Accumulation of External Reserves and Effects on Exchange Rates and Inflation in Nigeria

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Abstract

The study is to find out the effects of holding Foreign Exchange reserves on Exchange Rates in Nigeria. It is also to find out the effect of such reserves on inflation in Nigeria. Two hypotheses are proposed for the study. Hypothesis I has Null (H_0) Hypothesis that foreign exchange reserves do not have significant effect on foreign exchange rate. There is the Hypothesis II where Null (H_0) hypothesis is that foreign exchange reserves do not have significant effects on inflation in Nigeria. Secondary time series data are collated from CBN Statistical Bulletin. Simple linear regression was run for two models with Minitab 14 for windows. The regression equation shows that there is a negative relationship between Foreign Exchange rate leading to the rejection of first null hypothesis and accepting H_1. The Second regression equation shows that inflation has positive relationship with foreign reserves. This means also rejecting second null hypothesis and accepting the second alternative hypothesis. Government is advised to ensure optimal management of the nations external reserves. Other causes such as Money Supply (M_2) are suspected to be responsible for causing inflation in Nigeria.

Key words: Foreign reserves; Foreign exchange; Balance of payments; Volatility; Guidotti–Greenspan rule; External shocks

INTRODUCTION/BACKGROUND OF STUDY

External Reserves, going by other names such as foreign exchange reserves, foreign reserves, are foreign currencies, foreign deposits and bonds held by Central Banks and monetary authorities of a nation. The term includes gold and silver, special Drawing Rights (SDRs) and International Monetary Fund (IMF) reserves positions. Some call special; Drawing Rights (SDRs) as paper Gold. External Reserves may also be referred to as official international reserves which are assets of Central Banks held in different reverses currencies such as US Dollar, British Pound Sterling, Euro and Japanese Yen. Reza *et al.* (2011) quoting IMF Balance of Payments Manual 5th edition (BPM5), put it that foreign exchange reserves are those external assets that are readily available to and controlled by monetary authorities for meeting balance of payments financing needs, intervention in exchange markets to affect the currency exchange rates; and other related purposes (confidence in the currency and the economy). In principle, the adequacy of prevent or ameliorate external shocks. To improve on the adequacy other types of foreign assets and contingent credit have been applied to complement reserves in addressing external shocks. Conversely it must be noted that not all external assets held may prove liquid and useful during a crisis.

Historically, official international reserves consisted only of gold and at times silver. But under the Bretton Woods System (set up after World War II), the US Dollar functioned as a reserves currency so that the Dollar also became part of a nation's official international reserves assets. From 1944-1968, the US Dollar was convertible into gold through the Federal Reserve System. After 1968 no central bank could convert dollars to gold from official gold reserves and after 1973 no individual or institution could convert Dollars into gold from official gold reserves. Since 1973 no major currencies have been convertible into gold from official gold reserves. Individuals and institutions must now buy gold in private markets, just like other commodities. Even though Us Dollar and some

other currencies are no longer convertible into gold, they still functioned as official international reserves.

Nzotta (2004) explains that foreign reserves come about when foreign exchange disbursements are lower than foreign exchange receipts. The surplus gives rise to foreign reserves. According to him "foreign reserves represent balance of foreign exchange surpluses of a country that accumulated over time" In case of Low Income Countries (LICs) and Least Developed Countries (LDCs) most reserves come from donations and aids.

In the review of Literature, we dealt extensively on why the sudden up surge in the quest by countries especially low income and developing countries. But on a general level countries hold external reserves for some of these reasons. The Central Bank of Nigeria (CBN) holds reserves for various reasons (http://www.cenbank.org/intops/Reservesmgmt.asp retrieved 25/4/2012).

Some of them are summarized below:

(i) External reserves serve as a form of support or backing as some Economist will call it. For example, the local currency, Naira, can be backed by External Reserves accumulation.

(ii) International trade settlements can be financed by reserves especially when there is deficit between exports proceeds and imports. These are cases of disequilibrium in the Balance of Trade and Balance of payments.

