t \quad (7)$$

$$CABDGDP_t = \alpha_0 + \alpha_1 INVGDP_t + \alpha_0 EXCH_t + \alpha_3 FBGDP_t + \alpha_4 FDIGDP_t + \alpha_5 MPRICE_t + \alpha_6 FINA_t + \alpha_7 DEP_t + \alpha_8 DUMCRI + \varepsilon_t$$

(8)

$$CABDGDP_t = \alpha_0 + \alpha_1 FDIGDP_t + \alpha_0 EXCH_t + \alpha_3 MPRICE_t + \alpha_4 FINA_t + \alpha_5 IR_t + \alpha_6 RGDP + \varepsilon_t$$

(9)

$$CABDGDP_t = \alpha_0 + \alpha_1 FDIGDP_t + \alpha_0 EXCH_t + \alpha_3 MPRICE_t + \alpha_4 FINA_t + \alpha_5 IR_t + \alpha_6 RGDP + \alpha_0 OILP + \varepsilon_t$$

(10)

Where, CABDGDP is the ratio of the CA balance to GDP, INVGDP is the ratio of investment to GDP, EXCH is a measure of exchange rate (REER), FBGDP is the fiscal balance as ratio of GDP, RESBAL is resource balance (measure of capital flows), POPU is population, DUMIND is dummy variable for the period of Namibia's independence, DUMCRI is a dummy variable for the financial crisis of 2007-2009, FINA is financial development, IR is the interest rate (prime rate), RGDP is real GDP, FDIGDP is foreign direct investment as ratio of GDP, OILP is the price of oil and MPRICE represents a commodity prices index.

The effect of exchange rate changes on the CA balance can be positive or negative. A depreciation of the local currency is expected to promote exports and improve the CA (provided that the Marshall-Lerner[2] condition holds). An increase in exports however also implies higher income, which encourages domestic spending, raises imports and worsens the CA balance. It should also be noted that Namibia is a member of the Common Monetary Area (CMA) where its currency, Namibia dollar, is linked to South African Rand on a one to one basis. The country exports a significant proportion of its exports to South Africa. It also sources more than half of its imports from South Africa. In light of this, the exchange rate may not have a significant effect on the CA balance.

[2] When depreciation of a currency improves the current account of the balance of payments, provided that the sum of price elasticities of demand for export and imports are greater than one.

The ratio of the fiscal balance to GDP also cannot be assigned *a priori* because it depends on whether the twin deficit hypothesis holds or not. If the twin deficit hypothesis holds, it will be positive. If twin deficit hypothesis does not hold, the coefficient will be negative. Hence, its coefficient can be positive or negative.

Resource balance is used as a measure of capital flows. An increase in capital flows can cause the CA to deteriorate or improve. Hence, the effect of this variable is expected to be positive or negative.

The effect of population and the FDI to GDP ratio on the CA balance can also be positive or negative. A larger population may suggest self-sufficiency and ability to produce a variety of goods and services and improve the CA balance. However, an increase in population may also suggest a high capacity to import and worsen the CA balance. Most empirical studies found that foreign direct investment improves the CA balance. Other studies also found that an increase in foreign direct investment implies high income, and this may encourage spending on imports which worsens the CA balance.

The effect of financial development on the CA balance can be positive or negative. A more developed financial sector makes it easier to produce goods and services and this can accelerate production and export of goods and services which may improve the CA balance. The improvement in financial development can also make it easier to import goods and services. This will lead to deterioration of the CA balance.

Real GDP and commodity prices are expected to either improve or worsen the CA balance, while oil prices are expected to have a deteriorating effect for an importing country. The effect of real GDP, which is a measure of income, can be positive or negative. The effect of commodity prices on the CA balance can be positive or negative. That is because an increase in commodity prices means more income for a commodity exporting country. The increase in income may lead to increase in imports, which will worsen the CA balance. Oil price increases may worsen the CA balance for an oil importing country, as an increase in the oil price entails an increase of the import bill.

The effect of the interest rate, **a dummy variable for Namibia's independence period and a dummy variable** for the 2007-2009 crisis period cannot be assigned *a priori*. Hence, the effect of these variables can be positive or negative.

