

## Empirical Analysis of the Monetary Approach to the Balance of Payment in Namibia

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### *Abstract*

*This paper examined whether the monetary approach to balance of payment holds in Namibia. The paper used the Vector Error Correction Model (VECM) for data spanning between first quarter of 1991 to the fourth quarter of 2015, on variables such as NFA, exchange rate, GDP, CPI, fiscal balance, interest rate and domestic credit. The paper found that, an increase in domestic credit has a negative effect on the NFA and vice versa, while improvement in fiscal balance tends to improve the NFA in the short-run. Variables such as interest rate, exchange rate, GDP and CPI were found to be insignificant. The Granger causality results indicate that there is a uni-directional causality running from GDP, fiscal balance, exchange rate and domestic credit to NFA. The variance decomposition shows that, most of the variations in the NFA are caused mainly by own shocks, domestic credit, interest rate and exchange rate, while CPI, fiscal balance and GDP contributes the least variations to the NFA. The Granger causality and variance decomposition results, with regard to the fiscal balance and domestic credit, are consistent with the short run results. The study, therefore, concluded that, monetary variables are not the only cause of variations in the NFA in Namibia, as fiscal balance, which is a non-monetary variable also has a significant impact on the NFA. The study recommends that to improve the BoP, Namibian authorities should consider using monetary and fiscal policies aimed at reducing domestic credit and fiscal deficits.*

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**Key Words:** Namibia, NFA, VECM, BoP, Cointegration

**JEL Classification :** C19, G13, G14

## **1. Introduction**

The Balance of Payments (BoP) disequilibrium, in particular a deficit, is a major challenge but a common economic phenomenon in most developing economies. Many developing countries such as Namibia are constrained by balance of payment deficits, more specifically on the current account. This is a concern to Namibia given that like any other country, one of the macroeconomic objective of the country is to maintain a stable equilibrium in the balance of payment. Fleermuys (2005) for instance contend that organisations such as the International Monetary Fund (IMF) have put great emphasis to stable balance of payments. The BoP records all economic transactions carried out between the domestic economy and the rest of the world, within a given period (IMF, 1993). The BoP is made up of three main accounts, namely the Current Account<sup>1</sup>, the Capital Account<sup>2</sup> and the Financial Account<sup>3</sup>. Scholars have explored approaches to address BoP disequilibrium, and one such approach, is the Monetary Approach to the Balance of Payments (MABP). The MABP argues that BoP is a monetary phenomenon, by illustrating how equilibrium in a country's BoP can be influenced by monetary policy. MABP considers money as a stock, and suggests that money stock can be altered through internal reserve flows. Furthermore, MABP states that if a country has a good monetary policy, a fixed exchange rate system could ensure equilibrium in the BoP without recourse to devaluation, thus a devaluation will only occur because of the failure of monetary policy (Umer, et al., 2010). Du Plessis et al., (1998) contends that this is due to the fact that that disequilibrium in the balance of payment is a temporary situation that will be corrected if the money market is in equilibrium. Apart from the MABP, there are two other approaches that can be used to remedy disequilibrium in the BoP, namely the Elasticities Approach and the Absorption Approach. The MABP differs from the other two approaches (also known as the Keynesian approaches), in that it considers both the current and capital accounts of the BoP. The Elasticities Approach limits its focus on the current account BoP; more specifically, on how the exports and imports of a country are affected by developments in the exchange rate. The Absorption Approach, similarly focuses on the current

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<sup>1</sup>Covers all transactions (other than those in the financial account) that involve economic values, (i.e.; real transactions) and occur between resident and non-resident entities. Also covered are offsets to current economic values provided or acquire without a quid pro quo. Included are goods, services, income and current transfers (IMF, 2009).

<sup>2</sup>In the balance of payments, the capital account covers capital transfers and the acquisition or disposal of non-produced non-financial items such as patents (IMF, 2009).

<sup>3</sup>Consists of the transactions in foreign financial assets and liabilities of an economy. The foreign financial assets of an economy consist of holdings of monetary gold, IMF Special Drawing Rights and claims on non-residents. The foreign financial liabilities of an economy consist of claims of non-residents. The primary basis for classification of the financial account is functional: direct, portfolio, other investment and reserve assets (IMF, 2009).

account; however, it depicts how the devaluation of a currency might change the relationship between expenditures, or between absorption and income (Fleermuys, 2005).

Namibia experienced current account deficits from 2009 to 2015. This trend was mainly due to the deteriorating trade balance coupled with increased outflow in investment income. Between 1990 to 2008, Namibia registered current account surplus. The increase in the surplus was mainly due to substantial SACU inflows. With the exclusion of current transfers, which are predominantly made up of SACU receipts, Namibia would have recorded current account deficits during this period. As has been seen of recent years, the income delivered from SACU is not stable and hence the country need to devise other plans to address the recent but persistent current account deficits that the country is faced with.

