Botswana's Crawling-Peg Exchange Rate System: Trends and Variations in the Pula Exchange Rate

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Abstract

This paper aims to show trends and variations in the Botswana Pula exchange rate before and after the introduction of the crawling-peg exchange rate system. The survey indicates that previous devaluations not accompanied by the crawling-peg exchange rate system were short-lived. It is shown that since the adoption of the crawling-peg exchange rate system the Pula has been depreciating. Additionally, the variance and the standard deviation revealed that variations in the nominal bilateral Pula exchange rates have been minimal since the adoption of the crawling-peg exchange rate system. To corroborate the foregoing, both the variance and the standard deviation are computed for the nominal and real effective exchange rate of the pula against major currencies using quarterly data. The findings also suggest that the variations have been minimal after the crawling peg. This is shown by small variance and the standard deviation of both the nominal and real effective exchange rates. This implies stability in the Pula exchange rate and positive results of the crawling-peg exchange rate policy regime.

Introduction

The purpose of this article is to show trends and variations in the Botswana Pula exchange rate against other currencies. The variations in the exchange rate are computed for forty months before and after the introduction of the crawling-peg exchange rate system. i.e., the first period ranges from January 2002 to April 2005 while the period after the crawling-peg exchange rate system covers the period from May 2005 to August 2008. Additionally, the variations in the real effective exchange rate using quarterly data for the same period are also calculated. The survey indicates that previous devaluations that were not accompanied by the crawling-peg exchange rate system were not sustainable. It is also shown that since the adoption of the crawling-peg exchange rate system the Pula has been depreciating relative to other currencies. Furthermore, variations in the Pula exchange rate have been minimal. These findings suggest stability in the Pula exchange rate and positive outcomes of the crawling-peg exchange rate system.

The standard deviation as measure of dispersion is employed to measure the magnitude of the variations in the Botswana Pula exchange against other currencies. This measure of dispersion measures variation of a set of data in terms of amounts by which various numbers deviate from their mean value. The dispersion of the data is small if numbers are closely bunched about their mean value. Inversely, dispersion of the data is large if numbers are widely scattered about their mean value. It must be noted that with the standard deviation the interest is on the magnitude of the deviations and not on their direction (Freud *et.al,* 1988). Therefore, through this measure together with the variance we are able to draw conclusions on the movements of the Pula exchange rate after and before the adoption of the crawling-peg exchange rate system.

The discussion that follows outlines Botswana exchange rate policy taking into account various exchange rate policy regimes including the crawling-peg. This is followed by an examination of trends and variations in the Pula exchange against other currencies. The paper ends by highlighting survey we used.

Botswana's Exchange Rate Policy

The main objective of the exchange rate policy in Botswana has been to maintain and enhance international

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competitiveness of domestic producers by guarding against the misalignment of the Pula. Since 30 May 2005 Botswana has adopted the crawling peg exchange rate policy regime. The pula was also devalued by 12.5% as an attempt to improve export competitiveness of non-traditional exports (Makgala, 2008). Under the Crawling peg exchange rate regime the exchange rate of the Pula is now adjusted continuously rather in discrete steps as it was previously the case. The Pula is currently pegged to a basket of currencies consisting of the Rand and the Special Drawing Rights (SDR). Botswana has been able to maintain her current and past exchange rate policy regimes due to enough foreign exchange reserves derived from diamond export revenues. The Crawling peg exchange rate system is preferred since it mitigates the volatility of a floating exchange rate system and the problems associated with a completely fixed exchange rate system. The current system (Crawling peg exchange rate peg system) used in Botswana enables the country to benefit from advantages of two extreme exchange rate regimes. For instance, if the Pula has been allowed to float, large inflows of diamond revenues would have caused the Pula to appreciate. The appreciation of the Pula would have made non-mineral export sectors to be uncompetitive which would make economic diversification extremely difficult to achieve.

The SDR is a basket of currencies of the four countries that account for the world's largest share of exports of goods and services (the respective currencies in the SDR are the British pound, Euro, USA dollar and Japanese yen). The SDR is a preferred currency basket since it is made up of currencies of countries with low inflation rates. Furthermore, the choice to which currencies to peg the Pula was guided by Botswana's trade patterns and currencies' used in international trade and payments. Therefore, by pegging the Pula to the South Africa rand and the SDRs it is assumed that low inflation would be imported. So if low inflation is expected to be imported and conservative monetary and fiscal policies are employed, Botswana is likely to keep domestic inflationary pressures down. Additionally, it may make it possible to maintain a non floating exchange rate regime that is competitive. Table 1 below gives a summary of events since the Pula was adopted as Botswana's currency in 1976 to date.