4.4.1. Engle-Granger two step estimation methodology

Despite several limitations, the Engle-Granger two step method is widely used to estimate macro-econometric models that use limited observations. It can estimate the relationship between variables and avoid spurious regression results. The Engle-Granger two steps is specified as follows:

$$Z_t = \hat{Z}_t + \mu_t = \hat{\beta}_0 + \hat{\beta}_1 Y_t + \mu_t \quad (11)$$

The Engle-Granger techniques relies on the existence of a long-run relationship between *Z* and *Y* variables. This depends on the error term being stationary. The residuals from equation 6 are derived as follows:

$$\mu_t = Z_t - \hat{Z}_t \quad (12)$$

The Augmented Dickey Fuller (ADF) test statistic is used to test if the residuals are stationary. If the residuals are stationary, it implies that there is cointegration between Z and Y. Existence of cointegration suggests that it is appropriate to proceed to the estimation of a short run equation. The short-run equation is called the error correction model (ECM). The ECM is expressed as follows:

$$\Delta Z_t = \gamma_0 + \gamma_1 \Delta Y_t + \eta ECM_{t-1} + \mu_t \quad (13)$$

Where ΔZ and ΔY indicate that the variables are in difference form and are assumed to be integrated of order one or I (1). The coefficient of the ECM_{t-1}, η represents the speed of adjustment to equilibrium. The ECM_{t-1} is lagged residuals from equation (12). This coefficient is expected to be negative and statistically significant if there is adjustment to equilibrium.

4.4.2. Johansen methodology

The second econometric technique used in this study is cointegrated vector auto-regression (VAR). The VAR model is appropriate when estimating long time series. This methodology was developed by Johansen (1988;1995). It parametrically corrects for autocorrelation and endogeneity using a vector error correction model (VECM) specification. This

methodology dodges substantial bias that occurs when using the Engle-Granger procedure. The econometric technique is described as follows.

If a vector z_t of *n* potentially endogenous variables is defined, it is possible to specify the data generating process and model z_t as an unrestricted VAR involving up to *m*-lags of z_t expressed as:

$$z_t = \mu + B_1 z_{t-1} + ...+ B_m z_m + \varepsilon_t \qquad \varepsilon_t \sim IN(0, \sum), \tag{14}$$

where z_t is (*n* x *1*) and each of the B_i is an (*n* x *n*) matrix of parameters. According to Sims (1980), this modelling technique estimates dynamic relationships between jointly endogenous variables with no need to impose strong *a priori* restrictions. Equation (14) is re-specified in a vector error correction (VECM) format such that the system is in reduced form. In the VECM, each variable in z_t is regressed on its own lagged values and those of all the other variables in the equation; this is presented in equation (15):

$$\Delta z_t = \mu + \Gamma_1 \Delta z_{t-1} + ...+ \Gamma_{m-1} \Delta z_{t-m+1} + \Pi z_{t-k} + \varepsilon_t \tag{15}$$

where $\Gamma_i = -(I - B_1 - ..... - B_i), (i = 1, ..., m-1)$ and $\Pi = -(I - B_i - ..... - A_m)$, *I* is a unit matrix, and $B_i (i = 1, ...m)$

where $\Gamma_i = -(I - B_1 - .....B_i), (i = 1.....,m-1)$ and $\Pi = -(I - B_i - ..... - B_m)$ and, *I* is a unit matrix, and $A_i (i = 1....m)$ are coefficient vectors, *m* is the number of lags included in the system, ε is the vector of residuals which denotes the influence of exogenous shocks. It is assumed that equation (15) includes only variables that are I (0) and a white process because all terms contained in equation (14) are I (1). According to Jordaan and Eita (2007) if the system specified this way, it will allow for information on both the short- and long-run adjustment to changes in z_t through estimates of Γ_i and Π respectively. In this type of analysis, Π is a vector which denotes a matrix of long-run coefficients, this is very important in this analysis. The long-run coefficients are defined as a multiple of two (*n* x *r*) vectors, α and β'. Hence $\Pi = \alpha\beta'$ where α is a vector of the loading matrices and represents the speed of adjustment from disequilibrium, while β' is a matrix

of long-run coefficients so that the term $\beta' z_{t-1}$ in Equation (15) indicates up to (*n-1*) cointegrating relationships in the model. The existence of cointegration indicates the rank *(r)* for the Π matrix. If the matrix is of a full rank, the rank *r* = *n* and it is said that there are *n* cointegrating relationships and that all variables are *I* (0). If it is assumed that z_t is a vector of variables that are nonstationary or *I*(1), then all components in Equation (15) which involve Δz_t are *I*(0), and Πz_{t-m} must also be stationary so that $\varepsilon_t \sim I(0)$ to be white noise. According to Johansen (1988; 1995), the existence of cointegration between the variables in the equation is tested using two statistics. These test statistics are trace (λ_{trace}) and maximum eigenvalue (λ_{max}).

Prior to the estimation of equations, it is important to subject all the variables to unit root testing, to avoid spurious results from the estimated model. The study uses the Augmented Dickey-Fuller (ADF) test invented by Dickey and Fuller (1979) and Phillips-Perron (P-P) test to establish the stationarity of variables in the model. The null hypothesis of both tests is that the variables contain the unit root, which implies that they are nonstationary. The results of this test are presented in Table 1.