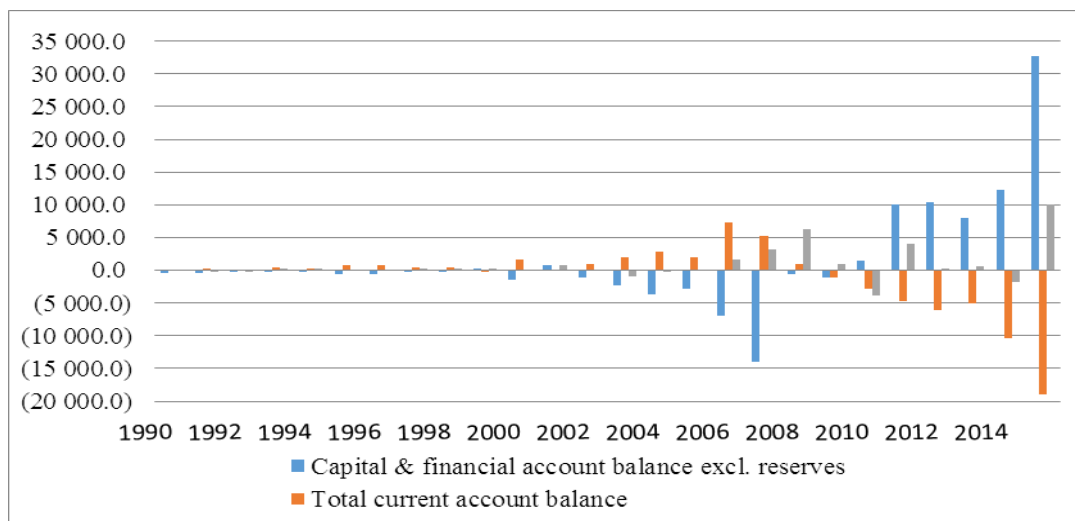
The conclusions reached by previous studies on the BoP in Namibia are divergent, necessitating another study in this area, more so given the impact of the 2008 financial crises. There are two studies that examined the balance of payments in Namibia. Fleermuys (2005), examined whether the monetary approach to the balance of payment holds for Namibia or not. Using quarterly data from 1993 to 2003, the study found that domestic credit was negatively correlated to the BoP, while interest rates was insignificant. On the contrary, Eita and Gaomab II (2012) found that interest rates were positively correlated with the BoP. Against the divergent findings, this study intends to revisit the question of whether the BoP is a monetary phenomenon in Namibia, i.e. whether the current account deficit of the country can be addressed using monetary policy. As can be noted, it has been more than 10 years since Fleermys (2005) study was undertaken. Moreover, the occurrence of the 2008 financial crises might have brought structural economic changes that could have changed the results found by Eita and Gaomab II (2012), thus necessitating a visitation of the applicability of MABP in Namibia. The paper thus intends to add to the understanding regarding the relationship between monetary policy and balance of payments problems in Namibia. The findings of the study will also provide recommendations to Namibia monetary authorities on how to handle disequilibrium in the balance of payment.

### **1.1 Overview of the Balance of Payments in Namibia**

Namibia registered a consistent current account surplus between 1990 to 2008, however this trend has turned into a deficit of recent. Namibia's current account surplus rose from N\$71.3 million in 1990 to its highest of N\$7.3 billion in 2007. The increase in the surplus was mainly due to the current transfers. With the exclusion of current transfers, which are predominantly made up of SACU receipts, Namibia would have recorded current account deficits during this period. From 2008 up until 2015,

Namibia experienced current account deficits, mainly due to the deteriorating merchandise trade balance<sup>4</sup> coupled with increased outflow in investment income. In this regard, on average, the net investment income recorded an outflow of N\$2.1 billion compared to N\$74.8 million during the period prior to 2008 (Figure 1).

**Figure 1: Trend of Namibia's Balance of Payments, 1990 to 2015**



*Source: Bank of Namibia (2016)*

The country's capital and financial account on the other hand registered deficits up to 2009, before turning to a surplus thereafter. In general, the capital and financial account has consistently recorded deficits prior to 2009. This was mainly due to capital outflows, which resulted from portfolio and other investments, mostly due to the underdeveloped capital markets and the repayment of long and short-term loans during this period. As from 2010, the capital and financial account started to experience surpluses resulting from an increase in direct investment especially in the mining sector, as well as capital inflow due to external borrowing such as the Euro and the Johannesburg stock exchange (JSE) bonds (Figure 1).

## 2. Literature Review

Adamu and Itsede (2010) concluded that money played a significant role in determining the BoP, confirming that the MABP holds for the West Africa Monetary Zone (WAMZ) countries. The study examined whether excess money supply caused disturbances in the BoP of WAMZ countries using panel data estimation techniques, involving both the cross-country and within-country effects, for the period 1975 to 2008. The study estimated a standard MABP model using net foreign assets (NFA) (dependent variable) against a set of economic determinants of BoP, namely GDP

<sup>4</sup> Merchandise trade balance is the net balance of the total export and import of goods excluding transactions in services between residents and non-residents (IMF, 2009).

growth, inflation, interest rates and domestic credit (independent variables). The study found that both interest rates and domestic credit had a significant negative relationship with NFA. On the contrary, a significant positive relationship was established between GDP and NFA. Accordingly, the study concluded that the imbalances in BoP can be corrected through appropriate mix of monetary and fiscal policies.

