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Bank of Botswana 2003 Monetary Policy Statement: Mid-Year Review

1. Introduction

1.1 The mid-year review of the 2003 Monetary Policy Statement (MPS) has three main objectives. First, it presents a progress report on the extent to which the objectives of monetary policy, outlined in February 2003, have been achieved half way through the year; second, based on the assessment of progress, it examines the prospects for the financial and economic outturn for the remainder of the year and, depending on the prognosis, it evaluates whether or not there is need for a change in the policy stance in the remaining period of the year; and third, it informs stakeholders at mid-year of key considerations on policy formulation.

1.2 In setting its inflation objective for 2003, one of the Bank's primary considerations was inflation in trading partner countries, which was forecast at 5.7 percent for 2003. In light of this forecast, the Bank maintained the range of 4 – 6 percent for the desired level of inflation in 2003. The inflation range was intended to assist in regaining some of the competitiveness lost in 2002, and to maintain low inflation in light of concerns about the risks of a further VAT-induced increase in inflationary expectations. Furthermore, it was felt that underlying inflation (excluding the impact of VAT), remained close to the upper end of the desired range, thereby making the 4 – 6 percent range a feasible objective for underlying inflation.

1.3 Since the main objective of monetary policy is to control demand-induced inflation, the Bank focuses on the rate of growth of commercial bank credit, which contributes to domestic demand pressures and is subject to the influence of monetary policy. The Bank also focuses on the level of government spending that is considered non-inflationary given that the Government accounts for a large component of consumption expenditure and investment.

2. Outturn for the First Half of 2003

2.1 In the first half of the year, annual inflation varied between 11.3 percent and 12.8 percent (Chart 1), and fell to 9.2 percent in July. After excluding the impact of VAT, inflation was close to the expected range stated in the 2003 MPS. Domestic credit maintained a downward trend over the period, falling within the desired range in June (13.9 percent) and averaging 15.3 percent for the first half of the year, down from an average of 20.8 percent of the second half of 2002. Growth in government spending also continued to slow; it averaged 11 percent in the first quarter of 2003, compared to 22.2 percent registered in the same period last year.

2.2 World economic growth was slower than expected in the first half of 2003, due mainly to weak business and consumer confidence resulting from tension in the Middle East and uncertainty about world economic growth prospects. World output is estimated to have grown by a lacklustre 1.7 percent in the second quarter of 2003, down from 2.3 percent in the first quarter. Expectations are for a recovery in global economic activity in the second half of the year. Meanwhile, and consistent with expectations, global inflation slowed in the first half of 2003, reflecting, in part, low international energy prices and sluggish world economic performance. Global inflation is expected to remain low and stable during the remainder of the year.

(a) International Inflation

2.3 Average inflation in trading partner countries[1] declined to 3.8 percent in June 2003 from a revised 7.1 percent in December 2002 (Chart 1). South African core inflation declined from a revised 9.8 percent at the end of 2002 to 5.8 percent in June 2003, while headline inflation fell from a revised 12.4 percent to 6.7 percent in the same period. The fall in South African inflation was due mainly to the recovery of the rand, lower oil prices following the end of the war in Iraq and an improvement in inflation expectations[2]. Meanwhile, SDR inflation remained stable at around 2 percent in the same period.

(b) Domestic Inflation

2.4 The rise in inflation from 11.2 percent in December 2002 to 12.8 percent in June 2003 was due to a combination of domestic factors that offset the favourable external trends. Besides the increase in the cost of some food items, prices of motor vehicles rose sharply in January and April 2003. There was also an increase in Botswana Housing Corporation (BHC) rentals in June. Inflation then fell to 9.2 percent in July as the impact of the introduction of VAT in July 2002 dropped out of the calculation.

2.5 The increase in inflation in the first half of the year was also reflected in the cost of both tradeables and non-tradeables. Prices of imports, which rose by 8.2 percent in January, increased year-on-year by 11.3 percent in June. A similar

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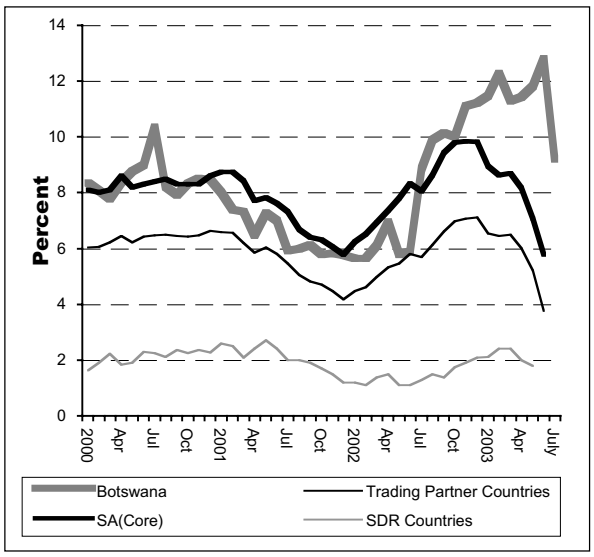
1 South Africa and SDR countries (Japan, USA, UK and the euro zone).

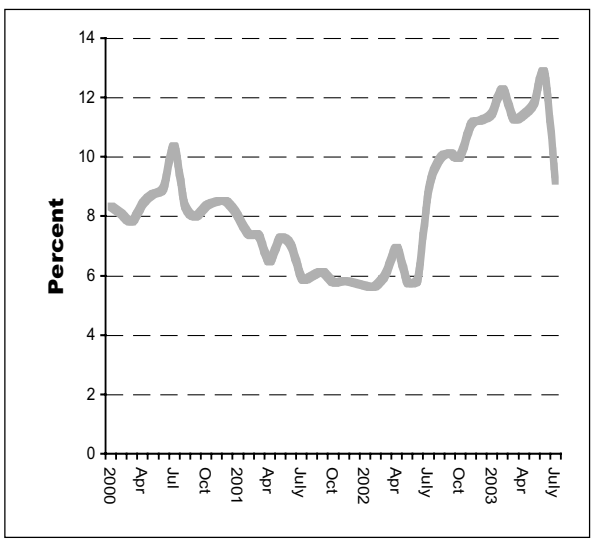
2 South African inflation was revised downwards from January 2002 to March 2003 to correct an error detected in the CPI.

CHART 1: INTERNATIONAL INFLATION



trend was evident with respect to prices of domestic tradeables and non-tradeables. The cost of domestic tradeables was largely influenced by the rise in food prices (mainly cereals), whereas the increase in BHC rentals explained most of the rise in the cost of non-tradeables, especially between May and June 2003, when non-tradeables inflation rose substantially from 10.6 percent to 14.6 percent.

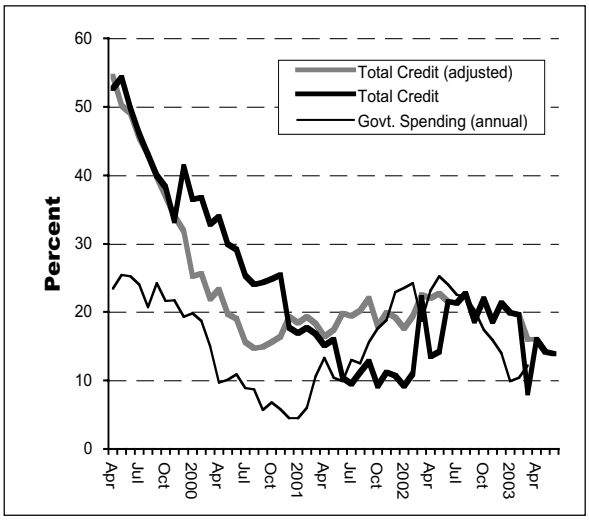
CHART 2: BOTSWANA INFLATION



(c) Domestic Credit

2.6 The growth of total commercial bank credit slowed to an average of 15.3 percent in the first six months of the year, from 21.3 percent at the end of 2002 and an average of 18 percent in 2002 (Chart 3). When adjusted for lumpy borrowing and repayments, average credit growth for the six months to June 2003 was 16.6 percent, or 4.4 percentage points lower than comparable figures for 2002. Year-on-year credit growth in June 2003 was 13.9 percent, thus bringing credit growth within the range of 12 – 14 percent that the Bank considers

CHART 3: GROWTH RATES OF CREDIT AND GOVERNMENT SPENDING (YEAR ON YEAR)



consistent with its inflation objective. The growth rate of adjusted credit in June was the lowest since March 1998.

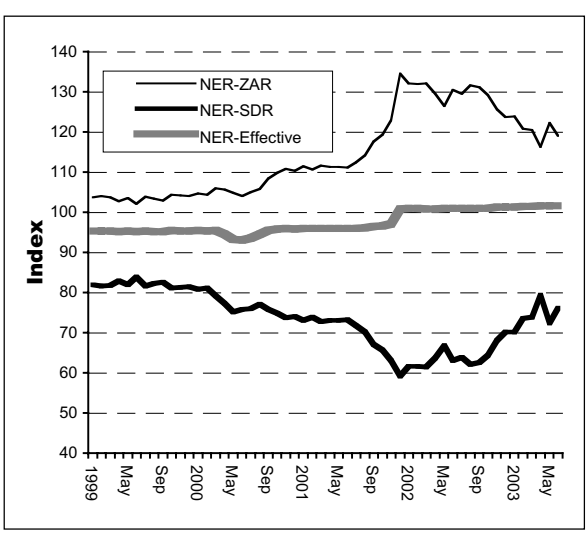
(d) Government Spending

2.7 In the first quarter of 2003, government expenditure was 9.7 percent higher than in the comparable period of 2002 (Chart 3). For the 2002/03 fiscal year, government spending rose by 12.4 percent year-on-year (a lower rate than the 18.7 percent of the 2001/02 fiscal year), thereby giving a more desirable balance between monetary and fiscal policies in restraining aggregate demand pressures for the remainder of 2003.

(e) Nominal Exchange Rates

2.8 The Pula appreciated against major international currencies in the first half of 2003 (Chart 4) as the external value of the rand continued to recover, thus reflecting the policy link between the Pula and the rand through the multi-currency basket. In the first half of 2003, the Pula appreciated

CHART 4: NOMINAL EXCHANGE RATES INDICES, NOVEMBER 1996 = 100

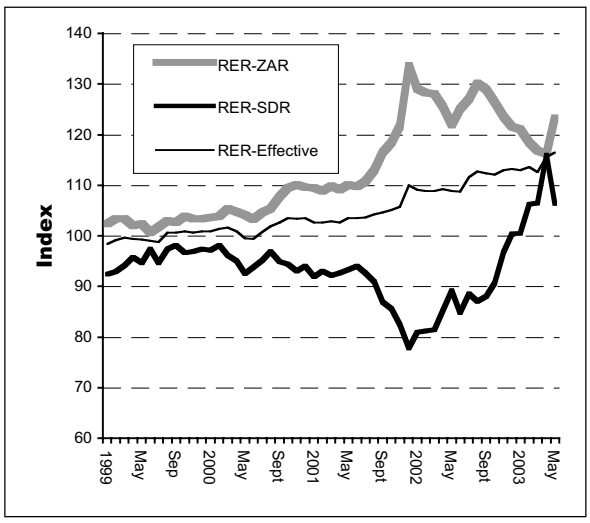


by 8.5 percent against the SDR, 11.3 percent against the US dollar and 2.2 percent against the euro. It depreciated by 3.8 percent against the rand in the same period. Despite the significant changes in bilateral exchange rates of the Pula against international currencies (mainly the US dollar), the nominal effective exchange rate remained relatively stable in line with Botswana's fixed exchange rate policy, appreciating by only 0.3 percent during the first half of the year.

(f) Real Exchange Rates

2.9 In the five months to May 2003, international competitiveness was eroded as the real effective exchange rate of the Pula appreciated by 2.9 percent, following the 2.8 percent appreciation in 2002 (Chart 5). The appreciation of the real exchange rate reflected higher inflation in Botswana than in trading partner countries which, in turn, was due largely to the introduction of VAT. However, in view of the fact that the real exchange rate measure is based on the consumer price index, which includes the effect of VAT, there is a possibility that the erosion of international competitiveness of Botswana producers may be exaggerated since VAT is not relevant in such international comparisons.

CHART 5: REAL EXCHANGE RATE INDICES, NOVEMBER 1996 = 100

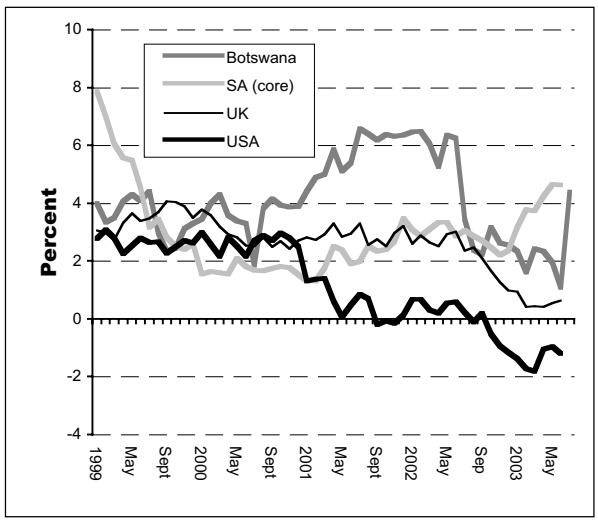


3. IMPLEMENTATION OF MONETARY POLICY IN THE FIRST HALF OF 2003

3.1 In order to ensure that inflation slows towards the Bank's desired range of 4 – 6 percent by the end of the year, monetary policy remained restrictive in the first half of 2003, following the increase in the Bank Rate by 1 percent (in two equal parts) at the end of last year. Correspondingly, other interest rates remained stable during the first half of the year. The commercial banks' prime lending rate remained constant at 16.75 percent, while the three-month Bank of Botswana Certificate (BoBCs) rate stabilised at around 14 percent.

3.2 In response to rising inflation, real interest rates maintained a downward trend in the first half of the year. The real 3-month BoBC rate fell from 2.5 percent in December 2002 to 1.1 percent in June 2003, which was below comparable rates in South Africa, but above those in the UK and USA (Chart 6). In July, however, the real BoBC interest rate rose to 4.4 percent as inflation fell.

CHART 6: REAL INTEREST RATES



4. OUTLOOK FOR INFLATION IN THE REST OF 2003

(a) External Factors

4.1 Global inflation fell modestly in the first half of the year due mainly to the decline in energy prices as well as the weak global economic activity; it is forecast at 2.7 percent for the whole of 2003. Growth is expected to accelerate in the second half of the year as the effects of expansionary fiscal and monetary policies adopted in most of the major economies are felt.

4.2 Inflation in South Africa is declining and forecast to be within the South African Reserve Bank's (SARB) 3 – 6 percent target range by the end of the year. Economic activity has slowed, with real GDP growing at an annual rate of 2.5 percent in the first quarter of 2003, compared to 3 percent the previous quarter. The slowdown in economic activity is attributable mainly to a decline in the volume of exports resulting from the appreciation of the rand and the subdued global economy. Interest rates are expected to decline in the second half of the year and this should support a revival of economic activity.

(b) Domestic Factors

4.3 Growth rates of key domestic demand indicators (commercial bank credit and government spending) have been falling since late last year.

Credit growth fell to 13.9 percent at the end of June 2003 (within the desired 12 – 14 percent range), and government spending growth was only marginally above the desired levels in the first quarter. If the current trends in credit and government spending are sustained, domestic inflationary pressures should ease during the remainder of the year.

4.4 Consistent with expectations, inflation decreased in July 2003 to 9.2 percent from the June level of 12.8 percent, as the VAT-induced increase in inflation dropped out of the inflation calculation. The reduction in fuel prices at the beginning of July also contributed to the reduction in inflation.

4.5 However, there is still uncertainty about the response of the Government to the report on the structure of public sector salaries, and on the extent of supplementary budget approvals. Large supplementary budgets and/or unsustainable salary increases that are not matched by reductions elsewhere in the government budget could lead to a rise in domestic expenditure and a corresponding increase in inflationary pressures.

4.6 The 4 – 6 percent inflation objective set out in the 2003 MPS was intended to help regain some of the competitiveness lost during 2002 and to maintain low inflation expectations. The current trends and forecasts of growth rates of credit and government spending suggest that the inflation objective for the year remains appropriate and, with a substantial slowing of monthly price increases in the second half of the year, headline inflation should end the year closer to the upper end of the desired range.

5. SUMMARY AND CONCLUSIONS

5.1 Inflation rose sharply following the introduction of VAT in July 2002, and has continued to rise through the first half of 2003. Besides VAT, prices have recently been driven by the rising cost of certain foodstuffs, motor vehicles, airfares and, lately, the increase in BHC rentals.

5.2 Domestic inflation is, however, expected to decline in the second half of the year for a number of reasons. The effects of VAT dropped out of the inflation calculation in July 2003. In addition, the reduction in fuel prices in July is also expected to contribute to low inflationary pressures in the second half of 2003. An additional significant factor is that domestic demand pressures, as indicated by the rates of growth in both credit and government expenditure, are slowing and, if sustained, will contribute to an easing in inflation pressures in the economy.

5.3 External factors are also supportive of a more favourable inflation outlook. Global inflation is expected to remain stable and low during the remainder of the year. In South Africa, inflation is expected to decline further, with an increased prospect of reaching the 3 – 6 percent target during the year.

5.4 Therefore, for the remaining part of the year, the Bank will adhere to the current inflation objective of 4 – 6 percent, and to the 12 – 14 percent growth in private sector credit as it is consistent with the inflation goal. The Bank will continue to monitor the relevant indicators and will take appropriate policy action, as necessary, in light of both financial and price developments during the rest of the year.

Using the GDDS Framework to Improve Standards of Statistics Production and Dissemination: The Experience of the Bank of Botswana

Sabata Legwaila, Pontsho Mochipisi and Matthew Wright[1]

Introduction

In October 2001, a mission from the International Monetary Fund (IMF) came to Botswana to assess the production and dissemination of official statistics. The 'Report on the Observance of Standards and Codes' (ROSC) mission examined statistics produced by the Central Statistics Office (CSO), the Ministry of Finance and Development Planning (MFDP) and the Bank of Botswana (BoB) against benchmarks set out in Data Quality Assessment Frameworks (DQAFs), and indicated the extent to which practices were in line with those recommended in the Fund's General Data Dissemination System (GDDS). While the standard of Botswana statistics has generally been regarded as good – at least among developing countries – the ROSC report revealed a variety of shortcomings, most notably perhaps in the area of effective dissemination, and subsequently the agencies have initiated a concerted effort to make good these deficiencies. This has been in the context of the IMF's 'anglophone' GDDS project for fourteen African countries that formally commenced in November 2001, under which Botswana became the first of the participating countries to meet the key requirement of posting metadata on the IMF's GDDS website. This paper reports on aspects of this process, with a special focus on the efforts by the Bank of Botswana, which is responsible for the compilation of monetary and balance of payments statistics in Botswana. It concludes by looking forward to the next stage of statistics development in Botswana, which is an on-going process.

History of the GDDS

The GDDS is one component of the IMF's Data Standards Initiatives (DSI) which resulted from the recognition that *ready and public availability* of economic and financial data facilitates the implementation of sound macroeconomic policies. Economic analysis is only as good as the data on which it is based, and the effectiveness of policies can be enhanced by their wider appreciation. This lesson was driven home by the financial crises of the mid- to late-1990s, which were exacerbated by the lack of access to necessary information.[2] In the wake of these, the IMF decided to develop standards on data provision to guide member countries. For this purpose, a two-tier standard was decided upon: the top tier – the Special Data Dissemination Standards (SDDS) – for countries that wished to access international capital markets; the second – the GDDS – for others. The SDDS and GDDS were approved by the IMF in March 1996 and December 1997, respectively. Other key components of the DSI are the ROSCs, of which DQAFs form an integral part.

