

## **Foreign Exchange Reserves (Fer) Accumulation And Macro-Economic Stability: The Nigerian Experience**

*\*Umeora Chinweobo Emmanuel*

---

**ABSTRACT :** *The Paper investigates the relationship between Foreign Exchange Reserves (FER) Accumulation, Exchange Rate, Inflation and Gross Domestic Product (GDP) in Nigeria. It has been observed that most developing countries of Africa and East Asia since the Asia Crisis of 1997 have engaged in massive accumulation of Foreign Exchange Reserves. The accumulation has been done regardless of the economic implication on the macro economy. It is known that such reserves could have other uses (opportunity costs). Econometric evidence shows that the variables in the study have unit roots. The results of the tests show that Exchange Rate and GDP have positive and significant relationship with FER accumulation while inflation has negative and insignificant relationship with FER. Nigeria is accumulating FER because of her over dependent on imports but should be aware of the social costs implication. Proper management of reserves is recommended*

**KEYWORDS:** *: Foreign Exchange Reserves, Gross Domestic Product, Social costs, Macro-economic variables, Greespan-Guidotti Rule, Error Correction model.*

---

### **I. INTRODUCTION**

#### **1.1 BACKGROUND OF THE STUDY**

It has been observed that developing countries of Africa and emerging economies of East Asia in the past few decades have engaged in a massive build up of Foreign Exchange Reserves (FER). Foreign Exchange Reserves go by such other names as External Reserves and Foreign reserves. They include gold, silver, bonds held by the Central Bank of a nation, Special Drawing Rights (SDRs) issued by the International Monetary Fund (IMF). External Reserves also include official reserves positions of Central Banks held in different Reserves currencies such as US Dollar, British Pound Sterling and Euro. Reza, Ostry and Sheehy (2011) quoting IMF Balance of Payments Manual (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 foreign exchange rates and other purposes. Under the Bretton Woods System, the US Dollar was convertible to gold between 1944 (when it was set up) and 1986. After 1968 conversion to gold was restricted and after 1973, conversion to gold ceased. Nzotta (2004) explains that foreign exchange reserves come about when foreign exchange receipts exceed foreign exchange disbursement. He adds that foreign exchange reserves represent the balance of foreign exchange surpluses of a nation accumulated over a period of time. Generally countries maintain reserves so to manage exchange rate and reduce volatility or excess fluctuations (Elhiraika and Ndikumana, 2007). Thus accumulation of foreign exchange reserves increases with international trade. The upsurge in accumulation of reserves in developing and emerging economies has been interpreted as a form of self-insurance against the high level of world economic and financial instability. The situation is not helped by near absence of an adequate international system for crisis management. Aizenman and Lee (2005) say that countries regard reserves accumulation not only as a means for ensuring effective exchange rate management but for mercantilist motive. By this motive countries accumulate reserves as a tool for maintaining low exchange rates so as to promote international trade and competitiveness. Some countries have also maintained high reserves accumulation to boost investors' confidence and enhance economic growth. For instance, since the East Asian Financial Crisis of 1997, the Asian countries have engaged in massive build up of reserves.

The Central Bank of Nigeria (CBN) as a developing economy is not different in the quest for accumulation of reserves. It accumulates reserves for some of these reasons:-External reserves serve as a form of support or backing for the local currency: Naira and Kobo. International trade settlements can be financed by reserves especially when there is deficit between exports and imports. External Reserves may also be used as a form of holding Sovereign Wealth Fund (SWF). Many oil – producing developing countries are setting aside some oil proceeds as a savings for future use in view of the fact that oil is a wasting asset. Nigeria has started its own Sovereign Wealth Fund with \$1 billion. However its operation is currently hampered by a serious disagreement between the President and State Governors over the constitutionality of setting up SWF.

The 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). External reserves accumulation is to shore up the country's credit rating and credit worthiness by credit Rating Agencies. External Reserves are held as a form of shock-absorber in times of financial shocks especially those occurring in the oil market (see <http://www.cenbank.org/intops/Reservesmgnt.asp> retrieved 25/4/2013).