In comparison to Adamu and Itsede's (2010) findings, Akpansung (2013) instead contends that monetary policy variables can be used to correct imbalances in BoP given that inequalities in the BoP always result from disturbances in monetary variables. The study suggests that this can be realised by adjusting domestic credit demand and hence the size of the foreign trade balance. Further, the study suggests that when monetary authorities adopt strict monetary policy measures to limit the growth of domestic credit, economic agents will respond by cutting back on their expenditure relative to their income, and thus rebuilding their cash balances. These findings were attained in a study which analysed several other empirical studies that have been conducted on various countries regarding the applicability of the MABP in those respective countries.

Tijani (2014), found a positive relationship between BoP, domestic credit, exchange rate and the trade balance, whereas, a negative relationship was found between BoP and inflation as well as GDP in Nigeria. Using a linear regression analysis method on annual time series data from 1979 to 2010 he argues that, monetary measures, although not entirely, greatly contribute to the position of Nigeria's BoP, cause disturbances and serve as an adjustment mechanism to bring BoP to equilibrium. The study suggests that in order to promote a favourable trade balance, which invariably stabilises the BoP, Nigeria's monetary authorities should use contractionary money supply and domestic credit measures. Similarly, Udude (2015) also concluded that monetary policy significantly affects the level of BoP in Nigeria when he analysed the effect of monetary policy variables on Nigeria's BoP using ordinary least square technique (OLS), from 1986-2012.

On the contrary Boateng and Ayentimi (2013) contend that BoP disequilibrium is not entirely a monetary phenomenon in Ghana. The study used annual data from 1980 to 2010 to analyse Ghana's BoP using the OLS single equation model. The study found a significant relationship between the NFA, GDP growth, domestic credit, and interest rate. Conversely, the study found an insignificant relationship between inflation and net foreign assets, implying that inflation was not relevant in determining the NFA. Although this study found a significant relationship between NFA and other monetary variables, it further cautioned that these results were not conclusive evidence that the MABP is applicable in Ghana. This is due to the low value of the adjusted R-square,

which suggests that other variables which have a significant impact on Ghana's NFA may have been overlooked in the study.

Similarly, Shamabobo (2015), found that the Zambian BoP is not purely a monetary phenomenon. The study tested the MABP in Zambia by estimating the Reserve Flow Equation (RFE), using OLS regression and joint hypotheses testing of the preconditions outlined by the MABP. In addition, the SVAR model was applied on monetary variables using annual data for the period 1980-2011 and monthly data for 1995 to 2011.

In Namibia, Fleermuys (2005) similarly argues that BoP disequilibrium is not entirely influenced by monetary variables. Using the reserve flow equation and quarterly data from 1993 to 2003, the study found an insignificant relationship between NFA, the prime interest rate and GDP. The study, however found a significant and positive relationship between inflation and NFA. Furthermore, it found a significant negative relationship between NFA and domestic credit. These findings suggest that BoP disequilibrium in Namibia cannot be entirely corrected by monetary policy.

In addition, Eita and Gaomab II (2012) posits that monetary policy, through interest rate, can be used to bring about equilibrium in BoP in Namibia. Their study employed the vector autoregression model, using data from 1999 to 2009, and found a positive relationship between interest rate, fiscal balance, GDP and BoP in Namibia. The positive impact of interest rate on BoP is indicative that monetary policy can be used to bring about improvements in the BoP. The study further indicated that, the impact of GDP on BoP comes through the positive impact which export expansion has on the current account. Furthermore, the study highlighted that an improved fiscal balance is also associated with an improved BoP.

Although the reviewed literature found varying results, a common conclusion from most of these studies is that BoP is not entirely a monetary phenomenon. That is, the disequilibrium in the BoP cannot be addressed by monetary policy alone; thus authorities need to consider other policies in order to correct BoP imbalances. The diverging results, especially those from studies pertaining to Namibia, further strengthen the need to revisit the application of the monetary approach to the balance of payments in Namibia.

### **3. Methodology**

#### **3.1 Research Questions**

The overall objective of this study is to investigate the applicability of the monetary approach to Namibia's BoP. The specific objectives are to determine whether monetary

variables have significant effects on the BoP. Secondly to inform policy makers on the impact that monetary policy formulation has on the balance of payments of the country.

