The balance of payments as a monetary phenomenon: An econometric study of Namibia

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Abbreviations

ADF   Augmented Dickey-Fuller
DW   Durbin-Watson
GDP   gross domestic product
IMF   International Monetary Fund
MABP   monetary approach to the balance of payments
NFA   net foreign assets

Abstract

This paper examines the monetary approach to the Namibian balance of payments for the period 1993–2003. Through the reserve flow equation, it tests whether excess money supply played a significant role as a disturbance by using cointegration tests and error-correction modelling. The empirical results showed that monetary variables do not play an overwhelming role in determining Namibia's balance of payments. The only two significant relationships found were between inflation and net foreign assets, which reflected a strong positive relationship, and between domestic credit extension and net foreign assets, which reflected a strongly negative relationship as posited by the monetary approach to balance of payments. The results evidently showed that, although some variables suggested by the monetary approach play significant roles, the balance of payments is not a purely monetary phenomenon. A balance of payments disequilibrium can, therefore, not be corrected only through monetary actions by the authorities.

1. INTRODUCTION

Namibia is currently experiencing an overall balance of payments deficit, which has provoked many questions on potential causes of this imbalance. This is a cause of concern because Namibia, like any other country, aims to maintain a stable equilibrium in the balance of payments as one of the core objectives of macroeconomic policy. Organisations such as the International Monetary Fund (IMF) have been giving a great deal of attention to stable balance of payments situations.

Throughout the years different adjustment mechanisms to balance of payments disequilibria have been developed, namely the monetary approach, the elasticities approach, and the absorption approach (Du Plessis et al., 1998:235). The main aim of this paper is to examine the monetary approach to the balance of payments (MABP), which argues that the balance of payments is a "*monetary phenomenon*" (Salvatore, 1998:473). This approach flows from the classical price-specie-flow mechanism, and is based on the notion that money plays an important role in causing a disturbance in the balance of payments account as well as serving as an adjustment mechanism to correct the disturbance (Salvatore, 1998:473).

The MABP regards money as a stock, and argues that money stock can be changed through international reserve flows. It states that a fixed exchange rate system could work without having to resort to devaluation, provided a country has a sound monetary policy; thus, devaluation will only occur as a result of a failure of monetary policy. This argument stems from the fact that disequilibrium in the balance of payments is a temporary situation that will be corrected if the "*money market is in equilibrium*" (Du Plessis et al., 1998:255).

Although the monetary approach has been commended for explaining the balance of payments well, it has prompted criticism from other scholars[1] as an approach that ignores other parts of international trade in determining the balance of payments. The MABP has been blamed for disregarding the fiscal and real factors that influence changes in the balance of payments, whilst concentrating only on monetary factors. Contrary to these views, it can be stated that the monetary approach does not ignore these factors. Valinezhad contends that "*the MABP only asserts that the effect on the balance of payments of a higher rate of economic growth should be analysed with the tools of monetary theory*" (Valinezhad, 1992:265).

Namibia has been running current account surpluses since 1993. Nevertheless, except for 2000, the merchandise trade balance was in deficit up to 2003 (BON, 2003). What is of concern is that the trade deficit has been increasing substantially throughout the years. This has influenced the country's overall balance of payments significantly. The country experienced an overall balance of payments surplus for most of these years, but from 2003 the balance of payments significantly changed into a deficit (BON, 2003).

Whereas the absorption and elasticities approaches concentrate on the current account balance, the MABP emphasises the overall balance of payments – including the capital account (Coppin, 1994:77). By employing the MABP, the paper intends to offer a basis for understanding the relationship between monetary policy and balance of payments problems. The research could also serve as a recommendation to monetary authorities in handling disequilibrium in the balance of payments. This study wishes to achieve an empirically robust

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[1] See Darby (1980) and Lanciaux (1990).

and theoretically consistent model of the MABP in Namibia by employing multivariate cointegration and error-correction modelling during the period 1993–2003, using quarterly observations. A specific objective is to determine whether excess money supply has played a significant role in the disequilibrium of balance of payments in Namibia. In addition, the study also sets out to establish whether there is a significant relationship between domestic credit and international reserves.

The paper is structured as follows: Section 2 refers critically to the available literature, both theoretical and empirical, on the MABP. In addition, it provides a brief outline of alternative approaches to the balance of payments. Section 3 provides a background of the Namibian economy and its balance of payments situation since 1993. Section 4 describes the methodology employed including the specification of the model, while Section 5 contains the econometric analyses and discusses the empirical results. The final section states the policy implications of the MABP in Namibia and the conclusions of the research.

2. LITERATURE REVIEW

Literature on the fundamental basis of the MABP in a country has been generated by scholars such as Dornbusch (1971), Frenkel (1971), Johnson (1972), Laffer (1969), and Mundell (1968, 1971). Mundell (ibid.) emphasised that monetary factors, not real factors, exert the most influence on the balance of payments through their effects on the currency and capital accounts of a country.[2] This approach contends that disequilibrium in a country's balance of payments shows an equivalent discrepancy between that economy's money demand and supply (Alawode, 1997:13).

The MABP is based on the assumptions of a small open economy with a fixed exchange rate and a stable money demand function. Furthermore, it assumes that output, domestic prices and interest rates are exogenously determined. Money supply is assumed to be endogenous[3] and monetary authorities do not sterilise foreign exchange reserves. This section discusses the available literature – both theoretical and empirical – on the MABP and its policy implications for a country's balance of payments. Alternative approaches to balance of payments adjustment mechanisms will also be examined. Reference will be made to the criticisms expressed against the MABP.

2.1 Review of theoretical literature

The balance of payments account records a country's international economic performance, with the two most important accounts being the current account and capital account. Whereas the current account records all transactions of goods and services and unrequited transfers in a country, the capital account records all exchanges and money capital for various kinds of real or financial assets. The latter account is important as it relates domestic transactions to international transactions.

When there is disequilibrium in a country's balance of payments, authorities often battle with how to correct it. Whether authorities can actually do something to remedy such a situation –

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[2] Real factors are assumed to have only a temporary effect.