Table 1: Pula-Exchange Rate Events.

Date	Action	Comments
1966-1976	Participation in rand Monetary Unit	No independent exchange or monetary policy
August 1976	Introduction of the pula; pula pegged to the US dollar at P 1=US 1.15	RSA rand pegged to the US dollar at the same rate; P 1=R 1
April 1977	5% pula revaluation	Anti-inflation measure
January 1979	Rand taken off US dollar peg and floated	Rand appreciates against the dollar as gold price rises
January 1980	Pula taken off US dollar peg ; introduction of pula basket consisting of SDR and rand	To reduce the volatility of rand/ pula exchange rate
November 1980	5% pula revaluation	Anti-inflation measure as imported inflation rises following pula depreciation against rand
January 1981	Steep drop in world gold price	Rapid rand depreciation as RSA export earnings collapse
May 1982	10% pula devaluation	Part of stabilization measures in response to 1981/82 BoP crises
February 1984	Foreign debt standstill for RSA and run on the rand	Rapid depreciation of the pula against US dollar as rand continues to depreciate
July 1984	5% pula devaluation	Competitive measure following rand collapse and rapid pula appreciation against rand

August 1984	Rand weight in pula basket adjusted	To reduce drift of pula from rand
January 1985	15% pula devaluation	Additional competitiveness measure in response to rapid pula appreciation against rand
January 1986	New pula basket introduced	Due to rapid rand appreciation against US dollar with re-introduction of financial rand
January 1989	5% pula devaluation	Anti-inflation measure
August 1990	5% pula devaluation	Competitiveness measure
August 1991	5% pula devaluation	Competitiveness measure
June 1994	Technical adjustment	
1996	Technical adjustment	In response to a sharp depreciation of the rand against the US dollar & a corresponding depreciation of the pula against the US dollar
1997	Technical adjustment	
Feb. 1998	US dollar strengthens; Asian currency crisis	Rand weakens several % points against the US dollar . However, overall rand and pula remain relatively stable
Feb 2004	7.5% pula devaluation against major currencies	Competitiveness measure
May 2005	12.5% pula devaluation against major currencies and adoption of the Crawling-peg system	Competitiveness measure and regime change to Crawling-peg system

Source: Bank of Botswana Annual Reports, *various issues.*

Exchange Rate Policy Regimes

Exchange rate systems are generally categorized as fixed or floating. In a floating exchange rate regime the value of the currency in terms of another is determined in the foreign exchange market by demand and supply. On the other hand, a fixed exchange rate regime is the one in which the value of one currency vis-à-vis another currency is held constant by the authorities intervention in the foreign exchange market. The following are arguments in favour for a fixed exchange rate policy. First, it can serve as a nominal anchor against inflation if the exchange rate is fixed to the currency of a country with a relatively low inflation. Second, there are benefits derived from a discipline effect since there are political costs associated with abandoning a fixed exchange rate policy. Last, there exist a confidence effect whereby the connection of the exchange rate to a stable foreign currency engenders a willingness to hold the domestic currency or assets denominated in the domestic currency. The maintenance of a fixed exchange rate policy may not however be viable in the presence of external borrowing constraint and a large current account deficit in most developing nations which may be compounded by the current global economic recession.

In the case of a floating exchange rate regime it is generally argued that automatic nominal depreciations improve domestic competitiveness, the trade balance and the balance of payments. But, it must be noted that depreciation of a currency has inflationary effects which may actually erode the initial competitiveness. Therefore, with a floating exchange rate regime the authorities must employ other macroeconomic policy instruments such as the interest rate to reduce inflationary pressures that may arise. So, even with a floating exchange rate regime the authorities are still concerned about the level of the exchange rate. It must however be noted that the validity and relevance of any exchange rate regime is governed by the structural characteristics of a particular economy within which policy is practiced (Hinkle

and Montiel, 1999 and Motlaleng, 2004). Practically, there is a range of intermediate exchange rate regimes. It is argued that intermediate exchange rate regimes (for instance, the crawling peg exchange rate policy) provide room for short-term flexibility within exchange rate margins and medium term parity adjustments.