### 3.2 Modeling Volatility

The first step the study undertook was to specify the mathematical model that will be used to examine the economic phenomenon (Koutsoyiannis, 1977). This study follows Boateng and Ayentimi (2013) in specification below.

$$NFA = \alpha - \beta_1 LNDC + \beta_2 LNGDP - \beta_3 LNFB - \beta_4 LNER - \beta_5 LNCPI - \beta_6 LNR + \mu \dots \dots \dots (1)$$

- |               |                                               |
|---------------|-----------------------------------------------|
| Where: LNNFA: | log of net foreign assets                     |
| LNGDP:        | log gross domestic product real values        |
| LNFB:         | log of fiscal balance                         |
| LNER:         | log of Nominal Effective Exchange Rate (NEER) |
| LNCPI:        | log of Consumer Price Index                   |
| LNR:          | log of interest rate (Repo)                   |
| LNDC:         | log of domestic credit                        |
| $\alpha$ :    | Constant term                                 |
| $\mu$ :       | Error term                                    |

The study makes the following assumptions and some prior expectations:

- This study expects a positive relationship between the fiscal balance and the NFA. A positive fiscal balance implies that the national savings are higher and hence lead to an improvement in the current account. On the other hand, an improved fiscal balance may be due to increased foreign direct investment, which may increase the domestic tax collection. Similar to Eita and Gaomab II (2012), this study assume that the fiscal balance is associated with improvement in the current account due to increased SACU receipts.
  
- In terms of inflation, a negative relationship is expected. When domestic prices rise, it leads to a reduction in demand of domestic goods and services. This increases the demand for imported goods which have a negative effect on the net foreign assets.
  
- GDP was used as a proxy to measure the national income. A high level of national income means that there is more money in the economy to invest both in the domestic economy and abroad. This in turn is expected to increase exports and improve the current account and increase the NFA. On the contrary, for a country which depends more on imports, an increase in GDP could lead to an increase in imports, which could cause a deterioration on the current account, and reduce the NFA. The overall effect will depend on which of those effects outweigh the other one. Thus the relationship between GDP and NFA is ambiguous.
  
- The coefficient of the interest rate is expected to be positive given that increase in interest rate would induce capital inflows on the capital and financial account, and hence increase the NFA. From the current account perspective, an

increase in interest rate reduces the countries production capacity which in turn negatively affects the current account and the NFA. Thus, the study expects the impact of the capital and financial account to outweigh the current account, and hence a positive relationship between interest rate and NFA is expected.

- The exchange rate coefficient is assumed to be negative, ceteris paribus. An exchange rate appreciation reduces the competitiveness of imported goods. Consequently, exports decrease while imports increase leading to a deficit on the current account and a reduction in the NFA. An increase in imports reduces foreign reserves which are needed to pay for the imported good, this in turn reduces NFA.
- A negative relationship between the NFA and domestic credit is expected. Increase in domestic credit increases the demand for imports, which in turn reduces the net foreign assets.

### **3.3 Data**

The study used quarterly data on variables such as NFA, interest rate, CPI, GDP, exchange rate and fiscal balance, covering the period from 1991 to 2015. NFA was used as the target variable instead of BoP because the inclusion of the BoP variable in the estimation produced spurious results. Data for variables such as the repo rate, NFA of the central bank, domestic credit, and nominal effective exchange rates (NEER) were obtained from the Bank of Namibia’s Annual Reports and Quarterly Bulletins. Fiscal balance (FB) data was obtained from the Ministry of Finance, while data for gross domestic product (GDP) and inflation were sourced from the Namibia Statistics Agency (NSA).

### **3.4 Estimation Methodology and Procedures**

The study used the vector error correction model (VECM) and the VAR methodologies. In the VAR methodology, time series data can be estimated simultaneously, while the VECM corrects for autocorrelation associated with time series data. The study, however had some limitations. Although other research methodologies such as Engle Granger two steps and Auto Regressive-Distributed Lag (ARDL) could have been used in the study, the VECM was found to be the most suitable methodology for long run relationship between variables and gave better results compared to other methodologies. The VAR of order m is given by the following:

$$Z_t = \mu + A_t z_{t-1} + A_m z_{t-m} + v_t \dots\dots\dots (2)$$

Where  $Z_t$  is  $(nx1)$  vector of variables,  $A_t$  and  $A_m$  are  $(n \times n)$  matrices of parameters, while  $V_t$  represent the residuals.



**3.5 The estimation procedures were made in four stages:**

- i. First step in VECM model was to test whether or not variables were stationary. Variables that were found to be non-stationary in levels were then differenced to induce stationarity.
- ii. If all variables are not stationary, but integrated of the same order I (1), then one can proceed to the next step of testing for cointegration. Test for cointegration was intended to find out if there was a long term relationship among variables. If the test found out that there was indeed cointegration then the next step was run the vector error correction model (VECM) and determine the speed of adjustment.
- iii. However, if variables were not cointegrated the last option was run a VAR.
- iv. The last step was to run the granger causality tests and conduct the variance decomposition test of variables.

