
External Reserve and the Nigerian Economy: The Dual Folded Debate

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Received, November 2007; received in revised version, May 2008; accepted, July 2008

Abstract

The external reserves-economy relationship argument has generated debate due to unsatisfactory theoretical and empirical consensus. This paper provides an economic assessment and empirical insight to the debate in Nigeria. Towards this, the paper used secondary data from CBN statistical bulletin (1994 - 2005). The outputs generated revealed that external reserves exceeding the three months benchmark equivalent was in excess: its holding cost was high. In addition, the results suggested dual fold interpretation of the analyses: 1) holding of external reserves do promote exchange rate stability, 2) positive relationship exists between external reserves and exports; however, the relationship was not significant, hence suggesting that export was not induced significantly by the nation's external reserves. The paper suggests that domestic production efficiency is required not really external reserve accumulation to improve macroeconomic performance.

Keywords: Exchange rate; Export; External reserve; Holding cost; Import.

Introduction

The Nigerian external reserves accumulation has exhibited an unprecedented growth with the arrival of Soludo as governor of Central Bank of Nigeria (CBN) in 2004. After decades of economic mismanagement, the CBN has successfully guided the Nigerian economy to a stable inflation rate. Domestically, the instituted financial intermediary recapitalization agenda has amplified the merits

of central bank's independence, and many commercial banks currently have autonomy in the execution of their monetary policy. However, the domestic picture vis-à-vis the international in terms of foreign reserve accumulation denotes a debatable progress.

From the late 1990s to the present, accumulation of foreign reserve by Nigerian government has shown some profound features, with reference to size, pace, and ownership categorizations. The figure for 1996 was \$3.40 billion, but has risen sharply to \$28.28 billion and about \$47.00 billion in 2005 and 2007, respectively as evident from CBN (2005) and the Nigerian Tribune newspaper, of Monday October 22, 2007. The reasons behind this development were documented by Soludo (2005) and Nda (2006) without ethnographic examination of taming capacity underutilization, instability in domestic prices, internal debt, electricity problem, and the risk/cost of reserve holding or accumulation.

Not surprisingly, the stance of external reserve holding has generated serious global academic debate, as different economies search for alternative strategies that will protect their economies against financial instability and stimulate economic growth. The conventional perspective sees national reserves as a store of assets that central banks could use to influence the exchange rate of their domestic currency (Nugee, 2000; Williams, 2003; IMF, 2004). From this understanding, the Nigerian economy recently moved from fixed exchange regime to partially floating exchange rate which needed the external reserves as a cushion strategy. Hence, the question of opportunity cost of reserve holding within the Nigerian context has never been a walk-over question. Some perceptual-based answers were given by a growing number of scholars including Yuguda (2003), Soludo (2005), and Nda (2006). Their argument is that external reserves help build international community confidence in the nation's policies and creditworthiness, in contrast to the current lack of confidence in Nigerian economy. The reserve thus performs a defensive-mechanism role (Mendoza, 2004) as against lack-of-confidence cum adequate cushion against financial turbulence.

The opportunity cost of stock-piling Nigeria's external reserve in order to cushion financial crisis vulnerability appears as a risk-aversion strategy. Nevertheless, this strategy undermines the marginal benefit if the reserve is pumped into investment to stimulate economic productivity. Alternatively, the elasticity of reserve accumulation to the degree of unlikely financial shocks affects the forgone utilization-benefits. Traditionally, the Nigerian reserve is to some degree exclusively held in government bonds (Nda, 2006). Hence, it attracts low yield, and provide security and liquidity that are highly priced by reserves managers. As a result, the cost-benefit analysis between security and liquidity vis-à-vis the return constitutes a bitter pill for the acceptance by the general public.

The CBN has narrowly focused on reserve's defence-mechanism without a proportionate evaluation of the lost confidence in areas of corruption, financial fraud, power outage, political instability, poverty, and low human capital development. The accumulation of reserves may not compensate for the Western countries' perception of Africa emerging economies, and the confidence-

hypothesis is susceptible to attack from developed economies at any time considered necessary. Although adequate reserves do contribute to confidence in a nation by guaranteeing the availability of foreign exchange to domestic borrowers to meet international debt servicing and enhance its credit rating (Humphries, 1990; Archer and Halliday, 1998), the confidence is often influenced by the soundness of a nation's economic policies and overall investment climate (UNCTAD, 2007). Thus, this becomes very crucial when examining the position of reserve holding in Nigeria especially when accumulated external reserves are usually financed by government oil-fund surplus.

