

NAMIBIA AND THE COMMON MONETARY AREA: COSTS, BENEFITS AND CHOICES

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A Dissertation Submitted to the School of Economics of the University
of Cape Town in Fulfilment of the Requirements of the Degree of
Master of Commerce in Economics

June 2000

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To: My brother, Christopher Eita

My uncle, Hina Mu Ashekele

You have given me so many things intangible and I couldn't begin to count them or even make them clear. I only know I owe so much to you when I put my thoughts in writing.

ACKNOWLEDGEMENTS

This study represents the final dissertation submitted to the Department of Economics of the University of Cape Town for the degree of Master of Commerce in Economics. It is the result of personal work with the invaluable advice of Barry Standish, my supervisor.

My appreciation goes to the Bank of Namibia for sponsoring my study. Without its sponsorship, this study would have been impossible. My appreciation also goes to Alletta Shatona, Senior Information Officer of the Bank of Namibia for providing the necessary materials and data during the preparation of this study.

I must confess that this dissertation owes much to the support of my parents. I would like to thank them for sending me to school. Had it not been their wisdom to send me to school and support me during my entire university life this dissertation would have been impossible. Nevertheless, all errors and omissions are my sole responsibility.

Joel Hinaunye Eita

University of Cape Town

June 2000

SUMMARY

This study analyses if the Common Monetary Area is an optimum currency area for Namibia. It analyses if Namibia should continue its membership of the Common Monetary Area or whether it should consider alternative exchange rate regimes. The analysis was done in terms of the theory of optimum currency areas. The traditional theory of optimum currency areas points labour mobility, openness, diversification, intensity of mutual trade, financial and goods market integration, wage flexibility and symmetry and asymmetry of shocks as important criteria for optimum currency area. The new theory of optimum criteria points generalised purchasing power parity hypothesis, time inconsistency and the issue of nominal anchor as criteria for optimum currency area. Elimination of transaction costs, savings on foreign exchange reserves, reduction of exchange rate uncertainty are identified as important benefits from using a common currency, while the loss of seigniorage revenue, real exchange rate misalignment, impact of exports on employment are identified as the most visible costs associated with using a common currency.

All criteria, benefits and costs were analysed. The results suggest that Namibia should not withdraw from the CMA, but should continue its membership and encourage negotiations for a full monetary union. That is because although the economy of Namibia is not well diversified and there is no labour mobility between Namibia and South Africa, there is a high degree of financial and goods markets integration, high intensity of mutual trade between Namibia and South Africa, and high degree of openness of Namibia's economy. The analysis of purchasing power parity hypothesis shows that the real exchange rates of Namibia and South Africa are cointegrated, and the shocks to the two economies are symmetric suggesting that the two countries require similar policy response. Analysis of the benefits and costs also shows that the benefits are far high than the costs. There are significant gains from the elimination of transaction costs, and savings on foreign exchange reserves. The impact of real exchange misalignment on measures of economic performance as well as the impact of exports on

employment is very weak. This weak impact of real exchange rate misalignments on measures of economic performance, and also weak impact of exports on employment as well as the symmetry of shocks of Namibia and South Africa as indicated by the Bayoumi-Eichengreen model suggest that Namibia should continue its membership of the Common Monetary Area. The symmetry of shocks of Namibia and South Africa suggests that the Common Monetary Area is still optimum currency area because these two countries require similar policy response.

CHAPTER 1. INTRODUCTION

1.1 Introduction and Background

Namibia used the German Reichsmark between 1884 and 1915. During that time Namibia was a German colony. After 1915 South Africa colonised the country and the South African pound became a legal tender. The South African rand replaced South African pound in 1961 and it became the legal tender in Namibia.

In 1990 Namibia became independent ending 105 years of colonial occupation. This led the way for Namibians to control their own country and national wealth. After independence, Namibia formally became a member of the Common Monetary Area (CMA)¹. Namibia together with Lesotho and Swaziland has to follow South African monetary policies even if they are not appropriate to their economies. This raised questions among Namibian policy makers about whether the CMA is still an appropriate exchange rate regime for Namibia or whether the country should consider alternative exchange rate regimes.

1.2 Problem Definition

Membership of the CMA implies that Namibia has to follow South African monetary and exchange rate policies even if they are not appropriate to its economy. Namibia loses the exchange rate policy as an instrument of adjustments and monetary independence. The formulation of monetary policy is no longer at national level but it is formulated by South Africa to which the Namibia dollar is pegged. South Africa pursues monetary policy by taking into account only its domestic economic conditions without considering what is

¹ The CMA is a hybrid of currency board and monetary union. It is a currency board because foreign assets back the issue of domestic currency. This kind of exchange rate system does not allow monetisation of fiscal deficits. Unlike the ordinary currency board, monetary system in Namibia is administered by a central bank, the Bank of Namibia. The Bank of Namibia has the mandate to perform the normal functions ordinarily performed by such institutions. This includes the possibility of extending loans to the government. The South African rand is the dominant currency to which currencies of Lesotho, Namibia and Swaziland are pegged. The rand remains the legal tender in these countries. In these countries, since the

appropriate for Namibia. This raises debate on whether the CMA is still an appropriate exchange rate regime for Namibia or whether Namibia should consider alternative exchange rate regimes.

1.3 Objectives of the Study

This study analyses whether Namibia should continue with its present exchange rate regime (membership of the CMA) or whether it should consider alternative exchange rate regimes. The study tests empirically if the CMA is an optimum currency area for Namibia. It examines if the benefits of Namibia's membership of the Common Monetary Area exceed costs or whether costs exceed benefits.

1.4 Methodology

The approach used in this study is an extensive research on the theory of monetary integration (theory of Optimum Currency Area and costs and benefits of monetary union). The literature on criteria for of Optimum Currency Area points out criteria for the success of monetary union. Criteria pointed out by this literature are: labour mobility, degree of openness, degree of diversification, intensity of mutual trade, degree of wage flexibility, financial and goods markets integration, similar inflation rates, symmetry and asymmetry of disturbances, and generalised Purchasing Power Parity for Optimum Currency Area was researched to analyse whether the Common Monetary Area is an optimum exchange rate policy for Namibia. Since the decision on whether Namibia should remain or withdraw from the Common Monetary Area should not be based on a single criterion, all criteria were researched and analysed individually to establish whether Namibia should remain or withdraw from the Common Monetary Area. The literature on costs and benefits of monetary was also researched to analyse whether the benefits exceed the costs or whether costs exceed benefits.

introduction of their national currencies, a fixed 1:1 parity with respect to the rand has been maintained, backed 100% by foreign exchange reserves.

Different models and econometrics techniques were employed to analyse if the CMA is an optimum currency area in terms of the criteria that were pointed in the literature, and to analyse whether costs of CMA exceed benefits or whether benefits exceeds costs. The analysis was done using secondary data from different sources including, Time Series Explorer-World Bank Development Indicators, World Bank African Development Indicators, Bank of Namibia Annual Reports, Central Bureau of Statistics of Namibia, various issues of Economist Intelligence Unit, South African Reserve Bank Quarterly Bulletins, International Monetary Fund-Namibia Statistical Appendix of 1997, Commercial Banks in Namibia and Chamber of Mines of Namibia.

Specifically, econometrics techniques, different models and techniques a were applied to the criteria for optimum currency areas and cost-benefit analysis of monetary union as follows:

- Labour mobility criterion was analysed to test the movement of labour between Namibia and South Africa using the data on employment in mining because most movements of labour in Southern Africa were in the mining industry.
- The degree of openness was measured as the sum of imports and exports as percentage of GDP.
- Regression equation was estimated by regressing wages on employment determine whether wages are flexible in Namibia.
- The Hefindahl index is used to measure the degree of diversification of the Namibian economy.
- A high degree of financial and goods market integration is required for countries to be in a Common Monetary Area. Cointegration analysis and the estimation of Allen-Kenen model through regression equations were used to test if financial and goods markets of Namibia and South Africa are integrated.
- South Africa's inflation was regressed on Namibia's inflation rate to determine if there is similarity in the rate inflation of the two countries,

because inflation similarity is a necessary criterion for countries to be in monetary union.

- The Bayoumi-Eichengreen was estimated by running a regression to estimate shocks to the Namibian and South African economies and tests whether the shocks are symmetric.
- Edwards model was used to estimate the equilibrium real exchange rate in order to find out if there were real exchange rate misalignments. This was done with the help of regression and cointegration analysis.
- The Johansen cointegration and the Error Correction Mechanism were applied to test empirically the generalised purchasing power parity for Optimum Currency Areas.
- The study also employed and cost benefit analysis techniques to find out whether the costs of Namibia's relinquishing of its exchange rate policy instrument exceeds the benefits or whether the benefits exceed the costs.

1.5 Organisation of the Study

Analysis of whether Namibia should continue its membership of CMA or consider alternative exchange regimes is as follows:

Chapter 2 analyses if the CMA is an optimum currency area for Namibia as suggested by the literature on optimum currency areas in the last thirty-eight years (1961-1999). The chapter analyses empirically Namibia's membership of the CMA in terms of the criteria for optimum currency areas. The literature points out labour mobility, wage flexibility, openness of the economy, diversification of the economy, financial and goods market integration, similar inflation, intensity of mutual trade, and symmetry and asymmetry of shocks as important traditional criteria for optimum currency areas. The new criteria are generalised purchasing power parity hypothesis, time consistency and the issue of nominal anchor. All of these are measured.

Chapter 3 analyses the benefits of Namibia's relinquishing of its exchange rate policy instrument. Savings on foreign exchange reserves, elimination of transaction costs, reduction of exchange rate uncertainty, and promotion of market integration were identified as important benefits of monetary union.

Chapter 4 analyses empirically the costs of Namibia's relinquishing of its exchange rate policy instrument. The literature points out loss of seigniorage revenue, real exchange rate misalignment, impact of export on employment as important costs of membership of the monetary union.

Chapter 5 concludes the study. The conclusion that is reached is that Namibia should not withdraw from the CMA but should continue its membership and encourage negotiations for a full monetary union. That is because although the economy of Namibia is not well diversified and there is no labour mobility between Namibia and South Africa, there is high degree of financial and goods markets integration, high intensity of mutual trade between Namibia and South Africa, and high degree of openness of Namibia's economy. Analysis of purchasing power parity hypothesis shows that the real exchange rates of Namibia and South Africa are cointegrated, and shocks to the two economies are symmetric suggesting that the two countries require similar policy response. Analysis of the benefits and costs also shows that the benefits are far high than the costs. However, the results of goods market integration, real exchange rate misalignments, impact of export on employment and supply shocks should be interpreted with caution because the analyses were done on few observations. Only annual data are available for these variables, and pre 1980 data are not available.

CHAPTER 2. THEORY OF OPTIMUM CURRENCY AREA

2.1 Introduction

The wide diversity of exchange rate arrangements in the international system poses interesting question: is there a good economic case for countries to have separate currencies? Should countries issue their own currencies and allow them to float against other currencies, or should they participate in a monetary union? This revives the theory of optimum currency areas, which according to Tavlas (1993: 32) has been dismissed as primarily a scholastic discussion. It offers guidance to countries choosing an exchange rate arrangement and set forth the costs and benefits associated with various exchange rate arrangements. This chapter discusses the traditional criteria for optimum currency areas and the new criteria for optimum currency areas.

Optimum currency area (OCA) is an area that is best to use a single currency. It is only an OCA if the gains from using a single currency exceed the costs. Mundell (1961) is usually regarded as the first original contribution to this literature. Together with McKinnon (1963) and Kenen (1969), these three papers represent the core theory of optimum currency areas and have been the basis for much of the recent empirical work. These three papers and the subsequent literature discuss the search for criteria which would define the OCA within which the exchange rates should be pegged immutably but whose rates should fluctuate or at least be varied against the rest of the world.

Section 2.2 discusses the traditional criteria for optimum currency area, while section 2.3 discuss the new criteria for optimum currency area and section 2.4 concludes the chapter.

2.2 Traditional Criteria for Optimum Currency Areas

2.2.1 Introduction

The traditional criteria are the early literature on optimum currency area. It identifies the characteristics of economies that would render the exchange rate changes of the country with currencies of other countries unnecessary. This approach was initiated and mostly popular in the 1960s and early 1970s. Criteria that were identified by this literature as relevant to the choice of an exchange rate regime are:

- Degree of inter-regional labour mobility
- The Degree of openness
- The degree of diversification
- Price and wage flexibility
- Financial integration
- Intensity of mutual trade
- Goods and market integration
- Similar inflation and
- Symmetry and asymmetry of demand and supply shocks.

2.2.2 Degree of Interregional Labour Mobility

Introduction and theory

This section discusses the theory and empirical analysis of labour mobility. It assesses the degree of movements of labour between South Africa and Namibia. If there is a high degree of labour mobility between Namibia and South Africa, this would strengthen the argument for Namibia to remain in the Common Monetary Area.

The initiator of the theory of optimum currency areas, Mundell (1961: 651) argued that while the costs of valuation and money changing were lower in a monetary union fixing

the exchange rate across regions by forming a monetary union was costly in the face of asymmetric disturbances and price rigidities. Nevertheless, these costs could be eliminated if there is a high level of factor mobility between the regions. Mundell viewed labour mobility as a key criterion in the choice of a monetary union.

High labour mobility within the monetary union serves to mitigate the effects of asymmetric shocks. That is because it allows workers from regions hit by high unemployment to take up jobs in other parts of the union (Fidrmuc and Horvath 1998:10, and Jonung and Sjorholm 1998: 3).

Unless labour can move freely between regions, shifts in demand facing one region relative to another may lead to unemployment if the nominal exchange rate is not flexible. Masson and Taylor (1992: 43) argued that if wages and prices are sticky, real exchange depreciation could only be achieved through nominal exchange rate. Depreciation will not be available if a country is in a monetary union.

However, Eichengreen (1992: 22) doubted that adjustment to regional disturbances would be accomplished through labour mobility. There are barriers to labour mobility that may include formal immigration restrictions, social services or pensions that are not available to immigrants and language or cultural differences. The effect of barriers to labour mobility can persist for decades even if they are formally dismantled.

Measuring Labour Mobility

In the Common Monetary Area, labour is expected to move to the strong economy, South Africa. Due to lack of data on labour mobility between members of the CMA, the data on labour movements to South African mining industry will be used. Non-members of the CMA are included in the table for comparison. Table 2.1 shows the total migrant labour in the mines from South Africa's neighbouring countries.

Table 2.1 Total migrant labour in South Africa's mines from South Africa's neighbouring countries

	Botswana	Lesotho	Swaziland	Mozambique	Malawi	Others
1982-1987	17727 (3.5%)	108312 (21.4%)	12852 (2.5%)	48315 (9.5%)	16096 (3.2%)	476 (0.1)
1988-1992	14602 (3.4%)	99082 (22.9%)	16354 (3.4%)	44093 (10.2%)	3123 (0.7%)	74 (0.0)
1993-1994	10362 (3.2%)	82651 (25%)	14614 (4.5%)	43274 (13.3%)	-	-

Source: Chamber of Mines of South Africa various reports. The figures in brackets represent the country's share of the total labour employed in South Africa mines. The column for others includes Namibia, Zimbabwe and others.

Table 2.1 shows that labour movements between South Africa and its neighbouring countries (excluding Namibia) have been extensive in mining. The existence of labour mobility puts paid the most important criticism of this characteristic that it would be difficult to rely on labour mobility as a factor of enhancing adjustments between regions. Workers are unwilling to migrate to foreign nations for cultural and social reasons. Table 2.1 shows that the total migrant of labour from South Africa's neighbouring countries amounted to about 40.6 and 46 percent of total labour employed in the gold and coal mines in South Africa during 1988-1992 and 1993-1994. Employment in South African gold and coal mines is important for Lesotho accounting for 25% of labour force in South African mines during 1993-1994. At the same time, 3.2% and 4.5% of the labour force of Botswana and Swaziland found employment in South Africa.

There is no movement of labour between Namibia and South Africa. That is because most of the labour movements to South Africa were in mining, and mining is the dominating sector in the Namibian economy. There is less need for Namibians to migrate for work in South African mines because mining dominates the Namibian economy. The criterion of labour mobility is not satisfied because, as shown by table 2.1, there is no movement of labour between Namibia and South Africa.

Conclusion

This section discussed the theory and empirical analysis of labour mobility in the Common Monetary Area. It was discussed that a high mobility of labour between is necessary for monetary union to be successful, because unemployed workers can move from the region that is experiencing economic problem to the one that is not experiencing economic problems. The data for labour movements from South Africa's neighbouring countries to South African mines were used because of lack of data on the mobility of labour in other sectors of the economy. The results show that there is high movements of labour from Mozambique and Lesotho to South Africa. There is no labour mobility between Namibia and South Africa because the Namibian economy is dominated by mining, and Namibians prefer to work in Namibian mines rather in South African mines.

2.2.3 The Degree of Diversification

Introduction

This section analyses theoretically and empirically whether the economy of Namibia is diversified. If the economy of Namibia is well diversified, this would strengthen the argument for Namibia to remain in the Common Monetary Area, and if the economy is not well diversified this would weaken the argument for Namibia to remain in the Common Monetary Area.

Kenen (1969) initiated this criterion. Kenen (1969: 49) argued that regions that have diversified economies would be able to maintain a monetary union than those with low diversified economies since the latter are subject to larger disturbances. The degree of diversification is an important criterion in whether to surrender control over the nominal exchange rate by joining a monetary union. That is because for a country that produces a small variety of products and exporting only one or a few products, a decline in export revenue would result in relatively higher unemployment than in a more diversified economy (see also Masson and Taylor, 1992: 46).

Fidrmuc and Horvath (1998: 9) also argues that for a well diversified economy the importance of asymmetric shocks will be much smaller than for a less diversified economy. Economic diversification serves to forestall the need for frequent changes in the terms of trade and therefore for frequent changes in national exchange rates. Fixed exchange rates are most appropriate to well-diversified economies. Similarly, economies that are less diversified should use flexible exchange rates. If output and exports of a country are sufficiently diversified, then disproportional shocks affecting certain industries will not have equally profound effect on the whole economy. In contrast to that, if the output and exports are concentrated heavily on few industries, then shocks affecting these industries will have a significant effect on the overall business cycle of the country. This will increase asymmetric shocks within the monetary union.

The criterion of diversification comes to the conclusion that contradict the conclusion arrived at through openness. Ishiyama (1975: 354) comments that the more diversified an economy, the larger it would be and the smaller would the foreign trade sector. If that economy is subject to fixed exchange rate as recommended by Ishiyama (1975: 354) then fiscal and monetary policies must be used to correct external imbalances. This contradiction arises from different assumptions concerning the source of payments disequilibrium. When instability arises from the rest of the world, it is appropriate to have flexible exchange rate in order to insulate the economy from outside disturbances.

Measuring Diversification

The best method of measuring the degree of diversification in an economic system is to investigate the proportion of the total production occupied by different sectors. The Herfindahl index is used to investigate the proportion of total production/exports occupied by different sectors (Jonung and Sjöholm, 1998: 5). The Hefindahl index is computed as:

$$Diversification_i = 100 * \sum_{j=1}^n s_j^2$$

where s_j is the fraction occupied by sector j in total export value added in country i . The Hefindahl index value can vary between 0 and 100. The higher the value of this measure, the smaller is the degree of diversification. The degree of diversification is normally reflected in the country's exports. Table 2.2 shows the Hefindahl index using the data on exports.

Table 2.2 Degree of exports diversification 1996/1997

Country	Hefindahl index
Diversified	
Swaziland	11.33
South Africa	16.83
Zimbabwe	26.74
Undiversified	
Namibia	46.5
Lesotho	52.5
Botswana	55.8

Data source: Official SADC trade, Industry and Investment Review

Table 2.2 shows that Swaziland has the most diversified export structure. It has the lowest Hefindahl index of 11.33 compared to South Africa's 16.83 and Zimbabwe's 26.4. Namibia has undiversified export structure and it has a high index of 46.5. The economy of Namibia is dominated by mining (predominantly diamond). However, the economy of Botswana is the most undiversified. It has the highest index of 55.8. There is heavy reliance on diamonds in Botswana, and it contributes 73 percent to total exports. This might have been the reason for Botswana's withdrawal from the Common Monetary Area (see the experience of Botswana on appendix 3).

Further, another measure of economic diversification is the share of economic sector's contribution to Gross Domestic Product. Table 2.3 shows diversification of the economies according to sector's contribution to the GDP.

Table 2.3 Degree of diversification according to sectors' contribution to GDP in 1998

	NAM	ZIM	SA	LES	SWA	BOT
Primary sector	30.9	21.8	10.6	13.9	13.1	40.7
Mining	19.7	4.3	6.4	0.0	1.0	37.6
Agriculture	11.2	17.5	4.1	13.9	12.0	3.1
Secondary sector	17.4	22.1	26.2	40.6	41.9	12.2
Manufacturing	13.2	17.8	19.9	16.9	37.3	4.8
Others	4.2	4.3	6.3	23.7	4.6	7.4
Tertiary sector	52.0	56	63.1	45.3	46.0	49.9
Government	24.8	12.7	16.8	35.8	16.0	14.5
Others	27.2	43.2	43.2	9.4	30.0	35.4
Total	100	100	100	100	100	100

Source: The percentages for ZIM, LES, and BOT were calculated from the data obtained from the Economist Intelligence Unit, 1998-1999. The data for SA were obtained from the South African Reserve Bank Quarterly Bulletin, 1998 and Namibia were obtained from the Bank of Namibia. Note: BOT =Botswana, LES =Lesotho, NAM =Namibia, SA = South Africa, SWA = Swaziland and ZIM = Zimbabwe

Botswana and Namibia economies are dominated by mining, mainly diamonds, while in Swaziland and South Africa manufacturing contributes a larger share to the GDP. Compared to the South African, Swaziland and Zimbabwe economies, the Namibian economy is not well diversified in terms of its industrial composition of output. This would argue against Namibia's continuation of its membership of the CMA.

Conclusion

The purpose of this section was to assess if the economy of Namibia is well diversified. The results shows that the economy of Namibia is not well diversified compared to those of the South Africa, Swaziland and Zimbabwe. The Hefindahl index of the Namibian economy is higher than that of Swaziland, South Africa and Zimbabwe. This weak diversification of the Namibian economy would weaken the argument for Namibia to continue its membership of the Common Monetary Area.

2.2.4 Degree of Openness

Introduction and Theory

The objective of this section is to test if the economy of Namibia is more open. A high degree of openness is necessary for the success of monetary union. If the economy of Namibia is open, this would strengthen the argument for Namibia to remain in the Common Monetary Area.

McKinnon (1963: 719) initiated this criterion. He argued that openness to external trade is an important criterion in the choice of a monetary union. If the economy was relatively open a flexible exchange rate would destabilise the internal price and have few beneficial effects on real wages or the terms of trade. A country is more open if there is greater proportion of tradable to non-tradable output. The more open the economy, the smaller the share of non-tradable goods in output. This result in the nominal exchange rate not being an effective instrument to bring about changes in relative prices (see also Masson and Taylor, 1992: 45). A high degree of openness between regions has been suggested as an important criterion for single currency area formation. To maintain external balance following a fall in the real demand of a country's export, resources in a fully employed economy must be shifted towards the production of traded goods and away from the non-traded sectors. The smaller the non-traded goods sector the larger the exchange rate needed to transfer a given amount of resources and the larger the required movement in

relative prices. For the objective of price stability, very open economies are good candidates for fixed exchange rate with their trading partners. This includes the possibility of joining them in a currency union provided that the policies of their neighbours are consistent with price stability.

Measuring Openness

Openness is measured as: $[\text{EXPORTS} + \text{IMPORTS}]/\text{GDP}$. Table 2.4 shows the degree of openness of Namibia's economy compared to other Southern African countries.

Table 2.4 Degree of openness, 1997

	NAM	ZIM	BOT	LES	SA	SWA
Openness	138	87.1	120.7	237.2	49.3	212

Source: The percentages were calculated from the data obtained from the *IMF-African Development Indicators 1998*. Note: NAM = Namibia, ZIM = Zimbabwe, BOT = Botswana, LES = Lesotho, SA = South Africa, SWA = Swaziland.

Table 2.4 shows that the Namibian economy is more open compared to that of Zimbabwe, South Africa and Botswana. Table 2.4 show that openness of the Namibian economy is 138 percent while that of South Africa is only 49 percent. The economies of Lesotho and Swaziland are the most open economies. This high degree of openness strengthens the argument for Namibia to remain in the CMA.

Conclusion

This section attempted to test if the economy of Namibia is open. As shown in table 2.4, Namibia has an open economy compared to South Africa. The index of openness of Namibia is 138 percent compared to 49 of South Africa. This high degree of openness strengthens the argument for Namibia to remain in the Common Monetary Area.

2.2.5 Wage Flexibility

Introduction and Theory

This section tests if wages are flexible in Namibia. In other words it will test the responsiveness of wages to local employment conditions. The degree of wage flexibility is another important criterion for the success of monetary union. If wages are flexible, unemployed workers will reduce their wage claims if the country is experiencing unemployment problem.

The more flexible the wages and prices in the country the lower is the cost of abandoning the domestic currency and giving up exchange rate adjustments as a means of counteracting asymmetric shocks. This may particularly be the case with wage indexation (Jonung and Sjöholm, 1998: 3).

The distinction between nominal and real wages is important. If real wages are perfectly flexible, then if nominal wages are sticky, the freedom of the authorities over nominal exchange rate may be useful. However, freedom of authorities over nominal exchange rate may be redundant if nominal wages themselves are flexible to change the real exchange rate (Masson and Taylor, 1992: 48). This suggests that labour market circumstances be adjusted in order to enable flexible nominal and real wages to be established. If wages are flexible in Namibia, unemployed Namibians should reduce their wage claims if the country is experiencing unemployment problem. In that case, it would be optimal for Namibia to remain in the Common Monetary Area.

The Structure of Namibia's Employment

A high percent of Namibia's labour force is on agriculture. Agriculture employs nearly half the total labour force. It employs 46 percent of the total labour force. The structure of Namibia's employment is shown in table 2.5.

Table 2.5 Structure of Namibia's employment

Sector	Percentage share
Agriculture	46
Mining	3.8
Manufacturing	5.9
Construction	4.8
Wholesale and retail trade	8.7
Hotels and restaurants	1.0
Transport storage and communications	2.4
Financial intermediation	1.0
Real estate, renting and business activities	1.2
Public administration, defence and social security	7.0
Education	5.8
Health and social work	2.8
Other community, social and personal service activities	1.5
Private household with employed persons	5.5
Non stated	2.6
Total	100

Source: Central Bureau of Statistics of Namibia, 1999

Other sectors that account for a significant share of the total employment are wholesale and retail trade, and public administration. Mining which contributes 3.8 percent of the total Namibian exports employs only 3.8 of the total labour force.

Measuring Wage Flexibility

The model for testing if wages are flexible or assessing the response of wages to local economic condition is estimated as:

$$\ln W_t = \beta_0 + \beta_1 \text{Employment}_t + \varepsilon_t \quad [2.1]$$

where $\ln W_t$ is the logarithm of wage at time t, employment is self-explanatory, β_0 and β_1 are the co-efficients and ε_t is the error term.

If wages are flexible, the co-efficient β_1 is expected to be positive, because a decrease in employment will cause wages to decrease and vice versa. If wages are regressed on the level of unemployment β_1 will be expected to be negative, meaning that an increase in unemployment will cause unemployed workers to reduce their wage claims and this would help to solve unemployment problem.

Data

For this analysis annual data on the percentage changes in total employment and percentage changes in total remuneration in the Namibian mining sector will be used to test if wages and employment move in the same or opposite directions. Annual data from 1975 to 1998 were used. The data were obtained from the Chamber of mines of Namibia Annual Report, 1989 and 1998. The data on the mining sector are the only ones available. The data for other sectors are not available. The data for unemployment are also not available. This suggests that it is very important for the Central Statistics of Namibia to keep a record of these data.

Results

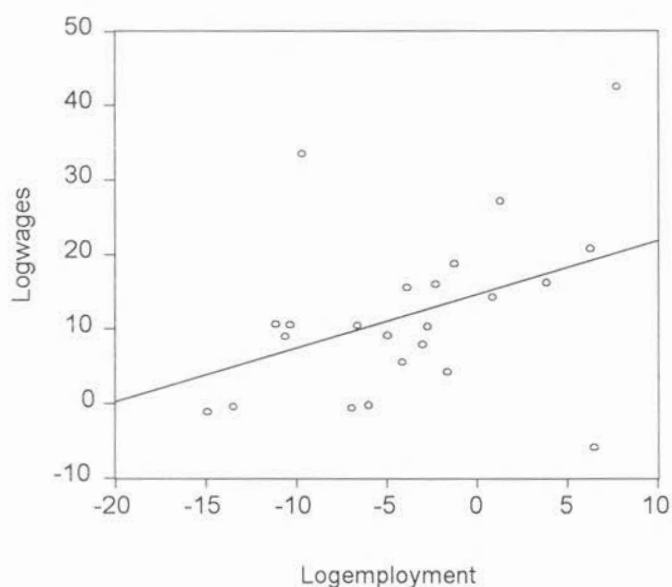
The results of equation [2.1] are shown in table 2.6. The results were estimated by using EViews computer software. The Durbin Watson statistics falls above the upper limit and this shows that there is no autocorrelation. The table also shows that the explanatory variable, LOGEMPLOYMENT is statistically significant. The R-squared is low, indicating that only 15 percent of the variations in the LOGWAGES are explained by LOGEMPLOYMENT. The F-statistics is highly significant, indicating that the regression results are good.