4.4.3. Autoregressive Distributive Lag (ARDL) methodology

To estimate Equations (6) - (10), the study adopts the Autoregressive Distributed Lag Model (ARDL) or bound cointegration technique developed by Pesaran, Shin and Smith (2001). Using Equation (9) as an example to illustrate the ARDL bound cointegration technique, the empirical model is specified in Equation (16). The ARDL bound cointegration technique is specified as follows:

$$\begin{aligned}\Delta CABGDP = \delta_0 &+ \sum_{i=1}^{n} \mu_{1i} \Delta FDIGDP_{t-i} + \sum_{i=1}^{n} \mu_{2i} \Delta EXCH_{t-i} + \sum_{i=1}^{n} \mu_{3i} \Delta MPRICE_{t-i} + \\ &\sum_{i=1}^{n} \mu_{4i} \Delta FINA_{t-i} + \sum_{i=1}^{n} \mu_{5i} \Delta IR_{t-i} + \sum_{i=1}^{n} \mu_{6i} \Delta RGDP_{t-i} + \gamma_1 CABGDP_{t-1} + \\ &\gamma_2 FDIGDP_{t-1} + \gamma_3 EXCH_{t-1} + \gamma_4 MPRICE_{t-1} + \gamma_5 FINA_{t-1} + \gamma_6 IR_{t-1} + \\ &\gamma_7 RGDP_{t-1} + \nu_t \end{aligned}$$

(16)

Here δ_0 represents the intercept, and μ_i are short run parameters, γ_i are long run coefficients and Δ indicates that the variables are in first difference. The most important part of equation (16) is to test the null hypothesis of no cointegration. This is tested as follows:

$$H_0 : \gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = \gamma_5 = \gamma_6 = \gamma_7 = 0$$
$$H_a : \gamma_1 \neq \gamma_2 \neq \gamma_3 \neq \gamma_4 \neq \gamma_5 = \gamma_6 \neq \gamma_7 \neq 0$$

If the null hypothesis is not rejected it means that there is no cointegration. If the null hypothesis is rejected, it indicates that the variables in the equation are cointegrated. The ADRL cointegration technique identify the long run relationship among the variables in the models. The technique uses the Wald or F-statistics to test for joint significance of $\gamma_1, \gamma_2, \gamma_3, \gamma_4, \gamma_5, \gamma_6$and γ_7. After establishing the long run relationship between the variables, the next step is to estimate the long run coefficients. The study use a technique adopted by Narayan (2005) to estimate long-run coefficients. This technique is called Dynamic Ordinary Least Square (DOLS). This technique or estimator was developed by Stock and Watson (1993). The technique DOLS is preferred because it asymptotically removes the sample bias and correct for endogeneity and serial correlation in the model. The use of DOLS requires the existence of cointegration among the variables in the model. The DOLS technique is expressed as follows:

$$A_t = \phi_0 + \phi_2 \psi_t + \sum_{j-p}^{p} \Delta \psi_{t-1} + \nu_t \qquad (17)$$

where A_t is the CA balance as ratio of GDP, Ψ_t is a vector of explanatory variables discussed in equations (1-5) and Δ is a lag operator. The use of DOLS suggest that it is not necessary to estimate short run or error correction model.

5. EMPIRICAL RESULTS

5.1.1. Sustainability of CA results

Before testing for cointegration and sustainability of the CA, the stationarity of all variables used in this study is tested using the Augmented Dicky Fuller (ADF) unit root test. Table 1 below, displays the results of the stationarity test for both exports of goods and services (Xt) and imports of goods and services plus net investment income and net transfers (MMt), both variables were integrated of the same order I (0), This order of stationarity suggests the use of ARDL

methodology. The advantages of ARDL methodology over Engle and Granger (1987) and Johansen (1988) cointegration, is that it can be used regardless of whether variables are cointegrated of the same order or not. Moreover, ARDL methodology is suitable when using fewer observations compared to other methodologies. Considering data shortages in Namibia, the ARDL (bound test) test of cointegration methodology is applied for the determinants and sustainability of the CA in this study.