The main questions posed by this study are: 1) does the benefits of exchange rate stability associated with keeping external reserve more than compensate for the cost of holding reserves?, and 2) does Nigeria need to follow the Asian nations by adopting the policy of accumulating external reserves as an excellent policy option? The study thus, uses empirical data to explore the optimal level of external reserves holding in Nigeria. The paper is structured into five sections. Next to this introductory part is the review of existing literature and theoretical framework followed by methodology, data used, results, and conclusion in that order.

Literature Review and Theoretical Framework

Conventionally, countries hold external reserves in foreign currencies in order to maintain a desirable exchange rate policy by interfering significantly in foreign exchange markets. Archer and Halliday (1998) identified the main reasons for a country holding external reserves as foreign exchange market stability, exchange rate stability, exchange rate targeting, creditworthiness, transactions buffer, and emergency (e.g. natural disasters). Humphries (1990) had earlier shared this view, noting that central bank holding of reserve in a nation is essential to ensure stable foreign market operations and creditworthiness.

IMF (2003) established the possible factors that determine reserve holdings in 122 emerging-market economies (1980-1996). These are: real per capita GDP, population, ratio of imports to GDP, and volatility of the exchange rate. Among the aforementioned determinants, GDP per capita, population level, ratio of import to GDP, and the volatility of exchange rate were statistically significant while opportunity cost and capital account vulnerability were not. The study therefore, concluded that external reserves in emerging Asia economies have reached a point where a slowdown in the rate of accumulation was required. However, the Latin America external reserves holdings were not in excess compared with the Asia countries. Mendoza (2004) iterated that reserve management in many countries was motivated by the need to guard against possible financial crisis. However, Dooley *et al* (2004) argued that reserve accumulation agenda in Asian central banks was to prevent their currencies from appreciating against the U.S. dollar in order to promote their export-led growth strategy.

Turner (2007) recently analyzed the causes of banking and currency crises in four Asian countries- Indonesia, South Korea, Malaysia, and Thailand (1997–1998), and identified some policy measures that would help rebuild their banking sector for the overall benefit of their economies. The measures included restoration of macroeconomic stability, accumulation of external reserves, and promotion of economic growth; reduction of foreign exchange intervention via replacement of fixed exchange rate system with a floating regime; recapitalization of financially distressed banks; reduction of the banking system's reliance on short-term financing; and strengthening the financial infrastructure through upgrading governance, prudential supervision, and establishing shock absorbing mechanism for the banking system and other institutions.

External reserves are generally held in the form of high quality, marketable securities issue, however, such holdings are not without cost; the costs usually include, among others, financing, personnel, systems, and overhead expenses, which fluctuate periodically. Marc-André and Nicolas (2005) classified the costs as loss of monetary control, exchange rate misalignment, and sterilization costs. Therefore, holding external reserves has both variable and on-going costs especially when it exceeds the benchmark of three months import equivalent. For instance, Archer and Halliday (1998) estimated the average annual cost of holding reserves in New Zealand as NZD5 million (about USD 3.763million) in 1998. While Rajan (2002) computed the social cost of holding external reserves in five Asian countries (Indonesia, Malaysia, Philippines, South Korea, and Thailand) in 1999 and suggested that a country should look beyond reserve and debt management to structure its international liquidity positions to effectively protect itself from shocks in international capital markets.

The evidence from Asian financial crisis indicates that published data on official foreign exchange reserves may be misleading and inadequate to cushion the self-insured role of external reserves (Stiglitz, 2002). The cost of misleading information and the vehement International Monetary Fund-IMF support programs for South Korea, Singapore, Thailand, and Indonesia in 1997 exposed the weakness of confidentiality argument purported for reserves accumulation. In reaction to this, Stiglitz (2002) blamed IMF for one-size-fit-all strategy that has not helped Indonesia despite the nation's reserves accumulation. Also, from evidence, the rejection of IMF's strategy by Malaysia made the country better-off compared to other affected Asian countries (Kaplan and Rodrik, 2001). However, the cushion-strategy as ideologically promoted could not sustain Russia and Brazil (Stiglitz, 2002), as billions of dollars were used by IMF as intervention strategy.