The crawling peg exchange rate system is where in a fixed exchange rate system the par value of a currency is adjusted continuously within a certain range of values. The adjustments are carried out continuously rather than by sudden currency devaluations (Salvatore, 2004). This element of the crawling peg exchange rate system brings about stability and confidence into exchange rate system. The adjustments are based on differential levels of inflation of a particular country relative to its major trading partners. In essence, this form of the crawling peg exchange rate system generally derives from the purchasing power parity theory of exchange rate determination. The purchasing power parity doctrine states that in the absence of impediments to trade the nominal exchange rate is equal to the ratio of the foreign price relative to the domestic price. Generally, both the foreign and domestic prices are proxied by the Consumer Price Indexes which indicates inflation levels. Given this, a country with higher inflation would have its currency depreciate. For instance, if inflation is high in Botswana relative to that in South Africa, the Pula must depreciate relative to the South African rand. Therefore, with the crawling peg exchange rate system movements in inflation levels in Botswana and its trading partners are monitored continuously and give rise to continuous movements of the Pula exchange rate, hence the 'crawling peg exchange rate system'. In Botswana before crawling peg exchange rate system the Pula was devalued by 7.5% in February 2004. This devaluation was further followed by 12.5% devaluation in May 2005 when crawling peg exchange rate system was adopted. These devaluations were followed by extensive and controversial debates in the public domain (Makgala, 2008). However, since the adoption of the crawling peg exchange rate system there has never been drastic currency devaluations.

Trends and Variations in Pula Exchange Rate

It is apparent from the figures 1, 2, 3 and 4 below (own construction; *Data Sources-Bank of Botswana, Botswana Financial Statistics)* that even though the Pula was devalued by 7.5% against major currencies in February 2004, it started appreciating again. This scenario is different when compared to the 12.5% devaluation of the Pula in May 2005 which was accompanied by the adoption of the crawling peg system. After the Crawling peg system there has been a continuous depreciation of the Pula relative to major currencies. Furthermore, variations in the Pula exchange rate are small and the trend is smooth. Interestingly, figure 4 shows that since the third quarter of 2006 the real effective exchange rate has been stable as shown by the smooth and almost horizontal curve. This is of paramount importance because this small variations in the effective exchange rate has taken place during the Crawling peg system whose main intension was to bring about the Pula exchange rate stability.

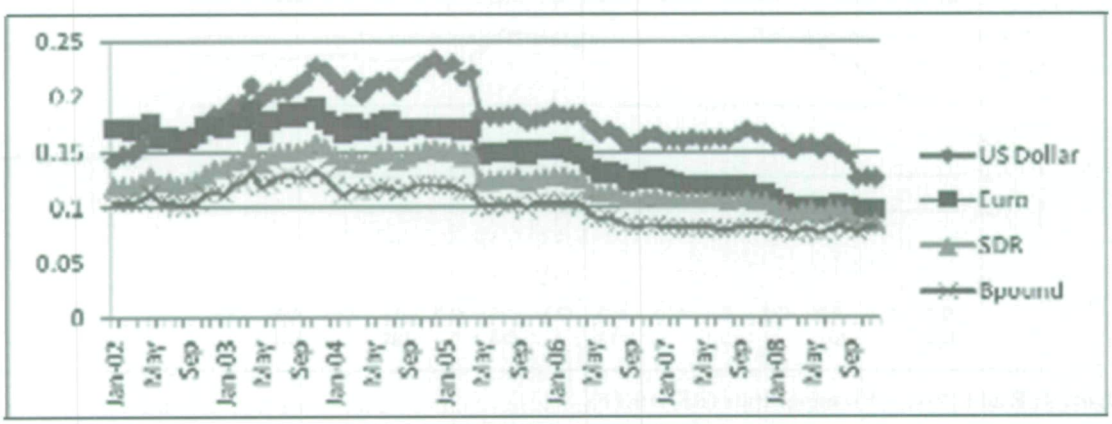

Figure1: USA Dollar, Euro, SDR and British Pound-Pula Exchange Rate.