Table 1: Unit root test: Augmented Dickey-Fuller Test

	Level- (trend and intercept)		**1st Difference (trend and intercept)**		
	t-statistic	**Probability**	**t-statistics**	**probability**	**Decision**
CAB/GDP	-2.855148	0.1920	-5.863229	0.0004	I(1)
PGDP	-5.146697	0.0028	-2.132120	0.4969	I(0)
PSCE/GDP	-1.680518	0.7309	-4.299502	0.0118	I(1)
FB/GDP	-2.855148	0.1920	-5.863229	0.0004	I(1)
INV	1.452074	0.9999	-6.594514	0.0001	I(1)
FDI/GDP	-4.044152	0.0197	-6.056611	0.0002	I(0)
REER	-2.295341	0.4204	-3.748610	0.0382	I(1)
DEP	-2.524055	0.3148	-2.361437	0.3888	I(2)
MPRICE	-1.853538	0.6479	-3.751582	0.0372	(1)
Oilp	-2.110663	0.2413	-6.643644	0.0000	I(1)
Resbal	-2.864345	0.0596	-7.652396	0.0000	I(1)
GDP	-1.577742	0.7787	-5.184553	0.0010	I(1)
MMt	5.648775	1.0000	-3.468294	0.0650	(1)
X_t	3.579693	1.0000	-4.823883	0.0042	(1)
lnX_t	-6.041727	0.0000			I(0)
$lnMM_t$	-4.542991	0.0027			I(0)

For an economy to satisfy the inter-temporal budget constraint methodology, there needs to be stationarity between Xt and MMt, if this condition is not met, then the economy will fail to satisfy its budget constraint and will not be able to pay its external debt.

Table 2: Bound test of cointegration (ARDL)

F-statistics	Lower bound (95%)	Upper bound (95%)	Decision
6.422876	4.94	5.73	There is cointegration

The result in Table 2 shows that, there is a long run relationship between exports and import plus net investment income and net transfers in Namibia. The computed F-statistics lies above the upper bound at 95 percent confidence interval. In this regard, the null hypothesis of no cointegration is rejected. The result above meets the first criteria of the intertemporal budget constraint of CA sustainability in the long run, however to fully satisfy the intertemporal budget constraint, the value of MMt β should be equal to one ($\beta = 1$), as the coefficient of MM_t needs to meet the following criteria:

Criteria 1: The CA is not sustainable if there is no cointegration

Criteria 2: The CA is sustainable if there is co-integration with ($\beta = 1$),

Criteria 3. When there is co-integration with ($\beta < 1$), then CA may not be sustainable, implying that the growth in total exports is slower relative to imports of goods and services.

The adjustment speed of the error correction term (ECT) and the coefficient of MM_t, are presented in Table 3 and 4 below.

Since the existence of cointegration between export and import is already established, it is worth noting that this is not the only condition of sustainability, the coefficient of MMt should also be equal to 1. The coefficient value of MM_t is obtained from three different methodologies for comparison sake (Table 3). All three test results indicate that the coefficient of MM_t is less than one, that is $\beta < 1$, and statistically significant.

Table 3: Comparison of MMt coefficient using ARDL, FMOLS and DOLS, where Xt is the dependent variable

	Coefficient	*Standard error*	*T-statistics*	*Probability*
ARDL	**0.8889**	0.044	20.095	0.000
DOLS	**0.8793**	0.031	28.623	0.000
FMOLS	**0.8779**	0.029	29.940	0.000

Namibia's current account is not sustainable. The estimated (MM_t) β is 0.88, this value is less than one, this means that exports and imports plus net investment income and net transfer are cointegrated with a coefficient of less than one. This reveals that in Namibia, exports grow at a slower pace than imports and export earnings are insufficient to meet external obligations. This implies that, a one percent increase in import of goods and services, net investment income and net transfers in Namibia will result in exports of goods and services increasing by 0.89 percent every quarter and vice versa. The coefficient is statistically significant as shown by the probabilities of all the three results (Table 4) and the diagnostic test of the ARDL result in Table 5 (annex). Based on the results, Namibia does meet the first criterion but fails under the third criterion, implying a weak form of sustainability, thus it can be concluded that, in Namibia, the CA may not be sustainable in the long run and that CA balance is not on a sustainable path.

Table 4: Error Correction of the ARDL model

Variables	Coefficient	Standard error	t-Statistic	Probability.
$D(LNX_t(-1))$	-0.172294	0.130229	-1.323002	0.1908
$D(LNMM_t)$	0.217870	0.131031	1.662739	0.1015
ECM_1	-0.535715	0.151160	-3.544032	0.0008

The model has an error correction term of 0.54, which implies that 54 percent of errors or deviation in the short term and long term between exports (X_t) and imports (MM_t) are corrected every quarter. The diagnostic test of the model in Table 5 in the appendix shows that the model is fit and stable. The serial correlation LM-test and Breusch-Pagan-Godfrey further show that the model does not suffer from serial correlation and heteroscedasticity. In addition, the residuals are normally distributed.