Marc-André and Nicolas (2005) used panel cointegration tests to estimate a long-run external reserve demand function in eight (8) Asian emerging-market economies (China, India, Indonesia, Korea, Malaysia, Philippines, Singapore, and Thailand) and established a positive structural break in their demand for international reserves. The study equally observed that the actual level of reserves accumulated between 2003 and 2004 was in excess relative to the predicted values. Also, Eichengreen and Mathieson (2000) found the composition of reserves responding to the following: the choice of currency peg, the identity of

the dominant trading partner, and the composition of foreign debt especially in developing countries, which was stable over time. Earlier, Iyoha (1976) had examined the demand for international reserves in 29 less developed countries-LDCs (comprising Nigeria and some Asian countries) and found that a 10% rise in the opportunity cost of holding reserves would lead to a 9% decrease in the level of reserves holding.

A de-constructive analysis of the trade-off has stimulated nation's self-assessment (Rodrik, 2006) with a realization of the inherent cost of reserve holding instead of alternative activities that are higher-yielding investments. Nevertheless, Edwards (1985) empirically identifies the insignificance of the holding cost which might have resulted from poor measurement procedure. From IMF's (2003) prescription, it means that reserve holding comes at a risk that complicates the portfolios and the task of managing the reserve. The CBN is not in doubt of the credit risks that are inherent in the nation's reserves management activities and complicating this is the consolidation of the banking industry.

Another commonly forwarded argument in literature is the exchange rate, which most market fundamentalists know to be a derivative of market forces. According to this argument, the exchange rate is consciously undervalued in order to stimulate export. Mercantilism appears doubtful, since it prevents the traditional market dynamics (Aizenman and Lee, 2006). Also, the attempt by government institutions to manipulate currency exchange rate does complicate the market price of items. In this regards, bodies of theoretical arguments are evident that exchange rate devaluation may have contractionary effect (Edwards, 1989; Kamin and Rogers, 2000). However, the inflationary possibility could be cushioned if new money issued against the external reserve increment is used for investment, so that output increases and inflation does not rise.

From the various views above, the general need to hold reserves simply arises from the fact that investors (especially foreign) believe that a country should have reserves to make such a country a viable place to invest with regards to credit rating, without much regard to whether or not such reserves would contribute meaningfully to economic growth of the country. Credit rating agencies do place considerable weight on the volume of a country's official foreign currency reserves, but the existence (or otherwise) of it may not be a key determinant of a nation's ability to meet up with its financial obligations and developmental efforts. Other factors such as the country's productivity, domestic efficiency, political will, among many others, could play a significant role in this respect.

The reason why this study is drawing inferences from the Asian economies is that the CBN governor (Soludo, 2006) has most times used them to canvass supports from the Nigerian populace for external reserve accumulation. In addition, among the top ten holders of external reserve in the world as at 2005, all of them with the exception of Mexico were in Asia (Russell and Torgerson, 2007).

Methodology and Model Formulation

The study adopts both economic assessment and econometric model in evaluating the role of external reserve in the Nigerian economy. The economic assessment was used to evaluate the cost of holding external reserves above the three months import equivalent benchmark. The excess value of reserve or the excess holding represents the difference between external reserve on one side and 3 multiplied the value of external reserve and divided by the value of months of import equivalent (the values of reserve and months of import equivalent are provided by the Nigerian central bank).

The econometric model used was to determine the relationships between the external reserves and selected macroeconomic variables (gross domestic product [GDP], exports and imports) towards adopting a policy option. It was assumed that external reserves were held with a view to making the economy more attractive to foreign investment, which would, in turn, improve the economic performance of the nation. Hence the expectation that external reserve has a relationship with the level of economic productivity captured by GDP. Further, when the economy performs better, it is expected that the domestic demands would be internally met to a reasonable capacity with the possibility of channeling excess production towards improving exports. Similarly a higher domestic economic productivity should reduce the propensity to import. From this perspective, this study differs significantly from existing empirical documentations (e.g. IMF, 2003).

