

**EXCHANGE RATES AND EXPORT
COMPETITIVENESS**

**PREPARED FOR THE WORLD BANK STUDY ON EXPORT
DIVERSIFICATION IN BOTSWANA**

DISCUSSION DRAFT¹

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¹ The views expressed in this paper do not necessarily represent the views of either BIDPA or the World Bank Group.

EXCHANGE RATES AND EXPORT COMPETITIVENESS

Executive Summary

- The objective of the report is to provide an assessment of the role of the exchange rate in determining export competitiveness, as part of the broader Botswana Export Diversification Study. The report comprises three main sections: (i) Real and Nominal Exchange Rate Trends and Measurement Issues; (ii) the Relationship Between Exchange Rates and Non-diamond Exports; and (iii) Exchange Rate Policy Issues and Recommendations.
- The determination of the pula exchange rate is based on a fixed peg to a basket, comprising the SA rand and the SDR; the basket weights are undisclosed but are related to trade patterns, the latter broadly comprising merchandise imports and non-diamond exports. The reason for excluding diamond exports is that they are considered to be relatively insensitive to the exchange rate.
- From an analysis of exchange rate developments between 1990 and 2004 it is evident that while the formal policy is a fixed peg, there have been adjustments to the value of the pula vis à vis the peg, including publicised step-devaluations as well as undisclosed “technical adjustments”. The result was a steady downward trend in the nominal effective exchange rate (NEER), measured using non-diamond trade weights, during 1990-2000. Between 2000 and early 2004 the NEER appreciated, although this appreciation was reversed by the 7.5% devaluation of February 2004.
- The NEER represents a weighted average of bilateral nominal exchange rates. Given that the exchange rates of the currencies in the pula basket fluctuated considerably against each other, bilateral pula exchange rates were much more volatile than the NEER. In particular, the pula depreciated significantly against the SDR currencies between 1990 and 2001, and appreciated slowly against the rand. Between 2002 and 2004 the trends were reversed, with rapid and substantial appreciation against the SDR currencies and depreciation against the rand.
- The real exchange rate takes into account inflation differentials between Botswana and its trading partners as well as nominal exchange rates. Bilateral real exchange rates (RERs) compare relative costs or prices in two countries, adjusted for the nominal exchange rate between them. Real effective exchange rates (REERs) can be constructed using trade weighted bilateral RERs, and provide a widely used, if incomplete, measure of a country’s international competitiveness. Internationally, productivity-adjusted price indices such as unit labour costs are preferred for REER calculations, but these are not available for Botswana or South Africa. A number of different REER indices are calculated for Botswana, based on alternative price indices for South Africa. It is found that REER movements vary across REER measures, although the broad trends are similar. The REER based on the South African Producer Price Index is the preferred measure, on the basis that it best represents the relative costs of production.
- The calculations show that the REER was fairly stable between early 1993 and 2001, in that it fluctuated within a fairly narrow range with no clear upward or downward trend. Nevertheless some upward movement can be seen from 1999 onwards, and

regardless of the measure chosen, the REER rose steadily for five years between early 1999 and early 2004, appreciating by 12% or more over this period. By late 2004, the REER was some 10% higher than its average value during the stable 1993-2000 period. The magnitudes of the changes are different when other inflation measures are used, but the broad trends are the same.

- Botswana's inflation rate has generally been higher than the (weighted) average inflation rate of its trading partners. During the 1990s, the steady depreciation of the NEER was sufficient to offset the higher inflation differential and keep the REER relatively steady. Between 2000 and early 2004, however, the NEER appreciated and this, combined with rising relative prices, has caused the REER to appreciate. After taking account of the February 2004 devaluation, REER appreciation since 2000 can be attributed entirely to rising relative prices and not nominal appreciation (unlike, for instance, South Africa, where real appreciation between 2000 and 2004 was almost entirely driven by nominal exchange rate appreciation).
- As with nominal exchange rates, bilateral RERs were much more volatile than the REER. The long periods of real depreciation against the SDR currencies and appreciation against the rand between 1993 and 2001 were reversed between 2002 and 2004; the latter period saw very extreme movements in bilateral RERs, with the pula appreciating in real terms by 80% against the US dollar.
- Turning to the impact of exchange rates on export diversification, it is clear that export diversification has not been particularly successful. Between 1990 and 2003, real non-traditional exports grew at an average annual rate of around 5%, insufficient for non-traditional exports to generate high rates of economic growth. It is also evident that, on various measures, exports were no more diversified in 2003 than they were in 1990, with diamonds still accounting for over 80% of total exports.
- However, there is some evidence that non-traditional exports are affected, as would be expected, by the real effective exchange rate. The period of recent REER appreciation has coincided with a slowdown, and indeed a reversal, of non-traditional export growth. Correlation coefficients indicate a negative relationship between real non-traditional exports and the level of the REER, regardless of the REER measure chosen. Regression analysis provides tentative support for such a relationship, although the statistical relationship is not conclusive as the results are not particularly robust to changes in data and model specifications. The analysis also indicates that the impact of export market growth is important, and as a result one important reason for the slow growth of non-traditional exports may be the relatively slow economic growth that Botswana's major market, South Africa, has experienced in recent years.
- Although the increase in the value of the REER in recent years has been fairly modest (around 10%), it can be argued that any increase in the REER, to the extent that it denotes a deterioration of international competitiveness, is inconsistent with a policy of export-led diversification and growth.
- The results of the sector studies provide limited information on the impact of exchange rates on non-traditional exports. Perhaps most importantly, all of the sectors reviewed have important structural issues that need to be addressed if there is

to be strong future export growth, and the overall level of the exchange rate does not figure among the priority issues. For most, if not all, of the sectors covered, and especially for individual firms, bilateral nominal (and real) exchange rates (notably pula/US dollar and pula/rand) appear to be of more importance than overall effective exchange rates. This reflects the structure of trade at the company/sector level, but also the volatility of bilateral exchange rates, where movements have been much greater than in the overall pula exchange rate. Given the magnitude of bilateral RER changes, and the speed of reversal of longer-term trends in 2002-04, it would be most unlikely that individual firms have not been affected, perhaps quite drastically.

- While from an economy-wide perspective it is the overall REER that is relevant, as an average of bilateral rates that have been moving by much larger magnitudes but in opposite directions, it may not be a good guide to the magnitude of changing prices, and hence incentives that guide firms. At the very least, bilateral RER volatility will have increased the uncertainty facing firms and this is likely to have contributed to reduced investment in non-traditional export activities (indeed, in the production of tradeable commodities more generally).
- It is important to note that this bilateral NER and RER volatility is outside of the control of domestic policy makers, and results from the volatility of the exchange rate of the rand against the SDR currencies, particularly the US dollar. Botswana cannot escape this volatility, but can only alter the distribution of exchange rate volatility across firms and sectors. The use of the trade weighted currency basket serves to distribute exogenous exchange rate volatility in accordance with the current importance of currencies in total trade.
- One way to assess whether the REER is at an appropriate level is to evaluate whether it is overvalued relative to its equilibrium value (the level of the REER that is consistent with macroeconomic equilibrium). Econometric estimation of the equilibrium REER indicates that while the actual REER has been slightly undervalued for most of the period from 1993 to 2001, in 2002-3 it rose sharply and by mid-2004 it was overvalued by around 10% relative to its fundamental determinants.
- A number of questions arise as to whether exchange rate policy could be more effective in supporting export-led diversification, in particular (i) whether the pegged exchange rate policy remains appropriate, and (ii) whether the exchange rate should be devalued to boost export competitiveness.
- A move to a more flexible exchange rate offers some possible advantages, including the potential of faster adjustment to changing economic fundamentals, hence avoiding prolonged exchange rate misalignments. It would also enable a more active monetary policy to contain inflationary pressures. Nevertheless there are several potential disadvantages, including more exchange rate volatility, resulting in greater variation in inflation rates and interest rates than at present. It is also uncertain as to whether there can be a meaningful market-determined exchange rate in a market where export receipts are very lumpy, and the market fluctuates between high levels of excess demand and excess supply of foreign exchange on a daily basis.

- Remaining with a broadly pegged exchange rate is probably appropriate for Botswana at the present time, as is generally the case for small open economies, although there may be scope for progressively greater flexibility in the operation of exchange rate policy.
- From the perspective of export diversification, the present method of calculating currency weights in the pula basket – which gives primacy to importers and non-mineral exporters – is appropriate. However, this induces greater, perhaps excessive, volatility in mineral export earnings and profitability, and fiscal revenues, and hence may not be appropriate from an overall macroeconomic perspective. Reflecting mineral exports in pula basket weights may be preferable from a macroeconomic perspective but would not necessarily be advantageous from the perspective of non-mineral exporters.
- The source of real exchange rate appreciation is higher inflation in Botswana than the average of trading partner inflation; in particular, high inflation for non-tradeable goods and services. While the causes of this are not well-established, it is thought likely that it is due in part to deteriorating relative productivity growth in Botswana. Therefore, while a devaluation would offer a short-term boost to competitiveness, it would not in itself deal with the source of the problem, which requires a longer-term strategy to boost productivity. Instead, it is likely that the initial improvement in competitiveness that a devaluation would bring about would be largely eroded, in the medium term, by the higher inflation that would result from a devaluation, thus offering no permanent gain in competitiveness.
- Devaluations are also problematic in that they reduce the pressure on producers to achieve the productivity gains that are ultimately required. Using devaluation to address the symptoms but not the causes of a lack of competitiveness runs the danger of starting a devaluation-inflation spiral, and undermining macroeconomic stability. In the circumstances, it is unlikely that devaluation is an appropriate policy response to the competitiveness problems denoted by the (relatively modest) overvaluation of the REER. Addressing more deep seated issues related to productivity and other factors that determine competitiveness (such as the legal and bureaucratic obstacles to investment identified in the FIAS study) would do more to bring about a sustainable, long-term improvement in export competitiveness than a devaluation of the pula.
- Nevertheless, devaluation could perhaps be effective if part of a broader package of structural reforms that were credibly focused on bringing Botswana's inflation rate down to levels comparable to trading partners. Such a package could also involve reforms to the exchange rate system with the objective of complementing the inflation and competitiveness objectives. One element could be greater exchange rate flexibility (such as a wider band rather than a narrow peg) that would permit the exchange rate to adjust in response to changing economic fundamentals, although still within the context of an overall managed rate. It would also permit a more active monetary policy to contain inflation more effectively. This could help to prevent prolonged real exchange rate misalignment from emerging. Considerable thought would have to be given to this package of

exchange rate and other reforms to ensure that (i) it had credibility and (ii) it addressed competitiveness problems at source.

- There are a range of potential data improvements that would help to enhance the quantitative analysis of trade and competitiveness issues. First, efforts need to be made to improve the quality and timeliness of trade data, which would enable better analysis of the impact of exchange rates on exports. Second, good quality data on productivity would help to identify possible sources of inflationary pressures and the underlying reasons for lack of competitiveness. Third, the calculation of a producer price index for Botswana would facilitate the calculation of an REER index that is consistent with good international practice. Botswana's REER calculations should, as far as possible, use PPIs for trading partner inflation rather than CPIs.

Exchange Rates and Export Competitiveness

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ABBREVIATIONS

AGOA	Africa Growth and Opportunity Act
CPI	Consumer Price Index
HHI	Hirschmann-Herfindahl Index
NDP	National Development Plan
NEER	Nominal Effective Exchange Rate
NER	Nominal Exchange Rate
PPI	Producer Price Index
REER	Real Effective Exchange Rate
RER	Real Exchange Rate
SA	South Africa
SACU	Southern African Customs Union
SDR	Special Drawing Right
USD	US dollar
ZAR	South African rand

INTRODUCTION

- 1.1 The objective of this report is to examine the exchange rate aspects of export diversification, in the context of the broader export diversification study. The exchange rate potentially plays a major role in determining the competitiveness of exports, and is more generally an important part of the macroeconomic environment within which export diversification is promoted. Both theory and widespread practical experience show that growth led by non-traditional² (or non-mineral) exports is very difficult to achieve if the real exchange rate is uncompetitive, and it is widely acknowledged that real exchange rate overvaluation has played an important role in economic crises faced by a wide range of developing countries.
- 1.2 This report considers both the nominal and real exchange rate aspects of export competitiveness. Obviously, competitiveness depends upon a range of factors, but for present purposes our focus is on the way in which the nominal exchange rate and relative (domestic and foreign) price levels interact to determine the real exchange rate. A crucial question, from a policy perspective, is the extent to which the nominal exchange rate can be used to influence the real exchange rate, and hence competitiveness.
- 1.3 The report is structured as follows. Section 2 reviews and analyses trends in both nominal and real exchange rates over the period since 1990, and considers some of the issues that arise in determining the relevant measures of the real exchange rate from an export diversification perspective. Section 3 explores the links between exchange rate policy, export diversification and “non-traditional” exports, drawing on both aggregate macroeconomic data and the sector studies that form part of the broader export diversification study. Section 4 considers exchange rate policy issues that arise from the analysis in sections 2 and 3. Section 5 summarises and concludes.

EXCHANGE RATE POLICY AND TRENDS

(A) EXCHANGE RATE POLICY FRAMEWORK

- 2.1 Botswana’s exchange rate policy has been consistently based on a fixed (pegged) exchange rate since the currency was introduced in 1976. Initially, the currency was pegged to the US dollar (and, implicitly, to the SA rand (ZAR), as the latter was also pegged to the dollar), but following the flotation of the rand in 1979, the Pula peg was changed to a basket of currencies in 1980 (see Box 1). The principle of a basket peg has been maintained ever since that time, although the details have changed. For most of the period since 1980 the basket has comprised the rand and the Special Drawing Right (SDR)³, initially in approximately equal amounts but subsequently with greater weight for the rand⁴. There have also been revaluations, devaluations and “technical adjustments” against the basket, in pursuit of various different exchange rate policy objectives.

[Box 1 about here]

² In this paper, non-traditional exports are defined as total exports less “traditional” exports, the latter category comprising diamonds, copper-nickel and beef.

³ The SDR comprises the US dollar, the Euro, the Japanese yen and pound sterling.

⁴ Details of the early years of exchange rate policy are given in Bank of Botswana (1987). Currency weights in the basket are not generally disclosed, but are broadly related to trade patterns.

- 2.2 The choice of a soft (adjustable) peg for the exchange rate is not in itself unusual; notwithstanding some evidence that in recent years many countries have moved towards either a hard peg (currency board or monetary union) or a free float, it remains common practice for small open economies, especially those with a dominant trading partner, to adopt a conventional fixed peg (Mussa et al, 2000)⁵.
- 2.3 The choice of pegging to a basket rather than a single currency reflects the structure of Botswana's trade, with no overall dominant trading partner (see Box 2). Trade patterns are polarised, with exports dominated by diamonds, denominated in US dollars, and imports predominantly from South Africa, denominated in rands. Besides motivating the choice of a basket peg, this trade pattern makes Botswana vulnerable to swings in the rand/dollar exchange rate.
- 2.4 Over the years, Botswana has attempted to pursue a number of different, perhaps conflicting or contradictory, objectives with its exchange rate policy. As noted above, the nominal (effective) exchange rate has varied over time, notwithstanding the basic policy of a fixed rate. At times, the policy focus has been allowing appreciation of the nominal exchange rate, with a view to moderating the impact of imported inflation and providing a stable anchor for prices. At other times, the nominal exchange rate has been allowed to depreciate, in order to boost export competitiveness. The relative importance of these objectives has varied over time; generally, the pursuit of international competitiveness, especially in the context of the policy of export diversification, has been dominant.
- 2.5 The objective of using exchange rate policy to promote international competitiveness has partly reflected concern about potential "Dutch Disease" problems resulting from the impact of strongly growing mineral exports. The concern is that if the exchange rate were market-determined, rising mineral export earnings would cause the nominal (and real) exchange rate to appreciate, making the production of non-mineral tradeable goods and services internationally uncompetitive. One reason for pegging the exchange rate has been to prevent this, and therefore, for most of the period since 1976, balance of payments surpluses have resulted in the accumulation of foreign exchange reserves rather than nominal exchange rate appreciation⁶.
- 2.6 Although it is sometimes held that the international competitiveness and price stability objectives of exchange rate policy are in conflict, the contradiction between policy objectives may be more apparent than real. Devaluation or depreciation of the nominal exchange rate may give rise to an initial improvement in competitiveness through a lower real exchange rate, but the higher inflation that will inevitably result from exchange rate depreciation is likely – in the long term - to erode most, if not all of the initial gain in competitiveness. The relationship between exchange rate policy, price/inflation objectives and competitiveness is discussed further in Section 4 of this report.