All the reasons notwithstanding, accumulation of reserves involves a lot of opportunity cost (Rodrik, 2006) because resources hoarded as reserves cannot be at same time used for investment. The risks of reserves accumulation for financial and monetary stability are often neglected by the Reserves accumulating nations (Steiner 2010). According to Steiner (2010), Excessive Reserves accumulation rather than prevent financial crisis might destabilize the international financial system in the long run. He adds that such accumulation of reserves in countries with current Account surpluses may contribute to the build up of global imbalance.

## **1.2 STATEMENT OF THE PROBLEM**

Since the collapse of the Bretton Wood system in the 1970s, many developing nations and emerging markets have made tremendous accumulation of foreign exchange Reserves. Foreign exchange policy makers have become more anxious of the uncertainties in the international financial system. Accumulations are made as insurance against shocks in exchange rate and also for mercantilist purpose. These accumulations are made regardless of the effects they have on the economies of the accumulating nation. A number of studies have been made on the effect of foreign exchange reserves accumulation on some macroeconomic variables such as Gross Domestic Product, Exchange Rate and Inflation. But these studies are on foreign countries. For example Elhiaika and Ndikumana (2007) investigated the effects on African countries. Steiner (2010) did his study using panel data covering a large number of countries. Polterovich and Popov (2002) did a cross country study of 51 countries including some OECD, African, Central Europe and Latin American countries. Over here in Nigeria search for existing studies indicates that most studies deal with exchange rates and management of reserves. Sparcity of extant studies is acknowledged by Olayungbo and Akinbobola (2011) when they said that studies in foreign exchange reserves accumulation in Nigeria are scanty. Thus a gap exists in the area of foreign exchange reserves accumulation which this paper wants to investigate. More specifically the paper investigates the effects of foreign exchange reserves accumulation on selected macroeconomic variables namely Economic Growth represented by GDP, Exchange Rate and Inflation.

## **1.3 OBJECTIVES OF THE STUDY**

Foreign Exchange Reserves are now accumulated on unprecedented scale regardless of the opportunity cost and the effects of such accumulations on the macro economy. Studies have shown that developing countries and emerging markets especially East Asia (including China) is mostly involved in the massive accumulation. Nigeria is not left out in this accumulation. The main objectives of the study are: (i) To investigate the relationship that exists between accumulation of foreign Exchange reserves and inflation in Nigeria.

(ii) To investigate the Relationship existing between accumulation of foreign Exchange Reserves and Exchange Rate in Nigeria.

(iii) To examine the relationship between foreign Exchange Reserves accumulation and GDP in Nigeria.

## **1.4 STATEMENT OF HYPOTHESES**

H<sub>01</sub> (Null) foreign Exchange Reserves Accumulation has no significant effect on Inflation.

H<sub>02</sub> (Null) foreign Exchange Reserves Accumulation has no significant effect on Exchange Rate.

H<sub>03</sub> (Null) foreign Exchange Reserves Accumulation has no significant effect on GDP.

## **SIGNIFICANCE OF THE STUDY**

Nigeria as a developing country is in the race to hoard external reserves. This paper, it is hoped will be useful to the government in calling its attention to the economic effects of such reserves accumulation especially as regards effects on GDP, Exchange Rate and Inflation. Other researchers and policymakers will find the work useful as it will enrich the collections in the literature.

## **1.6 SCOPE OF THE STUDY**

The study is limited to the period of Structural Adjustment Programme (SAP) in 1986 to 2011. The study is based on secondary data of time series figures for GDP, foreign exchange and inflation. SAP period has been selected because since then radical changes have been introduced into the economy in form of economic and financial reforms. Since then dealings in foreign exchange have been liberalized.