Basically, external reserve is the function of macroeconomic variables, exports and imports (i.e. reserve depends on export and import). However, the level of exports and imports is determined by domestic productivity, which is measured by the gross domestic product. Assuming the intention is to account for the level of productivity in the economy, these macroeconomic variables were divided by GDP. Hence the econometric model is formulated for the logarithmically transformed ratios as:

$$\ln(R_i) = a_0 + a_1 \ln(E_i) + a_2 \ln(I_i) + e_i \dots \dots \dots 1$$

Where:

\ln represents the natural log transformation and i represent the time period 1994 through 2005.

R is the ratio of external reserve to GDP

E is the ratio of exports to GDP

I is the ratio of imports to GDP.

e_i is the error terms that captures variables not included and expected to be identically and independently distributed (iid) and $N(0, \sigma^2)$. The a_s are the parameters to be estimated such that a_0 and $a_1 > 0$ while $a_2 < 0$. The *a priori* expectations above suggest that export should have positive influence on level of external reserves as excess proceeds from exportation would increase the level of reserve. On the other hand, an increase in the level of import would exert a

negative influence on external reserves as payments are made to foreigners to finance importation. The log-linear functional equation was adopted because the coefficient shows elasticity and it helps to reduce the problem of heteroscedasticity (Rehman, 2007).

Data and Results

The data used for the economic assessment as well as for the econometric model was collected from CBN statistical bulletin 1994-2005 and presented in Table 4.1. The scope of the study was anchored around this because the CBN adopted the new format for the balance of payment presentation suggested by the IMF in 1994 and included the three months of import equivalent of external reserves in the statistical bulletin (CBN, 2005:367-368).

Table 1: Some Macroeconomic Variables and Holding Costs of Reserves in Nigeria (1994-2005)

| Year (A) | External Reserves (B) | Exports (N'M) (C) | Imports (N'M) (D) | GDP (N'M) (E) | Months of Import Equiva- lent Reserve (F) | Excess Value of Reserve ^a (G) | Holding Costs ^b (H) | Exchange Rate (U.S\$/N) (I) |
|-------------|-----------------------------|-------------------------|-------------------------|---------------------|--|---|--------------------------------------|--------------------------------------|
| 1994 | 30456 | 206059 | 162789 | 1457130 | 3.00 | 0 | 0.00 | 21.89 |
| 1995 | 40333 | 950661 | 755128 | 2991942 | 2.10 | -17286 | -0.01 | 21.89 |
| 1996 | 174309 | 1309543 | 562627 | 4135814 | 7.60 | 105503 | 0.03 | 21.89 |
| 1997 | 262199 | 1241663 | 845717 | 4300209 | 9.60 | 180261 | 0.04 | 21.89 |
| 1998 | 226702 | 751857 | 837419 | 4101028 | 9.20 | 152778 | 0.04 | 21.89 |
| 1999 | 546873 | 1188970 | 862516 | 4799966 | 7.60 | 331002 | 0.07 | 92.69 |
| 2000 | 1090148 | 1945723 | 985022 | 6850229 | 13.60 | 849674 | 0.12 | 102.11 |
| 2001 | 1181652 | 1867954 | 1358180 | 7055331 | 11.30 | 867939 | 0.12 | 111.94 |
| 2002 | 1013514 | 1749964 | 1669485 | 7984385 | 7.30 | 597001 | 0.07 | 120.97 |
| 2003 | 1065093 | 3098185 | 2295891 | 10136364 | 5.60 | 494507 | 0.05 | 129.36 |
| 2004 | 2252644 | 4620085 | 2193967 | 11673602 | 13.60 | 1755737 | 0.15 | 133.50 |
| 2005 | 3835433 | 6310248 | 2496424 | 10904983 | 19.70 | 3251357 | 0.30 | 131.66 |

(N'M)= Naira in millions.

- a. The excess value of reserve in column G is the difference between external reserves and 3 multiply by the value of external reserve (B) divided by the

months of the import equivalent (F) i.e. $B - (3*(B/F)) = G$. E.g. for 2005, $[3,835,433 - \{3*(3,835,433/ 19.70)\}] = 3,251,357$.

