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Kingsley & Associates
Tel: +267 3904850 Fax: +267 3187052
e-mail: karin@kingsley.co.bw

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The Director
Research Department
Bank of Botswana
Private Bag 154
Gaborone

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2010 MONETARY POLICY STATEMENT

1. INTRODUCTION

1.1 The Monetary Policy Statement (MPS) is the Bank's annual publication through which the policy framework that guides the formulation and implementation of monetary policy is communicated to stakeholders. In this respect, the Bank seeks to foster policy credibility, with a view to anchoring public expectations of low, predictable and sustainable inflation. The MPS provides an opportunity for the Bank to assess the performance of monetary policy and inform the public about any changes to the policy framework[1], thereby fulfilling the obligation of accountability and transparency in the formulation and implementation of monetary policy. The MPS also reviews economic trends and policy implementation in the past year and evaluates the extent to which inflation deviated from the Bank's medium-term inflation objective range of 3 – 6 percent. In looking ahead, the MPS assesses prospective developments with regard to the determinants of inflation, as well as the risks to price stability, and details the Bank's policy intentions for the ensuing year.

1.2 Consistent with projections in the 2009 MPS, domestic inflation decreased from 13.7 percent in December 2008 to 5.8 percent in December 2009, thus falling within the Bank's objective range of 3 – 6 percent[2]. The decline in inflation was against the background of the world economic recession and the resultant fall in domestic economic activity, which led to low demand pressures on prices. Given subdued global economic activity, international commodity prices were generally lower compared to the previous year, while the rate of increase in food prices fell markedly. In Botswana, the impact of the decrease in external demand was mostly reflected in a fall in mining sector production (and exports) and the consequent decline in government revenue. While the growth of non-mining output was relatively strong, the risk of economic slowdown and moderate growth in personal incomes contributed to a deceleration in the rate of credit expansion. Overall, the rate of monetary expansion decelerated markedly from an annual increase of 21.1 percent in broad money supply (M3) in December 2008 to a contraction of 7.5 percent in 2009. This was due to the deterioration of the balance of payments, which resulted in a decrease in the level of foreign exchange reserves, and the slower rate of increase in both government spending and commercial bank credit to the private sector.

1.3 In consideration of these developments and the prospects for stable inflation over the medium term, the Bank maintained a monetary policy loosening bias in 2009; hence the Bank Rate was reduced five times during the year by a cumulative five percentage points. In implementing the exchange rate policy, the nominal effective exchange rate crawled downwards at a modest rate, with a marginal impact on inflation. However, bilateral exchange rates fluctuated significantly, with the Pula depreciating by 11 percent against the South African rand and appreciating by 11.1 percent against the Special Drawing Rights (SDR)[3], largely reflecting the weakness of the US dollar.

1.4 Looking ahead, inflation is expected to rise in the short term due to the increase in value added tax (VAT) from 10 percent to 12 percent[4] and the winding down of base effects linked to the previous year's decrease in fuel prices. Nevertheless, inflation is projected to stabilise around the 3 – 6 percent medium-term objective range from 2011, in the context of underlying low domestic demand pressures and benign foreign inflationary pressures associated with below-trend global and domestic economic activity. However, uncertainty with respect to oil prices and any inflationary increase in administered prices and government levies constitute a risk to the inflation outlook.

2. MONETARY POLICY FRAMEWORK

2.1 The Bank's monetary policy objective is to achieve price stability, as defined by a sustainable, low and predictable level of inflation, within the 3 – 6 percent medium-term objective range. Low inflation contributes towards the broader national objectives of sustainable economic growth and development through promoting savings mobili-

[1] Changes in the monetary policy framework could be motivated, at various times, by any of the following: economic developments, technical and operational advances, as well as policy innovations.

[2] Inflation was within the objective range in the first half of 2002 (when the objective range was 4 – 6 percent) and during 2004 and 2007 (when the objective range was 4 – 7 percent).

[3] The SDR is the unit of account of the International Monetary Fund; it is the weighted average of the US dollar, euro, British pound and the Japanese yen.

[4] The increase in VAT is effective from April 1, 2010. The simultaneous introduction of the 5 thebe per kilowatt hour levy on electricity consumption to finance the National Electrification Fund will have minimal impact on inflation.

sation and productive investment, while fostering international competitiveness of domestic producers.

2.2 In order to attain price stability, the Bank uses interest rates and open market operations to affect demand conditions in the economy and ultimately the rate of price changes. Changes in interest rates and the availability of loanable funds influence choices with respect to credit demand and saving and, in turn, aggregate demand. Apart from interest rates and credit availability, domestic demand and economic activity is also influenced by factors such as fiscal policy (decisions relating to government spending and raising revenue) and trade and exchange rate developments. Domestic demand conditions[5], along with other factors such as foreign inflation and changes in administered prices, also contribute to inflation developments. In addition, public expectations about the future level of inflation has a bearing on employee wage adjustments and price increases by firms as employees and employers strive to maintain their level of real income.

2.3 The forecast-based approach to medium-term policy formulation that is implemented by the Bank enables an assessment of the various factors that can impact on future domestic inflation. The framework allows for a differentiation of factors that are likely to lead to a longer-lasting deviation of inflation from the objective range from those that have a transitory impact, as shown by the duration of their individual effect on the inflation forecast. The Bank is, therefore, able to generate an inclusive and broad-based forecast for inflation, which informs the determination of monetary policy response. In general, monetary policy responds to a sustained deviation of the inflation forecast from the objective range in order to achieve price stability in the medium term. In response, the Bank makes an assessment of the factors that impact on inflation, including public expectations, which could be influenced by domestic monetary policy. For example, interest rates would be increased to pre-empt potential macroeconomic instability and erosion of incomes and financial savings that would result from high and volatile inflation. Conversely, the Bank would reduce interest rates in the event of sustained low and rapidly falling inflation, a development which could be indicative of subdued economic activity. In this regard, the Bank pays particular attention to the performance of the economy vis-à-vis trend levels by monitoring the output gap[6]. A sustained level of economic performance above trend is potentially inflationary and could signify the need to increase interest rates to dampen inflationary pressures, while output below trend could require a reduction of interest rates to stimulate economic activity.

2.4 The Bank also implements the crawling band exchange rate mechanism that is aimed at maintaining international competitiveness of domestic producers by stabilising the real effective exchange rate (REER). Attaining inflation equal to that prevailing in trading partner countries would indicate that Botswana producers are price competitive at a given level of the nominal effective exchange rate (NEER). In part, stability of the REER is attained through adjustment of the NEER of the Pula, but it could also be realised when domestic inflation is equal to inflation in trading partner countries. Thus, in instances where the inflation objective is higher than the forecast inflation in trading partner countries, a downward crawl of the NEER would be required to maintain international competitiveness of exports and domestic tradeable goods. Conversely, an upward crawl would be implemented in the event of the domestic inflation objective being lower than forecast inflation of trading partner countries. However, it is fundamental to note that durable international competitiveness is attained through productivity improvements.

2.5 Overall, the direction of both the real exchange rate and real interest rates, measured by the real monetary conditions index, provides an indication of policy performance and the likely influence of monetary policy on inflation (and economic activity). In this respect, an increase in real interest rates and an appreciation of the REER would indicate a tightening of monetary policy (or monetary conditions) that would be necessary to mitigate inflationary pressures, but it could also result in a slowdown in economic activity. Conversely, a reduction in real interest rates and a depreciation of the REER would imply a loosening of monetary

[5] In this instance, the rate of change in prices is associated with the variation in demand/supply conditions in the economy which are influenced by movements in interest rates and the exchange rate. Technically, this relates to the net impact of changes in real interest rates and real exchange rates, which together are referred to as "real monetary conditions", on the availability of credit and domestic industry competitiveness (see Appendix II for a more detailed explanation).

[6] In general, the output gap refers to the difference between long-term trend output and actual output (Appendix II).

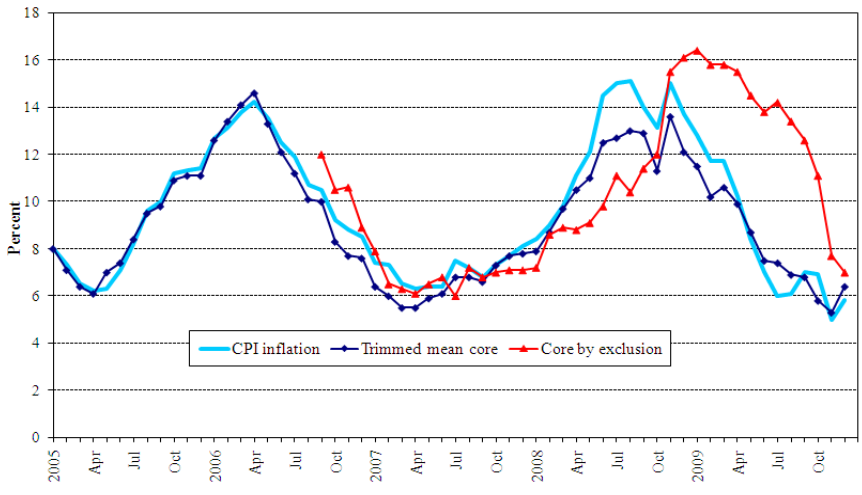
policy, which may be necessary to stimulate output growth, but it is also potentially inflationary.

2.6 To facilitate a timely policy response and dissemination of information, the Bank's monetary policy framework entails a regular review of economic developments and the inflation outlook which, in turn, has implications for the monetary policy direction as determined by the Monetary Policy Committee. The post-meeting dissemination of information is intended to inform the public about relevant economic developments, inflation outlook and likely monetary policy response. This approach helps to influence inflation expectations and contributes to sustaining policy credibility, which is critical in achieving long-term price stability. Appendix II provides explanations of some of the key variables involved in the Bank's monetary policy framework.

3. INFLATION TRENDS AND OTHER ECONOMIC DEVELOPMENTS IN 2009

3.1 Inflation trended downwards in 2009 and was within the 3 – 6 percent objective range by the end of the year (Chart 1), in the context of lower international commodity prices and subdued demand pressures. Headline inflation fell from 13.7 percent in December 2008 to 6 percent in July 2009, largely reflecting the decrease in fuel prices. Thereafter, inflation rose to 7 percent in September, due mostly to the winding down of the favourable base effects arising from the fuel price reductions in the second half of 2008 and a significant increase in private house rentals. Inflation subsequently eased to 5 percent in November 2009, as the impact of the previous year's increase in the alcohol levy dropped out of the inflation calculation; it then rose to 5.8 percent in December 2009. The 16 percent trimmed mean measure of core inflation also decreased from 12.1 percent in December 2008 to 6.4 percent in December 2009, thus providing additional evidence of the generalised lower rate of price increases that is associated with less robust economic conditions than was the case the previous year. Core inflation excluding administered prices also decelerated sharply from 16.1 percent to 7 percent in the same period.

CHART 1: BOTSWANA INFLATION (January 2005 - December 2009)



Source: Central Statistics Office

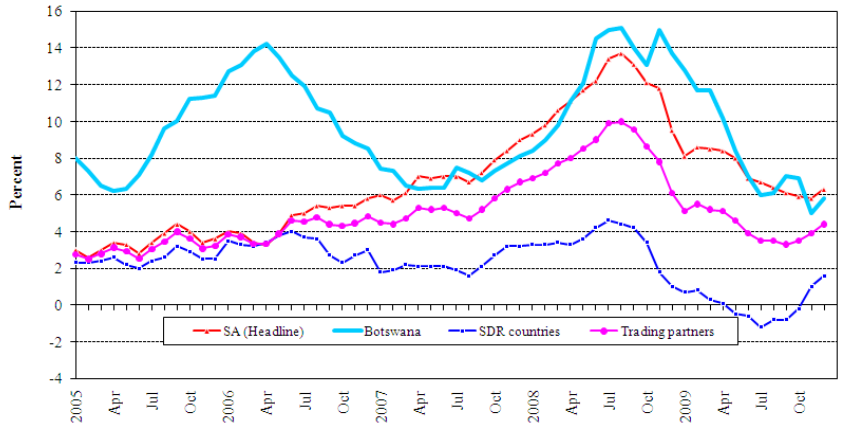
3.2 Global inflationary pressures were subdued during 2009, mainly reflecting the impact of the economic recession that prevailed in the first half of the year. The collapse in world demand due to the recession resulted in much lower commodity prices (compared to 2008), low-capacity utilisation and weak labour markets, resulting in minimal upward pressure on wages and other prices. As a result, some of the advanced economies (USA, UK and Japan) experienced a decrease in the price level although, except for Japan, there was no sustained deflation. World inflation decreased from 6.3 percent in 2008 to 2.7 percent in 2009, with global output growth slowing considerably from 3 percent in 2008 to a contraction of 0.8 percent in 2009[7]. Meanwhile, international oil prices have been much lower than the levels recorded in 2008, when they peaked at USD147 per barrel in July. However, oil prices rebounded from a low of USD38 per barrel in December 2008 to around USD80 per barrel in December 2009, thus reflecting entrenchment of expectations of global economic recovery, depreciation of the US dollar and production cuts by the Organisation of Petroleum Exporting Countries (OPEC). As a result, domestic fuel prices were increased in June and August 2009[8].

[7] World Economic Outlook published by the International Monetary Fund (January 2010).

[8] Prices for petrol, diesel and illuminating paraffin were increased by 12.5 percent, 9.9 percent and 4.5 percent, respectively, in June, and by 8 percent, 0.9 percent and 4.8 percent, respectively, in August 2009.

3.3 Average inflation in SDR countries[9] fell from 3.4 percent in 2008 to zero percent in 2009, as some of the major economies experienced a decrease in the price level during the year. In South Africa, inflation decreased from 9.5 percent in 2008 to 6.3 percent in 2009, thus falling outside the country's medium-term target range of 3–6 percent[10]. Overall, the trade-weighted average inflation of Botswana's trading partner countries decelerated from 6.1 percent in 2008 to 4.4 percent in December 2009[11]. Chart 2 shows a comparison of inflation trends for Botswana and trading partner countries.

CHART 2: BOTSWANA AND INTERNATIONAL INFLATION
(January 2005 - December 2009)



Source: Bank of Botswana

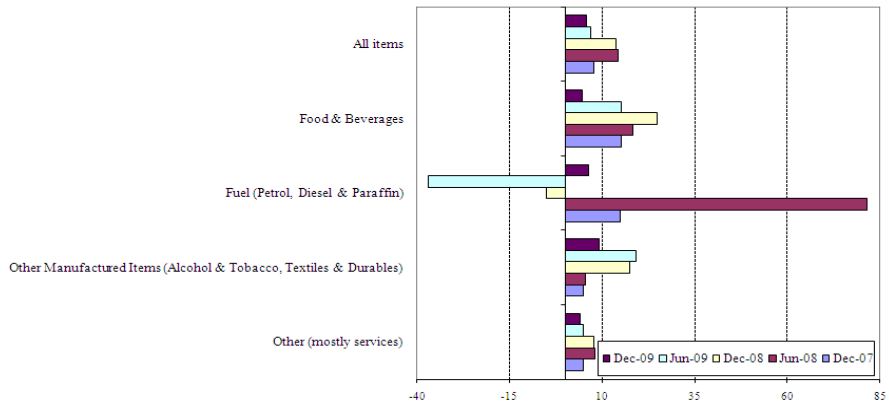
3.4 Although the increase in fuel prices in 2009 is estimated to have contributed 0.6 percentage points to domestic inflation, the overall decrease in the cost of fuel, compared to 2008, exerted substantial downward pressure on inflation. Similarly, the lower rate of increase in food prices during 2009 was disinflationary. Meanwhile, adjustments in public transport fares and the cost of education are estimated to have added 0.6 percentage points to inflation in 2009.

Chart 3 shows a decomposition of the CPI for the period December 2007 to December 2009 into four broad categories, viz., food, fuel, other manufactured items and other (mostly services).

3.5 By tradability, domestic tradeables inflation decreased sharply from 26.4 percent in December 2008 to 1.9 percent in December 2009 as the impact of the November 2008 increase in the alcohol levy dissipated. Similarly, the annual increase in the cost of imported tradeables fell significantly from 11.9 percent in December 2008 to -1.7 percent in July 2009, thus signifying the impact of lower fuel prices.

Imported tradeables inflation rose to 6 percent in December 2009 as the cost of fuel stabilised and the previous year's price reduction dropped out of the inflation calculation. The 2.6 percent increase in motor vehicle prices in December 2009 also contributed to the rise in inflation for imported tradeables. Despite the 11 percent annual depreciation of the Pula against the South African rand in the twelve months to December 2009, price increases for imported goods were moderate because of low demand pressures[12]. Nevertheless, inflation for non-tradeables rose from 6.4 percent in December 2008 to 8.5 percent in December 2009.