(B) EXCHANGE RATE DEVELOPMENTS SINCE 1990

- 2.7 While the general thrust of exchange rate policy, as presented in official policy documents such as the various National Development Plans (NDPs), has been

⁵ Appendix 2 of Mussa et al (2000) discusses exchange rate arrangements for small open economies.

⁶ There are other reasons why a "market determined" exchange rate may not be meaningful in a Botswana context, particularly the lack of an interbank foreign exchange market and the lumpy nature of export receipts. This is discussed further in section 4.

consistent over time, the details of exchange rate policy have changed. Discerning the timing of such changes, and the rationale for them, can be difficult, as they are not always publicly announced. Hence the interpretation of exchange rate policy changes must often be derived from the observation and interpretation of exchange rate data and trends.

- 2.8 In examining recent exchange rate developments, a number of different exchange rate measures are relevant. As noted above, Botswana's trade (and payments) patterns are polarised, and bilateral exchange rates against major trading currencies – particularly the US dollar and SA rand - are relevant to particular economic sectors. The volatility of the rand/dollar exchange rate in recent years has meant that the bilateral pula exchange rates against these currencies have both been volatile. From an overall macroeconomic perspective, however, rather than that of individual economic sectors, the nominal effective exchange rate (NEER) is more relevant. The NEER is essentially a trade-weighted average of bilateral exchange rates; weighting issues are discussed further in Box 2.

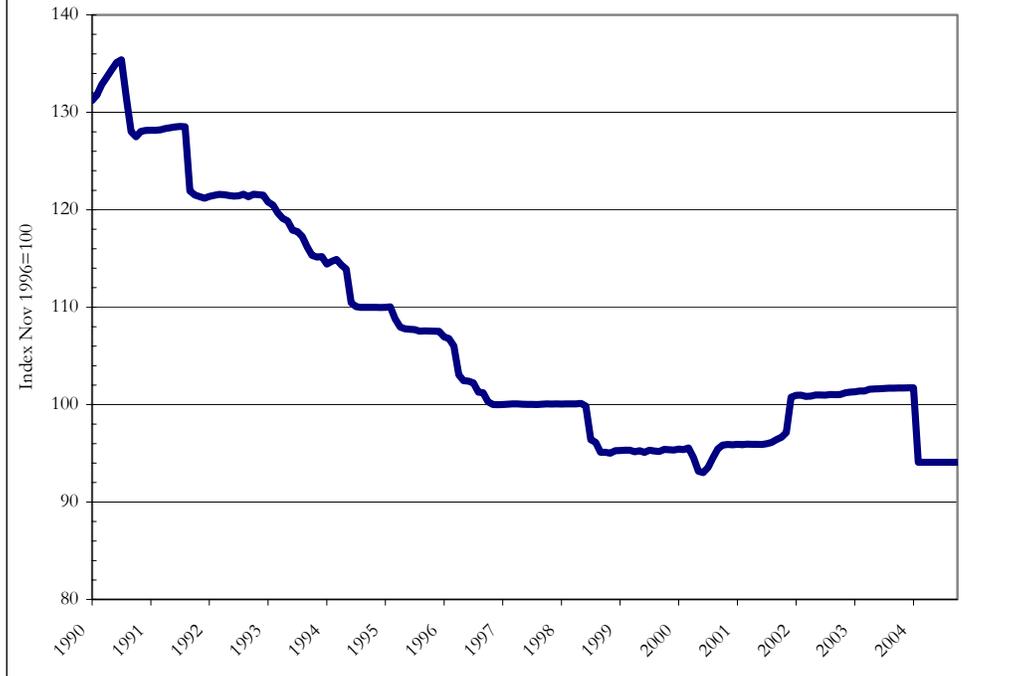
[Box 2 about here]

- 2.9 With regard to trade issues and competitiveness, real exchange rates are of more relevance than nominal exchange rates, as they take into account inflation differentials between trading partners as well as changes in nominal exchange rates. Again, bilateral real exchange rates may be more relevant for particular economic agents, but the real effective exchange rate (REER) is more relevant from a macroeconomic perspective.
- 2.10 In the following sections, both nominal and real exchange rates are discussed, bilateral and effective. The discussion covers both exchange rate trends and policy developments.

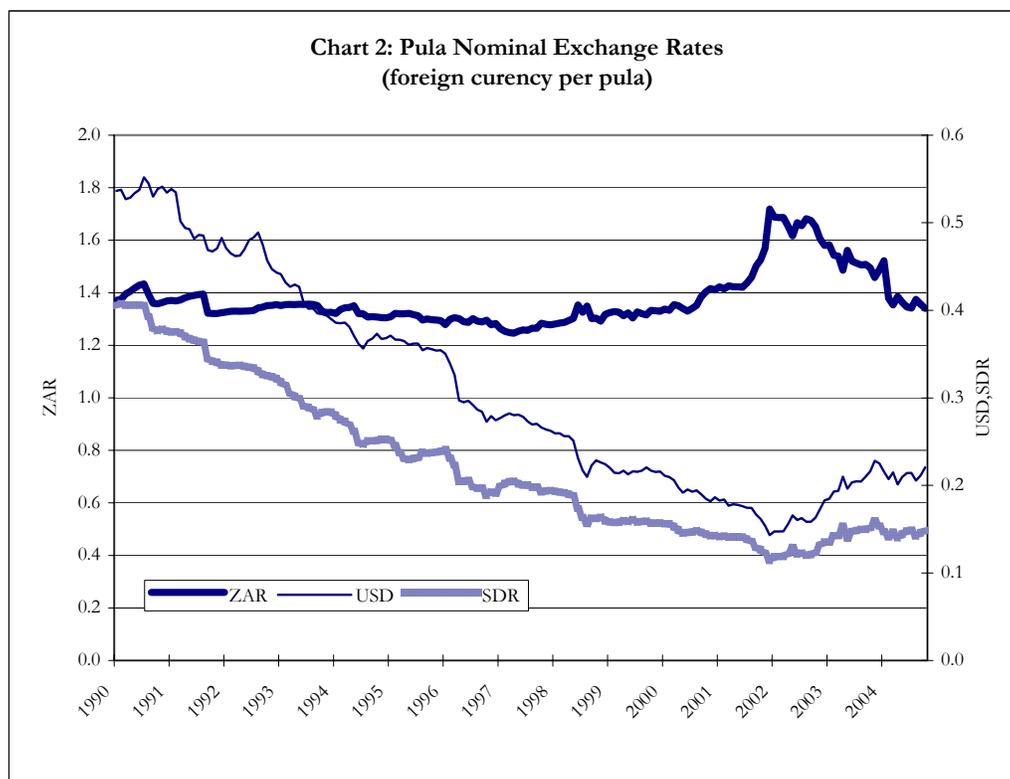
Nominal Exchange Rate Trends

- 2.11 Chart 1 illustrates developments in the NEER between 1990 and 2004. The period can usefully be divided into two sub-periods: 1990 to mid-2000, and mid-2000 to the present (late 2004). Between 1990 and 2000, the NEER followed a steady downward trend. Although exchange rate policy was formally a peg to a trade-weighted basket, it is evident that adjustments were made that resulted in devaluation against the basket. This was achieved by formal, publicly announced devaluations in 1990 and 1991, and subsequently through a process of (unpublicised) “technical adjustments” which had the cumulative effect (between 1992 and 2000) of a significant devaluation of the pula against the basket.

Chart 1: Nominal Effective Exchange Rate, 1990-2004



- 2.12 From mid-2000 onwards the NEER trend has been different; although there was no formal policy change announced, the appreciation of the NEER between mid-2000 and early 2004 was the first time that the NEER had appreciated since 1990. This was followed by a 7.5% devaluation of the pula in February 2004. The effect of the devaluation was to reverse the appreciation that had occurred between mid-2000 and late 2003, and to bring the NEER more or less back to the level of June 2000, at the end of the long period of depreciation since 1990.
- 2.13 Another perspective on exchange rate developments can be seen from trends in bilateral exchange rates. Chart 2 shows developments in the pula exchange rates with respect to the ZAR, USD and SDR – the first two representing the main trading currencies, and the third the being a component of the pula basket (along with the ZAR). This shows that subsequent to the 1991 devaluation, the pula-rand rate was kept fairly constant, around 1.30-1.35, until mid-2000. Subsequently it appreciated to a peak of over 1.70 in December 2001, due to the interaction of extreme rand weakness against major (SDR) currencies and the operation of the basket mechanism. As the rand recovered, the pula fell to around 1.50 rand in January 2004, and subsequently to around 1.35 following the February 2004 devaluation; by 2004, therefore, it was close to the levels that prevailed against the rand through most of the 1990s.



2.14 Chart 2 also shows that the pula depreciated steadily against the USD and the SDR throughout the 1990s; it was this depreciation (coupled with an approximately constant nominal exchange rate against the rand) that caused the overall NEER to depreciate. Since the beginning of 2002, rand strength has caused the pula to appreciate against the USD and, to a lesser extent, against the SDR.

2.15 Over the period as a whole (1990-2004), the pula has been approximately stable against the ZAR, and has depreciated considerably – by approximately 60% – against the USD and the SDR. Taking into account sub-period changes, however, there has been considerable volatility in all of the relevant bilateral nominal exchange rates (see Table 1).

Table 1: Summary of Pula Nominal Exchange Rate Changes

Period	ZAR	USD	SDR	NEER
Jan 1990-Dec 2004	-3.5%	-56.5%	-62.3%	-28.3%
<i>of which:</i>				
Jan 1990-June 2000	-3.0%	-63.6%	-63.9%	-29.1%
June 2000 - Dec 2001	29.2%	-26.7%	-21.9%	8.3%
Dec 2001-Dec 2004	-23.0%	63.1%	33.6%	-6.6%

2.16 Also over the whole period, the NEER has depreciated by nearly 30%, with almost all of the depreciation occurring between 1990 and 2001. These exchange rate developments, along with formal policy pronouncements, suggest that price stability (inflation) objectives did not receive much attention during the 1990s, whereas between mid-2000 and February 2004, exchange rate policy focused much more on using the exchange rate as a nominal anchor for prices, and there has been a greater focus on bringing inflation down to “low and sustainable” levels. As the

Bank of Botswana's *Monetary Policy Statements* have made clear, the recent objective has been to ensure that exchange rate policy was "neutral" with regard to imported inflation and that, with a fixed NEER, monetary policy then aimed at ensuring that domestic inflation was no higher than average trading partner inflation. Hence the basis for pursuing competitiveness objectives has shifted, from using nominal depreciations during the 1990s to a focus on restraining domestic price increases since 2000. The next section will examine real exchange rate developments during these periods, and consider the relative success of these different policy approaches.

Real Exchange Rates

- 2.17 As we have noted earlier, Botswana's exchange rate policy has consistently aimed at maintaining a stable and competitive real effective exchange rate (REER). Achieving this depends on the interaction of nominal exchange rate (NEER) developments and domestic inflation relative to trading partner inflation. If the NEER is fixed or stable, then Botswana's inflation must be no higher than the average of trading partner inflation if the REER is to be held constant.
- 2.18 As Table 2 shows, Botswana's inflation has, on average, been above average trading partner inflation. The resulting REER trends are shown in Chart 3. Although the details depend on the particular measure of the REER chosen (for more details, see Box 3), some broad trends can be identified. Between early 1993 and mid-2000 the REER was roughly constant, fluctuating in a fairly narrow range. After mid-2001 the REER broke out of this range and appreciated steadily, peaking in January 2004, prior to the recent devaluation.

[Box 3 about here]

Table 2: Inflation Summary (annual averages)

Period	Botswana	South Africa		SDR	Trading
	CPI	PPI	CPI	countries	partners
				CPI	
					[2]
1990-2004	9.4%	7.4%	7.7%	7.4%	5.5%
1990-2000	10.4%	7.4%	8.7%	7.9%	5.5%
2001-2004	8.3%	5.2%	5.6%	6.6%	4.1%

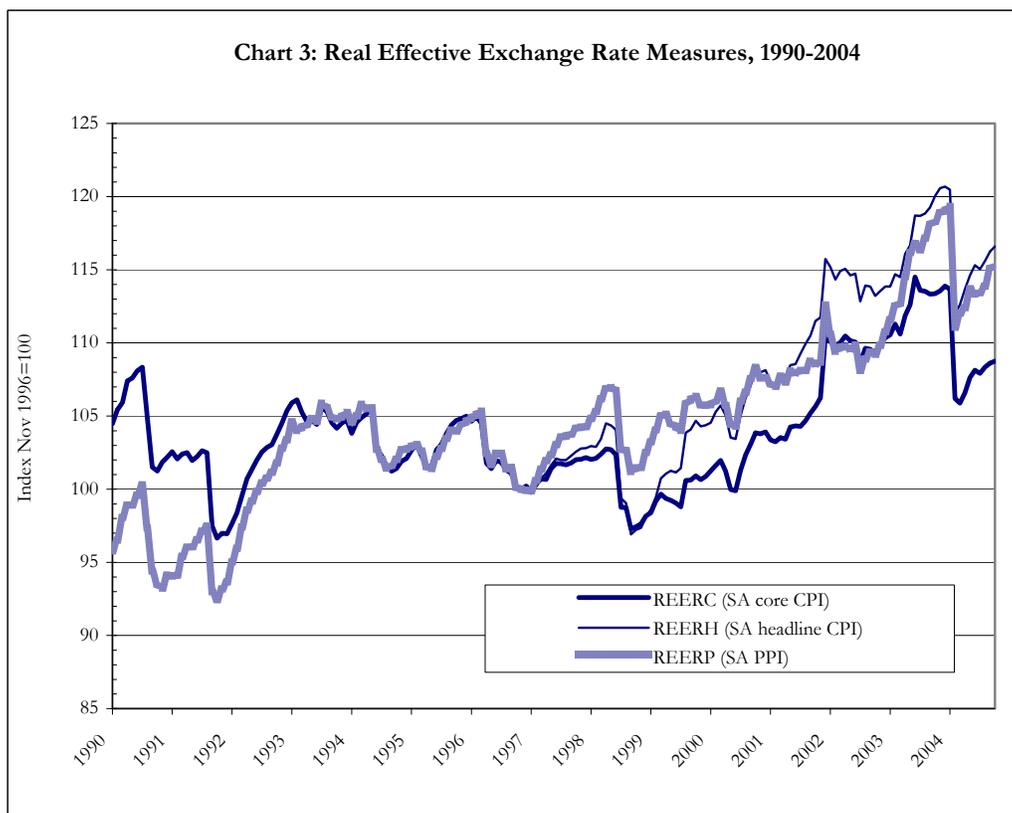
[1] Core CPI series starts in 1996

[2] Weighted average based on approximate trade weights. PPI used for SA

- 2.19 While mid-2000 may be an important "break" point in the REER series, given the NEER developments discussed earlier, it is also possible to identify an earlier turning point in REER trends, in late 1998. Between the end of 1998 and January 2004 the REER appreciated steadily, marking a change from the previous six year period when the REER was fairly stable. While the precise amount of the appreciation between late 1998 and early 2004 depends on the measure chosen (varying between 17% and 24%), all measures identify a common trend. Over the same period, the NEER appreciated by 7%, so the larger portion of the appreciation was due to higher inflation in Botswana than the average of trading partner inflation. The consistently higher inflation in Botswana than in trading partners compares with the Bank of Botswana's recent policy objective, expressed in various *Monetary Policy Statements*, of keeping Botswana inflation no higher than

the average of trading partners; this underlies the Bank's inflation objective range, published each year, which would be sufficient to keep the REER stable.

- 2.20 The REER appreciation that occurred between 1998 and 2004 was partially offset by the February 2004 devaluation of 7.5%. However, the value of the REER remains higher than during the relatively stable period of the 1990s; compared to its average over 1993-2000 (when fluctuations were within a narrow range), the REER (on the preferred SA PPI/Botswana headline CPI measure) was still 10% overvalued in August-October 2004.