## **II. THEORETICAL FOUNDATION, REVIEW OF LITERATURE AND EMPIRICAL WORKS**

### **2.1 THEORETICAL FOUNDATION**

Various authorities have advanced some theories on the accumulation of foreign exchange reserves. We can only look at few of them. There is the international financial integration theory which advocates that international integration should cause capital to flow from high income countries characterized by high capital labour ratios to low-income countries with lower capital-labour ratios (Prasad and Rajan, 2008). According to this approach, the process would improve the levels of investment through the access to foreign capital. It would also boost growth in poor countries and support higher returns to foreign investors who will be induced to make capital flows abroad. The process of capital flows will be facilitated foreign exchange liberalization. There is the Micro/Macro Theories based on the controversies of monetarists and fiscalists (Keynesians). The monetarists say that accumulation of reserves is as a result of the excess demand for the domestic currency and the growth of world trade. For the Keynesians accumulation of foreign reserves is to improve the current account and thereby positively impact on the aggregate input. This impact is in the short run and will affect nominal exchange rates. According to Fukuda and Kon (2008) in the long run, real exchange rates are used to adjust the equilibrium balance of payment. There is the self-insurance theory which explains the holding of buffer stock, of reserves to deal with the unforeseen shocks in the international financial system (Elhiraika, 2007; Fukuda and Kon, 2008). There is the mercantilist theory which is related to the expansion of trade and other international transactions that have necessitate the increase in accumulation of reserves. (Gupta and Agarwal, 2004 and Aizenman and Lee 2005). Another theory is the elasticity approach which examines the effect of an appreciation or depreciation of the exchange rate on resource flows of a country (Nzotta, 2004). The approach states that if there is downward adjustment of exchange rates, a nation experiencing and balance of payment disequilibrium has to raise exports and reduce imports and thus accumulate more external reserves.

### **2.2 REVIEW OF LITERATURE AND EMPIRICAL WORKS**

As stated earlier, there is astronomical increase, in the accumulation of foreign Exchange Reserves in the past three decades. The mostly affected are developing and emerging economies of East Asia including China.

### **2.3 DETERMINANTS OF EXTERNAL RESERVES ACCUMULATION**

Bastourre, Carrera and Ibarlicia (2004) used Panel Data approach to study why countries accumulate external reserves. Their study identified East Asia countries as the greatest world seekers of foreign reserves while OECD countries are the lowest. In the study they posed some of these questions: why do many countries accumulate international reserves? 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 the rationality of the accumulation. Based on their dynamic panel approach, they advanced three determinants for reserves accumulation:

- (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 import.
- (ii) The opportunity cost of hoarding reserves which is spread between interest rate earned by reserves and the alternative social use of the resources tied down as reserves (Rodrik, 2006).
- (iii) The volatility of the balance of payments to take consideration the degree of synchrony between external flows and reserves held. They concluded that optimal reserves increase with volatility and decrease with propensity, to import and the opportunity cost.

Lane and Burke (2001) concluded that trade openness is easily the most important factor in explaining cross-country variations in accumulation. They also observe that there is some evidence that financial development, country size and external volatility are associated with an increase in Reserves/GDP ratio. Their study found that for low income and developing countries there is a negative partial correlation between external debt stock and reserves. Romero (2011) made a comparative study of factors that affect foreign reserves in China and India. She mentioned that apart from the system in a country has effect on the demand for reserves. When the exchange rate is depreciated, the reserves go up meaning that more domestic currency is required to buy a unit of foreign currency. To offset the devaluation, the Central Bank will have to buy some of its own currency in the open market. Reserves will then be used to buy the domestic currency and thus deplete the reserves. As China and India have large stock of reserves, Romero hypothesized that China's reserves will be negatively correlated with the level of exchange rate on the other hand India's reserves will be positively corrected with its exchange rate. The main reason for this is because China maintain fixed exchange rate while India maintains flexible exchange rate.

Amarcy (2009) made a comparative study of Mozambique and Nigeria about the negative real and monetary implications of excessive accumulation of reserves. Although her work did not employ statistical analysis, she did extensive study of Green and Trogersen (2007). These parameters according to her can assist to evaluate on adequate reserves level (i) Reserves should equal short term debt stock (ii) Reserves should equal three months of import. These two are often referred to as Greenspan – Guidotti Rules. Thirdly Reserves should equal 5 – 20% of money supply ( $M_2$ ). 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.