(iii) External Reserves may also be used as a form of means of holding Sovereign Wealth Fund (SWF). Many oil-producing developing countries are setting aside some oil proceeds as a savings in view of the fact that oil is a wasting/non replenishable asset. Nigeria has started to create its own SWF with $1billion but its operation is hampered by a serious disagreement between the federal and state governors.

(iv) The Central Bank of Nigeria (CBN) as a monetary authority uses reserves to deal with exchange rates volatility. It holds fortnightly auction sales of foreign exchange through Dutch Auction Sales (DAS).

(v) External reserves Accumulation has to shore up the country's credit ratings and credit worthiness as Credit Agencies consider the holding of reserves in their rating of a country.

(vi) Holding of Reserves serves as a form of shock-absorber in times of shocks experienced in the oil market.

(vii) External Reserves are accumulated for other emergencies and natural disasters. See Appendix A and Table 1 for the movements in reserves in Nigeria.

(1) Foreign Exchange Rates in Nigeria

Before the enactment of Exchange Control Act of 1962, foreign exchange was earned by private sector operators. These were hold in their banks overseas which then acted as agents for local exporters. These were mainly foreigners doing business in Nigeria. During, Period, Agricultural exports contributed the buck of foreign exchange receipts. By then the currency, Nigerian Pound, was tied to the British Pound with ease of convertibility. But this caused delayed in the development of active exchange market. However, with the establishment of the Central Bank of Nigeria (CBN) in 1958, there was centralization of foreign exchange authorities in the CBN. Then there came a need to develop a local foreign exchange market.

Following sharp increases in the price of crude oil the 1970s, there was boom in foreign exchange. A lot of imports were done through Inward Bill for Collection (IBCs) whereby imports were made with acceptance bills of 90 days and above. These bills were paid in local currency but are to be remitted in foreign currencies. By 1981 crisis over the un-remitted bills developed necessitating the need to control the nation's foreign exchange. It was not until 1982 that comprehensive exchange controls were introduced. In 1986 Structural Adjustment Programme (SAP) was introduced. Second-Tier Foreign Exchange Market (SFEM) was introduced with dual exchange rates. Government businesses were done at ₦22 per/ US $ while others were at market determined rates. In 1995 Autonomous Foreign Exchange Market (AFEM) was introduced for sale of foreign exchange to end users by the CBN through authorized dealers (commercial banks) at market based exchange rates. In 1999, Inter-Bank Foreign Exchange Market (IFEM) came in. in 2006 Dutch Auction System (DAS) was introduced. The important point to note about all these changes since SAP to date is that the authorities, as much as they can, have tried to determined the exchange rate by the operation of market forces of demand and supply. The over all idea is to remove what people have argued is over valuation of the Naira. The Naira is allowed to find its level, the argument goes.

(2) Statement of Problem

Since the collapse of the Bretton Wood system many nations especially low income and developing nations have made tremendous increase in their accumulation of external reserves. The foreign exchange policy markets have become afraid of the uncertainties of the flexible exchange rate system introduced after the collapse of Bretton Woods System. In order to intervene in the foreign exchange markets and reduce foreign exchange volatility and achieve price stability accumulation of external reserves continued unabated. These accumulation are made regardless of whatever effects they have on the exchange rates itself price stability and volatility of both. In spite of the accumulations, policies and measures to manage external reserves, volatility and inflationary pressures persist. This paper, therefore, assesses the

motives for reserves accumulation and the effects of such reserves on exchange rates.

(3) Objectives of Study

Foreign Exchange Reserves are now accumulated regardless of the opportunity cost and effect the accumulation has on the economies of the accumulating countries especially Low Income and developing countries. Studies have shown that low income and developing countries are more assiduously involved in the accumulation. Some argue that the accumulations of External Reserves are to reduce exposition of the economy to external shocks associated with international payments. It is also argued that there is capital account vulnerability, the necessity to control the exchange rate and control inflation (Gupta & Agarwal, 2004). Nigeria, like other most other developing countries depend heavily on foreign trade which in turn demand external reserves. The macroeconomic effects of exchange rates and inflation are enormous. The main objectives of this study are to know why nations accumulate reserves. Other objectives are to investigate the effect that foreign exchange reserves have on the exchange rates in Nigeria. The Naira – US $ exchange rate is used.