- 2.21 The identification of REER trends and turning points helps to identify important aspects of the relationship between nominal and real exchange rates. Essentially, during the 1990s, the depreciation of the NEER was sufficient to compensate for Botswana's relatively high inflation (compared to trading partners) and keep the REER approximately constant. Since 2000, this has no longer been the case, and REER appreciation has resulted from the combination of a stable (or appreciating) NEER and inflation that has remained higher than trading partners.
- 2.22 Comparing the REERs calculated using the SA PPI and those using the SA CPI and core CPI shows similar overall trends, although the magnitudes of changes vary between measures. The largest differences are between REERC (using SA core inflation) and REERH (using SA headline CPI inflation), with REERP (SA PPI) in between. The reason for this is that SA core inflation has generally been higher than headline CPI inflation and PPI inflation in recent years, and thus Botswana's relative prices appear higher with respect to CPI and PPI inflation than with respect to core inflation. South African core inflation excludes, *inter alia*, interest rates, and as these have been on a downward trend in recent years, headline inflation has been lower than core inflation as a result. Furthermore, SA core

inflation has deviated from headline inflation over a long period, which makes core less useful as a measure of long-term inflationary trends. Finally, interest rates are part of the costs faced by producers, and therefore it is relevant to include them in relative price measures when assessing competitiveness. For these reasons, the REER based on SA core inflation is likely to be a misleading measure of competitiveness.

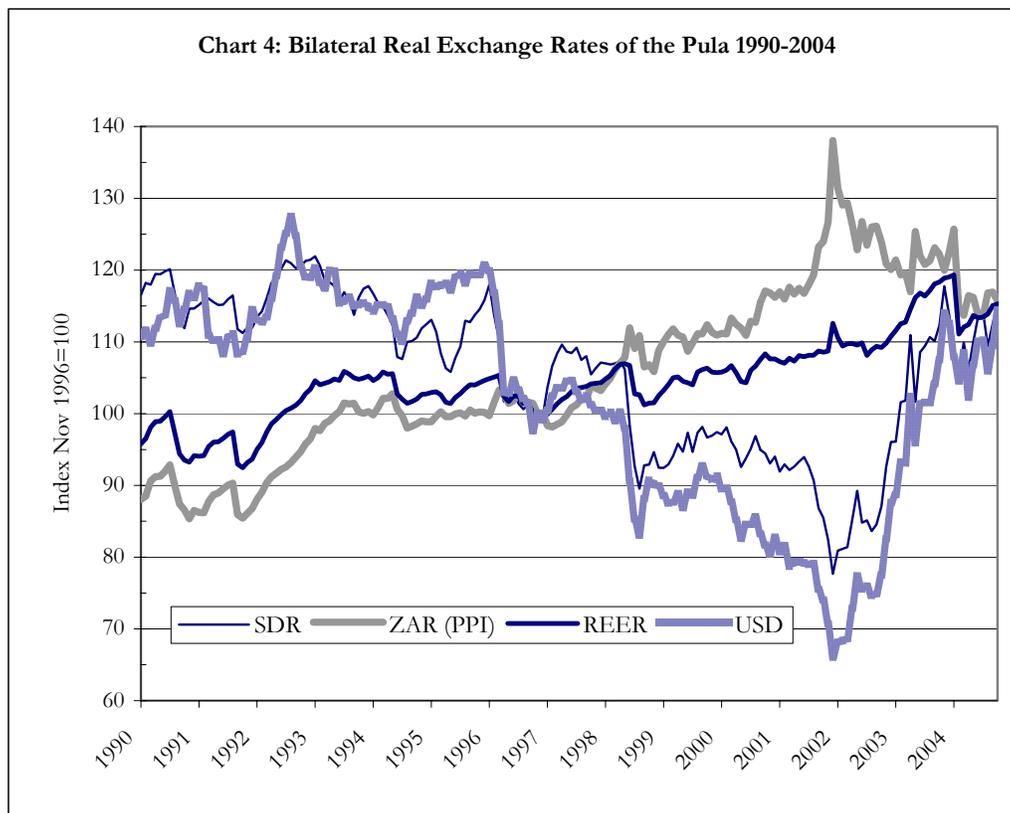
- 2.23 As with nominal exchange rates, bilateral real exchange rates showed considerably more volatility than the overall REER (see Chart 4 and Table 4). Against the SDR, the pula has been fairly stable in real terms over the 1990-2004 period taken as a whole, but this disguises sharp differences in sub-periods: between 1990 and 2001, the pula/SDR RER depreciated by 33%, but from 2001 to 2004, it appreciated by 54%. Developments in the pula/dollar RER were similar but more extreme: 40% depreciation from 1990 to 2001, followed by 80% appreciation from 2001-2004. Against the rand, there has been an opposite trend: 57% appreciation between 1990 and 2001, with the most rapid appreciation between 1998 and 2001, followed by 13% depreciation between 2001 and 2004. Overall real appreciation against the rand was 37% between 1990 and 2004.

Table 3: Summary of Real Exchange Rates Changes

	Bilateral Pula RERs vs.:			REER
	ZAR [1]	USD	SDR	[1, 2]
Jan 1990-Oct 2004	36.7%	7.5%	2.9%	20.4%
of which:				
Jan 1990-June 2000	26.0%	-23.7%	-19.6%	8.9%
June 2000-Dec 2001	24.5%	-21.8%	-17.2%	7.9%
Dec 2001-Oct 2004	-12.8%	80.2%	54.4%	2.4%

[1] using SA PPI

[2] adjusted for Botswana VAT

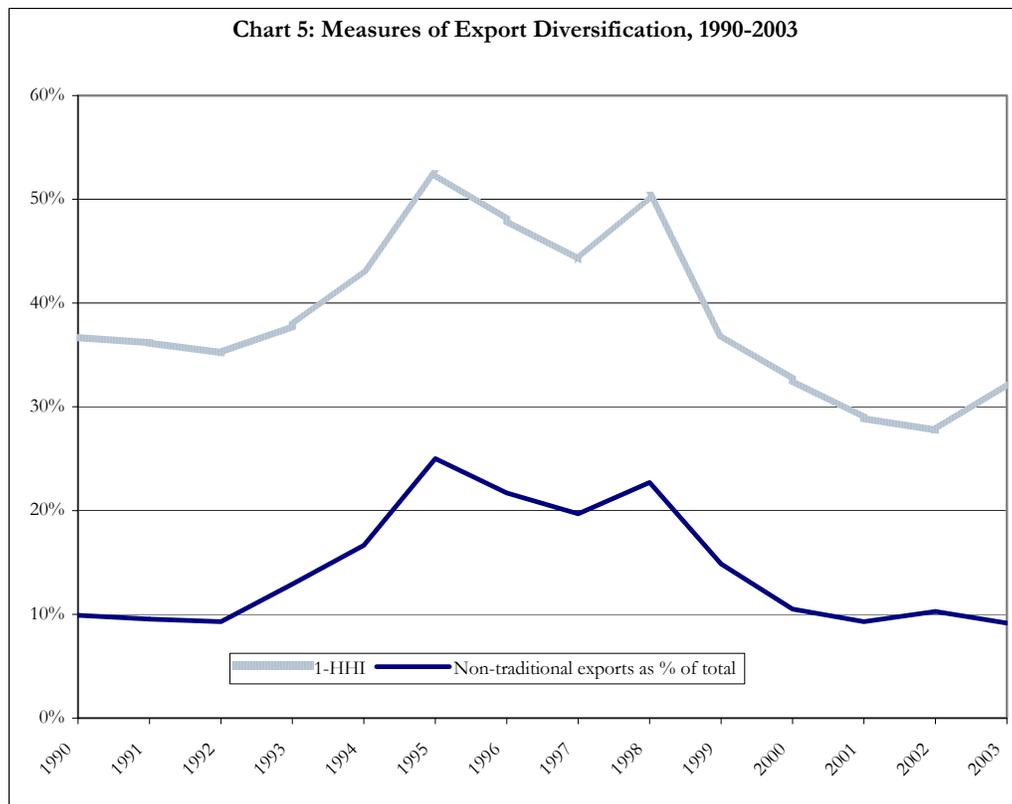


- 2.24 Bilateral RER volatility is of particular relevance for particular firms or economic sectors, which tend to have their trade concentrated in particular markets and currencies. Although bilateral RERs against the SDR/US\$ and rand tend to move in opposite directions in any particular period – a result of the operation of the pula basket – all the relevant bilateral RERs have experienced periods of rapid appreciation during 1990-2004, which is likely to have had important implications for exporters. RER volatility adds to uncertainty in the macroeconomic environment and makes investment planning difficult.
- 2.25 The policy implications of these developments will be discussed in Section 4; however, it is important to note that bilateral NER and RER volatility is generally outside of the control of domestic policy makers, and results from the volatility of the exchange rate of the rand against the SDR currencies, particularly the US dollar. Botswana cannot escape this volatility; the only variable under the control of domestic policymakers is the distribution of the volatility across bilateral pula exchange rates, which depends on the choice of weights in the pula basket. The relatively high weight for the rand in the basket tends to stabilise the pula against the rand, pushing the impact of volatility onto the pula/SDR rate. A higher weight for the SDR in the basket would transfer some of the pula/SDR volatility to the pula/rand rate, and would hence change the distribution of exchange rate volatility across firms and sectors, but would not reduce total volatility.

EXCHANGE RATES AND EXPORT DIVERSIFICATION

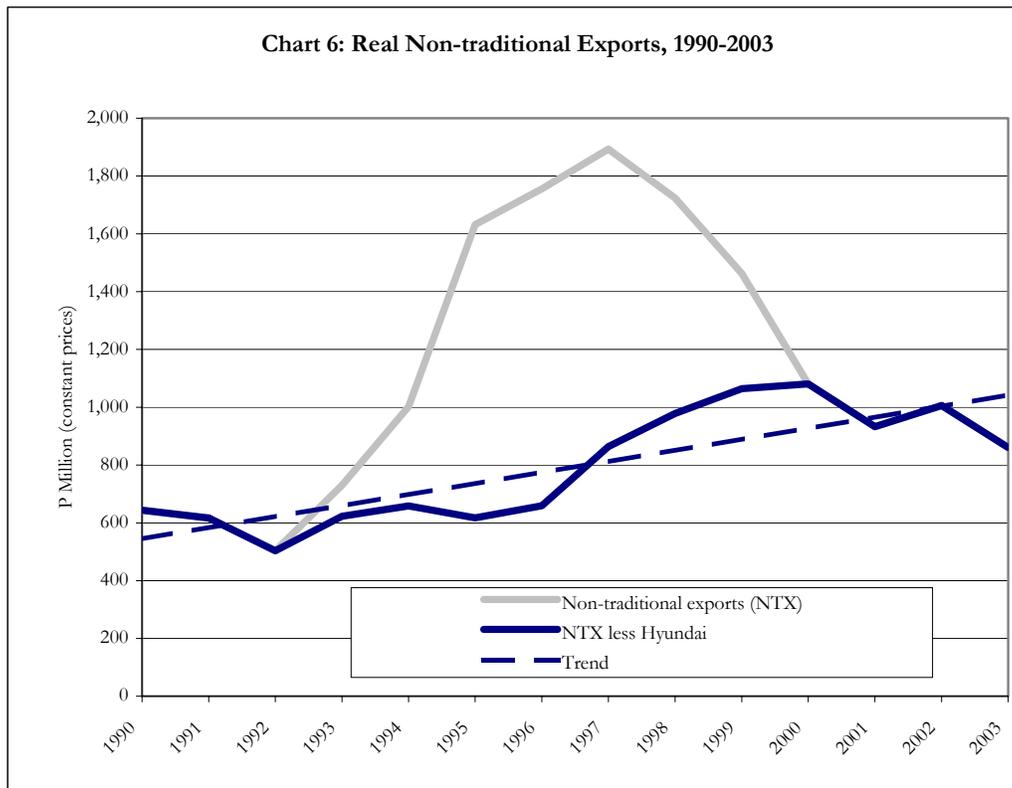
(A) TRENDS IN NON-TRADITIONAL EXPORTS

3.1 Botswana's export diversification strategy has been aimed at changing an export structure that has historically been highly concentrated, that is, dominated by a small number of "traditional" export products that include particularly diamonds, but also beef and copper-nickel matte. The strategy has aimed to diversify exports through the promotion of "non-traditional exports", which have typically been considered to be manufactured products, i.e., the development of the manufacturing sector has been thought of as the mainstay of the export diversification strategy. In recent years this view has changed somewhat, and diversification is now seen more broadly as encompassing any new or expanded products that diversify GDP and exports; this may therefore include new mineral products (e.g., soda ash, gold) and services (tourism, financial and business services) as well as manufactured goods (see, e.g., Bank of Botswana, 2002).



3.2 Trade data indicates that, during the period since 1990, the diversification strategy has been largely unsuccessful. Chart 5 shows that non-traditional exports (i.e., excluding diamonds, beef, copper-nickel and soda ash) accounted for around 10% of total exports in the early 1990s, and a similar proportion in 2000-2003. The non-traditional export share rose to over 20% in the mid-1990s, largely as a result of the establishment of the Hyundai vehicle assembly plant, but the rise in non-traditional exports proved unsustainable once the plant closed in 2000. A broader measure of diversification (1 – the Hirschmann-Herfindahl index, or HHI), also shown in Chart 5, similarly shows no sustained progress; in fact, apart from the Hyundai-

related developments in the mid-1990s, exports have become less diversified during the period under review⁷.



3.3 The counterpart of a lack of diversification is the slow growth of non-traditional exports in real terms (see Chart 6). Average real growth of non-traditional exports (excluding Hyundai vehicles⁸) over 1990-2003 was around 5% a year, which is not enough for non-traditional exports to provide the basis for export-led growth. Perhaps more disturbingly, real non-traditional exports, excluding Hyundai, were on a downward trend between 2000 and 2003. Textiles, in particular, have done badly; once seen as a key sector that would be able to lead export diversification, the share of textiles in total exports has fallen by half from over 3% in the 1990s to 1.5% in 2003⁹.

3.4 One positive aspect of export diversification relates to trade in services; as Chart 7 shows, services exports have been rising steadily in real terms, with an average annual growth rate of around 10% in real terms between 1990 and 2003¹⁰. Services exports have as well risen steadily in relation to goods exports and as a share of

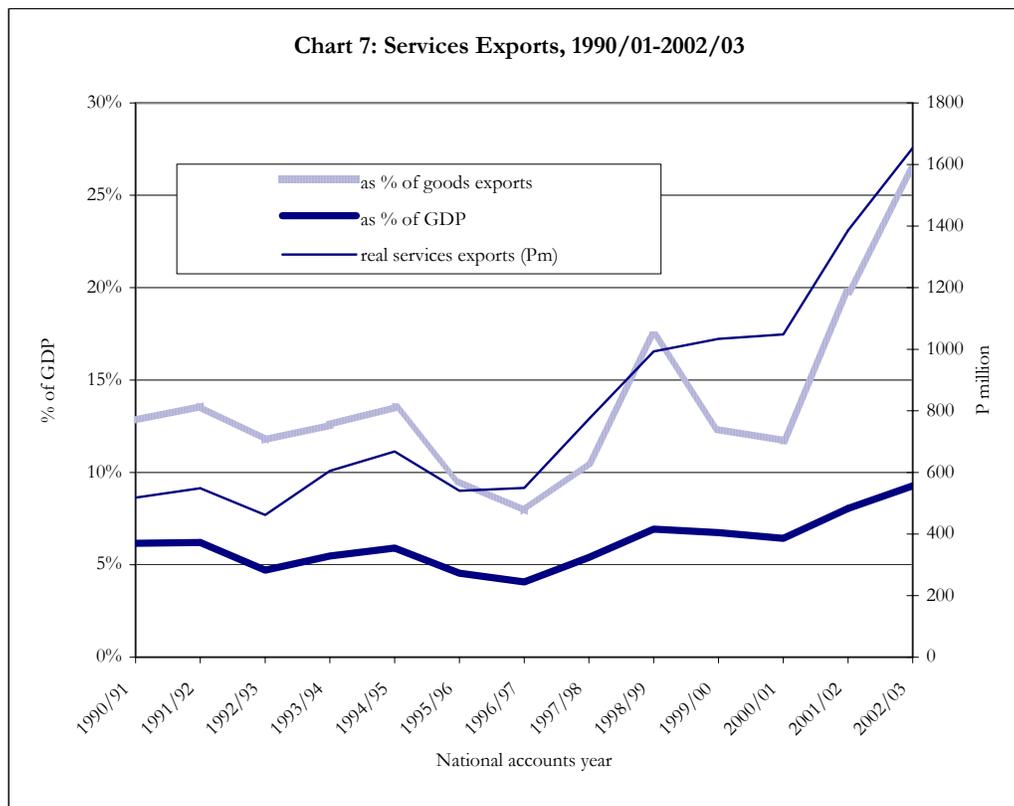
⁷ One proviso is in order, however, regarding the trade data. Data for 2002 and 2003 were only released early in 2005, along with data for part of 2004, and are provisional. Furthermore the provisional data contains some obvious errors, and the way in which these errors are corrected influences the calculation of recent non-traditional exports. It is also evident that the provisional data will need to be revised at some point.