CHART 3: DECOMPOSITION OF THE CPI INFLATION:
YEAR-ON-YEAR CHANGE IN PRICE (PERCENT)



Source: Central Statistics Office and Bank of Botswana Calculations

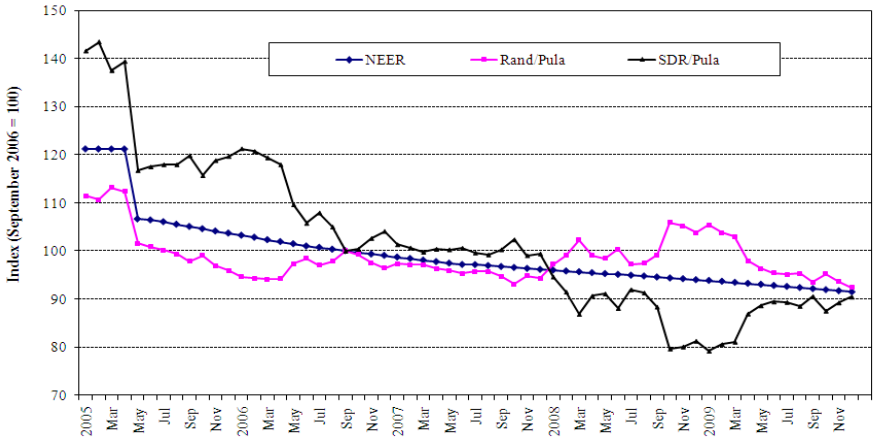
[9] USA, UK, Japan and euro zone.

[10] Effective January 2009, headline inflation replaced the CPIX rate of inflation as the target measure of inflation for South Africa. In October and November 2009, headline inflation fell within the target range for the first time in more than two years.

[11] The trade-weighted average inflation comprises South Africa's headline inflation and SDR inflation.

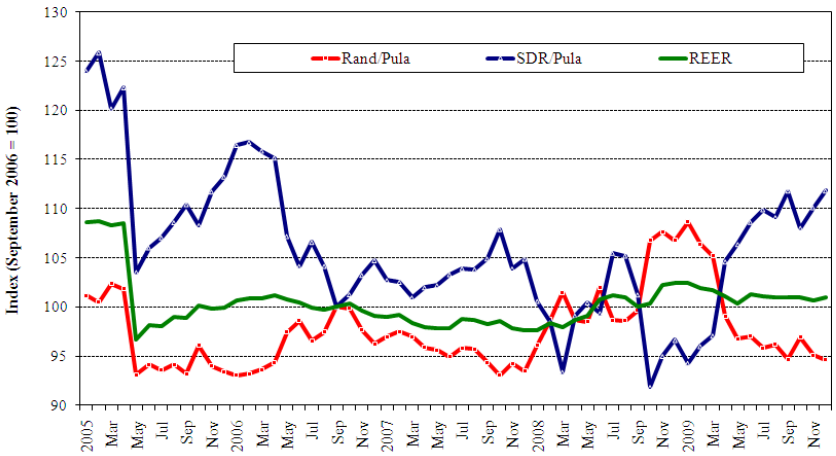
[12] The South African rand has a larger influence on domestic price developments as South Africa is the principal source of imports and the South African rand is more heavily weighted in the Pula basket.

CHART 4: NOMINAL EXCHANGE RATES (January 2005 - December 2009)



Source: Bank of Botswana

CHART 5: REAL EXCHANGE RATES (January 2005 - December 2009)



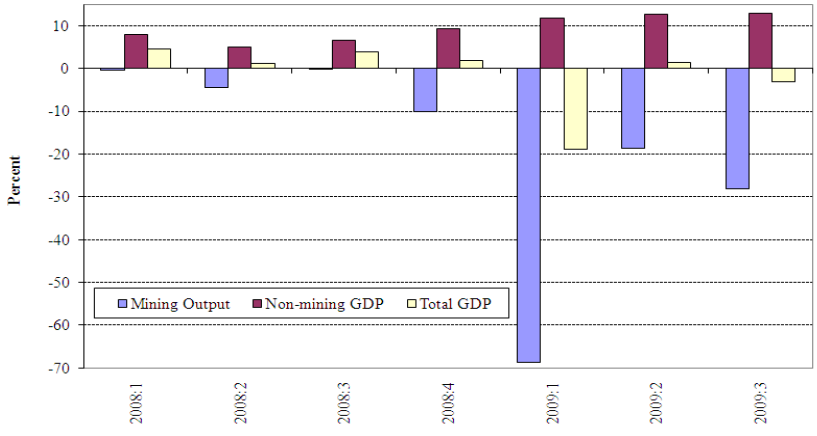
Source: Bank of Botswana

Overall, as a result of counter-balancing 11.1 percent appreciation of the Pula against the SDR, the trade-weighted nominal effective exchange rate depreciated by 2.7 percent in the year to December 2009 (Chart 4).

3.6 In 2009, domestic demand pressures were low largely due to the impact of the slowdown in global economic activity on diamond production and government revenue. In turn, the resultant decrease in the level of foreign exchange reserves, and the slower growth in government expenditure and commercial bank credit to the private sector, contributed to a significant deceleration in monetary expansion. In terms of output, mining production in the year to September 2009 was 38.4 percent lower than in the corresponding period in 2008, and this resulted in overall GDP decreasing by 6.7 percent in the same period (Chart 6 shows GDP growth rates between the first quarter of 2008 and the third quarter of 2009). In contrast, non-mining GDP increased by a robust 12.4 percent in the year to September 2009, with notable growth in construction (15.9 percent), social and personal services (13.6 percent), and transport and communications (10.6 percent). However, there are indications of a decline in non-mining output growth as shown by the change in the output gap from positive to negative in the last quarter of 2009 (moving from above trend to below trend - Chart 7).

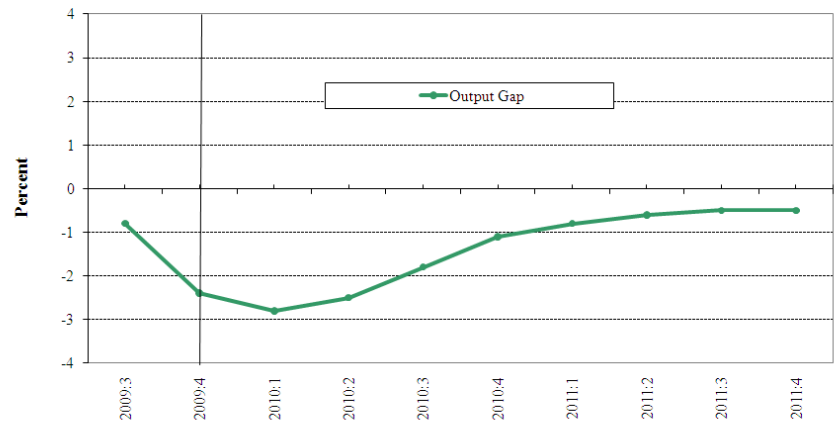
3.7 Growth in broad money decelerated from an annual increase of 21.1 percent in 2008 to a contraction of 7.5 percent in 2009 as net foreign assets declined by 11

CHART 6: BOTSWANA ANNUALISED QUARTERLY GROWTH RATE (2008Q1 - 2009Q3)



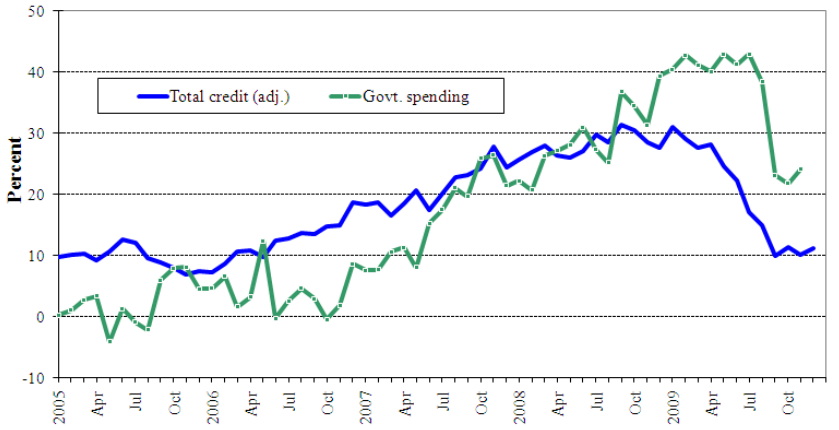
Source: Bank of Botswana

CHART 7: BOTSWANA NON-MINING OUTPUT GAP (September 2009 - December 2011)



Source: Bank of Botswana

CHART 8: ANNUAL GROWTH RATES OF CREDIT AND GOVERNMENT SPENDING (January 2005 - December 2009)



Source: Bank of Botswana

percent, compared to an increase of 20.4 percent in 2008. Credit growth also eased markedly from 27.7 percent in December 2008 to 15.2 percent in December 2009 (Chart 8). This was due to restrained demand for and supply of credit in an uncertain economic environment, an increase in loan loss provisions, the absence of an across-the-board wage increase for civil servants in 2009, and base effects associated with the acceleration of credit growth in 2008. In 2008, household credit demand increased partly due to the increase in salaries of civil servants, while businesses also increased their borrowing markedly; hence growth in credit to households and businesses decreased from 21.5 percent and 36.9 percent in 2008 to 17.4 percent and 12.3 percent in 2009, respectively.

3.8 Consistent with developments in other factors influencing monetary expansion, annual growth in government expenditure slowed significantly in 2009. In the year to November 2009, government expenditure rose by 24.1 percent compared to 30.4 percent in the year to November 2008. This was due to a slowdown in the annual increase in development expenditure in the same period, from 64.3 percent to 29.8 percent. Growth in recurrent spending increased from 19.4 percent to 21.6 percent in the same period.

3.9 The increase in government expenditure was much higher than the budgeted growth of 5.3 percent for the fiscal year 2009/10, which was announced in the Budget Speech (February 2009). Moreover, government expenditure for the fiscal year to March 2010 is projected to grow by 15.5 percent compared to the 2008/2009 spending[13]. Although existing spending programmes were largely maintained in order to complete projects that had commenced and, as a counter-cyclical measure to support economic activity, the sharp contraction in revenues has had adverse implications for the government budget. The budget deficit increased from P4.7 billion in 2008/09 to P13.4 billion in 2009/10, and was partly financed through borrowing funds from, among others, two multilateral institutions, the African Development Bank (AfDB) and World Bank, to ease expenditure constraints[14].

[13] As reported in the 2010 Budget Speech, the higher-than-budgeted growth in government expenditure reflects the impact of supplementary ministerial allocations that were made in December 2009, inadequacies in budget administration as reflected in cost overruns, award of tenders without enough funds and change of scope of projects.

[14] The Government was granted a loan of USD 1.5 billion (approximately P10.5 billion) by the African Development Bank (AfDB) to help finance the deficit. In addition, the Government acquired a loan of USD 186 million from the World Bank to fund the country's Integrated Transport Project, while proceeds from the domestic bond programme have been earmarked for the development of tertiary education infrastructure.

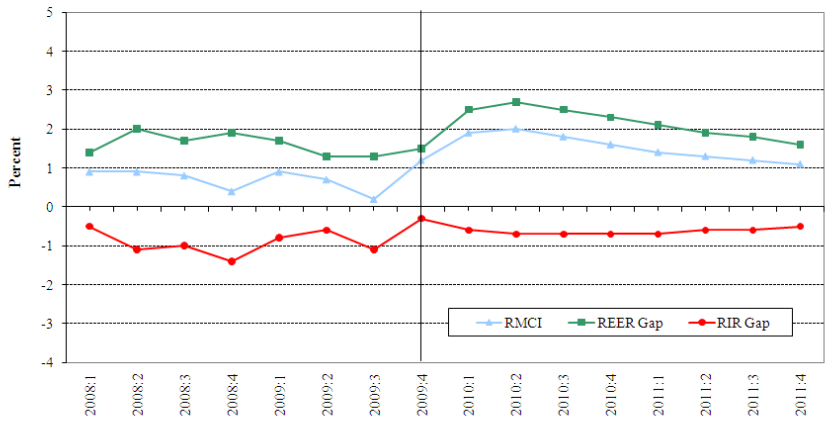
4. MONETARY POLICY IMPLEMENTATION IN 2009

4.1 During 2009, monetary policy was conducted in an environment of a global economic recession, generally low inflationary pressures, weak mining production and the expected transition to below trend growth for non-mining output. The projected paths for these variables (global and domestic output and inflation) were largely realised, as had been anticipated in the 2009 MPS, while the forecast beyond 2009 is largely unchanged. The Bank, therefore, maintained a monetary policy loosening bias with a view to providing economic stimulus in an environment in which the potential for sustained fiscal stimulus was constrained by the decline in government revenue. Furthermore, there were prospects to realise a low and stable inflation in the medium term. Accordingly, the Bank Rate was reduced on five occasions by a cumulative 5 percentage points in 2009, and ended the year at 10 percent (Table 1). The commercial banks' prime lending rate came down from 16.5 percent at the end of 2008 to 11.5 percent at the end of 2009.

4.2 The Bank continued to use open market operations to support monetary policy through absorption of excess liquidity in the banking system in order to maintain the desired level of interest rates. In the context of monetary policy easing, the yield on both the 14-day and 3-month Bank of Botswana Certificates (BoBCs) fell from 12.55 percent to 7.12 percent. Meanwhile, the average 88-day deposit rate, which was 8.53 percent in December 2008, declined to 5.79 percent in December 2009.

4.3 Real money market interest rates, which were negative at the beginning of 2009, became positive from March 2009, while the REER depreciated. The overall policy dynamics were such that the decrease in interest rates (5 percentage points for the Bank Rate) was lower than the decrease in inflation (7.9 percentage points), and this meant a tightening of monetary policy[15]. For example, the real 14-day BoBC rate increased from -1.01 percent in December 2008 to 1.3 percent at the end of 2009[16]. This effect was partially offset by the 1.4 percent depreciation of the REER, which resulted from a downward crawl of the nominal exchange rate that was larger than the differential between inflation in Botswana and average inflation of trading partner countries. Overall, real monetary conditions as measured by the combination of changes in the REER and real interest rates were relatively tight in 2009 (Chart 10), thus contributing to the easing of inflationary pressures.

CHART 10: REAL MONETARY CONDITIONS INDEX (RMCI)
(March 2008 - December 2011)



Source: Bank of Botswana

Table 1: Bank Rate - 2009

Month	Bank Rate before Change (percent)	Magnitude of Change (basis points)	Bank Rate after Change (percent)
February	15	100	14
April	14	100	13
June	13	150	11.5
August	11.5	50	11
October	11	-	11
December	11	100	10
Cumulative change		500	

Source: Bank of Botswana

Notes:

(1) The REER Gap is a measure of the deviation of the real effective exchange rate from its trend value.

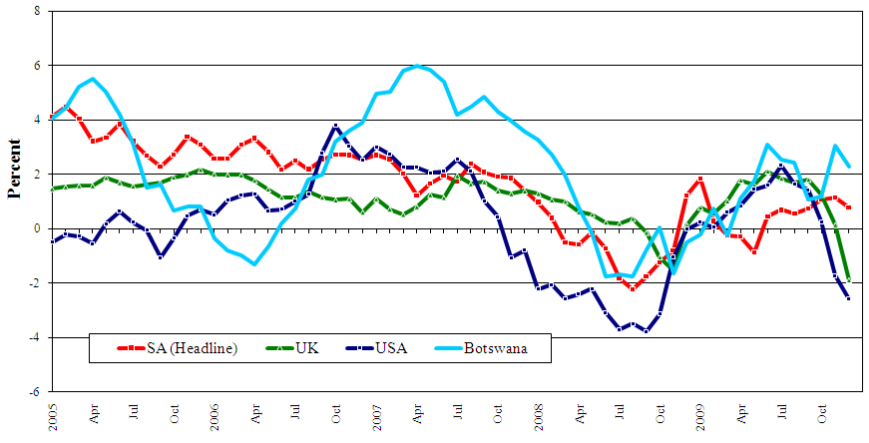
(2) The real interest rate (RIR) Gap is a measure of the deviation of real interest rate (3-month real BoBC rate) from its trend value.

(3) The real monetary conditions index (RMCI) is a weighted average of the REER Gap and RIR Gap.

[15] It should be noted, however, that this is only a partial analysis of contemporaneous changes in variables, while a forward-looking framework can involve measured policy changes that recognise the lagged impact of policy on inflation and output.

[16] Real 3-month money market interest rates were 2.3 percent, 0.8 percent, -1.9 percent, -2.6 percent and -0.6 percent in December 2009 for Botswana (3-month BoBCs), South Africa, UK, USA and the Euro zone, respectively.

CHART 11: REAL MONEY MARKET INTEREST RATES
INTERNATIONAL COMPARISONS (January 2005 - December 2009)



Source: Bank of Botswana

5. OUTLOOK FOR INFLATION

5.1 World GDP is projected to improve significantly in 2010 as more economies continue to emerge from recession (Appendix Charts A1 and A2). However, economic recovery in developed economies is slow and, in some cases, fragile, while concerns about the build-up of government debt in the wake of fiscal expansion is growing. Furthermore, there is a high rate of unemployment and slow improvement in income levels, both of which contribute to low demand. On the other hand, there are prospects for faster recovery in emerging market economies. In particular, economic expansion in Asian economies is underpinned by China's manufacturing-led growth, which is supported by the substantial fiscal stimulus and the increase in bank lending.