2.6 Regression results of wage flexibility for the mining sector

Dependent Variable: WAGES				
Method: Least Squares				
Date: 04/23/00 Time: 18:52				
Sample(adjusted): 1976 1998				
Included observations: 23 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	14.67306	2.636915	5.564481	0.0000
EMPLOYMENT	0.719497	0.362840	1.982959	0.0606
R-squared	0.157713	Mean dependent var		11.93937
Adjusted R-squared	0.117604	S.D. dependent var		11.47621
S.E. of regression	10.78028	Akaike info criterion		7.676256
Sum squared resid	2440.504	Schwarz criterion		7.774994
Log likelihood	-86.27694	F-statistic		3.932126
Durbin-Watson stat	2.657123	Prob(F-statistic)		0.060604

The coefficient of LOGEMPLOYMENT has a high positive sign of 0.7. This means that a decrease in employment (unemployment increasing) will cause wages to go down. Wages are flexible, because the co-efficient was expected to be positive for wages to be flexible. Figure 2.1 shows the relationship between wages and employment.

Figure 2.1 Scatter diagram showing the relationship between wages and employment in the mining sector



It can be seen from the scatter diagram in figure 2.1 that wages and employment are moving together in the same direction. That is because the regression line of the scatter diagram is upward sloping. This wage flexibility strengthens the argument for Namibia to remain in the Common Monetary Area.

Conclusion

The purpose of this section was to assess if wages are flexible or if they are moving the same direction with employment in Namibia. The results show that wages are moving in the same direction with employment. The coefficient shows that a one percent increase in employment will cause wages to increase by 0.7. If the explanatory variable was unemployment the coefficient is expected to be negative because unemployment is the opposite of employment. This positive impact of employment on wages shows that wages are flexible and this would strengthen the argument for Namibia to remain in the Common Monetary Area.

2.2.6. Financial and Goods Market Integration

Introduction

This section analyses if there is financial and goods market integration between Namibia and South Africa. It is expected that financial and goods markets of Namibia and South Africa are integrated. Because Namibia and South Africa are already in the monetary union a strong financial integration is expected. Good markets of the two countries are also expected to be integrated because the two countries are in a customs union. The purpose of this section is to test if the financial and goods markets of the two countries are integrated

Degree of Financial Integration

Financial integration is defined and measured by applying the law of one price. Two markets are said to be perfectly integrated if prices are the same in both markets and the two behave as one. Integration is defined more by the extent to which markets are connected.

Regions that are characterised by a high degree of financial integration in the financial markets are good candidates for monetary union. Financial integration might lessen the need for flexible exchange rates, because only fractional changes in interest rates are required to elicit sufficient capital movements across national frontiers (Ishiyama, 1975: 355 and Tjirongo, 1995: 26).

The Degree of Goods Market Integration

The degree of goods market integration is pointed out by Tavlas (1993: 33) as another criteria for optimum currency areas. Countries that possess similar production structures are likely to face similar terms of trade shocks. This negates the effectiveness of exchange rate adjustment between the countries as an instrument to deal with such shocks. Countries with the same production structures are better candidates for monetary unions than those that have different production structure.

This argument is also supported by Jonung and Sjöholm (1998: 4) that countries that have similar industrial structure are good candidates for a monetary union. They will be affected in a similar way by sector specific asymmetrical disturbances. As Jonung and Sjöholm (1998: 4) argue, "cyclical covariation in economic activities indicates that the countries are subject to common economic shocks, which reduces the significance of exchange rate adjustments".

Methodologies

In order to assess if there is financial and goods markets integration, we use the co-integration methodology that was used by Buch and Dopke (1999: 19) in testing whether there is financial integration among accession member states of the European monetary union. This method would also be used to test if there is goods market integration between Namibia and South Africa.

Additionally, the Allen-Kenen model that was used by Stuart (1992: 116) to test if there is financial and goods market integration between South Africa and Swaziland will also be used.

Cointegration Tests

Following Fidrmuc and Hovarth (1998: 6) and Buch and Dopke (1999: 19), the presence of common stochastic trend in the financial and goods markets of Namibia and South Africa is tested.

Buch and Dopke (1999:19) used the error correction model (ECM) to test for co-integration. According to the error correction model cointegration can be tested by regressing the domestic variable on the foreign variable, and the residuals yielded by that regression will be used to test if the variables are cointegrated. According to the error correction model co-integration can be tested as:

$$NAMINT = \beta_0 + \beta_1 SAINT + \beta_2 \mu_{t-1} + \varepsilon, \quad [2.2]$$

Where *NAMINT* is the Namibian lending rates, *SAINT* is the South African lending rates, and μ_{t-1} is the lagged value of the residuals from regressing the Namibia lending rates on South African lending rates. If the error correction model (that is coefficient β_2) is statistically significant, then financial markets of the two countries are co-integrated. This method can also be used to test if the goods market of South Africa and Namibia are integrated.

Additionally, the Johansen co-integration test will be used to test for the degree of integration. When carrying out the Johansen co-integration, it is assumed that the data have no deterministic trend and there is an intercept but no trend in the cointegration equation. The Johansen cointegration test leads to two test statistics for cointegration. The first is called the trace test, which tests the hypothesis that there are at most r cointegrating vectors. The second test is called the maximum eigenvalue test, and it tests the hypothesis that there are $r+1$ cointegrating vectors versus the hypothesis that there are at most r cointegrating vectors (see Maddala and Kim, 1998: 211).

In this analysis only the trace test would be used. According to the trace statistics, if the likelihood ratio exceeds the computed critical values then the variables are cointegrated. If it is less than the critical value the variables are not integrated.

Data

Quarterly lending rates were obtained from the International Financial Statistics. Data from 1991-1998 were analysed. The Namibian lending interest rates were regressed on the South African lending rates. For goods market integration, the data on GDP were used. The results for goods market integration should be interpreted with caution because only annual data from 1983 to 1998 are available for Namibia. There are no quarterly or monthly data. The sample is small.

Results

Financial Integration

The results of the error correction model are shown in table 2.7. The results show that the R-squared is high, as indicated by 86.5 per cent. This shows that 86.5 percent of the variations in the Namibian interest rates are explained by the explanatory variables. The F-statistics is highly significant, and the Durbin Watson statistics falls above the upper limit, indicating that the regression results are not spurious². The results are highly credible.

Table 2.7 Error correction model test for co-integration in the lending rates of Namibia and South Africa

Dependent Variable: NAMINT Method: Least Squares				
Sample(adjusted): 1991:2 1998:4 Included observations: 31 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.981939	0.158330	6.201871	0.0000
SAINT	0.679123	0.054150	12.54161	0.0000
ECM(-1)	0.693706	0.111287	6.233509	0.0000
R-squared	0.865529	Mean dependent var		2.966351
Adjusted R-squared	0.855924	S.D. dependent var		0.093303
S.E. of regression	0.035415	Akaike info criterion		-3.751570
Sum squared resid	0.035119	Schwarz criterion		-3.612797
Log likelihood	61.14933	F-statistic		90.11147
Durbin-Watson stat	2.418270	Prob(F-statistic)		0.000000

The co-efficient of SAINT is 0.67 and this means there is strong positive relationship between the interest rates of Namibia and South Africa. The error correction model (ECM) is statistically significant and this means that the Namibia and South African interest rates are co-integrated. This shows that the financial markets of Namibia and South Africa are highly integrated.

² Spurious regression results are the results that look good, but on further probing they look suspect. As Gujarati (1995: 724) suggested, and R squared that is greater than the Durbin Watson statistics is a rule of thumb to suspect that the estimated regression suffers from spurious regression.

The results of Johansen cointegration test are presented in table 2.8. The first column gives the eigenvalue, the second gives the likelihood ratio, the third gives the critical values at 5 percent, the fourth column gives cointegration vectors and the last column gives the results of whether the hypothesis of no cointegration is accepted or rejected. The first row tests the hypothesis of no cointegration, the second row tests the hypothesis of one cointegration relation.

Table 2.8 Johansen co-integration test for financial integration

Eigenvalue	Likelihood Ratio	5 percent critical value	Co-integration vectors	Result
0.398029	15.47200	15.41	None*	reject
0.008155	0.245639	3.76	At most 1	accept

*Denotes the rejection of the hypothesis at 5 % significance level.

LR test indicates indicates 1 cointegrating equation(s) at 5 % significance level

The results show that there is a common stochastic trend in the lending rates of South Africa and Namibia. There is one cointegrating equation at 5 percent significance level, because the likelihood ratio of 15.47 is greater than 15.41 at 5 percent critical value. The Likelihood Ratio rejects the hypothesis of no cointegration at 5 percent significant level. This indicates that there is financial integration between Namibia and South Africa.

Goods Market Integration

The methodology that was used to test if there is financial integration between Namibia and South Africa would be applied in order to test if there is goods market integration between the two countries. The following notations are used: NAMGDP = Namibia's GDP and SAGDP = South Africa's GDP. The results of the error correction model are presented in table 2.9 and the Johansen cointegration test are presented in table 2.10.

Table 2.9 Error correction model test for co-integration in the goods markets

Dependent Variable: NAMGDP				
Method: Least Squares				
Date: 04/23/00 Time: 16:51				
Sample(adjusted): 1984 1998				
Included observations: 15 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.625357	2.282116	2.026784	0.0655
SAGDP	0.337204	0.182401	1.848693	0.0893
ECM1(-1)	0.638568	0.277840	2.298326	0.0403
R-squared	0.607316	Mean dependent var	8.821193	
Adjusted R-squared	0.541868	S.D. dependent var	0.635465	
S.E. of regression	0.430117	Akaike info criterion	1.327340	
Sum squared resid	2.220013	Schwarz criterion	1.468950	
Log likelihood	-6.955048	F-statistic	9.279452	
Durbin-Watson stat	1.803776	Prob(F-statistic)	0.003667	

Table 2.9 shows the error correction model results are good fit because the R-squared is high. The variables explain 60.7 percent of the variations in NAMGDP. All variables are statistically significant. The F-statistics is statistically significant, and the Durbin Watson statistics falls above the upper limit, meaning that the results are not spurious but they are credible.

The co-efficient of SAGDP of 0.33 is weak and positive, and this means that the goods markets are weakly integrated. The error correction model is statistically significant and this indicates that the goods markets of the two countries are cointegrated.

The results of the Johansen cointegration test for goods market integration are presented in table 2.10 below. The first row tests the hypothesis of no cointegration, and the second row tests the hypothesis of one cointegration relation.

Table 2.10 Johansen cointegration test for goods market integration

Eigenvalue	Likelihood Ratio	5 % critical value	Co-integration vectors	Results
0.630363	18.12134	15.41	None*	Reject
0.328819	5.183305	3.76	At most 1*	Reject

* Denotes rejection of the hypothesis at 5% significance level.

L.R. test indicates 2 co-integrating equation(s) at 5% significance level.

The results of table 2.10 show that both the first and second rows show that the Johansen trace statistics reject the hypothesis of no cointegration at 5 percent critical values. The results show two cointegrating equations. The likelihood ratio of 18.12 and 5.18 exceed the critical values of 15.41 and 3.76. This shows that the goods market of Namibia and South Africa are integrated.

The Allen-Kenen Model

Introduction

The Allen-Kenen model is used to estimate the extent of financial and goods markets integration between Namibia and South Africa. This model was used Stuart (1992:116) to estimate the extent of financial and goods market integration between Swaziland and South Africa. The model will not be discussed in detail here, but will be simplified to test if financial and good markets of Namibia and South Africa are integrated.

Financial Market Integration

Asset market integration is said to exist between two countries if there existed a degree of substitutability between their bonds (Stuart, 1992: 116). As market integration increases the interest rates between the two countries begin to move together since differentials between these interest rates are offset by funds flow between capital markets. If there is complete asset market integration interest rate changes must be equal in order to maintain equilibrium.

As Stuart (1992: 116) argues, the scope for effective individual monetary policy declines as the degree of financial integration increases. The existence of financial integration strengthens the argument for monetary union. The Allen-Kenen model is specified as (Stuart, 1992: 116):

$$\partial r_2 = \beta_1 \partial r_1 + \beta_2 \frac{\partial \pi}{\pi} + \beta_3 \overline{\partial B_2^{ct}} + \beta_4 \overline{\partial r_0} + \beta_5 \partial W^{ss} + \beta_6 \partial W^{ns} + \beta_7 \partial B_2 \quad [2.3]$$

where r_2 = the Namibian interest rates,

r_1 = The South African interest rates,

π = The external flexible exchange rate,

$\overline{B_2^{ct}}$ = The total central bank holdings of Namibian bonds,

r_0 = World real interest rate,

W^{ns} = The Namibian savings,

W^{ss} = The South African Savings,

B_2 = Total Namibian bonds outstanding.

Sign expectation

The predicted sign are as follows:

$\beta_1 > 0$, the existence of goods market integration requires that β_1 be positive because sympathetic movement in the union interest rates is required to maintain union portfolio balance.

$\beta_2 < /> 0$, this is indeterminate in the model. As Stuart (1992: 117) stated:

"This outcome is a result of the primacy within the model of the asset market in determining the short-run exchange rate. However, the money market and bond market effects of exchange rate are at odds in their effects on the local interest rate. To illustrate, consider depreciation due to autonomous capital outflow. The depreciation instantly increases wealth as the value holdings of foreign bonds rise, and household must increase their value holdings of local bonds and money to maintain portfolio balance."

$\beta_3 < 0$, as central bank holdings of Namibian bonds increase, there will be an increase in liquidity and increase in demand for both bonds. The Namibian interest rates (r_2) will fall and this reflects an increase in demand for B_2^{ct} .

$\beta_4 < /> 0$, this is indeterminate because r_2 can rise or fall for a rise in r_0 . Gross substitutability of local and world bonds suggests that r_2 and r_0 should move together and the bond market excess supply that immediately results from a rise in r_0 puts pressure on r_2 to rise. Despite this, there is a money market effect (see Stuart, 1992: 117). An increase in r_0 reduces domestic demand for money and put pressure on r_2 to fall in order to clear the market. An increase in r_0 sets conflicting force on r_2 and the change will depend on the relative strength of these forces.

$\beta_5 < 0$, an increase in Namibian saving would cause a decrease in r_2 by virtue of the bond market effect.

$\beta_6 < 0$, an increase in South African for example, disposable income will cause an increase in saving. An increase in saving adds to wealth, which in turn increases desired holdings of bonds. This will cause r_2 to decrease.

$\beta_7 > 0$, as Stuart (1992: 118) stated:

"Under the model, deficit financing is undertaken by issuing the home bond, in this case B_2 . As the supply of B_2 increases, its traded price falls, raising its return and putting upward pressure on the local interest rate. Therefore the supply of local bonds is positively related to the interest rates".

The estimated Relationship

For the purpose of equation [2.3] the variables will be designated and interpreted as follows:

r_2 NAMINT, the Namibian interest rates. The measure of NAMINT is the lending rates.

r_1 SAINT, the South African interest (lending) rates.

r_0 WORLDINT, the world interest rates, and in this case the United Kingdom interest rates was used.

π EXCHA, is the nominal South African/United Kingdom exchange rate in units of foreign currency. Thus EXCHA is exogenous, since events in Namibia are unlikely to have any effect on the rand/pound exchange rate, given Namibia's economic size. EXCHA was converted into bilateral real exchange rate because all data need to be in real forms. It was converted as:

$$\text{EXCHAREAL} = (\text{SACPI}/\text{UKCPI}) * \text{EXCHA},$$

where EXCHAREAL is the bilateral real exchange rate, SACPI is the consumer price index of South Africa, UKCPI is the consumer price index of United Kingdom.

B_2^{ct} NAMBOND, central bank holdings of Namibian bonds. Bank of Namibia holdings of the Namibian government bonds and stocks. As Stuart (1992: 120) stated, changes in this variable can be interpreted as open market operations, and its influence will give an indication of the ability of the Namibian monetary policy to affect NAMINT.

W^{ns} NAMSAVINGS, Namibian savings, demand and time deposits

W^{SS} SASAVINGS, South African savings, demand and time deposits.

B_2 NAMBONDOUT, Namibia government bonds and stock outstanding.

Data

Quarterly data from 1993 to 1998 are used for financial integration while annual data from 1983 to 1998 will be used for testing goods market integration. All variables are converted into real terms to keep in terms with the fundamentals of the Allen-Kenen model, which does not permit analysis of inflation as a process. As pointed out by Stuart (1992: 120):

"The way in which the model is constructed with stationary expectations, the continuous clearing of the markets and a well-defined stationary state- precludes considerations of inflation as a process. Price do not move up or down in response to disturbances, but these are once for all price changes, even though they are drawn out over time."

Before estimating equation [2.4] it is important to discuss some problems related to data. The data for central bank holding of government stocks and bonds are not available. The data for government bonds and stocks outstanding are incomplete.

The final model

The model will finally be written as:

$$NAMINT = \beta_0 + \beta_1 SAINT + \beta_2 REALEXCHA + \beta_3 SASAVINGS + \beta_4 NAMSAVINGS \quad [2.4]$$

NAMBOND and NAMBONDOUT are excluded from equation [2.4] because of data unavailability. WORLDINT is also excluded from the equation because it was

insignificant in the regression. Its t-statistics was not significant and therefore it was decided to exclude it from the equation.

Results

The results are shown in table 2.11. The results were estimated by using Eviews computer software. The method of least squares was used to estimate equation 2.4. There was a problem of autocorrelation and the variables were adjusted for autocorrelation, by adding the term AR(1) at the end of the LS command. After adjustment, the Durbin Watson statistics of 1.599 is in the inconclusive region. It is between the critical values of 1.090 and 1.825. There is no evidence of autocorrelation. The F-statistic is highly significant, indicating that the overall regression and the R^2 figure are highly credible. The R^2 of 67.6 percent indicates that the variables explain 67.6 percent of the variations in dependent variable (Namibian interest rates). The regression is a good fit. The variables were transformed into logarithmic in order to remove autocorrelation problem.

Table 2.11 Allen-Kenen model's regression results for financial integration (all variables are in log form)

Dependent Variable: LOGNAMINT				
Method: Least Squares				
Date: 04/26/00 Time: 21:09				
Sample(adjusted): 1991:2 1998:4				
Included observations: 31 after adjusting endpoints				
Convergence achieved after 76 iterations				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.079503	16.56143	-0.185944	0.8540
LOGSAINT	0.997262	0.595198	1.675512	0.1063
LOGREALEXCHA	-0.097156	0.089160	-1.089676	0.2862
LOGNAMSAVINGS	2.165827	1.232759	1.756895	0.0912
LOGSASAVINGS	-1.019062	1.615319	-0.630874	0.5338
AR(1)	0.605836	0.191694	3.160431	0.0041
R-squared	0.676754	Mean dependent var	2.025039	
Adjusted R-squared	0.612104	S.D. dependent var	0.854152	
S.E. of regression	0.531977	Akaike info criterion	1.747551	
Sum squared resid	7.074978	Schwarz criterion	2.025097	
Log likelihood	-21.08704	F-statistic	10.46808	
Durbin-Watson stat	1.599596	Prob(F-statistic)	0.000017	
Inverted AR Roots	.61			

All variables are statistically significant. LOGSAINT has expected sign, it is highly positive, and this indicates that there is a strong relationship between South African and Namibian interest rates. The coefficient of 0.99 is almost unitary and this means that there is a high degree of financial integration between Namibia and South Africa. This is the most important coefficient in determining whether there is financial integration between the two countries. This high positive correlation strengthens the argument for Namibia to remain in the Common Monetary Area.

The coefficient of LOGREALEXCHA is negative. This is similar to the results that were obtained by Stuart (1992: 122) for Swaziland. According to Stuart, this negative sign indicate that the money market effect of an exchange rate change outweighs the bond market effect in the CMA.

The co-efficient of LOGSASAVINGS is negative. This is consistent with the theory that an increase in South African savings will cause the Namibian interest rates to decrease. A one unit increase in South African Savings will cause the Namibian interest rate to decrease by 1.019.

However, the coefficient for LOGNAMSAVINGS has unexpected positive sign. According to the theory, an increase in the Namibian savings would reduce the interest rates. One could interpret this result as the dominance of the money market over the bond market effect for interest rates changes.

The results have demonstrated that the Namibian financial market is integrated with that of South Africa, and this would again strengthen the argument for Namibia to remain in the monetary union with South Africa. The scope for an independent monetary policy is limited. This is due to the fact that the Bank of Namibia does not purchase or sell government bonds.

The variable that is most important in determining if there is financial integration between the two countries is SAINT. Figure 2.2 shows that the real interest rates of the two countries.

Figure 2.2 Real and nominal lending rate of Namibia and South Africa

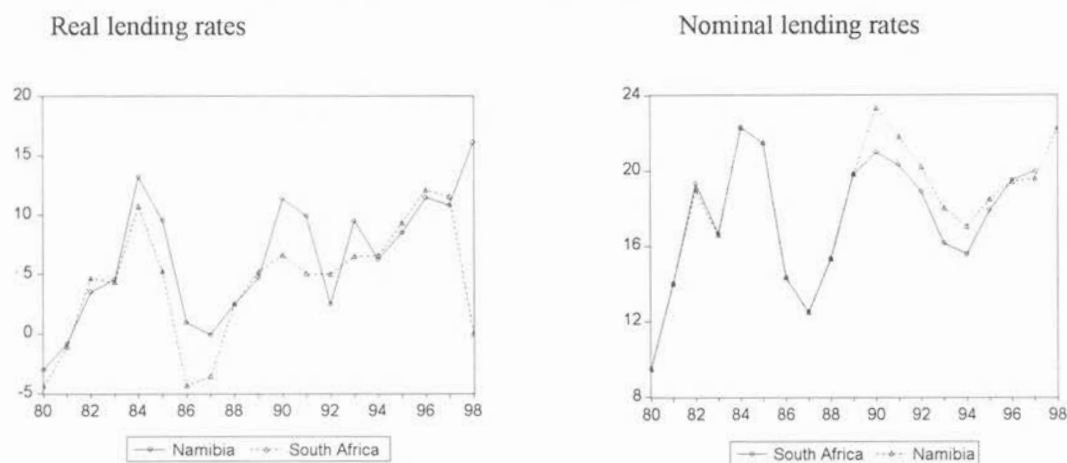


Figure 2.2 shows that the real interest rates of Namibia and South Africa are moving in the same direction. Only in 1998 where the two rates diverged from each other. The nominal rates were exactly similar before 1990 because Namibia was under South African rule and was administered as another province of South Africa. After 1990, interest rates in Namibia have been slightly above those in South Africa.

Goods Markets Integration

According to the Allen-Kenen model goods markets integration refers to the state of substitutability between the goods of the two or more nations that comes about when there is high mutual trade between them (Stuart, 1992: 125). In Stuart (1992) own words:

"Like the bonds of the two countries, the goods are gross substitutes and thus a price change in one market will lead to quantitative adjustment in all others. The degree of intensity of the responses indicates the degree of goods market integration, as the quantity increase in proportion to the size of the price changes, the level of goods market integration is said to be increasing. In the case perfect

or complete goods market integration there is no scope for price differentials since goods flows and market responses completely offset them. Thus prices and incomes move closer and closer together as goods market integration increases"

The model, which attempts to establish if there is goods market integration between Namibia and South Africa, is (Stuart, 1992: 126)³:

$$\begin{aligned} \partial Y_2 = & \beta_1 \partial Y_1 + \beta_2 \frac{\partial \pi}{\pi} + \beta_3 \partial r_1 + \beta_4 \partial r_2 + \beta_5 \partial r_0 + \beta_6 \partial W^{sa} + \beta_7 \partial W^{na} + \beta_8 \partial D_1 \\ & + \beta_9 \partial D_2 \end{aligned} \quad [2.5]$$

where Y_2 is the income of Namibia, Y_1 is the income of South Africa, W^{sa} and W^{na} are the wealth of South Africa and Namibia, D_1 and D_2 are South African and Namibian government deficits. The other variables that were explained under equation [2.4] will not be explained here again.

Signs Expectation

$\beta_1, \beta_2 > 0$, they are positive because changes in South African goods market will be felt strongly in the Namibian goods market due to integration of the markets. β_2 is expected to be positive because an increase in the real exchange rate or depreciation of the real exchange rate will cause expenditure switching.

$\beta_3, \beta_4 < 0$, they are expected to have negative signs because a decrease interest rates will cause a depreciation due to capital outflows, and this will in turn causes expenditure switching. An increase in interest rate will cause a decrease in investment, which will in turn reduce income/output.

³ Stuart (1992) used this model in assessing for goods market integration between Swaziland and South Africa. The results showed that the goods markets of Swaziland and South Africa are integrated. For the purpose of this analysis, the model has been simplified in order to make the analysis easy to understand.

$\beta_3 > 0$, an increase in world interest rates will cause capital outflow, which will cause depreciation of the exchange rate, which will in turn cause expenditure switching.

$\beta_6, \beta_7 > 0$, an increase in wealth will cause an increase in income.

$\beta_8, \beta_9 > 0$, an increase in government deficits will cause an increase in income/output, provided that the deficits are increased to spend on sectors that will contribute to economic growth.

The Estimated Relationship

Again the data have been converted into real terms. The variables that were explained under financial integration will not be explained here again. The variables that were not explained are as follows:

Y_2 is Namibia real GDP and will be denoted as NAMGDP,

Y_1 is the South African real GDP and will be denoted as SAGDP,

W^{sa} and W^{na} are South African and Namibian wealth defined as the sum of M2, foreign assets and bonds outstanding, and they will be denoted as SAWEALTH and NAMWEALTH.

D_1 and D_2 are the budget deficits of Namibia and South Africa and will be denoted as NAMDEFICIT and SADEFICIT.

Finally the model will be written as:

$$NAMGDP = \beta_1 SAGDP + \beta_2 WORLDINT + \beta_3 SAINT \quad [2.6]$$

Some variables such NAMDEFICIT, REALEXCHA, SADEFICIT and SAINT are excluded from the equation because of incomplete or they were not statistically significant. NAMWEALTH and SAWEALTH are excluded from the equation because the data for Namibia are incomplete, while for SAWEALTH it was insignificant and for that reason it was decided not to use these variables.

The results are presented in table 2.12. The results should be interpreted with caution because the sample is small. Only annual data are available for the GDP of Namibia, there are no quarterly data for GDP. For that reason it was decided to use annual data.

Table 2.12 Allen-Kenen model goods market integration regression results

Dependent Variable: LOGNAMGDP				
Method: Least Squares				
Date: 04/26/00 Time: 21:37				
Sample(adjusted): 1983 1998				
Included observations: 15				
Excluded observations: 1 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.907019	2.136685	2.764572	0.0184
LOGSAGDP	0.433611	0.140499	3.086220	0.0104
LOGNAMINT	-0.098377	0.159729	-0.615902	0.5505
LOGWORLDINT	-1.505549	0.472954	-3.183285	0.0087
R-squared	0.754327	Mean dependent var	8.788385	
Adjusted R-squared	0.687325	S.D. dependent var	0.682717	
S.E. of regression	0.381758	Akaike info criterion	1.135117	
Sum squared resid	1.603127	Schwarz criterion	1.323930	
Log likelihood	-4.513374	F-statistic	11.25830	
Durbin-Watson stat	1.797710	Prob(F-statistic)	0.001114	

Table 2.12 shows that all variables are statistically significant. The F-statistic is highly significant, indicating that the variables explain NAMGDP well. The R squared of 0.754 percent is high indicating that 75.4 percent of the variations in NAMGDP are explained by the explanatory variables. This shows that the regression is a good fit. The Durbin Watson statistic of 1.79 is above the upper limit of 1.750, indicating that there is no autocorrelation.

The variable of most interest is SAGDP, and have expected sign. The co-efficient SAGDP is positive, indicating that the goods markets of Namibia and South Africa are

integrated. This was expected because there is high intensity of mutual trade between the two countries. The coefficient of 0.43 shows that a one percent increase in South Africa's GDP will cause the GDP of Namibia to increase by 0.43.

The NAMINT and WORLDINT have expected signs, they are negative. An increase in interest rate would have a negative impact on the income. This means that an increase in Namibian interest rates by one percent would lead to a decrease in Namibia GDP by -0.098. Similarly an increase in the world interest rates one unit would lead to a decrease in Namibian GDP by -1.505.