⁸ The export of vehicles from the Hyundai factory that operated between 1996 and 2000 are excluded. Vehicle exports grew very rapidly and came to dominate non-traditional exports in the late 1990s. When the Hyundai plant closed, vehicle exports dropped sharply. The rapid rise and subsequent decline of Hyundai exports tends to obscure underlying non-traditional export developments.

⁹ Recently-released preliminary trade data does, however, indicate a sharp rise in textile exports in the second and third quarters of 2004, which, if sustained, will mark a reversal of this decline.

¹⁰ Compared to 3% a year for goods exports

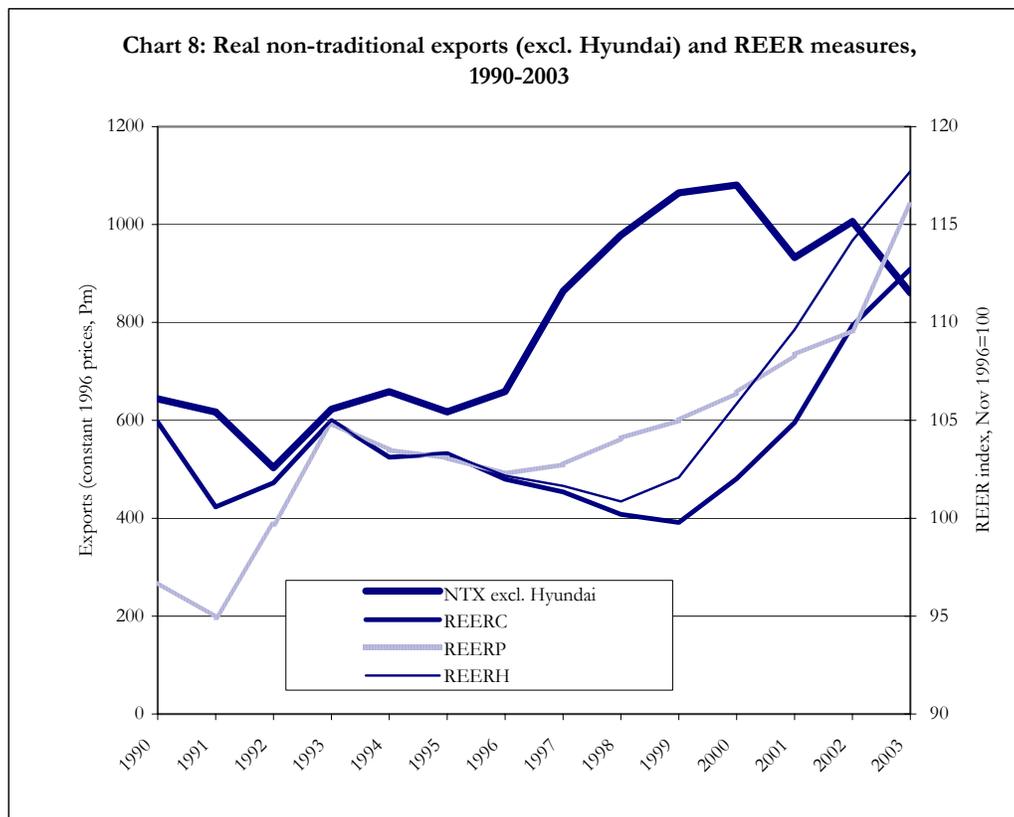
GDP. Such diversification of trade is in line with international trends that show a rising share of services trade in total trade, and is also indicative of some diversification taking place in Botswana's trade structure.



(B) NON-TRADITIONAL EXPORTS AND EXCHANGE RATES

3.5 For present purposes the key question is to what extent is non-traditional export growth, and export diversification, influenced by exchange rate developments and exchange rate policy. Economic logic suggest that there should be a relationship: to the extent that the real exchange rate measures the competitiveness of Botswana's exports in international markets, it is to be expected that the volume and growth of those exports will be influenced by their relative price, along with other variables. More specifically, it will be more difficult to achieve growth of non-traditional exports if competitiveness is deteriorating. And, as the discussion of Section 2 indicated, there has been overall appreciation of the REER since the mid-to-late 1990s, which is consistent with diminishing international competitiveness and could, potentially, be a contributory factor to the slow growth of non-traditional exports.

3.6 Chart 8 shows non-traditional exports and various measures of the real exchange rate during 1990-2003. Evidence of a relationship between the two depends on the measure of the real exchange rate chosen: the preferred REER measure (REERP, using SA PPI, see Section 2) appears not to show a relationship with non-traditional exports, while the other measures (REERH, using headline inflation, and REERC, using core inflation) do show some evidence of the expected inverse relationship between the real exchange rate and non-traditional exports, especially REERC.



3.7 Correlation coefficients can also help to present information on the relationship between non-traditional exports and the real exchange rate. Correlation coefficients are shown in Table 3 below between non-traditional exports and the three REER measures, for period 1990-2003 as a whole and in two sub-periods, 1990-1997 and 1998-2003. These indicate three conclusions. First, over the period as a whole there is no clear relationship between non-traditional exports and the REER; second, dividing the period in two shows evidence of the expected negative relationship, which is stronger in the second sub-period than the first; and third, negative relationship is evident across all measures of the REER.

Table 4: Correlation Coefficients – Real non-traditional exports and real effective exchange rate

Real exchange rate measure	REERH	REERC	REERP
1990-2003	0.293	0.053	0.487
1990-1997	-0.281	-0.321	0.063
1998-2003	-0.389	-0.418	-0.480

Note: using quarterly data

3.8 Regression results for export demand equations provide similar conclusions (see Box 4). They indicate that there is a statistically significant negative relationship between the REER and real non-traditional exports, although due to a lack of model robustness the results should be taken as somewhat tentative. In addition, they indicate a positive relationship between non-traditional exports and economic growth (demand) in export markets, which suggests that sluggish growth in the

main market for non-traditional exports - South Africa – is also to blame for the slow growth of non-traditional exports.

[Box 4 about here]

(C) SECTORAL IMPACT OF EXCHANGE RATES

3.9 On a more disaggregated level, hard information is difficult to come by regarding the impact of exchange rate changes on individual firms or industries. The accompanying sectoral reports (on beef, ostrich products, textiles, automotive products and tourism) provide little direct information on the impact of exchange rates and exchange rate movements on exports. Nevertheless, some conclusions can be drawn, at least from information on the currency structure of trade in the various sectors.

(i) Textiles:

3.10 It is evident that the textile sector has a relatively wide spread of markets for its products (the USA, Europe and South Africa are all important) so that the industry has diversified currency structure of revenue streams by currency. Individual firms, however, tend to be more concentrated on particular markets and currencies. The sources of imported inputs are also diversified, although Asia is the most important source, with input purchases likely to be US\$-denominated.

3.11 Recent bilateral exchange rate changes (a weak US dollar, strong rand, Pula depreciation versus the rand and appreciation versus the dollar) have had mixed impacts on the sector. In South Africa, pula depreciation has helped the competitiveness of Botswana producers but the SACU region as a whole is now less competitive vis a vis the rest of the world, and this has intensified competition from imported textiles and clothing in the South African market. In the US market, where apparel exported under the AGOA is increasingly important, competitiveness has declined due to the weak dollar and strong pula; nevertheless, exporting to the US market still appears to be viable, under AGOA's present concessionary terms. In all cases, there have been gains on the import side as pula appreciation against the dollar has contained the price of inputs imported from outside of the SACU region. Interestingly, at current exchange rates, Botswana textile sector wages are found to be competitive in the SACU region (lower than wages in SA and comparable with those in Lesotho). Looking at the future of the textiles sector, it is evident that there are a number of fundamental structural issues (such as developments with regard to relevant international trade agreements and the ability of the industry to cut costs by improved productivity and developing local or regional supply sources for inputs) that need to be resolved if there are to be good prospects of medium term growth. Exchange rate issues, while important, are not as critical as the resolution of these structural issues. The industry is affected by bilateral exchange rate volatility (stemming from the rand/dollar rate) as much as the overall level of the pula, and should have the flexibility to shift product sales between markets (the US, Europe and South Africa) in response to changes in the relative profitability of each, at least in the medium term.

(ii) Tourism

3.12 Like textiles, the tourism sector also has diversified revenue sources (USA, Europe and South Africa), with the latter important for relatively large numbers of tourist visitors but the USA, and to a lesser extent Europe, important for high-spending

visitors. The sector also has a high proportion of imported inputs, mostly sourced from South Africa. The recent period of a strengthening pula against the US dollar has coincided with declining visitor numbers from USA, but other factors have caused a general decline in the numbers of US citizens travelling internationally.

- 3.13 Botswana's approach to tourism has focused on a "high cost low volume" strategy, which has been based on niche marketing rather than being internationally price competitive. This is considered to be appropriate for the key tourism areas of the Okavango and Chobe; given the remote locations, the industry necessarily has a relatively high cost base. Hence prices will always tend to be relatively high, and demand may not be all that sensitive to the general level of the pula exchange rate. Nevertheless, many operators have found that their margins have been squeezed between (weak) US dollar revenues and (strong) rand costs, and those who depend on the international (rather than regional) market are vulnerable to cross exchange rate volatility.
- 3.14 The proposed strategy for developing the tourism sector involves making it more broadly-based throughout the country, for which the "high cost low volume" approach will not be universally appropriate. It will therefore involve being more focused on price-competitive products in certain market segments, and hence having a competitive exchange rate will be increasingly important, although there are many other important issues that need to be dealt with to make this a viable approach to developing the tourism sector.

Beef

- 3.15 In the beef sector, revenues are relatively diversified (export sales are denominated in pounds, euros and rands, while domestic sales account for a significant proportion of the sector's output). Exports to the European Union are the most important, for reasons of both quantities and the high prices received. The industry does not have any significant imported inputs.
- 3.16 There are a number of important structural issues facing the beef sector, including low levels of cattle supply to the Botswana Meat Commission's export abattoirs, excess capacity, high overheads and low profitability. The recent appreciation of the pula against the pound and the euro has squeezed margins and made a difficult situation worse. The effects of exchange rates are not discussed in the beef sector report at all, and are unlikely to be of great importance relative to the major structural issues that need to be resolved. Looking forward, however, competitive pressures are likely to intensify and, if other important issues can be resolved, the level of the exchange rate will be important and viability would be undermined by a prolonged excessively overvalued exchange rate.

Ostrich Products

- 3.17 The export of ostrich products is at present very small scale but the sector is seen as having considerable potential. Revenues are largely euro-denominated although there is a small (but important at the margin) proportion of sales to South Africa. The main input to production is feed, which is imported from South Africa. Margins have been under pressure from the recent appreciation of the rand and pula against the euro.
- 3.18 The exchange rate is important in determining the viability of the industry, but margins are determined as much by cross rates (euro-rand) as by the general level of the pula. But, as with the beef sector, there are much more important issues that need to be resolved in determining future prospects of the industry, and unless

these are resolved – especially scaling up ostrich supply to commercially viable levels – exchange rate issues will be irrelevant.

[Box 5 about here]

Automotive products

- 3.19 There is little information relevant to exchange rate issues in the automobile sector study. Almost all output of the sector is exported, to South Africa, other African countries and European Union markets. There are very high levels of imported inputs, but no information on where these are obtained from. The strengthening of the pula is mentioned as a problem but it is difficult to assess the impact of this. The level of the exchange rate is important in determining the competitiveness of local inputs to production, but given the high level of imported inputs, profitability will be more affected by cross rate changes to the extent that inputs and sales are in different currencies.
- 3.20 A number of tentative conclusions can be drawn from the sector studies for exchange rate policy. First, the relatively little attention given to exchange rate issues may indicate that growth prospects for the sectors covered are primarily dependent upon a range of other issues that need to be resolved, rather than exchange rates. Nevertheless, it is interesting that none of the sector studies indicated that the activities in question needed a significantly lower (depreciated) exchange rate in order to ensure their long term viability.
- 3.21 Second, it may be concluded that while the overall, trade-weighted REER may be a useful indicator of the economy-wide impact of changes in competitiveness, this may be of less direct relevance for individual firms or sectors, which tend to be more concentrated in trade in particular currencies. For them, the large changes in bilateral real exchange rates are likely to have had a greater impact than the relatively small changes in the overall value of the pula. For instance, for firms that have the US dollar (or other SDR currencies) as their dominant trading currency, the long period of a depreciating pula/US\$ bilateral RER from the early 1990s to late 2001 presented a particular set of incentives that would have guided investment decisions. However, this long-term trend has experienced a sharp reversal, with the pula/US\$ bilateral RER appreciating by 73% during 2002 – 2004. For firms exporting to US dollar-denominated markets – which represents the majority of world trade outside of the southern African region – this will have sharply reduced profitability. Such a situation applies to some manufacturing exporters (such as textile exporters selling into the US under the Africa Growth and Opportunity Act (AGOA)), some mineral exporters, and part of the tourism industry. Exporters selling to the South African market, however, have experienced different real exchange rate trends. The long-term trend between the early 1990s and late 2001 was of a steadily appreciating bilateral pula/rand real exchange rate, which will have restricted the ability of Botswana firms to expand sales in that market, although to a certain extent this difficulty will have been alleviated by the real pula depreciation against the rand since 2001. There are of course other factors to take into account: sources of raw materials and other inputs are relevant as well as markets, and both sources of inputs and product destination markets can be changed in response to changing relative prices and exchange rates. Nevertheless, the point remains that firms have faced periods of considerable real exchange rate appreciation, as well as trend reversals, which adds to uncertainty and, most likely, has reduced investment by exporting firms.

3.22 It is therefore likely that the impact of bilateral exchange rate changes is of more significance for many firms than of the overall effective exchange rate, in part because bilateral exchange rate changes tend to be much larger than overall changes. However, it should be noted that the extreme bilateral movements are exogenous, and all that exchange rate policy can do is to determine the distribution of this exogenous volatility across bilateral nominal and real exchange rates. A weighting structure that reflects relevant trade patterns is, from a trade perspective, the best way of “fairly” doing this. Finally, these points may in part explain the lack of attention given to exchange rate issues in the sector studies; if participants understand, correctly that the bilateral exchange rate changes that are of importance to them are (i) essentially random and (ii) largely outside of the control of domestic policymakers, then it is perhaps more appropriate to focus on underlying determinants of profitability and competitiveness.

(D) CONCLUSIONS

3.23 In concluding this section, it is plausible to argue that the slow growth of non-traditional exports is linked to exchange rate developments. Theory would suggest that exports and the real exchange rate are inversely related, and the available data indicates that the recent period of stagnant or declining real non-traditional exports coincides with the period of REER appreciation. Correlation coefficients also indicate an inverse relationship, and although the strength of the relationship depends on the REER measure chosen, all REER measures give support for the inverse relationship, especially recently. Regression analysis also provides some support for a relationship between the REER and non-traditional exports, but indicates that export market growth is equally if not more important. However, the preliminary nature of trade data for the most recent years (2002-2004) makes it difficult to draw firm conclusions, which is unfortunate as this is the period of relatively strong REER appreciation, when any strong impact of real appreciation on exports would be expected to show up REER.

EXCHANGE RATE POLICY ISSUES

(A) INTRODUCTION

4.1 The previous sections have reviewed exchange rate developments in Botswana over the period from 1990 to 2004, as well as developments with regard to the growth and diversification of exports. Some clear trends can be identified. With regard to exchange rates, the real effective exchange rate (REER) has appreciated in recent years, after a period of relative stability during the 1990s. Bilateral real exchange rates have been much more volatile than the overall REER, with the two key bilateral RERs of relevance to Botswana’s exporters moving in opposite directions, and experiencing reversals of long term trends since 2002. While there are some differences in the magnitudes of real exchange rate developments depending on the particular measure chosen, the broad trends are consistent across a range of measures.

4.2 At the same time, diversification of export trade has been largely unsuccessful; the degree of export diversification was certainly no higher in 2003 than it was in the early 1990s, and may even have been lower. The growth rate of non-traditional exports has been insufficient for them to be a leading factor in economic growth, and in recent years real non-traditional exports have declined.

4.3 The crucial question is, to what extent is the slow growth of non-traditional exports linked to exchange rate developments, and in particular, has the recent real appreciation negatively affected non-traditional export growth? There is some evidence of a negative relationship between the level of the REER and non-traditional exports from correlation and regression analysis, which would suggest that the recent real appreciation has adversely negatively affected non-traditional export growth.

