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An Examination of the Balance Sheet Structures of Central Banks in Africa

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Abstract

Against the background that all the countries in Africa are Reserve-Earning Economies, this study examined the balance sheet structure of ten central banks in Africa for the 15-year period 2000-2014. The objectives were to determine what their former practices have actually been and whether the combinations of their assets and liabilities at present are useful for their tasks over the longer term. Annual data was derived from the balance sheets of the selected central banks. It was found out that central banks in the sample are largely homogeneous as regards monetary policy practices and have a high degree of inflexibility. From the balance sheet indicators computed, it is apparent that most of the banks have not concentrated substantially on monetary policy alone but are largely responsible for other things. Furthermore, the 2008-2009 global financial crisis resulted in high volatility of monetary policy practices among central banks in Africa. The conclusion is that most of the central banks may not be able to adjust quickly if another global financial crisis breaks out.

Key words: Reserve-Earning, Reserve-Issuing, Interest Rate, Policy Flexibility, Seigniorage

JEL Classification: E52, E58

Paper Classification: Research Paper

Introduction

The study of central bank financial affairs began noticeably only in the past thirty years. As at today, the most commonly researched issues as regards central banks are independence, accountability, transparency, capitalization, profitability, and dividend policies. Before the financial crisis in Asia in 1997, focus was not directed at central bank operations and the attendant operational results and financial positions in a significant manner. According to Stella (2003), circumstances made many researchers to hold the notion that the accounting figures of central banks could be ignored as they were either insignificant in the macroeconomic sense; or just part of the whole government accounts and should therefore be analyzed within it; or, even, totally not useful forasmuch as central banks have unlimited ability to create money.

Since the end of Asian crisis however, central bank finance has attracted careful scrutiny and is a trending area of study for the following reasons among others-

i. Meeting ordinary and day-to-day functions, e.g. the issuing of national currency, have been observed to be difficult for some central banks as a result of financial distress. Some have had to change policy so as to reduce their losses and it is on record that a central bank (that of the Philippines) has ever been liquidated, (Stella, 2005)

ii. There are constraints on the policy options of central banks for the fact that they have to provide credit to their financial systems especially the banking industry to prevent systemic failures. More often than not, such provision of credit ultimately results in them having to issue debt in order to stem inflation and other immediate macroeconomic consequences. Some central banks have been weakened thereby (Stella, 2008).

iii. There are constant pressures on central banks especially in developing countries from the accumulation of large stocks of foreign reserves.

iv. The global rise in the size of the flow of capitals across borders relative to the size of balance sheets of central banks particularly in the aspect of leverage.

v. Increased attention is being paid to central bank financial issues especially independence since the European Central Bank was established, (Kluh & Stella, 2008).

vi. Finally, there is a high level of uncertainty as a result of, on one hand, US trade relations with China and NAFTA countries and, on the other hand, the Brexit deal between the United Kingdom and the EU. Similar to these are concerns regarding apparent and potential financial difficulties being observed in the operations of central banks of some advanced countries, for example, Spain, Ireland, Portugal, Greece, and even Japan.

As observed and shown by Mihaljek (2011), the set of monetary policy matters in Africa is highly diverse and delicate. While some of the countries have very rudimentary financial systems with limited transmission mechanisms, others have relatively well-developed systems and mechanisms. Yet, others (much of the Francophone countries) seemingly do not have distinct and clear mechanisms as they are tied for the most part to the French monetary system. Nevertheless, all the central banks in Africa have multiple objectives which include price stability, economic growth, and financial stability even though their abilities to have efficient and effective monetary policy may not be the same. But much more, like other developing regions, the narrow objectives of maintenance of price stability (or) specifically low inflation as well as achieving public debt sustainability dominate macroeconomic policies (Mboweni, 2000).

A financial crisis such as the one of 2008-2009 as well as current issues like emergence of crypto-currencies, large scale immigration, and Sino-American trade relations have serious systemic implications for the international monetary market. It is normal for developing countries to be affected by a global financial crisis chiefly in the areas of exports, tourism and remittances, capital flows, domestic competition, volatility of markets, as well as availability of credit. But all these affect how central banks operate and, consequently, the policy options available to them as they try to maintain the stability of prices and the exchange rate. It therefore becomes imperative to investigate the past financial results of the monetary policy practices of central banks in Africa. Such may help to determine what their former practices have actually been and whether their combinations of their assets and liabilities at present are useful for their tasks over the longer term. This study is a step in that direction.

Review of Literature

Central Banks and Global Asymmetry

This paper rests on two points which also serve as the researcher's motivation in this area. The first one is that, contrary to the view of the classicals, money matters. For the fact that liquidity

preference among economic agents is more of fact rather than fiction, money affects their motives. Second, asymmetry in international financial system is a fact to be reckoned with as it also affects the motives of economic agents principally as a result of their preference for foreign currency.

While Keynes and Post-Keynesians have explained extensively, and in several ways, how uncertainty and liquidity preference influence the determination of prices of assets, employment, as well as the financial positions of creditors and debtors, Banchs (2009) employs dynamism to show these explanations in the context of today's international monetary system which is replete with asymmetry. The thrust of the argument in Banchs (2009) is that policy choices are made by economic agents in the reality of international monetary asymmetries and that this asymmetry is largely responsible for the motives and choices of institutions within economies and the resultant financial positions of these economic agents. In essence then, pertinent issues such as liquidity preference, structures of balance sheets, the exchange rate regime, and the adjustments of monetary policy and fiscal policy within an economy would depend on (i) whether the economy is reserve-earning or reserve-issuing and (ii) how easily international payment can be facilitated or, to say, how much foreign reserve is available for that economy.