Conclusion

The purpose of this section was to discuss the theory and analyse empirically the degree of goods and financial markets integration between Namibia and South Africa. The results of both tests show that there is a high degree of financial integration between Namibia and South Africa. The error correction model as shown in table 2.7 is statistically significant. The Johansen cointegration test shows one cointegration equation at 5 percent significant level. The Allen-Kenen model shows that there is a high degree of financial integration between Namibia and South Africa as shown by the positive coefficient of 0.99 in table 2.11.

The goods market of the two countries are also integrated. The error correction method as shown in table 2.9 is statistically significant, and the Johansen cointegration model show that there are two cointegrating equations at 5 percent significant level. The Allen-Kenen model shows that there is a positive, but weak relationship between the goods markets of Namibia and South Africa as shown by the coefficient of 0.43 in table 2.12. These results would argue for Namibia to remain in Common Monetary Area.

2.2.7 Similar Inflation

Introduction and theory

This section discuss the theory and measurement of inflation similarity. It will test if the rate of inflation of Namibia is similar to that of South Africa. It is argued that candidates for an optimum currency area should have similar inflation rates. This is based on the assumption that the primary cause of payment imbalances is due to differences in such rates. Different rates of inflation indicate differences in the structure of economies or preferences as regards the conduct of economic policies in the participating countries. In a monetary union, the rate of inflation will be similar in the member countries (Jonung and Sjöholm, 1998: 4). For countries that have similar historical rates of inflation this convergence can be expected to be more easy to bring about.

However, the above argument may not be an important one if inflation rate equalisation is relatively easily achieved. Stuart (1992: 7) argues that the primary cause of inflation rate divergence is differential monetary expansion, and because he believes in a high level of wage and price flexibility, he suggests that inflation rate equalisation can be easily accomplished. The next section will test if the rates of inflation of Namibia and South Africa are similar. The rates of inflation of Namibia are expected to be similar because Namibia was ruled as another province of South Africa by South Africa, and these countries are already in monetary union. The best method of assessing for inflation similarity between countries is the error correction model, which assess if the rates are co-integrated between the two countries, and graphical representation.

Cointegration analysis

This section tests for the presence of common stochastic trend in the inflation rates of Namibia and South Africa. If there is a common stochastic trend in the rates of inflation of the two countries, they will be cointegrated. If the rates are cointegrated they are

similar. To test for co-integration, the error correction model is be used. The error correction model is estimated as:

$$Namibia = \beta_0 + \beta_1 Southafrica + \varepsilon, \quad [2.7]$$

where Namibia is the rate of inflation of Namibia, Southafrica is the rate of South Africa's inflation. After regressing the Namibia inflation rate of South African inflation rate, the residuals from that regression will be used to estimate the error correction model as follows:

$$Namibia = \beta_0 + \beta_1 Southafrica + \beta_2 ECM_{t-1} + \varepsilon, \quad 2.8$$

where ECM_{t-1} is the is the error correction model which is the lagged values of the residuals from equation [2.8]. If β_2 is statistically significant the inflation rates of South Africa and Namibia are cointegrated. If it is not statistically significant, the inflation rates are not cointegrated.

Results

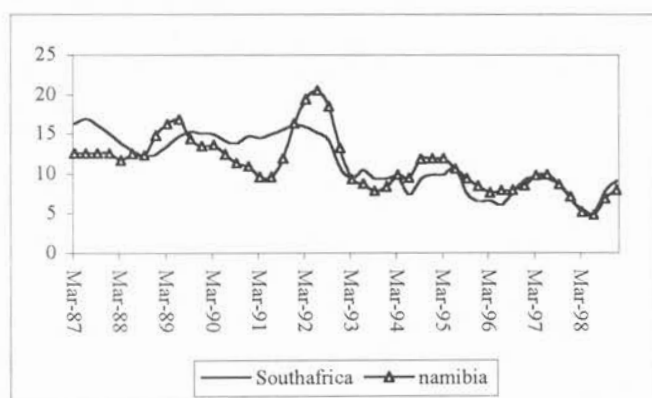
The results are presented in table 2.13. Quarterly data from 1987 to 1998 were used. The data were obtained from the International Financial Statistics. The results show that all explanatory variables are statistically significant. The R-squared of 0.54 is high meaning that the regression results are credible. This means the variables explain 54 percent of the variations in the Namibian inflation rates. The F-statistic is also highly significant. The Durbin Watson statistic falls above the upper limit and this means that the regression results are not spurious. There is no autocorrelation.

Table 2.13 Regression results for testing co-integration in inflation

Dependent Variable: NAMIBIA				
Method: Least Squares				
Date: 04/18/00 Time: 22:15				
Sample(adjusted): 1987:3 1998:4				
Included observations: 46 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.062350	1.545229	-0.040350	0.9680
SOUTHAFRICA	0.680639	0.113253	6.009872	0.0000
ECM(-1)	0.437284	0.138310	3.161628	0.0029
R-squared	0.542977	Mean dependent var	-1.002768	
Adjusted R-squared	0.521720	S.D. dependent var	15.08194	
S.E. of regression	10.43034	Akaike info criterion	7.590308	
Sum squared resid	4678.057	Schwarz criterion	7.709568	
Log likelihood	-171.5771	F-statistic	25.54355	
Durbin-Watson stat	1.860311	Prob(F-statistic)	0.000000	

The variable of most interest is the error correction model (ECM_{t-1}). The ECM is statistically highly significant. This means that the inflation rates of Namibia and South Africa are co-integrated. The inflation rates of the two countries are co-integrated, in other words they are integrated.

Figure 2.3 shows the rates of inflation of Namibia and South Africa. It can be seen that the rates are moving in the same direction. There is convergence among the rates of inflation of these countries.

Figure 2.3 Inflation rates of Namibia and South Africa

Conclusion

The purpose of this section was to test if the inflation rates of Namibia and South Africa are similar. The results show that the inflation rates are co-integrated, meaning that they are similar. Although this criterion is believed to be less important, it would argue for Namibia to remain in the Common Monetary Area.

2.2.8 Intensity of Mutual Trade

Introduction and theory

This section analyses the extent of mutual trade between South Africa and Namibia. A high intensity of mutual trade between the two would suggest that the CMA is an optimum currency area.

Intensity of mutual trade is one of the main criteria for assessing the benefits and costs of monetary union. The benefits of monetary union rise with the volume of trade between countries. Countries that trade extensively with each other will benefit more from monetary union. As Fidmorc and Hovarth (1998: 8) argue, high intensity of mutual trade increases the correlation of economic shocks between respective countries.

Degree of Mutual Trade

The extent of mutual trade between Namibia and South Africa is very high. Table 2.14 shows that 86.8 percent of Namibia's imports in 1996 were from South Africa and in 1997 imports from South Africa increased to 88.5 percent. South Africa accounted for 30 and 16.5 percent of Namibia's exports in 1996 and 1997. The United Kingdom is Namibia's second biggest trading partner.

Table 2.14 Trade between Namibia and its trading partners

	Imports 1996	Exports 1996	Imports 1997	Exports 1997
Total	100	100	100	100
Germany	1.7	3.2	1.4	1.6
Spain	0.2	5.5	0.8	5.0
France	0.4	3.5	0.4	3.6
United Kingdom	1.5	38.5	0.9	51.4
Japan	0.7	4.3	0.3	6.1
Netherlands	0.7	0.3	0.2	0.6
Russia	0.8	0.0	0.5	0.0
USA	1.4	0.4	2.2	1.5
South Africa	86.8	30	88.5	16.2
Zimbabwe	1.0	0.1	1.1	0.2
Others	4.8	14.2	2.7	3.8

Data source: Percentages were calculated from the data obtained from the Central Statistics Office, Windhoek.

This high intensity of mutual trade is expected to increase the correlation of economic shocks between South Africa and Namibia. Namibia and South Africa will be expected to fulfil the criterion of symmetric shocks.

Conclusion

There is a high degree of interdependence between the two countries, Namibia and South Africa. South Africa is Namibia's most trading partner. More than 80 percent of Namibia's imports are from South Africa, although the United Kingdom dominates Namibia's exports. The extend of mutual trade between South Africa and Namibia seems sufficiently to qualify as an optimum currency area.

2.2.9 Symmetric and Asymmetric Disturbances

Introduction

This section analyses if shocks that affect Namibia are symmetric (similar) or asymmetric (not similar) to those of South Africa. If the shocks or disturbances are symmetric, then the Common Monetary Area would be an optimal exchange rate regime for Namibia.

Fidrmuc and Horvath (1998: 5) present an example of a two-country world in which both countries are exposed to asymmetric shocks. Nominal wages are sticky and labour mobility is low in both countries. If shocks are asymmetric, countries can adjust the exchange rate in order to alter the relative prices and eliminate adverse effect of shocks. However, country specific monetary policy measure will not be available if two countries use the same currency, and in this case adjustment may be more costly. This means that if two countries are exposed to asymmetric shocks they should use flexible exchange rate. Similarly, if countries are affected by symmetric shocks they should use fixed exchange rates or common currency.

The nature of disturbances

If two regions or countries experience the same disturbances they will presumably favour the same policy responses. In that case, abandoning monetary policy autonomy for monetary union will involve relatively low costs (Bayoumi and Eichengreen, 1994: 4). Bayoumi and Eichengreen emphasised the magnitudes and correlation of disturbances as important for the assessing whether two countries or regions are good candidates for monetary union. Most of the studies on disturbances focused more on the correlation of disturbances and paid less attention on the magnitude of disturbances. If disturbances are of negligible size, two countries may still incur only minor costs from giving up monetary policy autonomy because output and unemployment will barely be disturbed from their level of equilibrium. This means that discussions on monetary union focusing

on the nature of disturbances should consider their size as well their cross-country correlation.

Further, Bayoumi and Eichengreen (1994: 4) argued that since economies sharing the same industries are likely to experience similar aggregate disturbances in so far as economy-wide disturbances are the aggregates of industry-specific shocks. If disturbances are imperfectly correlated across countries, economies that are diversified may experience smaller aggregate disturbances than highly specialised economies or undiversified economies. If two economies specialise and produce primary products, then it would be anticipated that the disturbances that they experience would be negatively correlated. Namibia exports mainly primary products (predominantly diamonds) and one can expect the correlation of shocks with South Africa to be negative.

Methodology: The Bayoumi-Eichengreen Model

The model is estimated using a procedure proposed by Bayoumi and Eichengreen (1994: 10) for distinguishing temporary from permanent disturbances to a pair of time series variables. As discussed by Bayoumi and Eichengreen (1994: 10), consider a system in which the true model can be represented by an infinite moving average of a vector of variables X_t and an equal number of disturbances ε_t . By using the lag operator this can be written as:

$$\begin{aligned} X_t &= A_0 \varepsilon_t + A_1 \varepsilon_{t-1} + A_2 \varepsilon_{t-2} + A_3 \varepsilon_{t-3} \dots A_n \varepsilon_{t-n} \\ &= \sum_{i=0}^{\infty} L^i A_i \varepsilon_t, \end{aligned} \tag{2.9}$$

where the matrices A_i represent the impulse response functions of the disturbances to the elements of X .

Let X_t be made up of change in output and change in prices, and let ε_t be supply and demand disturbances. The model will be:

$$\begin{bmatrix} \Delta y_t \\ \Delta p_t \end{bmatrix} = \sum_{i=0}^{\infty} L^i \begin{bmatrix} a_{11i} & a_{12i} \\ a_{21i} & a_{22i} \end{bmatrix} \begin{bmatrix} \varepsilon_{dt} \\ \varepsilon_{st} \end{bmatrix}, \quad [2.10]$$

where y_t and p_t represent the logarithm of output and prices, a_{11i} represents element a_{11} in matrix A_i , and ε_{dt} and ε_{st} are independent supply and demand disturbances. According to Bayoumi and Eichengreen (1994: 11) these disturbances will be independent if they have separate causes, such as shifts in macroeconomic policy in the case of aggregate disturbances and change in technology in the case of supply disturbances. However, the same underlying disturbance causes movement in both cases of supply and demand. If for example, a change in the product prices for a product producer. In this case the estimated aggregate supply disturbance will incorporate the associated effect on aggregate demand.

Supply disturbances have permanent effects on the level of output, but demand disturbances have only temporary effects, although both have permanent effects on the price level. Output is written in first difference form, and therefore the cumulative effect of demand disturbances on the change in output, must be zero, implying the restriction:

$$\sum_{i=0}^{\infty} a_{11i} = 0 \quad [2.11]$$

How to estimate the model defined by equation [2.10] and [2.11] is not clear since the disturbances are not directly observable. Bayoumi and Eichengreen (1994: 11) suggested that the model could be estimated by using bivariate vector autoregression (VAR) model to decompose the variation in series into demand (temporary) and supply (permanent) disturbances⁴. In vector autoregression, each element of X_t is regressed on lagged values of all the elements of X . As discussed by Bayoumi (1994: 11) the vector autoregression can be written as:

⁴ Fidrmuc and Horvarth (1998) also used this method in their analysis of Czech-Slovak monetary union.

$$X_t = \beta_1 X_{t-1} + \beta_2 X_{t-2} + \dots + \beta_n X_{t-n} + e_t \quad [2.12]$$

where β represents the estimated coefficients, e_t represents the residuals from the equation in the vector autoregression. X_t consists of Δy_t and Δp_t , and e_t consists of residuals from a regression of lagged values of Δy_t and Δp_t on current values of each in turn. The residuals are labelled e_{yt} and e_{pt} .

Data

The annual data on GDP growth and inflation were collected for members of the Common Monetary Area (Lesotho, Namibia, South Africa and Swaziland). All data were collected from the Time Series Explorer -World Bank Development Indicators.

Before estimating equation [2.12] it is important to mention some problems related to data. Only annual data for GDP are available and the pre 1980 data for Namibia are not available. There are no quarterly data for GDP. Annual data will be used to estimate the supply shocks, and the results should be interpreted with caution because the sample is small.

Estimation

Equation [2.12] is estimated for each country's economy. The lags were set to one and two because Bayoumi and Eichengreen (1994: 21) indicated that most of the model had an optimal lag length of either one or two. For the supply disturbances equation [2.12] was estimated as:

$$Y_t = Y_{t-1} + Y_{t-2} + e_t, \quad [2.13]$$

where Y_t is GDP growth and e_t is the error term or disturbance.

For the demand disturbances equation [2.12] was estimated as:

$$P_t = P_{t-1} + P_{t-2} + e_t, \quad [2.14]$$

where P_t is inflation rate and e_t is an error term or disturbance. Equation [2.13] and [2.14] were estimated for each country and the results are presented on appendix.

Results

Supply Shocks

Total Supply Shocks

The regression results used to estimate the shocks for each country are presented on appendix 1.1 in table A1. The shocks data yielded by the regression results in table A1 for each country are also presented on appendix 1.1 in table A2. The Namibian supply shocks were regressed on the shocks of South Africa, Lesotho and Swaziland. This is done in order to test if the correlation coefficients are positively or negatively correlated. The results are presented in table 2.15.

Table 2.15 Regression results showing the correlation of supply disturbances of Namibia and South Africa, Lesotho and Swaziland.

Dependent Variable: NAMIBIA				
Method: Least Squares				
Sample: 1982 1997				
Included observations: 16				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.56E-15	0.011042	8.66E-13	1.0000
SOUTHAFRICA	0.782996	0.132092	5.927642	0.0001
LESOTHO	0.099409	0.082608	1.203379	0.2520
SWAZILAND	-0.608326	0.433054	-1.404736	0.1855
R-squared	0.868973	Mean dependent var		5.87E-14
Adjusted R-squared	0.836216	S.D. dependent var		0.109135
S.E. of regression	0.044167	Akaike info criterion		-3.189342
Sum squared resid	0.023409	Schwarz criterion		-2.996194
Log likelihood	29.51473	F-statistic		26.52798
Durbin-Watson stat	2.863350	Prob(F-statistic)		0.000014

All the variables are statistically significant. The results indicate a good fit. The R^2 and F-statistic indicate that the variables explain the NAMIBIA shocks very well, as indicated by the high R^2 of 86.8 percent and highly significant F-statistics. The Durbin Watson statistics comes out above 1.728, the upper limit for acceptance. This indicates the regression results are not spurious. There is no autocorrelation.

The results show that the supply shocks of Namibia are strongly related to those of South Africa as indicated by coefficient of 0.78. This is the variable of most interest because the purpose of this analysis is to assess if the Namibian shocks and South African shocks are positively correlated. The shocks are also positively related to those of Lesotho, but the correlation co-efficient is very weak as indicated by 0.09.

Supply Shocks to Sectors

It is also important to test whether sectors of the Gross Domestic Products of South Africa and Namibia are symmetric or asymmetric. Using the same procedure that was used to estimate total shocks, the shocks to sectors of the GDP can be estimated. The

regression results used to estimate the shocks are shown on appendix 1.1 in table A3. The data yielded by the regression results in tables A3 are also shown on appendix 1.1 in table A4. The shocks to sectors of GDP such as agriculture and mining are expected to be symmetric for these two countries are exposed to drought and the world price of mineral products. Government sector is also expected to be symmetric because Namibia was under South African government until 1990. The results of sector shocks are presented in table 2.16, 2.17, 2.18, and 2.19. The following notations are used: NAMAGRIC = Namibia agricultural sector, SAAGRIC = South Africa agricultural sector, NAMMINING = Namibia mining sector, SAMINING = South Africa mining sector, NAMMANUFAC = Namibia manufacturing sector, SAMANUFAC = South Africa manufacturing sector, NAMGOV = Namibia government sector, and SAGOV = South Africa government sector.

Table 2.16 Supply shocks to the agricultural sector

Dependent Variable: NAMAGRIC				
Method: Least Squares				
Date: 05/02/00 Time: 22:53				
Sample: 1982 1998				
Included observations: 17				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.08E-14	0.025309	3.19E-12	1.0000
SAAGRIC	0.802756	0.192144	4.177881	0.0008
R-squared	0.537817	Mean dependent var		1.05E-13
Adjusted R-squared	0.507005	S.D. dependent var		0.148620
S.E. of regression	0.104351	Akaike info criterion		-1.571973
Sum squared resid	0.163338	Schwarz criterion		-1.473948
Log likelihood	15.36177	F-statistic		17.45469
Durbin-Watson stat	2.085033	Prob(F-statistic)		0.000808

Table 2.17 Supply shocks to the mining sector

Dependent Variable: NAMMINING				
Method: Least Squares				
Date: 05/02/00 Time: 22:55				
Sample(adjusted): 1984 1998				
Included observations: 15 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.004465	0.045622	-0.097863	0.9235
SAMINING	1.162930	0.653369	1.779898	0.0985
R-squared	0.195944	Mean dependent var		-8.67E-14
Adjusted R-squared	0.134094	S.D. dependent var		0.189596
S.E. of regression	0.176427	Akaike info criterion		-0.508256
Sum squared resid	0.404643	Schwarz criterion		-0.413850
Log likelihood	5.811923	F-statistic		3.168036
Durbin-Watson stat	1.831197	Prob(F-statistic)		0.098465

Table 2.18 Supply shocks to the manufacturing sector

Dependent Variable: NAMMANUFAC				
Method: Least Squares				
Date: 05/02/00 Time: 22:23				
Sample: 1982 1998				
Included observations: 17				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.95E-14	0.053771	-7.35E-13	1.0000
SAMANUFAC	1.561908	1.388288	1.125061	0.2782
R-squared	0.077818	Mean dependent var		-3.58E-14
Adjusted R-squared	0.016339	S.D. dependent var		0.223536
S.E. of regression	0.221702	Akaike info criterion		-0.064830
Sum squared resid	0.737280	Schwarz criterion		0.033195
Log likelihood	2.551053	F-statistic		1.265762
Durbin-Watson stat	2.078104	Prob(F-statistic)		0.278244

Table 2.19 Supply shocks to the government sector

Dependent Variable: NAMGOV				
Method: Least Squares				
Date: 05/02/00 Time: 22:25				
Sample: 1982 1998				
Included observations: 17				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.37E-15	0.018589	-7.38E-14	1.0000
SAGOV	0.288677	0.522454	0.552541	0.5887
R-squared	0.019947	Mean dependent var	1.18E-15	
Adjusted R-squared	-0.045389	S.D. dependent var	0.074964	
S.E. of regression	0.076646	Akaike info criterion	-2.189098	
Sum squared resid	0.088120	Schwarz criterion	-2.091073	
Log likelihood	20.60733	F-statistic	0.305302	
Durbin-Watson stat	2.355509	Prob(F-statistic)	0.588717	

The results show that the supply shocks to all the sectors are symmetric. The shocks to the agricultural sector are highly symmetrical as indicated by the positive coefficient of 0.8. The government sector shocks are symmetric, but the coefficient is low.

Demand Shocks

The regression results of equation [2.14] for each country are shown on appendix 1.2 in tables A5. The demand shocks data yielded from the regressions are also shown on appendix 1.2 in table A6 for each country. The demand shocks of Namibia are regressed on those of South Africa, Lesotho and Swaziland. The results are shown in table 2.20. The regression results show that both explanatory variables are statistically significant. Lesotho is excluded from the regression because it was statistically insignificant.

Table 2.20 Correlation of demand disturbances

Dependent Variable: NAMIBIA				
Method: Least Squares				
Date: 04/16/00 Time: 16:52				
Sample: 1987:3 1998:4				
Included observations: 46				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.96E-15	0.001208	1.62E-12	1.0000
SOUTHAFRICA	0.686130	0.166079	4.131357	0.0002
SWAZILAND	-0.103762	0.058430	-1.775825	0.0828
R-squared	0.350381	Mean dependent var		2.11E-15
Adjusted R-squared	0.320166	S.D. dependent var		0.009933
S.E. of regression	0.008190	Akaike info criterion		-6.708739
Sum squared resid	0.002884	Schwarz criterion		-6.589479
Log likelihood	157.3010	F-statistic		11.59634
Durbin-Watson stat	1.871282	Prob(F-statistic)		0.000094

The F- statistic is highly significant and the R- squared is lower than the one under total supply shocks. It shows that 35 percent of the variations in the demand shocks of Namibia are explained by the dependent variables (South Africa and Swaziland). The Durbin Watson Statistics falls within the rejection region (above the upper limit), and this means that the results cannot be interpreted with doubts. There is no autocorrelation.

The results show that there is a high positive correlation between the demand disturbances of Namibia and South Africa as indicated by the positive correlation coefficient of 0.68. This means that the demand shocks of Namibia and South Africa are positively correlated. Every increase in the demand shocks of South Africa would lead to 0.68 increase in the demand shocks of Namibia.

The results also show that the demand shocks of Namibia and Swaziland are weakly negative correlated. This is indicated by the negative correlation coefficient of -0.1. The relation between the demand disturbances of Namibia and Swaziland is weak.

Conclusion

The purpose of this section was to assess if the shocks affecting Namibia and South Africa are symmetric. The results show that the total supply shocks of Namibia and South Africa are symmetric. This is confirmed by a high positive correlation of 0.78. The results also show that the supply shocks of Lesotho are weakly positive related to that of Namibia. However, the results for Swaziland are negatively correlated to those of Namibia.

The demand shocks or temporary shocks of Namibia and South Africa are symmetric. However, the demand shocks of Namibia are weakly correlated to those of Swaziland as indicated by the negative correlation of -0.1 .

The results show that because shocks are positively correlated, the CMA is an optimum currency area. This suggests that these countries require the same policy response. Namibia should continue its membership of the CMA and encourage a move towards full monetary union.

2.3 New Theory of Optimum Currency Area

2.3.1 Introduction

The theory of optimum currency areas has been modified in line with other areas of macroeconomic theory. Liang (1999) points one important criterion for optimum currency areas, and that is the generalised purchasing power parity. This criterion asserts that if fundamental determinants of the real exchange rates in the two countries are interrelated, the real exchange rates in the two countries will be co-integrated.

Tavlas (1993: 35) points two developments in theory of optimum currency areas. The first one is is time inconsistency issue that provides guidance as to how monetary authorities can best make credible their commitment to reducing inflation, and the second is the issue of nominal anchor.

2.3.2 Empirical Test of the Generalised Purchasing Power Parity for Optimum Currency Area

Introduction

The generalised purchasing power parity explains the exchange rate behaviour across countries. The theory suggests that the real exchange rates are generally not co-integrated. Purchasing power parity does not hold because the fundamentals determining the real exchange rates are not interrelated. However, if the fundamentals determining the real exchange rates are interrelated among a group of countries, the real exchange rate might contain common stochastic trends. In other words, the real exchange rate will be co-integrated in the long run (Liang, 1999: 3).

Do Namibia and South Africa satisfy this necessary criterion for constituting an optimum currency area? Are their real exchange rates co-integrated? This section analyses

empirically whether the real exchange rates of Namibia and South Africa contain common trends. If the real exchange rates of the two countries are co-integrated, this would strengthen the argument for Namibia to remain in the Common Monetary Area.

The section is organised as follows. The first part presents an overview of the data. The second section presents the cointegration test results, and the last section concludes.

Data

Annual data from on the real effective exchange rates from 1980 to 1998 were tested for co-integration. The data for Namibia were obtained from the International Monetary Fund-Namibia Statistical Appendix of 1999. The data for South Africa were obtained from TSE Explorer - World Bank Development Indicators. The results should be interpreted with caution because of little number of observations.

Cointegration Analysis

The best methods to test if there is co-integration between the two variables are Johansen co-integration and the error correction method. The Johansen co-integration method is used to test empirically if there is co-integrating vector among the variables. Table 2.21 shows the results of the Johansen co-integration test.

Table 2.21 Test for co-integration in the real exchange rates of Namibia and South Africa.

Eigenvalue	Likelihood Ratio	5% critical value	Co-integrating vector	Results
0.472755	16.28311	15.41	None*	Reject
0.359465	6.681769	3.76	At most 1*	Reject

*Denotes rejection of the hypothesis at 5% significance level

L.R. indicates 2 cointegrating equation(s) at 5% significance level

The results show that there is co-integrating vector between the real exchange rates of Namibia and South Africa. The results show that there are two cointegrating equations at 5 percent significant level. The Likelihood Ratio of 16.28 and 6.68 exceed the critical values at 5 percent significant level.

Table 2.21 shows that the real exchange rates of Namibia and South Africa are co-integrated, meaning that there is a long-term equilibrium relationship between the two. In the short run there may be disequilibrium. The error correction mechanism or error correction model (ECM) corrects for disequilibrium. The error correction model was estimated as:

$$REER = \beta_0 + \beta_1 SAREER + \beta_2 u_{t-1} + \varepsilon, \quad [2.15]$$

Where REER is the real effective exchange rate of Namibia, SAREER is the real effective exchange rate of South Africa, u_{t-1} is the one period lagged value of the residuals from regressing Namibia's real effective exchange rate on the South African real effective exchange rate, and ε is the error term. If the real exchange rates of South Africa and Namibia are co-integrated the ECM is expected to be statistically significant. The results of equation [2.15] are presented in table 2.22

Table 2.22 Error correction mechanism regression results

Dependent Variable: REER				
Method: Least Squares				
Date: 04/17/00 Time: 15:05				
Sample(adjusted): 1983 1998				
Included observations: 16 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.812067	1.714040	-1.057190	0.3097
SAREER	0.543244	0.182442	2.977632	0.0107
ECM(-1)	0.550250	0.243073	2.263723	0.0413
R-squared	0.456511	Mean dependent var		-3.412379
Adjusted R-squared	0.372897	S.D. dependent var		8.272831
S.E. of regression	6.551241	Akaike info criterion		6.764547
Sum squared resid	557.9439	Schwarz criterion		6.909407
Log likelihood	-51.11637	F-statistic		5.459758
Durbin-Watson stat	1.838901	Prob(F-statistic)		0.018999

The results show that error correction mechanism (ECM) is statistically significant. This indicates that the fundamental determinants of the real exchange rates of Namibia and South Africa are interrelated.

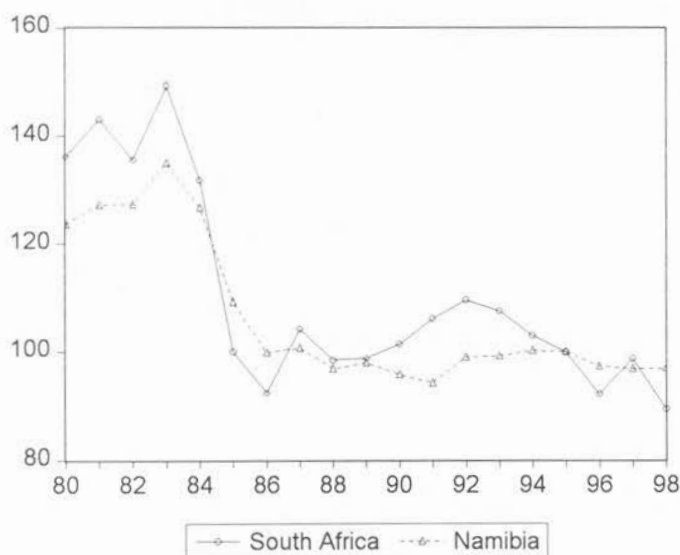
Figure 2.4 Real effective exchange rates of Namibia and South Africa

Figure 2.4 plots the real exchange rates of Namibia and South Africa. It can be seen that the real exchange rates of Namibia and South Africa are moving in the same direction.