4.4 These results and the available data are consistent with the expected relationship based on economic theory, that the growth of exports is dependent upon the real exchange rate. In this situation, the real appreciation that has occurred since 1998, and particularly since 2002, is of concern, especially given the central role that non-traditional exports are expected to play in Botswana's future growth strategy. In this section, therefore, we consider possible policy responses that could help to keep the real exchange rate at levels that are consistent with broader development policy.

(B) EXCHANGE RATE POLICY – FIXED OR FLOATING?

(i) The benefits of a pegged exchange rate

4.5 The choice of the fundamental nature of the exchange rate policy regime – a fixed or floating rate – is one faced by all economies. The choice is an extremely important one, as it has a fundamental influence on the way the economy operates, how (external) shocks are transmitted to the domestic economy, how the economy responds and adjusts to those shocks and other changes in economic fundamentals, and how monetary policy is conducted. The choices of exchange rate policy regime and monetary policy regime are interdependent, and revolve fundamentally around the choice of nominal anchor for prices.

4.6 As noted above, Botswana has always had a fixed exchange rate regime, originally through the use of the rand and, since 1976, through the (adjustable) peg to the pula basket. As noted earlier, the maintenance of a pegged exchange rate has been motivated by several factors, especially the desire to avoid “Dutch Disease”-type nominal and real appreciation that often afflict mineral-led economies. While it is generally held that the pegged exchange rate has helped Botswana to avoid the Dutch Disease, Mogotsi (2002) argues otherwise, and, as noted in Box 6, there is some evidence that Dutch Disease effects have become apparent.

[Box 6 about here]

4.7 The choice of a pegged exchange rate may also be suitable for Botswana, not just as a mineral economy, but as a small open economy. As Mussa *et al* (2000) note, pegged exchange rates are especially common amongst small open economies, with 45 of the 73 smallest IMF members having a pegged exchange rate in 1998, with only 28 having more flexible (managed or independently floating) arrangements. For small economies, there are good reasons to choose a pegged exchange rate:

“the key consideration for these highly open economies is that, where trade in goods and services represents a large fraction of domestic production and consumption, the microeconomic benefits of reducing transaction costs and exchange risks by pegging the exchange rate can be substantial. In addition, if the tradeable sector of the economy is large, domestic wages and prices are likely to react more quickly to changes in the nominal exchange rate. This effect makes it more difficult to modify the real exchange rate through changes in the nominal exchange rate,

which instead mostly destabilise domestic prices.” (Mussa *et al* (2000), p.40)

- 4.8 It should also be noted that most small economies are not well integrated into international capital markets, and have currencies that are not widely traded internationally; as a result they are less vulnerable to the type of large-scale speculative attack that has afflicted larger developing and developed economies and in some cases made exchange rate pegs difficult to sustain. A further advantage is that a pegged exchange rate provides a nominal anchor for prices, in that the fundamental determinant of domestic inflation and inflation expectations will be foreign inflation (of the country or countries to which the currency is pegged). Monetary policy is simplified as a result, but it nevertheless it remains important for monetary policy, along with other macroeconomic policies, to be consistent with the peg, otherwise a currency crisis is likely.
- 4.9 However, the benefits of pegging are perhaps greatest when a country has a single dominant trading partner (or dominant trading currency), and hence can peg to a single currency. If a country has several important trading partners, and as a result has to peg to a basket, the benefits are reduced, for several reasons. First, whereas a single currency peg is by definition transparent, and changes in the peg are obvious, a basket peg is not necessarily so, as the constituent currencies and their weights may not be publicised and changes in the weights or the parity of the peg may not be apparent to market participants. Such a lack of transparency reduces the effectiveness of a currency peg in providing an anchor for prices, and especially for inflation expectations¹¹. Furthermore, if the currencies in the basket are floating against each other, then the country’s bilateral exchange rates against each of those currencies will move accordingly, and the potential benefits of reduced transactions costs and exchange risks will not be realised.
- 4.10 Further reason for small countries to adopt pegged exchange rates relate to the nature of markets and institutions in small economies. It is often the case that small economies, even if they are open and trade is important, have relatively undeveloped foreign exchange markets; in such a situation, whether there can be a meaningful, floating, market-determined exchange rate is a moot point. Similarly, as Mussa *et al* (2000, p.41), point out:
- “ . . . the costs of the institutions and the technical expertise required for a well-behaved independent monetary policy and an efficient domestic financial market grow less than proportionately with the size of the economy. For some small economies, it is apparent that these costs can be too high, or even prohibitive”.
- 4.11 The above factors all tend to point in favour of small countries having a pegged exchange rate. Nevertheless, it is important to recall the potential disadvantages of having a pegged exchange rate, and the potential advantages of exchange rate flexibility. Perhaps the biggest danger of a fixed exchange rate is the potential for misalignment of the nominal, and more importantly the real, exchange rate. Pegged exchange rate regimes are demanding to manage properly. If the exchange rate is to

¹¹ The anchor for inflation expectations should be the weighted average of expected inflation rates in the countries whose currencies comprise the basket, but if the weights are not public information and have to be implicitly or explicitly guessed, the process of formation of expectations for domestic inflation will be inefficient.

be a hard, permanently fixed peg¹², or a conventional peg where it is not intended to change the parity, macroeconomic and other policies must be consistent with the maintenance of the peg; the inflation rate, for instance, must be kept similar to inflation in the country to which the currency is pegged if the real exchange rate is not to become uncompetitive. Maintaining an unchanged peg may not be appropriate, however, but if the exchange rate is an adjustable peg, then the question arises as to what is the basis for adjustments.

- 4.12 Central to the operation of a pegged exchange rate is the question of credibility, especially for a country that has an open capital account, where capital inflows and outflows can be significant and can change direction quickly. A set of macroeconomic policies that is inconsistent with the peg can quickly undermine credibility and the resulting capital flows can cause the peg to collapse long before other economic pressures generated by the inconsistent policies.
- 4.13 One of the important misalignments that can arise with a pegged exchange rate is between the real equilibrium exchange rate and the actual real exchange rate. The equilibrium REER depends on economic fundamentals and can change for a variety of reasons (see Box 7), but typically the value of the equilibrium REER is not known with any certainty, especially when it is changing. These changes can cause the actual and equilibrium REERs to diverge. In maintaining a pegged exchange rate, it can be difficult to know if, when and by how much the peg needs to be adjusted in order to bring the actual and equilibrium REERs into alignment. Alternatively, the equilibrium REER may be unchanged, but the actual REER may change, and cause divergence between the actual and equilibrium REERs. Again, the peg may need to be changed to restore alignment. This may be difficult to achieve, especially if it is attempted by changing the peg without addressing the underlying causes of the misalignment, which may include inconsistent macroeconomic policies. If misalignment between the actual and equilibrium REERs persists, and is not eliminated through adjustment of the nominal exchange rate, then adjustment will occur through other mechanisms¹³.
- 4.14 The analysis of Botswana's equilibrium real exchange rate in Box 7 suggests that by 2003-4 the REER – measured from the perspective of the whole economy – was overvalued, relative to its equilibrium value, by some 10%. While the analysis should be taken as preliminary, the results are credible in relation to similar analyses undertaken for other countries in sub-Saharan Africa. The sharp appreciation of the whole-economy REER in 2002-3 is striking (see Fig. B7.1 in Box 7), and provides strong evidence of REER overvaluation given that it is highly unlikely that the economic fundamentals that determine the equilibrium REER would have changed so much in a short period of time.

[Box 7 about here]

¹² E.g., a currency board or monetary union arrangement such as the Common (Rand) Monetary Area involving South Africa, Namibia, Lesotho and Swaziland.

¹³ The Chinese yuan, which is widely considered to be undervalued, may be an example; high investment, rapid productivity growth and economic deregulation have arguably caused the equilibrium real exchange rate to appreciate, while the nominal exchange rate has been pegged to the US dollar, effectively depreciating against China's trading partner currencies as the dollar has weakened in recent years. Rather than revaluing the nominal exchange rate, adjustment is taking place through, inter alia, relatively high inflation in China, which will cause the real exchange rate to appreciate.

(ii) The potential for a floating exchange rate

- 4.15 One of the advantages of a more flexible exchange rate regime is that it can facilitate adjustment to changing economic fundamentals and hence prevent prolonged real exchange rate misalignment; for instance, if the equilibrium REER changes, a floating exchange rate is more readily able to adjust to restore the actual REER to the appropriate level. A floating exchange rate does not prevent inconsistent macroeconomic policies from causing misalignment of the real exchange rate, but it may help to bring about the necessary policy changes and macroeconomic adjustments before an exchange rate crisis results.
- 4.16 A second advantage of a flexible exchange rate regime is that it permits an active monetary policy; whereas under a fixed exchange rate regime monetary policy is typically largely impotent, with a floating exchange rate monetary policy has to provide the nominal anchor for prices. While this nominal anchor can take various forms, such as a monetary aggregate target, it now increasingly takes the form of an inflation target, especially amongst smaller to medium sized developed economies and larger developing economies; despite its relatively short history, inflation targeting has been quite successful in bringing inflation down to levels that are consistent with price stability in many countries. A more active monetary policy can also be useful in reacting to changes in macroeconomic conditions, bringing about macroeconomic adjustment where necessary, and in contributing to macroeconomic stability.
- 4.17 However, this has to be balanced against the fact that prices are likely to be more volatile under a floating exchange rate regime in a small open economy, due to the rapid pass through of exchange rate changes to prices. Hence the task facing monetary policy is perhaps more demanding than under a pegged exchange rate, and the monetary policy stance more variable. The experience of South Africa – which is an open economy but not particularly small – during 2000-2004, when the rand depreciated sharply and then appreciated in quick succession, necessitating major changes in interest rates to offset and then accommodate exchange-rate induced changes in inflation, is instructive in this regard.
- 4.18 One potential disadvantage of floating exchange rates is the possibility of overshooting. While flexible exchange rates can adjust in reaction to various factors, sometimes the adjustment is overdone, a situation that is often caused by destabilising speculative capital flows. Such sharp movements in floating rates can cause the exchange rate to deviate from its equilibrium value for prolonged periods; the sharp depreciation of the South African rand in 2001, and its subsequent recovery in 2003 and 2004 is a good example of a floating exchange rate overshooting and exchange rate “bubble” causing the real exchange rate to deviate significantly from its equilibrium value (see IMF (2004b)). Reflecting these problems, one prominent commentator on exchange rate issues, John Williamson (1998, p1.) argues that “in general floating is undesirable because of the extreme weakness of the economic mechanism that holds the exchange rate close to a level consistent with the fundamentals”. Even without significant overshooting, a floating exchange rate would be more volatile than a pegged rate, for both bilateral and overall (effective) rates, at least in nominal terms, and this would add further to the uncertainty facing exporters.
- 4.19 Much of the discussion above has implications for Botswana. While it does not provide convincing arguments either way for the country to adopt either a fixed or flexible exchange rate, it does suggest that historically at least, as a small and very

open economy, Botswana was right to adopt a fixed exchange rate regime. However, the potential benefits of a pegged exchange rate might not be as great as for other small open economies. With its peg to a basket rather than an individual currency, and with a trade pattern polarised between currencies that have moved extensively against each other, causing volatility in the bilateral nominal and real exchange rates of the pula, there have been few benefits in terms of reducing currency transactions costs or exchange rate uncertainty. Furthermore, the lack of transparency regarding the details of the basket and adjustments to the peg has most likely made it less effective as a nominal anchor for prices and inflation expectations. Difficulties have also arisen in ascertaining when the equilibrium and actual REERs have diverged, and when changes in the equilibrium REER necessitate changes to the peg. These points, as well as others in the above discussion, suggest that as the economy grows, it may be appropriate to introduce more flexibility into the exchange rate peg. This would permit nominal exchange rate flexibility to assist real exchange rate adjustment, as well as broader macroeconomic adjustment. It would also permit a more active monetary policy to control the inflationary pressures that undermine the economy's international competitiveness¹⁴. Such changes to Botswana's exchange rate policy mechanism that could help to prevent real exchange rate misalignment emerging in future.

- 4.20 Nevertheless, there is one final point that would indicate that introducing significantly more flexibility into the exchange rate – at least to the extent of moving to a fully floating exchange rate - might be difficult and might not achieve exchange rate movements that are helpful to the economy. This relates to the nature of foreign exchange flows, and the structure of the foreign exchange market.
- 4.21 Botswana's foreign exchange flows are characterised by a currency mismatch between receipts and payments. Foreign exchange outflows are mostly for imports, and occur relatively smoothly over time, although there are occasional large transactions for major imported items (such as aircraft), or for capital account outflows (such as pension fund financing). In general, however, foreign exchange outflows are not particularly lumpy. Foreign exchange receipts, however, are quite different. Some 80% of total export earnings are derived from diamond sales, and diamond export receipts occur in a few very large transactions related to the timing of diamond sales through De Beers in London, which take place ten times a year. The bulk of export earnings are therefore received in a few very large transactions, each of which can be equal to 5% or more of total annual export earnings. Other elements of foreign exchange inflows, such as the government's quarterly receipts from the South African Customs Union, are also large and relatively infrequent.
- 4.22 The result of this market structure is that on any given day, the foreign exchange market has either a large surplus or large deficit of foreign exchange availability relative to demand. At present surpluses or shortages are met by the Bank of

¹⁴ This reflects the well-known "trilemma" in international macroeconomics, or the "impossible trinity" of free capital mobility, an active monetary policy and a fixed exchange rate. Essentially, an economy that does not have restrictions on international capital movements and has a pegged exchange rate cannot use an active monetary policy to control inflation, without running the risk of building up unsustainable macroeconomic imbalances; an active monetary policy requires a floating exchange rate. The reason that monetary policy is unlikely to be particularly effective with a fixed exchange rate, if the country is integrated into international capital markets, is because reducing (raising) interest rates will induce capital outflows (inflows), which will lead to a reduction (increase) in international reserves, which will tend to counter the original monetary policy change. If the monetary policy stance is continued, limits will be reached with the erosion of international reserves (for a loose monetary policy) or the fiscal cost of sterilising reserve inflows (for a tight monetary policy).

Botswana, selling unrestricted quantities of foreign exchange to market participants at fixed prices derived from the basket peg¹⁵.

- 4.23 In a floating exchange rate regime, the Bank of Botswana would still have to provide this buffer role, otherwise the market price of foreign exchange would fluctuate wildly depending on the balance of foreign exchange demand and supply. The commercial banks cannot provide this buffer role, as the resulting balance sheet foreign exchange exposure would be in excess of what prudential supervisory regulations allow, although they could become more active market participants by taking positions within the prudential exposure limits. Given that the bulk of foreign exchange traded in the market would be provided to buyers by the Bank of Botswana, the market price of foreign exchange – the exchange rate – would therefore depend on the rate at which the Bank supplies or absorbs foreign exchange to the market; this in turn would have to be done in relation to a pre-determined idea of what the Bank wanted the exchange rate to be – which starts to look much like a pegged – i.e. central bank determined – exchange rate. This does not mean that there couldn't be more flexibility in the exchange rate – for instance by significantly widening the spread between the Bank's bid and offer prices – but a fully floating exchange rate for the pula is unrealistic in the foreseeable future.

(C) FIXED EXCHANGE RATE POLICY ISSUES

- 4.24 Assuming that the basic policy choice of a fixed exchange rate is maintained, a number of policy issues still remain to be decided. These include, the choice of peg (single currency or basket); if a basket, the choice of constituent currencies and their weights; and, in a situation of apparent REER overvaluation, whether devaluation is a viable way of correcting such overvaluation. These issues will be addressed below

(i) Peg choice and basket weighting issues

- 4.25 As noted above, pegs to a single currency have some advantages over basket pegs. However, in Botswana a single currency peg would be difficult to justify; while the rand accounts for the majority of imports, the US dollar accounts for the majority of exports. Pegging to either of these currencies would expose traders in the other currency to considerable volatility, especially as the rand/dollar exchange rate has tended to be quite volatile. Even if, as under current practice, mineral exports have a reduced weight in the derivation of currency weights in the basket, given the desire to focus on non-traditional exports, non-rand currencies still account for a considerable proportion of trade. And while South Africa is likely to remain the largest market for exports as they diversify, given Botswana's membership of the Southern African Customs Union (SACU), exports to non-rand markets are also likely to grow, particularly in three areas: exports to the USA, under the African Growth and Opportunity Act; exports from new mineral discoveries; and tourism, for which many customers come from Europe and North America. It would therefore seem appropriate that the exchange rate peg is to a currency basket, rather than a single currency.
- 4.26 From an export-diversification perspective, the present method of deriving basket weights is probably appropriate, as it focuses on the competitiveness of producers competing with imports and those producing non-traditional exports. From an

¹⁵ Although the exchange rate of the pula is fixed vis a vis the basket, bilateral exchange rates change on a real time basis as the exchange rates of the currencies in the basket move against each other.

economy-wide perspective, however, disadvantages of the present basis for deriving basket weights have become apparent. By excluding traditional exporters, they are heavily exposed to currency volatility¹⁶. In the past, this has not been a major problem as the traditional exporters have earned revenues in US dollars and pounds, and these currencies depreciated against the rand (and the pula) for much of the 1990s, thus earning terms of trade gains for these exporters (and, at the same time, easing pressure on them to maintain or improve competitiveness). However, as the rand has appreciated during 2002-4, these terms of trade gains have been sharply eroded, and profitability has declined. As the traditional exporters remain extremely important to the economy, it may be appropriate to consider their trade more fully in the derivation of basket weights. A further issue, although not directly a trade issue, is that more than half of government revenues are derived from non-regional foreign currency sources, and the composition of the pula basket has introduced volatility into the fiscal position. As fiscal stability is important from a macroeconomic perspective, incorporating traditional exporters into the basket calculation would have an additional benefit.