**4. Results and Discussion**

**4.1 Unit Root Test**

All variables were integrated of the same order I (1), except for GDP growth rate which was stationary in levels. It is commonly known that economic variables that are non-stationary can bring spurious results if not resolved. The Phillips-Perron methodology was used to test for unit root and the results showed that, variables such as NFA, interest rates, fiscal balance, domestic credit, GDP values<sup>5</sup>, exchange rates and CPI were integrated of the same order I (1). The results of the unit root test are presented in table 1 below.

**Table 1: Unit root test -Phillips -Perron test of Unit root**

Variables	Levels with intercept		1 <sup>st</sup> difference with Intercept		order of integration
	T-values	P-values	T-value	P-value	
NFA	1.060219	0.9970	-3.398818	0.0133	I(1)
Interest rates	-1.349278	0.6040	-5.379778	0.0000	I(1)
Domestic credit	-2.652312	0.0862	-10.52559	0.0000	I(1)
GDP real values	1.794544	0.9997	-4.073862	0.0017	I(1)
Exchange rate	-1.153108	0.6920	-7.678979	0.0000	I(1)
Fiscal	-2.354918	0.1574	-4.469643	0.0004	I(1)
CPI	2.052911	0.9999	-12.77751	0.0001	I(1)

*Unit root test measured at 1 and 5 percent level of significance <sup>6</sup>*

<sup>5</sup> Given that GDP growth rates were stationary, the study used the GDP values instead.

<sup>6</sup> Phillips- Perron Test:  $H_0$ : has a unit root,  $H_1$ : Has no unit root. Critical value: 5 and 1 percent (p=0.05 and p=0.01). Reject  $H_0$  If P<0.05

#### 4.2 Lag Length Criteria

The study used lag of one as suggested by Schwarz information criteria. The optimum lag length suggested by the various lag length criteria test. Accordingly, one lag was suggested by the Schwarz criteria, and hence it was used by the study. Other criterions choose two, four and eight optimum lags but these did not yield good results.

#### 4.3 Cointegration Test

The Trace test revealed that there were two cointegrating equations, while the Max-Eigen test revealed that there was only one cointegrating equation, between NFA, interest rates, GDP, CPI, fiscal balance, domestic credit and exchange rate. To determine whether there was cointegration between variables or not, the Johansen cointegration test was applied. Since the Phillips-Perron test of unit root revealed that CPI, interest rates, GDP, exchange rate, domestic credit and NFA were cointegrated of the same order I (1), only these variables were used in the cointegration test and the results are given in Table 2.

**Table 2: Cointegration Tests**

Hypothesised No. of CE(s)	Trace Statistic	0.05 Critical Value		Max-Eigen Statistic	5 Percent Critical Value
None *	170.5238	125.6154	None *	72.64700	46.23142
At most 1 *	97.87683	95.75366	At most 1	37.24547	40.07757
At most 2	60.63135	69.81889	At most 2	32.02449	33.87687
At most 3	28.60686	47.85613	At most 3	13.25915	27.58434
At most 4	15.34770	29.79707	At most 4	9.074657	21.13162
At most 5	6.273047	15.49471	At most 5	6.218629	14.26460
At most 6	0.054418	3.841466	At most 6	0.054418	3.841466

\* denotes rejection of the hypothesis at the 0.05 level

The trace statistics and the Max-Eigen tests were both conducted at 5 percent confidence level. The hypothesis under these two tests are the following:

$$H_0 = \text{There is no cointegration}$$

$$H_1 \neq \text{There is cointegration}$$

The Trace statistics showed that, there were two cointegrating equations, given that the values of the trace statistics were greater than their corresponding critical values. On the other hand, the Max-Eigen test indicated only one cointegrating equation, also evident in the Max-Eigen statistics which was greater than the critical value. The study opted for the result of the Max-Eigen test because of its accuracy in producing reasonable results as compared to the Trace test (Banerjee *et al*, 1993).

#### 4.4 The Vector Error Correction Model

##### 4.4.1 Long-run equation

$$NFA = 24.5781 - 0.0419GDP - 0.0001FB + 0.9536EX - 4.5651DC + 2.0682CPI - 0.9240R$$

(-0.01097)
(-2.57530)
(1.0644)
(-7.4828)
(1.59819)
(-2.15208)<sup>7</sup>

From the estimation, only domestic credit had the correct and expected sign. The coefficients of exchange rate, interest rate and fiscal balance were different from what was expected by theory. Besides fiscal balance, domestic credit and interest rates, all other variables were statistically insignificant. Other things being equal, the results show that a one percent increase in domestic credit reduces the NFA by 4.5 percent. Fleermys (2005) similarly found domestic credit to be a significant explanatory variable of NFA in Namibia.

The coefficient of interest rate came out negative and inconsistent with the theoretical expectation. The results show that a one percent increase in interest rates will reduce the NFA by 0.92 percent, *ceteris paribus*. This suggests that the impact of increase in interest rate is more severe on the current account than the capital and financial accounts. This is contrary to Eita and Gaomab (2012) who found interest rates positively correlated to the BoP in Namibia and thus rendering support for the capital and financial account channel.