Since their inception, the role of the SDDS and GDDS in supporting the production of statistics, and hence sound macroeconomic policies, has been widely recognised (Silver, 2003). This process has been helped greatly by the importance attached to it by the IMF. As of mid-2003, over sixty IMF member countries participated in the GDDS or subscribed to the SDDS (IMF, 2003b). But it should not be inferred from this that the IMF originated the promotion of data dissemination based on international standards; rather it built upon and added clarity and urgency to a process that was already underway. The *Fundamental Principles of Official Statistics* had been adopted by the United Nations Statistics Commission in the early 1990s and covered many areas subsequently emphasised by the GDDS (de Vries, 1998). The production of the revised *System of National Accounts* (SNA) in 1993, which is the foundation of subsequent efforts to standardise guidelines on key macroeconomic data, was the joint work of five agencies, of which the IMF was one.[3]

Indeed, it might be suggested that it was only relatively recently that the IMF itself fully converted to the cause of transparency. Meltzer (2003) states that 'The IMF was slow to develop standards to improve the quality of information and slower still to make the information public'. Prior to the crises of the nineties, the details of the bilateral re-

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[1] Respectively, Senior Economist (Monetary Statistics), Senior Economist (Balance of Payments) and Principal Economist (Statistics and Information Services), Research Department, Bank of Botswana. The paper draws heavily on material presented at the National GDDS Workshop held in Gaborone on 3 July 2003, and the authors are grateful to the various contributions that made the workshop a success.

[2] For example, the Thai crisis of 1997 was caused in part by inadequate reporting by the authorities of the forward position on foreign reserves (Glennerster and Shin, 2003).

[3] The others were the United Nations, World Bank, EUROSTAT (the statistical arm of the then European Community, now the EU) and the OECD.

views between IMF staff and member countries had been kept strictly confidential, the prevailing view being that the role as advisor might be compromised if details of candid discussions were made widely available. It was only in late 2000 that the IMF Board agreed to make permanent a pilot project launched in 1999 to publish details of 'Article IV' discussions and other documents, and even then some IMF Directors have continued to express reservations about the possibility of undue pressure being put on countries to make public potentially sensitive information (IMF, 2001 and 2003c).

That the framework developed by the IMF has quickly acquired a pivotal role can perhaps be attributed to two principal factors. First, the IMF has been central to the process of further developing the guidelines to standardise the production of statistics both between countries and across statistical categories. Building on work done in producing the revised SNA, with the objective of introducing comparability across statistical systems based on the concepts and definitions agreed in the revision process, the IMF embarked on preparing a series of specialist manuals. Of these, some are revisions of existing work,[4] while others are entirely new. To date, these include manuals on balance of payments (fifth edition), monetary and financial statistics, and government financial statistics (revised), which together comprise the main macroeconomic accounts; along with more specialist subjects including quarterly national accounts, the non-observed economy, and international reserves, which focus on particular areas of concern in reaching required standards, especially those necessary for subscription to the SDDS.[5] The production of new standards has been supported by training at various levels, ranging from formal courses at either the IMF Institute in Washington, D.C., or regional training centres, to specialist technical assistance (TA) missions that typically include a training component.

Second, the process has been helped by the IMF's mandate, as formalised in 1977, '…to oversee each member's efforts to direct its financial and economic policies…' (Casteleijn, 1998). This immediately gives a comparative advantage in developing improved information standards (Meltzer, 2003), as the IMF naturally has great influence due to a framework for regular consultation with members (either through the regular Article IV consultations or under other IMF programmes such as the Poverty Reduction and Growth Facility (PRGF)), where matters it considers important can be placed on the agenda.

In addition, the extent to which support from the wider international community – both donors and capital markets – is frequently conditional on countries gaining the IMF's approval, is likely to be an important motivating factor in members' participation in transparency initiatives. While the IMF has continued to emphasise the voluntary nature of participation in the DSI (IMF, 2003b & c), and no IMF document can be published without the agreement of the affected country(ies),[6] it would not be surprising if non-participation or refusal to publish is taken as a negative indication.[7] Recent research conducted by IMF staff reports that countries which make details of policy discussions public and subscribe to the SDDS receive tangible gains in the form of narrower interest spreads in their dealings on international financial markets (Glennerster and Shin, 2003). Indeed, the potential for such effects, while generally beneficial, has required a cautious approach by the IMF, especially in further extending the data coverage of the DSI where giving prominence to specific data categories may suggest the endorsement of a particular policy regime.[8]

While the GDDS is explicitly of less relevance to the impact on financial markets, equivalent considerations encourage participation. For instance, the IMF has emphasised the role of GDDS assessments as a tool for helping both donors and recipient countries to help prioritise TA requirements (see IMF, 2003b). As part of the fifth review of the DSI, the benefits of directly linking the GDDS to the requirements of Poverty Reduction Strategy Papers (PRSPs) and, even more broadly, the millennium development goals (MDGs) is also being investigated (IMF, 2003a).

Since May 2000, information on countries' participation in the GDDS is found through the Internet on the GDDS section of the IMF's Dissemination

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4 The revisions were typically extensive, as the goal of consistency with the new SNA required an effective fresh start on systems that had up to that point been developed largely independently.

5 In the wake of the Thai crisis which revealed deficiencies in recording of international reserves (see footnote 2) the requirements for the SDDS were tightened up in this area, while the production of timely quarterly national accounts has proved the greatest challenge to countries in moving to SDDS observance status (Glennerster and Shin, 2003).

6 Under current guidelines, no publication is compulsory. The strongest category is 'presumed' under which a country must provide a written explanation to the IMF as to why it does not wish to publish (IMF, 2001).

7 Glennerster and Shin (2003) reports that, in an interview sample of financial institutions, 100 percent responded that a refusal by a member to 'voluntarily' publish an IMF report would be taken as a 'negative signal'.

8 For instance, in the 2003 DSI review, there was some concern that further encouraging the reporting of some categories of monetary data, such as measures of core inflation, while helping to increase public understanding, might be seen as an endorsement of inflation-targeting monetary policy regimes (IMF, 2003b).

Standards Bulletin Board (DSBB).[9] This also provides links to national statistical services, access to the Data Quality Reference Site, which sets out the standards according to which countries' statistics and dissemination practices are judged, and various useful references on the general topic of data quality (several of which have been useful in the preparation of this article). In March 2003 an enhanced DSBB was launched as part of a multiphase project to improve its functionality, including the capacity to search the site and compare countries' statistical practices. While the main emphasis of the upgrade has so far been on the SDDS subscribers, some elements cover GDDS also.

The IMF provides TA to countries participating in the GDDS through regional projects. Botswana is covered by the project funded by the United Kingdom's Department for International Development (DFID), and implemented by the IMF Statistical Department in collaboration with the World Bank, which provides support in the area of socio-demographic statistics. This project also covers thirteen other African countries loosely referred to as 'Anglophone',[10] and in the first instance will run from November 2001 to March 2004, after which a decision on further funding will be made.

The Fund has undertaken several reviews of the DSI, the most recent being concluded in July 2003 (IMF, 2003b). These reviews are aimed at maintaining the relevance to members of programmes under the DSI. This is in terms of both content, where the data requirements for the GDDS/SDDS are monitored to ensure relevance while not overburdening participants, and necessary resource allocation, especially in light of increased participation.

KEY FEATURES OF THE GDDS

The GDDS framework is multi-faceted, encouraging the producers of statistics to recognise that the process of preparation and dissemination goes beyond the compilation of data according to approved methodologies. Four dimensions are featured:

***data characteristics*:** including coverage, periodicity and timeliness;

***quality*:** including the importance of providing information on methodologies, so users can adequately assess quality against their own needs. The data characteristics and quality dimensions are, by their nature, closely linked;

***integrity*:** the need for objectivity and transparency to underpin users' confidence in the data. To this end, it is important that users are aware of the terms and conditions under which data is released, including the extent of prior internal use, the source of official commentaries that accompany releases, and the status of any subsequent revisions;

***access by the public*:** official statistics are a public good to which all users should have ready and equal access. This emphasises the usefulness of release schedules and discourages preferential treatment among users.

A System Not a Standard

The GDDS and SDDS are clearly meant to be closely related, as signaled by the similar acronyms. Both are based on the same four dimensions, as set out above. However, in each case the final 'S' has a different meaning, which gives each framework a crucially different emphasis.

The SDDS is a 'standard'. This does not mean that a one-size-fits-all approach is strictly applied. It is recognised that some data categories are not relevant to all economies, and are included in the 'as relevant' category, while others are considered of less importance and are 'encouraged' rather than 'prescribed'. Even within prescribed categories, there is some flexibility regarding periodicity and timeliness, a recognition that there may not be sufficient resources to cover all categories fully.[11] But the degree of permitted flexibility is limited, and failure to meet the requirements is highlighted. At the time of writing, one country on the SDDS subscription list was clearly marked as 'not in observance' and the rates of compliance in the various data categories are reported and updated on a regular basis.[12] One reason for strict subscription requirements is that the SDDS is intended to help promote a better functioning of financial markets in general, not just benefit the subscribing countries individually, i.e., there is a public good element in subscription which is only achieved through *general* adherence to high standards.[13]

By contrast the GDDS is a 'system', where the question is whether a country is 'in observance' or not is not so relevant. Countries 'subscribe' to the SDDS, but they 'participate' in the GDDS. While subscription reflects a commitment to reaching and

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[9] www.dsbb.imf.org

[10] The participants include countries such as Eritrea where any claim to an 'anglo' heritage is limited. The term 'anglophone' is a reference to the source of funding – i.e. DFID – and to distinguish the project with the similar 'francophone' initiative for another group of African countries.

[11] The only categories where it appears no flexibility is allowed is in the reporting of international reserves and foreign currency liquidity and external debt, again a reflection of the origins of the SDDS in international financial crises. Otherwise, an overall ceiling is put on the number of categories where lower standards of periodicity/timeliness can be applied (see www.dsbb.imf.org/Applications/web/sddsflexopts/).

[12] A casual review of status though quarterly reports suggests a compliance rate in most areas of around 90 percent.

[13] See the 'SDDS Overview' section of the DSBB.

maintaining set standards, participation provides a general signal that countries take the issue improving the production and dissemination of data seriously. The GDDS provides a framework for assessing the current situation against common benchmarks, and identifying means to improvement. It is less prescriptive than the SDDS with the emphasis being on making progress over time towards better statistical practices rather than indicating a standard that is currently adhered to.

Movement from GDDS to SDDS status is feasible but has yet to take place on any significant scale. Indeed, it was only in March 2003 that the first country – the Republic of Kazakhstan – made this transition (IMF News Brief 48/03) and this country had been among the first to participate in the GDDS.

Range of Coverage

The GDDS covers the following sectors:

- ***real*:** national accounts, production, prices and labour markets;
- ***fiscal*:** government operations, aggregates and debt;
- ***financial*:** survey of depository corporations, money and credit aggregates, interest rates and stock markets;
- ***external*:** trade, balance of payments, international debt and debt service, international reserves, exchange rates and international investment position (IIP);
- ***socio-demographic*:** education, health, population and poverty.

However, GDDS participation does not require the inclusion of all sectors. Most notably, the inclusion of socio-demographic data appears to be treated as less of a priority, although this is likely to change if the GDDS is linked more explicitly to PRSP and MDG programmes, which have a wider social component.

Metadata

While not all countries may be able to produce all their data according to the best possible standards, it is important that the basis of compilation is readily available as this allows users to make their own judgments concerning limitations, comparability with other sources, etc. For this reason, central to the GDDS framework is the preparation and publication by participating countries of relevant *metadata*. Metadata describe current practices for producing and disseminating statistics, and indicate plans for short- and long-term improvement. As well as providing relevant information to interested users, the preparation of metadata gives users the opportunity for a systematic and critical evaluation of statistics in terms of methodology, accuracy, timeliness and dissemination. This allows areas of weakness to be identified and plans for their remedy to be prepared.

An important point to note is that the preparation of metadata is an on-going process requiring regular update. This reflects the dynamic nature of the environment in which statistics are prepared and, with what constitutes best practice itself continuing to evolve, applies to all countries. This need for update is from several perspectives, notably:

- ***standards*:** there is always room for improvement;
- ***measures*:** what we need to measure changes over time;
- ***sources*:** closely related to this is the constant need to evaluate data sources. What is appropriate will obviously depend in large part on what is being measured.

In the GDDS, the reporting of metadata is divided into two interrelated classes. First there are the *comprehensive frameworks* within which data are compiled, aiming for wide coverage of data produced according to international standards. The main components of these frameworks include the analytical frameworks, scope of the data (including periodicity and timeliness), data sources and plans for improvement. In terms of the major data categories, there are such frameworks for the major economic and financial sectors (i.e. real, fiscal, financial and external), each of which is supported by the various harmonised manuals that establish international standards referred to earlier. Perhaps because no such equivalent standards have yet been developed, there is no comprehensive framework for the socio-demographic data.

The second data class comprises the various *data indicators* including summary indicators (e.g. GDP, current account balance, etc), tracking measures (such as production indices) and other key data (e.g. interest rates). Such indicators are included for all data sectors.

For both the comprehensive frameworks and data indicators, there is a further division between the core and encouraged extensions. For example, in the external sector the annual balance of payments is part of the core framework, while the international investment position is an encouraged extension. Among indicators, public external debt is core but private debt is an encouraged extension.

Emphasis on Dissemination

The inclusion of the word 'dissemination' in the overall title points to the importance of dissemination practices in the GDDS. It is not enough to produce the data, or even to share it with a group of preferred clients. It should be available on the same terms to all who may wish to use it and in a form that is easily understandable. The GDDS emphasises several good dissemination practices, recognising the context in which statistics have fre-

quently been produced. These include:

- taking timeliness seriously, including the introduction of and sticking to pre-release schedules;
- equal treatment of users. This recognises that while producers may have endeavoured to satisfy some users – typically other official agencies – others may have been neglected;
- dissemination is more than just providing data. Information on methodology is also crucial.

Best dissemination practice in the GDDS also recognises the great opportunities that are available through developments in information technology. As already noted, the IMF website is a key focal point for the DSI.

The ROSC Report on Botswana

The IMF ROSC mission commenced in early October 2001 and lasted for two weeks. It focused on the following data categories: national accounts; prices (consumer and producer); government finance; monetary statistics and balance of payments. Neither socio-demographic nor labour market statistics were included at this stage, although the subsequent GDDS project has covered some of these areas through the provision of TA.

The final report of the mission was presented to the Government in early December at the same time as the workshop to launch the regional GDDS project, which was held in Gaborone. The report included an assessment on the quality of Botswana statistics together with key short- and longer-term recommendations for improvement. After discussions with the Government and the Bank of Botswana, the report, together with 'The Response of the Authorities', was posted on the IMF website.[14]

Overall, the quality of Botswana statistics was generally seen as good, and in some cases very good. For example, the CPI on which inflation measures are based, was assessed as being of SDDS quality, and the report emphasised that a concerted effort could quickly move Botswana within striking distance of SDDS requirements more generally. The major deficiency in terms of quality was in the area of producer prices, which the CSO candidly admitted was a concern and that assistance would be required to effect necessary improvements.

The major area where improvements were found to be needed was that of dissemination. This was in terms of both timeliness and ready availability to all users. Some indication of this can be seen from Table 1, which divides the main ROSC recommendations according to sector. Of the 31 recommendations, nine (about 30 percent) were in the 'general' category and, of these, eight dealt with dissemination issues ranging from the need to establish advance release calendars to providing more extensive information on methodology, including on data limitations. (The ninth was a recommendation regarding the need for training.) Six of these were identified as achievable in the short term.

TABLE 1: BOTSWANA ROSC RECOMMENDATIONS

	General	National Accounts	Prices	Government Finance	Monetary Statistics	Balance of Payments	Total
Short term	6 (2)	1 (1)	2 (1)	2 (1)	4 (2)	2	17
Med term	3	2	2	4	1	1 (1)	13
Long term			1				1
Total	9	3	5	6	5	3	31

Note: figures in brackets are the number of recommendations which were given high priority

Source: Botswana ROSC Report

Some of the sector-specific recommendations also dealt with dissemination issues, notably timeliness. The relatively high number of recommendations for government finance was due in part to the difficulties associated with incorporating local government finances fully into the framework of regular reporting.

A further important conclusion was that, in some areas, production of statistics could be facilitated by improved coordination between agencies. The report noted discrepancies in methodology, delays in communicating necessary information (for instance, the balance of payments relies on various inputs from the CSO such as trade data while in turn, the national accounts require timely balance of payments data), and the potential confusion caused by the various reporting 'years' used across the different sectors.[15]

[14] www.imf.org/external/pubs/ft/scr/2002/cr0283.pdf. The report can also be accessed through the Bank of Botswana website, www.bankofbotswana.bw.

[15] In Botswana, as well as the difference between the calendar year and government financial year (the latter running from April to March), an additional difficulty is due to the national accounts being based on the year beginning July. (This is in line with the tax year which in turn was set to correspond with the break between agricultural seasons at a time when the needs of statistical coordination were given less priority.)

RECENT DEVELOPMENTS AT THE BANK OF BOTSWANA

The Bank of Botswana has specific responsibility for the production of monetary and balance of payments statistics. Two sections in the Research Department are focused on this. Since the early 1990s, the principal means of data dissemination has been through the monthly *Botswana Financial Statistics* (BFS) publication, which includes both statistics compiled by the Bank and a wide range of data from other official sources. Experience from various countries suggests that such monthly bulletins provide a good basis as reference points which enhance understanding of economic and financial issues, and more effective in this respect than quarterly reporting (Dziobek and Mei, 2002). A similar range of statistics, with more extensive commentary and analysis is also included in the Bank's *Annual Report,* while the *Research Bulletin*, produced biannually, has also carried articles on statistical issues.

The GDDS has not been the sole motivation for improvement in production and dissemination of statistics by the Bank. Not least such pressure has come internally as the Bank is a major user of statistics as well and is therefore familiar with the problems that arise when data is sub-standard in either content or method of delivery. Over the years, the Bank has participated in various user-needs initiatives organised by CSO. It had also taken advantage of TA and training programmes offered by the IMF. Nevertheless, GDDS has proved very valuable in providing a clear focus and a critical perspective from outside. The Bank took the recommendations of the ROSC very seriously.

Improvement of Data Quality

While the ROSC had acknowledged the generally high technical standard of the monetary and balance of payments statistics, some areas for improvement were identified. To address these, the Bank has sought further TA and training from the IMF, focussing on balance of payments, where two phases of TA were provided over four months in 2002 and 2003. This recognises the dynamic development of the external sector in Botswana in terms of both the range of transactions and the change in environment for statistics compilation since the abolition of exchange controls that was finally completed in 1999. In particular, the coverage and presentation of investment flows (inward and outward) has been improved. Less successful has been the attempt to introduce balance of payments estimates on a quarterly basis, due largely to continuing problems in producing up-to-date trade statistics, in particular for imports.

In August 2003, TA was also provided in the area of monetary statistics. This was with the principle aim of expanding the depository corporations' survey beyond the commercial banks to include the categories of merchant banks (currently two in Botswana), building societies and savings banks (one each). This was the major recommendation of the ROSC in this sector, and it is anticipated that the TA will have paved the way for progress to be made quickly. In addition the TA also included a formal training component for Bank of Botswana staff.