5.2 The challenge facing monetary policymakers is the desire to strike a balance between supporting the still fragile economic recovery and reining in potential pressures on inflation. Central banks are also addressing strategies for an orderly withdrawal of policy stimulus packages in 2010. In the context of the still weak global financial system, the approach is to institute a gradual, internationally coordinated and transparent framework for withdrawal. It is anticipated that the major economies will strive to reduce their fiscal deficits in order to avoid inflationary pressures. However, the major economies are likely to maintain low interest rates in 2010 as this should lend support in the face of expected sluggish and fragile economic recovery. As part of a broad exit strategy, the reduction of fiscal stimulus packages is critical to mitigating loss of confidence in macroeconomic stability that could arise from increasing public sector debt in the medium- to long term.

5.3 Overall, world GDP growth is projected to expand by 3.9 percent in 2010, thus reversing the contraction of 0.8 percent in 2009. Inflationary pressures are expected to remain subdued given below-trend world output growth and lower international commodity prices. Labour markets also remain weak, and this implies minimal upward pressure on wages and limited demand pressure on inflation. However, there are risks to the inflation outlook emanating from uncertainty about international oil prices and the potential rise in commodity prices that would accompany global economic recovery. World inflation is, therefore, forecast to increase from 2.7 percent in 2009 to 3.8 percent in 2010.

5.4 Average inflation in SDR countries is forecast to increase from 0.03 percent in 2009 to 1.5 percent in 2010. South Africa's headline inflation is expected to decrease from 6.3 percent in 2009 to 5.8 percent in 2010, thus falling within the country's 3 – 6 percent inflation target. Meanwhile, the exchange rate influence on import prices in Botswana is expected to be minimal. Given the inflation objective range of 3 – 6 percent and forecast trading partner inflation in the range of 3 – 5 percent, there should be a marginal downward crawl of the NEER in 2010. Foreign price developments, as transmitted through imported inflation, are expected to have benign influence on domestic inflation.

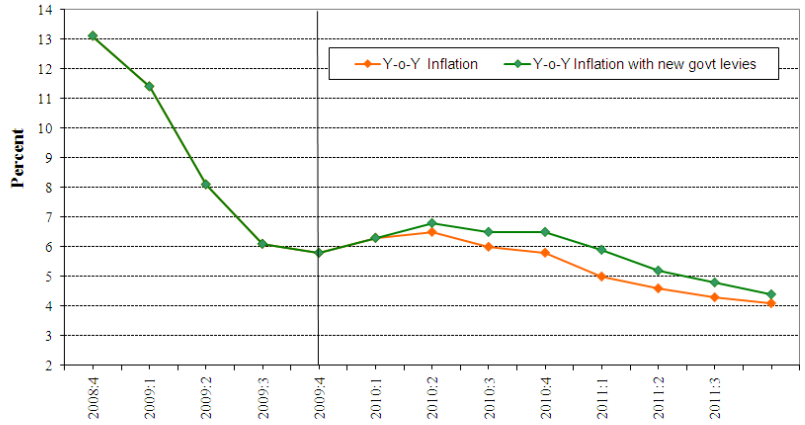
5.5 Economic activity in Botswana is expected to recover and grow at a faster rate in 2010 than was the case in 2009. Overall, it is forecast that output in the medium term will remain below trend (Chart 7), partly due to the lagged effect of the hitherto relatively restrictive monetary policy and the impact of the global economic recession. Furthermore, the pace of output expansion will potentially be constrained by low demand due to the significant decrease in real government expenditure and reduction in real disposable income associated with the wage freeze. This will be further compounded by the impact of the 2 percentage points increase in VAT and anticipated upward adjustment of levies for government services and some utility tariffs. The anticipated below-trend growth is, therefore, against

the background of the slower rate of monetary expansion, including a budgeted 3.7 percent annual reduction in nominal government spending[17]. It is also expected that credit growth will be restrained in the context of sluggish growth of personal incomes and an uncertain economic environment. With respect to the other source of increase in money supply, namely, net foreign assets, it is anticipated that, while exports will recover, receipts will continue to be lower than the levels reached prior to the global economic recession.

5.6 A recovery in output growth is also anticipated by domestic businesses, where confidence is shown to have markedly improved towards the end of 2009. However, the level of confidence is still substantially below that prevailing prior to the onset of the global economic downturn[18]. The indicative improvement in business confidence seems to be also partly underpinned by the willingness of the Government to increase national debt substantially in the medium term, rather than to significantly curtail its spending programme.

5.7 Given the projected below-trend economic activity and subdued disposable incomes, it is anticipated that domestic demand pressures on inflation will be low, as will be the impact of foreign price developments. It is estimated that the increase in VAT will add 1.7 percentage points to inflation from the second quarter of 2010 (Chart 12). In addition, there is an upside risk to the inflation outlook emanating from uncertain prospects for oil prices as the global recovery progresses, while any large increase in administered prices and government levies[19] would also exert upward pressure on inflation. Overall, on the basis of current information, it is expected that inflation will rise in the short term, and stabilise around the Bank's medium-term objective range of 3 – 6 percent next year (Chart 12).

CHART 12: BOTSWANA INFLATION FORECAST
(December 2008 - December 2011)



Source: Bank of Botswana

6. 2010 MONETARY POLICY STANCE

6.1 The outlook for both inflation and output suggests a largely neutral monetary policy stance in the medium term. Notably, inflation, which is forecast to stabilise within the objective range in the medium term, is expected to increase in the short term due to transitory supply-side factors, while underlying inflationary pressures are projected to be low. A below-trend level is forecast for GDP, with output expected to increase toward trend levels in the medium term.

6.2 With prospects for low stable inflation in the medium term, there is scope for monetary policy to support economic growth in an environment in which fiscal stimulus (or even government contribution to economic activity) is constrained by limited revenue. In addition, there is a case for accommodating an increase in money supply (especially credit to the business sector) to support economic recovery. However, the projected short term increase in inflation implies a need to manage and forestall inflationary expectations that could be detrimental to long-term price stability. Moreover,

[17] At P12.1 billion, the deficit for the 2010/11 budget is less than the P13.5 billion for the 2009/10 budget. The Government intends to balance the budget by 2012/13. The deficit for 2010/11 is expected to be financed through a combination of drawing down the government's savings, external borrowing and the ongoing domestic bond issuance programme.

[18] This analysis compares results from the March and September 2009 Business Expectations Surveys.

[19] It was indicated in the 2010 Budget Speech that the realisation of budgeted revenue was premised on significant adjustments, including an increase in several fees and levies that have not kept up with the costs of providing the associated services.

prospects for an expansionary monetary policy could be undermined by the potential risks to the inflation outlook. These include a faster pace of global economic recovery that would engender an inflationary increase in commodity prices (including oil prices), an overall increase in foreign inflationary pressures, and an inflationary increase in administered prices and government levies.

6.3 Consistent with its mandate, the Bank is committed to responding in a timely manner to any deviation of the medium-term inflation forecast from the inflation objective range of 3 – 6 percent, in order to engender expectations of low and sustainable inflation. With respect to the rate of crawl for the exchange rate, the Bank's inflation objective remains higher than the forecast average inflation of trading partner countries. This means that there will be a modest downward crawl of the Pula exchange rate in order to support international competitiveness of domestic industries and to enhance prospects for sustainable economic diversification.

7. CONCLUSION

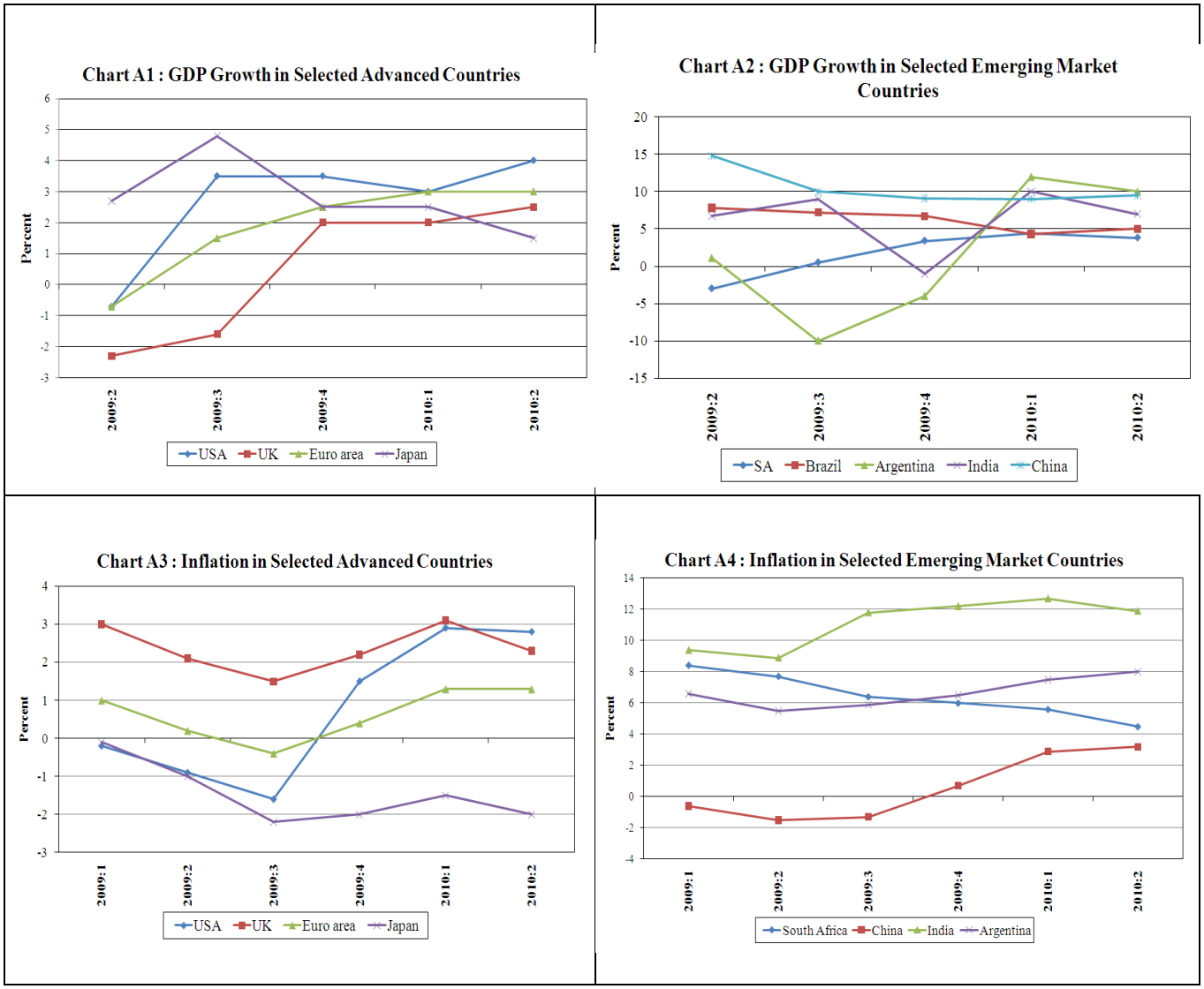
7.1 Inflation maintained a downward trend during most of 2009 and ended the year at 5.8 percent, mainly reflecting the disinflationary impact of the smaller rate of increase in the cost of food and the largely stable price of fuel.

7.2 Global economic activity is projected to improve in 2010 with more countries beginning to experience positive growth as coordinated policies (fiscal stimulus and monetary policy easing) that were designed to support demand take effect. However, recovery is largely constrained by high unemployment rates and the slow growth of incomes in advanced economies. As global output growth recovers, commodity prices (including oil prices) are expected to increase further, and this will exert upward pressure on inflation. Nevertheless, world inflation is expected to remain largely restrained in the context of the measured pace of economic recovery.

7.3 Domestic inflation is projected to rise in the short term and should revert to within the Bank's inflation objective range of 3 – 6 percent on a sustainable basis from the first quarter of 2011. In an environment of below-trend output expansion, and all things being equal, there is scope for an appropriate countercyclical adjustment of monetary policy, while it is important to recognise the potential for unfavourable expectations arising from short-term inflation developments. Overall, the Bank remains committed to responding appropriately to all economic and financial developments to attain price stability in the medium term without undermining sustainable economic growth.

APPENDIX I

Output Growth and Inflation for Selected Countries



Source: JP Morgan Chase
Note: Data from Q4 2009 to Q2 2010 are forecasts

APPENDIX II

KEY VARIABLES AND THEIR ROLE IN THE BANK'S MEDIUM-TERM MACROECONOMIC MODEL

(a) Output Gap

The output gap relates the measured level of economic performance to the long-term trend. Thus, it measures the state of the business cycle in terms of whether the level of output is below or above potential. Potential or long-run trend output is estimated by imposing a trend line on historical GDP data. It is assumed that deviations around the trend level represent an estimate of the output gap; the output gap is positive when measured GDP is above the trend level and negative when measured GDP is below the trend level. Measuring the output gap is useful in assessing inflation developments and the determination of the monetary policy stance. While the long-run trend level of output is associated with a stable rate of price increases, a positive output gap suggests upward inflationary pressures in the economy, a situation that would call for monetary policy tightening to mitigate inflationary pressures. Conversely, a negative output gap suggests downward inflationary pressures; this situation would require easing of monetary policy to restore economic activity to the trend level. It is assumed that the balance of pressure (beyond the trend level output) is on prices, thus pushing inflation up or down, as the case may be. In this regard, it is important to note that, while monetary policy can influence business cycle developments in the short term, it cannot influence output permanently, meaning that it cannot change the long-run trend output. Changes in trend output are rather a function of structural changes, innovation and productivity improvements in the economy.

In the Bank's forecasting model, non-mining output is used as a proxy for output in the economy, as this is considered to be a measure of economic activity that is more responsive to variations in the monetary policy stance. Conceptually, the output gap is measured as a percent above/below the trend level of output.

(b) Real Monetary Conditions Index (RMCI)

The RMCI is a measure that combines estimates of the deviation of the real exchange rate and real interest rate from their trend (equilibrium) values. It is, therefore, a weighted average of the real exchange rate gap and the real interest rate gap. It is assumed that trend/equilibrium levels with respect to these variables are consistent with the trend long-run output for the economy, while deviations represent relative tightness or easiness of financing conditions; and whether they constrain/stimulate demand. An increase in both the real interest rate gap and the real exchange rate gap would imply a tightening of financing conditions, hence it is associated with monetary policy tightening (similarly, a combination of changes that results in an increase in the index). Conversely, a decrease in both the real interest rate gap and the real exchange rate gap would imply a loosening of financing conditions in the economy and is associated with an easing of monetary policy (similarly, a combination of changes that results in a decrease in the index).

For the equilibrium real exchange rate, and consistent with the policy objective, the Bank's forecasting model assumes that the equilibrium appreciation or deprecation is zero (empirically, the equilibrium exchange rate appreciation or depreciation is also estimated at around zero). Like that for GDP, the long-run trend for the equilibrium real exchange rate and the real interest rate is assumed to be represented by a fitted trend using historical data.

(c) Monetary Policy Rule

The key equation of the model is the policy reaction function, which estimates the level of the policy variable (BoBC Rate and related Bank Rate) associated with the direction and level of both inflation and the output gap. In particular, interest rates are set each period in response to a weighted combination of the deviation of inflation from the objective/target and of output from equilibrium. The rule provides a tool to guide the direction and magnitude of interest rate changes in formulating and implementing monetary policy. However, the direction is of paramount importance while the magnitude could be influenced by assessment of alternative scenarios.

General Comment

Most variables in the Bank's forecasting model are expressed in terms of gaps (the difference between actual and trend values) or business cycle movements. This is guided by the widely accepted view on "long-run neutrality" of money, which postulates that real variables in the economy are, in the long run, essentially determined by real (supply-side) factors, and cannot be permanently influenced by

monetary policy. Therefore, in the short- to-medium term, the role of monetary policy is to stabilise the business cycle component of the real values around the sustainable long-run equilibrium values consistent with the specified inflation objective. Supply-side factors are those factors that drive the supply of goods and services in the economy, in particular the amount and quality of capital and labour, as well as technological progress and the design of structural policies.