5.1.2. Determinants of Namibia's CA results

One of the objectives of this study is to find out what are the macroeconomic determinants of Namibia's CA. This study tests whether the drivers of CA balance in Namibia depend on the type of econometric methodology applied. Therefore, this study used three different econometric methodologies to achieve this objective. The three methodologies are Engle-Granger two steps, Johansen or vector error correction model (VECM), autoregressive distributive lag (ARDL).

The model for the determinants of CA balance was estimated using annual data for two periods. These are 1980 -2016 and 1990 -2016. The model was also estimated using quarterly data for the period 2000 to 2016.

5.1.3. Estimation Results of the 1980 - 2016 sample

The results show that fiscal balance to GDP (FBGDP) is positively associated with CA balance. The results of the 1980 to 2016 sample period are presented in Table 6-8 (Annex). This positive effect of fiscal balance is evident in the results of all estimations techniques (except the second variation of the Engle-Granger technique). This shows that when the fiscal balance is in deficit, the CA balance will also be in deficit. This provides evidence in favour of the twin deficit hypothesis in Namibia.

The effect of the ratio of investment to GDP on the CA balance shows mixed results. The first variation of Engle-Granger estimation technique shows that the effect is negative, while the second variation indicate that the effect is positive but not significant. The result of the Johansen technique shows that this variable impact positively on the CA balance. The results of the first and second variations indicate that the impact is positive and statistically significant. The DOLS results indicate that the impact of this variable is negative.

The exchange rate impacts negatively on the CA balance (except) in the second variation of the Johansen's results. A depreciation of the exchange rate causes the CA balance to deteriorate, while an increase in population causes an improvement in the CA balance.

Increases in capital flows and real GDP cause the CA balance to deteriorate, while the period after independence is positively associated with the CA. The coefficient of the capital flow proxy (resource balance or RESBAL) is negative for the results of all estimation techniques. Increase in real GDP per capita which is a measure of income shows that increase in this variable deteriorate the CA balance. The dummy variable for independence (DUMIND) has a positive coefficient. This indicates that the period after Namibia's independence is associated with an improvement in the CA balance. The results for Engle-Granger and Johansen's techniques show that there is an adjustment to equilibrium. That is because the coefficients of the error correction terms are negative and statistically significant.

5.1.4. Results of the 1990 – 2016 sample

The results of the 1990 -2016 were estimated using only the Engle-Granger econometric technique. The Johansen technique was not applied because of limited observations. The ARDL (DOLS) was applied but there was no cointegration between the variables in all variations of the model. Hence, there are no results of the DOLS technique.

The results show evidence of the twin deficit hypothesis, while GDP, FDI and financial deepening are positively linked with the CA. The results presented in Table 10 (annex) show that the fiscal balance to GDP ratio has a positive effect in all variations of the estimated model. These coefficients show that there is evidence of the twin deficit hypothesis. An improvement in the ratio of foreign direct investment to GDP (FDIGDP) causes the CA balance to improve. Financial deepening (proxied by PSCEGDP) is associated with an improvement in the CA balance.

Commodity prices are negatively associated with the CA, while a higher (stronger) real exchange rate and higher dependency ratio cause the CA to improve. Since Namibia is a commodity exporting country, it can be expected that increase in commodity prices will cause CA to improve. However, this would depend on the weight of commodity in the commodity price indices. It should also be noted that, there are some studies that found a negative effect of commodity prices on CA balance. This can be partly explained by the fact that increase in commodity prices implies higher income for the exporting country. Higher income will encourage imports and this will in turn deteriorate the CA balance. It should also be noted that the sample period has limited observations. An increase in commodity prices, therefore, results in a deterioration of the CA. The real exchange rate appreciation causes CA balance to improve (in the first variation), but is insignificant in the second variation of the model. The results also show that dependency ratio is associated with an improvement in the CA balance, while the dummy variable for the crisis of 2007-2009 shows that the CA balance was negatively affected.

The coefficients of the error correction term in all variations of the estimated model are negative and statistically significant. This indicates that there are adjustments to equilibrium. The dynamics adjust to long-term equilibrium, instead of moving away from it.

5.1.5. Quarterly data 2000 -2016

The results of quarterly data for the sample 2000 -2016 are presented in Table 11 to Table 14 (annex). A fiscal balance variable is not included in this sample of quarterly data, because there is no quarterly data on the fiscal balance.

For the quarterly data over the 2000 – 2016 period, FDI and financial deepening are negatively associated with the CA. The results show that FDI as ratio of GDP is associated with a deterioration of the CA balance in all estimation techniques (except Johansen). Financial deepening also causes the CA balance to deteriorate.