Following Keynes' theory of non-neutrality of money, Wray (2004) asserted that all countries are able to circulate their own currencies domestically forasmuch as they collect taxes. But as rightly argued by Banchs (2009), not all countries are in the position to issue their currencies internationally. These two facts helps to explain the asymmetric nature of the international monetary system and the classification of the countries of the world into reserve-issuing economies (RIEs) and reserve-earning economies (REEs). Banchs (2009) applied the same reasoning that characterizes Keynes' theory. This is that credit crises, outcomes in markets, and, consequently uncertainty about the future, make players in an economy to prefer hold their money and have their assets in liquid form. This decision results in more unemployment. Banchs (2009) theorizes that such reasoning when translated to the international stage make economic players prefer to have portfolios of assets and liabilities that are denominated in foreign currency. This step is among the major causes of unemployment in domestic economies and also globally.

By demonstrating that there are differences among economies based on transaction currency, Banchs & Molleja (2010) provided an exhibit of the endogenous theory of money as well as the asymmetry prevalent in the global monetary system. The authors first described the Reserve Earning Economy (REE). The transactions of such an economy with the rest of the world can only be settled through the use of a foreign currency since the domestic currency is not accepted internationally. Virtually all economies of the world- except for the United States, the European Union, Japan, and the United Kingdom- are REEs. The central bank of a REE would always be concerned with growing the stock of foreign reserves and determining an effective rate of exchange of its currency to the dominant world currencies. These twin issues are known respectively as the quantity effect and the price effect. A reserve-earning economy naturally demonstrates a large foreign currency liquidity preference and growing its foreign reserves in order to meet its foreign currency obligations and ensure a reasonable rate of exchange. This behaviour is driven by the uncertainty of international credit facilities and vagaries prevalent in global price mechanism.

Reserve-Issuing Economies (RIEs) are categorized into three. There is the First-Order Reserve Issuing Economy (RIE-1). Such an economy is unique in the sense that all its transactions globally are settled by the use of the domestic currency. In essence, the domestic currency is the 'dominant reserve currency' globally. The only RIE-1 is the United States of America and the Federal Reserve (which is the central bank of the USA) is relatively unconcerned with stocking foreign currency reserves.

Next is the Second-Order Reserve Issuing Economy (RIE-2). The transactions of a RIE-2 within a region of influence are all settled through the use of the national currency. Transactions outside that region however must be settled by the use of the dominant reserve currency. RIE-2 economies majorly trade within the region of influence. The European Union is a ready example of this category. Finally, there is the Third-Order Reserve Issuing Economy (RIE-3). Such an economy, is able its currency within an area of influence and also associated strongly by a significantly large volume of trade with the RIE-1, the USA. Clear examples of this category are China, Japan, and the United Kingdom. Forasmuch as they operate much more outside their regions, RIE-3 economies have larger needs of foreign reserves than RIE-2 economies.

Effects of 2008-2009 Global Financial Crisis on Balance Sheets of Central Banks

A central issue in this study is the asset allocation decisions of central banks. As put forward by Kurihara (2012), the composition of currency, the structures of the maturity structures of assets as well as their classes (i.e.credit risk) are determined by the strategic asset allocation decision. This affects national and global markets and significantly influences balance sheet positions of central banks. Ultimately then, it is also responsible for the ways and means by which central banks respond to systemic and global crisis. Buiter (2008) shows that central banking operations, both theoretically and practically, have not kept up with key developments in the global financial system. This resulted in many central banks not being prepared when the financial crisis broke out in August 2007. According to Stella (2008), alludes to the fact that for much time in the past, central banks have been providing credit ailing banking systems and have been issuing debt to control the resulting immediate macroeconomic consequences. Stemming from these, many central banks have factually been weakened financially and have always been limited to few options as regards monetary policy.

In the same vein, the inadequacy of effective reserve levels in the balance sheets of central banks has been suggested severally as a major factor that elicited the Asian financial crisis of 1997. Price (2003) reports the significant opacity of South Korea where reserves which the central bank claimed to possess turned out to be unavailable because they were already being used as collateral by the commercial banks which held them. In the Thailand, the country's central bank published a portfolio of reserves which was seemingly very robust and healthy. However, it contained a large undisclosed short-forward position which was almost as large as the gross reserves shown on the balance sheet.

