



# Botswana Institute for Development Policy Analysis

March 2011

## Botswana's Debt Sustainability: *A Brief Narrative*

*BIDPA Policy Brief No. 9*

*Haile Taye*

# Botswana's Debt Sustainability: A Brief Narrative

## 1. Introduction

In terms of basic macroeconomic indicators, Botswana is, on the whole, in an enviable position relative to many African countries. The recent economic crisis notwithstanding, its growth rate has been more than average and its Balance of Payments position (as reflected in its foreign exchange reserves) has been impressive. Further, its exchange rate has been relatively stable compared to many middle and low income countries. Some of the weak points of the economy in recent years have been: (a) high inflation, even though it declined to a single digit in the last year (from 15% to about 7%); (b) relatively high unemployment for a fast growing economy (about 20%, according to the 2007 Informal Sector Survey); (c) stable financial sector, but with a wide spread between deposit and lending interest rates; and (d) lack of diversification, a heavy reliance on a few mineral products.

As was the case in many countries, the Botswana economy was hit hard by the global recession at the end of 2008 in which the demand for its minerals was drastically reduced (according to some estimates as much as 50%). And since mineral revenue significantly contributes (about 40% to 50%) to total government revenue, this

has put a constraint on the revised government budget as reflected in the 2008/09 and 2009/10 Government Budgets<sup>1</sup>). Consequently, in addition to relying on its substantial foreign exchange reserves, the government requested a loan from the African Development Bank to carry out its planned projects and to support the overall budget. The Bank recently granted a US \$ 1.5 billion (or at current exchange rates, about P 10.5 billion) loan to Botswana, even though not the whole amount has been drawn down.

But even after the newly acquired debt, the total debt outstanding is still small by the standards of many (particularly African) countries. For instance, the 1995 and 2007 average debt to GDP ratios of middle income countries was 34.7% and 24.8%, respectively. For low income countries it was 37.7% and 25.1%, and for Sub-Saharan Africa (SSA) it was 76.1% and 24.9%, respectively.

Further, even after some of the countries received huge debt reductions and cancellations via the Highly Indebted Poor Countries (HIPCs) initiative and Botswana acquiring the relatively recent significant debt, Botswana's degree of indebtedness is either comparable or better than many of its neighbors as shown in Table 1.

**Table 1: Total External Debt Outstanding**

	Country	Debt Outstanding: % of GDP				Debt Service: % of goods and services			
		2007	2008(e)	2009(p)	2010(p)	2007	2008(e)	2009(p)	2010(p)
1	Botswana	10.9	11.9	13.8	14.5	16.1	16.1	16.8	17.3
2	Angola	13.9	7.4	11.9	10.9	8.0	2.8	2.8	2.7
3	DRC	50.1	40.8	44.8	38.3	7.7	4.3	4.1	1.8
4	Ghana	37.9	46.2	47.7	54.8	2.9	3.1	2.5	2.6
5	Mauritius	9.9	8.9	10.1	11.7	3.9	3.3	3.6	3.2
6	Mozambique	56.5	34.5	38.3	38.5	44.4	17.1	17.9	20.2
7	Seychelles	73.2	88.5	124.7	118.6	10.0	9.1	10.7	6.5
8	South Africa	26.5	34.0	44.4	44.3	8.8	8.1	8.8	8.7
9	Zambia	5.8	5.5	8.6	9.4	1.3	1.1	0.9	0.6

Source: IMF, *World Economic Outlook (October 2008)*

<sup>1</sup> Even though the budget was initially drafted around September 2008 just before the crisis started, a revised version of the budget tried to make some adjustments to reflect the impending crisis.

The fiscal policy question of interest is then, given that Botswana has a very small previously accumulated debt, one of the highest global credit ratings, and a substantial foreign exchange reserves to rely on (usually around 20 months of imports), should the recently acquired loan be of any serious fiscal concern? This issue received some attention in some quarters (in the popular media, for instance) and to some extent by the general public. The objective of this small note is, therefore, to examine the financial and by extension the economic sustainability of the existing debt using non-technical analysis and a simplified narrative.

Even though the analysis carried out and the results obtained are based on recent econometric techniques and arithmetic formulations that trace the dynamic path of the debt, for brevity, an attempt will be made to make the presentation as accessible as possible at the risk of some simplification. In the econometric analysis only the main results will be briefly discussed focusing on the main findings and avoiding any technical intricacies involved in the estimation. Similarly, the dynamic path analysis will be discussed with the support of some tables without delving into how those results are obtained<sup>2</sup>.