#### **2.4 EXTERNAL RESERVES ACCUMULATION AND INFLATION**

Lin and Wang (2005) studied the effect of foreign reserves on inflation in Far East Asian Economies. They used the model developed by Kyaland and Prescott (1977) and arrived at the conclusion that when the foreign exchange reserves increase, inflation will rise while the exchange rate effect is stronger than monetary surprise effect is powerful. Steiner (2010) studied Central Bank's Dilemma on Reserves Accumulation and Inflation. He opines that the transmission of global liquidity to domestic asset prices works through the accumulation of reserves. He adds that inflationary consequences of reserves accumulation may depend on exchange rate arrangement – whether fixed or floating exchange rates. Under fixed exchange rate, worldwide inflation is determined by changes in global money supply which in turn depends on the Money Multiplier and the Monetary Base. Under floating exchange rate, inflation is a national phenomenon and international reserves lose their significance for inflation in the world economy. Steiner (2010) adds that the effect of an accumulation of informational reserves on inflation will also depend on the degree of sterilization applied by monetary authorities. Sterilization refers to action or policies undertaken by the monetary authorities to isolate or dampen the effects of reserves accumulation on inflation. His work concluded that global reserves accumulation drives global inflation and is inflation within each country. Usman and Waheed (2010) in their study of external reserves holding and implications for inflation in Nigeria opined that changes in reserves show no significant relationship between accumulation of reserves and inflation. They add that external reserves holding in Nigeria has no impact on inflation but the domestic money supply which should be a control measure for domestic inflation.

#### **2.5 ACCUMULATION OF EXTERNAL RESERVES AND EXCHANGE RATE**

Khan (2013) studied the relationship between exchange rate and foreign exchange reserves in Pakistan. His study concludes that there is a long run relationship existing between foreign exchange reserves and exchange rates. He also examined the causality relation between them and concluded that causality direction goes from Nominal and Real Exchange rate to foreign reserves. Mohanty and Tuner (2006) made a study on the domestic implications of reserves accumulation in emerging markets. On exchange rates, they opine that there are no simple indicators to show how exchange rates may have become misaligned as a result of continued sterilization actions by monetary authorities. However, real exchange rates do not rise significantly in countries with large stock of foreign reserves. In their own study Usman and Waheed (2010) reports that holding of reserves has been found to have influence on exchange rates. Olayungbo and Akinbobbola (2011) did a study on foreign exchange and exchange rates in Nigeria. The study shows that foreign reserves are significant in influencing nominal exchange rates in the short run. Also their result reveals that changes in foreign exchange reserves are significant in influencing the real exchange rates in the short run. Also the Granger causality test supports the view of a unidirectional causality running from nominal exchange rate to foreign reserves accumulation both in the short and long run.

#### **2.6 ACCUMULATION OF EXTERNAL RESERVES (FER) AND GDP**

Polterich and Popov (2002), in a cross country study, reported that the accumulation of foreign exchange reserves contributes to economic growth and foreign direct investment/GDP ratio as well as the share of exports in GDP. According to them foreign exchange accumulation influences economic growth through two mechanisms. First when the manufacturing sector and industrialization is established, external reserves accumulation causes real exchange rate to attain undervaluation. This then allows the economy to take full advantages of export externality and trigger export-led growth. Secondly foreign exchange reserves accumulation attracts foreign direct investment because it increases the credibility of the recipient country and increases productivity. Bastomrre, Carrera and Ibarlucia (2004), in their own study said that export-led-growth policies are necessary for developing countries to achieve increase real exchange rate. They opine that to achieve improved real exchange rate is not possible with accumulation of external reserves. Thus developing countries must accumulate reserves to attain substantial export-led-growth. Rodrik (2006) studied the opportunity cost of the excessive reserves accumulation. The point is that reserves accumulated are held idle and could have contributed to the economic growth of the accumulating country. The accumulation for developing countries is often reached up to 6–8% of GDP. Such can not be said to be assisting GDP to grow. No doubt then

Rodrik work is not in agreement with pro accumulation of reserves scholars. Nigeria, like other developing countries, is engaged in accumulation of reserves. But apart from lost opportunity cost, there is also the problem of loss often occasioned by depreciation of the reserves-currency-the US\$. Weakness of US\$ has often resulted in heavy losses as a result of exchange rate loss.