This suggests that the fundamental determinants of the real effective exchange rates of Namibia and South Africa are interrelated. This would strengthen the argument for Namibia to continue its membership of the Common Monetary Area.

Conclusion

The purpose of this section was to test if the real effective exchange rates of Namibia and South Africa are co-integrated. The results of both Johansen cointegration and the error correction mechanism show that the real exchange rates of the two countries are cointegrated. This means that the fundamental determinants of the real exchange rates of the two countries are interrelated. This would strengthen the argument for Namibia to remain in the CMA.

2.3.3 Time-inconsistency

"A good record of relatively low inflation depends upon the credible and stable government policies, particularly monetary policy" (Tavlas, 1993: 34). According to Tavlas, countries that have a reputation of pursuing high inflationary policies will find it difficult to get rid of that reputation without a long and costly process of disinflation. The authorities must pursue policies that are time consistent in order to gain credibility. According to time inconsistency criterion, the public recognise that policymakers have every reason to declare that they will aim for low inflation, but it also realises that they have strong incentives to renege on these commitments once the public accepts the declaration at face value.

Tjirongo (1995: 23) points one way to gain credibility, and that is by tying the hands of the government by some kinds of institutional change. The government could do this by abolishing the national monetary sovereignty and join a monetary union with a low inflation country. This may be possible for the high inflation country to gain the benefit of low inflation reputation without losing output and employment. If there is no

permanent trade-off between inflation and unemployment, a country with high inflation rate will have little to lose and much to gain in the long run by joining a monetary union with a low inflation country.

Another argument to gain credibility is pointed out by Tavlas (1993: 35). That is domestic commitment mechanisms to contain inflation such as the announcement of monetary growth targets.

However, these arguments do not mean that for a small country joining a monetary union this is the right way to follow. It is important that the small or medium sized economy possesses similar characteristics to the anchor currency. If countries have similar characteristics, it would be optimal to join a monetary union. If countries do not have the same characteristics then monetary union may not be the right way to follow.

2.3.4 Nominal Anchor

Tavlas (1993: 34) argues that a monetary union between two countries achieved through the fixing of exchange rates imposes identical interest rates in the two countries. However, there are many levels of nominal interest rates and levels of money supply that can fulfil the exchange rate commitment. Tavlas argues that countries should agree on how monetary policy should be conducted, and there must be some institutional mechanism that determines the money stock in the monetary system. That is the need to provide anchor to the system.

Tavlas (1993: 34) pointed out two kinds of arrangements that can be used to determine the money stock in a monetary union:

- Symmetric systems in which the members co-operate in reaching a policy solution.
- Asymmetric systems in which one country takes leadership role.

Each of these arrangements can serve to determine the money supply in a monetary union, but they are not without problems. Symmetric or co-operative monetary union entails the loss of safety value provided by resort to either suspension of currency convertibility or restriction on trade and capital flows. In cases where members of the monetary union are hit by different shocks, competitive pressures will build for the discontinuation of co-operation and the adoption of independent national monetary policies.

Tavlas (1993: 34) notes that asymmetric monetary unions can worsen the business cycle in the non-leading countries. For example, if only the non-leading country is affected negatively by the terms of trade shocks and contraction in real income. The money supply of that country should be allowed to expand. However, participation in the monetary union prohibits the monetary authorities from pursuing expansionary policy.

If the non-leading country is affected by contraction in real income, this will result in a decline in money demand, and this causes interest rates to fall and leads to capital outflows. Since the leading country does not change its monetary policy, it sterilises the capital inflows by keeping interest rates unchanged. A capital outflow in the non-leading country effects a contraction of its money supply. In that case the country does not only lose its ability to conduct monetary policy but it also experience money supply effects that will worsen the business cycle. Thus an important precondition in the choice of monetary union depends on the nature of the shocks to which participant countries are exposed.

2.4 Conclusion

The purpose of this chapter was to assess if the CMA is an optimum currency area in the context of the criteria for optimum currency areas. The analysis of the criteria is presented in table 2.23.

Table 2.23 Summary

Criteria	Description and importance	Measure	Results	Conclusion
Labour mobility	High mobility of labour is important for single currency area. If one area is experiencing economic problem, unemployed workers can move to the area that is not experiencing economic problem.	Movement of labour to South African mines from neighbouring countries as percentage of the total labour force.	High labour mobility from Mozambique, 13% and, 25% from Lesotho. Only 4.5% and 3.2% of the total labour force in South African mines were from Swaziland and Botswana during 1993-1994. There is no movement of labour between Namibia and South Africa	Weakens the argument for Namibia to remain in the CMA.
Wage Flexibility	If wages are flexible, the costs of abandoning exchange rate policy instrument will be less. Unemployed workers reduce their wage claims and this will solve unemployment problem.	Regression of wages on employment.	Wages are moving in the same direction with employment, as indicated by the positive coefficient of 0.7.	This would argue for Namibia to remain in the CMA.
Degree of diversification	The high the diversified economy, the less will be the exposure to external shocks. There is less need to change the exchange rate. High diversified economies are good candidates for monetary union.	Hefindahl index. If the index is close to zero, then the economy is well diversified.	The Namibian economy is not well diversified, compared to those of Swaziland, South Africa and Zimbabwe.	This weakens the argument for Namibia's continuation of CMA membership.
Degree of openness	High open economies are good candidates for monetary union with their main trading partners. The more open the economy, the smaller would be the proportion of tradable to non tradable output This results in the nominal exchange rate not being an effective instrument to bring about changes in relative prices.	[Export+Imports/GDP]	The Namibian economy is highly open compared to that of South Africa. This is indicated by the index of 138 percent compared South Africa's 49.3 percent.	Strengthens the argument for Namibia to continue its membership of the CMA.

Financial integration	High degree of financial integration is important for a single currency because only a small change in interest rates is required to correct capital imbalances between regions.	Co-integration and Allen Kenen model.	The financial markets are highly integrated. Both cointegration and the Allen Kenen model show that the financial markets are integrated.	Strengthen the argument for Namibia to continue its membership of the CMA.
Goods market integration	Countries that have similar production structures are prone to similar terms of trade shocks. This negates the effectiveness of exchange rate adjustment between the countries as an instrument to deal with such shocks. These countries would be better candidates for monetary union.	Co-integration and Allen Kenen model.	The goods markets are integrated.	Strengthens the argument for Namibia's membership of the CMA.
Intensity of mutual trade	High intensity of mutual trade is important for monetary union. It is important for the elimination of transaction costs between trading partners.	Share of countries in Namibia's imports and exports.	South Africa is Namibia's main trading partner. The intensity of mutual trade between Namibia and South Africa is very high.	Strengthens the argument for Namibia to continue its membership of the CMA.
Similar inflation	High inflation similarity is good for monetary union. That is because payment imbalance is most often likely to be the result of divergent trends in national inflation rates due to structural developments, differences in trade union aggressiveness or differences in national monetary policies.	Graphical illustration and the error correction model.	The rates of inflation are very similar. The error correction model is significant indicating that they are cointegrated. The co-efficient between Namibia and South Africa inflation is positively high.	Strengthens the argument for Namibia to continue its CMA membership.

Generalised PPP hypothesis	If fundamental determinants of the real exchange rates in both countries are interrelated, the real exchange rates of the two countries will be co-integrated, and this is good for monetary unification.	Co-integration and Allen Kenen model.	The real exchange rates of Namibia and South Africa are co-integrated.	Strengthening the argument for Namibia to remain in the CMA.
Symmetry and asymmetry of shocks	This criterion is very important for a single currency. If the shocks affecting countries are symmetric, countries require the same policy response, and these are good candidates for monetary union.	Bayoumi and Eichengreen model. This model tests the size of the coefficients between Namibian shocks and South African shocks.	The shocks of Namibia and South Africa are highly positive correlated.	Strengthens the argument for Namibia to remain in the CMA, because the countries require the same policy response.

CHAPTER 3. BENEFITS OF MONETARY UNION FOR NAMIBIA

3.1 Introduction

Any analysis of the theory of optimum currency area without a discussion on the benefits of monetary union is incomplete. Therefore, it is very important to analyse the benefits of monetary union (the benefits of relinquishing the exchange rate policy instrument). This chapter estimates the benefits of monetary union for Namibia. The most visible gains from monetary union are the elimination of transaction costs and savings on foreign exchange reserves. Other benefits are the welfare gains from less uncertainty, and the promotion of market integration.

3.2 Gains from the Elimination of Transaction Costs

De Grauwe (1997: 52) points eliminating the costs of converting one currency into another currency as the most visible gain from monetary union. These are costs experienced when converting one currency into another.

De Grauwe (1997: 53) argued that the transaction costs involved in exchanging money are deadweight loss, and they are like a tax paid by the consumer in exchange for which he gets nothing. In De Grauwe's own words:

"The banks will have a problem of transition: they will have to look for other profitable activities. When this has been done, society will have gained. The banks' employees previously engaged in exchanging money will now be free to perform more useful tasks for society" (De Grauwe, 1997: 53).

The gains from the elimination of transaction costs can only be reaped if national currencies are replaced by a common currency. This is unlikely to occur if national currencies remain in place, although with irrevocable fixed exchange rates. As Tjirongo (1995: 13) argued, as long as national currencies remain in existence and even if the

exchange rate is irrevocably fixed, doubts will continue to exist as to this fixity. This will encourage citizens or residents of each country to use home currencies instead of foreign ones. In support of this argument De Grauwe (1997: 53) stated that currencies would not be perfect substitutes. There will continue to be a need to convert one currency into another. This service will charge a price, and in this case transaction costs will not be eliminated. As mentioned earlier, monetary union eliminates the costs of converting one currency into another. Transaction costs include the buy or sell spread, which is computed as the difference between the rates at which the banks buy foreign currency and the rates they charge when selling foreign currency. Transaction costs also include the commission charged for engaging in foreign exchange transactions.

To compute the gains from the elimination of transaction costs in Namibia, table 3.1 presents the rate of commission when converting one currency into another currency. The information is obtained from commercial banks in Namibia. The commissions charged to different instruments are as follows:

Table 3.1 Transaction costs charge information

Cash transaction: commission charged is 1.5 % plus General Sales Tax (GST), currently at 10%. Minimum charge is N\$ 16.5. Maximum N\$231.58
Traveller's cheque: commission charged is 0.31% plus GST of 10%. Minimum charge is N\$ 28.95 and maximum is N\$ 231.58.
Inward transfers: commission charged is 0.31% plus GST of 10%. Minimum charge is N\$30 and maximum is N\$ 231.58.
Outward transfers: commission charged is 1.1% plus GST of 10%. Minimum charge is N\$ 30 and maximum charge is N\$ 231.58.

Source: Commercial Bank of Namibia, Standard Bank of Namibia, and Thomas Cook Namibia.

The commission charged is calculated for cash transaction will be calculated as:

$$\text{Commission} = (F * E) * (C) * (1 + \text{GST}), \quad [3.1]$$

where F is foreign currency transaction, E is the nominal exchange rate and C is the commission rate. If for example, a Namibian receives UK £4000 on 27 February 2000. The bank buys foreign exchange at the going rate of N\$ 10 per pound. The total amount

of receipts in domestic currency will be $(N\$10 * UK \text{ } \pounds 4000) = N \$ 40000$. The bank will charge a customer for this service. The commission will be $(0.015 * N \$ 40000) = N\$ 600$. The bank tax the commission at the GST rate, and the GST will be $(N\$600 * 0.10) = N\60 . The total costs to the bank's customer for engaging in foreign transaction will be the sum of the commission charged and GST. The total costs to the customer will be N\$660 and that is 1.65 percent of the receipts.

The minimum and maximum charges are applicable in order to penalise small transaction and subsidise large transaction. For example, if there are two customers of the bank, the first one receives $\pounds 105$ and the second one receives $\pounds 7000$. The exchange rate is still N\$10 per pound. If we take traveller's cheque, the first customer would get $N\$1050 = (\pounds 105 * N\$10)$. The commission charged to the first customer will be $N\$3.25 = (0.0031 * N\$1050)$. The sum of commission plus GST will be $N\$3.57 = [3.25 + (3.25 * 0.10)]$.

The second customer will get $N \$ 70000 = (\pounds 7000 * N \$ 10)$. The commission charged to the second customer will be $N\$217 = (N\$70000 * 0.0031)$. The sum of commission plus GST will be $N\$238.70 = [N\$217 + (217 * 0.10)]$.

The minimum and maximum charges are applicable to both customers. The first customer will pay $N\$31.85 = [N\$28.95 + (28.95 * 0.10 \text{ for GST})]$. The second customer pays $N\$254.738 = [231.58 + (231.58 * 0.10 \text{ for GST})]$. The first customer pays a penalty of $N\$28.28 = (N\$31.85 - N\$3.57)$ and the second customer will receive a subsidy of $N\$16.038 = (N\$254.738 - 238.70)$. To make it easy to understand these transaction costs are presented in table 3.2.

Table 3.2 Transaction costs as percentage of receipts

Customer	Receipts (£)	Receipts in N\$	Commission	GST	Transaction costs	Transaction cost as % of receipts
First	105	1050	3.25	0.325	3.57	0.340
Second	7000	70000	217	21.70	238.70	0.341

These transaction costs can be substantial if the Namibian dollar is delinked from the South African rand. A large part of Namibian imports and exports is done with South Africa. Membership of the Common Monetary Area means that Namibians save these costs because trade with South Africa is done in the domestic currency. That is because both the South African rand and the Namibian dollar are legal tender in Namibia.

The spread between buying and selling rates has been pointed out as the major costs that is eliminated when using a common currency. In this analysis the spread will be calculated as:

$$\text{Spread} = \frac{[(\text{sellingrate} - \text{buyingrate})]}{[(\text{sellingrate} + \text{buyingrate})/2]} \quad [3.2]$$

where sellingrate is the rate at which banks sell foreign currency, buyingrate is the rate at which banks buy foreign currency. The gains from the elimination of transaction depend on the degree of mutual trade between the countries. Countries that have more open economies are good candidates for being in a monetary union with their main trading partners. If the degree of mutual trade is high, the gains from the elimination of transaction cost will be substantial.

All CMA trade transactions are not subject to transaction costs. If Namibia was not in a monetary union Namibians would have paid for these transactions. The elimination of transaction cost represents the gains to the Namibian society as a whole. Transactions costs that Namibians would have paid if Namibia was not in the Common Monetary Area, consist of two parts: the commission charged for engaging in foreign exchange transaction⁵ and the spread between buying and selling rates. Information on the buying and selling rates is posted by different commercial banks on daily basis. As mentioned earlier, the rates charged for commission were obtained from different commercial banks in Namibia. The transaction costs due to buy or sell spread will be computed as:

⁵ Inward and outward transfers will be used in order to simplify the computation.

$$\text{Transaction costs} = [\text{spread} * (\text{export} + \text{imports})] + [\text{Commission} * (\text{exports} + \text{imports})] \quad [3.3]$$

The results of equation [3.3] are presented in table 3.3.

Table 3. 3 Gains from the elimination of transaction costs as percentage of GDP in 1998

Currency	Total CMA trade	Commission	Spread	Total spread	Total transaction costs	GDP	Transaction costs as % of GDP
US \$	10951	34	0.03	329	363	16826	2.1
UK £	10951	34	0.03	329	363	16826	2.1
JAP ¥	10951	34	0.05	548	582	16826	3.4
Botswana a pula	10951	34	0.07	767	801	16826	4.7
French Franc	10951	34	0.05	548	582	16826	3.4
Deutsche mark	10951	34	0.05	548	582	16826	3.4
ZIM\$	10951	34	0.24	2628	2662	16826	15.8

Source: Data for export and imports, and GDP were obtained from the Central Bureau of Statistics, Windhoek. Note: Total CMA trade is the sum of imports from and exports to the CMA. The commission was calculated by multiplying the inward transfer commission rate of 0.31% with total CMA trade. The total spread is calculated by multiplying spread with total CMA trade. The total transaction costs is the sum of total commission and total spread. In calculating the commission, the minimum and maximum charge were not included in order to simplify the analysis.

Table 3.3 shows that Namibia benefits from the elimination of transaction costs. The gains from the elimination of transaction costs are approximately 4.9% of GDP on average. Membership of the CMA means that Namibians can use these resources to invest in other productive sectors of the economy. That is because trade between Namibia and South Africa is not subject to these transaction costs.

3.3 Savings on Foreign Exchange Reserves

Ishiyama (1975: 363) points out another benefit of monetary union, saving on foreign exchange reserves. Members of the monetary union are liberated from having external reserves for transactions internal to the union, just as would regions inside a country. Members of the monetary union can economise on reserves by granting each other credits for intra-monetary area trade. Countries can economise on reserves needs vis-a-vis third countries if such needs are mutually offsetting and if monetary union pool its reserves.

Savings on foreign exchange reserves have been pointed as a visible benefit from the monetary union. Countries hold foreign exchange reserves to provide a buffer against future crises, and maintain confidence in the country's financial management, and also to enable the country to meet its current consumption from transitory declines in export earnings or sudden increases in imports prices. They are used to intervene in the foreign exchange market if the currency is depreciating or appreciating too much (see Lindert and Pugel, 1996: 401). A high level of foreign exchange reserves is associated with financial stability. However, holding of foreign exchange reserves involves costs.

The foreign exchange reserves of members of the Common Monetary Area are pooled together under the Common Revenue Pool administered by the South African Reserve Bank. The Lesotho, Namibia, Swaziland countries are not required to hold substantial foreign exchange reserves. Because holding foreign exchange reserves entail costs, the Lesotho, Namibia, Swaziland countries are benefiting from saving on their foreign exchange reserves, and these scarce resources could be used for other purposes.

The benefit of Namibia's membership of the CMA is that it reduces the costs of holding international reserves. Monetary arrangements in the CMA are an example of currency board, and as stated by Shuler (1998: 4), a currency board earns profit from the difference between its earnings from short-term assets of its anchor currency assets and the expense of maintaining its notes and coins. Tjirongo (1995: 15) estimated savings on foreign

exchange reserves for Namibia as the difference between South African short-term assets or treasury bills and long term and log term assets (long term government bond). A large part of Namibia's imports come from South Africa, and Namibia would maintain some rands in its foreign exchange reserves portfolio, and that is why the opportunity cost of holding foreign exchange reserves is proxied as the trade-off between investments in South Africa's short-term assets and long-term assets. Table 3.4 estimates savings on foreign exchange reserves, following the same procedure that was used by Tjirongo (1995: 15).

Table 3.4 Savings on foreign exchange reserves

	1994	1995	1996	1997	1998
Treasury bill rate	10.93	13.53	15.04	15.26	16.04
Gov. bond yield	14.83	16.11	15.48	14.70	14.60
Imports from CMA (N\$ millions)	4146.62	5192.96	6205.68	9613.06	9492.00
Reserves savings (N\$ millions)	161.72	133.98	27.30	53.83	136.68
GDP (N\$ millions)	10576	11694	13421	14901	16826
Reserve savings as % of GDP	1.5	1.19	0.20	0.36	0.81

Source: Data for treasury bills rate and government bond yield were obtained from the International Financial Statistics. The data for GDP were obtained from Central Bureau of Statistics of Namibia, Windhoek. Reserve savings were calculated by taking the difference between treasury bills rate and government bond yield multiplied by imports from the CMA.

The results of table 3.4 show that the savings on foreign exchange reserves are around 0.81 percent of the GDP on average between 1994 and 1998. For example in 1998 the savings on foreign exchange reserves were N\$ 136.68 million. This amount is greater than the expenditure (subsidies), which was allocated by the government to the University of Namibia and all tertiary institutions.

The benefits would be further enhanced if member countries do not incur balance of payments deficits at the same time and if economic shocks do not affect them

simultaneously. A small pool of foreign exchange reserves is required in the CMA than if individual countries manage their foreign exchange reserves.

3.4 Welfare Gains from Less Uncertainty

The uncertainty about future exchange rate changes introduces uncertainty about future revenues of firms. It is generally accepted that this leads to a loss of welfare of risk-averse individuals (De Grauwe, 1997: 55). Risk-averse individuals prefer a future return that is certain than the one that is less certain. They will only want to take the more risky return if they are promised that it will be higher than the less risky.

However, De Grauwe (1997: 56) also points that changes in the exchange rate do not only represent risk, but they also create opportunities to make profits. If the exchange rate becomes more variable, the probability of making large profits and losses increases. In the case of certainty, exporting can be seen as an option, but when exchange rate becomes unfavourable this option will not be exercised.

3.5 Exchange Rate Uncertainty and the Price Mechanism

De Grauwe (1997: 57) argues that exchange rate uncertainty introduces uncertainty about the future prices of the goods and services. Economic agents base their decisions concerning production, investment and consumption on the information that the price system provides for them. If these prices become more uncertain the quality of these decisions will decline.

De Grauwe (1997: 58) explained this by giving an example: suppose a firm decides to invest in a foreign country, and it bases its decision on many variables. One of these variables is the expected future exchange rate. Suppose that after making the investment, it turns out that the exchange rate to which the decision was made was wrong and that this forecast mistake makes the whole investment unprofitable and that the firm decides

to end its foreign operation. This kind of mistakes may be costly. They can be expected to be more frequent when uncertainty about the future exchange rate increases. The price system, which gives signals to produce or to invest, becomes less reliable as a mechanism to allocate resources.

A decline in the real exchange rate uncertainty due to the introduction of a common currency reduces adjustment costs. This results in the price system to become a better guide to make the right economic decisions. These efficiency gains are difficult to quantify (De Grauwe 1997: 58). A further reason why greater price and exchange rate uncertainty may reduce the quality of information provided by the price mechanism is that an increase in risk due to price uncertainty will generally increase the real interest rate. This follows from the fact that when the expected return on investment projects becomes more uncertain risk averse investors will require a higher risk premium to compensate them for the increased riskiness of the projects. In addition to this, in a riskier economic environment, economic agents will increase the discount rate at which they discount future returns. Higher interest rates lead to increased problems in selecting investment projects in an efficient way. These are problems of moral hazard and adverse selection⁶.

3.6 Promoting Market Integration

Another potential benefit of monetary union in addition to reducing transaction costs, enhancing price stability and others, is its contribution to market integration (Eichengreen 1992: 7). Because eliminating exchange rate uncertainty encourages international trade,

⁶ The moral hazard problem arises because an increase in the interest rates changes the incentives of the borrower. The latter will find it more advantageous to increase the riskiness of his investment project. This follows from an asymmetry of expected profits and losses. If the investment project is successful the extra profit goes to the borrower, and if it turns so badly and the borrower goes bankrupt his loss is limited to his equity share in the project. This asymmetry gives the borrower an incentive to select more risky projects. When the real interest rate rises the investment projects will become riskier. The lenders will try to defend themselves by asking for an additional risk premium, and this will in turn intensify the problem. The adverse selection problem leads to similar result, because when interest rate increases, the suppliers of low risk investment projects will drop out of the credit market. They will find it less attractive to borrow at the higher interest rate for projects that do not represent higher risk. On average, the riskiness of the projects increases when interest rate rise.

the establishment of a single currency will promote trade among countries in a monetary union.

However, the majority of studies of exchange rate uncertainty and trade find little evidence of an important link. Traders can use currency diversification and forward markets to lessen the risk attendant on exchange rate changes.

There is an argument that exchange rate uncertainty generally discourages investment. However, there exists little empirical support for the view that exchange rate uncertainty depresses the level of capital formation. Eichengreen (1992: 8) estimated an investment equation for sixteen industrial countries, among independent variables the month to month volatility of exchange rates. Although they were negative, the coefficient on exchange rate variability was never statistically distinguishable from zero.

The exchange rate uncertainty may influence who invests where, rather than affecting the level of investment. Eichengreen (1992: 8) states that there are only a few exceptions of the relevant studies, which offers some relatively weak evidence that exchange rate uncertainty depresses foreign direct investment within the countries in the monetary union. There is an evidence of positive association between exchange rate variability and foreign investment, which he explains by linking exchange rate uncertainty to the desire to diversify direct investment portfolios across currencies.

3.7 Conclusion

The objective of this chapter was to estimate the benefits of using a single currency for Namibia. The results of the analysis show that Namibia gains from the elimination of transaction costs amounting to 4.9 percent of GDP on average as shown in table 3.3. It was also shown that savings on foreign exchange reserves amount to 0.81 percent on average between 1994 and 1998. This would strengthen the argument for Namibia to remain in the Common Monetary Area.

CHAPTER 4. COSTS OF MONETARY UNION FOR NAMIBIA

4.1 Introduction

The exchange rate policy instrument cannot be given up without costs. Membership of the monetary union involves some costs. Therefore a decision on whether to remain in a monetary union or consider alternative exchange rate regimes should not be based only on the benefits but should also take into account the costs of membership of monetary union. This chapter analyses the costs of monetary union for Namibia. The most visible costs of monetary union are the loss of seigniorage revenue and real exchange rate misalignments because the country loses its ability to realign its real exchange rate. The impact of export shocks on labour market has also been mentioned as another cost of monetary union.

4.2 Loss of Seigniorage Revenue

Government can finance spending by raising tax revenue from the public by borrowing or simply by printing money. Revenue raised through the printing of money is called seigniorage. This comes because of the government's monopoly power to supply paper money to the economy (Ouanes and Thakur, 1997: 64). Because the cost to the government of printing money is negligible, but it acquires purchasing power over resources equivalent to the face value of the note, it gains revenue by providing money to the economy. In modern economies, banks also create money and hence get seigniorage.

Further, Tjirongo (1995: 18) argues that there are economic benefits associated with domestic control of inflation tax, especially because of its insurance value. For highly indebted countries can issue debt at a significantly reduced cost if investors know that there is a purchaser of last resort, the central bank to backstop the market in the event of a debt run. A credible purchaser of last resort is sure to exist only when the central bank is

under domestic control, otherwise investors would demand a significant risk premium to hold domestic currency denominated government debt.

In a monetary union countries are prohibited from monetising their budget deficits. A country would forfeit seigniorage revenue if it joins the monetary union. In other words, the government cannot monetise fiscal deficit. Countries face different collection costs for conventional taxes and hence their optimal inflation rates differ (Tjirongo, 1995: 18). This suggests that any common currency constraint that makes inflation rates of two countries converge must decrease the revenue of at least one of the countries. The less developed the tax system, the greater the economic costs in raising revenue by increasing taxes, and the lower the costs of increasing taxes through inflation. This means that for a high inflation country converging to a lower inflation rate of the monetary union will experience costs of loss of seigniorage revenue. Ounes and Thakur, (1997: 64), give seigniorage as:

$$S = \frac{\hat{M}}{P} \text{ or } S = \mu m \quad [4.1]$$

where $\mu = \hat{M}$ or the percentage growth nominal money stock. In this case seigniorage is thus defined as the change in nominal money balance held by the public (\hat{M}) expressed in terms of the price level (P). In other words the percentage growth rate of nominal money stock (μ) times the real money stock, $m = \frac{(M)}{P}$. Estimates of seigniorage revenues in the CMA are given in table 4.1.

Table 4.1 Seigniorage revenues in the CMA in 1998

Namibia	Lesotho	Swaziland	South Africa
3.2	3.0	2.6	6.6

Source: The data for the calculation of seigniorage were obtained from International Financial Statistics

Table 4.1 shows that seigniorage as a percentage of the GDP is very low, below 7 percent. In Lesotho and Swaziland seigniorage as percentage of GDP constitute 3 and 2.6

percent. In Namibia and South Africa it constitute only 3.2 and 6.6. Although a country loses seigniorage revenue if it joins the monetary union, relying on seigniorage revenue or inflation tax produce distortions, which rise with the tax rate.

Cukierman, Edwards and Tabellini (1992: 552) estimated seigniorage for 79 countries both developed and developing countries. The results show that reliance on seigniorage revenue increase with the share of agriculture in the economy and decrease with the share of foreign trade in the economy. As shown under openness the share of foreign trade in the Namibian economy is high compared to the share of agriculture. Seigniorage revenue may not be important for Namibia, because the country relies on mining taxation and transfer from the SACU (Southern African Customs Union) revenue pool.

4.3 Real Exchange Rate Misalignment

4.3.1 Introduction

This section estimates the equilibrium real exchange rate for Namibia and assesses if there was any misalignment of the real exchange rate from the equilibrium value. It will also tests the effect of these misalignments on measures of economic performance such as real GDP growth, per capita GDP, investment, export and the agricultural sector.

Equilibrium real exchange rate (ERER) is defined by Edwards (1989: 16) as the relative price of tradable goods to non-tradable goods that for a given sustainable or equilibrium values of other relevant variables, such as taxes, international prices and technology results in simultaneous attainment of internal and external equilibrium. Internal equilibrium means that the non-tradable goods market clears in the current period, and will be expected to be in equilibrium in the future periods. According to Edwards (1989: 16) this equilibrium takes place with unemployment at natural level. External equilibrium is achieved when the current and future current account balances are compatible with long run sustainable capital flows.