(4) Significance/Justification for Study

Countries all over the world especially low Income and developing countries are obsessed with accumulation of external reserves. Various explanations as we shall see the literature review have been advanced for the accumulation. Foreign reserves have social and opportunity costs and have effects on the entire economy of nations. There are various studies on external reserves but not much appears to have been done to x-ray the effect on exchange rates and inflation. Hence this paper is to add to existing knowledge. Also there will be something information on accumulation of foreign reserves and inflation. The findings will thus enrich the existing literature and provide suggestions on how best to mitigate costs and adverse effects of holding external reserves. Policy makers and scholars will find the study rewarding.

(5) Statement of Hypotheses

Two Null and two alternative hypotheses have been proposed for the study.

    (I)   Ho (Null) External Reserves accumulation has no significant effect on Foreign Exchange rate in Nigeria.

    (II) Ho (Null) External Reserves have no significant effect on inflation in Nigeria.

(6) Scope of Study

The study is limited to a period of time ranging from 1986 to 2010. The study is based on secondary data of time series figures for foreign exchange reserves, exchange rates and inflation. The period has been selected considering that 1986 was the year Structural Adjustment Programmes (SAP) was adopted in the country. Since then, radical changes have been introduced in the economy and foreign exchange dealings. Prior to this time, foreign exchanges were fixed by fiat. But SFEM started deregulation of foreign exchange deals to the economy and also on accumulation of reserves and inflation.

(7) Plan of Study

The study is arranged in five chapters.

Section 1 is on the Introduction Background of Study, Objective of study, significance/Justification for study, statement of hypotheses and scope of study.

Section 2 is on theoretical foundations and review of literature including empirical studies. Section 3 deals with Reserves methodology and model estimation.

Section 4 deals with Data Presentation, Interpretation, Analysis and Discussion.

Section 5 concludes the study with recommendation.

1. THEORETICAL FOUNDATION, LITERATURE REVIEW/ EMPIRICAL WORKS

The theoretical frame work of external reserves relates to theoretical formulations of balance of payments (Nzotta, 2004). Dwivedi (2008) defines Balance of Payments (BOP) as "A systematic record of all economic transactions between the residents of a country and residents of foreign countries during the period". Sloman (2004) briefly stated "Balance pf Payment (BOP) accounts are on accounting record of all monetary transactions between a country and the rest of the world". Balance of Payments often results in disequilibrium giving rise to surplus or deficit and also necessitating the maintenance of external reserves. The disequilibrium is always associated with Current Account. If there is a surplus, it is taken in to increase reserves but if there is deficit, it is taken from reserves. According Dwivedi (2008) if there is a deficit in current Account it is offset from surplus in capital account, it may be borrowing from abroad or running down of foreign exchange reserves. If there is surplus in current Account, it is previous external borrowing. It is thus regard that the with Capital Account and External Reserves economists say that balance of payments must always balance.

Three theoretical approaches have also been put up as foundation for foreign exchange reserves. The approaches are: the elasticity approach, income absorption approach and the monetary approach (Nzotta, 2004). The elasticity approach examines the effect of an appreciation or depreciation of the exchange rate on the resource flows of a country. The approach posits that with down ward adjustment of exchange rates, a country with balance of payments disequilibrium would have to export more, import less and thus accumulate more foreign reserves. According to I.M.F, the position is based on the rigid

assumption of mass unemployment, perfectly elastic supplied, an initial balanced growth and the assumption that the elasticities of domestic and foreign demand for imports should exceed unity.