THE SOUTHERN AFRICAN CUSTOMS UNION (SACU) AGREEMENT: PAST, PRESENT AND FUTURE PROSPECTS

By: Lesedi S. Senatla, Tayani Chankuluba and Chepete S.G. Chepete[1]

ABSTRACT

This paper surveys the historical evolution of the SACU Agreement between South Africa, Botswana, Lesotho, Namibia and Swaziland and it evaluates factors resulting in inexorable renegotiations of the Agreement leading to the present 2002 Agreement; and it provides a prognosis of the likely complexion of SACU. In brief, the paper reports that the Agreement, which formally began in 1910, has undergone various revisions and modifications over the years on account of dissatisfaction by the least developed members who viewed it as serving the interests of the South African economy to their detriment. This is exemplified by, for example, the industrial polarisation and price-raising effects. The resultant 2002 Agreement appears to satisfy all parties involved. The paper contends that SACU is important to Botswana as it is one of the key sources of government revenue and also facilitates the country's goods access to the much larger South Africa economy. The paper finally asserts that with the changing trading and economic relationships landscape, SACU could be transformed into a much larger Southern African Development Community (SADC) Customs Union in future, which will introduce its own complications as it would imply reconciling different countries' expectations and requirements.

1. INTRODUCTION

1.1 The Southern African Customs Union Agreement (SACUA) effectively dates back to 1893, when the Bechuanaland Protectorate entered into a customs union with Basutoland, the Cape Colony and the Orange Free State. It is, in fact, the oldest customs union in the world. Following the formation of the Union of South Africa in 1910, the first formal customs union agreement was signed between South Africa, the Bechuanaland Protectorate, Basutoland and Swaziland (Hudson, 1981)[2].

The original 1910 Agreement has undergone various technical and substantive amendments over the years to align it with changing political and economic conditions. In particular, the 1910 Agreement was re-negotiated into the 1969 Agreement. In turn, the 1969 Agreement was further negotiated commencing 1994-50 following South Africa's democratic dispensation- resulting in the current 2002 Agreement. Technical amendments were also made to the Agreement, such as the addition, in 1977, of the stabilisation factor.

This paper addresses issues of interest in the SACU Agreement that were debated over the years which were of specific interest to Botswana. In other words, the paper is deliberately biased towards discussing SACUA from a Botswana perspective. It goes on to ponder the future of the Agreement in view of the changing international trading relationships. In brief, the paper highlights refinements to the SACU Agreement over the years beginning with the 1910 Agreement up to the 2002 Agreement (Section 2). It is argued that SACUA has been important to Botswana from a revenue perspective, but that this has possibly compromised the country's ability to attract foreign direct investment in its own right (Section 3). The paper concludes that SACU is likely to give way to the Southern African Development Community (SADC) Customs Union, which could give rise to a new set of problems, including reconciling different countries' expectations in a much larger country grouping than SACU (Section 4).

2. TIMELINES FOR THE SACU AGREEMENT

2.1 The 1910 Agreement

The 1910 Agreement provided for the following (see Hudson, 1981):

(i) The absence of customs duties on goods originating from within the custom union members;

(ii) That all the four member countries would charge the same customs duty on goods originating from outside the Common Customs Area (CCA) and the same rate of exercise duty on goods produced within the CCA;

[1] Respectively, Deputy Director, Banking Supervision Department, Senior Economist, Research Department and Special Assistant to Governor/Public Relations Officer, Governor's Office. The views expressed in the paper are those of the authors and do not necessarily reflect those of the Bank of Botswana.

[2] Namibia formally joined SACU in 1990 following independence from South Africa.

(iii) That South Africa would be the custodian of the duties collected, which will then go into a revenue pool;

(iv) Each member country would receive a fixed percentage of the total amount of the duty collected on an annual basis; and

(v) The fixed percentages were to be immutable, even if the patterns of consumption of dutiable goods among the member countries changed.

The revenue sharing formula was basic and operated as follows:

$$\sum \rho_{BLS,RSA} = \rho_{Bot} + \rho_{Les} + \rho_{Swz} + \rho_{RSA} \qquad (2.1)$$

Where Botswana (then Bechuanaland), Lesotho (then Basutoland), Swaziland and South Africa's revenue shares were, respectively:

$\rho_{Bot} = 0.0028$
$\rho_{Les} = 0.0088$
$\rho_{Swz} = 0.0015$; and
$\rho_{RSA} = 0.9869$

The percentages were based on estimates of duty on the goods consumed in each country during the period April 1907-March 1910 (Hudson, 1981, p.132).

After independence in 1966, Botswana, together with Lesotho and Swaziland, were increasingly dissatisfied with the 1910 Agreement on account of the following:

(a) That the revenue accruing to Botswana, Lesotho and Swaziland was inconsistent with their shares of total imports in the Customs Union;

(b) That the imposition of the common external tariff had a significant price-raising effect on their (imported) goods; and

(c) That the Agreement had an industrial polarisation effect in the sense that (foreign) firms preferred to locate in South Africa, a more advanced member, at the expense of Botswana, Lesotho and Swaziland (Davies, 1994). This relegated the territories to producers of natural commodities and suppliers of cheap labour.

2.2 The 1969 Agreement

Concerns expressed about the 1910 Agreement and the persistent demands by BLS members gave rise to the 1969 Agreement. As it turned out, the amendments merely addressed financial payouts to BLS countries and not substantive trade policy considerations such as the unilateral tariff levels setting by South Africa. This potentially made it easier for South Africa to negotiate the Agreement. The 1969 SACU Agreement was aimed at: "maintaining the free interchange of goods between member countries and applying the same tariffs and trade regulations to goods imported from outside the common customs union area … on a basis designed to ensure the continued economic development of the customs union area as a whole, and to ensure in particular that these arrangements encourage the development of the less advanced members of the customs union and the diversification of their economies, and afford all parties equitable benefits arising from trade among themselves and with other countries" (SACU, 1969, preamble).

The 1969 Agreement dispensed with formula 2.1 replacing it with the following (see also Davies, 1994):

$$\rho_i = \left(\frac{\alpha_i + \beta_i + \varepsilon_i}{\nu_i + \varphi_i + \eta_i + \psi_i} \right) * \mu * 1.42 \qquad (2.2)$$

Where

i = where i refers to Botswana, Lesotho and Swaziland.

α_i = value of goods imported (cif) into country i

β_i = value of excisable goods produced and consumed in i

ε_i = excise and sales duty paid on β

$\nu = \sum \alpha_i + \alpha_{RSA}$

$\eta = \sum \beta_i + \beta_{RSA}$

φ = customsand sales duty paid on ν

ψ = duties paid on η

μ = accumulated SACU revenue in the year

In this case, formula 2.2 determined the revenue share of the three countries of Botswana, Lesotho and Swaziland, while the South African share was the resulting residual. It is important to note that

the 1969 agreement explicitly included excise duties, while the 1910 agreement did not. The 42 percent provision in the 1.42 factor in the formula was intended to compensate for three factors, namely: the price raising effect of the tariffs on imports; industrial polarisation effects; and the loss of fiscal discretion, since Botswana, Lesotho and Swaziland (BLS) were obliged to adopt the excise and sales duties applicable in South Africa. The price raising effect compensation was an acknowledgement that a common tariff fixed unilaterally by South Africa to protect its producers from imports into BLS countries makes such imports more expensive for the BLS. The industrial polarisation aspect was to acknowledge that investors interested in the SACU market would find it more attractive to invest in the centre of the customs union (South Africa) from which to access and supply other SACU markets.

The Agreement explained that goods originating from within SACU were to be free of tariff duties and that a common revenue pool was to be created with the funds deposited into the Consolidated Revenue Fund of South Africa pending distribution. Giving South Africa the sole mandate to administer the funds in this way implied that other members were denied the chance to develop financial expertise in this area (Kirk and Stern, 2003 make a similar point).

As was the case with the 1910 agreement, the 1969 Agreement proved unsatisfactory to Botswana, Lesotho and Swaziland over the years for a number of reasons among which were:

(a) That there were long revenue share distribution time lags, e.g., two years, from the pool as a result of procedures followed in compiling import data. This effectively provided South Africa with an interest-free loan[3] in instances in which errors were made and South Africa, i.e., the revenue pool custodian, had not paid the accurate amounts. However, it is not suggested that there was a two-year delay in payment. Rather, that the payments made were based on trade and consumption data of the preceding two years. Adjustments were made to the payments as necessary where import data deviations from estimates became apparent, however, high inflation rates tended to considerably reduce the real value of transfers received by the BLNS countries two years later.

(b) That South Africa in practice discouraged the growth of infant industries in BLS countries that it viewed as competitors to its own industries in spite of being a signatory to "infant industry protection" clause in the Agreement (Davies, 1994). In other words, while the Agreement provided for "sympathetic consideration" by South Africa to BLS on excise duties applicable to industries viewed by BLS as of major importance to them, in practice South Africa did not abide by this clause.

(c) That the dispute resolution mechanisms in the 1969 Agreement were non-existent;

(d) For Botswana at least, the 1.42 price raising compensation factor proved inadequate. Leith, (1992) found that in 1987 Botswana paid R371 million above world market prices on its RSA imports, but received only R296 million as its SACU revenue share. Factoring in the price stabilisation factor failed to compensate the country adequately leading to a net loss;

(e) SACU denied BLS member countries access to cheaper imports, which in effect shielded South African producers, thus working in South Africa's favour. This resulted in welfare losses for consumers, particularly in the BNLS countries, as they did not benefit from additional employment and revenue (as well as company income taxes) from the individual South African companies benefiting from the protection;

(f) Beyond revenue receipts' concerns from SACU, Botswana felt it was no longer justified for South Africa to continue to unilaterally set the tariff rates, among other things, as was the practice. Lack of input from the country was perceived to have the undesirable effect of stifling foreign investment possibilities in Botswana; and

(g) In the case of South Africa, the concern was the progressive deceleration in its share of the revenues, even though it bore the administrative costs unaided. For example, the BLS share of the revenues grew from a total of 3 percent in 1969/70 to 18 percent in 1990/91 and further to 38 percent in 1992/93(South African Department of Trade and Industry, quoted in Davies, 1994). Increases in BLS shares reflected their GDP growth.

[3] Kirk and Stern, 2003 (page 7) explain this point succinctly by stating that payments made in year n were based on trade and consumption data from year n-2.

In 1977, lower and upper margins were set at 17-23 percent as a stabilisation measure to reduce volatility in revenue shares. However, even after the addition of a stabilisation clause to the 1969 Agreement, the BLS countries continued to exert pressure in a bid to derive more benefits from the Agreement. In 1980, for instance, the Customs Union Commission (CUC), the SACU governing body, established a study to review the revenue sharing formula, taking into account some of the concerns raised. The proposals which, among others, suggested technical modifications to the statistical estimation procedures; adjustments to the calculation of the compensation and stabilisation factors, were approved by the BLS countries in 1982. However, the proposals were rejected by South Africa, which then opted to appoint its own commission (World Bank, 1992). The Commission, called the McCarthy Commission, deriving its name from its chairman Professor Colin McCarthy, submitted its findings to the CUC in 1986. The Commission found some of the issues raised under the previous study, such as the lag in payment of shares amounting to an interest free loan to SA, to be legitimate. Nevertheless, the Commission suggested that the revenue sharing formula should be made "clean" by getting rid of compensation and stabilisation factors, so that the revenue shares for the BLS countries is calculated solely on their contributions to the revenue pool. The BLS countries, in turn, rejected the proposals.

The renegotiation of the 1969 Agreement started in earnest in 1994, following the demise of the Apartheid government, to address notable shortcomings, resulting in the 2002 Agreement.

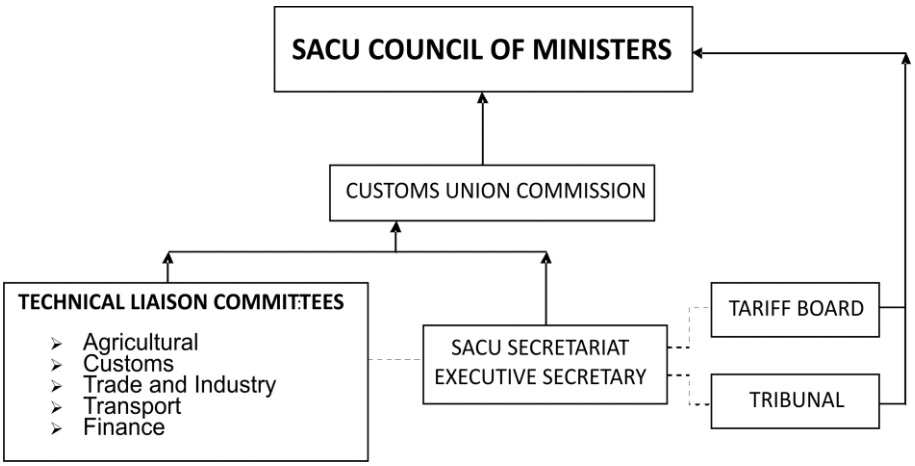
2.3 THE 2002 AGREEMENT

2.3.1 Institutional Framework

The renegotiation of the Southern African Customs Union Agreement (SACUA) took about eight years to complete (from 1994 to 2002) so as to iron out difficult negotiating areas. And on the 21st October 2002, the heads of state of Botswana, Lesotho, Namibia, South Africa and Swaziland signed the new SACUA in Gaborone, Botswana. The 2002 Agreement covers three major components, namely, governance and administration; economic policies as well as regulation; and a revised revenue sharing formula. The objectives of the new agreement, as captured under Article 2 of the Agreement are:

- To facilitate cross-border movement of goods between member states;
- Create effective, transparent and democratic institutions which will ensure the equitable trade benefits to members;
- Promote fair competition within SACU area;
- Substantially increase investment opportunities within the SACU region;
- Enhance economic development, diversification, industrialisation, as well as competitiveness of member states;
- Promote the integration of member states into the global economy through enhanced trade and investment;
- Facilitate an equitable sharing of revenue arising from customs, excise and additional duties levied by members; and
- Facilitate the development of common policies and strategies.

Chart 1: The 2002 SACU Institutional Structure



Unlike the 1969 Agreement, which gave South Africa sole decision-making powers with regard to the setting of the external trade policy in particular, the 2002 Agreement[4] is more democratic, since it provides for joint decision-making in all issues relating to SACU through independent institutions such as the Tariff Board, the Tribunal and other Technical

[4] It is worth noting that while permitting member states to maintain preferential trade arrangements with third parties, which were already in existence at the time of the signing of the Agreement (Article 31.1), the new SACUA does not allow members to negotiate or enter into third party preferential trade agreements without the concurrence of other SACU members. Hence, a common negotiating approach in foreign trade relations is required under the Agreement.

Liaison Committees as shown in the structure in Chart 1.

The Council of Ministers, in which all member states are represented, is the supreme policy making body of SACU.

The SACU Customs Union Commission, comprising senior government officials from all member states serves as an advisory body to the Council and is also responsible for the implementation of the Agreement, supervision of the Secretariat and the oversight of the management of the Common Revenue Pool.

The SACU Secretariat is headed by the Executive Secretary – appointed by the Council of Ministers – with headquarters in Windhoek, Namibia. Among the duties of the Secretariat is the daily handling of administrative duties, including record keeping of all transactions into and out of the Common Revenue Pool, and assistance in policy harmonisation in so far as they relate to SACU.

The new Tariff Board, consisting of experts drawn from member states, replaces the South African Board of Tariff and Trade (BTT) and accordingly recommends the common external tariff levels to be adopted. This arrangement is intended to remove the bias in favour of South Africa, an accusation that was frequently levelled against the South African Board of Tariff and Trade in the formulation of tariff levels that prevailed under the 1969 Agreement.

The Tribunal adjudicates on matters of dispute relating to the application/interpretation of the SACU Agreement, while the various technical committees advise on detailed aspects concerning their specific areas of focus.

2.3.2 The New Revenue Sharing Formula

The formula based on the 2002 Agreement, or at least what accrues to each member state, is arrived at after subtracting the operating costs of the Customs Union, namely the Secretariat, the Tariff Board and the Tribunal. This is to recognise that SACU is an independent and self-financing entity. The 2002 SACUA revenue sharing formula has three components, namely, customs component, excise component and the development component. Under the customs component, custom duties are distributed to each country in proportion to its share of intra-SACU imports; thus a country which imports more from SACU will have the largest share of the component. The excise component is set at 85 percent of the excise duty collected within SACU, and is distributed in proportion of each country's GDP to the total SACU GDP- South Africa as the largest economy in SACU gets the lion's share of this component. The development component has been initially set at 15 percent of excise duties collected within SACU, and is distributed inversely to the GDP per capita; and Botswana with the largest GDP per capita amongst the SACU member countries receives the smallest share of this component.

In this case the formula becomes:

$$\rho_i = \varphi_i + \varepsilon_i + \delta_i \qquad (2.3)$$

Where

ρ_i = Botswana, Lesotho, Namibia, Swaziland and South Africa's country shares.

φ = all customs duties collected on goods imported into SACU less operating costs and customs duties rebated or refunded.

ε = total excise duties collected on goods produced in SACU, less operating costs, less excise duties rebated or refunded, and less 15 percent for the development component.

$\varphi_i = \text{customs component for country i}$

$\varepsilon_i = \text{excise component for country i}$

$\delta_i = \text{development component for country i}$

In turn the various components, or shares, of the revenue formula are to be determined as follows:

$$\varphi_i = f\left(\frac{M_i}{\sum_{i=1}^{n} M_i} * \varphi\right) \qquad (2.4)$$

$$\varepsilon_i = f\left(\frac{GDP_i}{\sum_{i=1}^{n} GDP_i} * \varepsilon\right) \qquad (2.5)$$

Where

M_i = Total intra-SACU imports of country i.