Going further, Cukierman (2013), among several authors, has observed that, the appearance of financial crisis in 2007 pushed central banks in major advanced economies to undertake some monetary policy stances which were unconventional. Such measures were mainly in the use of quantities- low interest rates, direct intervention, direct credit easing, and indirect credit easing. In several cases, large amounts of assets including government bonds, commercial papers or corporate bonds were purchased. This step led to the increase in the assets side of the balance sheets as domestic assets such as government bonds or commercial papers increased rapidly. In essence, the operations have led to fundamental changes in the size and composition of central bank balance sheets. Cukierman (2013) cites the instance of the US Federal Reserve which reacted so vigorously that within six months of Lehman's collapse in 2008, its balance sheet had increased by more than 100 per cent. The yearly rate of expansion of the Fed's balance sheet over those six months was calculated to be 420%. After this dramatic shift in policy, a number of operational changes in both its implicit and explicit IT procedures followed. Within less than six months of the Lehman event, the zero bound on the short-term policy rate became effective thereby constraining the Fed to supplement interest rate policy by means of quantitative easing programs. Parallel to

this, longer term maturities and higher risk securities characterized the conduct of expansionary open market operations. On the part of the European Central Bank (ECB), the rate of expansion of the balance sheet also went up significantly stemming from increases in demand for liquidity which was induced by the persistence of the sovereign Greek debt crisis. Between May 2011 an May 2012, the rate of increase averaged 70.88%. The crisis also made other countries such as Japan, Switzerland, Brazil, and Israel, to intervene periodically in the foreign exchange market so as to moderate excessive appreciations caused by inflows of foreign exchange. These steps made total assets to increase significantly, mostly in the form of government securities, bank loans, and mortgage-backed securities and consequently entailed specific (and new) risks for central banks, (Schwarz, Karakitsos, Merriman, & Studener, 2015).

Central banks of African countries were not left out of the expansions in balance sheets, (Mangani, 2011). The audited financial statements of the Central Bank of Nigeria (CBN) for the year ended 31st December, 2011 indicated that total income was N311.2 billion, a decline of 44.6 per cent from the level in 2010. The decline in income largely reflected the significant fall (-88.4 per cent) in income from realized gains on foreign currency. Conversely, the size of CBN's balance sheet increased in 2011 as total assets/liabilities grew appreciably by 66.6 per cent to N11.3 trillion. The assets position reflected a phenomenal growth of over 3,000 per cent in investments, which was driven largely by the Bank's investment in Asset Management Company of Nigeria bonds and Bank of Industry Debenture, as loans and advances fell by 52.9 per cent. The corresponding increase on the liability side was driven by increases in both the CBN instruments and other financial liabilities which grew by 1,352.2% and 279.1% respectively.

Theoretical Framework

The major operation of a central bank in fulfilling its mandate centers on the conduct of monetary policy. Perera, Ralston, & Wickramanayake (2013) are of the view that the attainment of persistently low but positive inflation, that is price stability, is considered the primary objective of monetary policy. High inflation would thus be a clear signal of a policy failure. A prototype of the balance sheet of a central bank is presented in Table 1.

Table 1: Classes of items in the balance sheet of a typical Central Bank

ASSETS	CAPITAL AND LIABILITIES
Gross International Reserves (GIR): Gold Foreign Currency Others	**International Reserves Liabilities (IRL)**
Domestic Credit (DS): Credit to Government Credit to Financial System	**Monetary Base (BM):** Currency in circulation Deposits from financial institutions
Due from International Monetary Fund	**Due to International Monetary Fund**
Other Assets (apart from GIR): Foreign Currency (Not GIR) Domestic Currency	**Debt Securities issued (DS)**
	Government Deposits (GD)
	Other Liabilities (OL)
	Total Liabilities
	Capital (C)
Total	**Total**

Source: Banchs & Molleja (2010)

From the balance sheet above, an increase in the most components of the assets above would be recorded as an operation of addition of monetary base. Conversely, a decrease in the asset components is an extraction of base money (Kurihara, 2012). As the monopolistic supplier of base money, the central bank can either control its price (short-term interest rate) or its quantity (which is the monetary base or a component of it, for example, bank reserves, net international reserves , or net domestic assets). If a central bank had perfect information about conditions, targeting the price or the quantity would just be two sides of a coin. However, because of uncertainties and instability in the demand and supply of base money, there would naturally be fluctuations in money market rates (in cases where the central bank targets quantities) or fluctuations in the monetary base (when a short-term interest rate is the target).

In addition to short-term interest rates, and items of the central bank balance sheet, the exchange rate can take the role of an operating target under certain circumstances. This would be the case when monetary policy is conducted mostly through central bank interventions in the foreign exchange rather than through adjustments in the interest rate. Normally, only countries with large stocks of reserves and access to foreign borrowing or restricted capital flows can engage in such operations. In this case, there can be room for a domestic and international dimension of monetary policy.

Operating targets link the intermediate targets (the exchange rate or monetary aggregate) or indicator variables of monetary policy, on the one hand, and the policy instruments of the central bank on the other given the lags in the transmission of monetary impulses. The choice of the operating target affects the policy instrument [which can be Open Market Operations, standing facilities, and foreign exchange swaps] that a central bank should use. The thematic graph of this is presented below:

Instrument → Operating Target → Intermediate Target → Ultimate objectives

From Banchs (2009), assuming that Other Items Net (OIN) is zero, that is, when the total of Other Assets is equal to the total of Other Liabilities cancel, the assets and liabilities of a central bank would result in equation (1) below:

$$GIR + DC = IRL + BM + DS + GD + K \quad (1)$$

From (1), the base money of the central bank can then be expressed as

$$BM = [(GIR - IRL) + (DC - DS - GD)] - K \quad (2)$$

If Base Money (BM) is equal to Debt Securities (DS), there would be losses of seignorage and this would most likely result in pressures upon the level and stability of the interest rate. In order to avoid such, the monetary base must be higher than the debt securities that the central bank has issued. This requirement, i.e. BM > DS, implies that

$$BM > (GIR - IRL) + (DC - BM - GD) - K \quad (3)$$

Equation (3) above is equivalent to:

$$BM > \tfrac{1}{2} * [(GIR - IRL) + (DC - GD) - K] \quad (4)$$

Combining equations (1) and (3) above and solving for DS leads to

$$DS < \tfrac{1}{2} * [(GIR - IRL) + (DC - GD) - K] \quad (5)$$

From (4), a minimum degree of flexibility for monetary policy would compel (6) below:

$$DS \leq \tfrac{1}{2} * [(GIR - IRL) + (DC - GD) - K] \leq BM \quad (6)$$

The above shows that there are two fundamental effects of international monetary asymmetries. The first is a quantity effect which is a consequence of REEs having to target a minimum stock of foreign reserves since their own currencies do not circulate abroad. Banch & Molleja (2010) shows that this quantity effect is not market-determined but policy-determined and establishes the link between the short-term interest rate and the minimum target level of foreign reserves. In particular, the monetary authority might increase the interest rate to indirectly limit the expansion of domestic credit and induce capital inflows when the level of reserves is below the minimum target. The opposite is that they might reduce it after such a minimum has been reached.

Price effect is the second effect of international monetary asymmetry. This derives from the fact that in reserve-earning economies, central banks must deal with not just the local-currency base reserve but with foreign-currency reserves as well. In essence, central banks must contend with interest rate and exchange rate determination at the same time (Banchs, 2009). Swiston et al (2014) point out that the central bank's authority to expand the monetary base rules out an outright default on obligations in domestic currency. This ability to create more monetary base allows the central bank to always settle, at least in nominal terms, its domestic currency obligations. This potential for money creation to cover losses is the major difference between a central bank and a deposit money bank in the need for capital.

However, monetary expansion has its limits as a financing option. As Buiter (2008) observes, the fundamental determinant of demand for currency is the confidence of the public in its real purchasing power and requires confidence in the ability of the national treasury to provide real resources in exchange for currency. Pinter (2015) echo the thought that once agents perceive that the central bank is relying excessively on money creation to finance its losses, they will seek to exchange their holdings of the monetary base for assets more likely to maintain their real value. Ultimately, this will lead to increased inflation, depreciation of the currency, and loss of international reserves. In essence then, beyond a certain point, the reduced demand for real money balances would negate the initial gains from money creation. These issues above provide a strong rationale for the examination of the balance sheet structure and thus show the effects of the global financial crisis on the balance sheets of the selected central banks.

Methodology

This paper draws its data from the published financial statements of the central banks of ten countries in Africa that are classed as 'small open economies'. The central banks in the sample are for Botswana, Ghana, Kenya, Malawi, Mauritius, Namibia, Nigeria, South Africa, Uganda, and Zambia. The central banks under consideration are all reserve-based and only that of South Africa is owned by private investors while each of the other nine belongs wholly to the government of the individual countries. Similarly, only the Reserve Bank of South Africa has political independence while the others in the sample have only instrument independence. Finally, the central banks of Ghana, Mauritius, and South Africa are identified as having the single goal of inflation targeting. Conversely, the central banks of Botswana, Kenya, Malawi, Namibia, Nigeria, Uganda, and Zambia have multiple goals. From the discussion of Banchs & Molleja (2010), it is established that all economies in Africa are reserve-earning.

The thrust of the study is to determine the structure of the balance sheets of the sampled central banks. All the ten central banks use English as the language of their financial reports and use basically the same accounting principles which make for good comparison of the data. More

centrally, the ten central banks in the sample form blocs of economic competitors for financial flows in East Africa (Kenya, Mauritius, Uganda, and Zambia), Southern Africa (Botswana, Malawi, Namibia, and South Africa), as well as West Africa (Ghana and Nigeria).

Variables and their Evaluation

The objective of this study is the evaluation of the balance sheet structure of the central banks in the study. Using Martinez-Resano (2004) as a basis, the monetary policy index (MPI) of the central banks in the sample is first considered. MPI describes the degree to which a central bank has only monetary policy operations on its balance sheet. The higher this indicator of a central bank is above 1 (or 100%), the less the concentration of the central bank has been on monetary policy, hence financial weakness. The MPI is computed by the use of equation 7 which is:

$$\frac{TL_{it}}{MB_{it}} \text{ ----------} \quad (7),$$

where TL refers to Total Liabilities and MB is for Monetary Base

Following Banchs & Molleja (2010), this study proceeded to construct, for the central banks in the sample, a set of five balance sheet indicators that are peculiar to central banks of reserve-earning economies. The essence of this step is to reveal their degrees of concentration on monetary policy issues and the structure of their balance sheets. The analysis of the computed indicators indicated the changes in the mix of the assets and liabilities of the central banks in the study and served to detect the balance sheet structure and the diverse forms of monetary policy practices across the continent. The indicators so measured are:

(i) External Dependence (ED): This is usually measured when the largest component of the balance sheet is Gross International Reserves. It serves to indicate the external source of liquidity arising from foreign currency inflows. Thus, it is very important in a reserve-earning economy which has to hold constantly large stocks of foreign currency reserves. The larger the value of this variable, the more flexible monetary policy is in a reserve-earning economy.

External dependence, ED_{jt}, is given by $\frac{BM_{jt}}{GIR_{jt}}$ ---------- (8)

'jt' is the overall performance score of the *j*th central bank in period t.