The remainder of this note is organized as follows. The next section describes the basic anatomy of debt and the most widely used techniques of sustainability analyses. These include an econometric approach that examines the conditions under which the debt will converge or will become sustainable. And the second approach extends the econometric narrative to discuss a more elaborate approach to calculate debt sustainability in a dynamic context and under various economic growth scenarios and parameter values. This approach will calculate the primary government budget balance (described here to mean either deficit or surplus) that is compatible with a sustainable debt. That is, it will report the requirements of the primary balance and the evolution of the debt under different growth scenarios. And, finally, the Third section presents a brief summary and conclusions of the analysis.

## **2. The anatomy of Debt and Analysis of Debt Sustainability**

### **2.1. The Anatomy of Debt**

In simple terms, government budget balance could be defined as the difference between government's revenue

<sup>2</sup> Readers interested in the details of the results (based on the algebra and econometrics) may contact the author for a full description of the methodology and results or consult the indicated references.

intake and its expenditure in a given fiscal year. The difference between revenue and expenditure in a given fiscal year is either zero (a balanced budget), revenue exceeds expenditures (a surplus) or expenditure could exceed total revenue, in which case it will result in a budget deficit.

For clarity, a distinction is usually made between a primary, conventional and an inflation corrected deficit. A primary deficit is simply the raw yearly balance between government revenue and expenditures, while the conventional deficit is the primary annual deficits plus debt service payments on any existing debt. And as the name implies, the inflation corrected deficit is simply the yearly conventional deficit adjusted for inflation.

Consequently, the relationship between a deficit and debt is one of flow and stock. That is, accumulated deficit is what is called Debt. The accumulated debt could be decomposed into foreign and domestic, private and public and short term and long term debt.

Despite such variation in the conceptualization of debt, however, for practical purposes most analysis of debt focuses on total debt (both foreign and domestic) that the national economy accumulates either directly by government or government guaranteed private loans. This total national debt is usually referred to as public debt. The sustainability of public debt is, therefore, the extent to which the accumulated public debt stock could be repaid without causing future macroeconomic imbalances or future hardship for both existing citizens and /or the next generation of a country.

In general, sustainability of an existing debt is anchored or dependent on two main factors: the degree of indebtedness as measured by the size or magnitude of the accumulated debt as a ratio of the country's GDP and the growth rate of the economy, again scaled by a given country's GDP or GNP. Hence, the approaches to test or compute the sustainability of a debt focus on the behavior of revenue and expenditures over time or the speed with which the debt accumulates or deaccumulates given the actual or projected economic growth path.

### **2.2. Testing Debt Sustainability Using Econometric technique**

The recent econometric literature for testing the sustainability of debt proceeded along two lines: one focusing on the flow and the other on the stock components of debt. That is, the approach on the flow component examines how the revenue and expenditures flows move together over time and the extent to which that movement exhibits some correlation. The simplest

way of expressing the rational is that, do the revenue and expenditure flows show close co-movements as a trend. If they do, they are said to be co-integrated which is a technical way of saying their co-movements have a linear combination or correlations that could be traced and converges to zero even though each variable behaves randomly.

On the other hand, some authors focused on the proposition that for the stock of debt to converge to zero, the flow or the budget balance must on average be zero. This suggests that the necessary and sufficient condition for debt sustainability is for government revenue and expenditures to be co-integrated<sup>3</sup>.

The main objective of the econometrics exercise was, therefore, to test whether (a) the limit term (the stock of debt) converges to zero and (b) the flow terms (government revenue and expenditure) are co-integrated. The results using the cited econometric models show that the existing debt in Botswana is sustainable. That is, revenue and expenditures are co-integrated and the stock of debt is stationary (converges to zero).

### 2.3. Debt Sustainability and Fiscal Policy Path

The above noted econometric approaches suggested that debt sustainability in Botswana does not seem to be of any serious concern. However, despite its wide use, the econometric approach does not consider the dynamic path of the economy and the impact of other crucial factors (changes in domestic debt, the monetary sector, inflation and the exchange rate) in gauging the trajectories of debt sustainability. To address that, authors, such as Edwards (2002) and others, suggested methods/approaches to further evaluate debt sustainability taking into account the impacts of these factors. It is beyond the scope of this simple note to derive the algebra of how it is calculated, as noted above. Instead the note will focus on the main results of the dynamically computed model.