[3] "*The movement of reserves in response to money market disequilibrium implies that the money stock is endogenous and beyond the control of the authorities*" (Alawode, 1997:16). Alawode (ibid.) also contends that, by changing domestic money into foreign goods and assets, the public arbitrates the total stock of money. See also Frenkel and Johnson (1976).

for example, through policy actions, or whether there are self-correcting mechanisms in place – is often a point of debate. Throughout the years different adjustment mechanisms to such disequilibria in a country's balance of payments have been identified (see e.g. Du Plessis et al., 1998:235). Three of these mechanisms are the monetary approach, the elasticities approach, and the absorption approach.

2.1.1   The monetary approach to the balance of payments

The MABP emanates from the David Hume price-specie-flow mechanism,[4] which was launched as a counter-argument to the mercantilist belief that a country can achieve a relentless balance of payments surplus by import-substituting and export-promoting policies.

The MABP, which regards the balance of payments as a "*monetary phenomenon*", expresses the relationship between a country's balance of payments and its money supply (Chacholiades, 1990:463). Furthermore, it argues that there is disequilibrium in the money market if there are surpluses and deficits in the balance of payments. Deficits are caused by money supply exceeding money demand, while surpluses are caused by money demand exceeding money supply (Howard & Mamingi, 2002:214). The MABP, therefore, largely emphasises the monetary implications of balance of payments disequilibria. In terms of prices, the MABP regards the general price level as the determinant of the real value of nominal assets, money and international debt. Relative prices seem to play a secondary role as they are considered to have only a transitory effect on the balance of payments.

The MABP specifies a money supply identity, money demand identity, and an equilibrium condition. The model[5] consists of the following equations:

$$M^s \quad = \quad (R + D) \tag{1}$$

$$M^d \quad = \quad F(Y, P, I) \tag{2}$$

$$M^s \quad = \quad M^d \tag{3}$$

where –

M^s = money supply
R = international reserves
D = domestic credit
M^d = money demand
Y = level of real domestic income
P = price level
I = rate of interest, and
M = equilibrium of stock money.

The monetary theory holds that there is a positive relationship between money demand and income ($\partial M^d / \partial Y > 0$), and between money demand and the price level ($\partial M^d / \partial P > 0$). However,

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[4] Hume, who was concerned with the inflow and outflow of gold from a country, demonstrated that increases in exports would lead to increases in domestic prices as more gold entered a country and would, thus, reduce demand for domestic goods. This would culminate in rising import demand and would, therefore, automatically limit the amount by which exports would exceed imports.
[5] See Dhliwayo (1996) and Du Plessis et al. (1998).

there is a negative relationship between money demand and the interest rate ($\partial M^d/\partial I < 0$). If interest rates are increased, people will demand less money as the opportunity cost of holding cash balances is increased, thus creating incentives for investing in interest-bearing securities. Then the reserve flow equation is written as –

$$\Delta R = \Delta[F(Y,P,I)] - \Delta D \tag{4}$$

where equations **(1)**, **(2)** and **(3)** are combined, placing the variables in percentage changes and isolating reserves as the dependent variable.

Equation **(4)** is the basic equation of the MABP, stating that the balance of payments is the result of divergence between the growth of money demand and the growth of domestic credit, whilst the monetary consequences of the balance of payments bring the money market into equilibrium. With money demand being stable, an increase in domestic credit will cause an equal and opposite change in international reserves. The coefficient of ΔD is, therefore, known as an *offset coefficient*: it shows the extent to which changes in domestic credit are offset by changes in international reserves. The MABP envisages a value of minus unity for this coefficient in the reserve flow equation (Dhliwayo, 1996).

The MABP claims that balance of payments deficits result in decreases in the money supply as a consequence of a loss in international reserves. This loss in reserves will only be temporary, however, provided that monetary authorities do not completely sterilise them. Many small economies experience persistent deficits in their balance of payments because authorities use "*credit policies and expenditure policies to maintain levels of output and employment*" (Howard & Mamingi, 2002:218). The MABP regards money demand as a demand for a stock; therefore, the inflows or outflows of money are regarded as the disequilibrium between desired and actual stocks, which can be adjusted through an excess of income over expenditure or vice versa. The differences between income and expenditure will be corrected when the flow of money brings the desired and actual money stock back into equilibrium.

Monetary authorities only have an influence on the *flow* supply of money. They do not have control over the *stock*[6] of money supply. Therefore, it is assumed that, in the case of countries with fixed exchange rates, money supply is endogenous. Monetary policy only has an influence on the balance of payments through its control over credit creation. In the modern, demand-determined world, where money supply is credit-driven and loans make deposits, this argument has gained ground, especially as the banking systems of countries develop.

2.1.2 Alternative approaches to balance of payments

There are two alternative approaches to balance of payments: the elasticities approach, and the absorption approach.

(a)   The elasticities approach

The elasticities approach, which has been associated with Robinson (1937), places its emphasis on the effects of exchange rate changes on the exports and imports of a country and, hence, on the trade account balance, whilst ignoring all other variables such as income.

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[6] These are multiples of reserve assets, as defined by monetary authorities.

This approach as an aspect of equilibrium also excludes the capital account on the basis that an excess or deficiency of exports in relation to imports will result in a balance of payments surplus or deficit; thus, its main focus is on the current account to the balance of payments. Furthermore, this approach assumes that the price elasticity of supply (domestically and internationally) is equal to infinity. The elasticities approach applies the Marshall-Lerner condition, which states that the sum of the elasticities of demand for imports and exports must be more than 1 in absolute terms for a devaluation to improve the balance of payments (Du Plessis et al., 1998).

(b)   The absorption approach

The absorption approach, which has been linked to Alexander (1952), was developed to highlight the importance of income changes in the adjustment process (Du Plessis et al., 1998:251). The absorption approach intends to show how devaluation might change the relationship between expenditures, or between absorption and income – in both nominal and real terms. It is worth noting that great emphasis is laid on the current account balance. This approach contends that the devaluation of a currency would lead to an increase in inflationary prices, which would in turn revoke the initial effect of an increase in prices.

This resulting process can only be prevented if inflation itself deflates the aggregate demand for goods through an income redistribution effect or through a reduction in the real value of existing money balances. The absorption approach is based on the national income identity:[7]

$$Y = C + I + G + X - M \tag{5}$$

where –

Y	=	national income
C	=	private consumption of goods and services purchased at home and abroad
I	=	total investment, by firms as well as by government
G	=	government expenditure on goods and services
X	=	exports of goods and services, and
M	=	imports of goods and services.