4.3.2 A Summary of the Literature

Approaches to Equilibrium Real Exchange Rate Determination

There are different approaches for the determination of the equilibrium real exchange rate based on the structural exchange rate model. The methodologies of ERER determination are summarised below (see Kahn, 1997: 3):

- The purchasing power parity approach (PPP), in which the real exchange rate is computed as the ratio of trading partners' wholesale price indexes to the country's consumer price index, all measured in common currency. The value of the real effective exchange rate (REER) in a year when the current account was equilibrium is taken as equilibrium real exchange rate. Deviations of real effective exchange rate from the equilibrium value represent misalignment. The problem with this approach is that it does not take into account changes in the real effective exchange rate that may be due to changes in the fundamentals such as government expenditure or terms of trade. The other problem is that it does not capture the relationship between tradable and non-tradable goods prices, which is a key indicator in competitiveness. An increase in consumer price index that does not distinguish between tradable and non-tradable goods prices is not a good indicator of competitiveness.
- The second approach is the elasticities approach. This approach assumes that imports and exports are constant-elasticity functions of the real exchange rate. The real exchange rate is in this case is calculated as $REER = \text{imports or exports} / \text{CPI}$. The REER and real exchange rate misalignment are calculated relative to a given current account target. However, adjustments elsewhere in the economy are neglected by this partial equilibrium, especially in the non-tradable goods sector. The CPI used includes both tradable and non-tradable goods.

- The third approach defines the real exchange rate as the ratio of prices of tradable to non-tradable goods. This approach decomposes traded sector into imports and exports, and therefore separate real effective exchange rate for exports and imports can be derived. The REER is calculated as: $(REER_m = P_m / P_d); (REER_x = P_x / P_d)$, where P_m, P_x and P_d are imports, exports and non-tradable prices. Tjirongo (1997: 3) referred to this approach as an extension of the Salter-Swan Model. According to Tjirongo (1997: 3) this model is a general equilibrium model that requires minimal data for calculation of the REER. This approach can be used to calculate the real exchange rate misalignment over a short span of time. However, as Tjirongo (1997:3) stated:

"The extreme sensitivity of the estimation results to the base year and selected values of elasticities suggests that the results may depend very much on the assumptions that are made at the time. The timing and the degree of overvaluation are affected by the base year and or the values assumed for the elasticities. Therefore depending on the motive for calculation, two analysts may reach completely different results".

- The last approach is the fundamental approach. This is a more increasingly prominent, sophisticated and influential alternative in assessing misalignment of real exchange rates and is the increasing influential, and represents a clear advance over PPP and useful complement to other approaches (see Kahn, 1997: 6). Using time series data, the responsiveness of the real exchange rate to various disturbances in the short run and long run can be estimated. The fundamental approach rejects the notion that the equilibrium real exchange rate is a constant number, which cannot change overtime as suggested by the PPP approach. This approach permits a distinction between ERER and the transition to a new equilibrium. The fundamental approach will be used in this chapter to estimate equilibrium real exchange rate for Namibia.

The Fundamental Approach to the Equilibrium Real Exchange Rate Determination

There is considerable interest in measures of the equilibrium real exchange rate based on the medium term behaviour of the underlying macroeconomic fundamentals (Kahn, 1997: 6). This approach disagrees with the notion that domestic relative to foreign purchasing powers establish the long run equilibrium nominal rate. Rather, a number of macroeconomic fundamentals including import tariffs, export taxes, real interest rates, terms of trade and capital controls are included in addition to the purchasing power parity in determining the equilibrium real exchange rate. Therefore, the real effective exchange rate is not an immutable number as postulated by the purchasing power parity. When there are changes in any of the fundamentals that affect the country's internal and external equilibrium, there will also be changes in the equilibrium real exchange rate.

Edwards (1988 and 1989) and Mongardini (1998) identified the fundamentals that determine the equilibrium real exchange rate:

- Terms of trade (TOT): The developing nations have traditionally been subject to terms of trade shocks. Change in the terms of trade or world relative price of exportable goods to importable goods will affect the equilibrium real exchange rate. If the terms of trade deteriorate the equilibrium real exchange rate will depreciate, and improvement in the terms of trade will lead to appreciation of the equilibrium real exchange rate (Mongardini, 1998: 14). However, Domac and Shabsigh (1999: 14) argue that the effect of the terms of trade on the real exchange rate can cause appreciation or depreciation depending on the substitution and income effect. If the income effect dominates the substitution effect an improvement in the terms of trade will cause real exchange rate appreciation and vice versa.
- Government expenditure: An increase in government expenditure will cause an appreciation or depreciation of the equilibrium real exchange rate. This depends on whether the expenditure was directed to tradable goods or non-tradable goods.

An increase in government consumption of non-tradable goods will increase production in the non-tradable sector and the real exchange rate will appreciate. Conversely, if government expenditure on tradable goods increases the trade balance deteriorates and real exchange rate depreciation is necessary to achieve external balance (see Edwards, 1988: 8, Mongardini, 1998: 14).

- **Capital flows:** Net capital inflows are defined as net increase in foreign borrowing, transfers and foreign aid minus net factor payments. An increase in capital inflows may be caused by increase in grants, reduction in the world real interest rates, removal of domestic capital controls, an increase in public borrowing to finance deficit and exogenous increase in voluntary lending by foreign creditors. An increase in capital inflows due to investment boom generated by new discoveries, relaxation of capital controls or increase in government deficit, capital flows will be spent domestically (Edwards, 1988: 8 and Mongardini, 1998: 14). This will result in high current expenditure on all goods including non-tradable goods. In order to maintain internal equilibrium in the current period there will be an increase in the price of non-tradable goods or equilibrium real exchange rate appreciation.
- **Trade policies:** Trade policies affect the exchange rate. Trade liberalisation characterised by a reduction of tariffs on imports and elimination of quantitative restrictions will result in equilibrium real exchange rate depreciation. The demand for imports is expected to increase as imports price decline in line with low tariffs or the removals of quantitative restrictions, generating a deficit. To restore external balance the trade liberalisation will need to be accompanied by an increase in the relative price of tradable goods or real exchange rate depreciation. An increase for example in import tariffs will increase the domestic price of importable goods. This will reduce the demand for importable goods and the volume of imports. This will also induce a high demand for non-tradable goods, and to maintain equilibrium, non-tradable price will increase. This will result in real exchange rate appreciation (see Edwards, 1988: 7).

- **Technology:** Higher rates of technological progress in the tradable sector relative to the non-tradable sector raises the non-tradable goods price level. This will cause an appreciation of the real exchange rate. That is because efficiency in producing non-tradable goods did not increase as quickly, the prices of non-tradable goods had to increase relative to those of tradable goods. As a result the real exchange rate appreciates (Edwards, 1989: 47 and Mongardini, 1998: 14).
- **The ratio of investment to GDP:** In developing countries, investment is more import intensive than consumption. An increase in the ratio of investment to GDP will increase absorption and this will lead to worsening of the current account and the real exchange rate will depreciate. However, Edwards (1989: 140) argued that the effect of investment could be positive or negative, depending on whether it took place in the tradable or non-tradable goods.

4.3.3 Application of the Fundamental Approach to Namibia

Together with Lesotho, South Africa and Swaziland, Namibia is a member of the Common Monetary Area. The Common Monetary Area is an example of asymmetric monetary union. South Africa dominates the smaller countries (Lesotho Namibia and Swaziland). The Namibia dollar is pegged to the South African rand on a one to one basis (see the highlights of the Common Monetary Area agreement between Namibia and South Africa on appendix 2). There are no restrictions on capital flows between members of the Common Monetary Area. These countries together with Botswana belong to a custom union, Southern African Customs Union (SACU), which allows free flows of goods and services between them. It was stated by Tjirongo (1997: 5) that the pass through of South African prices to Namibian prices is near or about unity, and the speed of pass through is faster, it was less than two months in some cases.

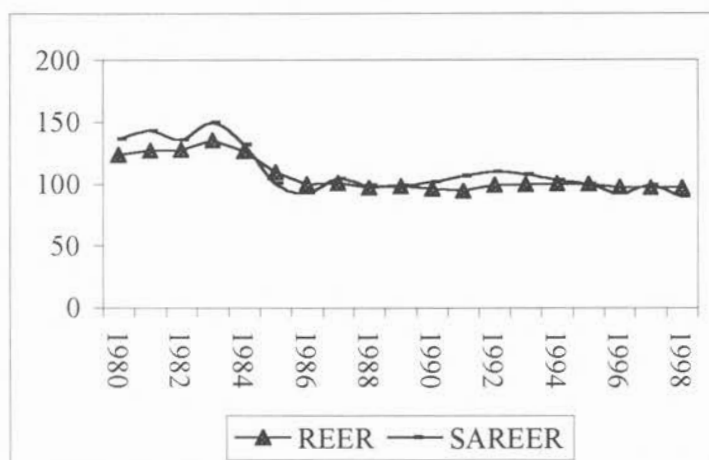
Because of these circumstances, the equilibrium real exchange rate of Namibia will not only be influenced by the fundamentals for Namibia, but it is also influenced by the

fundamentals of South Africa. Pegged currencies are not immune to speculative attacks, and this suggests that the focus on the real exchange rate tensions and the extent to which the real exchange rate are in line with economic fundamentals are important. In this connection, Tjirongo (1997: 5) suggests that it is important to examine trends over time in the indicators of a country's external competitiveness and developments in its balance of payments to assess whether its real exchange rate is consistent with a sustainable current account. Countries whose exports are dominated by primary exports experienced large real exchange rate misalignments and this suggests that the costs of real exchange rate for countries participating in a monetary union may be unevenly distributed.

Namibia has high share of primary exports compared to South Africa, and in this case estimates of real exchange rate misalignment is necessary for Namibia. Using Edwards model, the real exchange rate misalignments can be estimated. However some problems with this model must be taken into account. The model may need some fundamentals to include in the estimation, because as stated, Namibia's equilibrium real exchange rate is not only influenced by movements of real exchange rate fundamentals affecting the Namibian economy, but will also be influenced by the fundamentals that affect the South African economy. This does not necessarily mean that all fundamentals affecting the South African economy are relevant for the determination of equilibrium real exchange rate for Namibia. However, if a model with South African fundamental variables is estimated, it will still cause some problems because there is no way of determining which fundamental to include or to exclude.

Figure 3.1 shows the real effective exchange rate of Namibia (REER) and that of South Africa (SAREER). As expected, it can be seen that the real exchange rates of the two countries are moving in the same direction, and they are close to each other.

Figure 4.1 Real effective exchange rate of Namibia and South Africa (1995=100)



Source: Data for Namibia (that is REER) were obtained from International Monetary Fund-Namibia Statistical appendix 1999. The data for South Africa (that is SAREER) are obtained from TSE-World Bank Development Indicators.

It is important to know that similarities observed between the real effective exchange rates of South Africa and Namibia is expected. That is because Namibia and South African inflation do not diverge from each other significantly and the nominal exchange rate is fixed at unity between the two countries. Most of Namibia's imports are coming from South Africa. The real effective exchange rates of the two countries are expected to move closer together because of these factors. There is only very little divergence between the real exchange rates of the two countries, which may have been caused by the difference in the weights to the consumer price indexes. There was a high appreciation (decrease) in the two real effective exchange rates between 1983 and 1986. The two rates depreciated (increased) between 1991 and 1993, although they diverged from each other during that period.

The similarity of movements of the real effective exchange rates of Namibia and South Africa may suggest that some of the fundamentals determining the real effective exchange rate of South Africa are also determining the real effective exchange rate of Namibia.

4.3.4 The Model

The model used in this study is adapted from Edwards (1989: 137). The fundamentals relevant to the determination of the equilibrium real exchange rate for Namibia are: terms of trade, capital flows, investment, technology, government consumption and trade policies. The equilibrium real exchange rate can be specified as:

$$REER_t = \beta_0 + \beta_1 TOT_t + \beta_2 CAPITALFLOWS_t + \beta_3 INVESTMENT_t + \beta_4 TECH_t + \beta_5 GOVERNMENT_t + \beta_6 TRADE_t + \mu_t \quad [4.2]$$

where the following notation has been used:

REER = real effective exchange rate,

TOT = the terms of trade, defined as (price of exports/price of imports),

CAPITALFLOWS = measure of capital flows,

INVESTMENT = ratio of investment to Gross Domestic Capital Formation to GDP,

TECH = measure of technological progress,

GOVERNMENT = ratio of government consumption to GDP,

TRADE = trade policies,

μ = error term.

Sign Expectation

The expected sign are as follows:

- The sign of β_1 can be $\neq 0$, depending on whether or not the income effect dominates the substitution effect. If the income effect associated with terms of trade deterioration dominates the substitution effect, then $\beta_1 < 0$ and vice versa.
- The sign of β_2 is < 0 because capital inflows cause an increase in the price of tradable goods and non-tradable goods, and the price of non tradable goods would increase and this will lead to equilibrium real exchange rate appreciation.

- The sign of β_3 is expected to be <0 because an increase in the ratio of investment to GDP will increase absorption and worsen the current account and lead to real exchange rate depreciation. The effect of investment could also be positive depending on whether it took place in tradable or non-tradable goods.
- The sign of β_4 is expected to be <0 because an improvement in technological progress will cause equilibrium real exchange rate appreciation.
- The sign of β_5 can be <0 . The sign of the ratio of government consumption to GDP cannot be predicted because it is possible for government expenditure to increase even when the share of non-tradable goods is going down.
- The sign of β_6 is expected to be <0 because a liberalisation of current account or reduction in taxes on imports will cause an increase in imports and worsen current account and cause real exchange rate depreciation.

Data

Annual data starting from 1980 to 1998 are used to estimate the equilibrium real exchange rate for Namibia. Only annual data are available, and therefore the results should be interpreted with caution because the sample is small.

The main problem encountered refers to data availability. The only fundamental for which we have reliable data is the terms of trade and ratio of investment. This means that in order to estimate equilibrium real exchange rate proxies have to be found for those variables that do not have reliable data.

Technology was proxied by the rate of real GDP growth. Edwards (1989: 139) used this type of proxy. In the case of capital flows the ratio of foreign direct investment to GDP was used, while trade policies was proxied by openness calculated as $(\text{exports} + \text{imports}) / \text{GDP}$. Any reductions in for example, import tariffs increase openness and leads to real exchange rate depreciation. There are no data on government

expenditure on non-tradable goods, and because of that total government expenditure to GDP was used.

The data for government expenditure, terms of trade, capital flows, and technology were obtained from Time Series Explorer (TSE) - World Bank Development Indicators. The data for investment were obtained from the Central Bureau of Statistics of Namibia, and the data on Namibia's real effective exchange rate were obtained from the International Monetary Fund - Namibia Statistical Appendix of 1999.

4.3.5 Methodology

Co-integration

Regressing one non-stationary series against another can lead to spurious results in that conventional significance tests will tend to indicate a relationship between the variables when in fact non exists (Pindyck and Rubinfeld, 1998: 513). That is a reason why it is important to test if the series are stationary. If a test fails to reject the hypothesis of non-stationary one can difference the series before using it in regression.

Many economic time series follow a random walk (they are non-stationary) and therefore one can difference them before using them in regression. As Pindyck and Rubinfeld (1998: 513) stated, although it is acceptable that differencing can result in loss of information about the long run relationship between the two variables, there are situations where one can run regression between two variables even though they are non-stationary. Sometimes two variables may be non stationary but a linear combination of those variables will be stationary. It may be that the variable x_t and y_t are non-stationary but the variable $z_t = x_t - \lambda y_t$ is stationary. In this situation x_t and y_t are co-integrated and λ is called co-integrated parameter. The co-integrated parameter λ can be estimated by running a regression of x_t on y_t . The residuals of this regression can be used to test whether x_t and y_t are co-integrated.

Economic theory tells us that the equilibrium real exchange rate and its fundamental determinants should be co-integrated and a test for co-integration is a test of the theory. The Dickey Fuller test and Phillips Peron tests are used to test if the series are stationary. If the computed Dickey Fuller test or Phillips Peron test exceeds the critical value then the variable are stationary, and if they are less than the critical values then the series are non-stationary. If the real effective exchange rate and its fundamental determinants are stationary, then it is easy to test whether the variables are co-integrated. This can simply be done by running the Least Squares regression in order to estimate equation [4.2]:

$$REER_t = \alpha + \beta FUNDAMAMENTALS_t + \mu_t \quad [4.3]$$

where FUNDAMETALS represents the fundamental determinants of the equilibrium real exchange rate. The residuals μ_t are tested for stationary. If the equilibrium real exchange rate and its fundamental determinants are co-integrated a linear combination of them will be stationary. The fundamental determinants are tested individually for stationary before using them in regression. The results are shown in table 4.2. The Dickey Fuller was used to test for stationary.

4.3.6 Results

Tests for Stationary and Co-integration

The results for stationary for individual variables and co-integration are shown in table 4.2 and table 4.3. If the Dickey Fuller test exceeds the critical value, the series or variable is stationary. If it does not exceeds the critical value then it is non-stationary.

Table 4.2 Test for stationary

	Dickey Fuller test	Critical value at 5%
Terms of trade (TOT, 2)	-4.065	-3.081
Capital flows (CAPITAL,2)	-5.664	-3.081
Government	-4.180	-3.100
Technology (TECH)	-3.434	-3.100
Investment (INVESTMENT,1)	-3.467	-3.122
Trade	-4.565	-3.100
REER (REER,2)	-3.250	-3.081

The results of table 4.2 show that all variables are stationary, although terms of trade, capital flows and REER are stationary on the second difference. Investment is stationary on the first difference. Since the variables are now stationary, equation [4.2] can now be estimated. After estimating equation the residuals from regression will be tested for stationary as discussed by equation [4.3].

Table 4.3 Test for cointegration

ADF Test Statistic	-4.459893	1% Critical Value*	-4.0113
		5% Critical Value	-3.1003
		10% Critical Value	-2.6927
*MacKinnon critical values for rejection of hypothesis of a unit root.			

The results show that the real effective exchange rate and its fundamental determinants are stationary because the computed Augmented Dickey Fuller test of -4.459893 exceeds the MacKinnon critical values at all percentage levels. In most economic analysis the residuals are tested at critical value of 5 percent for co-integration.

Equilibrium Real exchange Rate Estimation Results

The results of equation [4.2] are shown in table 4.4. The regression results indicate a satisfactory fit. The adjusted R^2 indicates that together the variables explain 56 percent of variation in REER. The F statistic 4.199 exceeds the critical value of 0.027, indicating that the overall regression and the R^2 figure are credible. Only terms of trade and technology are statistically significant, and the rest of the variables are not significant. The Durbin Watson stat is in the inconclusive region. It is between the upper and lower limit. This indicates that there is no evidence of presence or absence of autocorrelation.

Table 4.4 Equilibrium real exchange rate estimation results (variables in log form)

Dependent Variable: REER				
Method: Least Squares				
Date: 02/29/00 Time: 18:00				
Sample(adjusted): 1983 1998				
Included observations: 16 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	55.52964	48.74891	1.139095	0.2841
INVESTMENT1	6.483542	4.204373	1.542095	0.1574
CAPITAL	-5.008048	4.180587	-1.197929	0.2615
TOT	-0.362965	0.133952	-2.709662	0.0240
TRADE	-0.436034	0.406635	-1.072298	0.3115
TECH	-1.113280	0.557560	-1.996698	0.0770
GOVERNMENT	-0.905739	1.016833	-0.890745	0.3963
R-squared	0.736818	Mean dependent var	-3.412379	
Adjusted R-squared	0.561364	S.D. dependent var	8.272831	
S.E. of regression	5.479064	Akaike info criterion	6.539382	
Sum squared resid	270.1813	Schwarz criterion	6.877389	
Log likelihood	-45.31505	F-statistic	4.199484	
Durbin-Watson stat	2.206209	Prob(F-statistic)	0.027157	

From equation [4.2] the equilibrium real exchange rate for Namibia is determined as follows:

$$REER_t = 55.529 - 0.3629TOT_t - 5.008CAPITAL_t + 6.483INVESTMENT_t - 1.113TECH_t - 0.905GOVERNMENT_t - 0.436TRADE_t + \mu_t \quad [4.4]$$

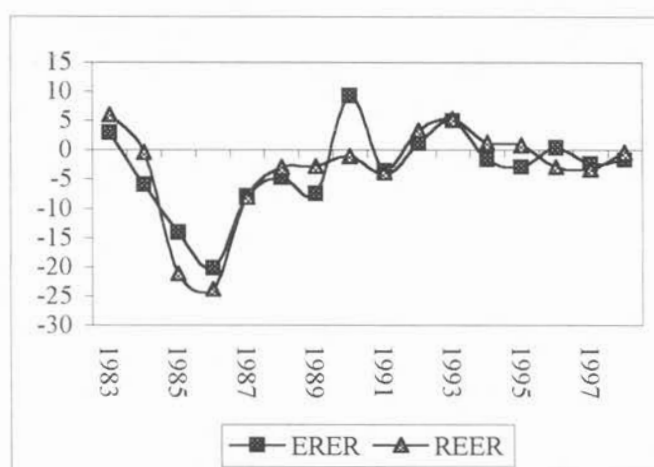
From the theoretical discussion, the results show that all the fundamental determinants of the equilibrium real exchange rate have expected sign. The real exchange rate appreciates

(decrease) if the terms of trade improve, and if capital inflows increase. An improvement in technology will increase expenditure on non-tradable and increase the price of non-tradable goods and the real exchange rate appreciate. The co-efficient of government consumption -0.905 is the third highest and it means that if government expenditure were directed at non-tradable goods the real exchange rate will appreciate.

An increase in imports or exports tariffs will reduce openness (that is because openness was used as a measure of trade policies) and this will lead to real exchange rate depreciation (increase) as shown by the negative co-efficient of -0.436. The positive co-efficient of investment could also be expected because an increase in the ratio of investment to GDP will increase absorption and worsen the current account and this will cause equilibrium real exchange rate depreciation.

The equilibrium real exchange rate can now be obtained from the regression results of equation [4.4]. Edwards (1988: 44) suggests that the fitted values of the regression results are good proxy for the equilibrium real exchange rate. This is shown in figure 4.2.

Figure 4.2 Equilibrium real exchange rate (ERER) and Real effective exchange rate (REER)



Note: These variables are in log form

When the REER is above the ERER then it indicates that the real exchange rate is undervalued, and when it is below the ERER it indicates that the real exchange rate is

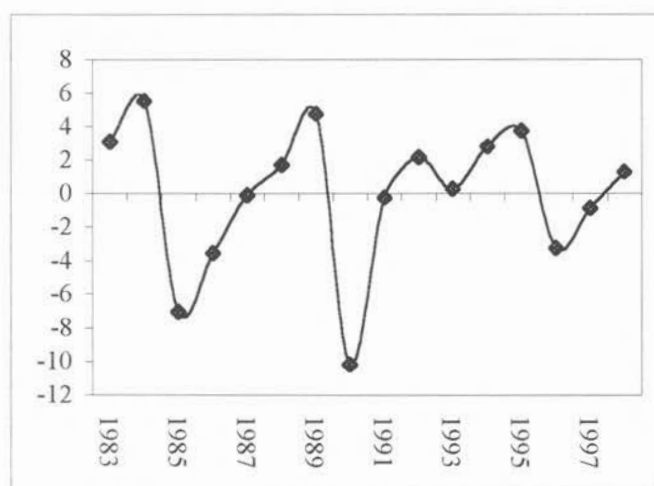
overvalued. Figure 4.2 shows that the real exchange rate was undervalued during the period 1983-1984, 1987-1989 and 1992-1995. The real exchange rate was overvalued during the period 1985-1986, 1990-1991 and 1996-1997. The highest overvaluation was in 1990, while the highest undervaluation was in 1989. Political uncertainty during 1989 and 1990 might have contributed to these over and under valuations of the real exchange rate. Although figure 4.2 shows that there was overvaluation and undervaluation of real exchange rate, it can be seen that the real effective exchange rate did not diverge significantly from the equilibrium real exchange rate. It was closer to the equilibrium real exchange rate.

4.3.7 Real Exchange Rate Misalignments

Real Exchange rate misalignments are a departure of the real exchange rate from its long run equilibrium value. As stated earlier, the equilibrium real exchange rate is not constant number. Changes in the fundamental determinants will cause the equilibrium real exchange to move from its equilibrium value.

The computation of real exchange rate misalignments requires an estimation of the equilibrium real exchange rate or some idea of what it should be its level. Real exchange rate misalignments is calculated as the difference between the REER and EREER or some values representing the year when the real exchange rate was judged to be in equilibrium. In this study, misalignment was computed as the difference between the EREER and REER or regression residuals. As stated by Edwards (1988: 44) the fitted values of the real exchange rate regression are good proxy for equilibrium real exchange rate. The deviations of actual real effective exchange rate from these estimated values or regression residuals are considered a good measure of real exchange rate misalignments. Real exchange rate misalignments during the period 1983-1998 are shown in figure 4.3.

Figure 4.3 Real exchange rate misalignments (computed as the difference between REER and ERER)



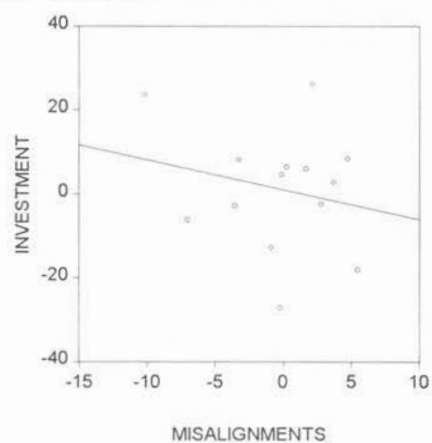
As shown in figure 4.3, the highest misalignment was in 1985 and 1990 and the lowest misalignments were in 1987-1988, 1991, and 1997.

Real exchange rate misalignments can reduce economic efficiency, misallocate resources, and undermine the performance of the agricultural sector, affect investment and cause capital outflows. Edwards (1988: 44) pointed out that the most serious cost of overvaluation is that it is almost invariably accompanied by severe exchange and trade control.

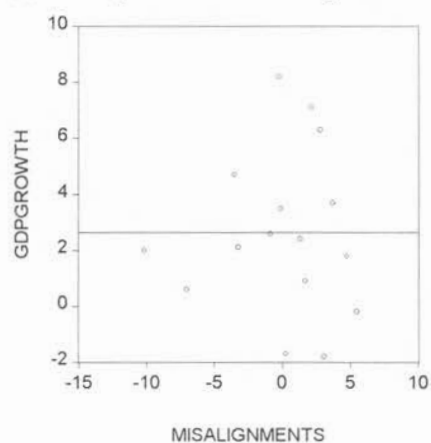
It is very important to test the effect of real exchange rate misalignment on measures of economic performance. Figure 4.4 shows the relationship between real exchange rate misalignments and some measures of economic performance, such as investment, exports, the agriculture sector, per capita GDP, capital flows and GDP growth.

Figure 4.4 Scatter diagrams of real exchange rate misalignments and measures of economic performance

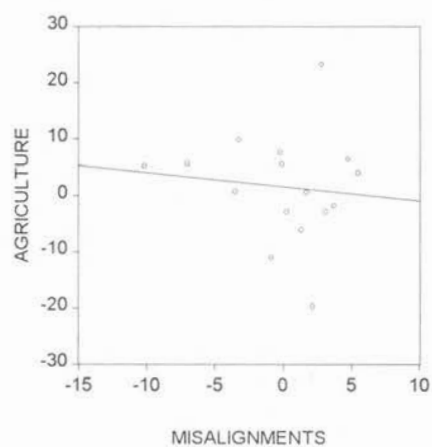
(a) Misalignments and investment



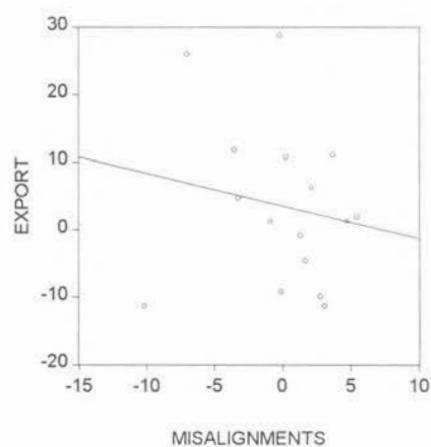
(b) Misalignments and GDP growth



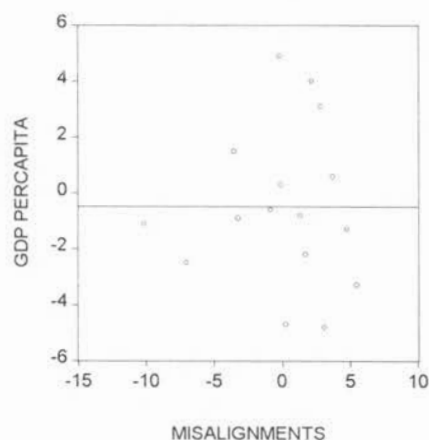
(c) Misalignments and agriculture



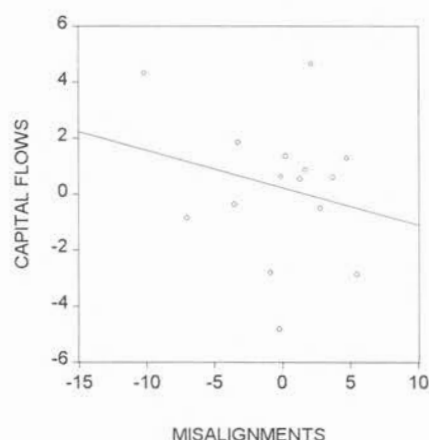
(d) Misalignments and export



(c) Misalignments and GDP per capita



(f) Misalignments and capital flows



If the scatter diagram has a regression line that is downward sloping, it indicates a negative relationship between the variables. If it is upward sloping it means that the variables are positively correlated, and if it is horizontal it indicates that there is no relationship between the variables.