Improved Dissemination

Various initiatives have been undertaken to improve the dissemination of the Bank's statistics. This was already effective at the official level, where the Bank has maintained a good record of meeting the data requirements of the Botswana Government, international organizations (e.g. the IMF and the Southern African Development Community (SADC)), as well as for its own purposes. Recent efforts have focused on providing the same levels of service to other users, both within the financial community and more widely. In this respect, simple measures can be very effective. For example, the authors of this article can attest to the impact of making specific contact names for enquiries more readily available to the public.

Integral to the efforts to improve dissemination has been the initiative to make better use of information technology (IT). Independent, but complementary to the GDDS-related work, the Bank has undertaken a project to enhance its website (www.bankofbotswana.bw). Improvements that have already been introduced indicate the extent of potential benefits. Most importantly, these include the introduction of a range of financial and economic highlights on the home page, and giving priority to the prompt posting on the site of the BFS, making it available well before the printed version is ready, and allowing flexibility for users in downloading data. The website will, in due course, provide additional data resources in the form of a historical archive of exchange and interest rates. The Bank is determined to make substantive progress towards improved dissemination over time, although at present some of the key data highlights are only being introduced after an initial period of in-house testing, to ensure the sustainability of scheduled reporting.

Intra-Agency Coordination – the SPC and National GDDS Committee

As already noted, one of the main recommendations of the ROSC was that there should be greater coordination between the statistics-producing agencies. In response to this a *Statistics Producers Committee* (SPC) was established, comprising high-level representatives of the CSO, the Bank, and MFDP. The SPC has been meeting regularly since early 2003. While its initial focus has been the successful implementation of the ROSC recommendations it will continue beyond this phase, recognising both that the maintenance of statistical standards is a dynamic process requiring continuing attention, and that active high-level participation helps

strengthen the underlying statistical system which, in turn, underpins the quality of statistical outputs.

A National GDDS Committee (NGC) was set up to coordinate Botswana's participation in the regional GDDS project. This supports the work of the national GDDS coordinator who is based at CSO. An on-going function of the NGC has been to coordinate TA provided under the regional GDDS project. In addition, it was instrumental in organizing the national GDDS workshop in April 2003 as part of the dissemination effort, where all the three main institutions participated actively.

Concluding Observations – beyond GDDS

The ROSC report highlighted that in some areas Botswana was already within striking distance of the standards set in the SDDS. However, several basic requirements have yet to be addressed before formally committing to SDDS can be considered. Essential components, such as the quarterly reporting of national accounts and balance of payments statitics have yet to be produced on a regular basis. This may not be surprising given the experience of other SDDS subscribers (see footnote 5), but it points to the problems that can arise if commitments are made before all the necessary resources are available.

Whether such resources *should* be made available also needs careful consideration. Plenderleith (2003) warns of the constraints faced by developing countries in allocating resources to statistics in a context where skills scarcity is a constraint on economic development more broadly.

Here, it should be recognized that Botswana already has a good reputation for openness and transparency, which may reduce the additional benefits available from SDDS subscription. Glennerster and Shin (2003) report that countries with high rankings on, for example, the Transparency International (TI) 'Corruption Perceptions Index' may benefit to a lesser extent from participation in IMF-led transparency programmes.[16] The country has also participated in other transparency exercises (e.g. the IMF's review of good practice regarding foreign exchange management (IMF, 2003d)).

Set against this, however, Glennerster and Shin (2003) also suggest that there are additional benefits of formal subscription for small countries with less active capital markets, since private financial institutions are less likely to invest in their own research and rely instead on public sources of information. The important role that the IMF can play in reducing the costs of acquiring information about countries' economic situations is also emphasized by Meltzer (2003). Such factors are likely to be important in the context of Botswana, which remains small in the context of the world economy and international financial markets.

Other considerations also mean movement in the direction of improved production and dissemination of statistics will continue. This will come both as a result of the general commitment to improve statistical standards, which is inherent in the GDDS framework, and due to specific developments in the design and implementation of economic policy which, in Botswana as elsewhere, rely increasingly on timely and accurate statistics. An important example in this context is the greater emphasis that has been placed on explicit inflation objectives in the conduct of monetary policy.[17] In turn, this puts a premium on good inflation data, where even small revisions (or, equivalently, lack of trust in the provenance of the official data) can undermine confidence in the policy framework (Bier & Ahnert, 2001).

More generally, the broad, long-term development goals for Botswana have been clearly set out in *Vision 2016* (Presidential Task Group, 1997), and the extent of progress towards their achievement has become a matter of intense national interest. Inevitably, as with the monitoring of the MDGs, this requires an increased and *equally broad* commitment to improving the quality and coverage of statistics.

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[16] In 2003 Botswana was ranked 30 out of 133 countries on this index, the highest of any African country (see www.transparency.org/cpi/2003/cpi2003).

[17] Since 2002, the Bank's annual *Monetary Policy Statement* included an objective range for CPI inflation.

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The Process of Monetary Integration in the SADC Region

Keith Jefferis[1]

Introduction

Monetary union is an increasingly topical issue in economic policy discussions. This has been prompted in part by the experience of European Monetary Union (EMU), which is widely perceived as having been both successful and beneficial to member countries. In Africa, there have been a number of recent monetary integration initiatives, and continent-wide monetary union has been adopted as a formal objective by the newly-formed African Union. It is anticipated that such an African monetary union will be achieved by 2021 through a long-term, incremental process, known as the African Monetary Cooperation Programme (AMCP). The AMCP entails various stages, including macroeconomic convergence, monetary integration and monetary union at the regional level, following which the regional monetary unions would come together to form a full African monetary union, with a single currency and central bank. The declaration of intent to pursue African monetary union has been adopted as a long-term policy initiative at both a political level, by heads of state of the African Union, and at a technical level by the Association of African Central Banks (AACB), on the basis that it is both feasible and will be beneficial to the countries involved. A variety of advantages and benefits have been identified, either explicitly or implicitly, which lie behind this enthusiasm. These include both political and economic factors, ranging from the abstract 'African unity' to more concrete economic benefits, such as the promotion of trade, efficiency gains, and improving the quality and credibility of macroeconomic policymaking, and hence achieving higher economic growth. Interest in monetary union in Africa also reflects a broader, more general commitment to regional integration initiatives in the continent, covering trade and other forms of economic cooperation (Masson & Patillo, forthcoming).

However, it may be appropriate to be somewhat cautious about monetary integration, especially overly-rapid pursuit of full monetary union, for several reasons. The experience with full EMU is still somewhat early. While euro notes and coins have been well accepted by the populations of member countries, the jury is still out on other issues, including the applicability of the 'one-size-fits-all' monetary policy, the choice of appropriate fiscal policy rules, and the continuing need for structural reforms within the euro zone. It is not yet clear that EMU will lead to higher growth rates in Europe, and while the populations of several of the 'accession countries' due to join the European Union (EU) from 2004 also seem keen to adopt the euro in due course (as they are obliged to do), the same cannot be said for the populations of the longer-standing 'opt-out' countries, the UK, Denmark and Sweden. It should also be recalled that the adoption of the euro as the single European currency was the culmination of a period of economic and monetary integration spanning nearly fifty years.[2] Elsewhere in the world, the dangers of monetary integration that is not supported by appropriate policies were well illustrated by the collapse of Argentina's currency board system and peg to the US dollar, where initial successes were undermined by lax fiscal policies and unsustainable divergences from regional trading partners. Within Africa, concern has been raised about undertaking monetary union too quickly, without ensuring that policy prerequisites, especially those relating to fiscal policy, are in place (Jenkins & Thomas, 1966; Debrun, Masson and Patillo, 2002). Others have pointed out that further work is required to establish whether Africa as a whole, or the various sub-regions, fulfil enough of the conventional 'Optimum Currency Area' (OCA) criteria to ensure that the benefits of monetary union outweigh the costs (Bayoumi and Ostry, 1997). More generally, it is necessary to ensure that for African monetary integration to be credible, it is essential to pay sufficient attention to the pre-requisites for making it successful, and to the speed and sequencing of its implementation, as well as ensuring that there is sufficient political support.

As noted above, the outline plan for African Monetary Union envisages regional monetary unions providing the building blocks of an eventual continent-wide monetary union. One of these blocks comprises the thirteen countries that make up the Southern African Development Community (SADC)[3]. The SADC region includes one of the two

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[1] Deputy Governor, Bank of Botswana. This paper is based on a presentation originally made to the Symposium of the Association of African Central Banks on 'Sub-Regional Monetary Integration: Challenges and Prospects', Kampala, Uganda, August 2003. The paper has benefited from comments on earlier drafts by members of staff of the Bank of Botswana, particularly Don Stephenson, Lesedi Senatla and Matthew Wright.

[2] See Hogeweg (2002), for more details on the process of European monetary union.

[3] The 13 member states of SADC comprise Angola, Botswana, Democratic Republic of Congo (DRC), Lesotho, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe. The Seychelles was a member but announced its intention to leave the organisation in mid-2003.

long-standing monetary integration arrangements in Africa, the Common (Rand) Monetary Area, as well as a number of other countries that have little or nothing in the way of formal monetary integration at present.[4]

The aim of this paper is to consider the feasibility of further monetary integration in the region, and to identify the steps that will be required if SADC is to fulfil the AU objective of becoming one of the building blocks of African monetary union by 2021. The paper is structured as follows. Section 2 discusses some of the general issues around monetary integration, including looking in more detail at the arguments in favour of monetary union, what the process implies for economic policymakers, and what the pre-requisites are for making the process successful. Section 3 considers the experience of the Common Monetary Area (CMA), while section 4 reviews the extent to which there has been macro-economic convergence between the SADC countries. Section 5 provides concluding comments on the issues that will have to be dealt with if the SADC monetary union project is to proceed successfully.

MONETARY INTEGRATION AND MONETARY UNION

Stages of Monetary Integration

Monetary integration can be viewed as a process involving progressively greater harmonisation and linking of monetary and exchange rate policies by a group of countries. While the degree of monetary integration can cover a spectrum with many variations, four main 'stylised' stages can be identified; these stages can be characterised primarily by the nature of exchange rate policy, which in turn has implications for monetary policy as well as a range of other policies. The four stages are:

1. No monetary integration (floating exchange rates; no monetary policy harmonisation);
2. Weak monetary integration (linked exchange rates and capital mobility; partial monetary policy coordination);
3. Strong monetary integration (fixed exchange rates; monetary harmonisation);
4. Full monetary integration (monetary union; single currency; single central bank).

Further details of the stages are shown in Figure 1. Under stage one, no monetary integration, there is no attempt to link or coordinate the monetary policies of different countries, although of course national monetary policies may move in tandem if countries have similar economic structures and/or experience similar external shocks. Exchange rates would be freely floating (against each other) and countries would have national monetary policy autonomy,

Under stage two, weak monetary integration, exchange rates are in some ways linked, perhaps by a managed float that constrains exchange rates within a predetermined range, or a crawling peg arrangement. Depending on the extent of capital mobility, such exchange rate linkages may impose restrictions on the independence of national monetary policies; however, if capital controls are retained, there may still be monetary policy autonomy.

Under stage three, strong monetary integration, the exchange rates of national currencies are pegged to each other (either with adjustment permitted or, more strongly, with an irrevocable peg). If there is full capital mobility (no capital controls and well-developed national capital markets), a common monetary policy must be followed by all countries, for instance, with coordinated movements in interest rates. If monetary policy is not coordinated, the result will be unsustainable capital flows that would, in the limit, make the exchange rate peg impossible to maintan.[5]

The final stage, full monetary union, is the culmination of the process of monetary integration. In a monetary union, all member states make an irrevocable (non-reversible)[6] commitment to the monetary union; adopt a common currency (which may be an existing currency or a completely new one), and a single central bank manages monetary policy. Individual member states, therefore, have no autonomous monetary or exchange rate policy *vis à vis* other member states of the union, although they do (collectively) *vis à vis* non-members.

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[4] The second existing monetary union in Africa, the CFA franc zone, involves 13 mostly francophone counties in central and west Africa (for further details of the CFA franc zone see Boughton, 1993; Bayoumi & Ostry, 1997; Honohan & Lane, 2000; and Masson & Patillo, forthcoming). Besides the existing monetary unions, several other monetary integration initiatives are in progress or under discussion. These include the monetary union programme of the Community for East and Southern Africa (COMESA); the agreement by Kenya, Tanzania and Uganda to revive the East African Community, including a common currency; and the proposed creation of the West African Monetary Zone (WAMZ) in 2005, including Gambia, Ghana, Guinea, Nigeria and Sierra Leone.

[5] The inconsistency of a monetary policy target, and exchange rate target and capital mobility is often referred to as 'the impossible trinity'.

[6] In principle, monetary union treaties can be revoked, either collectively or by individual countries, but it is generally considered that such 'exit clauses' undermine the credibility which is necessary for the success of monetary union. The treaties underlying EMU have no provision for member countries to leave the union once they have joined.

FIGURE 1: STAGES OF MONETARY INTEGRATION

POLICY CHOICES	DEGREE OF MONETARY INTEGRATION			
	None	**Weak**	**Strong**	**Full**
Exchange Rate	Floating	Constrained float/crawling peg	Fixed peg	Single currency
Capital Market	Exchange (capital) controls possible	Progressive removal of capital controls Equal treatment across jurisdictions		
Other		Removal of controls on labour mobility Stricter limits on fiscal deficits and public debt Trade liberalisation Stabilisation of financial sector and strengthening of supervision		
Monetary policy implications	Unconstrained	Constrained by exchange rate targets and capital movements	Co-ordinated movements in interest rates	Single central bank & benchmark interest rate

Economic Policy Implications of Monetary Union

The ceding of autonomy in the fields of monetary and exchange rate policy is a crucial aspect of monetary union, and has many implications for national governments. At the political level, this may be seen as a cost, in that the power of national governments is reduced, and hence there must be clear advantages resulting from monetary union if there is going to be sufficient political support to carry the process forward. There are also major economic implications, as the range of economic policy instruments available to national governments is reduced. Thus the economic policy implications of monetary union need to be thoroughly examined beforehand. However, the implications go beyond relinquishing monetary and exchange rate policy, as other policy instruments are also affected, for reasons that will be detailed below.

Economic policy instruments enable policy-makers to respond to the various shocks that economies face; if, as in a monetary union, key policy instruments have to be common across a group of countries, then those countries should be individually subject to similar shocks. If they are not, the common policy will not be generally suitable to differing national economic circumstances. For small, open economies, as in the SADC region, the most important economic shocks are likely to be external shocks, such as those resulting from changes in terms of trade. The conventional expected response to a (permanent) deterioration in terms of trade, which entails a reduction in national income, would be exchange rate depreciation (in the case of a floating exchange rate) and a tightening of monetary policy. Countries with similar trade structures would face similar changes in terms of trade, and hence it is plausible that a common policy response would be suitable and, from this perspective at least, a monetary union might be feasible. However, if countries do not share similar trade structures, this would not be the case. For instance, a group of countries comprising both oil exporters and oil importers would seek very different economic responses to the economic impact of an increase in the price of oil; a common policy response would be unsuitable for some, if not all, of the group. Monetary union is, therefore, likely to be more suitable for countries that have similar trade structures and which are relatively diversified (thus reducing their vulnerability to shocks emanating from the global market for one or a small number of commodities). A member of a monetary union that is subject to large, idiosyncratic shocks will find that it does not have access to the exchange rate and monetary policy adjustment mechanisms that would otherwise be available to it, and hence may have trouble in responding to shocks unless other effective adjustment mechanisms are available, with the result that national income is more volatile than it would be otherwise.

While monetary union is formally about exchange rate and monetary policies, there are also implications for other policies, particularly fiscal policy. The traditional optimum currency area literature argues that in a monetary union, members should have additional flexibility over fiscal policy in order to compensate for the loss of policy instruments (monetary and exchange rate policies) with which they can respond to economic shocks. However, this argument is not widely accepted, for two main reasons. First, using fiscal expansion to compensate for negative shocks can quickly lead to problems of public debt sustainability. Second, budget deficits in one country may have negative externalities for other members of the monetary union, if additional borrowing and recourse to capital markets pushes union-wide interest rates upwards. This is potentially a problem in any monetary union with centralised monetary policy decision-making and decentralised fiscal policy decision-making. Such concerns have led to the adoption of strict limits on budget deficits under EMU, and hence constraints on the use of fiscal policy as a stabilisation policy by EMU member states.[7] In such a situation, none of the three main levers of macroeconomic policy (monetary, exchange rate, fiscal) are fully available to national governments within a monetary union. This gives rise to an adjustment problem: how to respond to economic shocks, especially divergent shocks across monetary union members (common shocks can be dealt with by monetary union-wide monetary and exchange rate adjustments).

Within a monetary union, greater reliance is placed upon factor mobility. Capital should be

mobile, with no restrictions on capital movements between union members, and labour should be free to move from low growth/low income areas of the union to high growth/high income areas; in other words, all monetary union residents are treated equally with regard to employment and residence across the union. Furthermore, there should be no restrictions on trade flows within the union, and prices should be flexible and able to adjust easily to differing economic conditions. It is also important that financial systems are robust, in order to avoid financial crises that can themselves disrupt economic activity, affect monetary policy and have fiscal implications if rescues of financial institutions are necessary.

Finally, adjustment can be assisted by some kind of 'federal' transfer or stabilisation mechanism to transfer resources from fast-growing to slow-growing regions of the monetary union; otherwise differing economic conditions will last longer and be more difficult to eliminate through convergence, thus perhaps creating tensions within the monetary union and making a common policy, relevant to all members, more difficult to find.[8] While such transfers are common within richer developed nations to compensate for and reduce economic divergence between regions, and have been implemented within the EU, they would be more difficult to agree upon in a monetary union of developing countries given the lower income levels and less secure fiscal positions.

The above discussion makes clear some of the economic prerequisites for credible and successful monetary union between countries: similar economic structures (in terms of openness, trade patterns and diversification), and a willingness to remove restrictions on capital and labour movements between union members. The political feasibility of liberalising restrictions on factor mobility is enhanced if member countries are at similar levels of development and income levels. Similar levels of per capita incomes are also important in that countries would tend to have similar levels of institutional development as a result, and more generally a convergence of interests, which could otherwise be a reason for friction between potential members.[9] Finally, there should be free trade within the union, price flexibility, and a robust financial system with common prudential rules and supervision.

Monetary integration or monetary union can in itself entail a significant economic shock. Sometimes this is intended; Argentina's adoption of a currency board and pegging to the US dollar was aimed at, and achieved, the rapid reining in of hyper-inflation through the adoption of strict rules on monetary expansion. But outside of a crisis situation, joining a monetary union is easier if there is a smooth transition, and this will tend to make the union more credible and sustainable. Hence, progress towards macroeconomic convergence is generally accepted as part of the transition to monetary union. This was well illustrated in the process of EMU: establishing a free trade area, then a customs union, abolishing controls on capital and labour movements, introducing an exchange rate mechanism that limited exchange rate movements between members, and ensuring convergence of fiscal positions, inflation and interest rates.