The income absorption approach views that under extreme conditions, direct control measures could be used to reduce foreign exchange expenditures and thus increase the stock of reserves. Obaseki (1991) recommends that the principal measures of financing temporary deficits through reserves should be for cases where there are large controls as well as domestic credit restrictions. Devaluations are necessary where deficit are persistent.
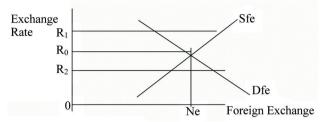
The monetary approach takes note of the rate of money supply in exercising influence over other macroeconomic aggregates which affect the movement of external resource flows and then foreign reserves. The approach believes that the inflow and outflow of foreign exchange associated with surpluses and deficits in the balance of payments are not immediately sterilized and thus affect the money supply (M2). This approach does not concentrate on trade balance in explaining the factors that exert influence on the external sector. The approach assumes that when the exchange rate is fixed, the monetary authorities con control foreign exchange reserves through monetary policies since monetary policies exert pressure on domestic credit and money supply. In this situation of assumed fixed exchange rates, foreign reserves have to be adequate to protect foreign exchange rates. The need for keeping reserves in a floating exchange rate is de emphasized. Nzotta (2004) opines that in a deregulated foreign exchange system under the reforms in Nigeria, foreign reserves are not emphasized to stabilize exchange rates but to meet the random disturbance in the resource flows of the country.

1.1 Foreign Exchange Rates in Nigeria

An exchange rate is a price-just exactly like any other price- which is the amount you give up to acquire something else. In this case you give an amount of Naira to acquire another currency, say US $. Afolabi (1998) said the, "exchange rate is the rate at which one currency will exchange for another". He add that in dependent economies such as Nigeria's, the exchange rate is an important price because it determines virtually all other prices Nzotta (2004) agrees with Afolabi and adds that exchange rate is the transformation of one country's currency to another. He further opines the foreign exchange rate is maintained by arbitrage. Arbitrage is a mechanism whereby speculators buy foreign exchange in one market where the rate is low and sell in the market where the rate is high. The difference constitutes arbitrage income.

In trying to establish the theoretical frame work we note that fixed rate and flexible rate exist. Before the introduction of SAP in 1986, exchange rates were fixed by fiat of government. This was believed to have given Naira over valued rate which encourage massive important and

capital flight out of the country. Since SAP exchange rates are largely determined by the market forces of demand and supply. The operation is illustrated in the diagram below.

Dfe = Demand for Foreign Exchange
Sfe = Supply of Foreign Exchange
Ne = the Equilibrium Demand and Supply
R_2 = Equilibrium exchange rate changes in quantity demanded of foreign exchange can push the prices (exchange rate) to R_1 (increase in quantity demanded) and R_2 (when there is fall in quantity demanded).

Figure 1
Equilibrium of Demand and Supply of Foreign Exchange Rate

1.2 Literature Review/Empirical Studies

It has been observed almost to the point of being a puzzle that the world accumulation of foreign exchange reserves has been on an astronomical increase in the past three decades. Worst hit in the frenzy for this accumulation are developing countries. At thus stage then we do not consider it out of place to discuss the determinants of country's quest for external reserves.

1.2.1 Determinants of Upsurge in Nations' Accumulation of External Reserves

Bastourre *et al.* (2004) used Dynamic Panel Data approach to study why countries accumulate reserves. They observed that nations were moved by the fact that with a few exceptions, emerging economies as well as developing countries are leaders in the quest for the accumulation. Their study identified East Asia countries are the greatest seekers of foreign reserves while European and North American countries are least in the quest for accumulation. In view of the magnitude of the accumulated their study among others posed some of these questions: why do so many countries accumulate internation reserves? Is there a common reason behind accumulation? What are the roles of reserves in an era of capital liberalization and exchange rate flexibility? Are the theoretical models and empirical estimations adequate to explain rationality of accumulation? Bastone and his co researchers said that answers for their questions are to be answered by international macroeconomics literature. On their part based on their dynamic panel approach their study emphasized the traditional views which gave these three determinants:

(i)   The benefit of building up reserves is calculated by the reciprocal of the marginal propensity to import. The aim is to reduce national income and hence reduce imports.

(ii)   The opportunity lost of hoarding reserves which is the spread between interest rate earned by

reserves and the alternative social use of the resources tied down as reserves.