Figure 4.4 (a), (c), (d) and (f) show that real exchange rate misalignments cause a decrease in investment, undermine the performance of the agricultural sector, and hinder the performance of export. The scatter diagrams for these variables are downward sloping. However, figure 4.4 (b) and (e) shows that there is no relationship between real exchange rate misalignments and GDP growth and GDP per capita. The regression line for GDP growth, GDP per capita and misalignments is horizontal.

A simple regression of measure of economic performance (GDP growth, GDP per capita, export performance, investment and agriculture) on real exchange rate misalignments was estimated to confirm the scatter graphs. The regression of measures of economic performance on misalignments is specified as:

$$ECONPERFORMANCE = \beta_0 + \beta_1 MISALIGNMENT + \mu, \quad [4.5]$$

where ECONPERFORMANCE is measures of economic performance, MISALIGNMENT is real exchange rate misalignment and μ is the error term. The variables are tested for stationary before running the regression of equation [4.5]. The results of the test for stationary are shown in table 4.5.

Table 4.5 Test for stationary

	Dickey Fuller Test	Critical values at 5 %
Misalignments	-4.459	-3.100
Agriculture	-3.355	-3.100
Export	-3.363	-3.100
GDP growth	-3.434	-3.100
GDP per capita	-3.386	-3.100
Investment (Investment,1) ⁷	-3.467	-3.122
Capital flows (capital flows,1)	-3.638	-3.122

As shown in table 4.5, all series are stationary. Investment and capital flows were differenced to become stationary. The regression results of equation [4.5] are shown in table 4.6. The t-statistics are shown in parentheses.

Table 4.6 Regression of measures of economic performance on real exchange rate misalignment

	Agriculture	Export	GDP growth	GDP per capita	Capital	Investment
Constant	1.518 (0.616)	3.537 (1.142)	2.637 (3.522)	-0.467 (0.665)	0.227 (0.346)	1.000 (0.254)
Misalignment	-0.249 (0.415)	-0.480 (-0.637)	0.000 (0.000)	0.000 (0.000)	-0.133 (-0.846)	-0.706 (-0.076)
R ²	0.012	0.028	0.000	0.000	0.052	0.046

The results of the regression of measures of economic performance on real exchange rate misalignment supports the scatter diagrams in figure 4.4. There is a negative correlation between real exchange rate misalignment and investment and export performance as confirmed by the negative co-efficient of -0.706 and -0.480. The coefficient of

⁷ In this case, investment is taken as gross domestic investment as percentage of GDP.

agriculture and capital are also negative and weak as confirmed by the coefficients of -0.249 and -0.133. This means for example, that one percent decrease in real exchange rate misalignments will cause agriculture and capital to increase/improve by 0.249 and 0.133. These results are in line with prediction of the theory.

However, real GDP growth and GDP per capita show unexpected results. It is expected that misalignment of the real exchange rate will affect the GDP growth and GDP per capita negatively, but the results show that there is no relationship between real exchange rate misalignment and GDP growth and GDP per capita.

4.3.8 Correcting Misalignment

Real exchange rate misalignment results in severe welfare and efficiency costs. The worst comes from the exchange and trade controls that usually accompany overvaluation. Such controls also encourage the creation of strong lobbies, which compete for the rents the controls generate (Edwards 1988: 22). A real exchange rate overvaluation hurts exports, and if maintained for a long period it can even wipe up agricultural infrastructure. It can also generate massive capital flight. Edwards pointed out measures that can be used to correct misalignment of real exchange rate are devaluation, imports tariffs and export duties, income policies, multiple nominal exchange rate or wait for the economy to adjust on its own.

The authorities could choose to wait for the economy to adjust on its own until the real exchange rate converges with the equilibrium real exchange rate. This approach has some limitations that can be severe in the case of predetermined nominal exchange rate.

Devaluation can help the domestic price of tradable goods to adjust. The objectives of devaluation are to improve the international competitiveness of the country and its external position. Since the $RER = EP_T / P_N$, a nominal devaluation that increases E will be effective in moving the RER towards its high equilibrium value only if P_N does not go

up in the same proportion as E . Devaluation can affect the economy through the following channels:

- Devaluation has an expenditure reducing effect. There will be a negative wealth effect that will reduce the real value of all assets denominated in domestic currency, and this depends on the extent to which domestic prices rise as a result of devaluation. If negative wealth effect dominates, the expenditure on all goods will be reduced, as will the trade deficit.
- Devaluation tends to have expenditure switching effect. Expenditure will switch away from tradable goods and production toward them. This depends on the extent to which it succeeds in altering the relative prices of tradable to non-tradable goods. The demand for domestic home goods will either rise or fall depending on which effect dominates. Devaluation will boost the domestic price of imported intermediate inputs, pushing up the supply for the final goods.
- In unified nominal exchange rates and no quantitative restrictions a nominal devaluation increases the domestic price of all tradable goods, services and assets. If there is a parallel or dual market and only the official rate is devalued, only those transactions affected by the official rate will be directly affected by the devaluation.
- If a country implements devaluation at a time when the RER is greatly overvalued, it will help to restore equilibrium. If devaluation is accompanied by appropriate macroeconomic policies it will have a medium to long run positive effect on the RER. On the other hand, if the initial condition is one of equilibrium, nominal devaluation will have no positive effect.
- A nominal devaluation that increases E tries to eliminate misalignment by causing a real depreciation, and it is important that it is not be accompanied by equiproportional increase in P_N . Such increase could be caused by expansive monetary, fiscal policies and wage indexation. However, if nominal devaluation is implemented along with monetary and fiscal restraint and without wage indexation, it is likely to achieve a real devaluation and help the RER to return to equilibrium.

Membership of the Common Monetary Area implies that this option is not available for Namibia. That is because the Namibia dollar is linked to the rand. Namibia has to follow the exchange rate policies of the South Africa even if they are not appropriate for its economy.

The imposition of import tariffs and export subsidies is another policy option for correcting real exchange rate misalignment. Imports tariffs will boost the domestic price of importable goods, while export subsidies boost the domestic price of exportable goods. If both tariffs and subsidies are at the same rate, the relative price between importable and exportable (tradable) goods will not be affected, but their relative price with respect to non-tradable goods will increase.

Real exchange rate misalignment can also be corrected by the adoption of dual or multiple exchange rates. This constitutes semi-devaluation, as the exchange rate is altered for some set of transactions. Multiple exchange rates are discriminatory, whereas one of the most important properties of devaluation is neutrality. As Edwards (1988) noted, every variety of multiple exchange rate system poses the important question of how to unify the different rates.

Finally income policies will succeed in realigning the real exchange rate if the price of domestic goods falls relative to that of foreign goods. It should be noted that income policies that are not supplemented by demand restraint have failed to bring down inflation for more than a short period. Attempts to realign the real exchange rate by controlling the income policies alone are an inefficient and risky policy.

4.3.9 Conclusion

This section estimated the equilibrium real exchange rate for Namibia, and assessed if there was real exchange rate misalignments. After the estimation of equilibrium real exchange rate, real exchange rate misalignments were estimated. In order to test the effect of real exchange rate misalignments on measures of economic performance (agriculture, real GDP growth, GDP per capita, investment, export performance and

capital flows), measures of economic performance were regressed on real exchange rate misalignments

The results of the estimated real exchange rate show that all fundamental determinants have expected signs. The estimated equilibrium real exchange rate shows that there was misalignment of the real exchange rate. The real exchange rate was undervalued during the periods 1983-1984, 1987-1988 and 1992 - 1995. It was overvalued during 1985-1986, 1990-1991 and 1996-1997. The highest undervaluation was in 1989 while the highest overvaluation was in 1990. Devaluation should have been done to realign the real exchange rate from overvaluation, but because Namibia is a member of the monetary union, this option is not available.

The results also show that real exchange rate misalignments have a weak negative effect on agriculture, export and capital flows. The coefficients are very small. However, with regard to the effect of real exchange rate misalignments on real GDP growth and GDP per capita, the results are unexpected because real exchange misalignment is expected to cause deterioration in the growth of GDP and GDP per capita. The results show that there is no relationship between GDP and real exchange rate misalignments as well as between real exchange rate misalignments and GDP per capita.

The weak negative effect of real exchange rate misalignments on measures of economic performance would strengthen the argument for Namibia to continue its membership of the Common Monetary Area.

4.4 The Impact of Export Shocks on Employment

4.4.1 Introduction

When an external shock hits the economy, it is easier to adjust the exchange rate than domestic prices or wages. It is widely accepted that wages do not decrease when there is an increase in unemployment (but the analysis of wage flexibility in chapter 2 shows that wages and employment move in the same direction). In the words of Belke and Gros (1997):

"A system of flexible exchange rates is usually presented, by its proponents, as a device whereby depreciation can take the place of unemployment when external balance is in deficit, and appreciation can replace inflation when it is in surplus"
(Belke and Gros, 1997: 3).

The idea behind this approach is that nominal wages are usually sticky in the short run, and it is easier to adjust external shocks and obtain changes in the real exchange rate or the terms of trade through a movement in the exchange rate. This section analyses if the loss of the exchange rate instrument lead to massive unemployment because of external shocks. The section will examine if export shocks have strong impact on employment and unemployment.

An argument in favour of exchange rate flexibility is that if shocks reduce the demand for exports a real depreciation in the exchange rate is required in order to maintain full employment and external equilibrium. The real depreciation can also be achieved by a reduction in nominal wages, but (as argued by Belke and Gros, 1997: 4) this can take time and can only be achieved if there is substantial unemployment. Proper exchange rate policy could reduce and eliminate unemployment that is caused by export shocks. This raises an interesting question: does Namibia lose by giving up the exchange rate policy as an instrument to eliminate the problem of unemployment caused by export shocks? The next section analyse the effect of export and export shocks on employment.

4.4.2 Estimation Technique

The impact of export or export shocks on unemployment or employment is estimated as follows:

$$Employment = \beta_0 + \beta_1 Export + \beta_2 exportshocks + \varepsilon$$

Where employment is the number of people employed, export is the total export, exportshocks is the shocks to total export. The coefficient β_1 is expected to have a positive sign because an increase in export is expected to cause a rise in employment. If the dependent variable was unemployment, β_1 is expected to be negative because an increase in export will cause unemployment to decrease.

The co-efficient β_2 can be positive or negative, because any shock that affect the demand for the country's export demand will cause a decrease in employment. If the dependent variable is unemployment, an increase in shocks that affect the country's export demand will lead to an increase in unemployment, the coefficient will be positive. If shocks increase exports of the country then the coefficient will be negative.

The shocks were estimated by regressing export on its own lagged values and the residuals from the regression were taken as good proxy for shocks.

4.4.3 Data

The data were taken from Time Series Explorer (TSE)-World Bank Development Indicators, Central Bureau of Statistics of Namibia and the International Financial Statistics. Only annual data on employment are available, data on unemployment are not available, and quarterly data are also not available. The pre-1980 data are not available, and therefore the results should be interpreted with caution because the sample is very small.

4.4.4 Results

The results are presented in table 4.7. All variables are statistically significant. The R-squared is very high, indicating that 98 percent of the variations in the dependent variable, logemployment are explained by the explanatory variables (logexport and logexportshocks). The F-statistics is highly significant indicating that the regression results are highly credible. The Durbin Watson statistics of 1.478677 falls in the inconclusive region. It is between the lower limit of 0.982 and the upper limit of 1.539. This indicates that it cannot be concluded whether positive autocorrelation is present or not.

Table 4.7 Regression results of exports and export shocks impact on employment

Dependent Variable: LOGEMPLOYMENT				
Method: Least Squares				
Date: 03/21/00 Time: 17:57				
Sample(adjusted): 1982 1997				
Included observations: 16 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.334316	0.137889	67.69430	0.0000
LOGEXPORT	0.178136	0.006305	28.25484	0.0000
LOGEXPORTSHOCK	-0.112675	0.036125	-3.118994	0.0081
S				
R-squared	0.984044	Mean dependent var		13.22888
Adjusted R-squared	0.981589	S.D. dependent var		0.111716
S.E. of regression	0.015159	Akaike info criterion		-5.373143
Sum squared resid	0.002987	Schwarz criterion		-5.228283
Log likelihood	45.98515	F-statistic		400.8612
Durbin-Watson stat	1.478677	Prob(F-statistic)		0.000000

Both explanatory variables' coefficients have expected sign. The co-efficient of LOGEXPORT is positive, indicating that an increase in export will cause employment to rise. However, this coefficient of 0.178 is very weak. It is close to zero, and this indicates that export has little impact on employment. The co-efficient of EXPORTSHOCKS is negative, indicating that it has negative impact on employment. This coefficient of -0.112

is also very weak because it is close to zero. This indicates that export shocks have no significant impact on employment.

The results have shown that export and export shocks have no significant impact on employment. This means that Namibia does not incur significant costs as a result of the loss of exchange rate policy. Even if Namibia can use the exchange rate as an instrument to promote export, it will not be able to eliminate the problem of unemployment caused by shocks on exports because of the weak correlation between employment and export. It should also be noted that diamonds dominates Namibia's export. They are sold by means of a quota system by the Central Selling Organisation (CSO, De Beers diamond selling arm). Diamonds are not demanded depending on their price, but is according to the quota system. The demand for diamonds is inelastic, suggesting that the Marshall Lerner⁸ condition does not hold for Namibia's diamond exports.

4.4.5 Conclusion

The objective of this section was to analyse the impact of export and exports shocks on employment. The results show that although export has positive effect on the level employment, while export shocks have negative effect, their impacts are very weak. This indicates that Namibia does not loose by giving up the exchange rate as an instrument of export promotion. That is because the impact of exports or export shocks on employment is very weak as indicated by their correlation coefficients of 0.178 and -0.112.

⁸ Marshall Lerner condition is the condition for devaluation to improve the country's balance of trade. For devaluation to be successful, the sum of the elasticity of demand for imports and elasticity of demand for export must exceeds unity. That is $[dx+dm]>1$. Where, dx are elasticity of demand for exports and dm is elasticity of demand for imports. In the case of Namibia, the price elasticity of demand for diamond is expected to be zero or very small. That is because even if Namibia use the exchange rate policy instrument to devalue its currency, there will be no effect on the demand for diamonds, because diamonds are sold through the quota system.

4.5 Loss of Exchange Rate Policy Instrument

The main cost of monetary union is loss of exchange rate as an instrument of adjustments and loss of monetary independence. If a country joins a monetary union, the formulation of monetary policy is no longer at national level but at the level of monetary union (Tavlas, 1993: 34). In monetary union, the exchange rate cannot be used as an instrument to lower for example, unemployment, unless other union members agree to ease monetary policy throughout the union.

However, in the case of currency board, which is not a full monetary the dominant country to which currencies of small economies are pegged decides union monetary policy. In the Common Monetary Area, South Africa holds this dominant position. South Africa pursues monetary policy by taking into account only its domestic economic conditions without considering what is happening to Namibia.

4.6 Conclusion

This chapter attempted to estimate the costs associated with membership of the monetary union. The most visible loss is the loss of seigniorage revenue. Membership of the Common Monetary Area implies that Namibia forfeit seigniorage revenue. However, reliance on seigniorage may be less important for Namibia because the country relies much on foreign trade and the share of agriculture in the economy is small compared to that of foreign trade.

The real exchange rate misalignment has also been pointed as a cost of being in a monetary union. The results of the analysis have shown that there was real exchange rate misalignment for Namibia, and Namibia cannot use the exchange rate as policy instrument to prevent overvaluation and undervaluation of its real exchange rate because it is in a monetary union. Although, Namibia loses the exchange rate policy instrument, the impact of real exchange rate misalignment on measures of economic performance is

very weak. This weak impact of real exchange rate misalignment on measures of economic performance would weaken the argument for an independent monetary policy for Namibia.

The impact of export shocks on employment has also been pointed as another costs associated with the loss exchange rate policy instrument. If export shocks have strong impact on the level of employment Namibia would incur costs because it cannot use the exchange rate policy instrument to promote its export in order to reduce unemployment. However, the results show that export and export shocks have a weak impact on employment. This would weaken the argument for an independent monetary policy for Namibia.

CHAPTER 4. CONCLUSION

The objective of this thesis was to analyse if the Common Monetary Area is an optimum currency area. This analysis will facilitate the debate on whether Namibia should remain in the Common Monetary or consider alternative exchange rate regimes.

Chapter 2 discussed the theory and empirical analysis of the CMA in terms of the criteria for optimum currency area. The analysis shows that:

- Although the economy of Namibia is not well diversified, and there is no labour mobility between Namibia and South Africa, the criterion of openness shows that the Namibian economy is more open as indicated by the index of 138. This high degree of openness suggests that Namibia would benefit by remaining in a monetary union. This high degree of openness would strengthen the argument for Namibia to continue its membership of the Common Monetary Area.
- Analysis of intensity of mutual trade shows that there is a high degree of trade between Namibia and South Africa. A large part of Namibia's imports was from South Africa. The results show that 88 percent of imports and 16 percent of Namibia came from or went to South Africa in 1997. This means that Namibia would benefit by being in a monetary union with South Africa.
- The measurement of wages flexibility also shows that wages is moving in the same direction with employment. This was indicated by the positive coefficient of 0.7. That means an increase in employment (unemployment decreasing) will cause wages to go up and vice versa. This would strengthen the argument for Namibia to remain in the Common Monetary Area.
- In order to test for financial and goods market integration between Namibia and South Africa the cointegration methodologies and the Allen-Kenen model

were used. The results of both cointegration methodologies and Allen-Kenen model show that the financial market of South Africa and Namibia are integrated. The error correction method shows that both financial and goods markets of the two countries are cointegrated. The Allen-Kenen model also shows that the financial markets of the two countries are highly integrated as indicated by the positive coefficient of 0.99. Then Allen-Kenen model also shows that the goods markets of the two countries are integrated as indicated by the co-efficient of 0.40. This means that a one percentage increase in South Africa's GDP will cause an increase in Namibia's GDP by 0.4. This strengthens the argument for Namibia to remain in the Common Monetary Area. The presence of financial integration between the two countries suggests that only a small change in interest rates will be required to correct for imbalances between the two countries.

- The analysis of shocks shows that both the supply and demand shocks of Namibia and South Africa are positively correlated. This was indicated by the coefficient of 0.78 for supply shocks, and 0.68 for demand shocks. This strengthens the argument for Namibia to continue its membership of the CMA.
- As stated under the purchasing power parity hypothesis, if the fundamental determinants of the real exchange rates of the two countries are interrelated, the real exchange rates will be cointegrated. These countries are good candidates for a monetary union. The results of the analysis show that the real exchange rate of South Africa and Namibia are highly cointegrated. This strengthens the arguments for Namibia to continue its membership of the Common Monetary Area.

Chapter 3 and 4 estimated the benefits and costs of Namibia's membership of the CMA. The results show that:

- Namibia benefits from the gains from the elimination of transaction costs and savings on foreign exchange reserves. The gains from the elimination of transaction costs were estimated on average at 4.9 percent of GDP and savings on foreign exchange reserves were estimated at 0.81 percent of GDP. Costs of monetary union were also analysed. The most visible cost of monetary union is loss of seigniorage revenue, which was estimated at 3.2 percent of GDP. However, reliance on seigniorage revenue decrease with the share of foreign trade in the output and increase with the share of agriculture share in the output of the economy. This costs may not be important for Namibia because the share of foreign trade in it economy is higher compared to that of agriculture.
- The real exchange rate misalignment was also estimated and its effect on measures of economic performance such as real GDP growth, investment, agriculture, GDP per capita and exports performance. The result shows that real exchange rate misalignment has a negative effect the performance of the agriculture sector, investment, export and capital flows, but the impact is weak (except on investment) as indicated by the coefficients of -0.249, -0.706, -0.480 and -0.133. However, the results show that there is no relationship between real GDP growth, GDP per capita and real exchange rate misalignments. The coefficients from the regression is 0. Although membership of the CMA prohibits Namibia from realigning its real exchange rate, the weak impact of the real exchange rate misalignment on measures of economic performance would weaken the argument for an independent monetary policy for Namibia.
- The impact of export shocks on the level of employment was also estimated because if export has a strong impact on employment, this would be a cost to

Namibia because it cannot use the exchange rate policy instrument to promote its exports in order to reduce unemployment. The results show that exports have a weak impact on employment, and this would argue against monetary independence for Namibia.

It is very difficult to weigh the criteria, and costs and benefits. However, the literature suggested that if the shocks affecting the two economies are symmetric then the area is an optimum currency area, because those countries require similar policy responses. Chapter 2 assessed if the shocks in the Common Monetary Area are symmetric or asymmetric. The results of the Bayoumi-Eichengreen model shows that the supply shocks of Namibia and South African are highly symmetric as indicated by the positive coefficient of 0.78. The demand shocks of Namibia and South Africa are also symmetric. This strengthens the argument for Namibia to continue its membership of the Common Monetary Area.

The symmetry of shocks of Namibia and South Africa, weak impact of real exchange rate misalignment on measures of economic performance as well as the weak impact of export on employment would suggest that the CMA is an optimum currency area. Namibia should continue its membership of the CMA and encourage negotiation for a full monetary union so that it will be included in decision making.

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APPENDIX

1. Disturbances

1.1 Supply disturbances (shocks)

The following notations represent:

LOGLESGDP = log of Lesotho's GDP,

LOGNAMGDP = log of Namibia's GDP,

LOGSAGDP = log of Swaziland's GDP,

LOGSAGDP = log of South Africa's GDP,

LOGNAMAGRIC = log of Namibia's agricultural sector,

LOGSAGRIC = log of South Africa's agricultural sector,

LOGNAMMINING = log of Namibia's mining sector,

LOGSAMINING = log of South Africa's mining sector,

LOGNAMANUFAC = log of Namibia's manufacturing sector,

LOGSAMANUFAC = log of South Africa's manufacturing sector,

LOGNAMGOV = log of Namibia's government sector,

LOGSAGOV = log of South Africa's government sector.

Total Supply shocks

Tables A1. Supply disturbances regression results, which estimated the shocks

(a) Lesotho

Dependent Variable: LOGLESGDP				
Method: Least Squares				
Date: 04/09/00 Time: 22:11				
Sample(adjusted): 1982 1997				
Included observations: 16 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.161721	1.790132	0.090340	0.9294
LOGLESGDP(-1)	1.509598	0.246340	6.128103	0.0000
LOGLESGDP(-2)	-0.515106	0.273817	-1.881207	0.0825
R-squared	0.921144	Mean dependent var		18.30131
Adjusted R-squared	0.909012	S.D. dependent var		0.693850
S.E. of regression	0.209295	Akaike info criterion		-0.122786
Sum squared resid	0.569456	Schwarz criterion		0.022074
Log likelihood	3.982290	F-statistic		75.92833
Durbin-Watson stat	1.649083	Prob(F-statistic)		0.000000

(b) Namibia

Dependent Variable: LOGNAMGDP				
Method: Least Squares				
Date: 04/09/00 Time: 22:16				
Sample(adjusted): 1982 1997				
Included observations: 16 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.965219	2.775660	0.708019	0.4914
LOGNAMGDP(-1)	1.179597	0.258751	4.558808	0.0005
LOGNAMGDP(-2)	-0.269727	0.276794	-0.974467	0.3476
R-squared	0.832448	Mean dependent var		21.57544
Adjusted R-squared	0.806671	S.D. dependent var		0.266619
S.E. of regression	0.117230	Akaike info criterion		-1.281992
Sum squared resid	0.178658	Schwarz criterion		-1.137132
Log likelihood	13.25594	F-statistic		32.29388
Durbin-Watson stat	1.942812	Prob(F-statistic)		0.000009

(b) South Africa

Dependent Variable: LOGSAGDP				
Method: Least Squares				
Date: 04/09/00 Time: 22:21				
Sample(adjusted): 1982 1997				
Included observations: 16 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.588907	3.374142	0.767279	0.4566
LOGSAGDP(-1)	1.091169	0.272669	4.001807	0.0015
LOGSAGDP(-2)	-0.192773	0.284386	-0.677858	0.5097
R-squared	0.806211	Mean dependent var		25.27881
Adjusted R-squared	0.776398	S.D. dependent var		0.275612
S.E. of regression	0.130327	Akaike info criterion		-1.070172
Sum squared resid	0.220808	Schwarz criterion		-0.925312
Log likelihood	11.56138	F-statistic		27.04166
Durbin-Watson stat	1.823126	Prob(F-statistic)		0.000023

(c) Swaziland

Dependent Variable: LOGSWAGDP				
Method: Least Squares				
Date: 04/09/00 Time: 22:25				
Sample(adjusted): 1982 1997				
Included observations: 16 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.651184	0.599880	1.085524	0.2974
LOGSWAGDP(-1)	1.514165	0.220489	6.867320	0.0000
LOGSWAGDP(-2)	-0.544334	0.219132	-2.484042	0.0274
R-squared	0.988723	Mean dependent var		20.84647
Adjusted R-squared	0.986988	S.D. dependent var		0.285685
S.E. of regression	0.032588	Akaike info criterion		-3.842405
Sum squared resid	0.013805	Schwarz criterion		-3.697544
Log likelihood	33.73924	F-statistic		569.9064
Durbin-Watson stat	2.048399	Prob(F-statistic)		0.000000

Table A2. Total Supply shocks yielded by the above regression results

	Lesotho	Namibia	South Africa	Swaziland
1982	-0.26512	-0.08433	-0.13038	-0.04245
1983	-0.04126	0.04485	0.072685	-0.01867
1984	-0.11275	-0.2043	-0.17684	0.013903
1985	-0.2744	-0.20952	-0.29864	-0.02973
1986	0.179976	0.103229	0.103576	0.063709
1987	0.415884	0.148327	0.18207	0.044041
1988	-0.04008	-0.00165	-0.01577	-0.03541
1989	-0.1816	-0.03564	-0.0022	0.029615
1990	-0.04242	0.052684	0.118878	0.017365
1991	-0.05778	0.014804	0.013467	-0.04012
1992	0.323559	0.101629	0.051427	-0.01764
1993	-0.09576	-0.10605	-0.03366	0.008451
1994	-0.08177	0.131321	0.042444	0.000749
1995	0.002312	0.053047	0.092599	-0.00666
1996	0.076239	-0.05571	-0.06119	0.010082
1997	0.194978	0.047308	0.041545	0.002772

Supply shocks to sectors of Namibia and South Africa

Tables A3. Regression results, which estimated the shocks

Dependent Variable: LOGNAMAGRIC					
Method: Least Squares					
Date: 05/02/00 Time: 21:29					
Sample(adjusted): 1982 1998					
Included observations: 17 after adjusting endpoints					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
C	0.085249	0.368900	0.231089	0.8206	
LOGNAMAGRIC(-1)	0.979919	0.268789	3.645685	0.0026	
LOGNAMAGRIC(-2)	0.026423	0.275145	0.096034	0.9249	
R-squared	0.955789	Mean dependent var		6.416403	
Adjusted R-squared	0.949473	S.D. dependent var		0.706827	
S.E. of regression	0.158881	Akaike info criterion		-0.682532	
Sum squared resid	0.353406	Schwarz criterion		-0.535494	
Log likelihood	8.801518	F-statistic		151.3324	
Durbin-Watson stat	1.997236	Prob(F-statistic)		0.000000	

Dependent Variable: LOGSAAGRIC
Method: Least Squares
Date: 05/02/00 Time: 21:36
Sample(adjusted): 1982 1998
Included observations: 17 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.320735	0.558324	0.574460	0.5748
LOGSAAGRIC(-1)	0.911833	0.266891	3.416506	0.0042
LOGSAAGRIC(-2)	0.065456	0.266367	0.245735	0.8095
R-squared	0.949507	Mean dependent var		9.354648
Adjusted R-squared	0.942294	S.D. dependent var		0.604223
S.E. of regression	0.145147	Akaike info criterion		-0.863359
Sum squared resid	0.294946	Schwarz criterion		-0.716321
Log likelihood	10.33855	F-statistic		131.6343
Durbin-Watson stat	1.950387	Prob(F-statistic)		0.000000