Then $C + I + G$ are combined into a single term, *A,* which represents domestic absorption (i.e. total domestic expenditure):

$$A = C + I + G \tag{6}$$

then –

$$Y = A + X - M \tag{7}$$

stating that national income equals absorption plus the trade balance, rewritten as –

$$X - M = Y - A \tag{8}$$

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[7] See Dhliwayo (1996) and Du Plessis et al. (1998).

which states that the trade balance is equal to the difference between domestic income and total absorption.

Equation **(8)** is the fundamental equation of the absorption approach. It implies that, if total absorption (expenditure) exceeds income (production), then imports will exceed exports, resulting in a balance of payments deficit. If the opposite occurs, i.e. where income exceeds absorption, then the balance of payments will be in surplus. A balance of payments deficit can, therefore, only be corrected if the level of absorption changes relative to the level of income (Du Plessis et al., 1998:251).

One aspect that these two alternative approaches have in common is that they assume balance of payments disequilibria are permanent. Furthermore, both approaches have been criticised mainly for not taking into account the capital account of the balance of payments. These mechanisms concentrate only on the current account and, thus, ignore the particular impacts of capital movements on the balance of payments (Coppin, 1994:77).[8]

2.2   Review of the empirical literature

A vast number of studies have emerged throughout the years testing the validity of the MABP empirically. There is convincing evidence that the MABP in fact applies to small open economies with fixed exchange rates. Most parts of the empirical literature were based on the 'reserve-flow equation', where a country's international reserves, or the rates of change in reserves, are regarded as the dependent variable. On the other hand, the independent variables vary in the different studies. They can include domestic income, prices, the interest rate, government expenditure, money multiplier, money stock, the exchange rate, and demand for nominal and real money balances.

Mixed results were obtained from the different studies on the MABP. Coppin (1994:83), in a study for Barbados, found that the "*degree of openness of an economy*" played a particularly important role in determining international reserves. He also found that expansionary fiscal policy played a vital role over monetary factors in determining international reserves. In essence, he found that there was evidence of the MABP being applicable to balance of payments in Barbados. Leon (1988), who examined Jamaican data, found that the MABP's predictions were not rejected. He used the reserve-flow and sterilisation equations in single and simultaneous equations and found strong evidence that the reserve-flow equation was working; however, he also observed that monetary authorities were in fact sterilising reserves in Jamaica. Watson (1990), in a study where he modelled Trinidad and Tobago's balance of payments for the period 1965–1985, found that, although all the other variables were significant and had the correct signs, modelling the change in international reserves as the dependent variable found a coefficient which was less than 1; thus, it was not in accord with what the MABP predicted.

A study by Jimoh (1990) also found strong evidence of the MABP in Nigeria. His suggestion (ibid.:74) was that "*monetary authorities in Nigeria must pay adequate attention to domestic credit creation in any of their attempts to control balance of payments in Nigeria*". Aghevli and Khan (1977) performed an empirical test on the MABP for 39 developing countries and found highly significant results, maintaining that the mechanisms underlying this approach held strongly for these countries. Lachman (1975), in a study that he did on South Africa,

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[8] For greater detail on these approaches, see Dhliwayo (1996), Du Plessis et al. (1998) and Zaidan (1999).

found basic grounds for the MABP. He concluded that monetary authorities would definitely be able to predict the extent to which increases in money supply would augment imports.

2.3   Criticisms of the MABP

The MABP has largely been criticised for emphasising monetary factors without taking into account that real factors also play a role, as it argues that balance of payments is in effect a monetary phenomenon (Howard & Mamingi, 2002:216). Nevertheless, the fact that the MABP is said to be a monetary phenomenon does not mean that it claims all other factors are unimportant. Rather, the approach explains that, since disequilibria in the balance of payments are caused by monetary imbalances, it would be more appropriate to use policy solutions that rely on monetary policy. Moosa (1992:265) contends that "*MABP only asserts that the effect on the balance of payments of a higher rate of economic growth should be analysed with tools of monetary theory*".

Furthermore, the MABP is criticised for concentrating on the change in international reserves in order to determine a country's external position (Lanciaux, 1990:436). The approach's characteristic of excluding other important factors – such as the current account balance, trade deficit/surplus, and the extent of a country's international borrowing – is regarded as being short-sighted with respect to the real factors which determine a country's balance of payments. In response to this it is argued that devaluation, tariffs and import quotas can only have an effect on the balance of payments by influencing the stock of money. The MABP was explicitly also expected to include the government budget constraint in its identity; however, as Howard and Mamingi (2002:217) pointed out, "*there is an interaction between government's fiscal policy and credit creation, so that the government's budget constraint is not really excluded*".

The MABP was also criticised for neglecting the errors that can occur in balance of payments data (Lanciaux, 1990:436). The balance of payments account includes an item called "*Net errors and omissions*" in order to make provision for balancing the account and noting any errors that might occur in the data. This provision is, however, ignored by the MABP in its equation. Lanciaux (ibid.) pointed out that the MABP, in determining the monetary base, includes the central bank's holdings of international reserves, but then excludes net errors and omissions, whilst "*the magnitude of the central bank's holdings of reserves is very small relative to the other items on the central bank's balance sheet, sometimes smaller than net errors and omissions*". In response to this criticism, Valinezhad (1992:264) points out that the item "*Errors and omissions*" is more a balancing item to fill the gap in the double-entry book system that the balance of payments follows. He (ibid.) contends that "*this item is not under direct control of the policymakers*". The latter item is also not able to effect an automatic improvement in the official reserves account of a country that is experiencing a persistent loss of reserves. Evidently, "*when a country is faced with persistent balance of payment deficit and loss of foreign exchange reserves, no external adjustment measure, such as devaluation, would be necessary because of this item*" (ibid.). Thus, Valinezhad (ibid.) contends that the condemnation of the MABP based on the exclusion of this item is unfounded.

In addition, the MABP has been criticised for its assumption of a stable demand for money, which might not always hold for some countries, as money demand can shift from a state of stability due to changes in a country's financial environment. In addition, the demand for

money in small open economies is also subjected to external shocks[9] in foreign trade. Currency substitution (holding foreign currency instead of domestic currency) is another factor influencing the trade balance; hence, the demand for money. Alawode (1997:17) contends, therefore, that "*the greater the degree of substitution between the domestic and foreign currencies, the less stable are both the exchange rate and the money demand function*". The MABP's inconsistency in specifying the money demand function has received a great deal of attention as it is not clear in the theoretical foundations *which variables* to use and *why*. Tsiang (1977) concurs by stating that the casual way in which a specification of the money demand function is chosen in preference to the others does not inspire much confidence. Money supply, which plays a central part in the MABP, is also not properly modelled as it uses the standard multiplier model, which is not stable.