$\sum_{i=1}^{n} M_i$ = Total intra -SACU imports for all member states

GDP_i = GDP of country *i*

$\sum_{i=1}^{n} GDP_i$ = Total Gross Domestic Product for all Member States

n = member countries, i.e., 5 SACU members currently.

The development component is calculated as follows:

$$\delta_i = 20 * \left[i - \frac{\left((A \,/\, (B-1)) \right)}{10} * I \right] \qquad (2.6)$$

Where

$$\delta \subset \varepsilon \qquad (2.7)$$

$\delta = f\,(0.15\varepsilon)$ *or* in words the development component is set at 15 percent of the excise duties, at least initially.

A = Member state's GDP per capita

$B = \frac{\sum_{i=1}^{5} GDP_{percapita}}{n}$ *for* $\forall$ member States or in words average GDP per capita for all member states.

I = 15 percent of estimated excise revenue (total development component).

The New Revenue Sharing Formula has an inbuilt bias towards the smaller members of the SACU. This is because a country which imports relatively more from other members, which will tend to be the smaller members, will benefit more than a country which imports relatively less from the region. The customs duty component in the formula recognises that the smaller members depend more on custom union revenue than South Africa; and by linking the revenue distribution to the intra-SACU imports, where South Africa has large trade surplus with the BLNS, it compensates the BLNS countries for the polarisation and cost-raising effects.

As is the case with the customs component, the development component, as does the excise compo-

Table 1: SACU Revenue Shares 2009/10 (R'000)

	Botswana	Lesotho	Namibia	Swaziland	South Africa	TOTAL
Custom Revenue less Secretariat Share						29,138,548,356
Excise Revenue less Secretariat Share						22,845,341,135
Mean GDP per capita for SACU						23,586
Total Intra SACU Imports	18,233,288	9,638,151	17,367,654	10,195,120	13,597,669	69,031,881
Gross Domestic Product	73,170,857	9,670,944	49,883,257	14,719,105	1,543,936,770	1,691,380,933
Population	1,720	1,873	2,011	1,146	47,391	54,141
GDP per capita	42,541	5,164	24,803	12,843	32,579	117,931
15% of Excise Revenue						3,426,801
Shares (components)						
Customs Revenue Share (C)	7,696,322	4,068,290	7,330,935	4,303,388	5,739,614	29,138,548
Excise Revenue Share (E)	840,066	111,031	572,704	168,988	17,725,751	19,418,540
Development (D)	630,281	738,891	681,823	716,576	659,230	3,426,801
Total Payment (P= C+E+D)	9,166,668	4,918,212	8,585,462	5,188,953	24,124,595	51,983,889

Source: SACU Secretariat

nent, which is not trade related, aims at providing relatively more financial assistance to the less advanced members. The development component is distributed inversely to the GDP per capita, hence the smaller the country's GDP per capita, the larger its share of the development pool.

Table 1 illustrates the revenue shares accruing to each member country during 2009/10 from the 2006/07 consumption and trade data using the new revenue formula.

It is instructive to compare the 1969 and 2002 revenue sharing formulae as is done in figure 1.

3. IMPLICATIONS OF THE SACU AGREEMENT

The SACU Agreement seems to have fortified Botswana, Lesotho, Swaziland and Namibia's (BLNS) economic dependence on South Africa since it has made overseas or externally sourced merchandise destined for BLNS relatively more expensive, leading consumers in these countries to buy South African products instead. In effect, BLNS countries have acted as an extension or expanded market for South Africa's products (Davies, 1994). It is also plausible to argue that the industrial polarisation effect of the Agreement has contributed to the apparent lack of foreign direct investment in Botswana, for example, in most areas of the country except mining. This is because the production inputs sourced externally and destined for BLS countries were rendered expensive, making business adventures in Botswana unviable. Nevertheless, it is not altogether certain that the lack of foreign investment in Botswana, in particular, can be attributed to SACU Agreement alone. Other domestic factors, such as the small market size, relatively high wage and utility costs, as well as relative infrastructure shortcomings, have almost certainly played a role.

Figure 1: SACU Revenue Sharing Formula (2002 versus 1969)

2002	1969
• Revenue to be paid every quarter in each financial year.	• Revenue paid based on trade and consumption data of the preceding two years.
• Compensation and stabilisation factors removed.	• Provides for the compensation and stabilisation factors.
• Members' shares to be calculated using the same formula.	• South Africa's share is calculated as a residual.
• Based on customs, excise and development components.	

The Agreement has possibly served South Africa's political interest well, at least temporarily, during the period of its political isolation since domestic firms that were protected by the tariff barriers contributed to the country's economic survival. The firms that were protected by the tariff walls during the hard economic times may find it difficult to compete with their international counterparties in a liberal trading environment, however, if this is true, it is possible that such firms would lobby for keeping the Agreement in place indefinitely.

The commonality of external tariff levels limits the degrees of freedom for SACU members' country-specific trade policy formulation. In principle, at least, customs union membership implies harmonisation of trade policies in all respects, e.g., investment, competition, anti-dumping, intellectual property rights and agricultural policies. Nevertheless, in the case of SACU, symmetry with respect to trade policies, particularly so on agriculture, is yet to be achieved. Indeed, each SACU member is attempting to devise its own trade policy, which not only contradicts the spirit of a customs union, but also potentially complicates third party negotiations.

The relatively more democratic 2002 Agreement seems unlikely to undo the 'damage' done by previous agreements- at least in the short run- such as the deepening of BLNS economies dependence on South Africa. This argument is, however, valid only if it is established that BLNS countries' continual economic dependence on South Africa exerts economic harm *a' la* the Leith (1992) study. Indeed, it is not obvious a priori that BLNS dependence on South Africa is harmful, particularly if one accounts for the fact that the Agreement facilitates members' free access to the big South African market (Hudson, 1981). Similarly, the Agreement also facilitates South Africa's access to BLNS markets (Kirk and

Stein, 2003). Potentially, at least, the agreement is a mutually beneficial arrangement.

From a revenue generation perspective, SACU revenue is not insignificant to Botswana, since it accounts for some 12 percent of government revenue[5] (Langton, 2008 quoting Flatters and Stern, 2005). Indeed, tables 2 and 3 below show that Botswana's share of the SACU revenues, as a proportion of total recurrent revenue, has improved in absolute terms over the years, although the revenue movement does not show a consistent pattern in percentage terms. The significance of SACU as one of the key revenue sources for the government budget, as well as providing ready access to the South Africa market as argued above, may partly explain the Botswana government's keenness to continue to be a member of SACU.

Table 2: The Contribution of Customs Revenue to Total Recurrent Revenue in Botswana

The Contribution of customs revenue to total recurrent revenue			
Year	Customs Revenue (P' million)	Total Recurrent Revenue (P' million)	Proportion Arising from Customs (percentage)
1899	0.012	0.12	10.0
1909	0.021	0.15	14.0
1919	0.042	0.16	26.3
1929	0.062	0.29	21.4
1939	0.081	0.48	16.9
1949	0.190	1.10	17.3
1959	0.610	3.80	16.1
1969	5.100	17.00	30.0
1979	79.000	210.00	37.6
1990	612.900	2,751.00	22.3
1999	1,842.100	11,963.10	15.4

Source: Hudson, 1981 (adapted from Hermans, 1974) and Bank of Botswana.

Table 3: The Contribution of Customs Revenue to Total Recurrent Revenue in Botswana

The Contribution of customs revenue to total recurrent revenue			
Year	Customs Revenue (P' million)	Total Recurrent Revenue (P' million)	Proportion Arising from Customs (percentage)
1991	667.7	4,069.4	16.41
1992	615.2	4,652.2	13.22
1993	633.2	5,359.5	11.81
1994	749.2	4,472.5	16.75
1995	892.1	5,464.3	16.33
1996	976.3	7,394.8	13.20
1997	1,402.5	8,281.3	16.94
1998	1,666.7	7,677.6	21.71
1999	1,842.1	11,963.1	15.40
2000	2,136.1	13,025.9	16.40
2001	1,887.6	13,338.8	14.15
2002	1,536.2	14,073.8	10.92
2003	2,084.2	14,727.3	14.15
2004	2,989.6	16,852.5	17.74
2005	3,644.2	21,466.1	16.98
2006	4,897.8	25,190.3	19.44
2007	8,787.2	29,942.7	29.35
2008	7,714.4	31,055.6	24.84

Source: Bank of Botswana

[5] Swaziland and Lesotho's dependence on SACU revenue is even more significant with contributions of 70 percent and 60 percent to states' revenue, respectively (Walker, 2009).

In short, it is clear that while there are costs and benefits associated with SACU membership as articulated in this paper, it is not immediately apparent that the costs outweigh the benefits in the case of BLNS countries, in particular. Nor is it entirely correct to attribute all of BLNS countries' economic developmental challenges to SACU membership. The best and correct course of action in addressing challenges that SACU members have with the Agreement is to renegotiate and refine it as has been done to-date.

4. POSSIBLE FUTURE PROSPECTS FOR SACU

Third party agreements that SACU members embrace, such as the Africa Growth and Opportunity Act (AGOA), RSA-EU agreements and, indeed, the World Trade Organisation (WTO) requirements, that call for tariff reductions or cancellations, have the potential to weaken the SACU Agreement, as they entail opening up SACU members to 'free' international trade. Indeed, tensions recently arose between South Africa, on one hand, and the BLS, on the other hand, following the latter's decision to sign the Interim Economic Partnership Agreement (IEPA)[6] with the European Union (EU) aimed at liberalising some import tariffs and allowing for competition in domestic network service sectors, such as energy, transport, communication and finance (Draper and Khumalo, 2009). In fact, the decision to sign IEPA now poses a major challenge to the future of SACU, as it effectively implies the presence of two different external tariff regimes for SACU, thus undermining its integrity as a customs union. However, Botswana had to sign the reciprocal IEPA with EU partly because not doing so could have risked losing the EU beef market.

The proposed coming into existence of the SADC[7] customs union in 2010 implies the demise of SACUA. This is so because it is not possible for countries to belong to two customs unions simultaneously.

The exact form that a SADC customs union would take is yet to be determined. Among the possible options would be an expansion of the existing SACU (Kirk and Stern, 2003). However, reconciling different countries' expectations and requirements within such a big country grouping as SADC will prove a major challenge.

In sum, it would seem that SACU faces an uncertain future owing to the advent of free trade negotiations and the proposed SADC customs union, whose coexistence with SACU is impractical.

5. ISSUES FOR FURTHER RESEARCH

Future research should further explore Leith's (1992) findings that membership to SACU is comparatively and quantitatively more costly for small member countries. Other issues for future research include a quantitative assessment of the 2002 Agreement to Botswana's industrialization efforts; and a quantitative study on the implication of bilateral agreements on the viability of SACU.

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THE EFFICIENCY OF THE BOTSWANA EQUITY MARKET

By: Pako Thupayagale[1]

ABSTRACT

In order to evaluate the informational efficiency of the Botswana equity market this paper examines the statistical properties of the return and volatility of the DCI using the ARFIMA-FIFARCH/HYGARCH models. The results show that stock returns on the DCI follow a long memory process which stands against the precepts of the efficient market hypothesis. As a consequence a variety of remedial measures to improve efficiency are suggested. In contrast, stock return volatility is not characterised by a long memory dynamic and, hence, volatility on the DCI is not predictable on the basis of past volatility. The absence of long memory structure in the volatility profile of the DCI means that risk models based on a pattern of time-dependence are not appropriate. Finally, the results obtained are insensitive to the choice of model used.

1. INTRODUCTION

Long memory (or long-range dependence) in stock market data has important implications for the efficiency of the market in pricing securities. The efficient market hypothesis (EMH) provides the standard framework to analyse and interpret the dynamics of equity data. While, a number of definitions of market efficiency are available, the random walk version of the EMH proposed by Bachelier (1900) and formalised by Osborne (1959) and Fama (1965, 1970) asserts that stock price movements do not follow any patterns or trends and as a consequence future prices cannot be predicted from currently available information.

If equity data exhibit long memory, then it displays significant autocorrelation between distant observations. This, in turn, implies that the series realisations have a predictable component; and, hence, past trends in the data can be used to predict future returns. Therefore, long memory provides evidence against the weak-form version of the EMH.[2] In particular, the efficiency of an equity market in processing information affects its allocative capacity and, therefore, its contribution to output growth. Indeed, this was a key motivation behind the establishment of the Botswana Stock Exchange (BSE).

This study makes a contribution to the existing literature in the following ways. First, by investigating if long memory exists in Botswana, since little is known about these dynamics in the local equity market. Second, this paper builds upon previous work by simultaneously modelling long memory in equity returns and volatility using the Auto-Regressive Fractionally Integrated Moving Average (ARFIMA)-Fractionally Integrated Generalised Auto-Regressive Conditional Heteroskedasticity (FIGARCH) and ARFIMA-Hyperbolic GARCH (HYGARCH) models which represent relatively new innovations in time series analysis. These two approaches also provide a means to examine the sensitivity of the findings to the choice of method used.

To summarise the results from the outset, the study found that the Domestic Companies Index (DCI) of the BSE displays a predictable component in returns; while evidence of long memory in volatility is non-existent. These results show that the behaviour of equity market returns and risks are dissimilar and this may have implications for portfolio diversification and risk management strategies. Moreover, long memory in returns indicates slow information dissemination and a need to improve efficiency and liquidity in the BSE.

The remainder of the paper proceeds as follows. Section 2 provides a review of the extant literature. Section 3 presents an outline of the trends and characteristics of the BSE; while Section 4 introduces long memory in time series data. Section 5 discusses the empirical methodology used in this analysis; while Section 6 highlights the dataset, provides some summary statistics and presents the empirical results of the long memory modelling exercise. Finally, Section 7 summarises the findings obtained and concludes.

[1] Senior Dealer, Financial Markets Department, Bank of Botswana. The views expressed in the paper are those of the author and do not necessarily reflect those of the Bank of Botswana.

[2] There are three categories of the EMH depending on how much information is available. Weak form efficiency asserts that current prices reflect all historical information about equity data (and hence technical analysis is of no use). Semi-strong form efficiency suggests that all publicly available information is reflected in current prices (and hence fundamental analysis cannot be exploited). Strong form efficiency argues that all information (i.e., private and public) is reflected in equity prices (and therefore insider information cannot improve returns).

2. REVIEW OF RELEVANT LITERATURE

To investigate long memory in equity data, previous studies have used different estimation procedures and data of varying frequencies. For example, to detect long memory in asset markets, Mandelbrot (1971) proposed the 'range over standard deviation', which was modified by Lo (1991). A standard long memory model is the Auto-Regressive Fractionally Integrated Moving Average (ARFIMA) (*m, d, n*) model introduced by Granger and Joyeux (1980) and Hosking (1981). These models provide an alternative to ARIMA (*m, d, n*) process by not restricting the parameter *(d)* to an integer value (0 or 1), but allowing it to assume any real value. Because the fractional differencing parameter *(d)* implies dependence between distant observations, recent empirical research has focused on the analysis of fractional dynamics in equity market data. Furthermore, these methods have been applied to international equity data with mixed results.

There are a number of empirical studies that report evidence of long memory in equity data. For example, Barkoulas *et al* (2000) report evidence of long memory in the Greek stock market using weekly data spanning ten years. Investigating Australian stock market returns over a period spanning 120 years (i.e., from 1876-1996), McKenzie (2001), using a time series composed of monthly observations, finds evidence consistent with long memory in Australia. Similarly, Lee *et al* (2001), using data for China, report evidence which suggests the existence of long-range dependence in stock price changes. Assaf and Cavalcante (2005) report evidence of long memory in a variety of stock return volatility measures in Brazil, while little evidence of long-range dependence is found in the stock returns. DiSario *et al* (2008) use methods based on wavelets and aggregate series to show the existence of long memory in stock return volatility in Turkey. McMillan and Thupayagale (2008) examine the long memory properties of South Africa's equity market using the ARFIMA-FIGARCH model and conclude that financial market reforms had no effect with respect to improving the efficiency of the market. Furthermore, McMillan and Thupayagale (2009) analyse the efficiency of eleven African stock markets and show that these markets largely exhibit long memory in returns. In comparison, the US and UK equity market returns follow a short memory process. However, evidence of long memory in stock-return volatility is mixed across markets. Furthermore, these results emphasised that the behaviour of equity market returns and risks are dissimilar across markets and consequently may have implications for investment strategies.