Commodity prices and the exchange rate are positively associated with the CA, but the effect is statistically insignificant for the exchange rate. Increases in commodity prices cause the CA balance to improve. The coefficient of the exchange rate shows that an appreciation of the real exchange rate is associated with an improvement in the CA balance. However, this coefficient is not significant for the results of the Johansen technique. It is also insignificant for the results of the first and second variation of the DOLS technique.

The effect of an increase in interest rates on the CA balance is positive, while the effect of GDP is contingent on the econometric methodology utilized. This may suggest that an increase in interest rates discourages people from importing products. This can improve the CA balance. According to the Engle-Granger and DOLS techniques, an increase in real GDP causes the CA balance to deteriorate. However, it improves the CA balance according to the results of Johansen.

The coefficients of the error terms for the Engle-Granger and Johansen techniques are negative and statistically significant. This indicates that the dynamics adjust to equilibrium instead of moving away from it.

5.1.6. CONCLUSION

The study found that Namibia's CA is weakly sustainable in the long-run. The main objective of this study was to empirically investigate the sustainability of the Namibian CA deficit for the period 1990-2016. The study analysed the long run relationship between exports of goods and services and imports of goods and services plus net investment income and net transfers, using the intertemporal budget constraint which applied the ARDL approach and macroeconomic structural analysis following Roubini *et al* (1997). The study found evidence of a positive long run relationship between exports and imports (plus net income and net transfers). However, the estimated import coefficient was less than one which violated the intertemporal budget constraint. Since only one condition of sustainability was met, the study concludes that the Namibian CA is weakly sustainable. Macroeconomic structural analysis also suggests a weak form of sustainability as evidenced by an increasing ratio of foreign debt to GDP, rising CA deficit as percentage of GDP, widening trade balance and a declining ratio of foreign reserves to the debt stock.

The study found evidence of twin deficits in Namibia, suggesting the fiscal balance as one of the main determinants of the CA balance. The study investigated the macroeconomic determinants of Namibia's CA balance based on the theoretical and empirical literature, using three econometric cointegration approaches. The results from all methodologies revealed that there is evidence of twin deficits in Namibia, that is, the fiscal balance is positively related to the CA balance. A larger fiscal deficit is associated with a larger CA deficit. Moreover, the CA balance is also determined by variations in financial deepening as presented by private sector credit and also by investments, commodity prices, capital flow, exchange rate and per capita income indicators.

6. POLICY INTERVENTION AND STRATEGIES

The results imply that fiscal policy is very important for Namibia because of the limitations associated with monetary policy, given the country's exchange rate arrangement. The results indicate that in Namibia, the more the government accumulates budget deficits due to increases in expenditure, the more the CA experiences deficits. This suggests that in order to reduce a persistent CA deficit and achieve an optimum balance, the following policy interventions should be considered:

1. Policy interventions could be directed towards improving the fiscal balance first, as an improvement on the fiscal balance will have a corresponding effect on the CA balance (i.e. validation of the twin deficit hypothesis). These can be achieved by promoting more fiscal curtailing policies, by applying the following interventions:

   - **Fiscal consolidation policies**: government expenditure should be in accordance with the revenue that the state is able to generate. This strategy may require an effective planning tool such as the fiscal strategy which should provide clear guidance regarding financial management and the economy at large. This should also take into account strategy on how to reduce debt, as the debt-to-GDP ratio is currently high.
   - **Expenditure planning**: a strategy towards expenditure should be developed to improve efficiency of expenditure which is linked to development policies such as Vision 2030 and NDPs. Through this plan, the government should strengthen accountability, monitoring and evaluation. This will enhance transparency and efficiency in public spending and ultimately improve CA.
   - **Increase government revenue collection**: increasing government revenue could be one of the solutions to reducing the fiscal deficit. Government needs to reduce the debt burden by improving domestic revenue collection or tax administration. The introduction of the new Revenue Authority could possibly be the solution.
2. Given the result of a weakly sustainable CA deficit, fiscal policy should be further supplemented with other trade policies that will improve exports such as export promotion policies, while more attention should also be directed to improving the trade balance by way of import substitution and increased competitiveness.
3. As the analysis has indicated that the level of international reserves is low, there is a need to come up with strategies to increase/enhance the level of reserves in the country.

4. Stimulate sectors in the economy that have potential to produce and add value for exports, such as those in the primary (agriculture, fishing and mining) and manufacturing industries. These are some of the priority sectors in NDP5, which are identified to both create employment and also contribute to economic growth. Directing more investment to accelerate the implementation of NDP5 will help in increasing productivity in these sectors for export.