Edwards (2002, p. 5) defined debt sustainability as “a situation where increases in each type of debt are in line with the pace at which national and international creditors desire to accumulate government-issued securities”. Therefore, one of the key indicators used to

<sup>3</sup> Among others, Hamilton and Flavin (1986), Kreamers (1988), Wilcox (1989), Haug (1991) and Crosetti and Roubini (1991)), focused on testing whether the discounted value of the debt converges to zero in some future date or not. While others such as Trehan and Walsh (1988, 1991), Hakkio and Rush (1991), and Arghyrou (2003) focused on showing whether the discounted debt stock is stationary or not whereby stationarity of the series is interpreted as indication of sustainability.

compute the dynamic path of debt sustainability is the government primary balance (i.e., surplus or deficit) that is consistent with a sustainable debt burden. It is conventional to assume that the international flow of credit will have an upper limit, which is equal to or less than the growth of domestic GDP and the foreign inflation rate; it is similarly assumed that domestic credit will also increase by the same amount. Clearly, the sustainable primary balance that is consistent with a sustainable debt is determined by both the initial ratios of domestic and foreign debts to GDP, nominal domestic and foreign interest rates, domestic and foreign inflation rates, the rate of growth of real GDP, and the sustainable increases in both foreign and domestic debt<sup>4</sup>.

Given the host of variables used as determinants of the basic relationships between the government primary balance and debt outstanding, it is possible to invoke various scenarios regarding the likely behavior of the determinants of a sustainable debt. Among others, just to name a few, it is possible to consider variations in GDP growth rates, different international credit flows, changes in both foreign and domestic interest rates and inflation rates, and changes in the domestic exchange rate (which may affect the domestic inflation rate, if there is a substantial pass through to the domestic economy). As a first step, this note is limited to considering the impact of different economic growth scenarios consistent with the Botswana economy. It further assumes that both international and domestic credit flows continue to be available, at least in the tune of the stated amount. More specifically, it is assumed that both foreign and domestic credit will flow into Botswana, at least at a rate of half the nominal growth rate of GDP plus the foreign inflation rate<sup>5</sup>. It is unlikely that Botswana will need such high flows of credit, at least not in the immediate future once the recession is fully over, but it will strengthen the argument that the fiscal balance required to maintain a sustainable debt is not that constraining for Botswana even if we assume the flow of credit (both foreign and domestic) continues at such rates.

The model is computed using the assumptions stated earlier and parameters values obtained from the most recent Botswana data. To appreciate the scope and its limitation, it is important to again highlight the main assumptions used in computing the results.

<sup>4</sup> Again, readers interested to follow how the dynamic path is set up and calculated using the values and given the parameters, should consult the full model in Edward (2002) or contact the author for full details.

<sup>5</sup> This rate is less than what the HPIC countries receive even though their economies are at a much worse position than that of Botswana.

1. The model is computed using GDP growth rates ranging from -6 to 10% to cover possible scenarios and fluctuations exhibited over the years;
2. The numbers for foreign and domestic debt chosen are mainly from the 2009 Bank of Botswana Annual Report. This year may not be representative in terms of economic performance, but it helps to err on the conservative side;
3. Finally, in reading the results, it must be noted that changes in the exchange rate, inflation rate, and the interest rate are among the relevant variables that the model will be sensitive to, in addition to variations in GDP growth rates. But except, variations in the growth rates, changes in the other parameters in not considered in this initial exercise.

Substituting the relevant parameters in the model gives the results reported in Table 2. The figures in the table indicate the ratio of the primary balance (surplus if negative or deficit if positive) as a ratio of GDP that the

government should have every year in order to maintain a sustainable debt. For instance, if the attendant GDP growth rate happens to be 6% in 2010, it must have a budget surplus of 0.07% of GDP in order to maintain a sustainable debt. But if instead the GDP growth rate is 7% during the same year, the government could incur a deficit of 0.14% of GDP and yet maintain debt sustainability.

In short, it could be concluded that, even after the relatively significant increase in foreign debt in recent years, fiscal sustainability is not of serious concern for Botswana even under extremely pessimistic economic growth scenarios. For instance, under the initially forecast worst economic growth performance of 2009 (-6%), the primary fiscal balance required to maintain a sustainable debt is a surplus of less than 2% at steady state. In other economic growth scenarios, the required primary balance to ensure sustainability is a very small percentage of GDP. And even in the low growth scenario of only 2% per annum for about ten years, the required surplus to sustain the debt is less than one percent (.76%) of GDP.