The negative sign of the fiscal balance was contrary to theoretical expectations, since an improvement in fiscal balance, as supported by SACU receipts, is supposed to increase NFA. The result might be explained by the fact that Namibia as a net importer, an increase in SACU receipts might lead to an expansionary fiscal policy which as a result may increase imports and consequently reduce NFA in the long run.

The coefficient on the exchange rate was positive and contrary to theoretical expectations. This variable was, however, found to be statistically insignificant. These results collaborate those of Eita and Gaomab II (2012), who found the exchange rate to be insignificant. It can, therefore, be concluded that, in the long run domestic credit, fiscal balance and interest rates are negatively correlated to the NFA in Namibia.

##### 4.4.2 Short-run Model

**Table 3: Vector Error Correction Model results**

Variables	Coefficient	Std. Error	T-Statistic	Prob.
ECT(-1)	-0.409192	0.057037	-7.174171	0.0000
D(LNNFA(-1)	0.035166	0.080094	0.439066	0.6617
D(LNGDP(-1)	22.52096	11.84189	1.901806	0.0605
D(LNFB(-1)	0.000366	0.000159	2.297833	0.0240

<sup>7</sup> The figures in brackets ( ) represent the t-statistics of coefficients.

D(LNEX(-1))	1.461613	0.767271	1.904950	0.0601
D(LNDC(-1))	-1.330437	0.334558	-3.976702	0.0001
D(LNNCPI(-1))	0.047367	1.229695	0.038519	0.9694
D(LNR(-1))	0.280392	0.528659	0.530383	0.5972
C	0.072394	0.066663	1.085962	0.2805

R-square 0.51, Adjusted R-squared 0.46, Durbin Watson 1.75

The VECM results showed that, in the short run, the exchange rate is positively correlated with the NFA and is statistically insignificant as presented in Table 3. This implies that an appreciation of the Namibia Dollar will increase NFA, which in turn improve the country's BoP, and vice-versa. This is, however, against theoretical expectation and statistically insignificant. These results are similar to the long run effects and supports the results by Eita and Gaomab II (2012). This implies that the exchange rate depreciation cannot be used to support the current account and hence increase the NFA. This phenomenon can be ascribed to the nature of Namibia exports (fixed contracts, especially minerals) which are less sensitive to exchange rate changes.

The VECM results showed that in the short run GDP and fiscal balance were positively correlated with the NFA, while domestic credit was negative and statistically significant. The results on the fiscal balance is consistent with prior theoretical expectations and statistically significant. Similar to the long run, the coefficient of domestic credit is statistically significant. Accordingly, a one percent increase in domestic credit leads to a 1.3 percent decline in the NFA, *ceteris paribus*. The coefficient on GDP implies that an increase in output will lead to increase in the current account balance and hence increase the NFA, however it was statistically insignificant.

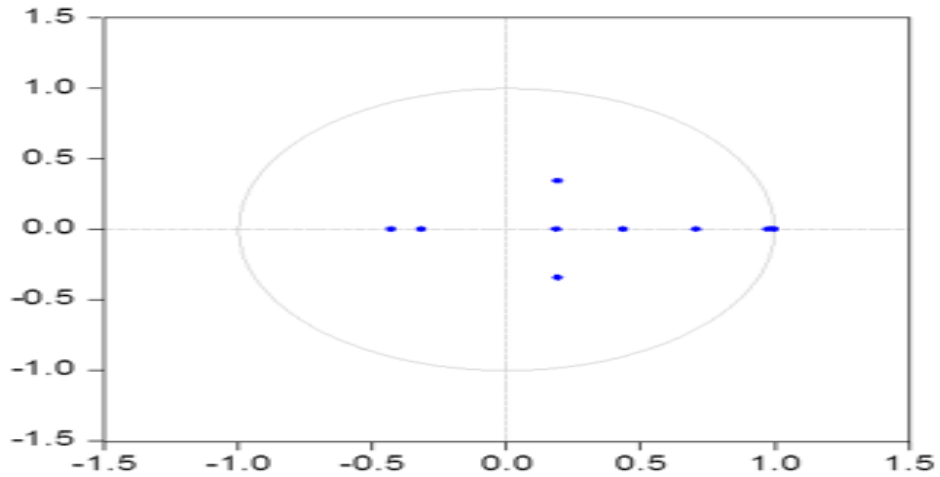
The coefficients of inflation and interest rate were found to be positive but insignificant in the short run. The insignificance of interest rates in determining the NFA was expected, given the limited monetary policy discretionary powers that Namibia has due to the fixed exchange rate policy.

The VECM results showed that, the error correction term had the expected negative sign and statistical significant. The speed of adjustment is 41 percent, implying that 41 percent of errors are corrected within the same period. Based on the results above, it can be concluded that in the short run NFA in Namibia is positively correlated with the fiscal balance and negatively with domestic credit. The results are validated by diagnostic tests presented in figures 2 and 4.