- 4.27 Altering the basket weights to reflect traditional export trade would raise the SDR-currency proportion of the basket to close to one half. This would tend to change the incentives facing non-traditional exporters to give greater emphasis to trade with countries other than South Africa.

(ii) Is devaluation a viable tool to boost export competitiveness?

- 4.28 The discussions in Section 2 and Box 7 indicate that the real effective exchange rate is moderately overvalued, in two ways (i) relative to its relative stable average value during the 1990s and (ii) relative to macroeconomic fundamentals. It is well understood that an overvalued REER is inconsistent with a policy of non-traditional export-led growth. All of this suggests that there is a need to take measures to boost competitiveness and reduce the value of the REER, in such a manner as to ensure that the reduction is sustainable.
- 4.29 Improving competitiveness is of course a multi-faceted task, of which the price-related issues encompassed in the REER are but one aspect. Microeconomic and institutional reforms have an important role to play in improving efficiency and boosting productivity. Indeed, improving productivity is, in the long term, the only sustainable means of improving Botswana's international competitiveness. However, although raising productivity is essential, it takes time, and cannot do much to improve competitiveness in the short-to-medium term.
- 4.30 The REER can be directly affected by two variables: the nominal exchange rate and relative (domestic/foreign) prices. Relative prices are difficult to influence in the short-term, but can be influenced in the medium term by monetary policy and measures to boost efficiency and productivity. In the short-term, the only available measure to correct REER misalignment is a change in the nominal exchange rate. However, in the case of REER overvaluation, there are serious questions about the likely effectiveness of devaluation in bringing about a permanent or sustainable change in the REER.

¹⁶ The currency volatility to which a producer is exposed depends on the weight that currencies of relevance to the producer have in the basket and the volatility of individual currencies against the basket. The greater the weight of a currency in the basket, the lower is the volatility of the pula against that currency. If international currencies are stable against each other the problem does not arise.

- 4.31 Although a devaluation would lead to an immediate gain in competitiveness as measured by the REER, the danger is that this initial gain would not be sustained. Devaluation would lead to higher inflation because of the impact of the lower exchange rate on import prices, and the greater the pass-through of exchange rates to prices, the more inflation will rise for a given devaluation. The more open the economy, the higher and faster the pass through is likely to be. As the pass-through approaches unity, the more inflation will erode initial competitiveness gains and leave little or no permanent reduction in the REER. With a very high pass-through, the economy will be worse off after a devaluation, with no improvement in competitiveness but higher inflation.
- 4.32 This does not mean that devaluations can never be effective. However, their effectiveness depends on many factors, including the reasons for the initial real overvaluation and the nature of other policies that accompany the devaluation. Identifying the cause of the overvaluation is important – if the cause is nominal exchange rate appreciation, then devaluation is more likely to be effective. In Botswana’s case, however, the cause of the rising REER is not nominal appreciation, but rising relative prices – Botswana inflation being higher than average trading partner inflation. Devaluation in these circumstances would lead to a short-term decline in the REER, but unless the causes of the initial overvaluation are addressed – the reason for the failure to bring Botswana inflation down to internationally comparable levels – it is unlikely to be sustained, unless accompanied by measures to deal with root cause of problem.
- 4.33 The cause of Botswana’s relatively high inflation rate is not easy to identify. It is unlikely to be due to loose monetary policy, as interest rates have been relatively high in real terms in recent years. The origin appears to be non-tradeables prices, which have risen faster than tradeables prices in recent years¹⁷. Besides being a classic symptom of Dutch Disease, it is also consistent with a lack of productivity growth, especially in the parastatals sector, whose outputs – such as utilities – tend to be important inputs to other productive sectors. Low (relative) productivity in the parastatals sector would therefore tend to push up overall prices. Unfortunately data on productivity is poor, so no firm conclusions can be reached. But if this hypothesis is correct, devaluing without addressing productivity problems would only be a short-term solution that may bring temporary relief but would in the long-term not achieve lasting higher competitiveness, only higher inflation. The greatest danger is of a devaluation-inflation spiral, in which successive devaluations are pursued to reach a REER target, but the devaluations become both progressively more frequent and at the same time less effective. Repeated devaluations in pursuit of a REER target become predictable and are built into the formation of inflation expectations, and hence into inflation itself. This is not a sustainable policy path.
- 4.34 While a return to the 1990s policy of (non-transparent) gradual nominal depreciation to compensate for higher domestic prices may seem superficially attractive, changes in economic structure may render this ineffective. These changes include deregulation of wage determination (which is now less dominated by government), the abolition of exchange controls and hence greater international capital flows, and the difficulties in maintaining a non-transparent exchange rate policy as economic agents become more sophisticated.

¹⁷ Between 1997 and 2004, non-tradeables prices grew on average by 9% a year, and tradeables prices by 7% a year.

- 4.35 There is, however, one argument in favour of devaluation: the evidence presented in Box 7 that the REER is overvalued relative to its equilibrium value. In this case devaluation would bring REER closer to its equilibrium value and hence is more likely to be sustainable, because an overvalued REER will tend to depress aggregate demand and make conditions less conducive to the pass through of exchange rate changes to prices. Nevertheless, allowing for a moderate degree of exchange rate pass through to prices, it would take a substantial devaluation to bring the REER back to equilibrium. However, the degree of overvaluation relative to fundamentals – some 10% – is not that great, and may not be significant enough to justify devaluation and dangers it involves.

SUMMARY AND CONCLUSIONS

- 5.1 Although it is not possible to identify any clear impact of exchange rates on export diversification, a number of conclusions can be derived from the discussion above.
- a. Over most of the period since 1990, exchange rate policy has been formulated with the policy of export diversification at the forefront. This extends to the choice of a pegged exchange rate, the choice of the weights in the currency basket to which the pula is pegged, and the focus of exchange rate policy, combined with a more active monetary policy in recent years, on maintaining a competitive real effective exchange rate.
 - b. Notwithstanding the focus of exchange rate policy on export competitiveness, the REER has appreciated in recent years, especially between mid-2000 and early 2004 when the pula was devalued by 7.5%, in contrast to the situation that applied for most of the 1990s, when the REER was largely stable. By late 2004, the REER is considered to be approximately 10% overvalued, relative to its average value during the 1990s, and relative to an estimated equilibrium REER value.
 - c. For most of the 1990s, exchange rate policy caused the NEER to depreciate, which compensated for higher inflation in Botswana than the average of trading partner inflation, thus leading to REER stability. Between 2000 and 2004, however, the NEER was largely stable, and monetary policy was focused on keeping relative prices stable. However, this has not been achieved, with the result that the REER has appreciated. An important reason for relatively high inflation was rising non-tradeables prices, many of which are government-controlled (administered) prices. Rising administered prices partly reflect changing government policy, which now focuses much more on forcing parastatals to make profits and achieving cost recovery in the provision of public services. However, there is also concern that rising administered prices reflect low productivity growth in the public and parastatal sectors.
 - d. While devaluation is one possible solution to the REER overvaluation, it would not address the source of the problem of relatively high inflation in Botswana, but would offer short-term compensation for the symptoms. There is a real danger of the short-term competitiveness gains of devaluation being eroded away by higher inflation; if this led to further calls for devaluations to restore competitiveness, a destructive devaluation-inflation spiral could result, with no long-term competitiveness gains, only higher inflation and reduced macroeconomic stability.

- e. Nevertheless, devaluation could perhaps be effective if part of a broader package of structural reforms that were credibly focused on bringing Botswana's inflation rate down to levels comparable to trading partners. Such a package could also involve reforms to the exchange rate system with the objective of complementing the inflation and competitiveness objectives. One element could be greater exchange rate flexibility (such as a wider band rather than a narrow peg) that would permit the exchange rate to adjust in response to changing economic fundamentals, although still within the context of an overall managed rate. This could help to prevent prolonged misalignment from emerging. Considerable thought would have to be given to this package of exchange rate and other reforms to ensure that (i) it had credibility and (ii) it addressed competitiveness problems at source.
- f. There is no doubt that export diversification has not yet been successful and non-traditional export growth has been slow. However, and notwithstanding evidence of modest real overvaluation of the exchange rate, there is no strong evidence that the level of the overall real effective exchange rate has been a hindrance to export growth, although, at the same time, it is clear that an overvalued REER is not supportive of the export diversification policy.
- g. Efforts need to be made to improve the quality and timeliness of trade data, which will enable better analysis of the impact of exchange rates on exports. In addition, good quality data on productivity would help to identify possible sources of inflationary pressures.
- h. Export diversification may also have been hindered by exchange rate volatility, independent of the overall level of the effective exchange rate. However, this is largely outside of the control of national policy, and reflects the combination of a diversified trade pattern and exogenous exchange rate volatility (especially in the rand/dollar rate). While changing the currency weights in the pula basket could alter the distribution of this volatility across bilateral pula exchange rates, a basket weighting structure that reflected overall trade patterns, including diamond exports, would not necessarily work in favour of export diversification based on exports to South Africa, as the rand/pula exchange rate would become more volatile.
- i. Finally, measurement of competitiveness using the real exchange rate would be more effective if based on producer price indices (PPIs) rather than consumer price indices, and this would be helped by the development of a PPI for Botswana as well as the incorporation of the full range of trading partner PPIs into the RER calculations.

References

- Bank of Botswana (1987) Selected Papers on the Botswana Economy (Gaborone: Bank of Botswana)
- Bank of Botswana (2002) Annual Report (Gaborone: Bank of Botswana)
- Bank of Botswana (various) Monetary Policy Statements (Gaborone: Bank of Botswana)
- Cady, J. (2003) "The Equilibrium Real Exchange Rate of the Malagasy Franc: Estimation and Assessment" IMF Working Paper 03/28 (Washington DC: IMF)
- Corden, W.M. (1984) "Booming Sector and Dutch Disease Economics: Survey and Consolidation", Oxford Economic Papers 36, pp.359-380.
- Edwards, S. (1989) Real Exchange Rates, Devaluation and Adjustment: Exchange Rate Policies in Developing Countries (Cambridge MA: MIT Press)
- IMF (2004a) "Eastern Caribbean Currency Union – Selected Issues", IMF Country Report No.04/335 (Washington DC: IMF)
- IMF (2004b) "South Africa: 2004 Article IV Consultation – Staff Report", IMF Country Report No.04/378 (Washington DC: IMF)
- MacDonald, R and L. Ricci (2002) "Purchasing Power Parity and New Trade Theory", IMF Working Paper 02/32 (Washington DC: IMF)
- MacDonald, R. and Ricci, L. (2003) "Estimation of the Equilibrium Real Exchange Rate for South Africa" IMF Working Paper 03/44 (Washington DC: IMF)
- Mathisen, J. (2003) "Estimation of the Equilibrium Real Exchange Rate for Malawi", IMF Working Paper 03/104 (Washington DC: IMF)
- Mogotsi, I. (2002) "Botswana's Diamonds Boom: Was There a Dutch Disease?", South African Journal of Economics, 70(1), pp.128-155.
- Mussa, M., P. Masson, A. Swoboda, E. Jadresic, P. Mauro and A. Berg (2000) "Exchange Rate Regimes in an Increasingly Integrated World Economy", Occasional Paper No. 193, (Washington DC: IMF)
- Williamson J. (1998) "Crawling Bands or Monitoring Bands: How to Manage Exchange Rates in a World of Capital Mobility", International Finance, Vol.1 (1), pp.59-80.

Box 1
Currency Baskets

The pula is pegged to a basket of currencies comprising the rand and the SDR. A conventional basket currency (such as the SDR itself) comprises specified quantities of currencies as follows:

$$\text{Currency } X = k1.(a.\text{Currency } A + b.\text{Currency } B)$$

(all measured in terms of a numeraire currency, such as the USD)

While the quantities (a and b) of the constituent currencies in such a basket are fixed, the weights are not, as they depend upon the values (the cross exchange rates) of the currencies in the basket; as currency A weakens relative to currency B, its weight in the basket will decline, and vice versa. Such “weight drift” can be a problem when the cross exchange rates of the currencies in the basket change rapidly, causing the actual basket weights to deviate, perhaps significantly, from their nominal target values. In order to maintain desired weights, the quantities of each currency in the basket will need to be changed in order to compensate for cross exchange rate movements. Such weight changes can be achieved without changing the exchange rate of the basket currency against the numeraire currency. By contrast, a devaluation or revaluation of the basket currency is achieved by changing the scaling parameter, $k1$.

A fixed weight basket can be constructed as follows:

$$\text{Currency } X = k2.(\text{Currency } A)^a.(\text{Currency } B)^b$$

In such a basket the weights of the currencies remain constant regardless of the values of the constituent currencies.

Box 2

Deriving Trade Weights used in the construction of Nominal and Real Effective Exchange Rates.

Botswana's trade patterns are highly polarized between exports and imports, by commodity, direction of trade, and transaction currency. Goods exports are structured as follows:

COMMODITY COMPOSITION OF MERCHANDISE EXPORTS

<i>Commodity</i>	<i>Main Destination(s)</i>	<i>Currency</i>	<i>% of total exports</i>
Diamonds	Europe	USD	82
Copper-nickel	Europe/Zimbabwe	USD	3
Beef	Europe/SA	GBP/EUR/ZAR/NOK	2
Soda ash	SA	USD/ZAR	2
Textiles	SA/USA/Europe	ZAR/USD/EUR	2
Vehicles	SA	ZAR	3
Other		USD/EUR/ZAR/ZWD	5

Note: average 1999-2001

Of total exports, US dollar-denominated commodities account for approximately 85-90%, European currencies (euro, pound, Norwegian krona) approximately 5-7%, and ZAR approximately 5-7%.

The major sources of imports are as follows:

SOURCES OF IMPORTS

<i>Country</i>	<i>% of total imports</i>
South Africa	75
Zimbabwe & other Africa	5
Europe	9
Asia	9
US & RoW	2

Note: average 1995-99

If, for convenience, trade with Zimbabwe is included in regional "rand block" trade, and the Japanese yen is denominated as the currency of trade with Asian countries, "headline" weights in total trade, calculated as a simple average of export and import currency shares, would therefore be approximately as follows:

OVERALL CURRENCY TRADE SHARES (%)

ZAR	45
USD	45
GBP/EUR	5-10
JPY	5

However, the convention has been to make adjustments to these "headline" weights when deriving trade weights for nominal and real effective exchange rate calculations relevant

from an economic diversification perspective. On the export side, adjustments are made to take account of the sensitivity of export demand (and supply) to exchange rate changes. The major change that this entails is to give a low (or zero) weight to diamond exports, on the basis that the quantity of diamond exports is insensitive to the pula exchange rate. A reduced weight (say 0.5) may also be given to other commodities where demand is relatively insensitive to the exchange rate, particularly copper-nickel, and beef exported to the European Union under quota arrangements. Making these adjustments, export trade weights become:

ADJUSTED EXPORT WEIGHTS (%)

ZAR	60%
USD	30%
GBP/EUR	10%

On the import side, account is also taken of the fact that a certain proportion of imports from South Africa are effectively “trans-shipments” that originate in world markets; oil and fuel products are a good example. While these may be priced in ZAR and recorded as imports from South Africa, the original source and/or transaction currency is of more relevance for trade patterns. This can be taken account of by reducing Botswana’s imports from South Africa by the share of imports in South African GDP, and redistributing this according to the currency composition of South Africa’s imports.