- b. Holding cost denotes the ratio of excess reserve to GDP (i.e. $G/E = H$): the higher the value, the greater the cost of holding external reserves, vice versa.

All the values in the table except for columns F, H and I (with 2 decimal places) are approximated to the nearest whole number.

Source: Computed from CBN (2005) Statistical Bulletin.

Economic Assessment

The level of excess external reserves and the holding cost in the Nigerian economy were calculated as proposed by Rajan (2002) and presented in Table 1. The calculated excess reserves as indicated in column G in the table above shows that external reserves above three month import equivalent benchmark was in excess except for 1994 and 1995. In addition, column H revealed that the holding cost relative to the three months import equivalent benchmark was high i.e. above zero. Column I shows that the accumulated external reserve seems to justify the stabilization of the exchange rate. This conclusion was in tandem with Archer and Halliday (1998). However, the holding cost of the excess reserves induces scepticism as its cost increased, fluctuated and increased substantially towards 2005. Hence, it is doubtful if the high external reserves improve the basic efficiency in domestic production.

Econometric Results

Prior to the model estimation, the authors tested for stationarity among the variables using Phillips-Perron (PP) approach. The method is similar to the Augmented Dickey Fuller (ADF) approach, but accounts for the time series properties of the variables in the presence of structural change (Osabuohien, 2007; Rehman, 2007). The stationarity test was performed to ascertain the assumptions of constant mean, variance, and the co-variance for the macroeconomic time-series variables in question. The results are presented in Table 2.

Table 2 Phillips-Perron (PP) Test of Stationarity

| Variables | Intercept no trend | Intercept & Trend | Decision |
|----------------------------------|-----------------------|----------------------|----------|
| Ln(R) | -1.8192 | -2.0115 | |
| 1 st Difference Ln(R) | -5.4054 | -6.3064 | I (1) |
| Ln(E) | -2.2065 | -2.4509 | |
| 1 st Difference Ln(E) | -5.1837 | -4.9764 | I (1) |
| Ln(I) | -5.8309 | -7.3386 | I (0) |
| Critical values at 5% | | | |
| Original Level | -3.1801 | -3.9271 | |
| 1 st Difference | -3.2695 | -4.0815 | |

Note: A variable is stationary at a given level when the PP value is greater than the Critical value.

The results in Table 2 indicate that the ratio of external reserves to GDP, Ln(R) and export to GDP Ln(E) became stationary at first difference, while the import variable Ln(I) was at level. Furthermore, the variables that were stationary at first difference (*viz:* reserves and export) were subjected to the Johansen and Juselius (1990) multivariate cointegration trace tests. The trace test was conducted to ascertain if the linear combination of non-stationary variables will produce a cointegrating series. The cointegration test is presented in Table 3.

Table 3: Johansen’s Multivariate Cointegration Trace Test

| H0: | H1: | Λ trace | 5% Critical Value |
|------------|------------|-----------------|-------------------|
| $r = 0$ | $r \geq 0$ | 19.15* | 18.17 |
| $r \leq 1$ | $r \geq 1$ | 3.61 | 3.74 |

Notes: The cointegrating variables: Ln(R) and Ln(E).

*indicates a statistical significance at 5% level.

The first order contergration is computed under the assumption of unrestricted intercept but no trends.

The trace test gives the indication that the null hypothesis of no cointegration is rejected for $r = 0$ at 5% level, which implies that there is at least one cointegrating vector amongst the variables. Thus, the individual variables may not be stationary but their linear combination would be stationary, such that the estimates derived from them could be suitable for policy analysis.

Given the sample size of the study, the Engle and Granger (1987) Error Correction Model (ECM) was employed to estimate the short-run elasticities and the adjustment coefficients, as against the vector error correction approach. Three regression equations with each variable as a dependent variable were estimated. The results of the estimated equations labelled A to C as well as the standard diagnostic tests are presented in Table 4.