(iii) The volatility of the balance of payments, to take into consideration the degree of synchrony between external flows. Banstorne et.al study dwelt extensively on the works of Clark and Kelly (1970), Hamada and Ueda (1977), Frenkel and Jovanovich (1981). Like these researcher they came to the same conclusion: "optimal reserves increase with volatility and decrease with propensity to import and the opportunity cost" (Grimes, 1993).

Lane and Barke (2001) in their own study dealt with the work of Lardell-mills (1989) and Borodo and Eichengreen (1998) and their result concluded that "trade openness is easily the most important factor in explaining cross-country variation in accumulation". They also observed that "there is some evidence that financial development and at lest among industrial countries, country size and external volatility are association with an increase in the reserves/GDP ratio". Their study found for low income and developing countries that there is a negative partial correlation between external debt and reserves.

Romero (2011) made a comparative study of factors that affect foreign reserves in China and India. The time of the study was not specified but it is believed to be recent. She mentioned the factors so far stated by other researchers. However she added that the type of exchange rate system has influence on the demand for reserves (Beaufort & Kapteyn, 2001). The exchange rate is depreciated when the rate goes up. More of the domestic currency is required to buy a unit of foreign currency. In other offset this devaluation, the central currency in the have to buy some of its own currency in the open market. Reserves will then be used to buy the domestic currency thus depleting reserves. As China and India have tremendous quantity of reserves, Romero hypothesized that China's reserves will be negatively correlated to the level of the exchange rate. On the part of India, she hypothesized that India's, reserves will be positively correlated to its exchange rate.

The main reason for the hypothesis most probably is because China does not have flexible exchange rate while India has flexible exchange rate.

On developing countries output per capital, exchange rate regime, oil dummy (for oil producing countries such as Nigeria) and trade openness are important determinants. Amarcy (2009) made a comparative study of Mozambigne and Nigeria about the negative real and monetary implications of excessive accumulation of reserves. She did not use any statistical analytical tools but quoted the work of Green and Torgerson (2007). They gave what can be regarded as the parameters of evaluating adequate reserves level. The parameters are:

(i) Reserves are to equal short term debt- This is called Greespan – Gniditti Rules which states that countries with vulnerability to capital account crisis may hold reserves high enough to cover all debts of short maturity of about one year. The aim is to prevent countries from going into currency crisis.

(ii) Reserves to equal 5-20% of Money Supply (M2). This is used by countries that need to fortify the confidence in the value of the home currency to reduce the risk of diversion of capital.

(ii) Reserves to equal 3 or months of imports: This is appropriate to low income and countries where the exposure to current account shocks is high. Nigeria is very susceptible to this being and import inelastic nation. In low income countries such as Mozambigne foreign exchange is very scale and much of it comes by way of foreign aids.

Usman and Ibrahim (2010) made a study of external reserves holding with implications for investment, inflation and exchange rate. Using Vector Error Correction (VEC) model they concluded that demand for external reserves in Nigeria "has been driven mainly by current account variability, real exchange rate and opportunity cost of holding reserves (measured by the difference between the real return on reserves and the real return on domestic investments)". They opined that their finding corroborate those of Adam and Leonce (2007) who stated that "demand for international resources in Africa is determined by Export, GDP growth and opportunity cost of holding reserves".

1.2.2 Foreign Reserves and Inflation

Mei-Yin Lin and Jue-shayan Wang (date of study not stated) studies the effect of foreign reserves on inflation in fire East Asia Economies. They used the model developed by Kyaland and Prescott (1977) and arrived at the conclusion that when the foreign exchange reserves increase (or domestic currency depreciates), inflation will be rising while the exchange rate effect is stronger than monetary surprise effect. The inflation rate will be reduced when the monetary surprise effect is powerful and if the weight placed output stability is not large. Usman and Ibrahim in their study say that "changes in external reserves show no significant relationship with inflation in Nigeria". They further added that although "external reserves position for Nigeria has no import on inflation rate but the domestic money supply should be a control variable to regular domestic inflation rate".

