

Corruption and the Nigeria External Reserves Management

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Abstract

This study investigates the impact of corruption on the Nigeria external reserves management. ADF unit root test, Johansen Co-integration, ECM, granger causality and OLS were the techniques employed in estimating the data for this study and it reveals that there is a unidirectional relationship between corruption and external reserves and that corruption is positively related to external reserves though corruption is a menace that has eaten deep into the nation's economy and it is embedded in the management process of our external reserves. Exchange rate has a positive relationship with external reserves. The study concluded that corruption is embedded in the management process of our external reserves. The process of managing the nation's external reserves causes corruption in the country and that corruption has grossly affected the polity of Nigeria and it is seriously affecting the ability of the country to grow.

Keywords: Corruption, Exchange rate, External reserves, management and Gross Domestic Product.

Introduction

In Nigeria, corruption is one of the most dangerous social troubles bedeviling the economy. Its nature is thus one that is ubiquitous and endemic in modern governments. This is because corruption like a virus attacks the prominent structures that make for society's progressive functioning thus putting its existing into serious danger (Ameh, 2016). Corruption is a teething national problem that deserves to be studied because the long history of Nigerian government and politics is characterized by endemic problem of corruption, especially in high places. Most programmes and people oriented policies and projects embarked upon by successive administrations since independence has either been abandoned or shoddily executed as a result of the incidence of corruption in the polity (Akeem, 2015). Evidently in Nigeria today, public office holders with high impunity level loot public treasury for their private and personal interest and accumulate wealth for self-aggrandizement.

In the years past Nigeria has taken numerous policy initiatives and measures in the management of its external reserves. Although very little was achieved because the structure in place then could not support efficient reserves management, enduring lessons could be distilled from the nation's past experience (CBN, 2007) as cited by Abubakar (2011). Thus, since the 1970s, Nigerian economy has persistently depended on oil as the main source of foreign exchange earnings with the attendant cycles of economic booms and bursts.

Oil marketers tend to influence or pressurize the Nigeria government to yield to their yearnings of increasing pump price of petrol for their interest. The corrupt activities of Bureau de Change and the parallel market have impacted on the exchange rate causing the dollar to exchange at a higher rate against the naira and the possible reason behind all these anomalies was that corruption seems to have become institutionalized and enjoy official recognition, this has invariably affected the pace of socio political and economic development in the country which is giving birth to irresponsible leaders in the polity.

It is against this backdrop that this research work is anchored upon so as to ascertain the impact of corruption on the Nigeria external reserves management.

Conceptual and Literature Review

Corruption according to World Bank (1997) is the abuse of public office for private gains; public office is abuse for private gains when an official receives, solicits, or extorts a bribe. It is also abused when private agents vigorously offer bribe to circumvent public policies and processes for competitive advantage and profit. Public office can also be abused for personal advantage even if there is no bribery, through a patronage and nepotism, the theft of state's assets or diversion of state revenue. In any manner corruption manifested and by whatever way it is known, Ajegi (2002) admit that, it is certainly an anti-social, self-centered activity whose primary objective is to enhance the satisfaction of the perpetrator to the detriment of the larger society. It robs the society of scarce resources and weakens the efficiency and effectiveness of organizations within and outside the public realm.

IMF (2003) in its Balance of Payments Manual, 5th edition defined international reserves as "consisting of official public sector foreign assets that are readily available and controlled by the monetary authorities, for direct financing of payment imbalances, and directly regulating the magnitude of such imbalances, through intervention in the exchange markets to affect the currency exchange rate and/or for other purposes".

According to Eichengreen and Adegboye (2005), in recent decades, currency and financial crises accompanied by reversals in capital flows have become more frequent and severe. Therefore, with increased financial integration, countries are vulnerable to infection within and outside their expanses. Consequently,

central banks in developing countries have accumulated reserves to cushion extreme events, the gathering of external debt maturities, and other shocks that could affect the foreign exchange market and the local economy.