While macroeconomic convergence is an important component of the process of monetary union, there is scope for debate about how much convergence has to take place prior to the union taking place, and how much can follow afterwards. With regard to macroeconomic indicators that are primarily monetary in nature, such as inflation, interest rates and exchange rates, there are strong arguments that convergence should come prior to monetary union, as otherwise convergence will be forced, abruptly, as the union takes effect. However, it has been argued that for other criteria, especially structural factors, convergence may follow monetary union; in other words, convergence may be endogenous, as the existence of a monetary union will tend to alter the characteristics of an economy. From this perspective, it is less important that some of the convergence and optimal currency area criteria are met prior to a monetary union being established, as membership of the union will induce convergence and institutional and structural changes that will help countries inside the union to find new methods of adjusting to eco-

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[7] The adoption of such limits has been quite controversial. However De Grauwe (1992), argues that the case for strict budgetary limits is weak, for the following reasons. First, there will only be negative externalities if capital markets are inefficient. If they are efficient, only the country with high budget deficits and borrowing needs will pay higher interest rates, through an increased (default) risk premium, as markets will correctly evaluate that there is no increased risk on debt issued by other member countries, whose interest rates will, therefore, remain unchanged. Second, the existence of an effective common central bank, preventing the monetisation of budget deficits, will ensure that union members face a 'harder' budget constraint than in independent sovereign states where deficits can potentially be monetised. Third, it is argued that such limits are in any case unenforceable. The difficulties faced by the European Commission in 2003 in responding to the breaching by France and Germany of fiscal constraints imposed by the EU's Stability and Growth Pact under the Maastricht Treaty illustrates this problem.

[8] The optimum currency area literature argues that significant parts of national fiscal budgets should be centralised at union level in order to provide an automatic stabilisation mechanism through fiscal transfers (Kenen, 1969; De Grauwe, 1992)

[9] Negotiations for regional integration treaties between countries of very different levels of per capita income can be difficult and lengthy; the renegotiated Southern African Customs Union (SACU) treaty is a case in point.

nomic shocks (Mundell, 1993; Hawkins & Masson, 2003). Nevertheless this remains a controversial argument and the more widely-held view is that extensive convergence, both monetary and structural, is a prerequisite for monetary union.

While the focus of this paper is on the economic issues related to monetary union, it is important to note that the political dimension to the process is also extremely important. In the case of EMU the political backing for economic integration in general, of which monetary union is an important component, was crucial, in particular that of the two largest members, France and Germany. Furthermore, most EMU members are happy to view economic and monetary integration as counterpart to a process of political integration. Commentators on the implications of EMU for monetary unions elsewhere in the world (e.g. Hogeweg, 2002) consistently stress the importance of the political dimension, and the necessity for political commitment to the process, as integral to the success of the project.

The Potential Benefits of Monetary Union

The potential benefits of monetary integration/union can be classified into four main areas (Honohan and Lane, 2000):

(a) providing an 'agency of restraint' (Collier, 1991) that will reduce the ability of governments to pursue irresponsible and destabilising macroeconomic policies;
(b) acting as a bulwark against currency speculation and contagion effects that could add to exchange rate volatility;
(c) supporting the exploitation of economies of scale in the financial sector, with accompanying efficiency benefits; and
(d) the traditional Optimal Currency Area (OCA) benefits, i.e., the potential gains to trade from reduced transactions costs and exchange rate uncertainty, net of the potential losses resulting from reduced national policy autonomy and constrained ability to react and adjust to economic shocks.[10]

Within SADC, the 'agency of restraint' argument is potentially important for those countries that have a history of profligate public finances and microeconomic mismanagement; they may gain from delegating macroeconomic policy to a supranational monetary authority, and indeed, monetary union could be an indirect way of achieving central bank independence (Hawkins & Masson, 2003).[11] Even though the quality of macroeconomic policymaking in the region has much improved in recent years, a well-designed monetary union could help to 'lock-in' these gains.[12] Another dimension of the agency of restraint argument is that monetary union prevents exchange rate adjustments from being used as a 'quick fix' to achieve improvements, with the resulting benefit that efforts are focused on long-term structural fundamentals, such as productivity.

The potential 'bulwark against currency speculation and contagion' benefits are unlikely to be significant for most SADC countries. In all cases except that of South Africa, SADC currencies are 'below the radar screen' of international speculators, reducing exposure to contagion problems (Honohan & Lane, 2000). To the extent that a common SADC currency would be viewed as a 'superrand' by international markets, the smaller SADC countries might find themselves even more exposed to speculation and contagion, as international currency market developments that have until now only affected the rand would be spread immediately to the other countries as well.[13] While there would be complete exchange rate stability within the monetary union, the degree of international exchange rate volatility could increase (Barrell and Choy, 2003).

There could be benefits for the financial sectors of SADC countries, many of which are small, relatively undeveloped, and prone to bouts of financial instability. Monetary union, through the creation

[10] Optimum Currency Areas are extensively discussed in the international economics literature. For comprehensive overviews, see De Grauwe, 1992; Tavlas, 1992; and Bayoumi & Eichengreen, 1994.

[11] A similar argument was presented for the establishment of the Eastern Caribbean Currency Union (ECCU) in 1983, that 'central banking services could be more effectively and credibly provided through a regional as opposed to a national arrangement' (Venner, 2002:5)

[12] The importance of appropriate institutional design in contributing to the success of a monetary union cannot be overemphasised, as credibility is crucial. The problems faced by African monetary unions in the past (with three of the five historical arrangements having collapsed and the CFA zone having been severely weakened during the 1970s and 1980s) have been due to a mixture of fiscal pressures, weak rules regarding the formulation and implementation of monetary policy, failings in the regulation and supervision of financial institutions, and political differences. It is important to ensure that future African monetary unions have a high level of credibility from the beginning, through appropriately designed monetary policy and rules regarding supervision of financial institutions; mechanisms to deal with countries that break the rules and a willingness to apply such sanctions; and measures to ensure that exit from a monetary union is costly (Guillaume & Stasavage, 2000). For further details of the history of monetary unions in Africa, see Honohan & Lane, 2000; Guillaume & Stasavage, 2000; and Masson & Patillo, forthcoming).

[13] At present, only Botswana, Lesotho, Namibia and Swaziland are directly affected by changes in the international value of the rand.

of an integrated capital market, would help to achieve economies of scale and hence efficiency gains. Monetary union also requires high, and preferably uniform, standards of financial sector supervision. Given the high administrative costs of bank supervision, capital market regulation and the operation of securities exchanges, and the scarcity of supervisory and managerial resources in some countries, common international (regional) standards and the sharing of resources could help to improve the quality of prudential regulation and supervision. It could also boost capital market efficiency, resulting in enhanced financial stability and accompanying economic gains. There may also be gains from the process of distancing regulators from political pressures.[14]

Under point (iv) above, the balance of benefits depends very much on the structure of the economies involved. The extent of potential savings from the reduction in transactions costs and the reduction in uncertainty with respect to exchange rates depends on the extent of (actual or potential) trade between members of the monetary union; the more trade there is, the greater the potential benefits. In contrast, the more the individual members are subject to idiosyncratic or asymmetric shocks, the greater the problems or losses that may result from forgoing national control over monetary, exchange rate and fiscal policies. At present, intra-SADC trade is relatively small. While the smaller members of the Southern African Customs Union (SACU)[15] are heavily dependent upon South Africa for imports, and to a lesser degree for exports, this is less so for other countries. For the region's largest economy, South Africa, its largest trading partner is the European Union, and trade with SADC countries accounts for a relatively small proportion of its total trade (Masson & Patillo, forthcoming). Overall, it is estimated that intra-SADC trade only accounts for less than 20 percent of total trade of SADC members.[16] Trade flows within the SADC area are much smaller that trade flows with the rest of the world, in contrast to the euro area where the opposite applies. While there may be some potential for further growth in intra-SADC trade, more general analysis for Africa as a whole does not indicate a major unexploited potential for intra-Africa trade (Honohan & Lane, 2000; Yeats, 1999). This suggests, therefore, that the potential benefits for trade from monetary union are limited. At the same time, the SADC economies are quite different in economic size and structure, with South Africa being relatively industrialised and diversified while most other countries are small and relatively undiversified with dependence on a small range of primary product export commodities, which vary considerably across countries; as a result, the structures of GDP vary a great deal (Lewis et al, 2003). Hence, vulnerability to shocks is likely to be quite different and nominal exchange rate flexibility a potentially important adjustment mechanism. Furthermore, alternative adjustment mechanisms, especially labour mobility between countries, are limited. Therefore, it is unlikely that at present SADC qualifies as an OCA in terms of the conventional criteria.[17]

MONETARY INTEGRATION IN SADC: THE COMMON MONETARY AREA

The 13 SADC member countries have a variety of monetary arrangements. They can be classified into three groups with respect to exchange rate arrangements in place, as follows:

(i) floating exchange rates (with varying degrees of official intervention): Angola; Congo DR; Malawi; Mauritius; Mozambique; South Africa; Tanzania; Zambia.
(ii) exchange rates pegged to the SA rand: Lesotho; Namibia; Swaziland.
(iii) fixed exchange rates with other peg: Botswana (pegged to a basket comprising SA rand and SDR[18]); Zimbabwe (US dollar peg).

The main feature of monetary integration in SADC is the Common Monetary Area (CMA - formerly the Rand Monetary Area, or RMA), which currently comprises South Africa, Namibia, Lesotho and Swaziland. As noted above, the rand floats freely against international currencies, while the currencies of Namibia, Lesotho and Swaziland are pegged one-for-one with the rand. The CMA originated as an informal arrangement in the colonial era, whereby monetary arrangements applicable to South Africa were also applied in the three neighbouring colonies of Bechuanaland (now Botswana), Basutoland (now Lesotho) and Swaziland. This monetary union was a counterpart to the SACU, dating back to 1910, involving the same four countries. From 1921 onwards, when South Africa in-

[14] Problems with the supervisory framework for the financial sector were recognised as one of the issues contributing to the near-collapse of the CFA franc zone in the mid-1990s. Subsequent reforms have included the establishment of a two sub-regional banking supervision agencies, to prevent such problems from re-occurring.

[15] Botswana, Lesotho, Namibia and Swaziland.

[16] In 1998, the most recent year for which data is readily available, intra-SADC trade accounted for 19 percent of total SADC trade. Of this, approximately half represented trade with South Africa.

[17] Similar conclusions are reached by Maskay (2003) in respect of member countries of the South Asian Association for Regional Co-operation (SAARC – Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka), which face different patterns of shocks and have low levels of intra-regional trade and factor market integration.

[18] The IMF's Special Drawing Right, a basket currency comprising the US dollar, euro, yen and British pound.

troduced its own currency and established the South African Reserve Bank (SARB), the South African currency circulated in the three smaller countries. As a monetary union with its roots in the colonial era, the CMA has some similarities with other colonial-era monetary unions such as the CFA zone in central and west Africa and the East African Currency Board.

Under the informal arrangements of the RMA, the South African rand circulated freely in the BLS countries (Botswana, Lesotho and Swaziland). Despite the circulation of the SA rand in these countries, no consideration was paid by South Africa in respect of the seignorage income that it earned from the circulation of the rand outside of its national boundaries. Monetary and exchange rate policies were determined solely by South Africa, in its own national interests. The BLS countries had no independent foreign exchange reserves, and accumulated balance of payments surpluses had to be held in the form of rand balances. There were no exchange controls within the RMA, and the BLS countries applied South African exchange controls to transactions with countries outside the union.

In the light of increasing unhappiness of the BLS countries with the RMA arrangements, and following the successful renegotiation of the SACU agreement in 1969, negotiations began in the early 1970s to formalise the monetary arrangement, and to secure an improvement in its terms for the BLS countries. While the negotiations were in progress, however, Botswana decided that it would not be party to the new agreement, and would establish its own central bank and introduce its own currency, the Pula. Nevertheless, a new monetary agreement formalising the RMA was reached in 1974 and did offer significant improvements. These included agreement that Lesotho and Swaziland could establish central banks and introduce their own currencies, although on condition that those currencies maintained a one-for-one parity with the rand. The rand would remain legal tender in Lesotho and Swaziland, and South Africa would pay seignorage in proportion to the amount of rand circulating in those countries, but their currencies would not be legal tender in South Africa. The agreement was amended in 1986 (when the RMA became the CMA) and in 1992 to introduce more flexibility and to accommodate the independence of Namibia which joined the CMA in 1992, although it had been a *de facto* member while under South African control prior to independence. Other changes introduced were to give the LNS countries (Lesotho, Namibia and Swaziland) some independent control over their foreign exchange reserves, allowing them to hold non-rand assets, and to permit them to vary their exchange controls (although only in the direction of being stricter than South Africa). Swaziland also secured some specific concessions, giving it the right (in principle) to change the parity of its currency against the rand, and also terminating the status of the rand as legal tender in Swaziland (and hence ending the right to seignorage payments from South Africa), although the rand continues to circulate freely in the country.

Recent years have also seen the introduction of some consultation of the LNS countries by South Africa with regard to monetary issues. The first step was the establishment of the CMA Commission, involving officials from each of the four central banks. This, however, has proved to be somewhat ineffective, and has now been supplemented by formal meetings of the CMA central bank Governors prior to each meeting of the SARB's Monetary Policy Committee, giving the LNS countries the chance to make inputs to SARB's monetary policy decision-making process. While the LNS countries have formal monetary policy independence, their monetary policy is essentially determined by the SARB, given the pegging of their exchange rates to the rand and the absence of controls on capital movements within the CMA (Kahn, 2000; Guillaume & Stasavage, 2000; Foulo, 2003). It should also be noted that South Africa is by far the dominant economic power within the CMA, accounting for 96 percent of CMA GDP.

It is important to emphasise two points with regard to the CMA. First, the CMA is not a full monetary union, given that it has no single currency and no single central bank. Second, developments over the past three decades with respect to the reform of the CMA, while justified for several reasons, have in some respects marked a weakening of regional monetary integration, with the departure of Botswana, the introduction of national currencies and central banks in the LNS countries, and the concessions granted to Swaziland in the mid-1980s.[19] Nevertheless, the degree of monetary integration in the CMA is very high, and the fact that the arrangement has survived for such a long period suggests that it is robust, and has the flexibility to adapt to changing conditions.[20]

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[19] The RMA in 1970 was closer to a full monetary union than is the CMA in 2003.

[20] It should be noted that almost all colonial-era monetary unions weakened and eventually collapsed during the period leading up to or shortly after independence. These include the West African Currency Board (1913-1971), the East African Currency Board (1897-1972), and the Central African Currency Board (1940-56); see Honohan & Lane for more details. Only the CFA zone has strengthened the degree of monetary integration in the post-colonial period.

MACROECONOMIC CONVERGENCE IN SADC

Economic Performance of CMA and non-CMA Countries in SADC

Before considering the extent to which a broader monetary union might be feasible among SADC countries, especially with regard to macroeconomic convergence, it is instructive to compare the relative economic performance of CMA and non-CMA countries. Table 1 provides information on relative economic performance in terms of average GDP growth, inflation and the extent of exchange rate depreciation against the SDR, over the period 1990-2002, for SADC as a whole and for the CMA and non-CMA countries as sub-groups within SADC.[21] The data show that economic growth has been similar between the CMA and non-CMA countries, averaging 2.2 percent in both groups, although when the three countries that have experienced hyperinflation at some point over the period are excluded (Zimbabwe, DRC and Angola) the non-CMA countries performed somewhat better, with average GDP growth of 3.8 percent.

TABLE 1: COMPARATIVE ECONOMIC PERFORMANCE IN SADC, 1990-2002

Indicator [1]	SADC	CMA	non-CMA	non-CMA [2]
GDP growth	2.2%	2.2%	2.2%	3.8%
Inflation	243.3%	9.2%	801.3%	27.8%
XR Depreciation vs. SDR	79.1%	75.2%	88.3%	79.2%

Notes: [1] GDP-weighted averages [2] excludes DRC, Angola, Zimbabwe

With regard to inflation, the CMA countries did much better, averaging 9.2 percent over the period as against 801 percent for all non-CMA countries and 27.8 percent for the non-hyper inflation non-CMA countries. The relatively good performance of the CMA group has been anchored by the conduct of monetary policy by the SARB.

With regard to exchange rate developments, there is little difference between the two groups, even once the hyperinflation economies are excluded, with depreciation against the SDR of 75-80 percent over the 12-year period.

Macroeconomic Convergence Initiatives in SADC

Before considering the extent to which there has been macroeconomic convergence within SADC, it is important to note that SADC's main macroeconomic initiative has been with regard to trade liberalisation, with formal agreement between member states to achieve a Free Trade Area (FTA), under which it is envisaged that 85 percent of all goods trade within SADC will be at zero tariffs by 2008.

Nevertheless, there have been many initiatives in other areas, some more successful than others, including financial cooperation and macroeconomic convergence. This falls under the auspices of the Committee of Central Bank Governors (CCBG), which itself fell under the Finance and Investment Sector Co-ordinating Unit (FISCU) of SADC, led by South Africa, prior to the restructuring of SADC responsibilities in 2002; subsequent to the restructuring, the CCBG falls under the Directorate of Trade, Industry, Finance and Investment (TIFI).

A number of CCBG initiatives in the broad field of financial cooperation have implications for potential monetary union. These include:

- harmonisation of national payments systems (SADC NPS Project);
- strengthening of bank supervision (through the East and Southern Africa Banking supervisors' Group, ESAF);
- liberalisation of exchange controls to achieve capital account convertibility; and
- establishment of a macroeconomic database (www.sadcbankers.org).

In addition, a Memorandum of Understanding (MoU) on Macroeconomic Convergence was signed in 2002 by SADC member states. The MoU entails a commitment to converge on stability-oriented economic policies, which include: restricting inflation to low and stable levels; maintaining a prudent fiscal stance that eschews large fiscal deficits and high debt-servicing ratios; and minimising market distortions. Subsequent to the signing of the MoU it was agreed that Macroeconomic Monitoring, Performance and Surveillance (MPSU) Unit be established within the SADC Secretariat, with an accompanying Peer Review mechanism, whereby Ministers of Finance and Investment and Central Bank Governors would monitor the annual convergence programmes submitted by each member state. It was also agreed that performance be judged in relation to a set of macroeconomic convergence targets, relating to: inflation; the ratio of the budget deficit to GDP; the net present value of public and publicly-guaranteed debt to gross national income; and the balance and structure of the current account of the balance of payments.

The agreed targets proposed are as follows:

	by 2008	by 2012	by 2018
	(percent)		
Inflation	<10	<5	~3
Budget deficit/GDP	<5	<3	<3
NPV public debt/GNI	<40	<40	<40
Current account balance/GDP	6	6	6

While it is intended that a peer review mechanism will be established to oversee compliance with the convergence initiative, no proposals have yet been made for any sanctions to be applied to countries

[21] Figures of each group are weighted averages across countries, weighted by the GDP of each country.

that are unwilling or unable to meet the agreed targets, although there is scope for policy recommendations to be made to the peer review panel.

Macroeconomic Convergence among SADC Countries

The SADC macroeconomic convergence initiative is not designed specifically to support the process of monetary union. Instead, it reflects a broader objective of achieving macroeconomic stabilisation in the region as a whole, as a prerequisite for achieving sustainable economic growth, as well as reducing the volatility in exchange rates and divergence in other key economic variables that serves as an impediment to trade and other economic linkages between member states. However, as noted earlier, macroeconomic convergence is an important prerequisite for a monetary union to be feasible. A lack of convergence indicates divergences in economic structures and vulnerability to asymmetric shocks, and hence potential difficulties in adapting to the common monetary, exchange rate and possibly fiscal policies that characterise a monetary union. A high degree of convergence, by contrast, indicates that those common policies are more likely to be relevant to each of the various members of the union.