In contrast, evidence against long memory has also been reported in a number of empirical studies. For example, Lo (1991) does not find evidence consistent with long memory in US daily and monthly equity returns over several time periods, including various sub-periods from 1962 to 1987. Mills (1993) investigates monthly UK stock returns from 1965-1990 and his results indicate that the data are not long-range dependent. Chow *et al* (1995) are also unable to corroborate evidence of long memory in US equity returns from 1962 to 1991, even after splitting the data into two sub-periods and after controlling for seasonalities in equity returns. In a study comprising monthly stock market indices obtained from the Morgan Stanley Capital International (MSCI) stock index data for eighteen industrialised countries from 1970 to 1992, Cheung and Lai (1995) report that their empirical results in general provide little evidence of long memory in these stock returns. Huang and Yang (1995) test for the presence of long memory in nine Asian equity markets together with two benchmark comparators (the US and UK) using the modified rescaled range statistic and data of various frequency and find that in most cases the existence of long memory can be rejected, with the exception of data from the UK. Finally, Resende and Teixeira (2002) do not find evidence of long memory in Brazil for periods before and after the introduction of the Real Stabilisation Plan.

Most of the research to date on long memory behaviour has concentrated on the major international stock markets. However, comparatively little is known about the long memory behaviour of the returns and volatility of the smaller emerging markets, including Botswana. In particular, Assaf and Cavalcante (2005) argue that the industrial structure found in these markets is often quite different from that found in developed countries. Furthermore, both Irving (2005) and Yartey and Adjasi (2007) report that African equity markets are characterised by a small number of listed companies, low liquidity levels and a large number of non-actively traded shares. These underlying conditions may produce different stock return and volatility behaviour than that obtaining in the larger international equity markets.

Against this background, this paper examines the long memory properties of equity returns and volatility using Botswana data in order to evaluate the efficiency of the local market. This is relevant because the ability of an equity market to efficiently process information affects its allocative capacity,

and therefore its contribution to economic growth (El-Erian and Kumar, 1995). In addition, the ability of stock markets to convert information (on economic fundamentals) into accurate stock prices is important in the overall economic development context, in which the establishment of the BSE was pursued by the authorities as part of comprehensive financial reforms.

3. BOTSWANA STOCK EXCHANGE: TRENDS AND CHARACTERISTICS

The Botswana Stock Market (BSM) was established in June 1989 with five companies capitalised at P75 million, as part of the government's strategy to develop the financial sector, and to provide a secondary market for publicly held shares (Jefferis *et al*, 2001). The Botswana Stock Exchange (BSE) was formally inaugurated in 1995, following the enactment of the BSE Act in 1994. At the end of 1996, 12 companies were listed on the DCI with a total market capitalisation of P1.2 billion. In contrast, at the end of 2008, there were 20 listed securities with a total market capitalisation of P27.7 billion. Despite this increase in market capitalisation, the turnover ratio remains low (relative to global standards).[3] Indeed, at the end of 2008 the turnover ratio was only 3.9 percent compared to 9.0 percent in 1996. In contrast, the most liquid equity markets have turnover ratios in excess of 100 percent. Despite low liquidity, the size (measured as market capitalisation as a percentage of GDP) of the BSE has grown from 10.8 percent in 1996 to 40.7 percent at the end of 2008.

There are a number of characteristics in Botswana that may potentially explain why the EMH may not hold. First, the existence of a 'buy and hold' investment strategy on the part of many (institutional) investors reinforces non-trading effects. Second, the limited number of stocks traded implicitly results in a 'captive market', with little scope for investors to trade, given few buyers and sellers. Third, stock ownership (and hence market capitalisation) is dominated by a handful of companies. Fourth, there exists a pattern of cross-shareholdings among some of the largest corporations listed on the BSE which further concentrates stock ownership and limits trading activity. Fifth, infrastructural bottlenecks in Botswana may also impede how well these markets process information. For example, it is only recently that the BSE has automated the bulk of its trading and settlement systems; while, for most of the period under consideration, these procedures were manual. This difference may have helped contribute to deficiencies in the transmission and processing of information. Sixth, low liquidity in Botswana may hamper the price discovery process and limit the effectiveness of the BSE in financing corporate spending and, in turn, limit the impact of stock market development on economic growth (see, e.g., Levine, 2001). In total, these differences may constrain the dissemination of timely and accurate information on the performance of listed companies, which, in turn, may impact on the extent to which security prices adequately reflect available information.

4. LONG MEMORY IN TIME SERIES

Long memory describes the correlation structure of a series at long lags; where, the series are characterised by irregular cyclical fluctuations. More generally, long memory processes concern observations in the remote past that are highly correlated with observations in the distant future. Against this background, a widely accepted long memory model is represented by the ARFIMA (*m*, *d*, *n*) process introduced to economics and finance by Granger and Joyeux (1980) and Hosking (1981). The key point is that in these models the parameter *d* (which captures long memory) is not restricted to an integer value (0 or 1) but can assume fractional values. Because non-zero values of *d* (the fractional differencing parameter) imply dependence between distant observations, considerable attention has been directed to the analysis of fractional dynamics in high-frequency financial time series data.[4]

When $d \in (0, 0.5)$ the series is stationary and said to have long-memory; while, if $d > 0.5$, the series is non-stationary and hence unpredictable. For $d \in (-0.5, 0)$, the series is described as having short memory, which is a measure of the decline in statistical significance between distant observations.

[3] The turnover ratio indicates how quickly a particular stock changes hands (or the ease with which positions can be traded) and as a consequence is used as a measure of liquidity. The turnover ratio is given by turnover/capitalisation.

[4] To define a long memory model formally, a stationary stochastic process, X_t, is called a long memory process if its auto-covariance function, $\rho(\tau)$, is such that the auto-correlations are positive and decay monotonically and hyperbolically to zero. This asymptotic property can be expressed as:

$$\rho_\tau \approx |\tau|^{2d-1} \quad \text{as} \quad |\tau| \to \infty$$

5. EMPIRICAL METHODOLOGY

In the ensuing empirical analysis, the informational efficiency of the DCI of the BSE is examined by using the martingale model. The stochastic process of a stock price (or stock index), P_t, follows a martingale process when

$$E\left[P_{t+1} - P_t \middle| P_t, P_{t-1}, \ldots\right] = 0 \qquad (1)$$

This means that stock price changes are unpredictable and, hence, future price changes cannot be predicted from currently available information. Furthermore, when the time-series property of equity returns are expressed as an ARIMA (*m, d, n*) process, the hypothesis of market efficiency can be tested by analysing the size of its differencing parameter, *d*. Specifically, the martingale process implies that equity returns are stationary and can be expressed as an ARIMA (*m, d, n*) where $d = 0$. In contrast, $d \neq 0$ implies a departure from the EMH; hence, future price (or return) movements can be predicted on the basis of past information.

Therefore, in order to estimate long memory in stock market data (specifically, in both stock returns and stock return volatility), the ARFIMA-FIGARCH and ARFIMA-HYGARCH models are employed. The following section outlines the construction of these models. In particular, the ARFIMA model represents an extension of the standard ARIMA process; while both the FIGARCH and HYGARCH models have been formulated to capture long memory in stock return volatility.

ARFIMA MODEL

In order to model long memory in equity returns, the ARFIMA (*m, d, n*) model developed by Granger and Joyeux (1979) and Hosking (1981) is used. As previously discussed, this technique has been extensively used to analyse the behaviour of financial time series. This process can be expressed as:

$$\phi(L)(1-L)^d y_t = \theta(L)\varepsilon_t \qquad (2)$$

Where the stock return series is denoted by y_t and *d* refers to the fractional differencing parameter. The *L* designates a lag operator, and $\phi(L)$ and $\theta(L)$ are polynomials in the lag operator of orders *m* and *n*, respectively. Further, $\phi(L) = 1 - \sum_{j=1}^{m} \phi_j L^j$ and $\theta(L) = 1 + \sum_{j=1}^{n} \theta_j L^j$. All the roots of $\phi(L)$ and *θ(L)* lie outside the unit circle. The innovation, ε_t, follows a white noise process with variance, σ^2, i.e., $\varepsilon_t \sim$ IID $N(0, \sigma^2)$. The fractional differencing operator $(1 - L)^d$ is given by:

$$(1-L)^d = \sum_{j=0}^{\infty} \frac{\Gamma(j-d)L^j}{\Gamma(-d)\Gamma(j+1)} \qquad (3)$$

where $\Gamma(\cdot)$ represents the gamma function. The restriction of *d* to integer values in equation (2) results in the basic autoregressive integrated moving average (ARIMA). The long memory processes arises when the fractional differencing parameter, *d*, is allowed to assume any real value.

FIGARCH MODEL

The FIGARCH (*p, d, q*) model was introduced by Baillie *et al* (1996) and is used to capture long memory in volatility. The general representation for this model can be derived from the standard Generalised Auto-Regressive Conditional Heteroskedasticity (GARCH) process, which is given by:

$$h_t = \omega + \alpha(L)\varepsilon_t^2 + \beta(L)h_t \qquad (4)$$

where h_t and ε_t^2 are conditional and unconditional variances of ε_t, respectively, $\omega = \varepsilon^2[1 - \beta(1) - \alpha(1)]$, and $\phi(L) = 1 - \sum_{j=1}^{q} \phi_j L^j$ and $\beta(L) = 1 + \sum_{j=1}^{p} \beta_j L^j$. The GARCH (*p, q*) process in Equation (4) can be rewritten as an ARMA (*m, p*) process in ε_t^2 such that we have:

$$[1 - \alpha(L) - \beta(L)]\varepsilon_t^2 = \omega + [1 - \beta(L)]\nu_t \qquad (5)$$

where $\nu_t \equiv \varepsilon_t^2 - \sigma_t^2$. To ensure covariance stationarity, the roots $[1 - \alpha(L) - \beta(L)]$ and $[1 - \beta(L)]$ are constrained to lie outside the unit circle. When the autoregressive lag polynomial, $1 - \alpha(L) - \beta(L)$, contains a unit root, the model is referred to as an Integrated GARCH process (Engle and Bollerslev, 1986) and is specified by:

$$\phi(L)(1-L)\varepsilon_t^2 = \omega + [1 - \beta(L)]\nu_t \qquad (6)$$

From this model, the FIGARCH model is obtained by introducing the fractional differencing operator, $(1-L)^{\bar{d}}$, such that:

$$\phi(L)(1-L)^{\bar{d}}\varepsilon_t^2 = \omega + [1 - \beta(L)]\nu_t \qquad (7)$$

The FIGARCH (*p, d, q*) model nests a variety of other GARCH models, and is equivalent to the

standard GARCH model and the IGARCH process, when $\bar{d} = 0$ and $\bar{d} = 1$, respectively.

HYGARCH MODEL

The Hyperbolic GARCH (HYGARCH) model was developed by Davidson (2004) in order to address the theoretical limitations associated with the FI-GARCH process. In particular, Davidson shows that, in the FIGARCH model, the long memory parameter *d* behaves counter-intuitively, given that *d* approaches zero as the memory of the relevant stochastic process rises. In view of this anomaly, Davidson argues that the FIGARCH process is more akin to the 'knife-edge non-stationary' class of models represented by the IGARCH model. Therefore, Davidson proposed the HYGARCH model to overcome this deficiency. This model generalises the FIGARCH process so that it behaves in a more intuitive way, such that an increase in *d* reflects greater long memory. More precisely, the HYGARCH is obtained by modifying equation (7) to

$$\phi(L)\left((1-\tau)+\tau(1-L)^{\bar{d}}\right)\varepsilon_t^2 = \omega + [1-\beta(L)]v_t \qquad (8)$$

by incorporating the additional parameter $\tau \geq 0$. The HYGARCH model nests the GARCH model under the restriction $\tau = 0$ $(or\ \bar{d} = 0)$ and the FI-GARCH model under the restriction $\tau = 1$. When $\bar{d} = 1$ the parameter τ becomes an autoregressive root and the HYGARCH reduces to either a stationary GARCH ($\tau < 1$), an IGARCH ($\tau = 1$) or an explosive GARCH ($\tau > 1$).

6. EMPIRICAL RESULTS

The data used in this study are obtained from Bloomberg and consists of daily data for the DCI, from January 1, 2004 to June 30, 2009. In this paper, the equity return, r_t, is defined as $(p_t - p_{t-1}) \times 100$, where p_t is the log of the equity index (i.e., the DCI) at time t.

Prior to formal analysis, Table 1 examines the time-series properties of individual data using basic methods and generally confirms the findings of previous studies. The results of the Augmented Dickey-Fuller (ADF) unit root test offers evidence in favour of stationary equity returns. This result is further substantiated by application of the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test, which tests the stationarity hypothesis (compared to the unit root hypothesis tested by the ADF).

TABLE 1. DESCRIPTION OF THE DATA

No. of observations	1366
Mean	0.0965
Standard deviation	0.7835
Skewness	1.0176
Normality test	Chi^(2) = 7,514.9
ARCH (5) test	F(5, 1355) = 37.18
ARCH (10) test	F(10, 1345) = 21.52
ADF test (with constant)	51.62**
ADF test (constant and trend)	51.77**
KPSS test (with constant)	0.1892*
KPSS test (constant and trend)	0.1899*

*Note: '**' and '*' indicate statistical significance at the 1% and 5% levels, respectively.*

Both these tests offer evidence in favour of stationary equity returns. While these tests may be deficient in terms of their ability to capture an order of integration that may not be an integer (see Baillie, 1996), the results herewith obtained are consistent with those of previous research, for example, Lo (1991), Mills (1993), Resende and Teixeira (2002) and Nagayasu (2003).

However, based on the Jarque-Bera normality (1987) and Engle's Lagrange Multiplier ARCH (1982) test reported in Table 1, the equity data exhibit non-normality and ARCH effects. These results provide evidence against the market efficiency specified in the random walk version of the EMH.

RESULTS FROM GARCH MODEL

The GARCH (*p*,*q*) model allows for the modelling of volatility persistence based on some stylised facts usually observed in high-frequency financial time series data, among them, the presence of thick tails, time-varying correlations and volatility clustering. Table 2 below presents our model and highlights the importance of GARCH effects by showing that the GARCH and ARCH terms are statistically significant.

TABLE 2. GARCH ESTIMATES

Constant (mean)	0.0654 [0.0224]*
AR(1)	0.2917 [0.0283]**
Constant (variance)	0.0323 [0.0029]*
ARCH (α)	0.2238 [0.0170]**
GARCH (β)	0.6805 [0.0137]**
df	4.7507 [1.0312]
Q(5) 1/	1.6653
Q(10) 1/	3.6944
Q(5) 2/	6.6888
Q(10) 2/	9.1922

Note:
1/ The Ljung-Box Q test applied to standardised residuals.
2/ The Ljung-Box Q test applied to squared standardised residuals.
The numbers in ( ) and [ ] refer to lag lengths and standard deviations, respectively.
*'**' and '*' indicate statistical significance at the 1% and 5% levels, respectively*.

Furthermore, evidence of persistence in variance, as measured by the GARCH model, is reflected in the magnitude and significance of the ARCH (α) and GARCH (β) terms (indeed, as this sum approaches unity the greater the degree of persistence). In particular, evidence of volatility persistence is 0.9043, which suggests the existence of long memory behaviour in Botswana's equity return. In addition, we note that the parameters of the conditional variance equations are all positive and statistically significant.

To further evaluate the statistical properties of the GARCH models (reported in Table 2), some diagnostic tests were performed by applying the Ljung-Box Q statistic test to standardised and squared standardised residuals. These diagnostics show that the estimated model is appropriate for Botswana.

RESULTS FROM THE ARFIMA-FIGARCH MODEL

The ARFIMA part of the equation provides a basis to test for market efficiency by examining the size of the fractional differencing term, *d*, in the mean equation. In particular, *d* measures the adjustment speed (relative to a stationary ARIMA case where *d* = 0) and, hence, permits conclusions based on the EMH (i.e., adjustment speed measured by the fractionally differencing term) as a criterion. On the other hand, the FIGARCH part of the model captures long memory in the conditional variance (or volatility) of the data. The next step is to estimate the appropriate ARFIMA (*m*, *d*, *n*)-FIGARCH (1, $\bar{d}$, 1) models. Table 3 presents the findings on the size and sign of *d* and $\bar{d}$, respectively.

TABLE 3. ARFIMA-FIGARCH ESTIMATES

Constant (mean)	0.0237 [0.0155]
d-ARFIMA	0.2388 [0.0221]**
AR(1)	0.0842 [0.0026]**
Constant (variance)	0.0611 [0.0174]**
$\bar{d}$ -FIGARCH	0.5263 [0.0559]*
ARCH (α)	0.3182 [0.0281]**
GARCH (β)	0.9120 [0.4132]*
df	3.1178 [0.9928]*
Q(5) 1/	28.204
Q(10) 1/	21.599
Q(5) 2/	12.281
Q(10) 2/	10.233

Note:
1/ The Ljung-Box Q test applied to standardised residuals.
2/ The Ljung-Box Q test applied to squared standardised residuals.
The numbers in ( ) and [ ] refer to lag lengths and standard deviations.
*'**' and '*' indicate statistical significance at the 1% and 5% levels, respectively.*

ARFIMA-FIGARCH MODEL

The fractional differencing parameter, *d*, in the mean equation has a magnitude of 0.2388, which is also statistically significant. This result indicates the existence of long memory in stock returns. In other words, equity returns in Botswana reveal a predictable component which confounds market efficiency, since it implies that past prices can be used to forecast future price changes. This, in turn, suggests that investment strategies based on historical prices can be used to derive abnormal profits for equity investors.