**Table 2: Debt Sustainability (under different Growth Scenarios)**

Year	2%	3%	4%	5%	6%	7%	10%	-6%
2009	-0.91%	-0.73%	-0.52%	-0.30%	-0.09%	0.12%	0.77%	-2.85%
2010	-0.91%	-0.73%	-0.51%	-0.29%	-0.07%	0.14%	0.82%	-2.90%
2011	-0.91%	-0.73%	-0.50%	-0.28%	-0.05%	0.17%	0.87%	-2.95%
2012	-0.91%	-0.72%	-0.49%	-0.26%	-0.03%	0.20%	0.93%	-3.00%
2013	-0.90%	-0.72%	-0.49%	-0.25%	-0.01%	0.22%	0.99%	-3.05%
2014	-0.90%	-0.72%	-0.48%	-0.24%	0.01%	0.25%	1.05%	-3.11%
2015	-0.90%	-0.71%	-0.47%	-0.22%	0.03%	0.28%	1.12%	-3.17%
2016	-0.90%	-0.71%	-0.46%	-0.21%	0.05%	0.31%	1.18%	-3.23%
2017	-0.89%	-0.70%	-0.45%	-0.20%	0.07%	0.34%	1.25%	-3.29%
2018	-0.89%	-0.70%	-0.45%	-0.18%	0.09%	0.37%	1.32%	-3.35%
2019	-0.89%	-0.70%	-0.45%	-0.18%	0.09%	0.37%	1.32%	-3.35%
2020	-0.89%	-0.70%	-0.45%	-0.18%	0.09%	0.37%	1.32%	-3.35%
Steady-State	-0.76%	-0.63%	-0.49%	-0.36%	-0.24%	-0.11%	0.26%	-1.92%



Further, the evolution of Botswana's debt burden under different economic growth scenarios is also examined to evaluate the speed with which it converges to a steady state. Using these parameters and different growth rates, the evolution of the sustainable path in time is presented in Table 3. The numbers in the table indicate by how much the debt to GDP ratio will decline (or increase if the growth rate is negative) each year under different growth assumptions. For instance, if the economy grows by 6% in 2010, the debt to GDP ratio will decline by about 1 percentage point from its level in 2009. To illustrate the point, if the growth rate in 2010 instead is -6%, then the debt to GDP ratio will increase by 0.4 percentage points from its level in 2009.,

It has to be noted that even though the debt data used are based on the IMF's 2009 Article IV Consultation Report for foreign debt and Bank of Botswana for domestic debt, they may not be up to date even though the last AfDB loan is included. Therefore, the result may marginally

vary despite the economic fundamentals stated in the introduction (sizable reserves, excellent credit rating, recently decreased inflation rate, and generally prudent fiscal stance).

As indicated in Table 3, therefore even if the debt accumulates at the rate of half the growth rate of GDP plus foreign inflation every year, the ratio of debt to GDP will decline by about 50% of the initial value as long as GDP growth rates exceed 4% per annum. For instance, if we take the more realistic growth rate (at least in historical terms) of 5% to 6%, it takes about ten years to bring the ratio of debt to GDP to about half of its initial value. In the worst case of GDP growth rate of -6% (as in 2009), the accumulated debt would only grow by about 5 percentage points higher in ten years (despite a continuous accumulation of debt at the above stated rate (by half of a nominal GDP growth plus a foreign rate of inflation)).

**Table 3: Evolution of Debt, under Different Growth Scenarios**

Year	Rate of Growth per annum							
	2%	3%	4%	5%	6%	7%	10%	-6%
2009	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7
2110	11.19	11.07	10.96	10.85	10.75	10.64	10.33	12.12
2011	10.69	10.48	10.27	10.07	9.87	9.68	9.11	12.55
2012	10.22	9.92	9.63	9.34	9.07	8.80	8.04	13.00
2013	9.77	9.39	9.02	8.67	8.33	8.00	7.10	13.46
2014	9.34	8.89	8.45	8.04	7.65	7.28	6.26	13.94
2016	8.93	8.41	7.92	7.46	7.03	6.62	5.53	14.43
2017	8.54	7.96	7.42	6.92	6.45	6.02	4.88	14.95
2018	8.16	7.54	6.96	6.42	5.93	5.47	4.30	15.48
2019	7.80	7.13	6.52	5.96	5.44	4.98	3.80	16.03
2020	7.46	6.75	6.11	5.53	5.0	4.52	3.35	16.60