Abubakar, (2011) posit that when power shifted from military to democratic based government, a lot of internal crisis and debates on external reserves was witnessed by Nigerians. For instance, between 2005 and 2006, the then president Olusegun Obasanjo was called to face a panel before the National Assembly for the illegal withdraws of billions of naira from the country's external reserves in the name of some settlements such as payments to Paris Club Creditors to remove Nigeria's debt, payment for the support of Niger-Delta power plants establishment and withdrawal for emergency fund to support Census 2006. The allegation was that these monies were not authorized by the National Assembly. In the same manner, Nwakego (2011) as cited by Abubakar (2011) observed that the Nigerian government has spent billions of dollars since 2008 to maintain an exchange rate of 150 naira to the dollar. The nation's foreign reserve which was at least 60 billion dollars in 2008 is 26.5 billion dollars today such that tens of billions of dollars has gone into propping up a depreciating naira.

Most economists in their analysis argued that a nation with mismanaged external reserve will witness crisis like retrogressive growth and development, weakness in foreign exchange, excessive external debts, upsurge poverty, rising mass unemployment, millions of workers will be struggling to have access to basic amenities, low level of living standards among others.

Empirical/ Theoretical Review

Adewale (2011) investigates the crowding-out effects of corruption in Nigeria, covering the periods from 1996 to 2009, he uses simulation approach to investigate the economic implications of corruption in Nigeria, employs Error Correction Mechanism (ECM) to overcome the problem of spurious regression, to ascertain the degree of stationarity of variables employed in the study and the co-integrating properties of the data; the Augmented Dickey-Fuller (ADF) test was employed. He finds that all the econometric test applied in the study show statistically significant relationship between the model, thus, he concluded that corruption retards economic growth in Nigeria, that is corruption has a crowding-out effect on growth. Fabayo et al (2011), in their study analyzed the consequences of corruption on investment in Nigeria using the Ordinary Least Square technique. They use the annual corruption perception index between the period 1996 and 2010. Their study revealed that low Corruption Perception Index ranking on Nigeria, which implies high level of corruption, leads to low investment and thus low economic growth in Nigeria.

Aliyu and Elijah (2008) investigated the impact of corruption on economic growth from 1986-2007. A Barro-type endogenous growth model was adopted so also the Engle-Granger (1987) cointegration and error correction mechanism (ECM) techniques were employed. The core channels through which corruption affects growth were government capital expenditure, human capital development and total employment. Results show that corruption has significant negative effect on economic growth. The study also found that corruption exerts negative impact on both human capital development and total employment, but it positively impacts on government capital expenditure. The positive effect of corruption on capital expenditure is said to be however not surprising because public expenditure figure will always be inflated with the intention of siphoning or embezzling a reasonable proportion of the total value. The paper discovers that corruption exerts both direct and indirect negative effects on economic growth in Nigeria.

This study adopts the "Economic Growth theory of corruption" because it lays more emphasis on the long-run growth rate of an economy and on the basis of endogenous factors rather than exogenous factors of the neoclassical growth theory. This theory was propounded in reactions to the deficiencies in the Solow-Swan growth theory or model by Arrow (1962); Lucas (1988); and Romer (1990). This theory as propounded lay more emphasis on the long-run growth rate of an economy and on the basis of endogenous factors rather than exogenous factors of the neoclassical growth theory. The Solow-Swan model explains that the long-run growth rate of output is based on two basic exogenous variables such as population growth rate and level of corruption in the country. The growth theory emphasizes on technical progress resulting from the rate of capital stock, human capital development, reduction in corruption and investment rate.

Research Methodology

This study investigates the impact of corruption on the Nigeria external reserves management. The data used in this study were secondary data collected from CBN bulletin. The study period span from 1996 – 2015 and the time series data also cover the same period. Variable were divided into dependent and independent variables. The dependent variable is external reserves (EXTR) whereas; the independent variables are corruption perception index (CPI), exchange rate (EXCR), real interest rate (INTR) and Gross Domestic Product (GDP). The estimations were carried out using Eviews8.