In the remainder of this section, various convergence criteria are considered for SADC countries. The approach adopted is to assess the extent to which there has been economic convergence that could support the successful transition of non-CMA countries into a hypothetical SADC monetary union. This does not mean that a SADC monetary union would have to be based on the existing CMA, or on the adoption of the rand as a common currency. However, given economic dominance of South Africa in SADC, accounting for 67 percent of GDP, the reality is that South Africa would be the key member of SADC monetary union and hence that convergence with South Africa is likely to be a prerequisite for stable entry to a SADC monetary union.[22]

The indicators reviewed are inflation rates, interest rates and exchange rates. These are chosen because they are monetary indicators of specific relevance to monetary union. Once the union takes place, exchange rate volatility is zero (as national exchange rates are permanently fixed), all members have the same (benchmark) interest rate, and inflation rates should have minimal divergence across members of the union; hence, convergence in these measures prior to the union is important in minimising shocks in the transition process. There are of course other indicators that are important in assessing readiness to enter a monetary union, including fiscal deficits and debt, degree of economic diversification, trade patterns and openness, and capital and labour mobility, but these are related to more general economic conditions and characteristics, rather than monetary conditions.

The specific indicators reviewed are:

- **Inflation**: mean inflation differential vs. South Africa;
- **Interest rates**: mean interest rate differential vs. South Africa;
- **Exchange rate changes**: correlation of changes in each country's exchange rate against the SDR with changes in the SA rand/SDR exchange rate;
- **Exchange rate volatility**: volatility of national exchange rate changes vs. the SA rand (ZAR).

The results are summarised in Tables 2 to 5 and Figures 2 to 5. In each case, the table shows the value of the relevant indicators over two sub-periods, 1990-96 and 1997-2002 (or as recent data as is available), in order to enable an assessment of both the degree of convergence and whether this has increased or declined over time. The charts show the data for the most recent sub-period only.

TABLE 2: MEAN INFLATION DIFFERENTIAL VS. SOUTH AFRICA [1] (PERCENT)

	1990-1996	1997-2002
Mauritius	-3.3	-0.3
Mozambique	43.8	-0.1
Botswana	0.9	1.2
Swaziland	*-0.5*	*1.5*
Lesotho	*1.2*	*1.6*
Namibia	*0.1*	*2.0*
Tanzania	17.2	3.4
Zambia	91.1	20.1
Malawi	22.4	20.6
Zimbabwe	14.3	39.8
Congo, DR	6138.2	304.7
Angola	1691.0	366.7

TABLE 3: MEAN INTEREST RATE DIFFERENTIAL VS. SOUTH AFRICA [2] (PERCENT)

	1990-1996	1997-2002
Mauritius	-4.1	-3.9
Swaziland	*-3.5*	*-2.6*
Tanzania	16.0	-2.4
Botswana	-2.6	-0.7
Namibia	*1.4*	*-0.1*
Lesotho	*1.0*	*1.3*
Mozambique	42.7	4.5
Zambia	40.6	18.6
Malawi	10.4	25.3
Zimbabwe	10.0	28.1
Congo, DR	86.8	66.4
Angola	98.1	92.6

[22] The merits of such convergence have been enhanced in recent years by South Africa's relative success in implementing monetary policy and bringing down its inflation rate. If South Africa were to have high inflation, as was the case in the past, the case for convergence would be undermined.

	1990-1996	1997-2002
Lesotho	*1.00*	*1.00*
Namibia	*1.00*	*1.00*
Swaziland	*1.00*	*1.00*
Botswana	0.85	0.93
Mozambique	0.08	0.08
Congo, DR	-0.39	0.05
Zimbabwe	0.06	0.01
Zambia	0.09	-0.01
Malawi	-0.10	-0.04
Tanzania	0.43	-0.08
Angola	0.36	-0.08
Mauritius	0.04	-0.12

TABLE 4: CORRELATION OF PERCENT CHANGES IN SDR EXCHANGE RATE WITH SOUTH AFRICA [3]

With regard to inflation, it is evident that the differential *vis-à-vis* South African inflation has fallen for most countries between the early 1990s and the late 1990s, except for the CMA countries and Botswana, where there was a slight increase in inflation differentials, which nevertheless remained quite small. By the latter period, seven of the 13 SADC countries (Mauritius, Mozambique, Botswana, Swaziland, Lesotho, Namibia and Tanzania) had average inflation rates close to that of South Africa, with differentials of less than four percent. The remaining five countries (Zambia, Malawi, Zimbabwe, DRC and Angola) all had substantial inflation differentials *vis-à-vis* South Africa, ranging from 20 percent to over 300 percent.

The results for interest rate differentials are consistent with those for inflation. Interest rate differentials generally narrowed, in view of the narrower inflation differentials between the two subperiods, and the seven countries with relatively low inflation differentials have interest rates that are close to those of South Africa. Mauritius, Swaziland, Tanzania, Botswana, Namibia, Lesotho, and Mozambique all have interest rates that range between 3.9 percent below to 4.5 percent above those of South Africa, whereas Zambia, Malawi, Zimbabwe, DRC and Angola all have average interest rates ranging from around 18 percent above to over 90 percent above those of South Africa.

With regard to exchange rates, the three other CMA member countries obviously have no volatility in their exchange rates *vis-à-vis* the ZAR, given the fixed peg. Botswana also has a high correlation of exchange rate changes *vis-à-vis* the ZAR, and low volatility against the ZAR, which is to be expected given the important role that the ZAR plays in the basket to which the Pula is pegged. Beyond that, the correlation of exchange rate changes with

TABLE 5: VOLATILITY OF EXCHANGE RATE WITH ZAR (COEFFICIENT OF VARIATION)

	1990-1996	1997-2002
Lesotho	*0.00*	*0.00*
Namibia	*0.00*	*0.00*
Swaziland	*0.00*	*0.00*
Mozambique	0.61	0.09
Botswana	0.03	0.09
Tanzania	0.26	0.14
Mauritius	0.11	0.17
Zambia	0.73	0.17
Zimbabwe	0.27	0.29
Malawi	0.58	0.30
Angola	2.60	1.02
Congo, DR	2.30	1.68

Notes:

[1] Annual change in consumer price index

[2] National interest rates calculated as the average of treasury bill rate, central bank lending rate, and interbank money market rate.

[3] National currency/SDR vs. ZAR/SDR

[4] Quarterly data used in all cases

Source: calculations based on IFS data

the ZAR is very low for the currencies of all other SADC members. Volatility against the ZAR does not show any clear division into currencies with particularly 'low' or 'high' volatility (outside of the CMA members), but does show a progressive increase in volatility moving from countries that showed convergence with South Africa on the interest rate and inflation indicators (Botswana, Mozambique, Tanzania and Mauritius) to those that do not demonstrate convergence (Zambia, Zimbabwe, Malawi, Angola and DRC).

What conclusions can be drawn from these results? First, there has been some convergence across SADC between the first and second subperiods, with lower inflation and interest rate differentials between most countries and South Africa. Second, the process has been unequal, and it is possible to identify a 'convergence group' of countries – Mauritius, Swaziland, Tanzania, Botswana, Namibia, Lesotho, and Mozambique – that have moved closer to South African levels of inflation and interest rates, and whose currencies are relatively stable (have low volatility) against the ZAR. The remaining SADC countries – Zambia, Zimbabwe, Malawi, Angola and DRC – make up a 'nonconverging' group that continue to have much higher inflation and interest rates than South Africa, and show as much evidence of increasing di-

FIGURE 2: SADC INFLATION DIFFERENTIALS WITH SA (1997–2002, PERCENT)

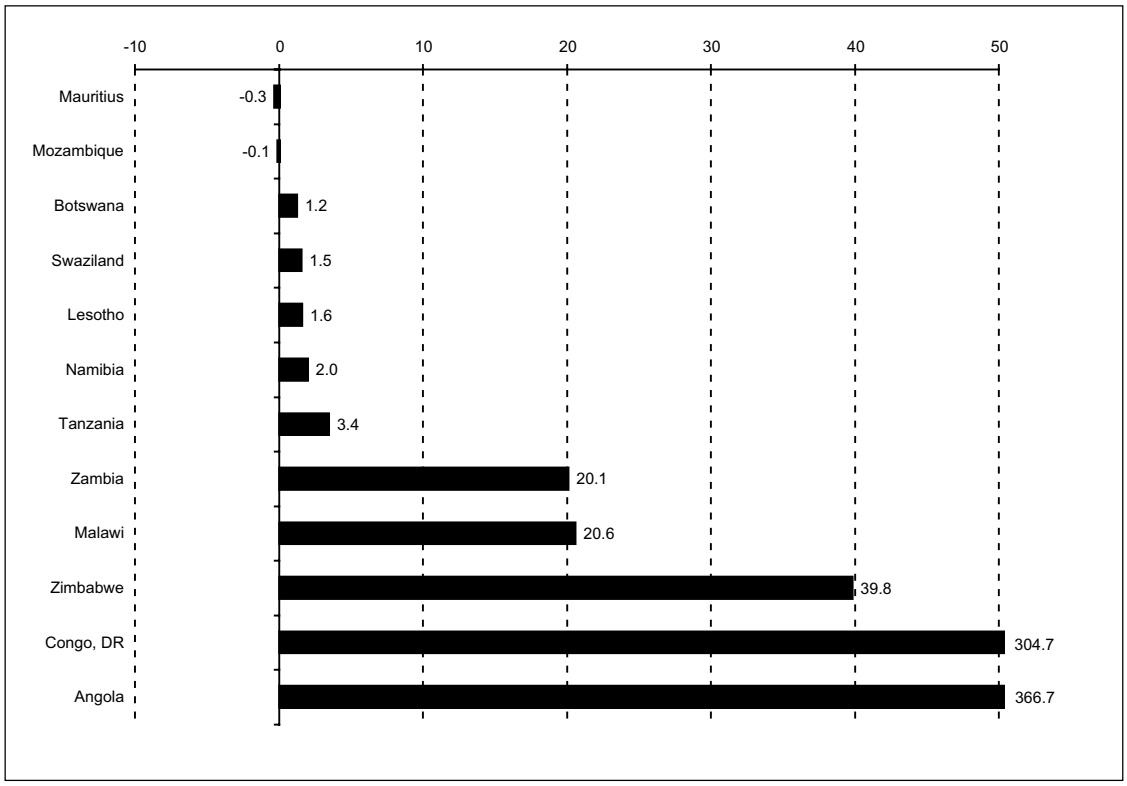


FIGURE 3: SADC INTEREST RATE DIFFERENTIALS VS SA (1997–2002, PERCENT)

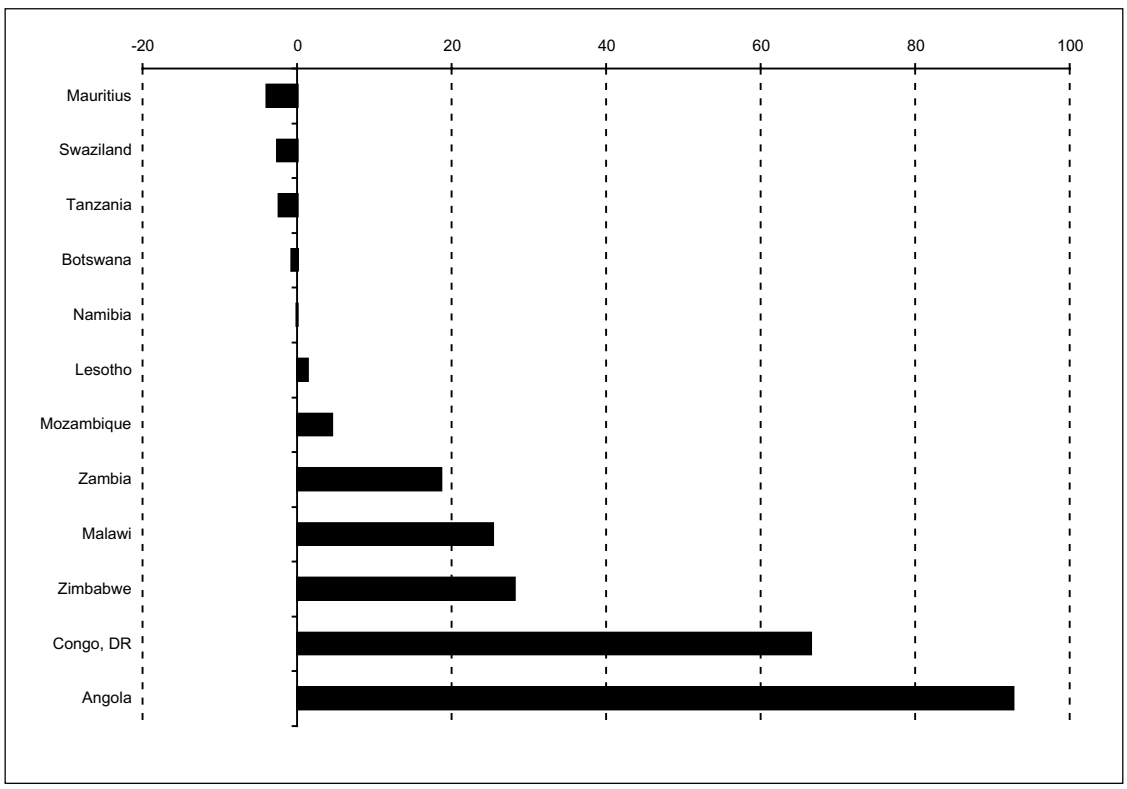


FIGURE 4: SADC CURRENCIES EXCHANGE RATE VOLATILITY WITH SA RAND (1997–2002)

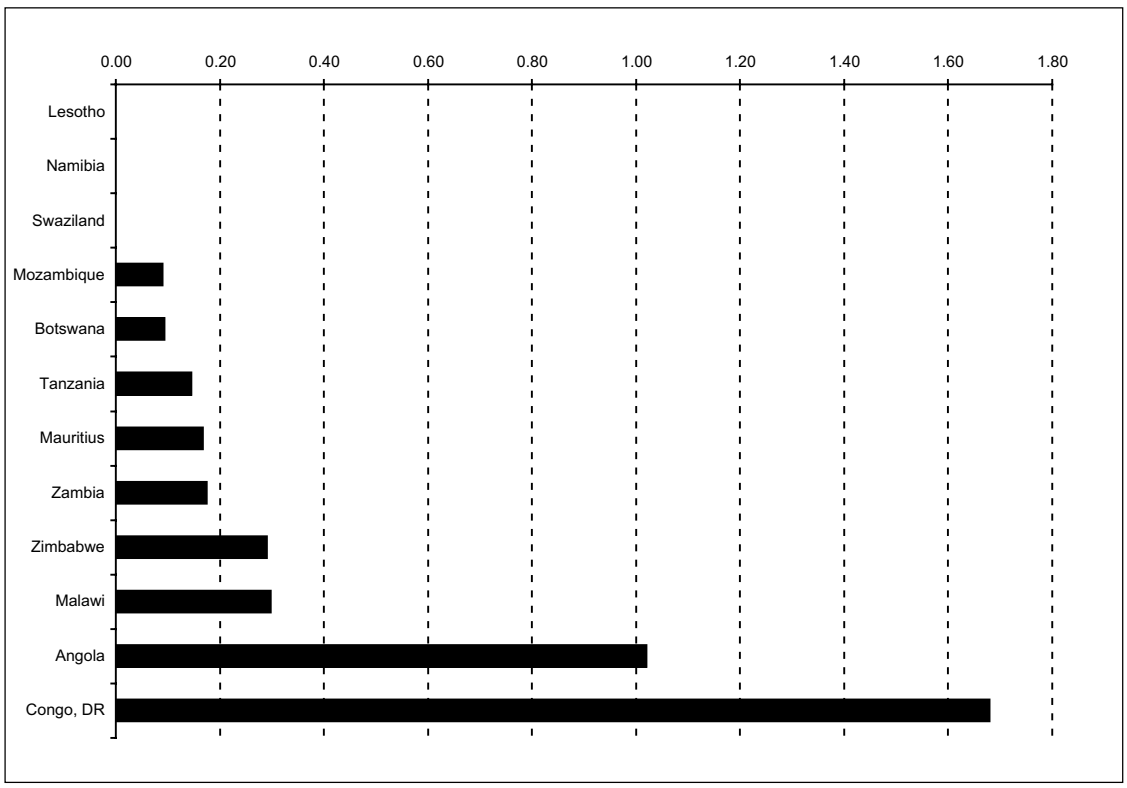
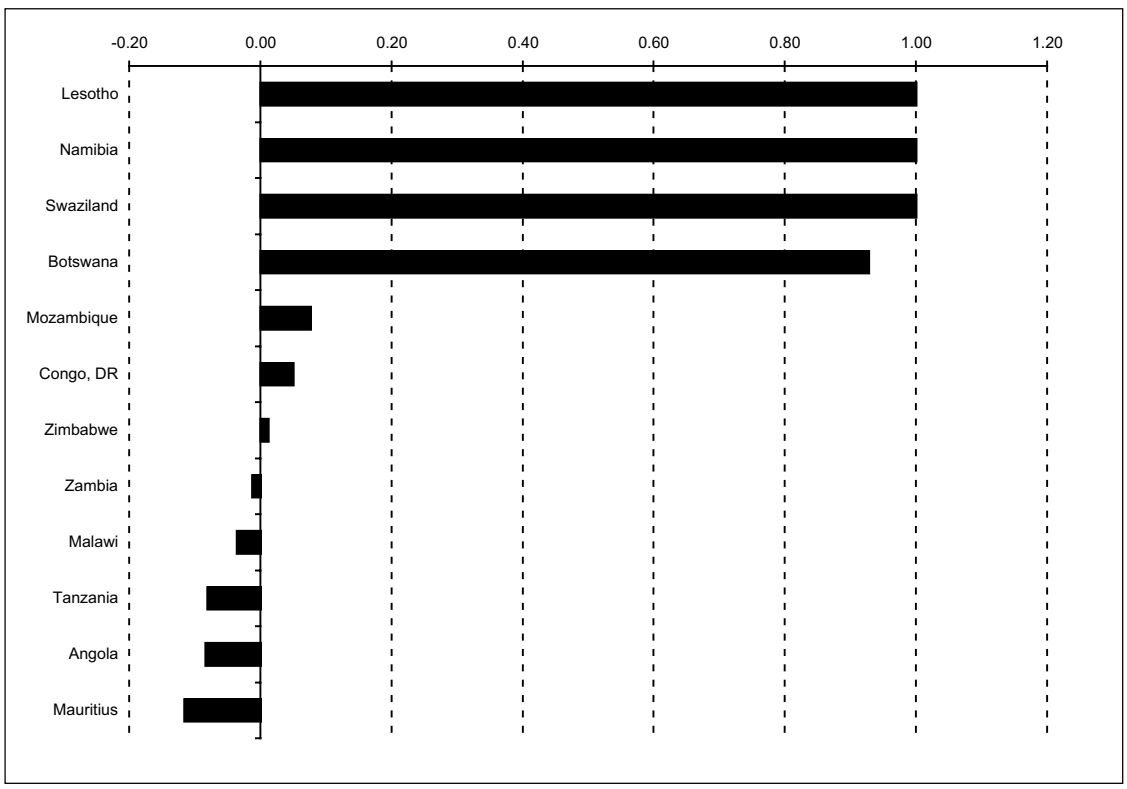


FIGURE 5: EXCHANGE RATE CORRELATIONS WITH SOUTH AFRICA (1997–2002)



vergence over the years as of convergence.