The MABP has been criticised for being a 'long-run' model. Policies need to be made on a short-term basis; therefore a model that only works in the long run was not regarded as particularly useful (Alawode, 1997). The long run might cause economies tremendous adjustment costs, as the basic argument is that no policy actions are necessary because balance of payments disequilibria are self-correcting.

2.4   Policy implications of the MABP

It is evident from the MABP that disequilibrium in the balance of payments under a fixed exchange rate system does not need a balance of payments policy, but is rather a self-correcting mechanism over the long term. In cases where the disequilibrium cannot be self-correcting due to a failure in international reserves, monetary contraction can be used to speed up the process. Another alternative is to use devaluation or import-substituting and export-promoting policies, but this should be effected by deflating real money stock through raising the price level rather than deflating nominal money stock through open market operations (Johnson, 1977).

Small open economies with fixed exchange rates are not in a position to control money stock levels over a long period. In cases where monetary authorities need to keep the balance of payments at desirable levels for fixed exchange rates, they need to opt for a growth rate in domestic credit, and the money multiplier should be either at a rate equal to or somewhat less than the internal demand for money (Wilford & Wilford, 1978). In addition, in fixed exchange rate systems, inflation depends on international markets; thus, domestic monetary policies will not have much of an effect on those rates. Inflation in this case can be imported even from the country to which the currency is fixed; therefore, it is only in the case of floating exchange rates where domestic policies actually have a substantial impact on the rate of inflation. Another important policy implication for the MABP is that excessive increases in credit creation might lead to an excessive loss of reserves. Notably, a country's balance of payments can be corrected by rapid economic growth through escalating money demand (Johnson, 1977).

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[9] As Alawode (1997:17) points out, these can include "*changes in the exchange rate, trade barriers or relative prices*".

3. BACKGROUND TO THE NAMIBIAN ECONOMY

The Namibia dollar is linked at par to the South African rand. Thus, Namibia belongs to the Common Monetary Area, in which its monetary and exchange rate policies are set by South Africa.[10] Namibia, therefore, does not have an independent monetary policy and is largely influenced by factors that affect the South African economy. As the South African rand is legal tender in Namibia, a large percentage of the Bank of Namibia's monetary liabilities need to be supported by the rand or by other foreign assets (Kalenga, 2001:3). Namibia also belongs to the Southern African Customs Union, with Botswana, Lesotho, South Africa and Swaziland as trading partners.

After reaching record lows in 2001, the Namibia dollar has been strengthening against its major trading partners. This appreciation in the currency has caused a large decline in export earnings, especially for the mining and fishing sectors, although the strong currency has contributed to increased expenditure that has stimulated economic growth.

3.1   Namibia's balance of payments since 1993

Namibia has been running extensive capital and trade account deficits since 1993, except for the years 1995 and 1996, during which it had capital account surpluses. The trade account showed a positive figure only in 2000, after which it continued with the negative trend. Merchandise exports decreased significantly during 2003, which contributed to the sharp decrease in the trade balance. The decrease has mainly been attributed to the significant decline in mineral, food, and live animal exports. The decline in exports, in turn, was due to the appreciation of the Namibia dollar against its major currencies as most mineral transactions are quoted in these currencies. Processed fish is exported to Spain, which falls under the Euro countries. Namibia's small domestic market has also largely been blamed for the negative trade balance.

The current account has recorded surplus amounts since 1993, although this has fluctuated substantially throughout the years. It represented 18.5% of the gross domestic product (GDP) rate in 2000, but declined significantly to 3.29% in 2001. Nevertheless, the current account surplus started to increase again in 2002 and constituted 9% of GDP that year, increasing to 15.8% in 2003. This increase in the current account surplus was attributed to a considerable rise in the inflow on the investment income account and an increase in net inflows in current transfers and services accounts (BON, 2003).

In 2001, the country managed to bring the capital account deficit down to N$96 million. However, in 2003, it was N$2,761 million in deficit (see Appendix B). This weak performance in the capital account was caused by the large outflows in both the portfolio and

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[10] Member countries are Namibia, Lesotho, South Africa and Swaziland. Ipangelwa (1997) outlined the reasons for joining the Common Monetary Area as follows: (1) Namibia is an open economy where tradable goods account for approximately 88% of gross domestic product (GDP); (2) the country has a high propensity to import, and about 80% of Namibia's imports are from South Africa; (3) the financial institutions in the country are mostly South African subsidiaries, meaning there is a free flow of capital; (4) the major investors in the country are South African companies; (5) the South African rand can be freely converted and is also internationally traded; (6) macroeconomic stability in South Africa, stemming from implementing sound policies; and (7) Namibia is a member of the Southern African Customs Union Free Trade Area.

other long-term investments.[11] Portfolio investments consist mostly of Namibian residents' investments in South African unit trusts. Other long-term investments include pension funds and life assurance assets. On the other hand, government foreign liabilities, which also fall under this category, declined in 2003 – contributing to the increased outflow.

Figure 1: Current account as a percentage of GDP

Source: Data from the Bank of Namibia, 2003

Furthermore, the Bank of Namibia (BON, 2003) contends that the total stock of international reserves decreased to N$2.1 billion by the end of 2003 from the N$2.9 billion at the end of 2002. This decreased stock represented 1.7[28] months of import cover, which is lower than the 2.5 months recorded in 2002. Therefore, the Namibian economy is 1.3 months short of the total import cover of 3 months that the IMF has prescribed (BON, 2003). The decline has also largely been attributed to the appreciation of the Namibia dollar against major currencies.

Namibia recorded an overall balance of payments deficit of N$776 million in 2003, from surpluses of N$298 million and N$266 million in 1993 and 1994, respectively. The significant deficit of N$776 million that the country experienced in 2003 was mainly caused by the substantial increase in the capital account deficit, although the current account recorded a surplus in the same year.