1.3 Problem of Reserves Accumulation in Developing Countries

Nigeria's over dependence of oil for its foreign exchange earning makes it s nation whose capital account is very vulnerable to vagaries in the international oil market. This has contributed to wide fluctuations in the level of foreign exchange reserves. During oil boom a lot of

foreign reserves is held and are depleted quickly during glut. Thus stability has remained a problem in the reserves accumulation. Emphasis has continued to be laid over the decades on the need to devastating sources of foreign exchange out of the near mono system. Amarchy (2009) stressed this problem of wide fluctuations when she opined that countries "which held reserves in US Dollars are now significant losses of wealth due to the weakness of the Dollar especially as a result of the international financial crisis. According to Lor (Amarcy) "this creates a vicious cycle in which countries will have to accumulate as much as they can in terms of foreign exchange reserves to counteract these losses in wealth".

There is also the problem of sterilization costs association exchange reserves. Amarchy (2009) states that the role of sterilization is to offset the impact of increase of money supply on inflation. This offsetting is made through the issuance of domestic debts so that if the interest rate for domestic borrowing exceeds the interest rate on reserves, there are direct fiscal costs implied which can be significant if the level of foreign reserves if high (Green & Torgerson, 2007; Elhlraika, 2007).

There is also the problem of balance sheet risks. If there is appreciation of domestic currency, the values of foreign reserves will fall and means less for the Central Bank Balance Sheet unless it increases the foreign reserves stock.

It has also been known that these reserves invested mainly US Dollar Treasury Bills and Bond wholes earning a low yielding. If invested in other safe investments would have earned more and this means substantial investment losses especially to developing countries. Akyuz (2010) estimates that developing countries lose some $130 billion annually in this way. This figure is larger than development assistance from developed to developing nations. He concludes that these are essentially subsidies foisted on developed countries.

Another problem is the social cost- Reserves are accumulated and held in foreign currencies but have opportunity costs lost in terms of alternative investments. There are also crying needs for development capital such as infrastructure but these funds are tied down as reserves (almost as idle funds) while the under development persists. Rodrik (2006) opines that keeping these reserves, it should be noted, has lots of imputed costs that are ignored by the reserves accumulations. He argues that" developing nations are paying a very high price to play by the rules of financial globalization".

2. DATA AND METHODOLOGY OF STUDY

DATA: the study deals with extensive review of related literature which covers the areas of foreign exchange reserves and exchange rates. Time series data for a period of 25years (1986-2011) were collated from Central Bank of Nigeria Statistical Bulletin. The key variables are grouped into dependant variable which is foreign (external) reserves while exchange rates and inflation are the independent variables. The data of the variables used for the study are seen on Appendix A.

2.1 Model Estimation

Two models are formed thus:

$$FER = a_o + a_r\,EXR + e_i \qquad (1)$$
$$FER = B_o + B_1\,INF + M_i \qquad (2)$$

Where FER = Foreign Exchange Reserves

EXR = Exchange Rate

$a_o + a_i$ are the regression coefficients for model (1) and $B_o + B_1$ are the regression coefficients for model (2) e and M are error terms for normal distribution with mean = 0 and standard deviation = S; I is the ith observation since data are time serial.

Simple Linear Regression is run for the model with the help of Minitab 14 for Windows (see Appendix B).

3. DATA INTERPRETATION

3.1 Interpretation

My computations on Appendix B show the following Results.

3.1.1 Effect of Foreign (External) Reserves on Exchange Rate

The regression equation is:-

FER = 4.84 + 0.166 EXR

$R - Sq (r^2) = 72.8\%$

T – Stat – 4.11 (P. value = 0.000).

During – Watson Statistic = 1.15

Standard Error of the Estimation s = 6.006

The regression equation shows that there is a positive relationship between Foreign Exchange Reserves and Exchange Rate in Nigeria. The coefficient of the regression equation indicates that 16.6% of changes in FER will lead to 1% improvement in the value of the Naira exchange rate to US Dollars. This suggests that for Nigeria to maintain a sound exchange rate to a large to extent insulated from volatility, she has to maintain what is considered adequate reserves level. This finding agrees with Usman and Ibhrahim (2010) whose study found that "External Reserves have been found influential to relative stability of exchange rates in recent time".