Model Specification

The model for this study examines the impact of corruption and exchange rate on external reserves. The model is formulated as below:

$$EXTR = f(CPI, EXCR, INTR, GDP) \dots\dots\dots 1$$

$$EXTR = \alpha_0 \alpha_1 CPI \alpha_2 EXCR \alpha_3 INTR \alpha_4 GDP \dots\dots\dots 2$$

$$\Delta EXTR_t = \alpha_0 + \alpha_1 \sum_{i=1}^n CPI_{t-1} + \alpha_2 \sum_{i=0}^n EXCR_{t-1} + \alpha_3 \sum_{i=0}^n INTR_{t-1} + \alpha_4 \sum_{i=0}^n GDP_{t-1} + \mu_t \dots\dots 3$$

Where:

α_0 is Constant term, $\alpha_1 - \alpha_3$ is Parameter estimate, μ_t is Stochastic disturbance term, EXTR is External Reserves, CPI is Corruption Index, EXCR is Exchange rate, INTR is Real interest rate, GDP is Gross Domestic Product. The A priori expectation provides expected signs and significance of the value of the coefficient of the model parameters to be estimated in light of economic theory and empirical evidence. It is expected that $\alpha_1 < 0$, $\alpha_2 > 0$, $\alpha_3 < 0$ and $\alpha_4 > 0$.

Estimation Technique

This study employs quantitative tools of data analysis. The Augmented Dickey-Fuller (ADF) unit root test was used to test for stationarity of the variables. This test is justified by Gujarati (2006) that “if we are dealing with time series data, we must make sure that the individual time series are either stationarity or that they are cointegrated. If this is not the case, we may open to the charge of engaging in spurious regression analysis.” Co-integration test was conducted to know whether the variables have a long-term or equilibrium relationship between them. The assumption of co-integration is that if in the long run two or more series move closely together, even though the series themselves are trended, the difference between is constant (Chimobi, 2010). A lack of co-integration means that the series have no long relationship. The Error Correction Mechanism (ECM) is then used to correct for disequilibrium which involves reconciling the short-run behaviour of the economic variable with its long-run behaviour. The Vector Autoregressive (VAR) Granger Causality test is conducted to ascertain the causal relationship between corruption, exchange rate and external reserves. The granger causality test determines the causal relationship or the direction of causality between series. This test is necessary because the direction of causation between external reserves, exchange rate and corruption is not really certain. The relationship between the variables was estimated using the ordinary least square technique.

Discussion of Empirical Results

Augmented Dickey Fuller Unit Root Test

Unit root test was carried out to determine if the variables are stationary and if not, to determine the number of times they are to be differenced to achieve stationarity. The variables were tested each to see the order of integration in which they achieve stationarity. This can be seen by comparing the absolute value of the Augmented Dickey fuller (ADF) test with the critical values at different level of significance.

Table 1: Unit Root

Variables	Level	Order of Integration	First difference	Order of Integration
CPI	-2.189174	1(0)	-5.476396*	1(1)
EXCR	-1.351992	1(0)	-4.034843*	1(1)
INTR	-5.935054*	1(0)	-	-
GDP	0.256049	1(0)	-4.423324*	1(1)
EXTR	-1.341455	1(0)	-3.501048**	1(1)

Source: Author’s computation using Eviews8

* Variable stationary at 1%, 5% and 10% critical values.

** Variables stationary at 5% and 10% critical values

*** Variables stationary at 10% critical values

From table 1 above the variables are not stationary at level except for INTR that is stationary at level 1(0) indicating that it has no unit root at 1%, 5% and 10% significant level. As a result of not attaining stationarity at level all the variables were tested at first difference and it can be seen that they all attained stationarity at first difference hence, they are integrated of the same order. It could be observed from the same table that EXTR is the variable that is stationary at 5% and 10% significance level.

Johansen Co-integration Test

This test is use to check if a linear combination of the integrated variables are stationary over the long-run, and if it is so, then it means co-integration exists among the variables, this further implies that a long run relationship exist among the variables. The result is as below.