Appendix C shows the monetary and financial developments in Namibia for the period 1993–2003. The rate of inflation exhibited large variations during this period. In 1993 it recorded a single-digit figure of 8.55%, but then in 1994 and 1995 it moved to double-digit figures of 10.74 and 10.06, respectively. In 2003 the country recorded a lower rate of 7.3% compared with the double-digit figure of 11.3% by the end of 2002. The reduced inflation in 2003 was

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[11] The net outflows in portfolio investment shifted by N$236.8 million in 2003 from the N$1.6 billion recorded in 2002. Net outflows in other long-term investments rose by 51.1% in 2003, whereas in that same year, other short-term investments reduced the net inflows from N$409.9 million in 2002 to N$323.2 million (BON, 2003).

due to a considerable decline in food inflation, complemented by a narrowing in non-food inflation. The decline in food prices has mainly been attributed to the appreciation of the Namibia dollar against major currencies. Improved conditions in Southern African Development Community countries in respect of food also contributed to this decline. Due to the fall in inflation rates, monetary policy was eased in 2003 and authorities decreased the bank rate by 500 basis points from 12.75 in December 2002 to 7.75 in December 2003.

Money supply experienced a decline at the beginning of 2003. A mere 2.3% increase in money supply was recorded for 2003, whereas the previous year recorded a 14.9% increase. This slowdown in money supply growth was mainly caused by a substantial decline in the net foreign assets of the banking system, which amounted to 52.2% in the first half of 2003. Nevertheless, claims on the central government and on the private sector increased during that time, but they both experienced a large decline in the second part of the year (BON, 2003). Net claims on the private sector increased in the second part of 2003.

4. ECONOMETRIC APPROACH AND MODEL

This section describes the sample size and the data, after which it discusses the model employed in testing the MABP.

4.1 Methodology

4.1.1 Data descriptions and source

The monetary approach to Namibia's balance of payments is tested on the basis of quarterly data covering the period 1993–2003. The reason for the short sample was due to data constraints. The data were acquired from various issues of the Bank of Namibia's annual reports as well as various issues of National Accounts data from the Central Statistical Office. The variables used were net foreign assets, gross domestic product, inflation, prime interest rate and domestic credit.

Net foreign assets (NFA) equals the sum of international reserves and gold. The log of domestic credit (LDOM_CREDIT) is the sum of net claims on government and claims on the private sector by the monetary sector. The log of GDP (LGDP) is used for the level of domestic income. The log of inflation represents the price level (LINFLATION). The prime rate is used for interest rate (INTEREST). All the series except the interest rate are seasonally adjusted,[12] and all variables except for the interest rate and net foreign assets are expressed in logarithms.

4.1.2 Model specification

The model aims to show whether monetary variables are central to determining the balance of payments in Namibia. In order to test this role, the study will employ the standard model of the MABP. The equation and expected signs of the coefficients are as follows:

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[12] The Census X12 method was used to seasonally adjust these series.

$$NFA = \beta_0 + \beta_1 LGDP_t + \beta_2 INFLATION_t - \beta_3 INTEREST_t - \beta_4 LDOM\_CREDIT_t + \mu_t \text{ (9)}$$

where –

LGDP	=	log of GDP
INFLATION	=	rate of inflation
INTEREST	=	interest rate
LDOM_CREDIT	=	log of domestic credit
μ_t	=	stochastic error term

4.1.3 Estimation procedure

Many researchers encounter problems with the presence of unit roots when they estimate econometric models from time series (Harris, 1995:1). Consequently, some of them then use data that are differenced at least once to test the soundness of various theories. Nevertheless, using these differenced data means that sometimes essential long-run relationships between variables are ignored (Engel & Granger, 1987). Therefore, the Engel-Granger approach to long-run estimation is used to test whether the balance of payments is in fact a monetary phenomenon in the long run. This approach follows a two-step procedure. The first step is to specify the long-run relationship. If the variables are found to be cointegrated, one then moves on to the second step, namely to apply the unit root test to the residual. This tests whether there is a cointegration relationship amongst the variables. If this residual is stationary, then the next step is to include the error correction variable in the equation.

Time series that contain unit root(s) create spurious regression results, as variables are non-stationary and do not cointegrate (Harris, 1995). Furthermore, Harris (ibid.:1) contends that "*… to proceed to estimate a regression model containing non-stationary variables at best ignores important information about the underlying (statistical and economic) processes generating the data*". One can obtain significant *t*-ratios and high r-squared values, although the trending variables would be completely unrelated. Thus, it would appear that a meaningful relationship obtains between variables, whilst that would not actually be the case. Unit root testing should, therefore, be done in order to see whether time series are stationary or not. In this paper, the Augmented Dickey-Fuller (ADF) test will be employed to test for stationarity as these regressions consist of only 44 observations.

The ADF is the t-statistic for the *γ* estimated in the regression –

$$\Delta x_t = \alpha_0 + \gamma x_{t-1} + \alpha_1 t + \sum_{t=2}^{P} \beta_i \Delta x_{t-1+1} + \varepsilon_t \tag{10}$$

where *t* is the time trend, *p* is the number of lags, ε_t is the stochastic error term, and augmentation with the lagged difference guarantees white noise errors (Dhliwayo, 1996:13).

The null hypothesis is that the variable tested in the regression is integrated of order one, denoted I(1) against the null of stationarity. The results from the regression equation will be evaluated using the *t*-ratios (McKinnon critical values) at a 5% level of significance. If the ADF test statistic is greater than the critical values, then one can reject the null hypothesis of unit root. If the series does contain a unit root, then it is first differenced to make it stationary at I(1).

5. EMPIRICAL RESULTS AND ANALYSES

5.1 Empirical evidence

The main aim of this section is to test the Namibian case and whether MABP applies to this country. The section presents the empirical results and analyses of the study. The unit root tests will be done first, followed by the Granger causality tests. The cointegration tests and analysis are then reported.

5.1.1 Order of integration and testing for stationarity

The stationarity of the time series data is also investigated by simply looking at the graphs of the variables in their levels (see Appendix A). They seem to be non-stationary, since visually the mean, variance and the auto covariance of the series appear to be time-variant. The graphs were then supplemented with the unit root tests shown below. In all of the graphs and unit root tests it is clear that the series are non-stationary in levels. A regression that involves such time series may, therefore, not reflect the true degree of association between them, but may simply highlight the common trend present in any time series data. Nevertheless, the first differences of these series are stationary, as is shown in Table 1 below. In applying the unit root tests, the intercept and trend variables are excluded as they turn out to be statistically insignificant at most of the levels.