Dependent Variable: LOGNAMMINING
Method: Least Squares
Date: 05/02/00 Time: 21:40
Sample(adjusted): 1984 1998
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.575030	1.096220	2.349007	0.0368
LOGNAMMINING(-1)	0.407255	0.252879	1.610476	0.1333
LOGNAMMINING(-2)	0.239611	0.155640	1.539516	0.1496
R-squared	0.681732	Mean dependent var		7.011605
Adjusted R-squared	0.628687	S.D. dependent var		0.336072
S.E. of regression	0.204787	Akaike info criterion		-0.156836
Sum squared resid	0.503253	Schwarz criterion		-0.015226
Log likelihood	4.176271	F-statistic		12.85201
Durbin-Watson stat	1.848663	Prob(F-statistic)		0.001039

Dependent Variable: LOGSAMINING
Method: Least Squares
Date: 05/02/00 Time: 21:43
Sample(adjusted): 1982 1998
Included observations: 17 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.513478	0.443446	1.157927	0.2663
LOGSAMINING(-1)	1.100733	0.187979	5.855628	0.0000
LOGSAMINING(-2)	-0.144659	0.194921	-0.742141	0.4703
R-squared	0.972864	Mean dependent var		10.06828
Adjusted R-squared	0.968988	S.D. dependent var		0.431396
S.E. of regression	0.075970	Akaike info criterion		-2.158176
Sum squared resid	0.080800	Schwarz criterion		-2.011139
Log likelihood	21.34450	F-statistic		250.9644
Durbin-Watson stat	2.486622	Prob(F-statistic)		0.000000

Dependent Variable: LOGNAMMANUFAC				
Method: Least Squares				
Date: 05/02/00 Time: 21:46				
Sample(adjusted): 1982 1998				
Included observations: 17 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.210064	0.419727	2.882979	0.0120
LOGNAMMANUFAC(-1)	0.551903	0.291968	1.890290	0.0796
LOGNAMMANUFAC(-2)	0.287805	0.279826	1.028514	0.3212
R-squared	0.925081	Mean dependent var		6.472162
Adjusted R-squared	0.914378	S.D. dependent var		0.816679
S.E. of regression	0.238970	Akaike info criterion		0.133830
Sum squared resid	0.799495	Schwarz criterion		0.280867
Log likelihood	1.862449	F-statistic		86.43402
Durbin-Watson stat	2.008400	Prob(F-statistic)		0.000000

Dependent Variable: LOGSAMANUFAC				
Method: Least Squares				
Date: 05/02/00 Time: 21:49				
Sample(adjusted): 1982 1998				
Included observations: 17 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.369151	0.212187	1.739741	0.1038
LOGSAMANUFAC(-1)	1.377659	0.281539	4.893323	0.0002
LOGSAMANUFAC(-2)	-0.405507	0.272554	-1.487805	0.1590
R-squared	0.996314	Mean dependent var		10.89429
Adjusted R-squared	0.995787	S.D. dependent var		0.657586
S.E. of regression	0.042680	Akaike info criterion		-3.311375
Sum squared resid	0.025502	Schwarz criterion		-3.164338
Log likelihood	31.14669	F-statistic		1892.069
Durbin-Watson stat	1.714022	Prob(F-statistic)		0.000000

Dependent Variable: LOGNAMGOV				
Method: Least Squares				
Date: 05/02/00 Time: 21:56				
Sample(adjusted): 1982 1998				
Included observations: 17 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.298785	0.174877	1.708546	0.1096
LOGNAMGOV(-1)	0.984639	0.247198	3.983208	0.0014
LOGNAMGOV(-2)	-0.005888	0.248793	-0.023666	0.9815
R-squared	0.991169	Mean dependent var		7.155923
Adjusted R-squared	0.989908	S.D. dependent var		0.797731
S.E. of regression	0.080140	Akaike info criterion		-2.051302
Sum squared resid	0.089914	Schwarz criterion		-1.904264
Log likelihood	20.43607	F-statistic		785.6938
Durbin-Watson stat	2.230694	Prob(F-statistic)		0.000000

Dependent Variable: LOGSAGOV				
Method: Least Squares				
Date: 05/02/00 Time: 22:00				
Sample(adjusted): 1982 1998				
Included observations: 17 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.532170	0.189322	2.810931	0.0139
LOGSAGOV(-1)	0.882489	0.270165	3.266486	0.0056
LOGSAGOV(-2)	0.081738	0.259847	0.314563	0.7577
R-squared	0.997831	Mean dependent var		10.33280
Adjusted R-squared	0.997521	S.D. dependent var		0.787492
S.E. of regression	0.039208	Akaike info criterion		-3.481064
Sum squared resid	0.021522	Schwarz criterion		-3.334027
Log likelihood	32.58905	F-statistic		3220.178
Durbin-Watson stat	1.905088	Prob(F-statistic)		0.000000

Table A4. Shocks data yielded by the above regression results

	Namagric	Namgov	Nammanufac	Nammining	Saagric	Sagov	Samanufac	Samining
1982	-0.1081813	-0.1515417	-0.4597657		-0.1451314	-0.0196386	-0.0087114	-0.083595
1983	-0.1794445	0.1498414	0.4778537		-0.2918905	-0.0417942	-0.0375042	0.0260068
1984	-0.0277011	-0.0251773	0.0324363	-0.025842	0.1436814	0.0688377	-0.0117597	-0.0373578
1985	0.0022271	-0.041441	-0.1436409	0.139961	0.1464265	-0.0413248	-0.0568858	0.1430938
1986	0.1011252	-0.0041628	-0.0773974	0.0128451	-0.0004809	-0.010762	0.034277	0.0696982
1987	0.2106633	0.0739171	0.0002581	-0.2794402	0.1519263	0.0051113	0.021527	-0.1480554
1988	0.0690178	-0.0704161	-0.0319475	0.1043545	0.1251972	-0.0350521	0.0653823	0.0486895
1989	-0.0454003	-0.0289965	0.0005738	0.1844557	-0.0292831	0.0511497	0.0137348	-0.0183196
1990	-0.0477555	0.0393685	0.0659816	-0.2190049	-0.0618936	0.0627071	0.0517466	-0.0626734
1991	0.0627458	0.0881244	-0.0257932	-0.1470979	-0.0207668	0.0373591	-0.0452122	-0.0153405
1992	-0.2682795	0.0896831	0.0880648	-0.0891279	-0.195023	0.0106796	-0.0244245	-0.0365242
1993	-0.0174051	-0.0714153	0.149902	-0.3639523	0.0796928	-0.0233342	0.0025564	0.0687355
1994	0.3619869	-0.038928	0.1702751	0.1420438	0.1504893	-0.0235111	0.0150429	0.0036571
1995	-0.0709401	-0.0038448	0.1234408	-0.0574296	-0.1334147	-0.0300268	0.0542651	-0.0513375
1996	0.0356891	0.0652754	-0.0398413	0.2551356	0.1217539	-0.012197	-0.0133932	0.0899896
1997	-0.1583298	-0.0266428	0.1473893	0.2061676	-0.0539149	-0.0252298	0.0145678	-0.0183941
1998	0.0799821	-0.0436436	-0.4777894	0.1369315	0.0126315	0.0270262	-0.0752088	0.0217272

1.2 Demand disturbances

Tables A5. Regression results, which estimated the shocks

(a) Lesotho

Dependent Variable: LOGLESOTHO				
Method: Least Squares				
Date: 04/08/00 Time: 22:47				
Sample(adjusted): 1987:3 1998:4				
Included observations: 46 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.074603	0.027264	2.736328	0.0090
LOGLESPRICE(-1)	1.018673	0.151373	6.729570	0.0000
LOGLESPRICE(-2)	-0.029887	0.149513	-0.199894	0.8425
R-squared	0.998570	Mean dependent var		4.328863
Adjusted R-squared	0.998503	S.D. dependent var		0.380725
S.E. of regression	0.014728	Akaike info criterion		-5.535077
Sum squared resid	0.009328	Schwarz criterion		-5.415818
Log likelihood	130.3068	F-statistic		15013.04
Durbin-Watson stat	1.961017	Prob(F-statistic)		0.000000

(b) Namibia

Dependent Variable: LOGNAMIBIA				
Method: Least Squares				
Date: 04/08/00 Time: 22:50				
Sample(adjusted): 1987:3 1998:4				
Included observations: 46 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.073810	0.021750	3.393515	0.0015
LOGNAMPRICE(-1)	1.221910	0.145733	8.384590	0.0000
LOGNAMPRICE(-2)	-0.234369	0.143774	-1.630126	0.1104
R-squared	0.999221	Mean dependent var		4.340573
Adjusted R-squared	0.999185	S.D. dependent var		0.355948
S.E. of regression	0.010162	Akaike info criterion		-6.277369
Sum squared resid	0.004440	Schwarz criterion		-6.158110
Log likelihood	147.3795	F-statistic		27585.24
Durbin-Watson stat	1.840117	Prob(F-statistic)		0.000000

(c) South Africa

Dependent Variable: LOGSOUTHAFRICA				
Method: Least Squares				
Date: 04/08/00 Time: 22:52				
Sample(adjusted): 1987:3 1998:4				
Included observations: 46 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.075384	0.019734	3.820069	0.0004
LOGSAPRICE(-1)	1.207766	0.148652	8.124797	0.0000
LOGSAPRICE(-2)	-0.220512	0.146259	-1.507677	0.1389
R-squared	0.999549	Mean dependent var		4.351506
Adjusted R-squared	0.999528	S.D. dependent var		0.350661
S.E. of regression	0.007620	Akaike info criterion		-6.852977
Sum squared resid	0.002497	Schwarz criterion		-6.733718
Log likelihood	160.6185	F-statistic		47621.55
Durbin-Watson stat	1.988522	Prob(F-statistic)		0.000000

(d) Swaziland

Dependent Variable: LOGSWAZILAND				
Method: Least Squares				
Date: 04/08/00 Time: 23:07				
Sample(adjusted): 1987:3 1998:4				
Included observations: 46 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.109040	0.043870	2.485550	0.0169
LOGSWAPRICE(-1)	1.051269	0.152015	6.915566	0.0000
LOGSWAPRICE(-2)	-0.070981	0.149202	-0.475735	0.6367
R-squared	0.995924	Mean dependent var		4.337748
Adjusted R-squared	0.995734	S.D. dependent var		0.331622
S.E. of regression	0.021660	Akaike info criterion		-4.763718
Sum squared resid	0.020173	Schwarz criterion		-4.644459
Log likelihood	112.5655	F-statistic		5252.702
Durbin-Watson stat	1.964244	Prob(F-statistic)		0.000000

Table A6. Demand disturbances (shocks) yielded by the above regression results

	Lesotho	Namibia	South Africa	Swaziland
1987.3	-0.01039	0.017825	-0.00147	-0.02064
1987.4	-0.0209	-0.02563	-0.00434	0.021868
1988.1	-0.00986	-0.00993	-0.00878	0.089525
1988.2	-0.01163	-0.001	-0.00483	-0.00819
1988.3	0.013931	0.015305	-0.00431	-0.02274
1988.4	0.00307	-0.00147	8.24E-05	-0.01554
1989.1	-0.0006	-0.00083	0.001956	-0.01249
1989.2	-0.00213	0.002648	0.005955	-0.02071
1989.3	0.002221	-0.00499	-0.00041	-0.01147
1989.4	0.000409	-0.00293	-0.00162	-0.01079
1990.1	0.006147	0.003877	0.003897	0.004085
1990.2	-0.02136	-0.0063	0.000423	0.051507
1990.3	-0.00736	-0.01068	-8.81E-05	-0.04995
1990.4	-0.01056	-0.00325	0.008944	-0.0162
1991.1	0.063651	-0.00578	0.001458	-0.00285
1991.2	-0.00515	-0.0028	0.006727	0.001356
1991.3	0.000192	0.011454	0.006114	-0.00508
1991.4	-0.00542	0.032368	0.014718	-0.0135
1992.1	0.024276	0.012597	0.000439	-0.00815
1992.2	0.019417	0.002384	0.002341	-0.03534
1992.3	0.013535	-0.00479	0.00089	0.022829
1992.4	0.013748	-0.00741	-0.01194	-0.00805
1993.1	0.014908	-0.01009	-0.00358	0.005157
1993.2	-0.01601	0.006204	0.015541	0.006316
1993.3	-0.01282	-0.01027	-0.01025	-0.00293
1993.4	-0.0035	0.000214	-0.00856	0.011824
1994.1	-0.00507	0.003295	-0.0003	0.006189
1994.2	-0.00309	0.000496	-0.00466	0.015007
1994.3	-0.00802	0.01312	0.013494	0.003409
1994.4	0.010742	-0.00283	-0.00632	0.012301
1995.1	-0.01609	0.004825	0.000278	0.014894
1995.2	0.003261	-0.01	0.002496	0.009616
1995.3	0.00887	0.005858	-0.01442	-0.01525
1995.4	-0.01025	-0.00745	-0.00872	-0.00068
1996.1	-0.00382	0.000264	0.003456	0.003462
1996.2	0.006476	-0.00483	-0.00169	-0.00804
1996.3	-0.00335	0.006764	0.002477	-0.01365
1996.4	-0.00237	-0.00168	0.002728	0.005623
1997.1	-0.00587	0.012216	0.005266	-0.00267
1997.2	-0.00626	-0.00595	-0.00302	0.014542
1997.3	0.005041	-0.00336	-0.00302	-0.01458
1997.4	-0.02497	-0.01261	-0.01158	0.005824
1998.1	0.001541	-0.00127	-0.00254	0.006248
1998.2	0.004095	-0.0048	-0.00326	0.00722

1998.3	0.009476	0.017487	0.023732	-0.00182
1998.4	0.001831	-0.00625	-0.0037	0.002517

2. Developments in the Monetary and External Sector

2.1 Introduction

Analysis of Namibia's membership of the Common Monetary Area without discussing developments in the monetary and external sector is incomplete. This section analyses some developments in the monetary sector like monetary policy, interest rates, inflation rates and money and capital market developments. It also looks at the external sector in order to find out if the Namibia is ready to be monetary independent.

2.2 Monetary Policy Developments and Capital Market Developments

2.2.1 Monetary Policy

The Bank of Namibia (BON) was established in 1990 with the main objective of fulfilling the functions of a central bank in future. It took over the functions previously performed by the Windhoek branch of the South African Reserve Bank (SARB). BON is responsible for issuing currency, management of public debt, exchange control administration, foreign exchange management, supervision of banks and building societies, and conduct of monetary policy.

The Namibia dollar was introduced on the basis of currency board in September 1993, and fully backed by the South African rand, which is also the legal tender in Namibia. The 1:1 parity is maintained between the two currencies. Namibia joined the CMA officially in 1992 (IMF 1995: 74). The provisions of the CMA permit free movement of capital by Namibians, companies and individuals. This linkage of the Namibia dollar to the South African rand constrains the conduct of an independent monetary policy in Namibia. Box A1 presents highlights of the Common Monetary Area agreement between Namibia and South Africa.

"Box A1 Highlights of the Common Monetary Area Agreement

1. The Management of Gold and Foreign Exchange Reserves

The respective monetary authorities have responsibilities over the management of gold and foreign exchange reserves of the two countries. Each member state provides the South African Reserve Bank with a monthly statement reflecting the total balances of gold and foreign exchange, including the rand held by the monetary authorities and authorised dealers in their respective areas. The purpose of this is to enable the South African authorities to monitor the exchange control system of the CMA.

2. Legal Tender

Article 2 establishes the rand as the legal tender for CMA, albeit there is a provision for the LNS (Lesotho, Namibia and Swaziland) countries to introduce their national currencies. Their national currencies will only constitute legal tender only within their respective national borders. The rand is the monetary standard for the CMA and any other national currencies must not only be pegged but they must also be convertible into the rand unconditionally.

3. Foreign Exchange Reserve Backing of the Namibia dollar

The contracting parties can agree upon the foreign exchange reserve backing of the issuance of the domestic currency. This was initially set 100 percent.

4. Conversion Rates

The rate of conversion or the bilateral exchange rate between the rand and the Namibia dollar can be agreed upon by the contracting parties. At the time of the introduction of the Namibia dollar the conversion rate was set at 1:1.

5. Access to South African Money and Capital Markets

Article 3 and 4 makes provision for the free flow of capital within the area. Private and official capital flows are encouraged, provided that such flows are neither disruptive to money and capital markets nor inconsistent with the management of domestic financial institutions. The South African Reserve Bank acts as a lender of last resort to the monetary authorities of the LNS countries, in order to underwrite the monetary stability of the Area.

6. Gold and Foreign Exchange Transactions

The Bank of Namibia and authorised dealers in Namibia shall have access to the foreign exchange market of South Africa. That is for its own transactions and for the government of Namibia and in the case of authorised dealers for transactions in terms of exchange control provisions of the Bank of Namibia or as approved by the Bank of Namibia. This is provided by article 5 of the agreement.

7. Repatriation of Loan Capital and Profits

No permission is required to repatriate approved foreign loan capital and to transfer net trading profits earned in Namibia and accruing to non-residents.

8. Exchange control

The exchange control provisions of the government of Namibia shall in all materials aspects be substantially in accord with the exchange provisions ruling in South Africa as amended from time to time.

9. Compensatory Payments

The formula for computing compensation payments for seigniorage is provided in article 6. This represents a return on the rand circulating in Namibia. Seigniorage revenue is calculated as: $s = (2/3) * (i^{\text{bondyield}}) * (cu^R)$, where $i^{\text{bondyield}}$ is the annual yield on most recently issued long term South African government stock and cu^R is an estimate of volume of rand in circulation in Namibia. The 2/3 is based on interest earned by a portfolio in the area, which is likely to contain both long term and short term assets with lower yields.

10. Transfer of Funds within the Joint Monetary Area

Contracting party shall not apply any restrictions on the transfer of funds to or from the area of the contracting party. The restrictions can only be imposed in cases of investment or liquidity requirements, which may from time to time be prescribed to domestic financial institutions, and such restrictions should not be discriminatory to any contracting party. The Namibian government may also introduce measures relating to investment of funds in domestic securities, for the mobilisation of domestic resources in the interest of development of its area. Members of the Common Monetary Area also have an obligation to work together in order to avoid disruptive capital flows arising as a result of measures taken in one area

11. Amendment and Termination of the Agreement

The agreement may be amended by agreement between the contracting parties, those are Namibia and South Africa. The agreement can be terminated by either contracting party by giving six months written notice to the other contracting party and it will be held to be terminated on expiration of such period or at such earlier or later date as the contracting party may agree.

12. Settlement of disputes

Should any dispute arise between the contracting parties concerning the interpretation or application of this Agreement, they shall make every effort to settle the dispute amicably and in good faith and any such dispute which cannot be so settled to an arbitral tribunal *mutatis mutandis*". (Tjirongo 1995 and Bank of Namibia).

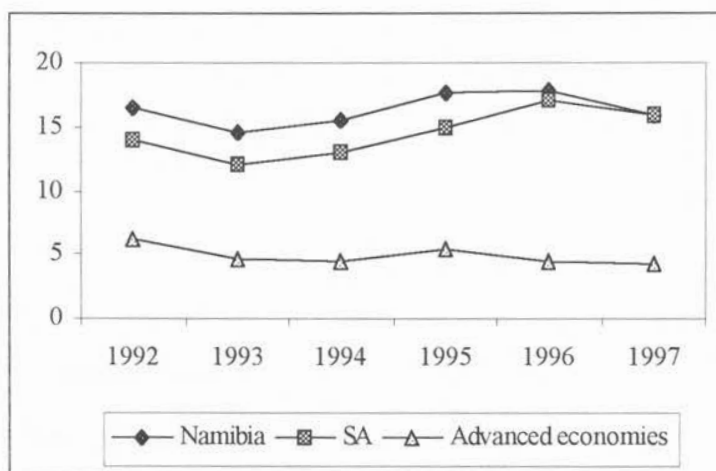
This present exchange rate arrangement is likely to remain long because the BON has indicated that the objective of Namibia with regard to monetary policy has been to support a fixed exchange rate between the Namibia dollar and the South African rand. It can be said that this policy has been effective in attaining the ultimate monetary objective of price stability. This is reflected in a stable inflation recorded over the period 1993 to 1997. Inflation was 10 percent on average during that period. The rate of inflation has been below the world inflation except in 1997 (see figure A5). This also reflects restrictive monetary policy pursued by the South African Reserve Bank to achieve price stability. This is transferred to Namibia through the fixed exchange rate. The BON indicated that this stable rate of inflation contributes to the government long-term objective of growth in a stable macroeconomic environment.

2.2.2 Interest Rates Developments

Namibia's interest rates are strongly affected by the developments in South Africa. Bank rates, deposit rate and lending rates have tracked down the South African rates closely as shown in figure A1, A2 and A3. This is in accordance with the theory of currency board that says that interest rates are expected to be in line with the anchor currency country's

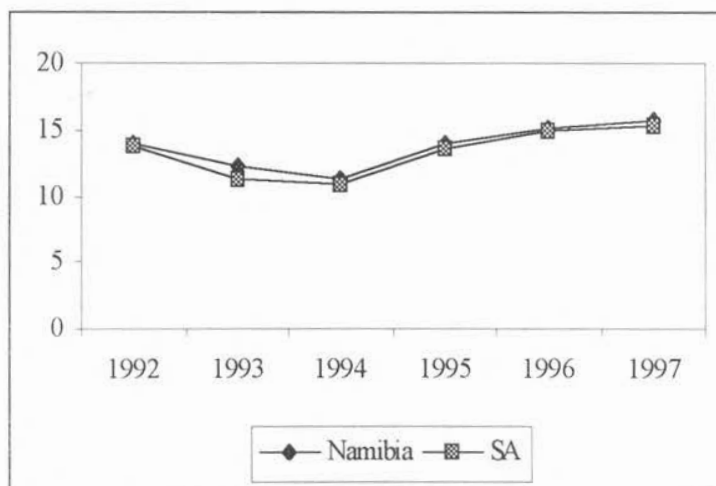
interest rates. Interest rates are expected to be in line with those in advanced economies. However, figure A1 shows that they are far from converging with those in advanced economies (Japan, United States, United Kingdom, France and Germany).

Figure A1 Bank rate



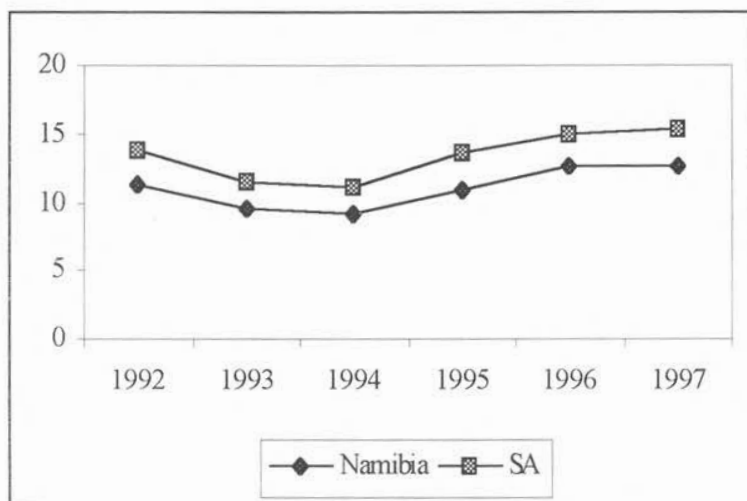
Source: Data for South Africa and Namibia are obtained from the *IMF Namibia Statistical Appendix 1999*. The data for advanced economies are obtained from the *IMF World Economic Outlook 1997*.

Figure A2 Treasury bills rate (average tender for 91-day bills)



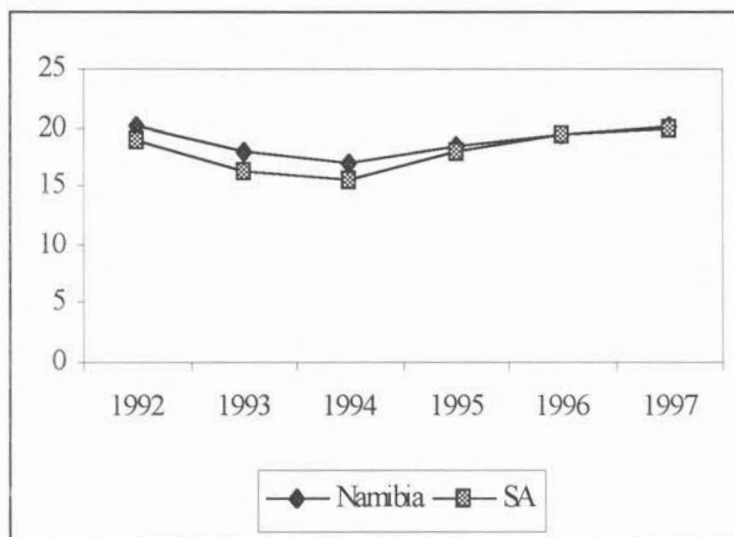
Source: IMF Namibia Statistical Appendix 1999

Figure A3 Deposit rates



Source: IMF Namibia Statistical Appendix 1999

Figure A4 Lending rates

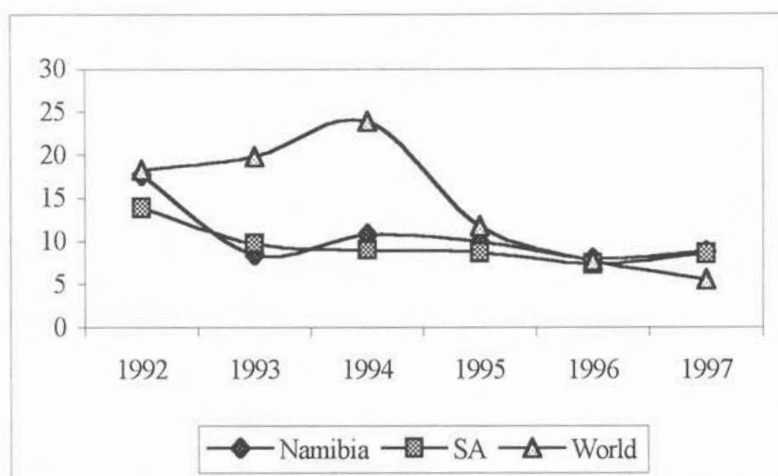


Source: IMF Namibia Statistical Appendix 1999

2.2.3 Inflation Rate

As a free market country, market forces determine all prices in Namibia. Price controls apply only to few commodities, especially petroleum products. These prices are adjusted periodically in line with market conditions and are free of government subsidies (IMF 1997).

Figure A5 Inflation rates



Source: Data for Namibia and South Africa obtained from the IMF-Namibia Statistical Appendix 1999. The data for the world are obtained from the International Financial Statistics.

Figure A5 shows the rate of Namibian inflation compared with that of South Africa and the world. The rate of inflation averaged about 9.9 percent during 1993 - 1995, with the highest inflation of 17.7 in 1992 as a result of the drought and the lowest of 8 percent in 1996. This is in line with price developments in South Africa. The rate of inflation for Namibia and South Africa were below that of the world from 1992 to 1995. They converged in 1996 and diverged in 1997. In 1997 the world inflation was 5.3 while that of Namibia and South Africa were 8.8 and 8.6. It can be seen from the figure that there is equalisation of inflation between South Africa and Namibia. This suggests that Namibia can benefit by being in a monetary union with South Africa. However, Parkin (1972) may argue that inflation equalisation may not be important for countries to be in a monetary union, because it can easily be achieved.

2.2.4 Money and Capital Markets Development

The money market instruments in Namibia include treasury bills, negotiable certificates of deposits, and bankers acceptance, with treasury bills being the most important. The issues of treasury bills and longer-term internal registered stock have been rising because of an increase in government financing needs. Table A7 shows the change in treasury bills and registered stocks of the government.

Table A7 Treasury Bills and internal registered stock of the Government of Namibia

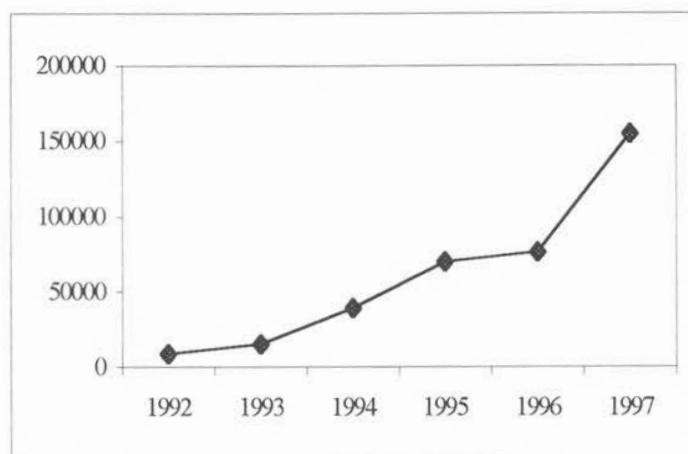
	Treasury Bills	Internal Registered Stock
1995	N\$ 1 202 500 000	N\$ 429 023 000
1996	N\$ 2 774 780 000	N\$ 403 900 000
1997	N\$ 5 029 310 000	N\$ 312 330 000

Source: Data obtained from the Bank of Namibia Annual Reports, various issues

In 1996, the total amount of treasury bills increased to N\$ 2.7 billion from N\$ 1.2 in 1995. In 1997 it increased to N\$ 5 billion. Internal registered stocks decreased from N\$ 429 million in 1995 to N\$ 312 million in 1997. Secondary markets for of these instruments have become active, but most of the trading has taken place outside the Namibia Stock Exchange. According to the BON, new proposals have been put forward to further deepen secondary market for government securities. This includes measures such as lengthening the maturity of the securities and focusing on longer-term securities.