Table 2: Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.998454	186.8545	69.81889	0.0000
At most 1 *	0.783786	70.35270	47.85613	0.0001
At most 2 *	0.774453	42.78595	29.79707	0.0010
At most 3 *	0.459530	15.97989	15.49471	0.0423
At most 4 *	0.238492	4.904190	3.841466	0.0268

Source: Author's computation using Eviews8
 Trace test indicates 5 cointegrating eqn(s) at the 0.05 level
 * denotes rejection of the hypothesis at the 0.05 level

Table 3: Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.998454	116.5018	33.87687	0.0000
At most 1	0.783786	27.56675	27.58434	0.0503
At most 2 *	0.774453	26.80606	21.13162	0.0071
At most 3	0.459530	11.07570	14.26460	0.1505
At most 4 *	0.238492	4.904190	3.841466	0.0268

Source: Author's computation using Eviews8
 Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
 * denotes rejection of the hypothesis at the 0.05 level
 **MacKinnon-Haug-Michelis (1999) p-values

H₀: there is no co-integrating relationship among the integrated variables

H₁: there is co-integrating relationship among the integrated variables

Table 2 shows that a long term linear relation is present in (Trace Statistics) and table 3 (Maximum Eigenvalue) using MacKinnon-Haug-Michelis (1999) p-values. In the co-integration tables, the trace statistic and maximum eigenvalue statistic indicate co-integration at the 5 percent level of significance, suggesting that there is co-integrating (or long run) relationship between EXTR, CPI, EXCR, INTR and GDP. The result of the co-integration test suggests that external reserves have equilibrium condition with corruption, exchange rate, interest rate and GDP which keep them in proportion to each other in the long run. The evidence of co-integration among the variables rules out spurious correlations which implies that one direction of influence can be established among the variables. But the existence of co-integration vectors among a group of variables may not imply that there is causal influence between pairs of variables in the model of co-integration test. The trace test rejected the null hypothesis (H₀) that there is no co-integrating relationship between the variables and the test base on the maximum Eigen value also rejected the null hypothesis. They both show that there is co-integrating equation at the 0.05 level of significance. Since the two tests are giving the same result, it shows that the variables are co-integrated.

Table 4: Normalized co-integrating Coefficients

VARIABLES	EXTR	CPI	EXCR	INTR	GDP
Coefficient	1.000000	-3.959890	-0.085946	0.566607	0.043552
Standard error		(0.02688)	(0.00321)	(0.01213)	(0.00107)
		-147.3173	-26.7744	46.7112	40.7028

Source: Author's computation using Eviews8

From table 4 the coefficient estimates can be interpreted in terms of long run elasticity and the t-statistics is used to determine the statistical significance of each variable. The rule of thumb states that, a variable is statistically significant if the absolute value of its t-statistic is approximately 2 or above. Our concern here is the relationship that exists between corruption, and external reserves. From table 4, corruption is elastic in relation to Nigeria external reserves, meaning that in the long run, a change in the corruption index will cause a more than proportionate change in external reserves and the t-statistic of CPI shows that the coefficient is statistically significant.

Error Correction Mechanism (ECM)

ECM captures the reconciliation of the variables over time from the position of disequilibrium to the period of equilibrium (Ogundipe et al, 2013). The ECM coefficient is known as the speed adjustment factor, it tells how fast the system adjusts to restore equilibrium. The basic criteria for analyzing ECM are: The ECM must lie between 0 and 1; for it to be meaningful it must be negative. If it is positive there is no error correction and it diverges and the T-statistic must be significant that is, it must be greater than 2. Below is the ECM result.

Table 5: ECM

Variables	ECM(-1)	S. E.	T. Statistic
D(CPI)	-0.417568	0.10116	-4.12783
D(EXCR)	-0.906300	0.70660	-1.28262
D(INTR)	-0.355323	1.82317	-0.19489

Source: Author's Computation using Eviews8

The CPI speed of adjustment coefficient is -0.417568. The ECM is negatively signed and its magnitude lies between 0 and 1. The significance of this is that it supports co-integration and it shows that there exists a long run steady equilibrium between external reserves and the explanatory variables. The error correction model in this equation means that about 41.76 % of errors generated between each period are correlated in subsequent periods and also, it is significant judging from the value of the T-statistic [-4.12783].