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8. ANNEX

Table 5: Diagnostic test of XT and MMT result

Normality			
Jarque-Bera (0.606)	Probability (0.738)	Skewness (0.232)	Kurtosis (2.921)
Serial correlation Breusch-Godfrey LM Test:			
Obs*R-squared (0.137)	Probability-Chi square (0.9340)	F-statistic (0.061167)	
Heteroscedasticity Breusch-Pagan-Godfrey			
F-statistic	2.058027	Prob. F(4,61)	0.0974
Obs*R-squared	7.847792	Prob. Chi-square(4)	0.0973
Scaled explained SS	6.441170	Prob. Chi-Square(4)	0.1685

Table 6. Engle –Granger estimation results (1980-2016)

Dependent variable: CABGDP

	First variation	**Second variation**
Long run		
CABGDP_1		0.442 (3.314)
FBGDP	0.352 (1.280)	-0.163 (-0.684)
LNINVGDP	-6.039 (-1.712)	2.039 (0.478)
LNEXCH	-1.084 (-0.742)	-1.449 (-0.525)
LNPOPU	1.409 (1.961)	3.867 (0.456)
RESBAL	-38.888 (-3.975)	-46.465 (-4.238)
DUMIND	5.464 (2.130)	
Constant		-55.423 (-0.487)

Short run		
∆FBGDP	0.748 (3.335)	1.822 (5.069)
∆LNINVGDP	-8.510 (-2.409)	1.499 (1.912)
∆LNFPOPU	-118.012 (-2.188)	
∆LNPOPU_1	-21.155 (-2.134)	-381.559 (-2.082)
∆LNPOPU_2	43.962 (2.744)	356.741 (1.946)
∆RESBAL	-26.625 (-3.821)	-41.112 (-5.186)
∆RESBAL_1		-19.077 (-2.400)
∆LNEXCH_2		5.969 (2.135)
constant	3.149 (2.185)	
ECM_1	-0.852 (-4.853)	-0.607 (-3.477)
R-squared	0.622	0.629

Johansen methodology (1980-2016)

Table 7. Johansen's or VECM results

Equation number	**First variation**	**Second variation**	
Number of cointegrating vectors	1	2	
Estimates of cointegrating vectors (long run)			
		First cointegrating vector	Second cointegrating vector
CAPBGDP	1.000	1.000	0.000
LNPOPU		0.000	1.000
FBGDP	5.131 (5.29)	2.047 (4.806)	0.022 (3.095)
LNINVGDP	38.22 (2.742)	30.687 (5.957)	-0.212 (-2.489)
LNPCAPITA	-12.435 (1.859)		
LNEXCH	27.66 (-3.257)	4.952 (3.230)	-0.207 (-8.175)
Constant	-34.753 (-1.845)	-109.261 (-6.602)	-13.435 (-49.008)
Error correction model			
∆CAPBGDP	-0.206 (-3.521)	-0.516 (-4.196)	-5.398 (-0.637)
∆LNPOPU		0.0001 (1.807)	-0.006 (-0.984)
∆FBGDP	-0.045	-0.081	-3.756

	(-1.395)	(-1.036)	-(0.701)
∆INVGDP	0.001 (0.499)	-0.009 (-1.799)	1.527 (4.571)
∆PCAPITA	-0.002 (-1.682)		
∆EXCH	-0.005 (-1.974)	-0.007 (-0.998)	0.639 (1.312)
R-squared	0.484	0.54	

ARDL methodology (1980-2016)

Table 8. Cointegration test results

F-test	**I(0)**	**I(1)**
4.991	2.39	3.38

Table 9. DOLS estimation results

Dependent variable: CABGDP

Variables	**Coefficient**
FBGDP	0.219 (0.490)
LNINVGDP	-28.029 (-1.947)
LNPOPU	55.030 (2.304)
LNEXCH	-2.548 (-0.490)
RESBAL	-5.432 (-0.162)
TREND	-0.865 (-1.669)
CONSTANT	-680.062 (-2.206)
R-squared	0.920

Engle-Granger two step methodology

Table 10. Results of the Engle-Granger technique (1990-2016)

Dependent Variable: CABGDP

	First variation	**Second variation**
Long run		
FBGDP	1.689 (3.617)	0.803 (1.846)
LNFDIGDP	0.072 (0.041)	0.397 (0.303)
LNMPRICE	-12.677 (-2.971)	2.489 (0.532)
LNPSCEGDP	1.584 (0.329)	22.232 (3.749)
LNREER	49.875 (1.972)	-4.228 (-0.189)
LNDEPR		124.907 (4.272)
DUMCRI		-2.384 (-0.827)
Constant	-172.552 (-1.681)	-612.383 (-4.731)
Short run		
ΔCABGDP_1		-0.433 (-2.190)
ΔCABGDP_2	0.689 (3.039)	0.589 (3.361)
ΔCABGDP_3		-0.216 (-1.160)
ΔFBGDP	1.798 (4.846)	1.822 (5.069)
ΔLNFDIGDP		1.499 (1.912)
ΔLNFDIGDP_2	1.502 (1.850)	
ΔLNPSCEGDP	-21.155 (-2.134)	-22.268 (-2.484)
ΔLNREER	43.962 (2.744)	54.331 (3.984)
ΔLNFDIGDP		
ΔLNDEPR		397.542 (2.354)
DUMCRI		-5.338 (-1.864)