(ii) Extracting Liability Components (ELC): This indicator is used to measure how relatively important each of the substitutes for monetary base is. They are the components of extracting liability. Banchs (2009) points out that having an ELC of more than 100% implies a relatively large loss of elasticity.

ELC_{jt} is computed as $\frac{DS_{jt} + GS_{jt}}{BM_{jt}}$ --- ---------- (9)

'jt' is the overall performance score of the *j*th central bank in period t.

(iii) Seigniorage Loss (SL): Seigniorage loss need be computed for all central banks and a value that is not more than 0.5 is adequate. The larger this variable is, the larger is the government's seigniorage loss which is actually the amount of government interest-bearing debt.

$$SL_{jt} = \frac{DS_{jt} + GS_{jt}}{TL_{jt}} \quad \text{----------} \quad (10)$$

(iv) Net Extraction of External Liquidity (NEEL): This applies whenever international reserves are the largest component of the assets side. It is fitting for all the central banks in the sample for this study as all of them are for reserve-earning economies. It is known that the lower the net extraction of external liquidity, the higher the degree of flexibility of the exchange rate and other monetary operations. The recommended maximum for this variable is 100%. Anything above this would suggest that foreign exchange interventions/sterilizations costs being used to sustain the regime are too high.

$$NEEL_{jt} = \frac{DS_{jt} + DS_{jt}}{GIR_{jt}} \quad \text{- -} \quad (11)$$

(v) Liquidity Requirement (LR): Liquidity requirement is measured as

$$LRjt = \frac{BR_{jt}}{DC_{jt}} \quad \text{- -} \quad (12)$$

Central banks lacking relative flexibility in conducting monetary policy activities would have values of LR higher than 100%. That would suggest that possibly, over time, the banking system of the monetary authority. An instance of this is where a net drain of domestic credit is drained as a way of sterilizing large foreign exchange interventions but the central bank avoids using interest-bearing debt.

Results and Discussion

This section has to do with the objective of the study which is to evaluate the balance sheet structures of the central banks in the sample. From the discussion under methodology, this necessitates the computation of a set of balance sheet indicators of the ten central banks in the sample for the period 2000-2014. The aim is to ascertain the structure of their balance sheets as well as their degrees of concentration on monetary policy issues. The indices computed are Monetary Policy Index, External Dependence, Extracting Liability Components, Seigniorage Loss, Net Extraction of External Liquidity, and Liquidity Requirement.

The summary are stratified into periods 'Before', 'During' and 'After' the global financial crisis and shown in Tables 2 - 7. The period 'before' is 2000-2006, the period 'during' is 2007-2009, while the period 'after' is 2010-2014. Each of the tables show the period means as well as the coefficient of variation. These two helped the study to draw inferences about the likelihood of the possibility of the global financial crisis affecting the operations of the central banks. While the mean is used to show the relativity of the indicators among the central banks, the coefficient of variation reports the volatility of the indicators in the three periods.

Monetary Policy Index

In evaluating the balance sheet structure, the analysis focuses first on the Monetary Policy Index (MPI) which shows the degree to which a central bank has only monetary policy implications on its balance sheet. It is constructed as total liabilities divided by the monetary base translated to percentage, with monetary base being taken as the sum of currency in circulation and deposits of financial institutions. A value that is not too far above 1 (that is, 100%) would be interpreted as the central bank being engaged with strictly monetary policy operations.

As evident from Table 2 below, the central banks of all the countries in the sample have not been efficient going by their mean of MPI for the period of study. Compared to the monetary base,

each of the central banks seems to have consistently carried other liabilities unrelated to monetary policy. Among others, this is a sign of largely unstructured growth of the financial sector of the countries and also strongly indicates the privileged financing each of the central banks has been according the public sector.

Relatively, by the mean scores for MPI of the central banks in the sample for the study period, the Central Bank of Kenya and the Reserve Bank of South Africa have the cleanest balance sheets with their indicators of 1.89 and 2.23 respectively. The central banks of Ghana, Mauritius and Malawi follow with 2.65, 2.65, and 2.91 respectively. The Bank of Botswana is a clear outlier as it had a monetary policy index mean of 21.36 before the GFC, 19.55 during the GFC, and 13.55 for the five years of study after the crisis.

Table 2: Mean and Coefficient of Variation of Monetary Policy Index for African Central Banks

Country	Before GFC		During GFC		After GFC		Study Period Mean (2000-2014)
	Mean	C o V	Mean	C o V	Mean	C o V	
Botswana	21.36	7.55	19.55	35.29	13.45	3.72	18.36
Ghana	2.84	5.17	2.40	12.78	2.53	15.31	2.65
Kenya	1.89	17.04	1.89	19.10	1.89	64.09	1.89
Malawi	2.80	4.98	3.19	21.48	2.91	16.50	2.91
Mauritius	2.98	3.22	2.10	111.19	2.53	8.27	2.65
Namibia	3.70	2.43	3.09	15.36	3.08	7.41	3.37
Nigeria	5.27	7.78	3.61	20.55	4.05	5.11	4.53
S/Africa	2.11	5.00	2.55	25.76	2.21	7.83	2.23
Uganda	4.54	8.61	4.14	9.37	4.32	12.61	4.39
Zambia	5.42	1.61	2.76	6.00	3.81	2.90	4.35

Source: Author's computation

Using the raw figures, the MPI of the Bank of Botswana was above 10 for each of the years under consideration except 2013. However, the Bank possibly has been positively changing the structure of its balance sheet with a consistent and drastic reduction in the MPI from 2010 to 2014 which translates to the period after the global financial crisis. In the case of the Central Bank of Nigeria, it had the second highest average of the balance sheet indicator with 4.53. The mean was highest before the GFC but the CBN seem to have done more of monetary policy in the period of the financial crisis as the mean went down to 3.61. In the aftermath of the crisis, the effect of the bailout of the banks has increased the mean to 4.05.