Implications and Conclusions

While these results are not conclusive and there are other ways of assessing economic convergence, some preliminary conclusions can be drawn. On the basis of this evidence and of the economic performance of the past decade, it would not yet be feasible for all SADC countries to move together towards monetary union; some kind of 'variable geometry' would be needed that accommodates the faster moving 'convergence group' while allowing the remaining countries to move at different speeds towards monetary union.[23]

For the 'convergence group', achieving the short-term SADC objective of inflation below ten percent is a realistic and achievable aim, and indeed several of these countries have already achieved it. This would help to keep interest rates at comparable levels. For the non-convergence group, their immediate objective has to be macroeconomic stabilisation. In fact the current picture is probably more favourable than that presented in five-year average figures, as very recent figures do provide some evidence that in some countries at least, stabilisation is succeeding. One or two years of good performance is not enough, however, and the achievements have to be sustained over a longer period for longer term convergence objectives to be feasible. Furthermore, if the SADC convergence objective is to be seen as a serious commitment by member states, the macroeconomic monitoring and peer review mechanism needs to be established as a matter of priority. Ultimately, some kind of sanctions against laggards may be necessary, even if the only sanction is the refusal of membership in the monetary union.

The short term objectives that are necessary to support a potential SADC monetary union are fairly clear and straightforward, as noted above: control of inflation to below ten percent; macroeconomic stabilisation; and convergence monitoring. It is in the medium term that more difficult issues will have to be tackled.

First, it will be necessary to review the extent to which the member states of SADC currently meet, or are likely to meet in the future, the necessary conditions for monetary union, such as similarity of economic shocks and similarity of economic structures and trade patterns. To the extent that there are similarities, monetary union is more likely to be both feasible and beneficial. However, perhaps not too much should be read into this requirement. Within the CMA, Lesotho, Namibia and Swaziland all have quite different economic structures to South Africa, and yet their monetary union has endured, presumably because on balance, the smaller countries have benefited from the 'agency of restraint' imposed by South African monetary policy, which has generally been run in a conservative and responsible manner, resulting in relatively low inflation over a prolonged period.[24] The BLS countries have also benefited from monetary union due to their integration into the South African economy and the very high proportion of their total trade that is carried out with South Africa, thus yielding considerable efficiency benefits, as the OCA literature predicts.

This illustrates a second factor that would support SADC monetary union, an increase in the level of intra-SADC trade. Obviously this is the intention of the SADC FTA, due to be fully operational in 2008, and it is to be hoped that the anticipated benefits do, in fact, result. A successful FTA, while welcome, would not, however, be sufficient. Evolution into a full customs union would have to follow, as part of the process of establishing a single market for goods, services, capital, money and labour among participating countries, which is an essential prerequisite for a viable monetary union.

Countries will, therefore, need to consider issues related to improving factor mobility. With regard to exchange controls on capital movements, there has been considerable progress in recent years, and at least in principle, among most countries, an acceptance that capital account liberalisation is desirable and feasible. However, labour mobility is more problematic, with concerns that severe income disparities within the region would lead to unsustainable migration between countries; this component of monetary union is unlikely to be feasible, at least not across all SADC countries, for some time.

The pursuit of SADC monetary union will also require some tough choices to be made regarding

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[23] This was the intention in EMU, where the expectation was that there would be an initial qualifying group of countries, to be followed later, as the necessary economic and financial reforms took place, by the joining up of other countries that did not initially qualify. Indeed, by some accounts the Maastricht criteria were designed to exclude Italy and other southern European countries with weak public finances, in order to 'sell' EMU to a skeptical German public, worried that the monetary policy achievements of the Bundesbank would be undermined. In the event, with a mixture of political bargaining and creative public finance accounting, almost all of the countries that wanted to join EMU did so in the first round in 1999 (the exception was Greece, which only joined EMU in 2001).

[24] It should also be noted that there are considerable differences in economic structure between members of the CFA zone, and yet this monetary union has also survived. Similarly with the Eastern Caribbean Currency Union (ECCU), which has been in existence since 1983. The ECCU does not fulfill several of the key criteria for an optimum currency area, and yet 'the arrangement has functioned smoothly and brought clear benefits to its members' (Venner, 2002:6).

monetary and exchange rate policy. As noted earlier, most SADC countries have floating exchange rates, and an independent monetary policy. An agreement to pursue monetary union will imply a reversal of these positions. A period of exchange rate convergence would be necessary, with all prospective monetary union members targeting an agreed exchange rate objective that would progressively minimise exchange rate fluctuations between these countries. This in turn implies that national monetary policy would have to, first and foremost, be oriented towards pursuing the exchange rate target while overall monetary policy would be determined on a collective basis across countries, rather than on an individual, national basis. The various exchange rate and monetary policy options, and how exchange rate convergence should be designed and structured, will require considerable discussion and debate.

The process will also need to be driven by political will supported by the necessary economic reforms; not just political will at the African Union level, but at the domestic level, where choices will need to be made that may appear to have short-term costs, but would be necessary for the long-term success of monetary union. The political commitments that have been made so far, mostly at Africa-wide level, will at some point have to be supplemented by political commitment at the national level, which would in turn drive the adoption of economic policies focused on monetary union, if the monetary union project is to move forward. It is important to recall that EMU was as much a political project as an economic one, and that this political backing, especially from the largest countries, France and Germany, was crucial to ensuring that the inevitable obstacles were overcome. In SADC, the political element will also be important, although the dynamics are likely to be different to those of Europe. While all potential monetary union members will need to be convinced that there are sufficient gains to be had from monetary union to compensate for the reduction of policy autonomy that would result from the sharing of economic policy decision-making, the issue is perhaps most acute for South Africa, as the dominant economic power in the region.

Finally, much thought will have to be given to the institutional issues that would accompany monetary union, which are essential to the union's credibility and hence its ability to influence expectations. It is important to get governance structures right, so that monetary policy and related rules can be enforced, any breaking of the rules can be effectively countered, and exit from the union is costly. Related institutional issues that will need to be resolved include the framework for fiscal policy, financial sector regulation and supervision and, especially, the structure of union-wide central banking and accompanying decision-making powers. Given the mismatch in size between South Africa and the remaining SADC members, and the varied record of members in terms of the quality of economic policy-making, reaching a solution that incorporates the interests of all members while ensuring a responsible monetary policy for the union, will require considerable compromise on all sides. Given the importance of getting the initial conditions and structures right, and bearing in mind that monetary union is, in principle, irrevocable, the process should not be rushed.

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An Approach to Estimating the Demand for Narrow Money in Botswana

Walter Mosweu[1]

Introduction

The aim of this paper is to present an approach to modelling the empirical relationship between narrow money, real income, interest rates and inflation, and to examine the stability of this relationship in Botswana, especially in light of financial reforms. Stability of the model is important, since any instability of the estimated model not only invalidates forecasting and policy simulation, but also presents economic and statistical difficulties in conducting any inference from the estimated relationship. The paper estimates a long-run demand for narrow money function for Botswana using the Johansen Vector Error Correction Mechanism (VECM).

The demand for money function represents one of the most important components of the monetary process in a market economy. Since the demand for money plays an important part in the monetary process, it is not surprising that it has been subject to extensive empirical scrutiny in many countries. The demand for money reflects the degree of desirability to possess money for companies, households and other economic entities. In its nominal representation, it indicates the attractiveness of a certain amount of money. However, in its real representation, it shows how attractive it is to possess money corresponding to the number of units of assets and services that may be acquired for the money. The demand for money function links money, interest rates and real economic variables and thus plays an important role in the decision making process of central banks dealing with monetary policies.

In Botswana, before the late 1980s, the financial sector was not well diversified; it was highly concentrated and had a limited range of financial instruments (Bank of Botswana, 2001). At that time, the central bank exercised a considerable degree of direct control over the operations of commercial banks, especially in regard to maximum interest rates on lending and minimum interest rates on deposit rates. It was only after 1986 that controls were lifted and commercial banks were allowed to set interest rates freely. The above-mentioned reforms were undertaken to improve the efficiency of financial institutions, broaden the range of financial instruments and liberalise financial markets. The financial sector has since undergone considerable transformation after the liberalisation and reform measures of 1986 and subsequent years. Table 1 summarises those reforms.

Table 1. Financial Sector Reforms in Botswana

Type of Reform	Year
Removal of control on interest rates	1986
Establishment of the Stock Exchange	1989
Liberalisation of commercial bank licensing requirements	1990
Introduction of Bank of Botswana Certificates	1991
Removal of all foreign exchange controls	1999
Introduction of International Financial Service Centre	2000

Source: Bank of Botswana Annual Report, 2001

When formulating a demand for money model in Botswana that can be estimated over a long period, the following points are of major concern:

- the relatively undeveloped capital markets in the 1970s may indicate a significant role for real assets such as livestock ownership;
- the constrained opportunities for financial investments restrict the choice of an appropriate rate of return on financial assets as a rate of interest on bank deposits;
- the transition period from a moderately regulated financial system to a liberalised system raises the interesting question of the stability of demand for money function.

The objective of this study is to investigate and estimate long-run relationships among money supply (M1), output, interest rates, and inflation with a view to determining whether there is a cointegrating vector that can be interpreted as a long-run money demand function. The cointegrating vector is interpreted as a long-run demand for money function since, mathematically, a vector is a linear combination of elements in a set, i.e., a set of variables. The paper presents a system approach to estimating a long-run demand for money function using a Johansen VECM, to fit a system of equations to the Botswana data. The use of a VECM framework allows for the examination of impulse response functions, whereby the responses of key variables to various economic shocks are examined. This comprises the second major component of the paper.

Time Series Characteristics of the Data

Annual data from various issues of Bank of Botswana Annual Reports over the period 1975 - 2001 are used in this modelling exercise. The variables

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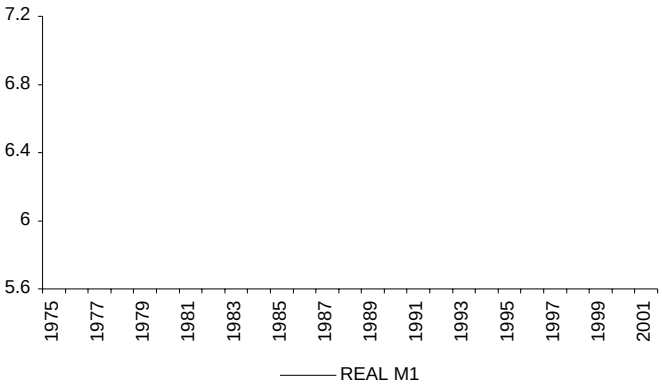
used are annual inflation (Inf), real interest rates (Rate) and the logs of real GDP (LRGDP) and real narrow money (real M1, LRM1). The M1 measure of narrow money comprises currency outside banks plus demand deposits. The 88-day deposit interest rate of commercial banks is used as it represents the closest substitute to financial assets. Figures 1-4 show the plots of the data, while Table 2 shows descriptive statistics of the variables.

FIGURE 1 AND 2: PLOTS FOR REAL NARROW MONEY AND REAL GDP



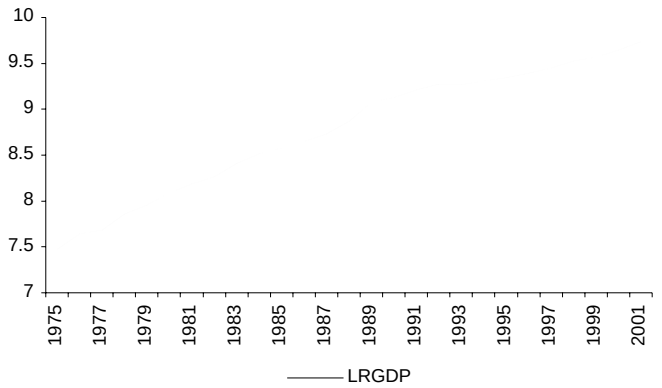
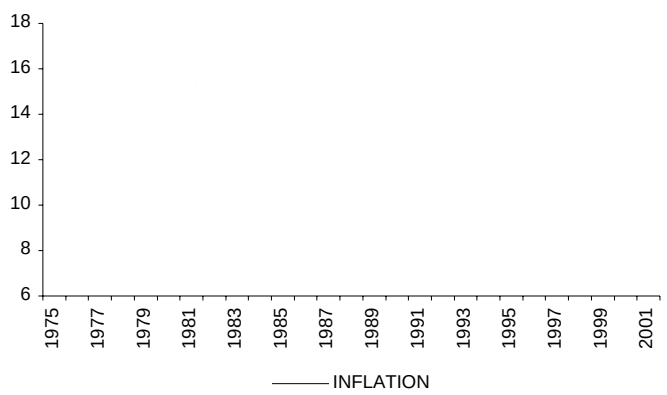
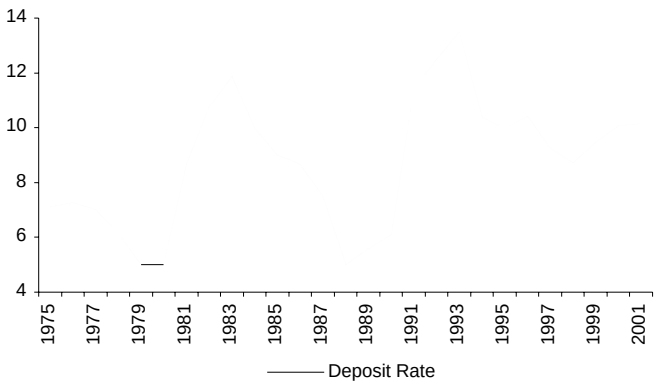


FIGURE 3 AND 4: PLOTS FOR INFLATION AND DEPOSIT RATE (PERCENT)





The graphs of income and narrow money are trending upwards, although the trend in narrow money is not smooth compared to income. The graphs of inflation and deposit rates show that the variables move up and down over time. Looking at the first, second, third and fourth moments of the distributions, it appears that none of the variables are normally distributed. The rejection of normality is buttressed by the Jacque-Bera statistic reported in Table 2. The distributions of all variables except inflation have long left tails and are thus negatively skewed. All the four variables have kurtosis of less than 3 implying that the distributions are flat or *platykurtic* relative to the normal.[2]

A test for unit roots was conducted since empirical work based on time series data assumes that the underlying time series is stationary (Patterson, 2000). However, most economic data are non-stationary and hence it becomes essential to test for unit roots to avoid spurious regression. Since time series data are used, they were subjected to a test for stationarity using the Augmented Dickey-Fuller (ADF) test. A non-stationary series that can be transformed into a stationary series by differencing d times, is said to be integrated of order d, i.e., I(d). Likewise a stationary series is I(0) and a series that is stationary after differencing once is I(1). The results are shown in Table 3.

The results show that all the variables have a unit root in their level form indicating that they are non-stationary. Stationarity is attained after differencing once, implying the variables are integrated of order one, or I(1). Although the series are non-stationary in their level form, their linear combination may be stationary, which is known as cointegration.

[2] The skewness of a symmetric distribution, such as the normal distribution, is zero while kurtosis is 3.

TABLE 2. DESCRIPTIVE STATISTICS OF THE VARIABLES

Variable	Mean	Standard Deviation	Skewness	Kurtosis	Normality #
Real M1	6.559	0.427	-0.411	1.943	2.017 [0.365]*
Inflation	10.754	2.594	0.485	2.746	1.133 [0.567]*
Real GDP	8.771	0.686	-0.382	1.862	2.115 [0.347]*
Deposit Rate	8.76	2.369	-0.031	2.16	0.798 [0.671]*

Notes: # Normalty is tested by the Jacqueue-Bera Statistic

** indicates significance at the 5 percent level*

TABLE 3. UNIT ROOT TESTS

Variable	ADF (Levels)	First Differences	Lag Length	ADF (First Differences)
LRM1	-2.0802	DLRM1	0	-5.5941*
Inf	-2.5412	DInf	1	-4.5814*
Rate	-3.9704	DRate	2	-4.1050*
LRGDP	-1.6781	DLRGDP	0	-4.0344*

Notes:

*1. * indicates significance at the 5 percent level.*

2. The lag length reported is the number of lags sufficient to remove any autocorrelation in the residuals.

REVIEW OF ECONOMETRIC TECHNIQUES AND METHODOLOGY

The finding that many macro-econometric time series may contain a unit root has spurred the development of the theory of non-stationary time series analysis. Until recently most econometric work on the estimation of cointegrating vectors used single equation dynamic models, especially the Engle-Granger Two Step Procedure (Doornik, *et al*, 1998; Hendry and Ericsson, 1991; Kganetsano, 2001). Engle and Granger (1987) showed that if there is a cointegration relationship between non-stationary variables, there must exist an equilibrium correction representation of the data.

Civcir (1999) estimated the demand for broad money in Turkey by using the 'general to the specific approach'. The model starts with the estimation of the dynamic, single equation, equilibrium correction representation model. The model included short-run dynamics while taking into account deviations from the long-run relationship. Civcir then applied the principle of parsimony by dropping insignificant variables and the furthest lags. In Botswana, Kganetsano (2001) estimated the demand for money function using the Engle-Granger procedure. However, one major drawback of the Engle and Granger technique and the single equation dynamic model is that they inherently assume the existence of one cointegrating vector even though they may be more than one. Harris (1995) argues that assuming that there is only one cointegrating vector, when in fact there are more, leads to inefficiency in the sense that a linear combination of these vectors can be obtained only when estimating a single equation model.

Johansen (1988, 1991, and 1995) developed a maximum likelihood technique by merging the Granger Representation Theorem (equilibrium correction theory) and cointegration. The Johansen maximum likelihood technique is used in this paper, as it is superior to the former techniques by allowing for the estimation of more than one cointegrating vector and for the calculation of maximum likelihood estimates of these vectors. Moreover, since the Johansen technique estimates a VECM, it represents an intermediate method between a basic Vector Auto Regression (VAR) and the more structural approach of traditional econometric models. A VECM is a restricted VAR that has cointegration restrictions built into the specification. The other advantage is that all the variables in the VECM are potentially endogenous and hence we do not have a problem of choosing which variables are endogenous or exogenous. Thus, in the model, narrow money, income, deposit rates and inflation are used as potentially endogenous variables in a system to discover long-run relationships among them. A more detailed presentation of the Johansen technique can be found in Appendix A.

RESULTS

The Johansen procedure is used to identify a long-run money demand among the cointegrated vectors. One potential problem of a VAR concerns the number of lags to be included in the system. The lag order of the VAR is often selected somewhat arbitrarily, with standard recommendations suggesting that it is set it long enough to ensure that the residuals are white noise. However, if you choose the lag length too large, the estimates become imprecise. The lag length of 3 was chosen as it removed the autocorrelation in the residuals. Finally we included the time trend to take account of long-run deterministic growth not included in the system.