(a)   Unit root tests

Table 1. Stationarity tests of the series

Variables	Level/ first/second difference	Lags	Calculated tau	ADF critical (5%)	Stationarity
NFA	Level	3	-1.350353	-2.936942	Non-stationary
	First difference	3	-3.929640	-2.938987	Stationary
LGDP	Level	3	-1.769885	-2.936942	Non-stationary
	First difference	3	-4.863416	-2.938987	Stationary
INFLATION	Level	3	-2.897071	-2.936942	Non-stationary
	First difference	3	-5.380642	-2.938987	Stationary
INTEREST	Level	3	-1.335020	-2.936942	Non-stationary
	First difference	3	-3.271635	-2.938987	Stationary
LDOM_CREDIT	Level	1	-1.345293	-2.933158	Non-stationary
	First difference	1	-3.738752	-2.935001	Stationary

Notes
- The ADF tests for $H_0 Xt$ as I(1) against $H_1 Xt$ as I(0).
- The optimal lag for conducting the ADF tests was selected based on the Schwartz and Akaike Information Criteria and also the auto-correlation function of the series. The optimal lag length in most cases was 3, whilst the log of domestic credit had 1 lag.

The augmented Dickey-Fuller unit root tests are applied to determine whether the series are stationary. Table 1 above summarises the results for all the variables.

The results show that all the variables are non-stationary at levels since the calculated tau values are less in absolute terms than the critical values. The variables are found to be stationary only when tested at first difference. Thus, they are integrated of order one I(1). Each of these variables becomes stationary if it is differenced once.

(b)   *Granger causality tests*

In addition to the stationarity tests, the Granger causality tests were conducted to investigate the relationship between the variables in question. The Granger causality tests show how much of the current dependent variable can be explained by its past values, and whether lagged values of the independent variable can improve the explanation of such a variable (Granger, 1969). These tests should not be viewed as showing that the one variable is the effect or the result of the other. Rather, it measures preference and information content and, thus, does not show causality as commonly expressed. Table 2 below shows the results of the Granger causality tests conducted for the respective variables of the model.

The number of observations is 41 in all cases. Table 2 is analysed at a 5% significance level. The Granger causality tests found no evidence of a causal relationship between domestic credit and net foreign assets. Furthermore, the tests found that inflation does indeed (Granger) cause net foreign assets. Nevertheless, no causal relationship between net foreign assets and inflation runs from the former to the latter. It is evident, therefore, that the direction of causality runs from inflation to net foreign assets. Hence, causality here is unidirectional.

A bidirectional causality was found between the log of GDP and net foreign assets. Furthermore, there was no causal relationship found between the interest rate and net foreign assets. It seems that, in the Namibian case, interest rates do not play a major role in changing the level of reserves. This is interesting because one would think that lower interest rates should increase domestic credit, which would in turn negatively affect net foreign assets.

Table 2. Granger causality

Null hypothesis	No. of lags	F-Statistic	Probability	Reject/Do not reject hypothesis
LDOM_CREDIT does not Granger cause NFA	3	0.75799	0.52549	Do not reject
NFA does not Granger cause LDOM_CREDIT	3	2.50170	0.07588	Do not reject
INFLATION does not Granger cause NFA	3	3.51709	0.02533	Reject
NFA does not Granger cause INFLATION	3	1.99679	0.13298	Do not reject
LGDP does not Granger cause NFA	3	3.01233	0.04344	Reject
NFA does not Granger cause LGDP	3	5.05895	0.00527	Reject
INTEREST does not Granger cause NFA	3	1.14112	0.34642	Do not reject

5.1.2 Estimating long-run relationships and checking for spurious association

Table 3. Cointegration
Estimated equation
$$NFA = \gamma_1 + \gamma_2 LGDP + \gamma_3 INFLATION - INTEREST - LDOM\_CREDIT + \mu_t \qquad \textbf{(11)}$$

Dependent variable: NFA

Independent variables	Coefficient	Standard error	t-Statistic
C	-116595.1	27457.08	-4.246449
LGDP	16838.83	4757.393	3.539509
INFLATION	131.1012	47.92761	2.735399
INTEREST	-0.026039	37.69743	-0.000691
LDOM_CREDIT	-2295.340	1291.557	-1.777188

$$R^2 \quad = \quad 0.7466$$
$$\text{Adj. } R^2 \quad = \quad 0.7207$$
$$DW \quad = \quad 0.6960$$

In the above regression results, interest rates and domestic credit are insignificant with t-statistics of -0.000691 and -1.777188, respectively. This is in contrast to what is predicted by the MABP. The adjusted r-squared value of 72% shows that the model is statistically fit; thus, the explanatory power of the variables is quite high. The log of GDP is significant and positive, as the theory predicts; thus, a country's income plays a significant role for its reserves. In addition, inflation also plays a significant role; the rise in prices would, therefore, have a positive effect on net foreign assets.

(a)   Testing the residual for unit root

In finding that the time series are cointegrated, one could obtain the residuals from the cointegrating regression. The residual of the long-run relationship in Table 3 above is tested for the existence of a unit root, therefore. If the residuals are found to be I(0), then a cointegrating relationship will be established.

Table 4. Cointegration test
Dependent variable: ΔRESIDNFA

Independent variables	Coefficient	Standard error	t-Statistic
RESIDNFA(-1)	-0.958716	0.201686	-4.752186

$$R^2 \quad = \quad 0.5871$$
$$\text{Adj. } R^2 \quad = \quad 0.5653$$
$$DW \quad = \quad 2.05$$

$$C(p) \quad = \quad \phi_\infty + \phi_1 T^{-1} + \phi_2 T^{-2}$$
$$C(p) \quad = \quad -4.1000 + [-10.745*40^{-1}] + [-21.57*40^{-2}]$$
$$\quad = \quad -4.38$$

The decision rule is to reject the null hypothesis if the absolute value of the critical test is greater than the calculated tau. The ADF test statistics reported a result of -4.752186, which is bigger negative than the calculated tau-statistic value of -4.38. This means that the series are I(0) and stationary in level terms. Thus, although all the series are individually non-

stationary, their linear combination is stationary. Generally speaking, then, we can conclude that there is a cointegrating relationship amongst variables. Furthermore, this means that the original regression is not spurious. The short-run equation will be specified below.