The model satisfies the stability test because the roots of the polynomial lie inside the circle and the line of the CUSUM test lies within the band of 5 percent level of significance (Figure 2 and Figure 4). Table shows that the model does not suffer from problems of serial correlation and heteroscedasticity, because of the respective p-values that are higher than the 0.05 percent level of significance. The model does, however,

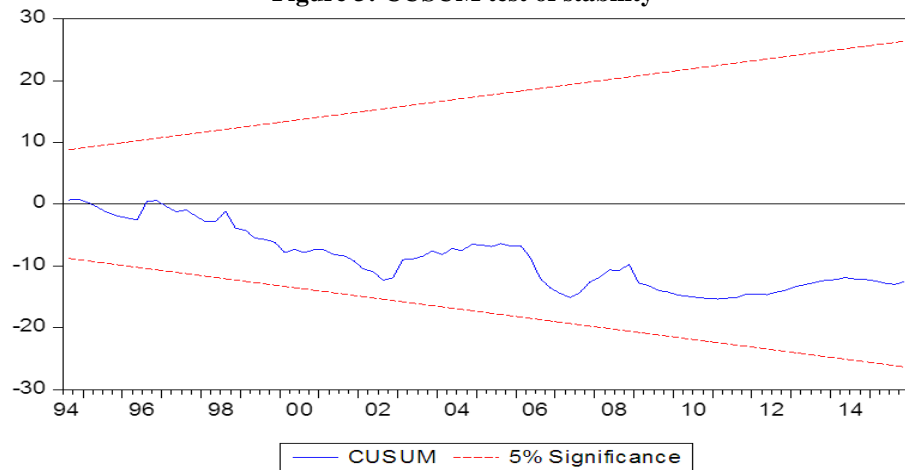
not satisfy the normality condition, as evident in the p-value of 0.0000, which is less than the 0.05 percent level of significance (Table 4). Moreover, the model has a reasonable R-squared value of 50.7 percent.

**Figure 2: Inverse Roots of AR Characteristic Polynomial**



Source: Author's compilation and values obtained from E-views

**Figure 3: CUSUM test of stability**



Source: Author's compilation and values obtained from E-views

**Table 4: Diagnostic tests results**

Tests		Probability
<b>Normality</b>	Jaque-Bera (119.9910)	0.000
<b>Serial Correlation</b>	Observed R squared (2.668181)	0.1024 Chi-square Probability(1)
<b>Heteroscedasticity</b>	Observed R-square (8.104321)	0.8838 Chi-square Probability(14)

Source: Author's compilation and values obtained from E-views

#### 4.4.3 Granger causality Results

The Granger causality results indicate that there is a uni-directional causality running from GDP, fiscal balance, exchange rate and domestic credit to NFA. According to Bihn (2013), causality, refers to the ability of the past values of one

variable in predicting the future values of another variable. The fiscal balance, GDP, exchange rate and domestic credit Granger causes the NFA and not the other way around. These results are consistent with the VECM results, in which fiscal balance and domestic credit are found to be the only variables significantly affecting the NFA, Table 5.

**Table 5: Granger Causality Test Results**

<b>Variable</b>	<b>Chi-square</b>	<b>P-Values</b>	<b>Decision</b>
<b>GDP - NFA</b>	3.616865	0.0572	Causality exist
<b>NFA - GDP</b>	0.521382	0.4703	Causality does not exist
<b>Fiscal Balance - NFA</b>	5.280035	0.0216	Causality exist
<b>NFA –Fiscal Balance</b>	0.656627	0.4178	Causality does not exist
<b>Exchange-rate -NFA</b>	3.628835	0.0568	Causality exist
<b>NFA – Exchange rate</b>	0.029331	0.8640	Causality does not exist
<b>Domestic Credit - NFA</b>	15.81416	0.0001	Causality exist
<b>NFA – Domestic Credit</b>	1.7647941	0.1840	Causality does not exist
<b>Interest rate - NFA</b>	0.281307	0.5958	Causality does not exist
<b>NFA – interest rate</b>	0.715988	0.3975	Causality does not exist
<b>CPI - NFA</b>	0.001484	0.9693	Causality does not exist
<b>NFA - CPI</b>	0.000712	0.9787	Causality does not exist

Source: Author's compilation and values obtained from E-views

#### **4.5 Variance Decomposition**

Results from the variance decomposition show that, apart from own shocks, most of the variations in NFA are mainly caused by shocks in domestic credit, interest rate and exchange rate. In the first quarter, 100 percent of variations in NFA result from own shocks. The proportion of variations in NFA resulting from own shocks decreases over time, reaching 67.5 percent in the fifth quarter and 51.6 percent in the tenth quarter. Domestic credit, interest rate and exchange rate shocks account for a combined 31.5 percent and 45.8 percent of variations in NFA, in the fifth and tenth quarters, respectively. GDP, fiscal balance and CPI shocks account for a combined 1.0 percent and 2.5 percent of NFA fluctuations, in the fifth and tenth quarters, respectively. Table 6 presents the variance decomposition results.