It is widely known that the Johansen approach only provides information on the uniqueness of the cointegrating space (Harris, 1995). Consequently, it becomes necessary to impose restrictions motivated by economic arguments to explain unique vectors lying within that cointegrating space. In this study, a standard Choleski type of contemporaneous restriction is used on the VAR. When using the Choleski type of restriction, the ordering of variables imposes a particular recursive structure on the model, so that variables appearing earlier in

the ordering contemporaneously influence the latter variables, but not *vice versa*. The recursive order of the variables in our model is log of narrow money, log of income, deposit rate and inflation. This ordering ensures that the estimated cointegrated vector is normalised to narrow money with the coefficient of narrow money imposed to unity. The resulting cointegrated vector, if it is unique can be interpreted as a demand for money function. The estimated results are shown in Tables 4, 5, 6 and 7.[3]

TABLE 4. JOHANSEN COINTEGRATING TEST

Ho rank = r	λmax	95% level	λrace	95% Level
r = = 0	52.19**	30.3	86.2**	54.6
r < = 1	22.41	23.8	34.0	34.6
r < = 2	9.053	16.9	11.59	18.2
r < = 3	2.541	3.7	2.541	3.7

*Notes: ** indicates the rejection of the null hypothesis at the 99% level.*

TABLE 5. STANDARDISED β

LRM1	LRGDP	Rate	Inflation
1.0000	-2.4581	0.2405	0.1103
-1.1953	1.0000	-0.0028	-0.0013
16.174	28.083	1.0000	-1.4742
-21.371	52.892	-0.5215	1.0000

TABLE 6. STANDARDISED α COEFFICIENTS (ADJUSTMENT/ FEEDBACK VECTORS)

LRM1	-0.2343	0.9495	0.0015	-0.0054
GDP	-0.0428	-0.0803	-0.0018	-0.0027
Rate	-2.7922	0.7923	-0.258	0.0619
Inflation	-4.9668	-14.630	0.0262	0.0707

TABLE 7. EIGENVALUES OF THE Π MATRIX

$|\lambda|' = [0.901 \;\; 0.789 \;\; 0.623 \; 0.173]$

Since the Johansen technique tends to have small sample bias, more emphasis was placed on higher confidence intervals, the 99 percent level instead of the usual 95 percent. The two likelihood ratio tests, the maximum eigenvalue, (λ_{max}) and the trace, statistic (λ_{trace}) are used concurrently, as Johansen (1995) recommends the use of both tests because the power of the trace test is lower than that of the maximum eigenvalue. Table 4 shows that with both criteria, the maximum eigenvalue and the trace statistic are greater than the critical value. Hence, the null hypothesis that the rank of α matrix is zero is rejected while the alternative hypothesis that there are at most *r + 1* cointegrated vectors is not rejected. Thus, the likelihood ratio tests show that there is at most one cointegrating vector for the demand for money function in Botswana at the 99 percent level. The likelihood ratio tests show that there is a unique cointegrating vector that can be interpreted as a demand for narrow money in Botswana. The cointegrating vector displays most of the desired qualities of the demand for money function. More specifically, all the estimated coefficients have the correct signs, although the magnitude of the GDP coefficient is higher (than unity), as shown in Table 5. As indicated earlier, the Johansen technique can have the problem of identification if there is more than one cointegrating vector. Since the cointegrating vector is unique, it does not suffer from this criticism and the estimated coefficients could be subjected to economic interpretations.

The normalised cointegrating relation is given by:

$$LRM1 + 2.4581LRGDP - 0.2405Rate - 0.1103Inf$$

The results show that long run elasticity of money with respect to GDP is 2.46, which is significantly different from unity. The relatively higher elasticity (of more than one) is not entirely unexpected, as it shows the strong transactionary motive for holding money in Botswana, like in other developing countries. The high elasticity may also imply that the income variable is capturing some trend effect of a high correlation between changes in income and the process of financial innovation. The coefficient of the deposit rate is about negative one-quarter, while the coefficient of inflation is about negative one-tenth. These results differ considerably to those of Kganetsano (2001), who reported an income elasticity of 1.11, the elasticity of the deposit rate of about minus one third, and a low coefficient of minus 0.03 for the interest rate. The results differ because Kganetsano estimated the demand for money using the Engle-Granger procedure and used quarterly data as opposed to annual data used in this study.

The adjustment of the estimated coefficient in the long run, i.e., the speed of adjustment, is given by the α matrix. The speed of adjustment matrix had all the correct signs. The α matrix shows that income adjusts slowly while the deposit rate and inflation adjust rapidly. The speed of adjustment for real money is minus 0.2343 implying that roughly one quarter of any disequilibrium in the stock of money is removed annually. Income has the lowest speed of adjustment of about minus 0.0428. The speed of adjustment for the deposit rate and inflation are minus 2.7922 and minus 4.9668 respectively implying that the two variables adjust rapidly each year to return to equilibrium.

[3] The estimation was done using PC Give and PC Fiml software.

The model was subjected to a range of tests. The system diagnostic statistics do not indicate any misspecification in the model as the model passed all the diagnostic tests. The portmanteau test tests for the overall significance of the residual autocorrelations up to lag 3. The AR test, which is a vector (series) of first-order autocorrelation shows that the model does not suffer from first-order autocorrelation. More importantly the model passes the test of normality. The full system tests are reported in Table 8.

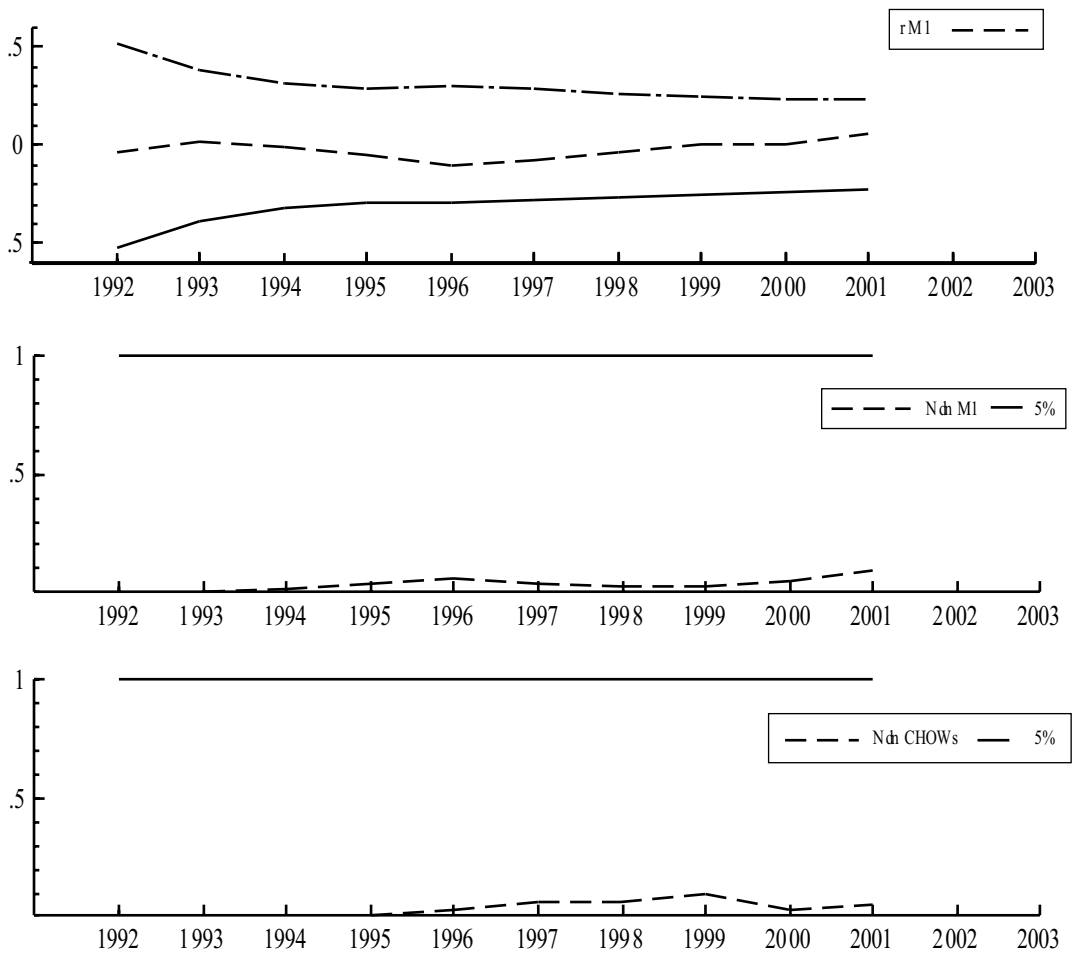
TABLE 8. FULL SYSTEM DIAGNOSTICS

Statistics	Values	*p*-value
Vector portmanteau, 3 Lags	53.451	
Vector AR 1-1 F(16, 9)	0.8458	[0.6316]
Vector normality χ^2 (8)	12.231	[0.1412]

We then examined the stability of the model, given that parameter constancy is an additional and crucial issue to ensure a well-specified relationship. This paper analyses the demand for money in Botswana from 1975 to 2001, a period marked by a number of external shocks, and different policies that had an impact on macroeconomic stability. For instance, the impact of financial liberalisation in Botswana could render the estimated relationship to be unstable. The stability of the demand for money is examined by recursive graphics,[4] as shown in Figure 5. The graphs are plotted with the null hypothesis of parameter constancy. The first graph shows the residuals in the M1 equation which are plotted in the ±2 standard error bands. The second and third graphs show the Chow break point test.

In the first graph, the residuals lie well inside the ±2 standard error bands indicating that parameter constancy is not violated. No point in the Chow breakpoint tests is higher than the 5 percent significance level, indicating again that parameter constancy cannot be rejected. The stability of the model is also buttressed by eigenvalues of the P matrix. A necessary and sufficient condition for stability is that all eigenvalues of the P matrix must lie inside the unit circle (Lüktkepohl, 1991). All eigenvalues of the P matrix lie inside the unit disk, as reported in Table 7, implying that stability is not violated. The constancy of parameters indicates that the money demand process has remained stable over the sample period. These results are surprising as there have been considerable financial sector reform in Botswana and structural changes in the economy.

FIGURE 5. RECURSIVE ANALYSIS OF THE LONG-RUN DEMAND FOR MONEY RELATIONSHIP



IMPULSE RESPONSES

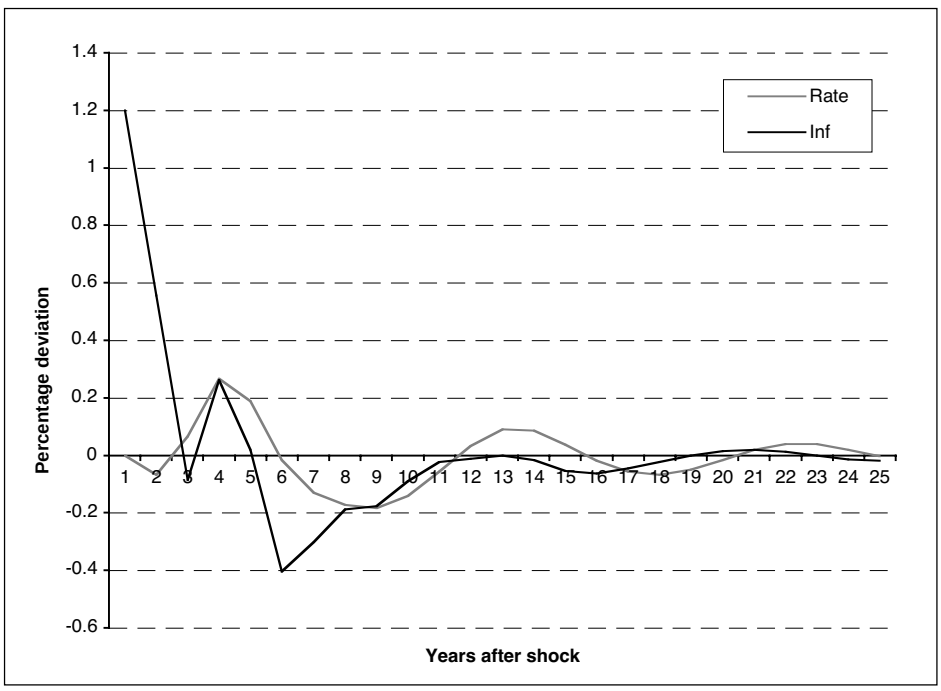
Arguably, a more informative approach to analyse short-run and long-run co-movements between variables is to examine impulse responses. An impulse response function traces the effect of a one standard deviation shock to one of the innovations or error terms on current and future values of the endogenous variables. A shock to the i^{th} variable directly affects the i^{th} variable, and is also transmitted to all other endogenous variables through the dynamic structure of the VAR (Patterson, 2000). Since the disturbances in a VAR represent all other factors other than the (four) variables in the system, a shock to the disturbances represents an exogenous shock. Also, more importantly, the impulse response functions allow us to determine the lag length of the economy, which contributes to a better understanding of the transmission mechanism. Knowledge of lags in the transmission mechanism reduces the inflation control problem of monetary policy makers as it gives them the information on the time it takes for policy actions to have effect.

The impulse response functions will be generated over a 25-year horizon. As opposed to the traditional VAR literature, the computation of impulse responses in the VECM differs with the former because the estimated long run restrictions are taken into account. More technically, the errors are orthogonalised using a Choleski decomposition so that the covariance matrix of the resulting innovations is diagonal. Making the errors orthogonal to each other makes the shocks to be interpreted as representing independent economic phenomena (Bank of England, 1999). The following diagrams show the impulses.

The impulse response in Figure 6 shows that a one standard deviation shock to the inflation equation immediately increases inflation in the first year. Inflation then wobbles up and down its steady state until it returns to its long-run equilibrium after 12 years. A shock to inflation tends to increase deposit rates. This is because higher inflation leads to higher nominal deposit rates and a higher opportunity cost of holding real money balances. Shocks to inflation could be associated or likened with supply shocks. A supply shock is a disturbance to the economy whose first impact is to increase the cost of production and, therefore, increases the price at which firms are willing to supply output (Dornbusch and Fisher, 1990). Examples could be persistent drought in Botswana and/or Southern Africa which may push up food prices, and increases in union aggressiveness that pushes up wages and prices of the goods produced by union workers.

The effect of impulse response to inflation on real money and income are shown in Figure 7. The impulse response shows that a shock to inflation does not change income in the current period, but reduces income after one year until income goes back to the steady state after 12 years. A shock to inflation has the effect of substantially reducing real narrow money. Real money hardly goes back towards its steady state value. Thus, the inflation shock on the money stock shows persistence as the shock has memory. The reduction in real money after a shock to inflation shows that as the opportunity cost of holding money increases (inflation), economic agents substitute money for real assets. The results of our impulse responses show that a shock to money has the effect of increasing money

FIGURE 6: IMPULSE RESPONSES TO INFLATION SHOCK – INFLATION AND INTEREST RATE



[4] The recursive estimation aims to throw light on the relative future information aspect of variables (parameter constancy). Hence, PC Give plots recursive graphics from the date at which parameter constantly is most likely to be violated. The default date is 1992, and recursive graphics are shown from that period up to 2003.

Figure 7: Impulse responses to inflation shock – money and gdp

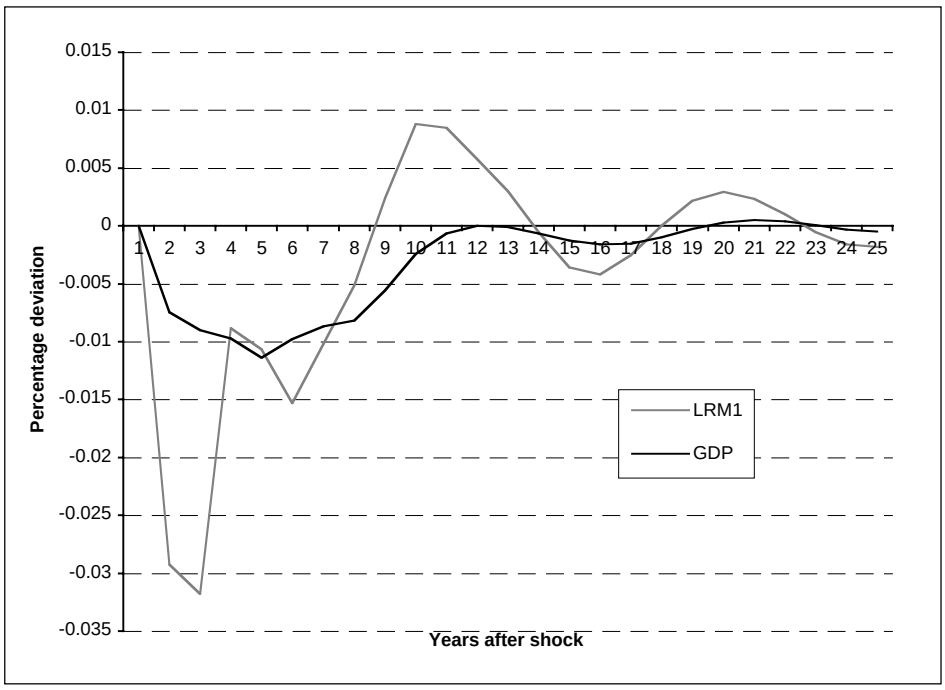


Figure 8: Impulse responses to money shock – money and gdp

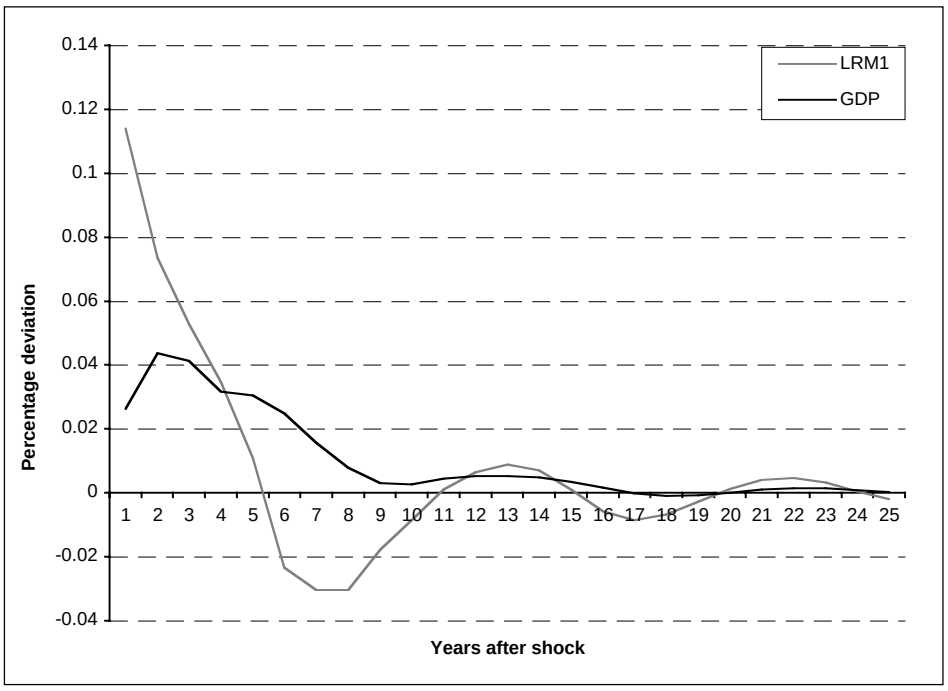
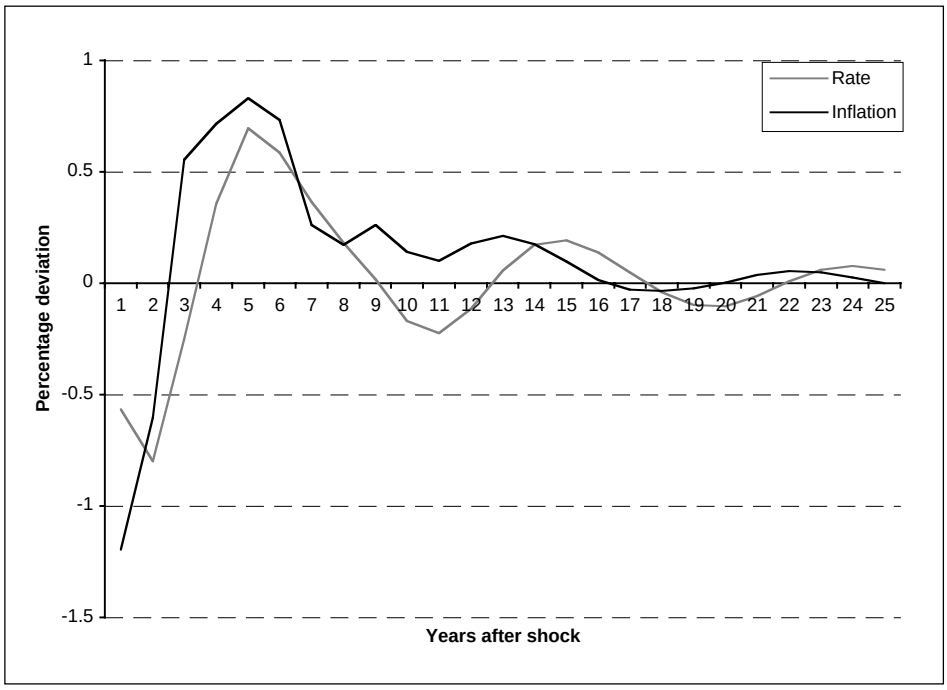