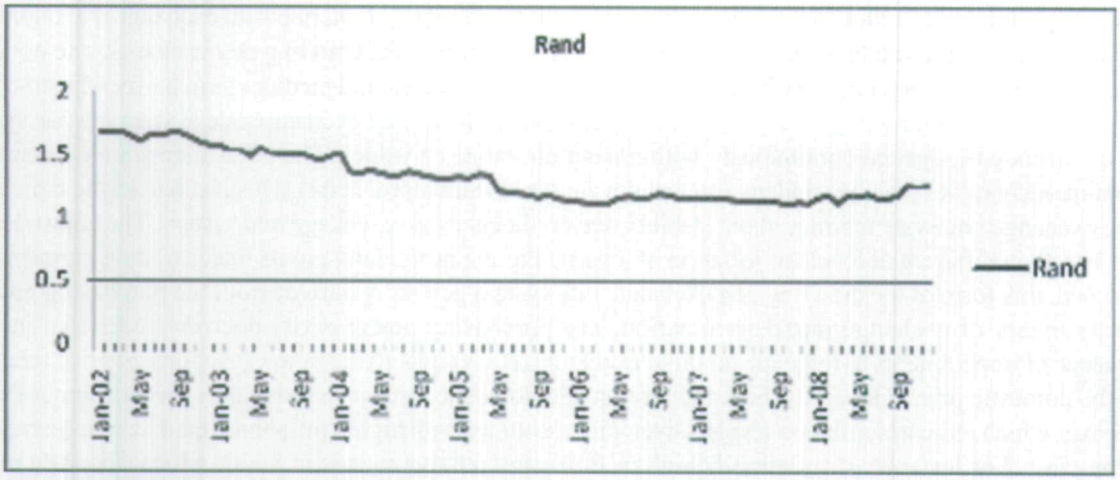

Figure 2: RSA Rand -Pula Exchange Rate.

Figure 3: Japanese Yen-Pula Exchange Rate.

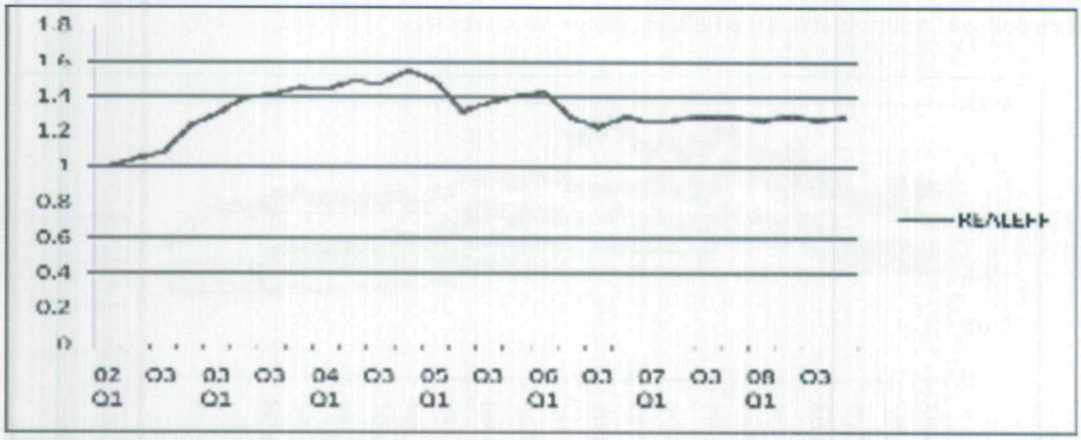

Figure 4: Real Effective Exchange Rate (REALEFF).

The above findings (from figures 1, 2, 3 and 4) are corroborated by evidence from tables 2, 3, 4 and 5. For all currencies except for the Euro and the British pound both the variance(v) and standard deviation(s) are smaller for the forty months period after the Crawling peg system than for the forty months period before the system. Furthermore, both the variance and standard deviation for the nominal and real effective exchange rates (i.e., the exchange rate index adjusted for relative inflation rates for Botswana and trading partners) from quarterly data for same period are smaller than those before the Crawling peg system. For instance, the variance and standard deviation for the real effective exchange rate from Table 4 are (231) and (15.2), while they turn to (19.81) and (4.45) after the Crawling peg system in Table 5. The standard deviation indicates variation of the exchange rates in terms of amounts by which they deviate from their mean values. Since the standard deviations are small these exchange rates are closely bunched about their mean value after the Crawling peg exchange rate system. The variance for the exchange rates also shows small variations after the Crawling peg exchange rate system.