constant	0.709 (1.013)	4.825 (2.515)
ECM_1	-0.892 (-4.632)	-0.868 (-2.998)
R-squared	0.654	0.839

Engle-Granger

Table 11. Results of the Engle-Granger technique (2000-2016) quarterly

Dependent variable: CABGDP

	First variation	**Second variation**	**Third variation**
Long run			
LNFDIGDP	-0.096 (-0.724)	-0.046 (-0.356)	-0.024 (-0.199)
LNMPRICE	6.115 (1.344)	4.534 (1.344)	6.664 (2.108)
LNPSCEGDP	-18.438 (-6.986)	-12.658 (-3.751)	-3.876 (-0.860)
LNREER	23.717 (1.335)	47.240 (2.467)	40.312 (3.826)
IR		1.474 (2.653)	1.196 (2.756)
LNRGDP			-21.393 (-3.494)
Constant	-47.762 (-0.651)	-197.197 (-2.194)	
Short run			
∆CABGDP_1	-0.438 (-3.670)	-0.436 (-3.466)	-0.373 (-2.945)
∆LNFIGDP _1	0.314 (3.643)	0.291 (3.354)	0.286 (3.394)
∆LNFDIGDP _2	0.284 (2.829)	0.265 (2.650)	0.262 (2.692)
∆LNFDIGDP _3	0.222 (2.519)	0.209 (2.389)	0.238 (2.748)
∆LNPRICE			10.421 (1.499)
∆LNREER_1	50.584 (1.607)		
∆IR			1.675 (1.733)
constant		-0.462 (-2.729)	
ECM_1	-0.386 (-2.770)	-0.439 (-0.709)	-0.629 (-3.542)
R-squared	0.579	0.574	0.614

Johansen methodology

Table 12. Results of the Johansen's technique (2000-2016) Quarterly

Number of cointegrating vectors	**2**	
	Estimates of cointegrating vectors (long run)	
CABGDP	1.000	0.000
LNOILP	0.000	1.000
FDIGDP	1.037 (6.441)	0.144 (8.941)
LNPRICE	-14.679 (-4.761)	-1.093 (-3.547)
LNPSCEGDP	-19.095 (-2.334)	-1.342 (-1.642)
LNREER	22.092 (1.376)	0.737 (0.459)
LNRGDP	6.986 (0.332)	12.847 (6.119)
TREND	0.799 (2.502)	-0.129 (-4.053)
CONSTANT	-36.678	
	Error correction model (short run)	
∆CABGDP	-0.539 (-3.169)	5.068 (3.990)
∆LNOILP	0.012 (2.432)	-0.084 (-2.135)
∆FDIGDP	-0.922 (-4.704)	-1.776 (-1.213)
∆LNPRICE	0.009 (3.109)	-0.082 (-3.884)
∆LNPSCEGDP	-0.003 (-1.434)	0.050 (3.281)
∆LNREER	0.001 (1.914)	-0.015 (-2.962)
∆LNRGDP	0.003 (1.762)	-0.053 (-4.122)
R-squared	0.622	

ARDL methodology (2000-2016) Quarterly

Table 13. Cointegration test results

Equation number	**F-test**	**I(0)**	**I(1)**
First variation	5.891	2.56	3.49
Second variation	6.275	2.39	3.38
Third variation	6.460	2.27	3.28

DOLS estimation results

Table 14: Dependent variable: CABGDP

Variables	**Coefficient of First Variation**	**Coefficient of second variation**	**Coefficient of second variation**
FDIGDP	-0.194 (-0.478)	-0.073 (-0.200)	-0.081 (-0.241)
LNPRICE	12.528 (2.475)	4.411 (0.811)	4.262 (0.964)
LNPSCEGDP	-19.817 (-5.343)	-9.666 (-1.728)	2.334 (0.255)
LNREER	-9.543 (-0.360)	49.462 (1.481)	42.692 (2.078)
IR		2.015 (2.245)	1.756 (2.710)
LNRGDP			-25.668 (-2.087)
CONSTANT	82.275 (0.764)	-228.408 (-1.444)	
R-squared	0.668	0.728	0.761