The coefficient of Determination (R^2) from the analysis (Appendix B) is 72.8%. This means that changes in exchange rate explains 72.8% of the reasons for Nigeria's accumulation of foreign exchange reserves over the years. More so the T–test statistic is 7.84 with a probability of 0.000. The result of the t–stat is used to test the hypothesis that: foreign exchange Reserves have no significant effect on exchange rate. Since the probability of the t-test is positive and above, the Null (H_o) hypothesis is rejected and Alternative (H_1) hypothesis accepted. This means that foreign exchange reserves have significant effect on exchange rate. The result of the study thus is that FER

have significant positive influence on the movement of exchange rates of Naira to US Dollar.

3.1.2 Effect of Foreign Exchange Reserves on Inflation

The regression equation is

FER = 23.1 - 0.3151 INFL

R – Sq (r^2) = 32.8%

T-stat = -3.35 (P. value 0.003)

During Watson statistic = 0.71

Standard Error of the Estimation s = 9.432

The regression equation shows the inflation (Inf) rate has positive relationship with Foreign Exchange Reserves. The coefficient of the regression equation indicates that 30.5% of changes in FER will lead to 1% change in Inflation rate in the Nigerian economy. The result of the coefficient of determination (R.sq) is 32.8%. This implies that as fluctuations in 32.8% of reserves are explained by inflation rate is. This tends to suggest that inflation related policies have not been the major factors favoring accumulation of reserves over the years. That is to say that 67.2% of reasons for reserves in Nigeria is not related to inflation. Again, this agrees with that of Usman and Ibrahim (2010) whose study stated that changes in external reserves in Nigeria have no impact on inflation.

The t-test statistic is -3.35 with probability of 0.003. The test of hypothesis II is based on the t-stat. Since the probability of the t-stat is negative and below the 5% level of significance, we accept Null (H_0) hypothesis that Foreign Exchange Reserves have no significant effect on inflation. Thus we reject the Alternative (H_1) hypothesis that foreign Exchange Reserves have significant effect on inflation in Nigeria.

CONCLUSION

This study has shown that accumulation of reserves is essential for the economy of Nigeria which tends to confirm finding of earlier researchers. Moreover, real life situations in developing countries show that there has been astronomical increase in their hoarding of reserves. Volatility of exchange rate can be tackled by holding of reserves. The notion is heavily dependent on imports so that our a priori thinking is that external reserves are essential for us. The Rule of Greespan-Guidotti advocates this and he states that countries with vulnerability of capital account crisis should hold reserves equal to external debts of short maturity of one year. Most of such debts most likely relate to trade debts and short borrowings especially from IMF to make up deficits in Current Account.

General apriori suggest accumulation of external reserves have been linked to inflation most of which is imported inflation. Apriori knowledge agrees with the study of Mei-Yin Lin and Jue-Shyan Wang whose study was on effect of Foreign Exchange Reserves on inflation on five East Asian Economies (Japan, Hong Kong, South Korea, Singapore and Taiwan). However, this study agrees with Usman and Ibrahim (2010) that reserves do not have causative impact on inflation in Nigeria. Other factors especially Money Supply (M_2) are fingered as one of the main causes (Usman & Ibrahim, 2010). However this study is silent on this as Money Supply (M_2) is not one of the factors brought into the study.

RECOMMENDATION

Since accumulation of reserves affects exchange rates, the government should continue to hold adequate reserves. However, mere accumulation of external reserves is no virtue. It has to be borne in mind that idle reserves held have opportunity cost as well as social costs (Rodrick, 2006). Such idle funds in reserves can be useful in trying to fix the nations decrepit infrastructure. The recent passage of Sovereign Wealth Fund Act (NSIA) should be implemented to be implemented to complement official reserves. The controversies are prolonging take off a scheme that is already many decades behind other nations.

I recommend more studies to investigate the social/economic effects of the accumulation of reserves and the likely effects of operating the SWFs.