5.1.3   Short-run dynamics: The error-correction model

In this section, the error-correction mechanism is employed to look at the short- and long-run behaviour of the independent variable (NFA) in relation to its explanatory variables (LGDP, INFLATION, INTEREST and LDOM_CREDIT). This equation incorporates the short-run adjustment mechanism into the model. In the previous section, it was evident that there is at least one cointegrating relationship between the variables. Nevertheless, in the short run, there may be disequilibrium. Therefore, the error term equation is employed to eliminate deviation from the long-run equilibrium.

Table 5: Error-correction model (ECM), original equation
ECM equation
$$\Delta NFA_t = \gamma_1 + \gamma_2 \Delta LGDP_t + \gamma_3 \Delta INFLATION_t - \gamma_4 \Delta INTEREST_t - \gamma_4 \Delta LDOM\_CREDIT_t - (1-\alpha_1)RESIDNFA_{t-1} + \mu_t \tag{12}$$

Dependent variable: ΔNFA

Independent variables	Coefficient	Standard error	t-Statistic
C	211.2670	71.75150	2.944426
ΔLGDP	86.22520	2259.997	0.038153
ΔINFLATION	123.1913	40.93294	3.009588
ΔINTEREST	-13.97863	40.76025	-0.342948
ΔLDOM_CREDIT	-4699.578	1666.518	-2.819998
RESIDNFA$_{t-1}$	-0.162355	0.088660	-1.831211

$$R^2 = 0.3755$$
$$\text{Adj. } R^2 = 0.2911$$
$$DW = 1.53$$

$RESIDNFA_{t-1}$ is the one period lagged value of the residual from the cointegrating equation that ties the short-run behaviour of the NFA to its long-run value, while μ_t is the error term with its normal properties.

The estimate of $(1-\alpha_1)$ indicates the speed of adjustment in eliminating deviation from the long-run equilibrium. Table 5 clearly shows that interest rates and a country's GDP level do not play a significant role in the level of reserves. This can imply that the short-run changes in these variables do not have significant effects on NFA. Although the expected signs are correct for both these variables, they are statistically insignificant as they yield results with t-statistics of less than 2. The residual variable is also less than 2, and, therefore, statistically insignificant.

Thus, in the short run, it seems that there might be other variables besides the monetary variables mentioned in the MABP that should be included in this equation. Public debt, for example, increased substantially during the period studied. Lower interest rates increased domestic credit. Other factors such as the appreciation of the exchange rate played significant roles in reducing the country's revenue. This caused authorities to rely on the central bank's credit to finance debt, which in turn increased domestic credit (BON, 2003).

Inflation and the log of domestic credit yield significant results for net foreign assets. The signs are also as expected. Furthermore, the low level of the adjusted R^2 value shows that the MABP model is not a true representation of the balance of payments. As the above error-correction model yielded very low t-statistics for two of these variables, standard practice for the two-step approach is to drop those variables. This is done in Table 6.

Table 6: Error-correction model, removing insignificant variables
Second ECM equation
$$\Delta NFA_t = \gamma_1 + \gamma_2 \Delta INFLATION_t - \gamma_3 \Delta LDOM\_CREDIT_t - (1-\alpha_1)RESIDNFA_{t-1} + \mu_t \qquad \textbf{(13)}$$

Dependent variable: ΔNFA

Independent variables	Coefficient	Standard Error	t-Statistic
C	216.1481	68.60153	3.150776
ΔINFLATION	117.2443	35.04741	3.345305
ΔLDOM_CREDIT	-4799.172	1531.686	-3.133261
RESIDNFA$_{t-1}$	-0.160449	0.079253	-2.024520

$$
\begin{aligned}
R^2 &= 0.\,0.3735 \\
\text{Adj. } R^2 &= 0.3253 \\
DW &= 1.51
\end{aligned}
$$

After the two insignificant variables were dropped, the results changed somewhat. The inflation rate and the domestic credit still seem to be the only two variables that have significant effects on net foreign assets. The signs of these variables are also as expected. Domestic credit is the offset coefficient, as stated in theory. The residual variable also became statistically significant; thus, about 0.1604 of the discrepancy between the actual and long-run – or equilibrium – value of NFA is eliminated or corrected each quarter. The fact that inflation and domestic credit are statistically significant can, however, not provide conclusive evidence that MABP works in Namibia, as the Durbin-Watson statistic is low, as is the adjusted R-squared value. The fact that the adjusted R-squared value is still so low means that there are other variables which have been overlooked by theory.

Of course, each country lives by its own unique circumstances. Therefore, one can only say that, for the Namibian case in particular, the MABP as specified in this paper might not be the correct measure for this country's balance of payments. Overall, the results of this study imply that other policy instruments or measures should also be used to obtain balance of payments stability rather than monetary tools only, as predicted by this theory. The specific results of this study imply that balance of payments problems could not be traced back solely to the government's monetary policies. Money supply is, therefore, not the only correcting mechanism for the disturbance in Namibia's balance of payments. This paper would not agree that the MABP, as a theory, can be applied to all developing countries, as was proved in the above regressions.

6. POLICY IMPLICATIONS AND CONCLUSION

The main aim of this paper was to investigate the theoretical basis of the MABP. The study tested whether this approach applied to the Namibian situation. The specific objective was to determine whether excess money supply played an important role in the disturbance of the balance of payments in Namibia. Furthermore, the paper also aimed at establishing a significant relationship between international reserves and domestic credit.

The paper suggests that, although the balance of payments is a self-adjusting mechanism, the central bank also needs to take policy actions to correct the situation. This is particularly necessary in Namibia's case, where the balance of payments has shown a deficit since 2003. When looking for policy instruments to correct the disequilibrium, authorities should also concentrate on other policy measures instead of relying solely on monetary tools to attain stability in the country's balance of payments account. The empirical results showed that the balance of payments in Namibia is not a purely monetary phenomenon: only two of the variables – namely inflation and domestic credit – seemed to have a significant relationship with net foreign assets. Although this is in accordance with some of the predictions of the MABP, the results of this study do not entirely comply with the strong assumptions of the latter approach.

Another important policy implication for the Namibian economy is that increases in credit creation lead to a continuous loss of reserves. Thus, monetary authorities should also pay special attention to domestic credit creation when controlling the country's balance of payments. It is important that the country achieves sufficient economic growth through money demand to correct the balance of payments deficit. Namibia should also look at its increased budget deficit, which is mostly financed through the central bank's credit. The expansion in the fiscal deficit caused the increases in domestic credit.