From the coefficient of variation, the observation is that the global financial crisis impacted on the balance sheets of the central banks in the sample. The crisis led to high volatility in monetary policy practices as shown by the increased coefficient of variation. The volatility was highest in Mauritius, Botswana, South Africa, and Malawi in that order. In the period of the crisis, almost all the central banks concentrated on strict monetary policy matters and this made the MPI to be lower than the period before the crisis.

The volatility abated after the shock of the global financial crisis as policy changes helped to reduce the volatility. The volatility moderated after the GFC but it never returned to what it was before the crisis except in Nigeria. Thus, the global financial crisis made monetary policy more volatile for African central banks. Considering the central banks with the highest MPI, Government Deposits and Foreign liabilities form the bulk of the liabilities side of the balance sheets of the central banks of Mauritius, Uganda, and Zambia. For the Central Bank of Nigeria,

the liabilities side is dominated by government securities. The assets side has Foreign Assets as the largest component for all the central banks in the sample. This is in tandem with the observation of Banchs (2009) on the pattern of the balance sheet of Reserve-Earning Economies.

External Dependence (ED)

By virtue of their being reserve-earning economies which have to hold constantly large stocks of foreign currency reserves, ED is very important. The larger will be the value of this variable, the more the flexibility of monetary policy implied. Table 3 summarizes the output for this index for the sample under consideration.

The deduction from Table 3 is that all the central banks in the sample are largely inflexible in their monetary policy. This is by the fact of the very low scores observed for each of the central banks in the sample. It is obvious that each of the central banks cannot as much as embark on an aggressive monetary policy as it has to focus so much on accumulation of foreign reserves. Thus, central banks of African countries are highly open to vagaries of the world currency market.

Table 3: Mean and Coefficient of Variation of External Dependence of Central Banks of Selected Countries in Africa

Country	Before GFC		During GFC		After GFC		Study Period Mean (2000-2014)
	Mean	C o V	Mean	C o V	Mean	C o V	
Botswana	0.12	0.67	0.10	7.75	0.07	2.86	0.06
Ghana	0.37	5.00	0.43	22.98	0.40	28.28	0.38
Kenya	0.75	7.45	0.69	9.98	0.73	30.5	0.73
Malawi	1.20	3.14	1.51	3.71	1.36	4.02	1.29
Mauritius	0.40	3.99	0.52	41.96	0.45	16.08	0.44
Namibia	0.44	2.14	0.37	17.84	0.41	7.18	0.41
Nigeria	0.28	1.83	0.50	4.80	0.39	10.86	0.35
S/Africa	0.71	2.24	0.42	33.94	0.64	22.16	0.62
Uganda	0.35	14.55	0.43	25.50	0.38	20.03	0.38
Zambia	0.50	2.95	0.62	10.06	0.54	14.84	0.53

Source: Researcher's computation

Relatively, the most flexible central bank in the sample is the Reserve Bank of Malawi with a mean score of 1.29. Kenya and South Africa follow but with low scores of 0.73 and 0.62 respectively. Clearly, the Bank of Botswana is the least flexible as the ratio of its total base money to gross international reserves is 0.06. It is observed that the inflexibility of the monetary policies of all the central banks has been before the outset of the global financial crisis of 2008. However, the crisis resulted in more flexible policies in Botswana, Ghana, Malawi, Mauritius, Uganda and Zambia whereas there was even less flexibility by the central banks of Namibia and South Africa.

Table 3 also accentuates the volatility that the global financial crisis imposed on the monetary policy practices of the central banks. From the table, the coefficient of variation for ED increased highly for all the countries during the crisis compared to the period before the crisis. After the crisis, volatility of the ED was heightened in five of the countries while it moderated in the other five. Notably, the five countries (Ghana, Kenya, Malawi, Nigeria, and Zambia) in which the ED became more volatile after the GFC are all commodity exporters. Conversely, the indicator of external dependence became moderated after the GFC in South Africa, Botswana, Mauritius, Namibia, and Uganda where the economies are more diversified.

Extracting Liability Components (ELC)

From the results in Table 4, only three central banks in the sample have loss of elasticity on this account as the debt securities and government securities in their balance sheets are larger than the base money.