In contrast, stock return volatility in Botswana does not reveal evidence of a long memory component. In particular, Botswana has a fractional differencing value of 0.5263 which implies that volatility is a non-stationary process and, hence, unpredictable. Furthermore, this parameter is found to be significantly different from zero.

RESULTS FROM ARFIMA-HYGARCH MODEL

By construction, the FIGARCH model does not specify a covariance stationary process. As a result, Davidson (2004) proposed the Hyperbolic GARCH (HYGARCH) model, which nests both GARCH and FIGARCH processes as special cases. Table 4

presents the results of the size and sign of the *d* and $\bar{d}$, respectively.

TABLE 4. ARFIMA-HYGARCH ESTIMATES

Constant (mean)	0.0447 [0.0216]*
d-ARFIMA	0.1244 [0.0349]*
AR(1)	0.0650 [0.0467]
Constant (variance)	0.9795 [0.0051]**
$\bar{d}$ -FIGARCH	0.5487 [0.0538]*
ARCH (α)	0.2441 [0.0933]*
GARCH (β)	0.4177 [0.3357]*
df	2.7233 [0.0689]*
Q(5) 1/	9.1087
Q(10) 1/	15.305
Q(5) 2/	4.7535
Q(10) 2/	3.2291

Note:
1/ The Ljung-Box Q test applied to standardised residuals.
2/ The Ljung-Box Q test applied to squared standardised residuals.
The numbers in ( ) and [ ] refer to lag lengths and standard deviations, respectively.
*'**' and '*' indicate statistical significance at the 1% and 5% levels, respectively.*

The fractional differencing term in the return equation (i.e., *d*-ARFIMA) for Botswana is such that $d \in (0, 0.5)$, suggesting a long memory component. Meanwhile, in terms of the conditional variance process, we find that $\bar{d} > 0.5$, which implies that the volatility process is non-stationary and, therefore, unpredictable. Furthermore, both the *d*-ARFIMA and $\bar{d}$ -HYGARCH parameters are statistically significant and the Ljung-Box diagnostic statistics indicate that the model is well specified.

More generally, we find that the results from the HYGARCH model are similar (in magnitude and statistical significance) to those obtained from the FIGARCH model previously described. The discrepancies between the ARFIMA-FIGARCH and ARFIMA-HYGARCH model results that we find underscore the importance of using recently developed models in time series econometrics, which ensure that the estimation techniques used appropriately reflect the time series characteristics of the data. Therefore, in view of the limitations of the FIGARCH model, results from the HYGARCH process can be considered more robust. In particular, on the basis of the ARFIMA-HYGARCH model, d is 0.1244 compared to 0.2388 in the ARFIMA-FIGARCH. This means that the magnitude of d is overstated in the ARFIMA-FIGARCH, which may reflect the inadequacies of the model's construction.

Indeed, from this perspective, market participants and policymakers are advised to utilise models which are more robust in order to derive more accurate measures of long memory in volatility and, hence, avoid misleading inferences. Finally, the results obtained from this model are largely consistent with those of the ARFIMA-FIGARCH model, suggesting that these models are close substitutes.

In sum, the results of the ARFIMA-FIGARCH and ARFIMA-HYGARCH models suggest that the DCI is characterised by a stochastic process which has a potentially predictable component, which, in turn, implies a departure from the EMH, suggesting that relevant market information was only partially or gradually reflected in stock price changes. This pattern of time dependence in stock returns may allow for past information to be used to improve the predictability of future returns. Evidence of long memory in equity return volatility in Botswana, on the other hand, does not suggest the existence of long memory in volatility. Furthermore, the significant size of *d* and $\bar{d}$ obtained from these models illustrates the importance of modelling long memory in Botswana.

7. SUMMARY AND CONCLUSION

Using the weak-form version of the EMH as a criterion, this study examines the time series properties of the returns and volatility of the DCI from January 1, 2004 to June 30, 2009. This is important because the efficiency of a market in processing information affects its allocative capacity, and, therefore, its contribution to economic growth.

The results from this study show that equity returns in Botswana follow a long memory process. Long memory in stock returns may reflect the shallowness of the local equity market and its relatively nascent institutional and regulatory frameworks. In particular, the preponderance of long memory in the equity returns in Botswana may reflect a variety of factors that influence the processing of new information, such as illiquid trading conditions and the still largely limited role of mutual funds and professionally managed intermediaries.

In contrast, this study finds no evidence of long memory in stock return volatility in Botswana. This means that Botswana's volatility profile is unpredictable. In other words, distant observations are not associated with each other and, therefore, observations in the distant past do not influence obser-

vations in the remote future. This also means that risk models that rely on the extrapolation of a (long-term) predictable component of volatility are not appropriate in the context of Botswana's equity market.

In terms of policy implications, the rejection of the market efficiency hypothesis implies that addressing trading frictions, promoting timely disclosure and dissemination of information to investors on the performance of listed companies are key elements of a strategy aimed at improving the efficiency of the BSE.

Furthermore, policies to resolve the informational inefficiencies in African Stock Markets (ASMs) also relate to upgrading the operational infrastructure. Indeed, the ongoing upgrades relating to the trading and settlement modalities of the BSE and the adoption of a central depository system can be anticipated to help improve the speed and accuracy of informational flows in Botswana.

In addition, to the extent that market inefficiency in ASMs may be linked to the lack of breadth and depth in these markets, it may be important to counteract these effects by promoting the establishment of regional stock markets. Indeed, Irving (2005) suggests that cooperation and integration of ASMs may help improve the liquidity and efficiency of these markets. This may, in turn, improve the mobilisation and allocation of capital and, in so doing, foster greater output growth. Further evidence of the beneficial effects of stock market integration are provided by Adelegan (2008), who finds that regionally integrated stock markets (measured by the number of cross-listings) generally tend to develop and grow faster than their non-regionally integrated counterparts.

Finally, there are two implications of this study for further research. First, while this study focused on efficiency from a long memory perspective, future research may investigate the micro-structural causes of inefficiency in the BSE. Secondly, this analysis can be extended to other asset markets (e.g., bond market).

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INTERPRETING NATIONAL ACCOUNTS ESTIMATES FOR THE GENERAL GOVERNMENT SECTOR:

THE CASE OF BOTSWANA

By: Matthew Wright[1]

ABSTRACT

The difficulties of valuing non-marketed output are most acute in cases where there is no marketed equivalent. Government, by its nature a monopolist producer of its core functions (and compounded by these being mainly services), is the prime example. Economists are often unaware of this and, even when they are, may deal with the problem by ignoring it. The impact is particularly acute in Botswana where the size of government, both as an employer and investor in fixed capital, means that the measure of its output has a major impact on GDP. Also, because of its size, in Botswana there is intense interest in the issue of government productivity, but the measurement of output renders traditional calculations of productivity largely meaningless and the development of usable alternatives is problematic and, in any case, at an early stage. Despite the inherent problems, there is no obvious alternative and the case for extending this measurement to other areas such as measuring the output of central banks is strong. Again, Botswana is a good example in this respect. However, proposals to refine the method of measurement to include an assumed rate of return on capital appear misguided.

1. INTRODUCTION

Economists should be critically aware of and concerned about the limitations of the data that they use. As stressed by Mokyr (1997), '…in this game an ounce of data is worth more than a pound of econometric technique'. This paper looks at a particular case of data limitations: the statistics used by economists to measure the 'output' of government.

The general government sector in the national income accounts presents chronic problems for measurement that, in turn, can cause acute difficulties in interpretation and analysis. As well as being non-marketed, much of government output is inherently monopolistic, intangible and often a subject of dispute about the basis of its value, if any. At the same time, the scale and range of government activities are clearly important. It is reasonable to ask what contribution this is making to GDP (i.e., how this activity translates into output) and, given the extensive command over national resources, how productively they are being used. The current 'solution' to this problem is to equate output with input. But this is clearly unsatisfactory as it assumes the answer to the main question the national accounts are intended to answer: i.e., the extent to which *value is added* to (or subtracted from) inputs in the process of production.

In looking at this problem, Botswana is a good country to consider. Government activity looms large in almost every aspect of economic life, so the basic problems can be illustrated easily and without the possibility of arguing that they are too small to 'matter'. Confining analysis to only the non-government sectors leaves out much of the story when discussing the Botswana economy.

It should be stressed that this paper looks at the problem of using non-market measures of output in economic analysis. Apart from some observations about the appropriate treatment of central banks in GDP estimates, it does not dwell on other aspects of the problem, such as the precise location of the market/non-market divide, which may also be of increasing importance for countries such as Botswana. Nor, with the focus on the limitations of macroeconomic statistics, is much said about alternative approaches, including the use of more detailed micro data.[2]

2. GOVERNMENT IN THE BOTSWANA ECONOMY

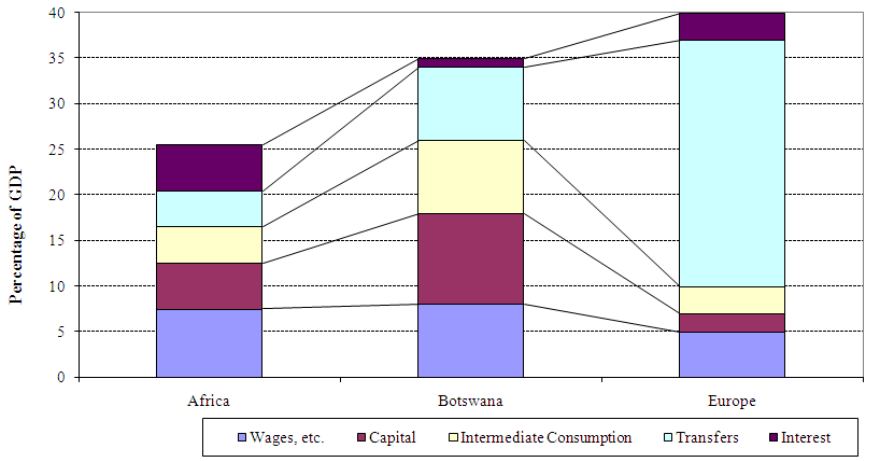
It has been estimated that in the mid-1990s total non-market production accounted for about 10 per-

[1] Deputy Director (General Economics and Statistics), Research Department, Bank of Botswana. This paper is based on material presented at the Conference of Commonwealth Statisticians held in Cape Town, South Africa, in September 2005. It has benefited from comments made at the conference and discussions with others, including colleagues at the Bank of Botswana. However, the usual disclaimer applies and the opinions expressed are those of the author. While there is by now a significant gap between the original presentation and the time of publication, the content remains relevant as a commentary on the compilation of estimates of government sector GDP in Botswana.

[2] Such questions are also relevant to Botswana, where the government is implementing a series of public sector reforms. The planned introduction of significant cost recovery for a wider range of services makes the question of whether these will be provided more on a marketed basis increasingly relevant; while the introduction of more structured performance measures for government departments could facilitate development of disaggregated productivity indicators which are typically intensive in requirements for additional data.

cent of output in OECD countries. In the Botswana national accounts, the general government sector currently contributes approximately 16 percent of GDP. The government is the largest employer (about 40 percent of formal sector employment), consumer (34 percent of gross domestic expenditure (GDE)) and investor (more than half the recorded capital stock) in the economy.[3]

FIGURE 1: CENTRAL GOVERNMENT EXPENDITUTRE IN BOTSWANA AND OTHER REPRESENTATIVE ECONOMIES



Source: Bank of Botswana (2000).

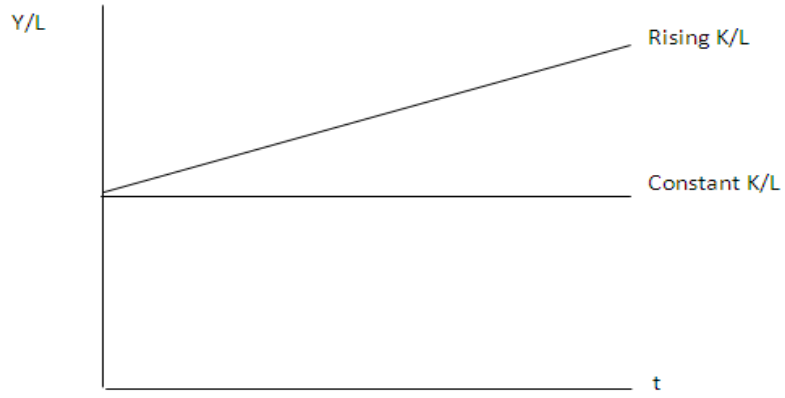
In recent years, central government spending in Botswana has been in the region of 35-40 percent of GDP, which is similar in scale to a typical European economy (Figure 1). However, the balance of spending differs considerably with a much smaller proportion devoted to transfers in Botswana and, correspondingly, more to wages, purchases of goods and services and capital spending. This structure is more comparable with elsewhere in Africa, although on a greater relative scale, reflecting a stronger financial position which has allowed, in particular, more extensive capital spending and with fewer resources tied up in debt servicing.[4]

That the government has become so dominant in a country which has consistently espoused the benefits of the market economy reflects the major role of diamond mining in Botswana's economic development. Revenues from mining have been channelled through the government to develop the economy more widely. While, by common consent, this has been done with considerable success, the dependence of the rest of the economy on government activity remains very high, despite efforts to diversify. It is striking that, for an economy that explicitly aims to develop exports, in the mid-1990s government consumption of goods and services from other domestic sectors was approximately 70 percent of the value of non-mining exports. The clear importance of the government in the economy inevitably raises questions about the efficiency of its operations.

3. THE ROOT OF THE PROBLEM

In the absence of a marketed equivalent (for many of its activities, government is essentially a monopoly producer) and on the assumption that the net operating surplus is zero, for national accounts purposes government output is valued by the sum of the inputs. Its contribution to GDP (i.e., value added, excluding intermediate consumption) is the sum of labour costs and consumption of fixed capi-

FIGURE 2: TYPICAL TRENDS IN GOVERNMENT LABOUR PRODUCTIVITY



[3] Since this paper was first prepared, this dominance by government has continued to increase. For example, more recently, the contribution to GDP has been close to 20 percent while government consumption has accounted for as much as half of GDE.

[4] The 'European' and 'African' economies shown in Figure 1 neither refer to any specific economy nor result from any mechanical averaging process across economies. They are designed to highlight features that may be regarded as 'typical' within each group. The share of transfers in the non-European economies would be smaller still if the whole government sector was included, as intra-government transfers would net out. In Botswana, much of the transfer component of spending is subventions to local authorities and, increasingly, other government agencies.

tal (CFC). This differs from sectors where value added is the independently derived measure of output based on sales data less intermediate consumption with net operating surplus determined as the residual. The most obvious implication is for measuring productivity. Even if the inputs are clearly defined, when both the numerator and denominator are versions of the same number, the answer is unlikely to be enlightening. For example, for labour productivity (*Y/L*) a gentle upward trend may well be expected as labour is augmented by an increasing capital stock (Figure 2).

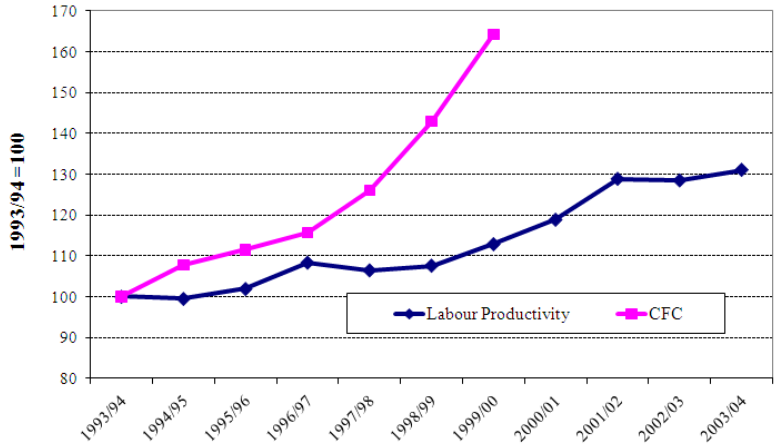
There are other problems. This measurement of output is not in any way justified by the assumption that there is a zero net operating surplus. Exactly the same problems would remain even if some return on capital were assumed; while to argue that the government *should* be operating on this basis is not the same thing either.[5]

Following from this, it should also be emphasised that the problem does not only emerge in the shift from current to constant prices. The 1993 System of National Accounts (SNA93) itself is clear on this[6], but confusion can quickly intervene. For example, OECD (1998b) seems to suggest that a current price valuation of output is acceptable and the real difficulties only emerge with the choice of deflators. But the concept of value added is clearly based on the difference between the value of output and the value of inputs. In turn, to be fully coherent, this must involve measures of value which use the same units of measurement, but are fully independent. This condition is breached from the moment that output is based on inputs, and before deflators have entered the picture. The use of deflators to separate price from volume is, of course, an additional problem, which may be amplified in this case. But it remains similar in nature to making allowances for quality changes, for both inputs and outputs, which applies across all sectors and especially services, marketed or otherwise.[7]

4. THE TREATMENT OF CAPITAL

A further point to note is that the natural focus of criticism is on the labour input being equated with output. This is in part because the cost of labour is clearly defined in government accounts. More generally, the large numbers working for government are readily observed and what they are doing commented on and compared with private sector activity. In contrast, capital consumption is *far* from obvious in government accounts, which have generally ignored depreciation; nor are government capital assets so readily comparable with privately operated equivalents.