### III. DATA AND METHODOLOGY OF THE STUDY

Data for the study deal with Time series figures for the period 1986-2011 collated from CBN Bulletin. 1986 relates to the period when the Structural Adjustment Programme (SAP) was introduced into the country with full scale economic reforms and liberalization of foreign exchange transactions. The key variables are Foreign Exchange Reserves (FER) as the dependent variable. Exchange Rate, Inflation and GDP are the Independent variables. The data are represented on table 3.1 below

DATE	FER	ECM	EXR	FER/GDP	GDP	INFL
1986	3587.400	48217.45	2.020000	0.051881	69147.00	5.400000
1987	4643.300	42424.64	4.020000	0.044128	105222.8	10.20000
1988	3272.700	228120.6	4.540000	0.023530	139085.3	56.00000
1989	13475.10	214730.8	7.390000	0.062155	216797.3	50.00000
1990	34953.10	84947.23	8.040000	0.130614	267550.0	7.500000
1991	44249.60	107743.2	9.910000	0.141762	312139.8	12.70000
1992	13992.50	12278.61	17.30000	0.026217	532613.8	44.80000
1993	67245.60	132598.2	22.05000	0.098331	683869.8	57.00000
1994	30455.90	-18320.08	21.89000	0.033845	899863.2	57.00000
1995	40333.9	-175402.9	21.89000	0.020863	1933212.	72.80000
1996	174309.9	-375633.7	21.89000	0.064494	2702719.	29.30000
1997	262198.5	-368935.7	21.89000	0.093576	2801973.	10.70000
1998	226702.4	-407248.2	21.89000	0.083702	2708431.	7.900000
1999	921715.0	-105992.5	92.69000	0.288576	3194015.	6.600000
2000	1129894.	-312854.1	102.1100	0.246587	4582127.	6.900000
2001	871420.8	-677647.5	111.9400	0.184424	4725086.	18.90000
2002	947661.3	-1226742.	120.9700	0.137096	6912381.	12.90000
2003	2332838.	-102056.9	129.3600	0.274871	8487032.	14.00000
2004	3756873.	705220.2	133.5000	0.329231	11411067	15.00000
2005	5456456.	1772678.	132.1500	0.374442	14572239	17.80000
2006	6055669.	1414678.	128.6500	0.326195	18564595	8.200000
2007	7025860.	1940981.	125.8300	0.340115	20657318	5.400000
2008	6339615.	445823.4	118.5700	0.260929	24296329	11.60000
2009	4872231.	-1404661.	148.9000	0.196507	24794239	12.40000
2010	5425579.	-1858095.	150.3000	0.185771	29205783	10.90000
2011	3373.000	-116851.9	155.5000	8.981000	37543655	10.80000

SOURCE, CBN STATISTICAL BULLETIN, 2010, 2011

#### 3.2 MODEL SPECIFICATION

The model is specified FER	=	f (EXR, INFL and GDP).
Where FER	=	Foreign Exchange Reserves
EXR	=	Nominal Exchange Rate
INFL	=	Inflation Rate
GDP	=	Gross Domestic Product

The model has been put in Econometric function of

$FER = a_0 + a_1EXR + a_2INFL + a_3GDP_{t-1} + \mu$  where  $a_0$  = intercept,  $a_1 - a_3$  regression coefficients and  $\mu$  is the stochastic Error term  $GDP_{t-1}$  is lagged by 1 year.

Adjusted Dickey-Fuller (ADF) is used to test for Unit Root and order of integration. Johansen is used to test for cointegration and Error Correction Model (ECM) is used for any possible error. Therefore Multiple Regression is employed for the analysis

**IV. DATA ANALYSIS AND PRESENTATION OF RESULTS**

In this chapter, the data are analyzed and results presented. The OLS results of the model are presented and the parameter estimates subjected to some statistical and econometric tests.