Table 4: Mean and Coefficient of Variation of Extracting Liability Components of Central Banks in Africa

Country	Before GFC		During GFC		After GFC		Mean for Study Period
	Mean	C o V	Mean	C o V	Mean	C o V	
Botswana	7.68	5.27	3.21	4.61	5.04	7.60	5.55
Ghana	1.64	8.12	1.49	10.68	1.59	20.00	1.59
Kenya	0.09	1.28	0.02	0.87	0.08	3.37	0.08
Malawi	1.56	1.81	2.08	11.46	1.80	9.66	1.71
Mauritius	0.43	1.08	0.27	1.74	0.38	15.56	0.38
Namibia	0.07	0.89	1.14	1.25	0.48	7.82	0.48
Nigeria	0.74	2.03	0.57	2.22	0.67	4.65	0.69
S/Africa	0.23	5.17	0.24	4.71	0.24	6.52	0.23
Uganda	0.15	1.05	0.04	2.16	0.13	6.69	0.12
Zambia	0.70	0.92	0.20	1.40	0.46	8.10	0.55

Source: Researcher's computation

The mean ELC scores for Ghana and Malawi are 1.59 and 1.71 respectively. But whereas the Bank of Ghana's problem with the ELC was consistent throughout the study period, that of the Bank of Malawi began to manifest in 2007 and ran through the global financial crisis till date. The trend of the ELC performance of the central banks in the sample is presented in Figure 4. Going by the trend, the Bank of Botswana posted the very high mean score of 5.55. It is apparent that the ELC score posted seems to reflect the preference or style of the regime of governance at the Bank. It is observed from the published financial statements that the governor of the Bank had remained the same over much the 15-year period.

By the coefficient of variation, the global financial crisis led to increased volatility in the ELC for countries seven of the central banks whereas the volatility decreased for Botswana, Kenya, and South Africa. The ELC moderated after the crisis for the seven countries whereas it has become heightened for the rest three, that is Botswana, Kenya, and South Africa. The Bank of Ghana showed a deep outlier position before the financial crisis but this seemed to have been remedied in the period of the crisis with the issuance of more base money. Also the ELC of Nigeria went up sharply at the peak of the crisis in 2009 but was normalized from 2010.

Seigniorage Loss (SL)

It is useful to consider SL for every central bank with a reasonable value considered to be not more than 0.5. The larger this variable is, the larger is the government's seigniorage loss which is actually the amount of government interest-bearing debt. The central banks in the sample seem to have minimized the seigniorage loss to a large extent. This is because, despite their having to fund the government for the most part, most of them have other items on their balance sheet that should prevent losses. Except for Botswana (0.71), Ghana (0.65), and Malawi (0.64), all the central banks in the sample have SL scores within the stipulated range of 0 and 0.50. The implication of this is that the losses recorded by some of the central banks in certain years are not majorly as a result of having interest-free assets, but other factors. The results for the sample are as in Table 5.

Table 5: Mean and Coefficient of Variation of Seigniorage Loss of Central Banks in Africa

Country	Before GFC		During GFC		After GFC		Mean for Study Period
	Mean	C o V	Mean	C o V	Mean	C o V	
Botswana	0.78	27.89	0.55	5.88	0.71	123.74	0.71
Ghana	0.39	3.89	0.70	6.55	0.66	18.59	0.66
Kenya	0.26	0.93	0.03	1.07	0.05	2.23	0.05
Malawi	0.59	2.17	0.78	6.34	0.65	41.45	0.65
Mauritius	0.26	1.94	0.17	1.78	0.20	14.56	0.20
Namibia	0.10	4.91	0.42	1.25	0.16	14.94	0.16
Nigeria	0.28	1.11	0.16	2.25	0.17	28.95	0.17
S/Africa	0.12	3.51	0.10	4.69	0.11	8.11	0.12
Uganda	0.06	2.27	0.07	0.87	0.05	4.45	0.04
Zambia	0.15	1.53	0.08	1.58	0.11	13.40	0.11

Source: Researcher's computation

By the coefficient of variation, the performances of the central banks during the global financial crisis are mixed. The seigniorage loss of the central banks of Ghana, Malawi and Namibia greatly increased as well as become more volatile increased in the period 2008-2011 whereas the central banks of Botswana, Kenya, Mauritius, Nigeria, Uganda and Zambia had reduced seigniorage losses within the same period. The Reserve Bank of South Africa had virtually unchanged rates during the period which could be termed as the period of the global financial crisis although managing the SL was more volatile during the crisis. Post-financial crisis, however, all the central banks in the sample have had consistent figures for SL.

Net Extraction of External Liquidity (NEEL)

This applies whenever international reserves are the largest component of the assets side. The recommended maximum for NEEL is 1. Any figure higher would suggest foreign exchange sterilizations costs that are deemed very high. An observation from the balance sheet figures of the central banks under the study is that foreign reserves/assets form the largest part of the assets side of each of them. From Table 6, except for Ghana, there seems to be no surge in the cost of preserving the foreign exchange regime all through the years of the period of study. The mean NEEL figure of Ghana is 3.90. The means were 3.76, 4.23, and 3.98 for the periods before, during, and after the global financial crisis respectively. Nigeria, Namibia, South Africa, and Uganda are the other countries that had an increase of NEEL in the period of the crisis while all the other central banks had decreases. The changes in all the countries however were insignificant. In the period after the crisis, the changes were reversed as the central banks of Botswana, Kenya, Malawi, Mauritius, and Zambia had increased NEEL scores while Ghana, Nigeria, Namibia, South Africa, and Uganda reverted back to their pre-GFC positions.