### 3. Conclusions

The motivation of this note was to shed light on the extent to which one should worry about the sustainability of the existing annual deficit and accumulated debt in Botswana. In other words, it attempted to show the dynamic path of the budgetary requirements to ensure debt sustainability under different economic growth scenarios. The aim was, therefore, to show how severe or easy it is likely to be managing the current debt burden in Botswana. On the whole, the analysis seems to suggest the following conclusions:

1. As it stands, financial debt sustainability in Botswana does not seem to be of serious concern, at least not in the short to medium term;
2. This, however, may not be the case in the long-run if the economy does not return to normal (pre-recession) levels very soon, while the debt stock continues to increase by a significant margin;
3. The usual negative macroeconomic side effects of debt (such as debt overhang, crowding out

effects) are unlikely to be of concern because of both its size and the quality of the expenditure; in fact, it might be more crowding-in private investment than the converse mainly because most of the expenditure is infrastructure related;

4. Issues of inter-generational equity and fairness are also unlikely to be of concern since long-term investment has a distributional component across generations;
5. Despite the above conditions, debt sustainability received undue attention probably because: (a) it is Botswana's first experience of being indebted in such a magnitude, at least in recent years; (b) it is taken as a measure (sign) of severity of the recession; and (c) the feeling of vulnerability after decades of economic progress.

According to the above simple analysis, therefore, Botswana should be more concerned with other growth thwarting challenges (such as reported high unemployment and uncompetitive market structure issues) than the currently accumulated debt.

#### 4. References

African Development Bank (Web Page: [www.afdb.org](http://www.afdb.org)).

Arnone, Marco, L. Bandiera, and A. Presbitero (2005), "External Debt Sustainability: Theory and Empirical Evidence", The World Bank.

Argyrou, M. (2003), "Debt Sustainability, Structural Breaks and Non-linear adjustment: A testing Application to Greek fiscal policy", Department of Economics and Finance, Brunel University.

CSO (Central Statistical Office (2007) Informal Sector Survey.

Cronin, D. and D. McCoy (2000), "Fiscal Sustainability when time is on Your Side", Technical Paper, 4/RT/00.

Corsetti, G. and Roubini N. (1991), "Fiscal deficits, public debt and government Solvency: Evidence from OECD countries", Journal of Japanese and International Economies, 5, PP. 354-80.

Edwards, S. (2002), "Debt Relief and Fiscal Sustainability", NBER Working Paper Series 8939.

Hamilton, J. and Flavin M. A. (1986), "On the Limitations of Government Borrowing: A Framework for Testing," American Economic Review, 76, pp. 808-819.

Hakkio, C. S. and Rush M. (1991), "Cointegration and Government Borrowing Constraints: Evidence for

the United States", Journal of Business & Economics Statistics", 9, PP. 429-445.

Haug, A. A. (1991), "Cointegration and Government Borrowing Constraints: Evidence for the United States", Journal of Business & Economics Statistics", 9, PP. 97-101.

IMF (2009), Article IV, Public Information Notice (Pin) No. 10/68 (June 1).

Johansen, S. (1988), "Statistical Analysis of Co-Integration Vectors", Journal of Economic Dynamics and Control, 12, 231-54.

Kremers, J. J. (1988), "Long-Run limits on the US federal debt", Economic Letters, 28, pp. 259-262.

Stock, J. and Watson. M. (1993), "A Simple Estimator of Cointegrating Vectors in Higher Order Integrated System", Econometrica, 5, pp. 1035-1056.

Trehan, B. and Walsh C. E. (1988), "Common Trends, The Government's Budget Constraint and Revenue Smoothing", Journal of Economic Dynamics and Control, pp. 425-444.

Wilcox, D. (1989), "The Sustainability of Government Deficits: Implications of the Present-Value Borrowing Constraint," Journal of Money, Credit and Banking, 21, pp. 291-306.







**Botswana Institute for Development Policy Analysis (BIDPA)**  
**Plot 134, Tshwene Drive, BIDPA House**  
**International Finance Park, Kgale View**  
**Private Bag BR-29**  
**Gaborone, Botswana**  
**Tel. 267 3971750, Fax: 267 3971748**  
**Website: [www.bidpa.bw](http://www.bidpa.bw)**