FIGURE 3: GOVERNMENT LABOUR PRODUCTIVITY AND CFC IN BOTSWANA: 1993/94 - 2003/04



Source: Author's Calculations.

But for national accounts purposes the CFC item may be very large. In the Botswana national accounts for 1999/2000, the general government sector is shown as owning fixed assets of P23.4 billion (current prices – then the equivalent of about US$4.7bn), which was almost half the entire capital stock. CFC by government was a smaller proportion for the total (due to the longer term profile of government investment), while compensation of employees in the government sector was 40 percent of that for the whole economy. But CFC was still large enough to make up almost one third of sectoral GDP.

[5] It may be reasonable to argue that governments are essentially non-profit making, but for this to justify the assumption of zero operating surplus it is required to further assume that they are always operating at optimal levels of efficiency.

[6] Para. 16.4 of the SNA93 states that 'the valuation of non-market output is difficult at both current and constant prices'.

[7] The problem may, in some sense, be less acute in other sectors where, without making such allowances for quality, useful real movements can often be obtained; while, for government, the only way to move away from the zero productivity growth result is to choose different deflators. But the problem arises initially from the method of choosing output, not the difficulty in identifying suitable deflators.

Such a weighting can give capital great leverage in the measure of indicators of labour productivity and the 'gentle upward trend' shown in Figure 2 and suggested earlier as being typical may be anything but! Figure 3 roughly calculates labour productivity for government in Botswana since the mid-1990s, together with changes in the general government capital stock.[8] In the mid-to-late 1990s, government invested very heavily towards the end of National Development Plan 7 (NDP 7) and early in NDP 8, where a policy of deliberately 'front loading' the development budget was followed. The results following a subsequent increase in terms of labour productivity are clear.

So clearly the impact of CFC is far from trivial. This is exacerbated by other factors which, as compared to labour costs, make its use highly problematic:

(a) Asymmetry

Measuring CFC is necessarily in large part based on assumption rather than observation. But, at least for the measurement of GDP, this does not matter in most cases since, for sectors where output is valued independently, CFC only affects the division between net and gross operating surplus. For government however, CFC increases value added on a one-for-one basis. If, for example, there is a reclassification between intermediate consumption and investment, then this can have a differential impact on value added across sectors, even if the good in question is being put to identical use.[9]

The existence of such asymmetry has been used to support the argument that there should be an assumed rate of return on capital for non-market production, an issue that is up for consideration in the on-going revision of the SNA93. But it is one thing to note the existence and possible magnitude of a problem; it is another to 'solve' it by adding to the extent that the end result is based on assumptions. Indeed, while these asymmetries and their consequences should be highlighted, it is less obvious that their resolution is the ultimate objective. The divide between government activity and other sectors is very real, and smoothing over what is naturally rough and treacherous terrain may not be the best course, even if the smoothing is '…soundly based on economic theory and normal accounting conventions'.

Nor is it so obvious that all the supposed anomalies are indeed anomalous. For example, it is true that the second hand value of identical assets of equal vintage must be equal. But there is no obvious inconsistency with this and with them having produced different returns in previous lives. The equality of value is driven by there being a market for these assets and the potential for future use; while the contribution to production so far has been on either side of the market/non-market divide. It requires a significant leap of faith to assume that up to that point the productive contribution has been the same. This point is developed further below.

(b) Ambiguity

Government owns assets where it is not the exclusive user. Again, this is in contrast to labour, where, while productivity is a major issue, it may reasonably be assumed that the purpose of government workers is to work in the production of services for government (and, ultimately, at least it is to be hoped, for the people). For capital, a three-fold distinction has been proposed, between assets that are used to:

- assist employees in the course of their work
- provide services to the economy at large
- provide services to the community at large.

This seems like a good way to start thinking about this issue. But a point to emphasise is that the key distinction is for assets where there may be productivity spillovers to other productive sectors. To allow capital spending on roads to boost the productivity of government labour at the very least requires noting and careful interpretation. Where the services provided are for the community (final consumption), then this is less of a problem, even if other difficulties, such as valuation, appear increasingly intractable.

(c) Controversy

That the benefits of extensive government investment programmes are controversial should not need elaborating, whichever side of the argument we are individually inclined to take. Indeed, this might appear to be sufficient to temper with considerable caution any enthusiasm to apply consistently economic concepts as broadly as possible. Pritchett (2000), who, in relation to this very point, speaks of the 'tyranny of concepts', argues:

> '*Unlike for private investors there is no remotely plausible behavioural model of the*

[8] CFC and general government sectoral output are taken from the national accounts. To calculate labour productivity, the output is divided by the sectoral employment shown in the estimates for formal sector employment.

[9] By way of contrast, in the unlikely event that intermediate consumption was reclassified as a labour cost the impact on value added would be the same across sectors.

government as investor that suggests every dollar the public sector spends as "investment" creates capital in an economic sense.'

Because of this, the same author concludes that '…everything currently said about total factor productivity in developing countries is deeply suspect…'. This is for the simple reason that the public sector capital stock typically plays a major role in such calculations.

Such a view does not, of course, provide much by way of support for measuring output at cost. But at least this method has the virtue of crudeness, with no ambition to adopt inappropriate behavioural assumptions. The proposal to revise the SNA to base government output on estimates of capital services, rather than consumption of fixed capital has already been mentioned. There are two further points to add here, relevant to the controversy issue.

First, it has been acknowledged that the main implication of such a change would be for the level, rather than the growth rate of GDP. On the one hand, this makes it possibly less pressing, at least for economic research which has focused primarily on growth trends. At the same time, it becomes more controversial: an announcement that income levels had been revised upwards because of an assumed rate of return on government investments would surely be met with considerable scepticism; and even more so if this then fed into international comparisons, which would surely be the next logical step.[10]

The change has also been justified on the basis that it will equalise the cost of capital for government and other producers. But there are all sorts of reasons to question whether this is a reasonable assumption. Indeed, the current methodology, which implicitly assigns a zero cost of capital to government assets, may be more realistic. Again, the case of Botswana makes this point very clear. The country is known for holdings of foreign exchange reserves that well exceed requirements for transactions and precautionary purposes, and a large portion of which are explicitly invested for long-term financial assets. In turn, this leads to significant revenues for the government and should provide a fair indication of a substantial opportunity cost when considering proposals for further capital spending. But, while such arguments are not ignored – the government's reputation for a prudent approach is well founded – the belief that these reserves are simply available (i.e., that the opportunity cost is zero) for investing in 'national development' remains widespread.

The capital services approach may be appropriate in some institutional settings where capital spending by government is fully subject to rigorous appraisal to the extent that similar returns to private sector spending can be assumed with some confidence. It is important to note, however, that reference to 'institutional settings' is not simply a roundabout way to describe differences between developed and developing countries. Capital spending that is difficult to justify on the basis of any mainstream 'investment' criteria is a common feature across a wide range of countries, both developing and developed.[11]

5. Data Requirements – The Economist's Perspective

It was suggested earlier that economists are often unaware of the problems surrounding measurement of non-market output and, even when they are, treat it largely with indifference, seeing it as a matter for statisticians to resolve. This statement is immediately qualified as an observation based on the personal experience of the author. But nor is it obviously unfair, even at the highest level. For example, Hendry (1995) states that 'measurements of gross national product (GNP) are far from exact, but are given to economists by an outside agency' and, because of this status, '…are part of the background knowledge base'. From such an authoritative source, this can easily be interpreted as saying these are data to be passively accepted and used by the economist as the best available.[12]

Figure 4 shows the basic stages of defining data requirements of economists moving from what is used in the underlying model to what is available in

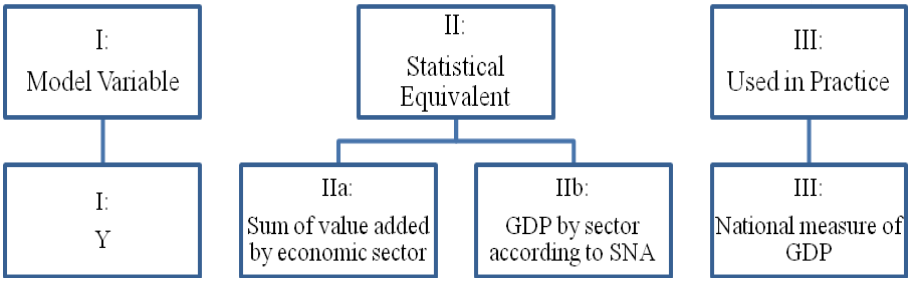
[10] Other things being equal, this would tend to increase the GDP for economies with a large general government sector by more than in those where government plays a lesser role.

[11] For instance, the US Highway bill, which came into law in August 2005, has been criticised for both the scale (US$ 285 billion) and quality of spending on roads and related projects. According to the Financial Times of 10 August, 2005, it contained 'More pork [i.e., spending that is politically popular, but may have little economic value] than the state of Iowa'.

[12] This interpretation, by exaggerating to make a point, may also be somewhat unfair. The same source acknowledges the need for more practical work on the importance of data revision, while Hendry and Krolzig (2004) are clear that one of the main benefits of technology on econometric modelling is to allow more time to assess data quality.

practice. In turn, this suggests reasons why in practice full consideration of all these stages may be neglected. Put simply, moving from the variable in the theoretical model (stage I) to a useable empirical approximation of that variable (stage II) to a good measure of that useable empirical approximation (stage III) requires proper planning and checking. This is a potentially time-consuming process that economists (eager perhaps to get on with the more 'glamorous' side of economic modelling) may have a tendency to try and keep as short as possible. For related reasons, it has been suggested that there is small wonder perhaps that data users are tempted to proceed on the basis that the assurance that data are 'compiled in accordance with the SNA' is sufficient.

FIGURE 4: THREE STAGES OF DATA - FROM MODEL TO PRACTICAL MEASUREMENT



resistance among both producers and users of statistics to adopt procedures that encourage revision of data (see Heston, 1994), while Runkle (1998) also reports that many researchers ignore the importance of taking note of the impact of data revision.

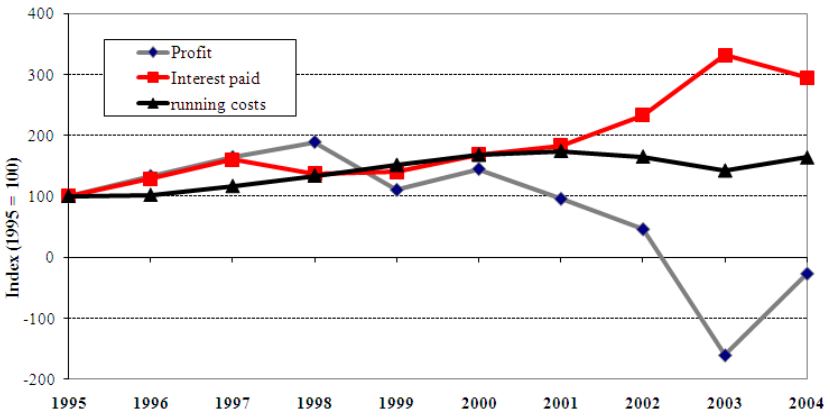
Figure 4 also links the main stages of data specification to the specific example of measuring national output: from the *Y* variable that is central to so many macroeconomic models to the array of national GDP estimates which are likely to differ widely in their makeup, but are assigned the same role in the modelling process. Particularly important here is that the second stage (identifying the statistical equivalent) is divided into two components: the concept of value added by sector and the guidelines for practical application in the SNA. So a situation develops where the various components of the same measure, in this case GDP, are compiled using not just different methodologies, but where the differences are so fundamental to the extent that some comparisons are illegitimate. It is

6. An Aside: the Problem of Central Banks

While the problems of measuring monopoly non-market output are clear, there is a case for extending use of the method. An interesting example is that of central banks. This is another issue up for consideration in the revision of the SNA93: i.e., whether the current recommendation of basing non-fee-related output on net interest income should be switched to a cost of production approach, something which, in practice, seems to have already been adopted in many cases.

The case that central banks are non-market producers is partly obscured by their clearly not being afraid of making profits. They are active in financial markets and derive revenues and incur costs at the same prices faced by other financial sector institutions and which are clearly 'economically significant' as required by the SNA. But it quickly becomes clear that the core activities of central banking are non-marketed. The issuance of currency, although a major source of potential profitability, is one example; the conduct of monetary policy another.

FIGURE 5: BANK OF BOTSWANA, VARIOUS REAL INDICATORS 1995 - 2004



Source: Author's calculations based on Bank of Botswana Annual Reports.

Note: All series deflated by the CPI.

Figure 5 shows indices of profits and interest payments by the Bank of Botswana from 1995 to 2004,

as well as an indicator of 'running costs'. The decline in profits matches the rise in interest payments quite closely, although not too much should be read into the detailed correlation as other factors are involved and the absolute amounts are not indicated.

Neither profits nor interest payments are a measure of the Bank of Botswana's output; but they are both relevant indicators of trends in its activities in recent years, and both tell very different stories.

Most important is the growth of interest payments which are made mainly on holdings of the Bank's own short-term paper, Bank of Botswana Certificates (BoBCs), which were introduced in the early 1990s. In the general absence of domestic government debt, the Bank has used BoBCs for liquidity management purposes and, in a growing economy where excess liquidity has been a chronic problem for many years, the trend may be a good indicator of the output over the period of the product 'domestic monetary policy'.

This is not the whole story, however. Prior to 2001, government pensions were funded directly from general government revenues, to which the Bank of Botswana profits made a significant contribution. But a public officers pension scheme was subsequently established under which pensions are now funded through investments handled by private asset managers. This has impacted on the Bank through two distinct channels, both of which contributed to the squeeze on profits. First, the outflow of private offshore investments has resulted in a corresponding reduction of the official foreign exchange reserves, thus reducing the Bank's earnings; second, the proportion of pension fund assets remaining onshore, due both to legal requirements and high prevailing domestic interest rates (as necessitated by monetary policy objectives), has substantially boosted the need to issue BoBCs and, hence, interest payments.

Thus, the effective privatisation of government pensions has had a dramatic impact on the financial operations of the central bank, through both the simultaneous corresponding transfer of assets to private management and the greatly increased costs of domestic monetary operations. Amid these differing profiles of the Bank's operations, the use of an output measure based on costs, which shows a reassuring 'gentle upward trend' is certainly tempting. That said, moving to a cost-of-inputs based approach to measuring central bank output could itself be problematic. Cost structures vary widely across central banks and their 'outputs' may be even more concentrated than governments on intangible and collective goods.[13]

7. CONCLUSION

Castles and Henderson (2005) identify the existence of non-marketed goods and services as one of three major 'significant and unavoidable problems' in making GDP estimates. In this context, a very important plus for the current method is that it is self-evidently crude, stands out like the proverbial 'sore thumb' and sends a very clear signal that it should be interpreted with caution. If this is best achieved with analysis that features messy 'ifs and buts', then so be it.

In highlighting some of the problems associated with using non-market measures of output for government and, in particular, the difficulties of using CFC as a direct contributor to non-market output, a gloomy picture of an unbridgeable gap between non-market and market activities has emerged. In some ways this is perhaps too extreme. The fundamental assumption that underpins this presentation is that a market-based measure of output is, while not perfect, sufficiently superior to the extent that alternatives fall far short by comparison. If this view is not accepted, then the balance of some of the conclusions may change. Assuming equal returns to similar capital serving market and non-market sectors may appear more reasonable, for example. Similarly, if some of the blurred edges of the actual divide are considered more fully (see, for example, OECD 1998a), the case for imputing more market-related aspects to non-marketed government output may grow accordingly.

The paper also does not appear so kind to economists, suggesting that they have a tendency to take data for granted. This is not meant as negatively as it may at first appear. The real message is that the dividing line between statisticians and economists as users should not be taken as a rigid distinction between producers and users of statistics. From the economist's perspective this requires some greater familiarity with data compilation. A matching requirement is for statisticians to follow up on how data are being used. At the same time, both statisticians and economists, as part of the process of managing statistics, should have a view on how analyses will be interpreted, especially

[13] Even for countries of similar size, staff costs can vary widely, even allowing for differences in the range of responsibilities. As an extreme example, staff costs at the Banque de France are greater than the entire Federal Reserve System (see, 'Central Banks Scrutinize Staff Costs' www.centralbanknet.com, 25/08/05).

in circumstances where the 'messy ifs and buts' may well be obscured.

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