Table 4: Regression Estimates from Error Correction Model and Diagnostic tests

| Regressors | Dependent dLn(R) (A) | Dependent dLn(E) (B) | Dependent Ln(I) (C) |
|---------------------|-------------------------|-------------------------|------------------------|
| dLn(R) | | 0.3110 (1.19) | -0.1794 (-2.27**) |
| dLn(E) | 1.3067 (2.19**) | | 0.2880 (1.57) |
| Ln(I) | -2.3630 (-2.27**) | 0.9033 (1.57) | |
| Constant | -4.6226 (-2.64**) | 0.9910 (1.96**) | -1.7092 (-7.83*) |
| ECM (-1) correction | -0.8655 (-3.75*) | -0.2876 (-1.77) | -0.2054 (-2.62*) |
| R-square | 0.72 | 0.42 | 0.52 |
| Adj-R-square | 0.60 | 0.29 | 0.32 |
| F-Statistics | 6.00* | 3.22** | 3.15** |
| Probability | 0.024 | 0.088 | 0.094 |

Diagnostic Tests

| | |
|--------------------|------------------|
| J-B normality | 0.6336 (0.73) * |
| B-G Serial LM | 0.2633 (0.31) * |
| ARCH Test | 2.1127 (0.18) * |
| White | |
| Heteroskadasticity | 0.2402 (0.85) * |
| Ramsey RESET | 0.2864 (0.61) * |
| Chow Breakeven | |
| Point | 1.0340 (0.44) * |

Notes: *and ** denotes significance at 5% and 10% respectively. T-statistics are in brackets.

The F-statistics in Table 4 were statistically significant at 10%, which suggests a moderate goodness of fits. This denotes that the model could be relied upon in making useful inferences. In addition, the error correction term in all the

equations had the expected negative sign, which indicates convergence at the long-run with equation A having the highest speed of adjustment. The estimates were statistically significant at the 10% except for equation B. A look at the diagnostic tests indicates that the J-B (Jarque-Bera) test of normality of the error term was not rejected at 10%. Similarly, the B-G (Breuch-Godfrey) serial correlation LM and the White's heteroskedasticity tests were moderately within accepted range (See Gujarati, 2003 for details).

In equation A of Table 4, the R-squared value shows that about 72% of the changes in the dependent variable, the ratio of external reserve to GDP was explained collaboratively by the exports and imports ratio variables. The regression result equally suggests that exports has positive impact on external reserves, while imports exhibit negative effects at the 10% significance level. This as expected, seems to validate the observation of Marc-Andre and Nicolas (2005). This implies that an increase in the level of exports would induce more reserve accumulation, while the contrary holds for the imports.

The R-squared for equations B and C indicate that about 42% and 52% variations of the dependent variables were explained by the explanatory variables, respectively. In equation B, where export ratio was made the dependent variable, the results suggest that external reserves and import are positively related to export, though not statistically significant. As for equation C, an increase in the level of external reserves terms to reduce the propensity to import, which suggests that as the nation accumulates more reserves, the level of her imports would reduce, *ceteris paribus*. Relative to the results in equation B, the use of accumulated external reserve for imports to stimulate domestic production and efficiency and hence to significantly improve exports seems to be lacking. This observation turns to support the impression that the cost of reserves is highly in disproportion to the exchange rate stability obtained through reserve accumulation as was observed within the economic assessment.

Conclusion

The optimal use of a nation's external reserve to stimulate desirable macroeconomic performance has been debatable within the Nigerian context. This paper's contribution to the debate is the evidence derived from secondary data of dual fold impacts. The first is from the economic assessment and the second is from the econometric analysis.

The results of the study revealed that external reserves exceeding the three months benchmark of imports equivalent was excess. Hence, its holding cost was high. However, the holding of external reserves was able to achieve stability of exchange rate. The positive relationship between external reserves and exports that existed from the econometric analysis was not significant. This underscores the fact that export was not promoted to a satisfactory degree by the nation's external reserves holdings. Hence it is specifically doubtful, if the underlying assumption of external reserves' ability to accelerate macroeconomic performance can be substantiated in Nigeria. Thus, it is concluded that domestic efficiency

should be most preferred in attaining satisfactory macroeconomic performance while ensuring exchange rate stability with appropriate level of external reserve holdings.

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Acknowledgements

The authors immensely appreciate the useful comments of the anonymous reviewers. The contributions of the participants at the 3rd National Finance Conference of Nigerian Society of Financial Research held at Adekunle Ajasin University, Akungba, Ondo State, Nigeria, 20-22nd November, 2007, where the first draft of the paper was presented, is equally acknowledged.