With imports accounting for 21% of GDP, resulting import shares are as follows:

ADJUSTED IMPORT WEIGHTS (%)

South Africa (ZAR)	63
Europe (GBP+EUR)	17
Asia (JPY)	14
US & RoW (USD)	6

The adjusted import and export trade weights can be used to construct overall trade weights, although the exact results depend on the relative weights given to imports and exports in the calculations. The reason that this is important is that the adjustment made to exports to account for export sensitivity to exchange rates gives a zero weight to diamonds, and hence the exports that are taken account of amount to around one-fifth of total exports. If exports are given equal weight to imports in the overall trade weight calculation, then non-diamond exports are being over-emphasised, while if they are given their actual trade weight, less than one-fifth of that of imports, then exports will have little impact on the overall trade weights. An “in-between” solution would give the following overall (non-diamond) trade weights:

ADJUSTED OVERALL TRADE WEIGHTS (APPROXIMATE, %)

South Africa	62
Europe	15
Asia	10
US & RoW	13

From a policy perspective, the choice of trade weights is important, as they influence the calculation of effective (nominal and real) exchange rates, and hence influence assessments of overall exchange rate trends and their economic impact.

The nominal and real effective exchange rates used in this report are calculated as follows:

$$NEER_t = \frac{\prod_{i=1}^2 \left(\frac{FCU}{BWP} \right)_{i,t}^{\alpha_i}}{\prod_{i=1}^2 \left(\frac{FCU}{BWP} \right)_{i,b}^{\alpha_i}}$$

where $(FCU/BWP)_{i,t}$ is the bilateral exchange rate (of the rand and the SDR) at time t measured in units of foreign currency per pula, α_i is the weight of currency i in the NEER calculation, and $(FCU/BWP)_{i,b}$ is the value of bilateral exchange rate i at the chosen base time period b .

$$REER_t = \frac{\prod_{i=1}^2 \left[\left(\frac{P_t^d}{P_t^f} \right) \left(\frac{FCU}{BWP} \right)_{i,t} \right]^{\alpha_i}}{\prod_{i=1}^2 \left[\left(\frac{P_b^d}{P_b^f} \right) \left(\frac{FCU}{BWP} \right)_{i,b} \right]^{\alpha_i}}$$

where P_t^d and P_t^f are respectively domestic and foreign price indices at time t , and P_b^d and P_b^f are the price indices at the base time period b .

It should be noted that this report uses the ratio of domestic to foreign prices for the calculation of the real exchange rate, and not the ratio of non-tradeables to tradeables prices, as is sometimes the case.

Box 3

The Choice of Price Indices for use in Real Exchange Rate Calculations

One of the uses of real exchange rates (RERs) is to measure the relative competitiveness of countries (or currencies) or, more accurately, to measure changes in competitiveness over time. Amongst the factors that determine competitiveness are nominal exchange rates, prices/costs, and productivity.

Recognising these factors, a generally preferred measure of real exchange rates compares unit labour costs (ulcs) across countries; such a measure takes into account nominal exchange rates, prices (wages) and labour productivity. Real exchange rates based on ulcs are, however, only generally available for developed countries; the IMF's *International Financial Statistics*, for instance, publishes them only for 19 industrialised countries.

In the absence of ulcs, other price/cost measures have to be found that enable costs of production to be compared across countries. Reflecting the fact that it is firms that produce and compete, the next best approach, where ulcs are not available, is to use producer or wholesale price indices (PPIs/WPIs). PPIs/WPIs are more widely available than ulcs, but are still not available for many developing countries.

Where ulcs and PPIs/WPIs are not available, RERs have to be based on consumer price indices (CPIs). While CPIs measure the cost of a household consumption basket rather than the production costs of specific relevance to firms, they are broadly-based and to that extent provide a measure – often the only available measure – of the general price level in a country. CPIs (and, sometimes, PPIs/WPIs) also have the advantage of being available at high frequency, and are usually available quickly after the relevant data collection. CPIs are also available for almost all countries of the world, and therefore have to be used for the most broadly-based international comparisons of competitiveness.

CPIs have one disadvantage, however, in that they can be quite volatile as they reflect short-term, often transient, price changes that may have little to do with long-term price trends or trends in the costs of production. Assessing competitiveness as measured by RERs may therefore be distorted by short-term price changes, especially if RERs are being observed at high frequency. One way to avoid this is to use core inflation, where it is available. Core inflation measures aim to strip out short-term volatility and measure long-term price trends and, over a long period, core and headline CPI measures should not deviate significantly. Where this condition is met, a core inflation measure may be a viable alternative to headline inflation as an input to RER calculations.

While core inflation measures have the advantage of being less volatile, they nevertheless have the disadvantage of stripping out certain price changes – such as interest costs and fuel costs – that are part of firms' costs of production, and hence removing them may give a distorted picture of production costs, and hence of competitiveness. It should also be noted that there are few, if any, examples internationally of core inflation measures being used in RER calculations. Furthermore, core inflation measures are generally calculated for monetary policy purposes, and not for assessing international competitiveness, and the basis for their calculation may vary considerably across countries.

The choice of price indices to use in REER calculations for Botswana is an important issue, as different measures give quite different results. The crucial decisions relate to the choice of price indices for South Africa, where a number of alternatives are available, including the headline CPI, a core CPI, and a Producer Price Index (PPI). For Botswana, only a headline CPI is available; although the Bank of Botswana has developed a core CPI measure for monetary policy purposes, it is not (yet) published. For the SDR component of RER calculations, a range of different price indices is available, but in view of the relatively low SDR country inflation rates and the relatively low weight of the SDR in the

pula basket, it is not considered that calculated REERs will vary much with different price indices, and hence the more readily available CPIs are used.

REER measures using 3 different SA price indices – headline CPI, core CPI and the PPI – are presented in Chart 3¹⁸; all use headline CPI for Botswana and SDR countries. Summary data for changes in the various CPI measures during key periods are presented in the table below. With the objective of best measuring relative production costs, the preferred REER measure would be the one using SA PPI; however, the empirical analysis in this report will generally make use of all three measures in order to accommodate the possibility that the REER according to other measures may be of more practical relevance.

Summary Data – Real Effective Exchange Rates

<i>SA inflation measure</i>	Headline CPI [REERH]	Core CPI [REERC]	PPI [REERP]
REER index [1, 2]			
Jan 1993 - Jun 2000 (average)	102.7	102.0	103.8
Aug-Oct 2004 (average)	116.1	108.6	114.7
Differential	13.1%	6.4%	10.6%
Changes			
1993-2000 [3]	0.8%	-2.8%	1.5%
2000-2003 [3]	11.2%	10.5%	9.0%

[1] all using headline CPI inflation for Botswana and SDR countries

[2] all adjusted for the introduction of Botswana VAT in 2002

[3] annual averages

¹⁸ All measures have been adjusted for the impact of VAT that was introduced in Botswana in 2002. As VAT is not applicable to exports, and is applied to both domestic and imported tradeables sold within Botswana, using a domestic price index that includes the impact of VAT would distort the relative competitiveness of Botswana products. It is estimated that VAT added 4% to domestic prices, and hence in the real exchange rate calculations, Botswana prices are reduced by this factor.

Box 4

EXCHANGE RATES AND NON-TRADITIONAL EXPORTS

A simplified export equation often applied to developing countries takes the following form:

$$Exports = f(REER, Y^f)$$

where *REER* is the real effective exchange rate and Y^f is real income (representing demand) in foreign markets. This simplified equation is a demand equation and ignores other influences on domestic macroeconomic activity, such as wages, prices and interest rates, which may, in turn, affect exports, but can be usefully applied to developing countries where data availability is constrained.

In the Botswana case, the export equation can be formulated as follows

$$\log(NTX) = c_0 + c_1 \log(REER) + c_2 \log(Y^f)$$

where *NTX* is (adjusted) non-traditional exports¹⁹; *REER* is the real effective exchange rate, and Y^f is a weighted average of real GDP in South Africa and major industrial countries.

The equation was estimated using quarterly data over the period 1990Q1 – 2004Q1 (giving a total of 57 observations). A vector error correction model was used to estimate the coefficients of a long-run cointegrating relationship between the variables. The model did not perform particularly well, in that the results are sensitive to changes in data and model specification. One set of results is shown below, for three different models, with three REER measures. The results are in accordance with expectations, and show that real non-traditional exports are positively related to real foreign GDP, with strongly significant coefficients in all models. Models 2 and 3 (using the core and headline price measures for the REER) show that exports are negatively related to the real effective exchange rate; the estimated coefficients for the REER are relatively large, and strongly significant. The error

correction term in both cases (correctly) negatively signed, and indicates relatively fast adjustment to equilibrium. In Model 1, using the PPI measure for the REER, the coefficients are significant but diagnostic tests do not support the existence of a long run cointegrating relationship between the variables. Nevertheless, the results are consistent across model specifications and provide evidence for the expected (negative) relationship between the real exchange rate and non-traditional exports, but also indicate that the latter are importantly dependent upon export market growth.

Non-traditional export equation results

	Model 1*	Model 2	Model 3
LGDPF	4.84	3.44	2.94
	<i>6.16</i>	<i>9.41</i>	<i>11.38</i>
LREERP	-7.70		
	<i>-3.23</i>		
LREERH		-3.91	
		<i>-5.09</i>	
LREERC			-4.26
			<i>-5.57</i>
Constant	18.17	7.18	11.14
ECM term	-0.41	-0.82	-0.89
	<i>-2.36</i>	<i>-3.68</i>	<i>-3.38</i>

* no evidence of cointegrating relationship
t-statistics in italics

¹⁹ Non-traditional export figures have been adjusted by excluding Hyundai exports during 1993-99, to avoid possible distortions. See Section 3 for more details.

Box 5

THE IMPACT OF EXCHANGE RATE CHANGES ON THE VIABILITY OF OSTRICH PRODUCT EXPORTS

The example shows the impact of exchange rate changes on the profitability of ostrich products (including both the farming and processing stages, based in figures given in the ostrich sector study). Scenarios 1 and 2 show the impact of rand appreciation and depreciation against the euro, but with the overall value of the pula unchanged. Rand movements of 10% in each direction cause the gross margin per bird (P680 in the base case) to fall by 12% (with rand appreciation) and rise by 13% (with rand depreciation). This compares with an increase of 14% in the gross margin in the case of a 10% pula devaluation (allowing for a small pass through of devaluation to domestic prices). In conclusion, the overall value of the pula is important in determining the viability of the industry, but changes in external cross rates, independent of the value of the pula, are equally important.

Item	Currency	Base case		Scenario 1	Scenario 2	Scenario 3
		Foreign currency value	Pula value	Rand appreciation 10% Pula value	Rand depreciation -10% Pula value	Pula devaluation -10% Pula value
Costs (per bird)						
Feed	ZAR	844	625	647	605	694
Other farm costs	BWP	255	255	255	255	261
BOC costs [1]	BWP	150	150	150	150	154
Total			1,030	1,052	1,010	1,110
Revenues						
Fillets	EUR	198	1,170	1,097	1,254	1,300
Other meat	BWP	140	140	140	140	140
Skin	ZAR	540	400	414	387	444
Total			1,710	1,651	1,781	1,884
Margin			680	599	771	775
Change vs. base case				-11.9%	13.4%	14.0%
Exchange Rates						
BWP=	0.169	EUR		0.181 EUR	0.158 EUR	0.153
BWP=	1.350	ZAR		1.305 ZAR	1.395 ZAR	1.215
ZAR=	0.126	EUR		0.138 EUR	0.113 EUR	0.126

Note [1]: BOC – Botswana Ostrich Company

BOX 6
BOTSWANA AND THE DUTCH DISEASE

The “Dutch Disease” refers to the process whereby economies with a booming sector (e.g. minerals) experience an appreciation of the real exchange rate that causes a contraction of the tradeables (e.g. manufacturing) sector. The basic mechanism is that the spending of the additional income generated by the booming sector (perhaps through government spending based on taxes levied on the booming sector) increases the demand for domestic resources. The non-tradeables sector, which is not subject to international competition, raises prices to maintain profitability. The tradeables sector, however, cannot raise prices, as these are set in international markets, and profitability declines in the face of higher factor costs, leading to the movement of resources from the tradeables sector to the non-tradeables sector. The real exchange rate (measured as the ratio of non-tradeables to tradeables prices) appreciates, as will the nominal exchange rate, if the exchange rate is floating. The tradeables sector, which becomes less competitive, contracts. This is the basis for Dutch disease-induced deindustrialisation (or de-agriculturalisation, if the tradeables sector comprises predominantly agricultural products).

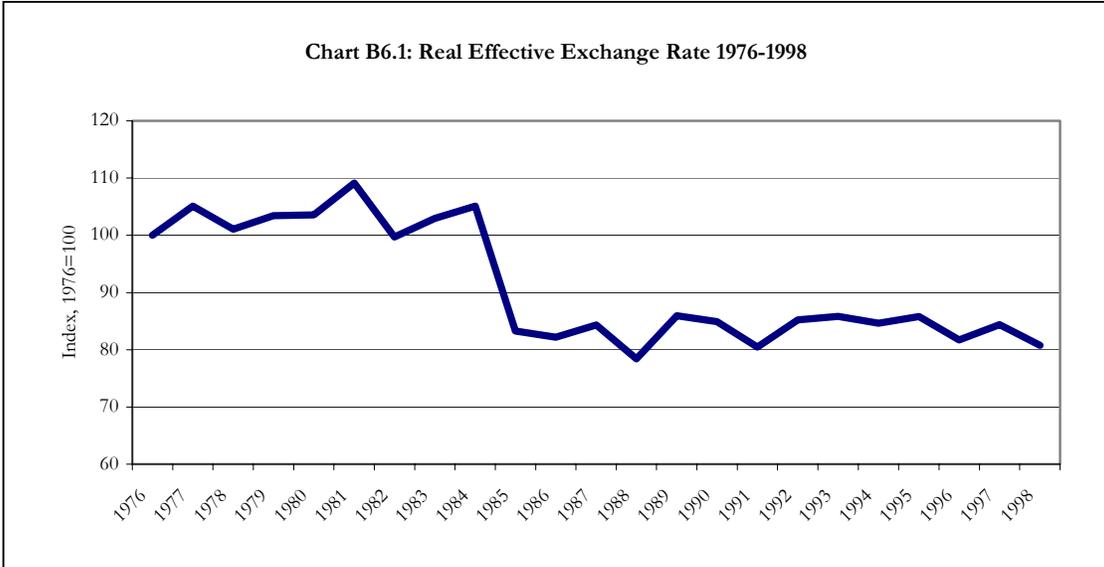
It is not necessarily appropriate to term this process a “disease”, as it simply describes the adjustment process to a higher level of real income as a result of the boom. However, if the boom is expected to be temporary, and if the economy is not expected to adjust smoothly to the new equilibrium, some “protection” of the tradeables sector from the Dutch Disease may be appropriate. While Corden (1984) notes that the best form of protection is a direct subsidy of the tradeables sector (financed by taxes levied on the booming sector), an alternative is to use “exchange rate protection”, whereby the maintenance of a fixed exchange rate prevents the nominal exchange rate from appreciating, thus inhibiting real appreciation. The outcomes of such exchange rate protection include the accumulation of foreign exchange reserves; keeping consumption below the levels that would otherwise result from the higher (boom-induced) real income; and a forced balance of trade surplus. Exchange rate protection needs to be accompanied by sterilisation of the monetary impact of reserve accumulation, whether through open market operations or budget surpluses, and the resulting suppression of aggregate demand growth helps to contain the upward pressure on the relative price of non-tradeables.

Botswana attempted to use such exchange rate protection in an attempt to deflect Dutch Disease-induced real appreciation. Whether the policy has been successful is difficult to ascertain. The main period of rapid structural change in the economy occurred as the minerals sector grew rapidly during the late 1970s and the 1980s²⁰. A long-term REER series (comparing domestic and foreign prices) covering that period provides no evidence of real appreciation – indeed significant real depreciation seems to have occurred during the 1980s (see Chart B6.1). Nevertheless, the process of structural change in the economy is highly consistent with Dutch Disease predictions, with the relatively slow growth of the tradeables sectors (agriculture and manufacturing) relative to the non-tradeables (services) sectors²¹.

²⁰ The mining sector grew from 10% of GDP in 1974/75 to 47% in 1984/85.