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APPENDIX A

Variables for the Analyses

SN	YEARS	GDP at Current Market Price (N' Million)	FER (N' Million)	EXR	INFL	FER/GDP (%)
1	1986	69,147.00	3,587.4	2.0206	5.4	5.19
2	1987	105,222.80	4,643.3	4.0179	10.2	4.41
3	1988	139,085.30	3,272.7	4.5367	56.0	2.35
4	1989	216,797.50	13,457.1	7.3916	50.5	6.21
5	1990	267,550.00	34,953.1	8.0378	7.5	13.06
6	1991	312,139.70	44,249.6	9.9095	12.7	14.18
7	1992	532,613.80	13,992.5	17.2984	44.8	2.63
8	1993	683,869.80	67,245.6	22.0511	57.2	9.83
9	1994	899,863.20	30,455.9	21,8861	57.0	3.38
10	1995	1,933,211.60	40,333.2	21,8861	72.8	2.09
11	1996	2,702,719.10	174,309.9	21,8861	29.3	6.45
12	1997	2,801,972.60	262,198.5	21,8861	10.7	9.36
13	1998	2,708,430.90	226,702.4	21,8861	7.9	8.37
14	1999	3,194,015.00	921,715.0	92.6934	6.6	28.86
15	2000	4,582,127.30	1,129,894.4	102.1052	6.9	24.66
16	2001	4,725,086.00	871,420.8	111.9433	18.9	18.44
17	2002	6,912,381.30	947,661.3	120.9702	12.9	13.71
18	2003	8,487,031.60	2,322,837.7	129.3565	14.0	27.37
19	2004	11,411,066.90	3,756,873.1	133.5004	15.0	32.92
20	2005	14,572,239.10	5,456,456.2	132.1470	17.8	37.44
21	2006	18,564,594.70	5,425,578.6	128.6516	8.2	29.23
22	2007	20,657,317.70	6,055,669.0	125.8331	5.4	29.31
23	2008	24,296,329.30	7,025,860.2	118.5669	11.6	28.92
24	2009	24,794,238.70	6,339,615.2	148.9017	12.4	25.57
25	2010	29,205,783.00	4,872,231.41	150.2980	10.9	16.68

APPENDIX B

Simple Regression Analyses for Models 1 and 2

1. Regression Analysis for Relationship Between Foreign Exchange Reserve and Foreign Exchange Rate
Regression Analysis

The regression equation is

FER = 4.84 + 0.166 EXR

Predictor	Coef	StDev	T	P
Constant	4.841	1.856	2.60	0.016
EXR	0.16646	0.02124	7.84	0.000

S = 6.006R	Sq = 72.8%	R − Sq(adj) = 71.6%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	2216.6	2216.6	61.44	0.000
Error	23	829.8	36.1		
Total	24	3046.4			

Unusual Observations

Obs	EXR	FER	Fit	StDev Fit	Residual	St Resid
25	150	16.68	29.86	2.14	-13.18	-2.35R

R denotes an observation with a large standardized residual
Durbin - Watson statistic = 1.15

2. Regression Analysis for Relationship Between Foreign Exchange Reserve and Inflation Rate
Regression Analysis

The regression equation is

FER = 23.1 - 0.315 INFL

Predictor	Coef	StDev	T	P
Constant	23.108	2.832	8.16	0.000
INFL	-0.31473	0.09388	-3.35	0.003
S = 9.432	R - Sq = 32.8%		R − Sq(adj) = 29.9%	

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	1000.0	1000.0	11.24	0.003
Error	23	2046.3	89.0		
Total	24	3046.4			

Unusual Observations

Obs	INFL	FER	Fit	StDev Fit	Residual	St Resid
10	72.8	2.09	0.19	5.08	1.90	0.24 X
20	17.8	37.44	17.51	1.94	19.93	2.16R

R denotes an observation with a large standardized residual
X denotes an observation whose X value gives it large influence.

Table
Showing FER/GDP%

From 1999 the percentage has been on increase peaking in 2005 and declining thereafter