For future empirical studies a larger sample size is recommended. The sample size that was used for the period 1993–2003 was small, mainly due to limitations in the database. Therefore, fewer observations could be made. Furthermore, although the study referred to the theoretical propositions of alternative adjustment mechanisms to the balance of payments, it did not include these theories in the empirical testing. Future research should, therefore, also base empirical work on these theories, so that it is clear whether these approaches do not apply to Namibia as a case in point. It would also be interesting to see more theoretical work combining the different approaches to balance of payments into one single approach.

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APPENDIX A: GRAPHS OF THE VARIABLES

1. Net foreign assets
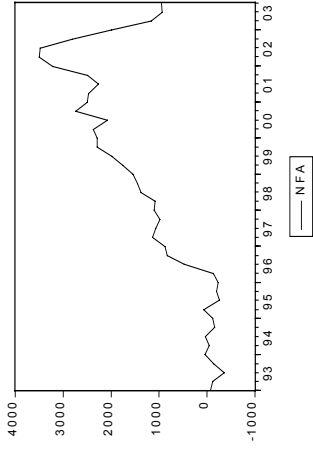
2. Log of real GDP
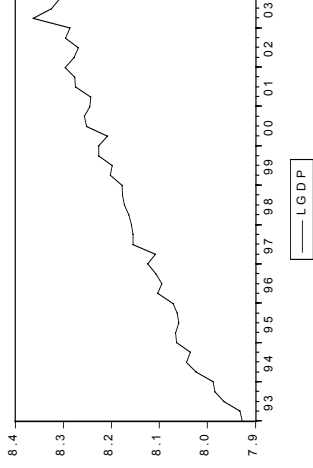
3. Rate of inflation

4. Interest rate

5. Log of domestic credit

21

APPENDIX B: BALANCE OF PAYMENTS – A SUMMARY

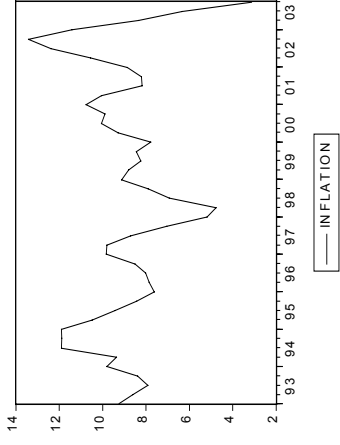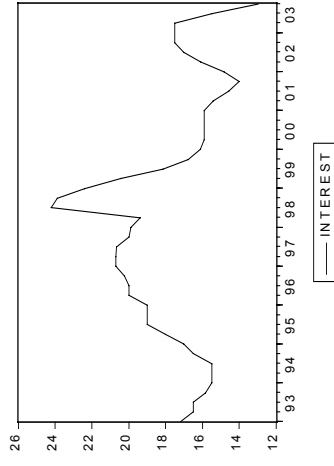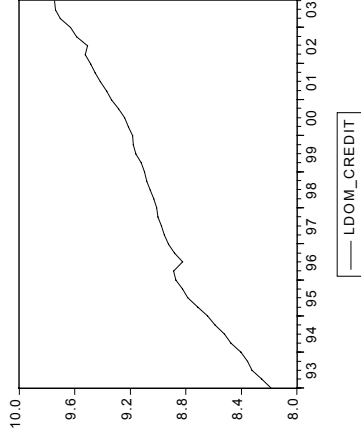|	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Merchandise exports	4226	4689	5145	6246	6281	6656	7314	9184	9828	11278	9450
Merchandise imports	-4362	-4993	-5615	-6636	-7566	-8236	-8562	-9136	-11539	-13461	-12944
Merchandise trade balance	-137	-305	-471	-390	-1285	-1580	-1248	48	-1711	-2183	-3494
Service receipts	691	869	1091	1396	1690	1726	1977	1611	1849	2483	2812
Service payments	-1586	-1663	-2012	-2514	-2474	-2664	-2724	-1995	-1953	-2086	-1873
Compensation of employees (net)	-4	1	1	-4	-32	-13	-8	-9	-8	-13	-27
Income receipts	674	737	1540	1329	994	982	1626	1694	1665	1760	2071
Income payments	-481	-546	-960	-1001	-643	-476	-624	-1569	-2316	-1437	-509
Current transfers - receipts	1217	1239	1566	1936	2161	2489	2792	3267	3283	3205	3790
Current transfers - payments	-72	-79	-87	-90	-83	-82	-354	-253	-300	-312	-171
Current account balance	303	254	670	662	329	382	1436	2794	509	1417	2598
Capital account balance	-1039	-949	211	72	-418	-1289	-833	-1677	-96	-147	-2761
Net capital transfers	88	154	146	181	154	252	140	778	816	1166	1209
Direct investment	176	364	558	562	383	426	124	1275	3253	1966	679
Portfolio investment	246	167	279	133	85	-57	-35	-965	-1659	-1641	-1878
Other investment – long term	-1623	-1540	-992	-615	-627	-1737	-684	-2591	-2983	-2047	-3094
Other investment – short term	74	-94	221	-190	-413	-173	-378	-174	478	410	323
Net errors and omissions	-47	70	-80	52	67	38	-253	-1010	306	-1079	-613
Overall balance	298	266	87	99	312	309	350	107	718	190	-776

Source: Bank of Namibia (2003)

APPENDIX C: TRENDS IN MONEY SUPPLY, NET FOREIGN ASSETS, NET CLAIMS ON GOVERNMENT, AND CLAIMS ON THE PRIVATE SECTOR FROM 1993–2003 (IN N$ MILLION)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Broad money supply	2673	3251	4030	4975	6403	6843	7846	8812	9775	11145	11613
Net foreign assets	-169	-24	-139	-78	1024	1272	1910	2421	2566	3439	1394
Net claims on government	489	463	589	734	202	-53	190	195	226	129	442
Claims on the private sector	2389	3182	4216	5322	6118	6868	7242	8013	9372	10789	13325
Rate of inflation (%)	8.55	10.74	10.06	8.00	8.85	6.19	8.65	9.25	9.30	11.30	7.30
Foreign exchange rate (N$/US$)	3.27	3.55	3.64	4.30	4.50	5.53	6.11	7.59	8.60	10.52	7.52

Source: Bank of Namibia, *Annual report* (various issues), and National Planning Commission, *National accounts* (various issues)

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