**4.1 UNIT ROOT TEST**

E-View version 3.1 is used to carry out Unit Root test to check whether a time series data being used are stationary or not. Establishing stationarity is essential because if there is no stationary, the processing of the data may produce biased result. The consequences are unreliable interpretation and conclusions. We test for stationarity using Adjusted Dickey and Fuller (ADF) tests on the data. The ADF tests are done on level series and first order differenced series. A variable is said to be integrated of order 1 if it must be differenced once to become stationary. Let us consider Table the below

**TABLE 4.1 ADF LEVEL AND ORDER OF INTEGRATION**

VARIABLES	ADF	ORDER OF INTEGRATION	LEVEL OF SIGNIFICANCE
D(EXR,S)	-5.147017	2	1%
D(FER,3)	-3.281091	2	5%
D(GDP)	3.696312	0	5%
D(INFL,2)	-5.918625	1	10%

Sources: computation using E-view version 3.1

Evidence from unit root table above shows that Exchange Rate and Foreign Exchange Reserves are integrated at order 2, GDP is integrated at level while inflation is integrated at order 1. The parameters are therefore stationary at the order of integration as indicated in the table 4.1 above. They are also significant at 10%, 1% and 5% respectively.

**4.2 CO-INTEGRATION TEST**

Cointegration means that there is a correlation among the variables. Cointegration test is done on the residual of the model. The results obtained are shown in the table below.

**TABLE 4.2 JOHANSEN COINTEGRATION TEST**

Eigenvalue	Likelihood Ratio	5% Critical Value	1% Critical Value	Reject hypothesis or Accept
0.896330	127.8812	68.52	76.07	None **
0.774071	73.48426	47.21	54.46	At most 1 **
0.657710	37.78328	29.68	35.65	At most 2 **
0.380143	12.05298	15.41	20.04	At most 3
0.023657	0.574590	3.76	6.65	At most 4

SOURCE: computation using E-view version 3.1

\*\* donates rejection of the Null Hypothesis at 5% (1%) significance level. The tests indicate 3 cointegration equation at 5% significance level showing that there exists a long run equilibrium relationship among the variables.

**4.3 DATA PRESENTATION**

The data for the study are presented in Table 3.1 in chapter 3. The results of the Error Correction Model (ECM) test are shown in Table 4.3 below. The test has become necessary to correct any errors in the variables although they are cointegrated.

**TABLE 4.3 ERROR CORRECTION MODEL TEST RESULTS**

Variables	Coefficients	Std. Error	t-statistic	Prob
C	-186175.5	55911.96	-3.329798	0.0035
EXR	4891.431	670.3887	7.296410	0.0000
FER/GDP	-2314.936	16983.85	-0.136302	0.8930
GDP-1	0.228083	0.004724	48.28249	0.0000
INFL	-850.6477	1219.095	-.0697770	0.4938
ECM(-1)	0.958511	0.029353	32.65459	0.0000

SOURCE: computation using E-view 3.1

R-squared (R<sup>2</sup>)           0.998654  
Adjusted R<sup>2</sup>               0.998300

F-statistic 2820.197  
 Durbin-Watson Statistic 1.921552

**4.4 INTERPRETATION OF RESULTS**

To analyze the regression results, we employ economic a priori criteria and statistical criteria.

**4.5 ECONOMIC A PRIORI CRITERIA**

The regression line has a negative intercept as presented the constant ( $a_0$ ) – 18617.5. The a-priori expectation is that the intercept could be positive or negative. From the regression analysis it is observed that Exchange Rate (EXR) has a positive relationship with foreign Exchange Reserves with its value as 4891.431. This result implies that a unit change in the exchange rate leads to an appreciable increase in FER by 4891.43 units. This agrees with a priori expectation. The regression furthermore shows that FER/GDP has a negative relationship with FER given its value as -0.136302. This is not a priori expectation which is a positive sign.

From the analysis GDP has a positive relationship with value 0.228082. This is in consonance with theoretical expectation.

On inflation, it is observed that it has negative value of -0.67770 and has negative impact on the dependent variable (FER). It conforms to our a priori expectation.

**4.6 STATISTICAL CRITERIA**

To determine the statistical significance of the parameters in the model, the tools of T-tests, std. error, F-test, Durbin-Watson as well as the coefficient of Determination ( $R^2$ ) are used.