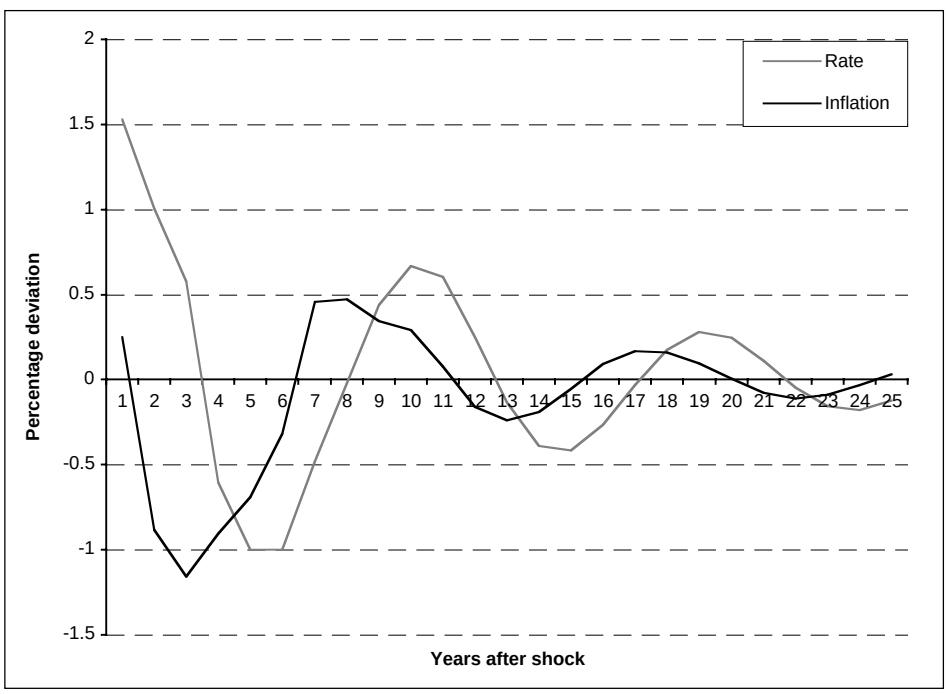
FIGURE 9: IMPULSE RESPONSES TO MONEY SHOCK – INFLATION AND INTEREST RATE



and income until both variables converge to their long run equilibrium after at least 11 years, as shown in Figure 8. A shock to money leads to increases in inflation after one year and leads to increases in deposit rates after two years, as shown in Figure 9. The effect of a shock to money does not immediately cause inflation to rise because prices are sticky in the short run. For instance, a shock to money does not immediately cause inflation to rise after the shock because of menu costs, and firms may be bound by contractual obligations in the short run. However, since prices are variable in the long run, a shock to money leads to higher inflation one for one. Figure 9 shows that inflation and deposit rates increase after the shock to money, and converge to the steady state after eight years. The increase in inflation after a shock to money in Botswana underlines the fact that inflation is basically a monetary phenomenon in the long run.

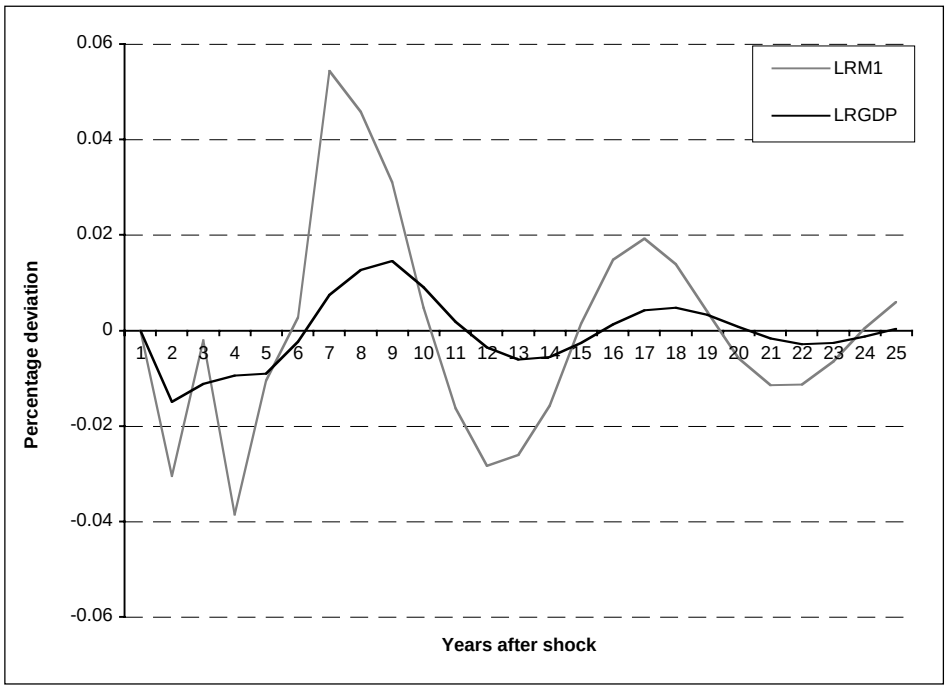
The impulse responses in Figure 8 also provide interesting results that a shock to money supply temporarily leads to an increase in output. After a shock to money, output increases temporarily for about two years and then converges to the steady state equilibrium after seven years. The temporary increase in output after a shock to money may provide an incentive for myopic policy makers to inflate the economy. However this will create an unnecessary inflation bias in the economy. More so, empirical evidence suggests in the long run, higher inflation results in lower output growth than otherwise. The shock to money, however, dies out in the long run as income converges towards the steady state after about nine years. In this model, money neutrality is preserved in the long-run but not in the short run. In the long run money supply affects nominal variables (inflation and deposit rates), but not real variables, such as income. This is because in the long run output is influenced by real factors, such as the supply side of the economy, the amount and productivity of the labour force, capital equipment, land and technology, which are independent of monetary policy.

FIGURE 10: IMPULSE RESPONSES TO A DEPOSIT RATE SHOCK – INFLATION AND INTEREST RATE



Figures 10 and 11 show that a shock to the deposit rate shows some persistence as the shock has memory. A shock to the deposit rate has persistent effects to all variables in the system. The persistence displayed by the shock could be due to a unit root process in the VAR. As Enders (1995) observed, shocks

FIGURE 11: IMPULSE RESPONSES TO A DEPOSIT RATE SHOCK – MONEY AND GDP



to non-stationary series are necessarily not temporary. The response to inflation and deposit rate are almost symmetrical as both variables have a tendency to move at almost the same rate and direction. This result is not entirely unexpected as the deposit rate depends on the level of inflation among other things. The impulse responses to the deposit rates in Figure 11 show that the stock of money and income are sensitive to the deposit rate.

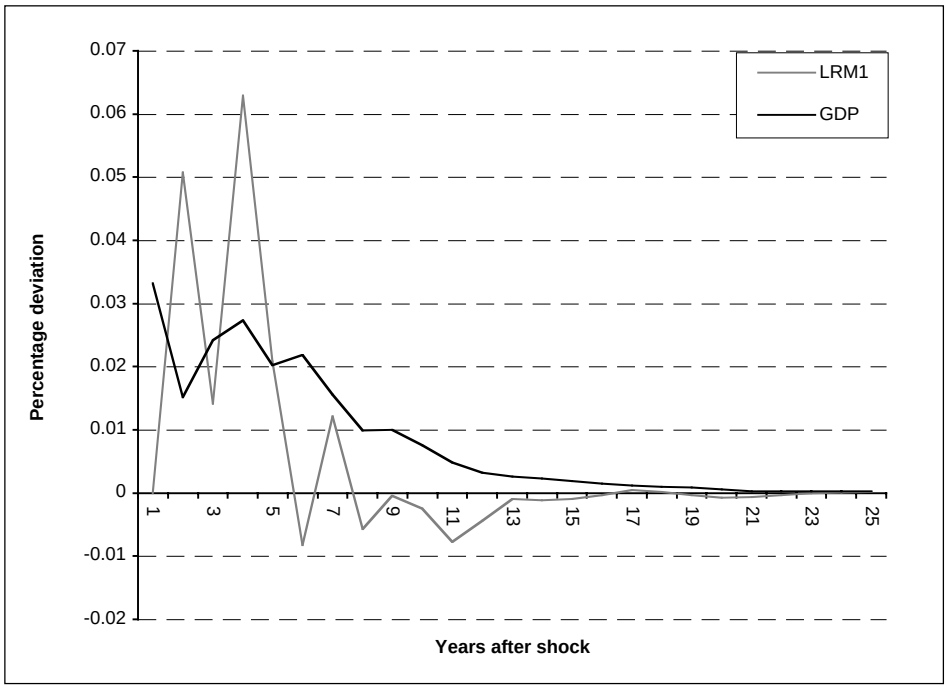
Figure 12 shows that a shock to income leaves the rate of inflation unaffected in the current year.

FIGURE 12: IMPULSE RESPONSES TO GDP SHOCK

After two years the shock to income is associated with inflationary pressures in the economy as inflation rises and converges to the long run steady rate after about 15 years. The deposit rate follow the same direction as it declines and then increases until it converges to its steady state level after about 13 years. A shock to income increases income and then begins to reduce it after some time, as shown in Figure 13. The shock to income does not affect narrow money in the first period and then starts increasing. Money returns to its equilibrium after about 13 years. Figure 13 further shows that a shock to income takes the longest time for the variables to converge towards the steady state.

Finally, caution should be exercised when interpreting these shocks. A shock to money is not necessarily a monetary policy shock, since the shock could originate from different sources like migrant workers remittances or a fiscal policy action that has a symmetrical effect in theory. Likewise, a shock to real GDP could be either due to an aggregate demand or an aggregate supply shock. Finally, in practice interest rates are not changed in isolation, but are altered following a sequence of economic developments that require some monetary policy response.

FIGURE 13: IMPULSE RESPONSES TO GDP SHOCK



IMPLICATIONS FOR FURTHER RESEARCH

This study has identified a number of areas where further studies could be conducted to the empirical approach used in order to improve the quality of the results. First, using non-mineral GDP could be a better proxy for income than total GDP, given that Botswana GDP is heavily dominated by the mining sector, especially diamond production. Second, the power of the ADF test may be another limitation of the study. Perron 1989, quoted in Harris, 1995, showed that if a series is stationary around a deterministic time trend which has undergone a permanent shift some time during the period of study, failure to take account of the this change in the slope will be mistaken by the ADF test as a persistent innovation to a stochastic (non-stationary) trend. This has been attributed to the fact that the test is of low power against a trend stationary process. Consequently, it has little power to distinguish between trend stationary and drifting processes (Enders, 1995). For further studies, it is recommended for testing unit roots using the Phillips - Perron and the KPSS tests and compare and contrast with the results from the ADF test.

Third, the Johansen procedure has been criticised for being sensitive to a small sample, (Harris, 1995; Providinsky, 1998). Since the data used only 27 observations it may be susceptible to the small sample bias of over-rejecting the null hypothesis when it is in fact true. The use of critical values adjusted for degrees of freedom, like Reimers or Gonzalo and Pitarakis critical values may be advisable in future work.

Finally, the use of quarterly rather than annual data, when sufficient quarterly data becomes available, could be a step forward. When using annual data seasonality is lost. Consequently, impulse responses may take longer to converge towards to the steady state. The longer period arises because the effects of that less than one year cannot be derived.

CONCLUSION

This paper has presented the use of the Johansen maximum likelihood methodology to estimating a demand for narrow money function of Botswana. Using the technique, it was possible to identify a unique, theoretically consistent and stable cointegrating vector exists among money, income, deposit rates and inflation that can be interpreted as a demand for money function in Botswana.

The cointegrating relationship shows (high) income elasticity, which indicates the strong transactionary motive for holding real money balances in Botswana, as in other developing countries. The high income elasticity may also imply that the income variable is capturing some trend effect of a high correlation between changes in income and the process of financial innovation. More importantly, the model displayed neutrality of money in the long run but not in the short run. This was interpreted as implying that the long-run economic performance depends on the supply side of the economy. i.e., the productivity of factors of production. Inflation and deposit rates were also shown as significantly affecting the demand for money in Botswana. The significance of inflation implies that as the opportunity cost of holding money increases, economic agents will substitute money for real assets, such as houses.

The other main finding of the study is that, perhaps not surprisingly, it takes time for the economy to return back to equilibrium after shocks. The impulses show that it takes roughly eight years to return to the steady state. This is useful information from an inflation forecasting perspective, although the period may be exegerated due to the use of annual data. Given that there are lags in the implementation and effects of policies, the model suggests that only an active monetary policy may have desirable long-run effects. A completely passive monetary policy may fail to adequately stabilise the economy given the relatively long outside lags[5] of monetary policy displayed by the model.

The impulses also show that a shock to money does not immediately lead to an increase in inflation. It was argued that this might be because prices

are sticky in the short run. However, inflation increases after some time due to money shocks since in the long-run prices are flexible and can respond to changes in demand or supply. These results have strong monetary implications, as they imply inflation is basically a monetary phenomenon in the long run. Because prices behave differently in the short run and long run, economic policies will have different effects over different time horizons.

Other findings are that supply shocks lead to lower output and lower stock of money. The central bank may accommodate this shock by expanding aggregate demand to bring the economy towards its natural rate. However, as the shocks showed, increasing income can lead to higher inflation. The second option is to hold aggregate demand constant, so that prices fall to restore full employment. However, this may come at a painful cost of recession. The impulse responses also provide interesting results that a shock to money supply leads to an increase in output, although the increase is short-lived. This may provide a temptation to inflate. Such myopic actions however create an unnecessary inflation bias in the economy.

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[5] The outside lag is the time between a policy action and its influence in the economy.

APPENDIX A

The Johansen methodology begins with a general Vector Auto Regressive (VAR) model with Gaussian errors written in the error correction form:

$$\Delta X_t = \mu + \Gamma_1 \Delta X_{t-1} + \Gamma_2 \Delta X_{t-2} + \ldots + \Gamma_{k-1} \Delta X_{t-i} + \Pi X_{t-k} + \Phi D_t + \varepsilon_t \quad (1)$$

Where, $\Gamma_t = -(I - \Pi_1 + \Pi_2 - \ldots - + \Pi_i)$, $\Pi = -(I - \Pi_1 + \Pi_2 - \ldots - + \Pi_i)$, and i = 1,2.,k.

The ΔX_t is a 1 x *n* difference vector of variables, which in this article are money, income, deposit rate and inflation. Π_t is a vector of estimated coefficients and *k* is the number of lags included in the system. Also included is μ, the vector of constants known as drifts. The deterministic vector, D_t may represent seasonal dummies and/or a linear term and are orthogonal to the constant term (Johansen, 1988). Σ_i represents the vector of short term parameters and I is the identity matrix. Lastly, ε_t is a 1 x *n* vector of innovations relative to the information set in the vector. The disturbances are assumed to be white noise, i.e., they are independent and identically distributed Gaussian errors with a mean of zero and variance matrix _, i.e., $\varepsilon_t \sim I.I.D(0, \Delta)$.

Writing the system in full:

$$\begin{bmatrix} \Delta M1_t \\ \Delta Y_t \\ \Delta i_t \\ \Delta \pi_t \end{bmatrix} = \begin{bmatrix} \mu_1 \\ \mu_2 \\ \mu_3 \\ \mu_4 \end{bmatrix} + \sum_{i=1}^{k-1} \begin{bmatrix} \gamma_{11} & \gamma_{12} & \gamma_{13} & \gamma_{14} \\ \gamma_{21} & \gamma_{22} & \gamma_{23} & \gamma_{24} \\ \gamma_{31} & \gamma_{32} & \gamma_{33} & \gamma_{34} \\ \gamma_{41} & \gamma_{42} & \gamma_{43} & \gamma_{44} \end{bmatrix} \begin{bmatrix} \Delta M1_{t-i} \\ \Delta Y_{t-i} \\ \Delta i_{t-i} \\ \Delta \pi_{t-i} \end{bmatrix} +$$

$$\begin{bmatrix} \alpha_{11} & . & \alpha_{1n} \\ \alpha_{21} & . & \alpha_{2n} \\ \alpha_{31} & . & \alpha_{3n} \\ \alpha_{41} & . & \alpha_{4n} \end{bmatrix} \begin{bmatrix} \beta_{11} & \beta_{21} & \beta_{31} & \beta_{41} \\ . & . & . & . \\ \beta_{1n} & \beta_{2n} & \beta_{3n} & \beta_{4n} \end{bmatrix} \begin{bmatrix} M1_{t-k} \\ Y_{t-k} \\ i_{t-k} \\ \pi_{t-k} \end{bmatrix} + \begin{bmatrix} \varphi_{11} & \varphi_{12} & \varphi_{13} & \varphi_{14} \\ \varphi_{21} & \varphi_{22} & \varphi_{23} & \varphi_{24} \\ \varphi_{31} & \varphi_{32} & \varphi_{33} & \varphi_{34} \\ \varphi_{41} & \varphi_{42} & \varphi_{43} & \varphi_{44} \end{bmatrix} \begin{bmatrix} D_t \\ D_t \\ D_t \\ D_t \end{bmatrix} + \begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \varepsilon_3 \\ \varepsilon_4 \end{bmatrix}$$

The Johansen technique decomposes the matrix Π to discover information about the long run relationship between variables in X. In particular, if time series data are non-stationary and cointegrated, according to the Granger Representation Theorem[6], then matrix Π can be of reduced rank, that is 0 < rank (Π) < n, and can be decomposed as $\Pi = \alpha\beta'$, where α and β' are *n* x *r* matrices. β' is a matrix of *r* cointegrating vectors and α is a matrix of speeds of adjustments to restore long run equilibrium.

Johansen (1991) further proposed two *Likelihood Ratio Tests* to test the rank of matrix Π, the maximum eigenvalue (λ_{max}) and the trace (λ_{trace}) statistic. The maximum eigenvalue statistic tests the hypothesis that the number of cointegrating vectors is equal to *r*, against the hypothesis that there are *r* + 1 cointegrating vectors. The trace statistic tests the hypothesis that the number of cointegrating vectors is, at most equal to r, and is tested against the alternative hypothesis that the matrix Π is of full rank, i.e., *r* = *k*. Full details can be seen in Johansen (1988), Johansen (1991), and Johansen (1995).

[6] The Granger representation theorem has the important implication that if two or more time series data are cointegrated, then an error correction mechanism generates them.