Table 6: Mean and Coefficient of Variation of Net Extraction of External Liquidity

Country	Before GFC		During GFC		After GFC		Mean for Study Period
	Mean	C o V	Mean	C o V	Mean	C o V	
Botswana	0.34	6.41	0.26	3.19	0.31	14.61	0.31
Ghana	3.76	4.19	4.23	11.95	3.98	31.41	3.90
Kenya	0.38	4.52	0.16	4.06	0.32	7.30	0.32
Malawi	1.04	3.15	0.69	1.51	1.13	2.91	0.93
Mauritius	0.23	3.05	0.22	4.31	0.22	3.57	0.22

Namibia	0.50	2.21	0.62	1.85	0.55	21.11	0.54
Nigeria	0.45	4.72	0.83	5.19	0.57	29.29	0.57
S/Africa	0.24	3.26	0.33	8.84	0.27	11.58	0.27
Uganda	0.89	16.18	1.03	7.07	0.93	40.26	0.93
Zambia	0.62	1.86	0.49	2.16	0.59	50.42	0.59

Source: Researcher's computation

Using the criterium of NEEL, relatively, Mauritius (0.22) and South Africa (0.27) are the most flexible of the central banks in the sample. The trend of NEEL of the central banks presented in Figure 6 shows that the central banks of Malawi (0.93) and Uganda (0.93) have a strong inclination to pass the 1.0 benchmark and thus pay more to intervene in their foreign exchange market.

Liquidity Requirement (LR)

The LR scores for the central banks are presented in Table 7 below.

Table 7: Mean and Coefficient of Variation of Liquidity Requirement of Central Banks in Africa

Country	Before GFC		During GFC		After GFC		Mean for Study Period
	Mean	C o V	Mean	C o V	Mean	C o V	
Botswana	0.06	0.50	0.29	2.37	0.14	6.14	0.13
Ghana	0.17	20.47	0.20	24.50	0.19	8.80	0.18
Kenya	3.96	2.56	3.56	2.30	3.83	24.23	3.84
Malawi	22.99	0.61	113.1	1.45	62.95	15.84	62.44
Mauritius	13.26	1.22	52.75	4.86	25.70	13.80	25.20
Namibia	19.47	18.50	1.86	1.77	14.23	4.06	14.19
Nigeria	2.43	0.95	3.90	1.53	2.90	7.78	2.87
S/Africa	3.10	3.64	4.17	4.89	3.72	48.02	3.43
Uganda	2.71	1.21	15.13	6.75	6.44	16.48	6.43
Zambia	456.14	4.87	78.24	0.84	340.18	16.98	342.8

Source: Researcher's computation

As shown in Table 7 above, all the central banks in the sample, except for Botswana (0.13) and Ghana (0.18), have scores that are significantly higher than 1. Again, an implication of this is that central banks of African countries lack flexibility in conducting monetary policy activities. This suggests that over time, the banking system of the countries possibly have had to experience coercion from the central banks in order to maintain their accounts at the central banks. This accounts for the large amount of bank reserves relative to the credit advanced by the central banks. Most likely, it is possible that the reason for this is in a bid to manage the foreign exchange market(s) without incurring large expenditure (as may happen with debt that would involve payments of interest). The results above also show that among the central banks, Zambia, Malawi, and Mauritius have liquidity requirements that can be termed 'excessive'. For Zambia and Malawi, this trend was throughout the period of the study. It can be inferred that the largely undeveloped nature of the financial system of the two countries and the relatively low capacity of the economy may be the reasons for these large reserves. In the case of Mauritius (and to an extent, Namibia), the observation is that the building of the bank reserves began at the outset of the global financial crisis. One of the common strategies adopted in several economies to manage the crisis was for the central bank to make much credit available either by reducing the bank rate or through

quantitative easing or other methods. However, in most of the banking systems, the banks largely utilized the available money to increase their reserves at the central bank. Though this step was taken by banks to avoid being run out of cash, it was found to have immensely helped the economies in having low inflation during the period of the crisis. On this particularly, the reserves in the central banks of Kenya, South Africa and Uganda is observed to have risen significantly during the period of the global financial crisis.

By the coefficient of variation, the LR was highly volatile in the Bank of Ghana, Mauritius and Uganda during the global financial crisis. In the aftermath of the crisis, all the central banks apart from the Bank of Ghana have had to deal with increased volatility of liquidity. This is one of the fallouts of the expansion of balance sheets that came up as a result of the management strategy adopted during the global financial crisis. Thus, the global financial has again been proven to have resulted in increased volatility in monetary policy practices across the African continent.

Conclusion

A major observation from literature is that the essential features, goals, and needs of monetary policy are similar in Africa to those in other regions of the world. Among others, it is agreed that price stability remained the prime objective of monetary policy of central banks of African countries. For this reason, central banks of African countries too had to resort to unconventional measures that authors have observed to be larger and financially riskier than any previously undertaken. This is because they are most vulnerable to contagion effects due to their external exposure. A conclusion of the study is that the global financial crisis of 2008-2009 has resulted in increased volatility in monetary policy practices among central banks in Africa. The evidence from the balance sheets and the indicators computed suggests that there is no significant difference in the balance sheet structure of the central banks in Africa. For most of the central banks, foreign reserves form the largest component of their assets while deposits form the largest component on the liabilities side. Furthermore, quantitative indices of the balance sheets show evidence of low flexibility across the whole sample. Finally, the balance sheet structures of the central banks have been steady over time but they may not be able to withstand another round of financial crisis given the structures of their assets and liabilities.

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