**4.7 COEFFICIENT OF DETERMINATION ( $R^2$ )**

This test is the explanatory power of the independent variables in a regression model. It tests for the goodness of fit of the model. From our analysis  $R^2$  is 0.99%. This implies that the independent variables have contributed immensely to the Foreign Exchange Reserves accumulated. F-statistic This measures the overall significance of the explanatory parameter. The Decision Rule is that if the calculated value of F is greater than the tabulated value of F at 5% significance level, the parameters are statistically significant. Otherwise they are insignificant,  $k-1, N-K$   $5-1 = 4, 26 - 5 = 21$   $F(4, 21) = 2.84$ . We observe that f-cal (21) is greater than f-tab (2.84). That implies the rejection of Null Hypotheses and acceptance of Alternative Hypotheses

**T-STATISTICS**

The test is used to know the statistical significance of the individual parameters. Two-tailed tests at 5% significance level are conducted.

The Result is shown on Table 4.4 below

Variables	t-cal	t-tab	Remarks
GDP	48.28249	2.08	Statically significant
EXR	7.296410	2.08	Statically significant
INFL	-0.69770	2.08	Statically insignificant

SOURCE: computation using E-view 3.1

All the variables are statically significant and positive except inflation which is negative with and statistically insignificant. Let us consider the individual hypothesis.

$H_{01}$ , Foreign Exchange Reserves (FER) Accumulation has no significant effect on GDP. From Table 4.4 above we observe that t-calculated is greater than t-tabulated at 5% level of significance. The Decision Rule is to reject Null Hypothesis if t-cal. is greater than t-tab and alternative hypothesis accepted. The Null Hypothesis is rejected that is 48.372.08. The implication is that FER accumulation has significant effect on GDP.

$H_{02}$  states that Foreign Exchange Reserves Accumulation has not significant effect on Exchange Rate. From Table 4.4 we observe that t-calculated is greater than t-tabulated (i.e. 7.372.08) at 5% level of significance. Thus we reject Null Hypothesis. We accept alternative hypothesis meaning that FER Accumulation has significant effect on EXR.  $H_{03}$  states that Foreign Exchange Reserves Accumulation has no significant effect on inflation.

From table 4.4 t-calculated is less than t-tabulated (-0.6 < 2.08) and so the Null Hypothesis is accepted meaning that Foreign Exchange Reserves Accumulation does not have significant effect on inflation. With Durbin-Watson statistic at 1.9, there is absence of autocorrelation in the series so that the model is reliable for the predictions. Finally, the ECM (-1) results shows that about 99% of equilibrium error is corrected every year.

## V. DISCUSSION, SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATION

The study has shown that Nigeria, like other developing nations, has engaged in large Reserves Accumulation. The nation is heavily dependent on imports and so accumulation is necessary. The Rule of Greenspan-Guidotti advocates that countries with vulnerability of capital account crisis should hold reserves equal to external debts of short maturity of one year. The study shows that FER Accumulation leads to increase in GDP. However, this raises the question of social costs inform of reserves held almost as idle resources. The study also agrees with the study of Usman and Waheed (2010) that reserves accumulation does not cause inflation in Nigeria. On FER and Exchange Rate, the study is in agreement with a priori expectation that foreign exchange reserves accumulation has significant effect on exchange rates. Volatility of exchange rate can be tackled by holding reserves.

### 5.1 CONCLUSION

From the results of the regression analysis accumulation of reserves is essential for Nigeria. However there is the opportunity cost lost in the resources held up as reserves. Such reserves are almost idle and at best earn minimal interest. They also subject the country to losses that occur as result of falls in exchange rate in the reserves currencies. For example the falls in US Dollar rate have always adversely affected the countries whose reserves are in Dollar.

### 5.2 RECOMMENDATION

In accumulating excessive foreign exchanges the country should have proper management of reserves. There is need for more studies to examine social and other opportunity costs of accumulation of foreign exchange reserves.

- Umeora Chinweobo Emmanuel is a Senior Lecturer, Department of Banking and Finance, Anambra State University, Igbariam Campus, Nigeria.