Inversely, for the euro and the British pound standard deviations are large indicating that these exchange rates are widely dispersed about their mean value. Additionally, the variance indicates large variations of Pula relative to the Euro and the British pound. From the foregoing it can be argued that variations in the Pula exchange relative to most currencies have been minimal except for the Euro and the British pound exchange rates. However, since the variances and standard deviations for the nominal and real effective exchange rates are smaller after the Crawling peg exchange rate system, it can be argued that the Crawling peg has resulted in the stability of the Pula exchange rate.

Table: 2 Variance (v) and Standard Deviation before Crawling-Peg.

	USA Dollar	Euro	SDR	British pound	Japanese Yen	RSA Rand
$S(X)^2$	61.83	48.30	31.51	21.66	800828.11	3580.5862
$n(SX^2)$	62.95	48.38	31.73	21.77	805922.84	3606.727
n(n-1)	1560	1560	1560	1560	1560	1560
V	0.000719	5.2E-05	0.000147	7.31E-05	3.265849	0.0167569
S	0.0268	0.0023	0.0121	0.0027	1.807	0.1386

Notes: SDR -Special Drawing Rights; Variance (v), $v=[n(SX^2)- \Sigma(X)^2 / n(n-1)]$; Standard deviation(s), S= Square root of V; *Period: January 2002 to April 2005.*

Table: 3 Variance (v) and Standard Deviation after Crawling-Peg.

	USA Dollar	Euro	SDR	British pound	Japanese Yen	RSA Rand
$S(X)^2$	44.92	25.60	19.64	12.53	582428.	4 2169.79
$n(SX^2)$	45.11	26.13 1	9.83	12.69	586693.	7 2170.808
n(n-1)	1560	1560	1560	1560	1560	1560
V	0.000117	0.00034	0.000121	0.000104	2.734166	0.000653
S	0.0108	0.0184	0.0011	0.0101	1.6535	0.081

Notes: SDR -Special Drawing Rights; Variance (v), $v=[n(SX^2)- S(X)^2 / n(n-1)]$; Standard deviation(s), S= Square root of V; Period: *May 2005 to August 2008.*

Table: 4 Variance (v) and Standard Deviation before Crawling-Peg. Nominal Effective (NOM EFF) and Real Effective (REAL EFF) Exchange Rates Quarterly data.

	NOM EFF	REAL EFF
$S(X)^2$	21.65	1992615
$n(SX^2)$	32.49	2028658
n(n-1)	156	156
V	0.069525	231.0447
S	0.2636 1	5.2

Notes: Variance (v), v=[n(SX2)- S(X)2 / n(n-1)]; Standard deviation(s), S= Square root of V

Table: 5 Variance (v) and Standard Deviation After Crawling-Peg Nominal Effective (NOM EFF) and Real Effective (REAL EFF) Exchange Rates: Quarterly data.

	NOM EFF	REAL EFF
$S(X)^2$	97.03	2521109
$n(SX^2)$	97.19	2525270
n(n-1)	210	210
V	0.000793	19.81552 S
S	0.0282	4.45

Conclusion

This article aimed to show trends and variations in the Botswana Pula exchange rate. The findings are for forty months before and after the adoption of the crawling-peg exchange rate system. The first period ranges from January 2002 to April 2005 while the period after the crawling-peg exchange rate system covers the period from May 2005 to August 2008.The study indicates that previous devaluations not accompanied by the crawling-peg exchange rate system were short-lived. Since the adoption of the crawling-peg exchange rate policy the Pula has been depreciating. Through the variance and the standard deviation it is shown that variations in the bilateral nominal Pula exchange rate have been minimal since the adoption of the crawling-peg exchange rate system. To buttress these results, both the variance and the standard deviation are computed for the nominal and real effective exchange rates. It is revealed that the variations have been minimal after the crawling peg as shown by small variances and the standard deviations of both the nominal and real effective exchange rates. This implies stability in the Pula exchange rate and positive results of the crawling-peg exchange rate system

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