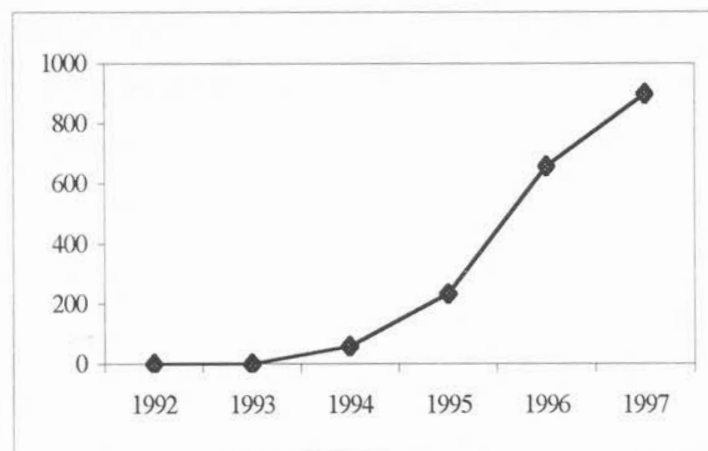
The Namibian Stock Exchange (NSX) was established in 1992 to assist in broadening investment opportunities in Namibia, against the background of continued investment of the country's saving in South African financial market (IMF 1995). The performance of the NSX is impressive. This is shown in figure A6, A7 and A8.

Figure A6 Market capitalisation (NS millions) of the Namibia Stock Exchange



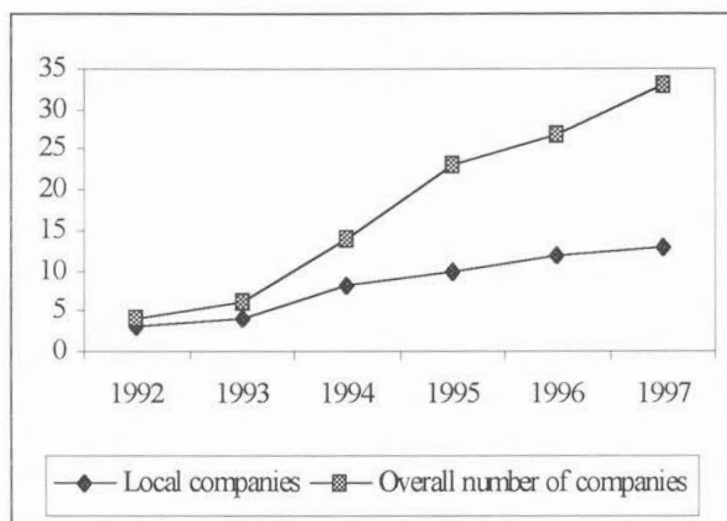
Source: IMF-Namibia Statistical Appendix 1999

Figure A7 Value traded on the Namibia Stock Exchange (NS millions)



Source: IMF-Namibia Statistical Appendix 1999

Figure A8 Number of companies registered on the Namibia Stock Exchange



Source: IMF-Namibia Statistical Appendix 1999

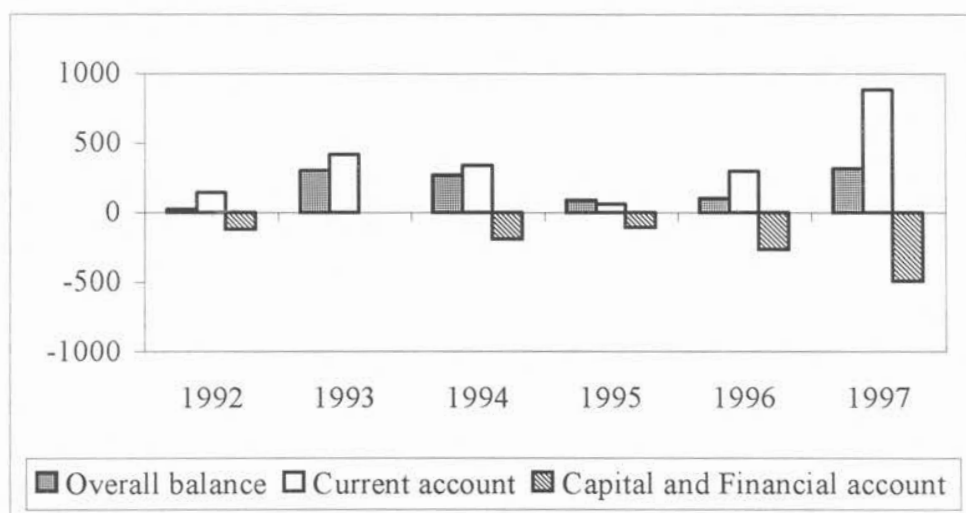
It started operations in October 1992 and it has grown substantially. It started with only 4 companies listed but it expanded rapidly, particularly during 1994 when the number of listed companies increased from 6 in 1993 to 14 at the end of 1994. The Stock Exchange grew from a market capitalisation of N\$ 8.6 billions in 1992 to N\$ 154.7 millions in 1997. The value of shares traded increased from N\$ 0.2 millions in 1993 to N\$ 901 millions in 1997. As shown in figure A8, at the end of 1997, 13 of the 33 companies listed were local. The registered stocks issued by the Bank of Namibia are traded on the NSX. The NSX maintains dual listing or cross listing system under which firms already registered for example, on the Johannesburg Stock Exchange (JSE) can list their stocks on the NSX. Dividends payable from the NSX listed companies payable to Namibian residents and firms are free from taxation.

2.3 The external Sector

2.3.1 The Current Account and the Capital and Financial Account

Namibia has a small and open economy. Foreign trade is a significant component of overall economic activity. As shown in figure A9, Namibia has been running surpluses in the current account of the balance of payments. The current account surplus increases to N\$ 884 millions in 1997. The Bank of Namibia has indicated that this increase was because of an increase in exports and transfer from the Southern African Customs Union (SACU) revenue pool. This surplus in the current account led to an increase in foreign exchange reserves from N\$ 152 millions in 1992 to N\$ 1219 millions in 1997 as shown in figure A10. However, these reserves are still below 3 months imports cover.

Figure A9 The current account, capital and financial account and the overall balance of the balance of payments



Note: Overall balance is the sum of current account and capital and financial account.

Source: Data obtained from the Bank of Namibia Annual Report 1998.

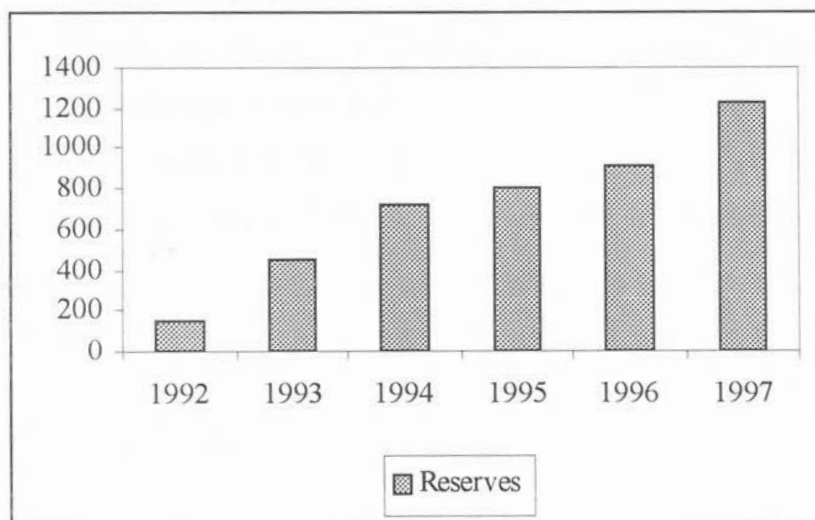
In the capital account (in the Namibian case it is called the capital and financial account) there have been significant outflows of N\$ 271 and N\$ 492 millions during 1996 and 1997. This reflects the outflows of pension funds and life insurance assets. In 1993 and

1995 the outflows were very low, N\$ 4.8 and N\$ 109 millions. This was caused by increase in mining investments and oil exploration.

2.3.2 Foreign Exchange Reserves

Figure A10 shows foreign exchange reserves and table A8 shows the imports cover of goods and services in weeks. Before the introduction of the Namibia dollar in September 1993, foreign exchange reserves were low covering only 2.8 and 2.0 weeks in 1990 and 1991. After the introduction of the Namibia dollar, foreign exchange reserves increased to N\$ 454 millions in 1993. This provided an import cover of 4.3 weeks (one month). After that, foreign reserves have increased further to N\$ 1257 millions in 1997. This was equivalent to 7.3 weeks (one month and 3 weeks) import cover.

Figure A10 Foreign reserves (N\$ millions)



Source: Data obtained from the Bank of Namibia Annual Report various issues.

Table A8 Imports cover in weeks

	Imports cover in weeks
1990	2.8
1991	2.0
1992	1.6
1993	4.3
1994	5.4
1995	5.5
1996	5.5
1997	7.3

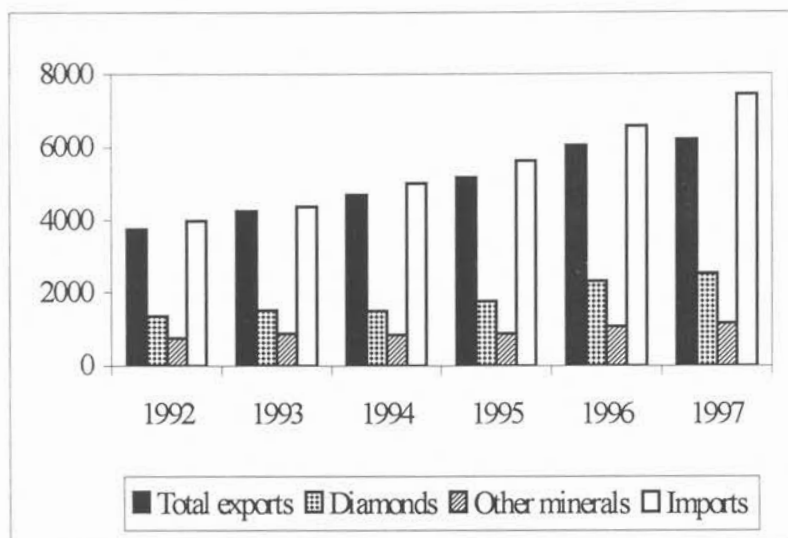
Source: Data obtained from the Bank of Namibia Annual Reports, various issues.

Despite this increase in reserves, the reserves are still under three months import cover, which is the optimal or international level of imports cover. This means that if Namibia wants to be monetary independent it must wait until it build up enough foreign reserves which can be used to intervene in the foreign exchange market. The experience of Botswana (see the experience of Botswana on the last section of the appendix) provides a lesson for Namibia. Its monetary independence was delayed for 10 years (1966 - 1976) after independence. As shown on appendix 3, at the time of adoption of monetary independence, Botswana had reserves covering four months of imports, while Namibia foreign exchange reserves are still below 3 months of imports cover. This suggests that Namibia should remain in the Common Monetary Area while building up its reserves and credibility.

2.3.2 Exports and imports

Primary products, especially minerals dominate the Namibian exports. Diamonds and other mineral products account for a high value of total exports. Figure A11 shows that in 1992 diamonds contributed N\$ 1349.8 millions out of total exports of N\$ 3739.8 (that is 36 percent of exports). However in 1994 diamonds declined to N\$ 1489.2 from N\$ 1522 millions in 1993, and that is a decrease to 31 percent of the total exports.

Figure A11 Exports and imports (in millions)



Note: The figure for total exports includes diamonds and other minerals. Other minerals are the sum of copper, gold, silver, lead, zinc, tin, marble and uranium.

Source: Data obtained from the Bank of Namibia Annual Report 1998.

The cause of the decline in diamonds and other minerals was the weakening of the international market for diamond and uranium. The growth of Namibian exports is determined in the world market conditions, in the case of minerals Diamonds are sold through a quota system by the Central Selling Organisation in London. That means the demand for diamonds is inelastic. Marine conditions and local weather determine the growth of fish and livestock. It is important for Namibia to diversify its exports in order to insulate from shocks in the world market. The government has focused on developing and diversifying the export base through the provision of fiscal incentive to the manufacturing enterprises and exporters (Bank of Namibia 1995). The government established the Export Processing Zone (EPZ) in 1995 with incentive to attract investors to Namibia in order to speed up industrialisation and diversification of the Namibian export base. Kenen's (1969) argument of diversification may suggest that Namibia should adopt a flexible exchange rate in order to insulate its economy from shocks originating from abroad. However, the inelasticities of Namibia's mineral products may suggest that the exchange rate may not be appropriate. A country can devalue its currency in order to promote its exports, but in the case of Namibia, devaluation of the Namibia

dollar may not increase exports but it will increase inflation and lower the standard of living of the Namibians.

Since 1992, imports have grown rapidly and this reflects that the economy is dependent on imports because it has small industrial base. Imports increased from N\$ 3961 millions in 1992 to N\$ 7441 in 1997. The cause of this increase may have been the drought and capital goods associated with new investment in mining and oil exploration. South Africa remains the leading source of Namibian imports. That is because of Namibia's membership of SACU that has high external tariffs, but imports from Germany, Zimbabwe, USA, Russia, and France are on the increase as shown in chapter 2. McKinnon's (1963) argument of openness would suggest that Namibia would benefit by remaining in the monetary union with South Africa because a high percentage of its imports comes from that country.

3. The Experience of Botswana

3.1 Introduction

Botswana was a member of the Common Monetary Area and was subject to the exchange rate policies of South Africa. The rand was the only legal tender in Botswana and during that time it had little control over its economy. In 1976 Botswana decided to issue its own independent currency in order to have control over its economy and national wealth. After that, it has enjoyed high growth in real GDP and its foreign exchange reserves increased. This section discusses the nature of the Botswana's economy, the realities of its flexible exchange rate and the reason for its success. This will serve as a lesson for Namibia. Botswana and Namibia depend largely on diamonds for exports earning. This will answer a question on whether Namibia should follow the example of Botswana because the two economies seem to be the same.

3.2 The nature of the economy

The economy is extremely undiversified. It is dominated by mining, which accounted for 37.6 percent of GDP for the year 1997/1998. This is shown in table A9. Manufacturing contributes a small share to the GDP. Electricity and water contributes 1.8 percent to the GDP while construction contributes 5.6 percent.

Table A9 The nature of the economy of Botswana in 1997/1998

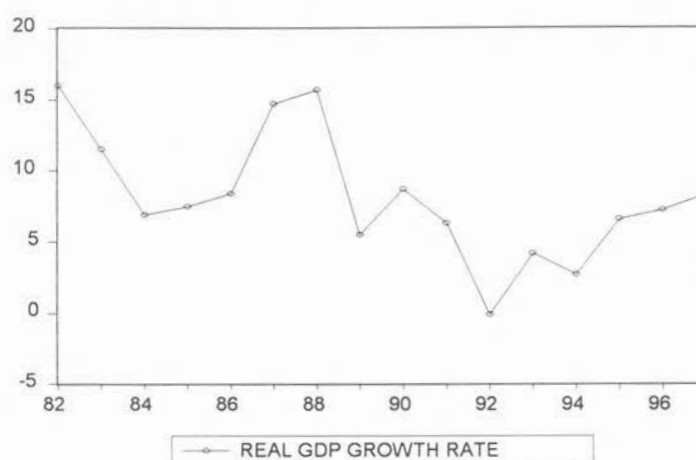
Agriculture, forestry and fishing	3.1
Mining and quarrying	37.6
Manufacturing	4.8
Electricity and water	1.8
Construction	5.6
Trade, hotels and restaurants	17.3
Transport and Communication	3.9
Financial services	10.1
Government services	14.5
Social and personal services	3.8
Total	100

Source: Economist Intelligence Unit 1997-1998.

Table A9 shows that Botswana relies more on mining than on manufacturing. If we compare this to the Namibian economy, it will become clear that the two economies are nearly the same, although mining in Namibia contributes 19.9 percent to the GDP.

With the exception of 1992, Botswana has achieved positive economic growth between 1982 and 1997. In 1982 and 1988 the real GDP growth was above 15 percent. The average GDP growth during 1982 - 1989 was 10 percent and the average real growth rate during 1990-1997 was 5.4 percent.

Figure A12 Real GDP growth rate



Source: Botswana Central Statistics Office

These growth rates surpass the performances of most African countries. The high real growth rate was caused by the continued strength of mining, especially diamonds, which is the major contributor to GDP.

Since 1985, the income generated by diamond sales has accounted for balance of payment surpluses. This permitted Botswana to build up massive foreign exchange and foreign asset reserves. The external financial surplus distinguishes it from other Sub Saharan African countries. This is also the most important reason behind the relative success of its attempt to gain monetary autonomy from South Africa. The other thing is the expansion of the local money supply and consequent excess liquidity in the banking sector. Another one again is the absence of balance of payments constraint to importation and foreign borrowings since foreign assets exist in abundance. The financial surplus has permitted Botswana to adopt relatively lenient exchange control measures. This is another distinguishing feature of its financial structure (Stuart 1992). These lenient exchange controls enabled Botswana to attract private investment when other countries could not.

3.3 The realities of Botswana's flexible exchange rate

3.3.1 The Creation of an Independent Monetary System

Botswana was a member of the Common Monetary Area until 1976. It used the rand as its currency and was subject to the monetary and exchange rate policies of South Africa. There was no possibility of Botswana having a monetary or exchange rate policy independent of that in South Africa. On 23 August 1976 the Bank of Botswana introduced the pula as a national currency in order to have control over its national economy. There began to be some scope for using monetary policy to separate the Botswana economy from policy and events in South Africa (Harvey 1986: 4).

The principal reason for withdrawing from the Rand Monetary Area was to enable the Botswana authorities to exercise greater control over the domestic economy. The ability to determine the external value of the currency is a central aspect of monetary policy. Over the past 21 years the Bank of Botswana has attempted with varying degrees of success. This was done in order to balance the need to maintain the competitiveness of the Botswana economy with the need to constrain the impact of imported inflation (Herman's 1997).

It did not take long after the introduction of the national currency to exercise its newly acquired monetary independence. The rate of exchange between the pula and the rand has been fixed on the Pula day at $R1=P1$. The public has been assured that this rate will not change during the following 100 days currency exchange period.

The pula was officially linked to the US\$ at a rate of $P1=US\$ 1.05$, which would yield the desired parity with the rand. This was not difficult to achieve because at that time the rand was linked to the US dollar, at the same rate of exchange. The pula was revalued on 30 April 1977 by 5% against the US\$ (Hermans 1997). The currency exchange has gone better than expected, and the level of Botswana's foreign exchange reserves was

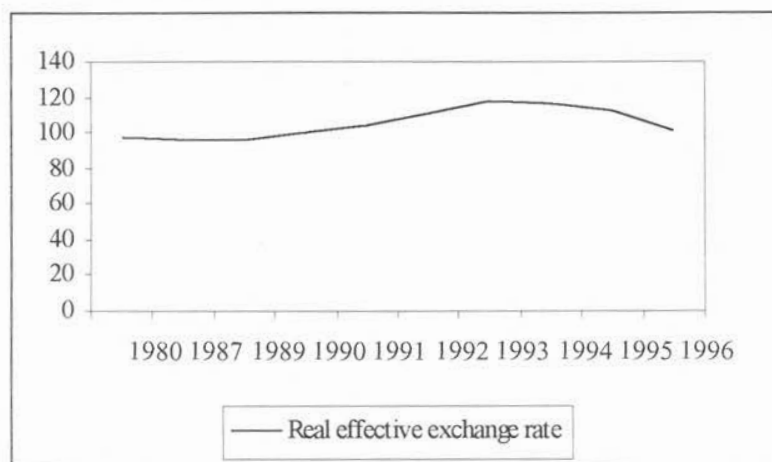
continuing to rise. This provided an early opportunity to demonstrate that, contrary to the gloomy warnings of international organisations and the business community, the pula would not necessarily be the weak currency as they predicted. Some people transferred their funds to South Africa before the Pula Day, and opened their accounts there. They expected that the pula would be a weak and unstable currency. The revaluation was intended to send a message to them that the pula would not be a weak currency. It was also hoped that the small appreciation of the pula would soften the impact of imported inflation and benefit consumers by making the costs of imported goods and services slightly cheaper in pula terms.

The revaluation was met with disbelief in South Africa. The IMF and the Governor of the South African Reserve Bank were surprised when Botswana decided to withdraw from the Rand Monetary Area. However, the revaluation had the desired effect of instilling some confidence in the pula and encouraging the transfer of funds back to Botswana from South Africa.

To maintain a more stable relationship with the rand, the peg with the US\$ was dropped in June 1980. It was dropped in favour of pegging to a basket of currencies consisting of the rand and the IMF's composite units of accounts, Special Drawing Rights (SDR). The pula was revalued by a further 5% in September 1979 and again 5% in November 1980. This was done in order to relieve domestic consumers whose real incomes were undermined by imported inflation. This trend had to be reversed when Botswana faced its first major economic crisis since independence resulting from the slump in diamond sales in 1981 and 1982 (Hermans, 1997).

Despite the exchange rate adjustments made from time to time by the central bank to maintain the country's export competitiveness or to mitigate the impact on domestic prices for imported inflation from South Africa the real effective exchange rate between has remained stable since 1980. The real effective exchange rate is shown in figure A13. It can be seen that it has been stable, and it depreciated between 1992 and 1995.

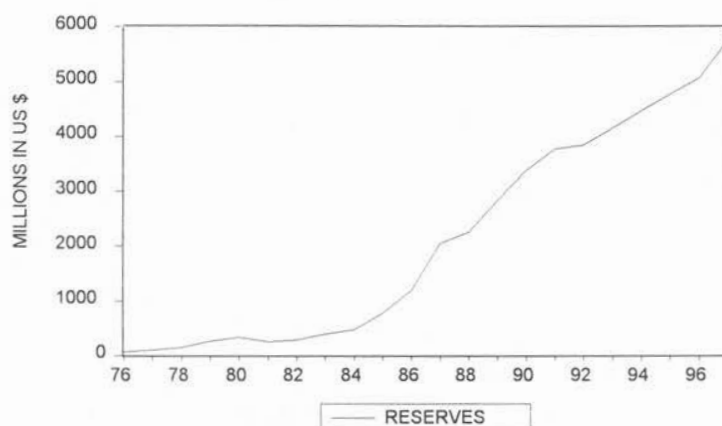
Figure A13 Botswana's real effective exchange rate



Botswana has enjoyed rapid economic growth over the past 25 years, and it has become one of the world's leading diamond exporter. Botswana has managed to avoid many problems experienced by many developing minerals exporting countries. Its success has been attributed to the high quality of macroeconomic and public financial management and to its relationship with international mining companies (Atta *et al*, 1996: 300).

3.3.2 Foreign Exchange Reserves

Avoiding the tendency to spend all of its revenues, the government has instead accumulated surpluses in recognition of the limits of the absorptive capacity of the economy. This has led to consistent balance of payments surpluses and accumulation of substantial foreign exchange reserves, which was equivalent to 30 months of import cover in 1996. This enabled the exchange rate policy to be used for purpose other than balance of payments stabilisation. The level of foreign exchange reserves is shown in figure A14.

Figure A14 Foreign reserves

Source: International Financial Statistics, various issues

It can be seen from figure A14 that foreign exchange reserves have increased since Botswana moved out of the CMA. The reserves increased from \$ 74.8 millions in 1976 to nearly \$ 6 billions in 1997. It is necessary to show the reserves imports coverage during the time of the adoption of an independent monetary policy in Botswana. This will serve as a lesson for Namibia. This is shown on table A10.

Table A10 Foreign exchange reserve imports cover in months at the time of implementing monetary independence

	Imports cover in months
1976	4.3
1977	4.3
1978	5.5
1979	5.1
1980	5.7

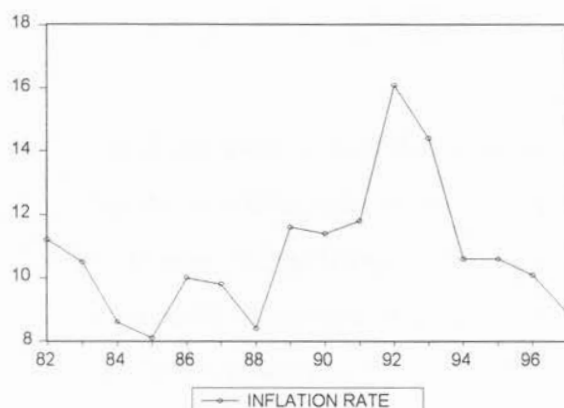
Source: Harvey (1985): 14

It is shown in table A10 that at the time of adoption of an independent monetary policy, Botswana had foreign reserves covering 4.3 months. This was above three months, which is regarded as the optimal level of imports cover. According to the Economist Intelligence Unit (1998 - 1999), these reserves are equivalent to 50 months of import

cover in 1997. This may suggest that Namibia should remain in the CMA until it builds enough foreign exchange reserves.

The rate of inflation was low during the 1980s, but reached high level of 16.1 percent in 1992. According to the African Development Report (1998), the main cause of high inflation was a rise in transport costs and fuel prices. Figure A15 shows the rate of inflation in Botswana.

Figure A15 Inflation rate



Source: data obtained from the International Financial Statistics

Due to steady depreciation of the pula, inflationary pressures have increased causing the price of imports to increase in local currency terms. The other contributing factors include an expansionary fiscal policy and more relaxed monetary stance. Despite this double-digit inflation rate, Botswana has tried to prevent a sharp increase in inflation rate. Inflation rate declined in 1993 and it was around 10 percent on average during 1994 - 1997.

3.4 Reasons for the success of Botswana

Adjustment measures adopted by Botswana were successful in restoring external balance. Harvey (1985: 44) indicated that these measures were very much of the sort of the normality insisted on by the IMF. Botswana reached agreement with the IMF on the letter of intent, which was never sent because the speed with which the foreign exchange reserves responded to the changes in macroeconomic policy. The factors that enabled Botswana to adjust successfully were very special of the situation facing much of the rest of countries in Sub-Saharan Africa. It would not be right to assume that as a result of the success of the Botswana case similar measures would necessary work in the same way elsewhere.

Harvey (1986: 44) pointed out some factors that enabled Botswana to succeed:

- In 1982 imports into Botswana were determined wholly by the ability to pay and not by licences or exchange control. Increase in the growth of imports could be reduced by increasing their prices and by reducing the rate of growth of domestic credit and income.
- Foreign creditors considered Botswana as creditworthy and the trend of interest rate meant that the country's capacity to borrow from abroad had not been used. The country was not in a position of having to hope that agreement with the IMF would restore its credit standing with foreign lenders. It was possible to shift some borrowing from domestic commercial banks to foreign creditors, by making local finance more expensive and less easily available. It was acceptable to increase foreign borrowing. During that period (early 1980s) the official debt service ratio was very low. There have been plenty of foreign exchange reserves and the government had not even drawn on the Eurodollar to make immediate addition to the foreign reserves by drawing down this loan.
- Employment and income have been increasing very fast before 1982, and there were plenty of opportunities for promotion among those people already employed.

- Botswana experienced a short crisis after introducing its pula. The diamond market was recovering and its exports were boosted by the sale of some of the outputs from the new diamond mine at Jawneng. This enabled the government to relax the credit ceiling during 1982 allow increase in wage early in 1983.
- The government of Botswana was aware of the effects of imports strangulation on neighbouring countries, where factories closed down or operating at 20 percent of capacity. The basic consumer goods were unobtainable for long periods and farmers unable to buy fertilisers and seed or to sell their output, government services working ineffectively because of lack of fuel, medicine or books. The government was determined to avoid the same problems from happening in Botswana. They were fortunate that the country's first balance of payments crisis came when there had been plenty of time to learn from the experience of other countries.

3.5 Conclusion

The real lesson of the experience of Botswana for Namibia was that early adjustment was better in some sense, albeit even that depends on the hypothetical argument as to what would have happened if adjustment had been delayed. The measures introduced by Botswana have enabled them to increase foreign reserves up to import cover of more than 45 months, a level above all other African countries.

Although the economies of Botswana and Namibian seem to be similar, there are differences between the two. When Botswana withdrew from the CMA in 1976 it had enough reserves equivalent to 4 months imports cover, while Namibia has reserves that are equivalent to 7.3 weeks imports cover in 1997. It seems reasonable to suggest that Namibia should remain in the CMA and work on its improvement and build up its credibility. Namibia should remain in the CMA, while building up its foreign exchange reserves. That is because even monetary independence was delayed in Botswana for 10 years after independence.