**Table 6: Variance decomposition of NFA**

<b>Period</b>	<b>S.E.</b>	<b>LNNFA</b>	<b>LNGDPV</b>	<b>LNFB</b>	<b>LNEX</b>	<b>LNDCRDT</b>	<b>LNCPI</b>	<b>LNR</b>
1	0.295247	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.358123	95.90827	0.005492	0.187515	2.079423	0.901588	0.128022	0.789686
3	0.410015	83.80792	0.004557	0.346311	3.274645	10.02977	0.218240	2.318560

4	0.458061	74.22337	0.010005	0.536207	3.887094	16.38245	0.274573	4.686308
5	0.504829	67.53059	0.029600	0.731252	4.465359	19.99453	0.269243	6.979430
6	0.549657	62.71341	0.065791	0.938917	5.092329	22.03165	0.260390	8.897507
7	0.592461	59.00145	0.117317	1.167314	5.666500	23.38154	0.248189	10.41769
8	0.633342	56.03365	0.182394	1.418163	6.148370	24.34592	0.237411	11.63410
9	0.672509	53.61812	0.258070	1.691795	6.541787	25.04010	0.226841	12.62328
10	0.710208	51.61759	0.341794	1.986426	6.866076	25.53247	0.216915	13.43872

Source: Author's compilation and values obtained from E-views

## 5. Conclusions and Recommendations

The objectives of this study were to empirically investigate the applicability of the monetary approach to the Namibian balance of payments and to also inform policy makers on the impact of monetary policy formulation on the balance of payment. To answer these questions, the VECM econometric methodology was adopted for analysis. Net foreign assets was the target variable representing BoP, while CPI, exchange rate, interest rate, domestic credit, fiscal balance and GDP were used as explanatory variables. The Phillips-Perron test was used to test for unit root and it indicated that all variables were I(1).

The paper found that, an increase in domestic credit has a negative effect on the NFA and vice versa, while improvement in the fiscal balance tends to improve NFA, whereas variables such as interest rate, GDP and CPI were found to be insignificant, in the short run. The Granger causality results indicate that there is a uni-directional causality running from GDP, fiscal balance, exchange rate and domestic credit to NFA. The variance decomposition shows that, most of the variations in the NFA are caused mainly by own shocks, domestic credit, interest rate and exchange rate. CPI, fiscal balance and GDP contributes the least variations to the NFA. The Granger causality and variance decomposition results, with regard to the fiscal balance and domestic credit, are consistent with the short-run results.

The study concludes that; monetary variables are not the only cause of changes in the NFA in Namibia. The results show that fiscal balance, which is non-monetary variable, has a significant impact on NFA as revealed by the VECM, Granger causality and variance decomposition results. This is consistent with Eita and Gaomab (2012) who concluded that the fiscal balance has an impact on the BoP in Namibia. Similarly, Adamu and Itsede (2010), concluded that the fiscal balance determines the NFA in the WAMZ. This study concludes that increase in domestic credit has a negative effect on the NFA in Namibia. This finding collaborates with other scholars such as Fleermuys (2005). Boateng & Ayentimi (2013) also reached the same conclusion in the case of Ghana. The positive relationship between the exchange rate and NFA in both the short

and long run implies that a depreciation of the Namibia Dollar may not improve BoP. This is also consistent with the conclusions of Mushendami & Namakalu (2016) who concluded that, changes in the exchange rate may not improve the trade balance of Namibia. The insignificance of monetary variables such as the exchange rate, CPI and interest rates implies that the BoP cannot entirely be corrected by monetary policy.

### **5.1 Policy Implications**

The implication of the study is that, contractionary monetary policies aimed at reducing domestic credit may increase the NFA and hence improve the BoP in Namibia. In order to increase NFA, contractionary monetary policy measures should be employed, so as to reduce domestic credit. Furthermore, policy efforts to devalue the Namibia Dollar might not improve NFA and consequently the BoP. Caution, however, needs to be exercised as contractionary monetary policy may have negative impacts on GDP growth of the country and ultimately on employment creation. Thus, it is recommended that, contractionary policy be taken only at a time when the country's national income is increasing. Moreover, when correcting the imbalances in the BoP, policy makers should also consider other non-monetary policy instruments, instead of entirely relying on monetary instruments. On the fiscal side, policies aimed at improving the fiscal balance can improve the BoP in the short run. The policy implications with regard to the above findings suggest that, to remedy the imbalances of BoP in Namibia, policy makers should target their efforts on reducing fiscal deficits. Thus the government should devise strategies to increase revenue.

The insignificance of some variables suggests that the study might have skipped other major variables. Hence the study recommends that another study on the overall determinant of the BoP in Namibia be undertaken.

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