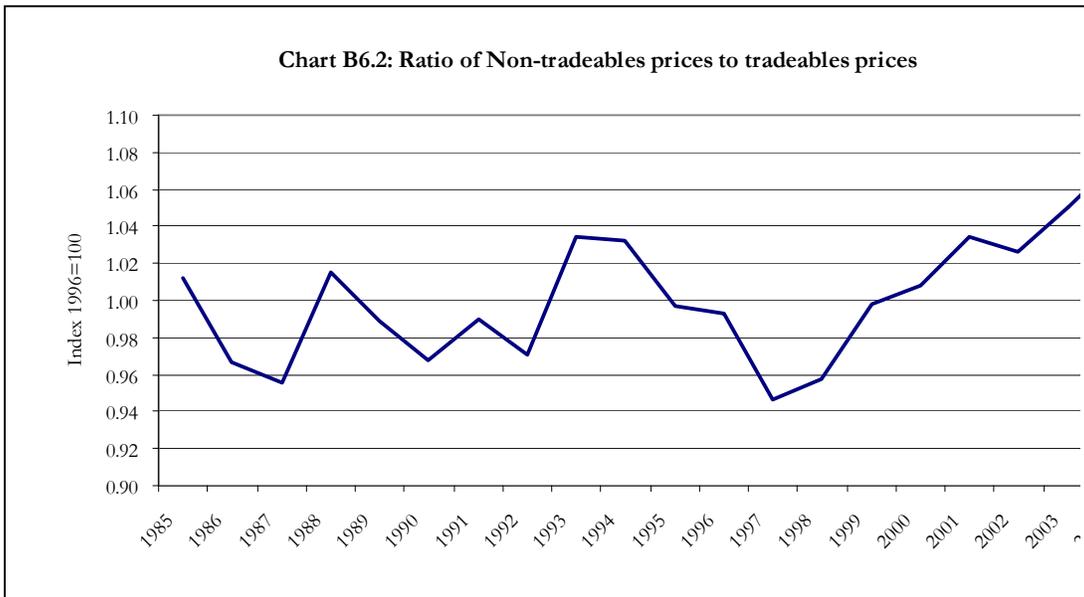
²¹ The combined share of agriculture and manufacturing in GDP fell from 40% in 1974/75 to 7% in 2002/03, while that of services grew from 22% to 31% of GDP over the same period. Perhaps more strikingly, while the output of the services sector was equivalent to 56% of the combined output of agriculture and manufacturing in 1974/75, by 2002/03 services output was 440% of that of agriculture and manufacturing.

Chart B6.1: Real Effective Exchange Rate 1976-1998



With regard to the movement of prices by tradeability, it is unlikely that non-tradeables prices would have risen relative to tradeables prices given the REER trends noted above²². However, a process of rising relative non-tradeables prices has been apparent since the late 1990s (see Chart B6.2), which has also shown up in the appreciating REER (see section 2). To ascribe recent real exchange rate appreciation to the Dutch Disease would require some explanation of a long-delayed impact of the minerals boom, as well as discussion of how the Dutch Disease mechanism works in the absence of nominal appreciation. One possible mechanism is through the costs of skilled labour, as follows. Rising government expenditure, financed substantially through taxes on the minerals sector, has generated demand for skilled labour (compounded by demand from the booming sector itself, although this remains relatively small in employment terms). As the supply of skilled labour is less than perfectly elastic (a result, in part, of restrictions on immigration of skilled labour), its cost rises, for all sectors of the economy. The non-tradeables sector raises prices to maintain profitability, while the tradeables sector cannot do so, due to international competition, and hence its profitability declines. Returns to other factors (unskilled labour and capital) are unaffected by this spending effect, as the supply of unskilled labour is

Chart B6.2: Ratio of Non-tradeables prices to tradeables prices



highly elastic, due to unemployment, as is the supply of capital, as domestic savings exceed investment. The result of this process would be real appreciation, as the price of non-tradeables rises relative to the price of tradeables.

The reason for the long delay in this process after the initial minerals boom may be a result of the relatively strict wages policy that was maintained until the early 1990s, whereby government deliberately aimed to restrain growth in skilled wages in both the public and private sectors. Following the removal of controls on private sector wages and the relaxation of controls on wages in the parastatal sector, there is some evidence that wages for skilled workers have risen more rapidly than wages of unskilled workers, which could explain the rise in non-tradeables prices and the slow growth of the manufacturing sector. Corden (1984, p.359), presents an interesting alternative interpretation of the Dutch Disease: "it might be argued that the true Dutch Disease in the Netherlands was not the adverse effects on manufacturing of real appreciation but rather the use of Booming Sector revenues for social service levels which are not sustainable, but which it has become politically difficult to reduce". This could well be applied to Botswana.

Box 7
Estimating the Real Equilibrium Exchange Rate (REER)

One of the key issues regarding the level of the real effective exchange rate (REER) is how the actual level compares to its equilibrium level at any given time. The equilibrium REER is defined as that level of the REER that is consistent with both internal and external macroeconomic balance. Comparing the actual REER with its historical values does not take account of changing macroeconomic fundamentals, or shocks, over time; the REER can only be meaningfully said to be overvalued or undervalued relative to the equilibrium REER, i.e., relative to the value of the REER that is consistent with its fundamental determinants. Furthermore, if the REER is overvalued (undervalued) relative to its equilibrium value, there will be a tendency for the actual REER to depreciate (appreciate), and vice versa. REER depreciation can occur either through a change in the nominal exchange rate or in relative prices (with domestic prices decreasing relative to foreign prices). In a floating exchange rate regime, REER adjustment can occur either through nominal exchange rate flexibility, or through changing relative prices. In a fixed exchange rate regime, such as Botswana, REER adjustment can only occur through relative price changes, in the absence of a deliberate change to the exchange rate peg. If REER is overvalued, therefore, in the absence of a devaluation vis a vis the peg, there will be a tendency for domestic prices to decline relative to foreign prices, and this will be achieved as the overvalued REER causes domestic demand to decline.

Having a good idea of where the actual REER is relative to its equilibrium value is important, as it will give an idea of the likely future direction of the REER. In a flexible exchange rate regime, it will provide a pointer for the likely future direction of the nominal exchange rate, while in a pegged exchange rate regime, it will indicate whether a change to the peg is likely to be sustainable. For instance, a devaluation aimed at achieving a depreciation of the REER is much more likely to be successful if the actual REER is overvalued relative to the equilibrium REER. By its nature, the equilibrium REER is unobservable. However, it can, in principle, be estimated econometrically. One technique that has been applied to several African economies is to investigate whether a long run cointegrating relationship exists between the REER and a set of fundamentals. If such a relationship can be established, the equilibrium REER can be generated by applying the coefficients from the long run equation to the trend values of the determinants. The actual REER can then be compared to the calculated equilibrium value.

Theoretical approaches (e.g. Edwards, 1989) tend to assume that the prices of tradeable goods are equalised across countries and the analysis focuses on how changes in the REER arise from changes in the prices of non-tradeable commodities relative to the prices of tradeables. However, other models, which allow the relative price of traded goods to vary, yield broadly similar results (MacDonald and Ricci 2002).

A number of variables have been identified in the literature as explaining changes in the REER in developing countries. These include terms of trade (or commodity price movements), net foreign assets (NFA), size of government, rate of investment, and productivity differentials (technological progress). More specifically, an improvement in terms of trade or net foreign assets increases national income/wealth, which puts upward pressure on the prices of domestically produced commodities, which in turn causes the REER to appreciate. Higher government spending also tends to cause the REER to appreciate, as it tends to be biased towards domestic non-tradeables rather than imports or tradeable commodities. Finally, the Balassa-Samuelson effect posits that an increase in the productivity of tradeables relative to non-tradeables of one country relative to foreign countries raises its relative wage, thus increasing the price of non-tradeables relative to the (fixed) price of tradeables, hence causing REER appreciation. However, with price imperfections for tradeables the impact is less clear-cut, as a

(productivity-induced) price reduction for tradeables could dominate, causing the REER to depreciate.

Recent empirical studies have estimated the equilibrium REER for Malawi (Mathisen, 2003), Madagascar (Cady, 2003), South Africa (MacDonald and Ricci, 2003) and the Eastern Caribbean Currency Union (ECCU) (IMF, 2004a). Although the detailed results vary from country to country, in general they find that the expected variables – NFA, terms of trade/commodity prices, size of government, rate of investment and relative productivity - are the important determinants of the equilibrium REER.

A similar analysis has been carried for Botswana as part of this study. The REER measure chosen is slightly different to that discussed earlier in this report, as the equilibrium REER analysis covers the whole economy and the REER measure therefore uses currency weights (50% ZAR/50% SDR) that more closely reflect overall trade patterns. This immediately reveals one striking result: that the REER when calculated from the viewpoint of the economy as a whole (rather than with a bias towards economic diversification) appreciated very sharply in late 2002 and 2003, reversing the slight long term downward trend (see Fig. B5.1). As it is unlikely that economic fundamentals have changed so dramatically, it is likely that by 2003 the actual REER had become overvalued relative to its equilibrium value.

RESULTS

The model included a set of conventional variables, as follows:

<i>Variable name</i>	<i>Description</i>
REERP50	Real effective exchange rate (with 50/50 ZAR/SDR weights)
INV	investment (gross fixed capital formation) as % of GDP
NFA	net foreign assets as % of GDP
RPROD	relative productivity (real per capita GDP in the non-mining sector used as a proxy)
TOT	terms of trade (the ratio of export unit values to import unit values)
GCONSEXP	Government consumption expenditure, as % of GDP

Quarterly data was used from 1993Q3 to 2004Q1 (43 observations). Graphical representations of the data series are included as Figs B7.1-7.6. All were entered in log form in the regression. A long run cointegrating relationship between the variables was estimated using a vector error correction model (VECM).

Investment and net foreign assets were found to be insignificant, and so the final model was estimated with three variables: relative productivity, terms of trade and government consumption. The results are shown below. All terms are statistically significant, and the error

REER estimation results	
LRPROD	-1.332 <i>5.695</i>
LTOT	1.211 <i>-4.068</i>
LGCONSEXP	0.997 <i>-5.968</i>
Constant	9.347
ECM	-0.138 <i>1.731</i>
<i>t-statistics in italics</i>	

correction term has the correct negative sign. The coefficients on TOT and GCONSEXP have the expected positive signs, indicating that an increase in these variables will cause the RER to appreciate. However, the negative sign on the relative productivity term is not in accordance with the Balassa-Samuelson effect. This may reflect the way the REER is measured (the ratio of domestic to foreign prices, rather than the ratio non-tradeables prices to tradeables prices), and may illustrate that the price-reducing effects of productivity growth dominate price-raising effect in the non-tradeables sector. The ECM coefficient illustrates that the speed of adjustment to disequilibrium is moderate – the half life (the

time taken for half of the disequilibrium to disappear) – is around 14 months. This compares with estimated half lives of 11 months for Malawi, 24-30 months for South Africa, and 18 months for Madagascar.

The results can be used to construct a series for the equilibrium REER. The data series for RPROD, TOT and GCONSEXP were detrended using the Hodrick-Prescott filter, and the equilibrium REER value calculated using the coefficients from the long-run equation. The equilibrium and actual REER series are shown in Fig. B7.7. This indicates that for most of the period covered, the REER was marginally undervalued relative to its equilibrium value (see Fig. B7.8). However, the rapid appreciation of the REER during 2002 and 2003 has led to it being overvalued. While the degree overvaluation in early 2004 was relatively high by historical standards, at around 10%, it was not that large in absolute terms.

Variables used in Equilibrium REER regressions (in log form)

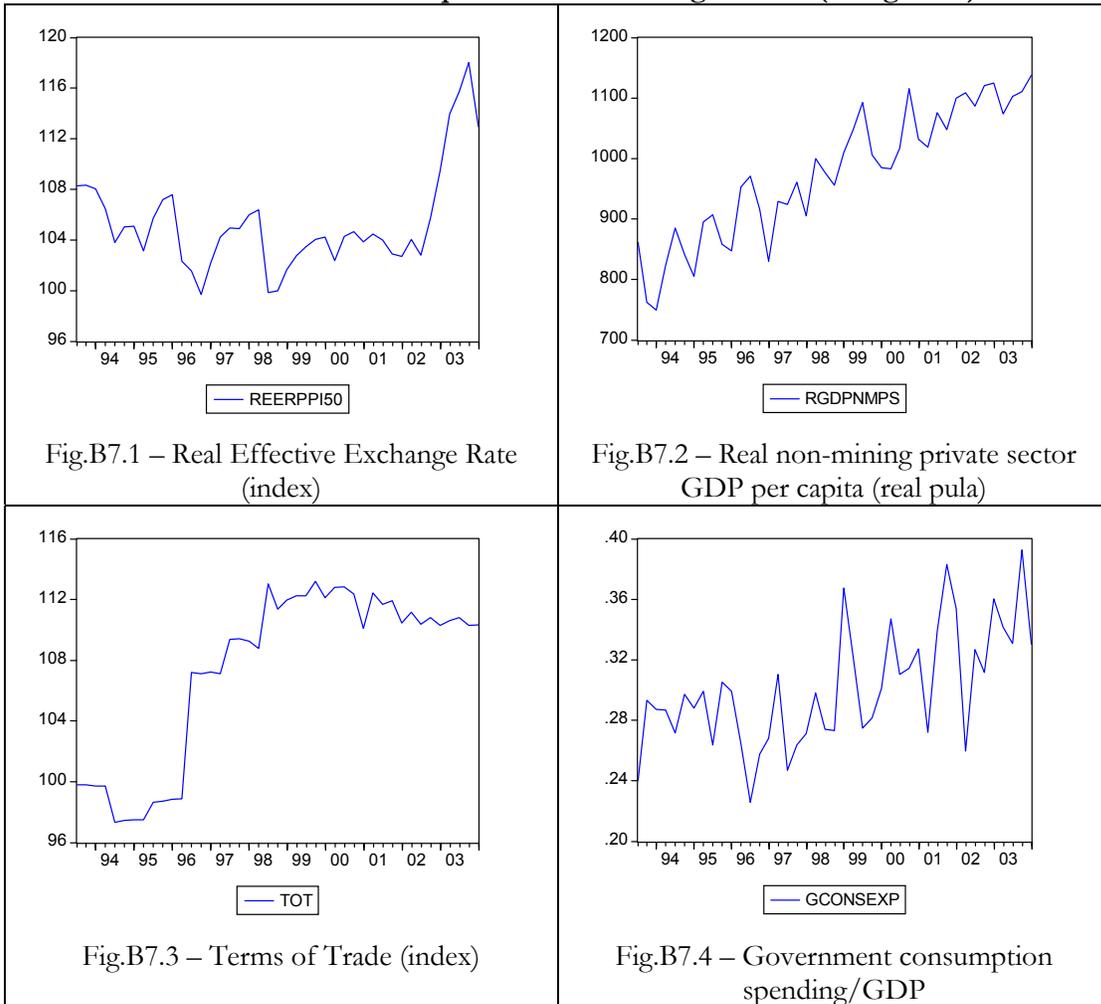
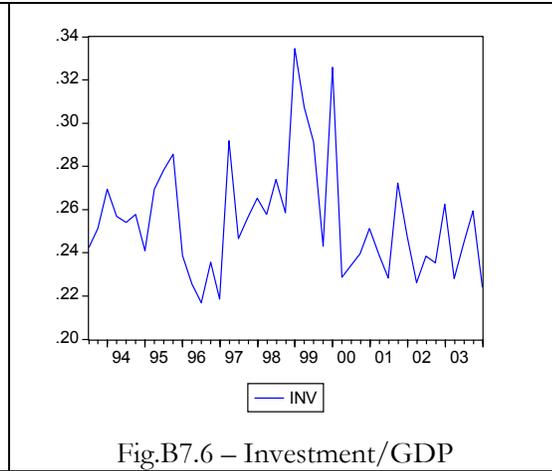
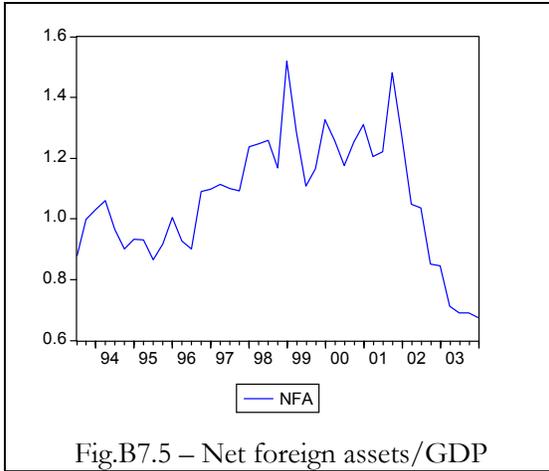


Fig.B7.1 – Real Effective Exchange Rate (index)

Fig.B7.2 – Real non-mining private sector GDP per capita (real pula)

Fig.B7.3 – Terms of Trade (index)

Fig.B7.4 – Government consumption spending/GDP



ACTUAL AND EQUILIBRIUM REERS