## REFERENCES

- [1] Aizenman J. and Lee J. (2005) International Reserves: Precautionary Mercantilist Views, Theory and Evidence, *IMF Working Paper wp/05/198* Pp 1-30
- [2] Amarcy, S. I. (2009) The Negative Real and Monetary Implications of Excessive Accumulation of Foreign Exchange Reserve: Comparison between Mozambique and Nigeria, Unpublished M.Sc. Thesis, University of London. Pp 1-46
- [3] Bastourre D, Carrera J. and Ibrahucia J. (2004), Why Countries Accumulate Foreign Reserves?: A Dynamic Panel Approach, Banco Centrate De la Republican Argentina, Buenos Aries pp 1-14
- [4] CBN (2012) Reserves Management <http://cenbank.org/intops/resveresgmt.asp> retrieved 25/10/2012.
- [5] Elhiraika A. (2007), Reserves Accumulation in African Countries: Source, Motivations and Effects, [www.uneca.org/acc/documents](http://www.uneca.org/acc/documents), retrieved 25/10/2012.
- [6] Elhiraika A. and Ndikumana (2007), Reserves Accumulation in African Countries: Sources, Motivations and Effects, University of Massachusetts Amherst Working Paper, 2007-12, pp 1-27
- [7] Fukuda S. and Kon Y. (2008), Macroeconomic Impacts of Foreign Exchange Reverses Accumulation: A Theory and some International evidence, [www.nzae.org.nz/conference/2008/nv1215384178/pdf](http://www.nzae.org.nz/conference/2008/nv1215384178/pdf), retrieved 28/4/2012.pp 1-23
- [8] Gupta A. and Agarwal R. (2004), How should Emerging Economies Manage their Foreign Exchange Reserves? <http://129.3.20.21/esp/if/paper/0401/0401005.pdf>, in Amaray (2009).
- [9] Kyland F.E. and Prescott E.C (1977), Rules Rather than Direction: The Inconsistency of Optimal Plans, *The Journal of Political Economy*, 85(3) pp 473-492.
- [10] Lane P.R and Burke D. (2001), The Empirics of Foreign Reserves, *Open Economies Review*, Forthcoming. Pp 1-21
- [11] Lin Mei-yin and Wang Jue-Shyan (2005), Foreign Exchange Reserves and Inflation: An Empirical Study of five East Asia Economies, Aletheia University, Taiwan and National Chengchi University, Taiwan. Pp 1-18
- [12] Mohanty M.S. and Turner T. (2006), Foreign Exchange Reserves Accumulation in Emerging Markets: What are the domestic Implications? *B/S Quarterly Review*, September. Pp 39-52
- [13] Nzotta S.M (2004), *Money, Banking and Finance (Theory and Practice)*, Hudson-Jude Nigeria Publishers, Owerri.
- [14] Olayungbo D.O. and Akinbobola T.O. (2011), Foreign Exchange Reserves and Exchange Rates in Nigeria. Structural Breaks, Unit Roots and Cointegration tests, *Journal of Social and Economic Development*.pp 1-6
- [15] Pasad E.S. and Rajan R.G (2008), A Pragmatic Approach to Capital Account Liberalization, Discussion Paper No 3475, on-line accessed 25/4/2013 in Rodrik (2005).
- [16] Polterovich V. and Popov V. (2002), Accumulation of Foreign Exchange Reserves and Long Term Growth, A Paper in the Framework on the New Economic School Research Programme, Russia. Pp 161-195
- [17] Reza M, Ostry J.D and Sheehy R. (2011), Assessing Reserves Adequacy. IMF, prepared by Money and Capital Markets, Research strategy, Policy and Review Department. Pp 1-49
- [18] Rodrick D. (2006), The Social Cost of Foreign Exchange Reserves, NBER Working Paper Series No 11952.
- [19] Romero A.M (2011), Comparative Study: Factors that Affect Foreign Currency Reserves in China and India, *the Park Economists*, vol x 111. Pp 79-88
- [20] Steiner A. (2010), Central Banks' Dilemma: Reserves Accumulation, Inflation and Financial Instability, Grade School of Economic, A Social Sciences, University of Mannheim, Germany. Pp 1-31
- [21] Usman A. and Waheed I. (2010), External Reserves Holding in Nigeria: Implications for Investment Inflation and Exchange Rate, *Journal of Economics and International finance* 2(9). Pp 183-192