Granger Causality test

This test is conducted to ascertain the causal relationship between corruption and external reserves. If the probability is less than the critical value it means it is significant i.e. there is a causal relationship between external reserves and corruption. Mathematically it is stated as

$$\Delta Y_2 \rightarrow \Delta Y_1 \text{ or } \Delta Y_1 \rightarrow \Delta Y_2$$

$$H_0 = \Delta Y_2 \rightarrow \Delta Y_1 \text{ or } \Delta Y_1 \rightarrow \Delta Y_2$$

Table 6: Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
EXTR does not Granger Cause CPI	18	3.87990	0.0477
CPI does not Granger Cause EXTR		0.54859	0.5906
EXCR does not Granger Cause CPI	18	3.80201	0.0501
CPI does not Granger Cause EXCR		2.11458	0.1603
EXCR does not Granger Cause EXTR	18	1.97567	0.1782
EXTR does not Granger Cause EXCR		2.53198	0.1179

Source: Author's Computation using Eviews8

From table 6 it could be seen that there is a causal relationship between external reserves and corruption in Nigeria. The relationship between external reserves and corruption is unidirectional. We reject the null hypothesis and accept the alternative hypothesis that external reserves granger cause corruption. Also, we accept the null hypothesis that corruption does not granger cause external reserves. The above result means that external reserves management in Nigeria can cause corruption but corruption itself does not account for the increase or decrease of the Nigeria external reserves. Also from table 6 there is a causal relationship between exchange rate and external reserves. The relationship between the two variables is significant. This means that as Nigeria naira continue to depreciate against the dollar our external reserves will continue to deplete.

Table 7: Ordinary Least Squares Result
 Dependent Variable: EXTR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPI	1.146096	0.480354	2.385942	0.0297
EXCR	0.002254	0.076432	0.029485	0.9768
INTR	-0.028335	0.181607	-0.156022	0.8780
GDP	0.025375	0.020195	1.256502	0.2270
R-squared	0.616732	Mean dependent var		26.69650
Adjusted R-squared	0.544869	S.D. dependent var		17.96511
S.E. of regression	12.11988	Akaike info criterion		8.004428
Sum squared resid	2350.264	Schwarz criterion		8.203574
Log likelihood	-76.04428	Hannan-Quinn criter.		8.043303
Durbin-Watson stat	0.256349			

Source: Author's Computation using Eviews8

$$\text{EXTR} = 1.146096 + 0.002254 \cdot \text{CPI} - 0.028335 \cdot \text{INTR} + 0.025375 \cdot \text{GDP}$$

From table 7 the relationship between corruption and external reserves is positive as against our aprior expectation which suggest a negative relationship. This could be due to the fact that corruption is embedded in the management process of our external reserves. The coefficient of corruption is 1.146096 indicating that a percentage increase in corruption will increase external reserves by 14.60%. This result agrees with Ajie Etal, (2015) who in their study "Corruption and Economic growth in Nigeria" find out that an increase in corruption leads to an increase in FDI. Exchange rate and gross domestic product are positively related to external reserves. On the other hand interest rate has a negative relationship with external reserves with it coefficient being - 0.028335 indicating that an increase in interest rate will reduce external reserves by 02.8%. This conforms to our expectation of a negative relationship. The correlation coefficient (R) is 0.616732 signifying that there is 62% of relationship between external reserves and corruption, exchange rate, interest rate and gross domestic product. The coefficient of determination (R^2) is 0.544869 indicating that 54% of the total variation of external reserves is attributed to corruption, exchange rate, interest rate and gross domestic product while 46% is as a result of the error term. The Durbin Watson statistics is 0.256349 indicating the absence of autocorrelation.

Summary, Recommendation and Conclusion

The results of this study are summarized as follows:

- The unit root test suggests that corruption, exchange rate, external reserves and gross domestic product are stationary at first difference whereas, interest rate is stationary at level. The co-integration test carried out indicates that corruption, exchange rate, interest rate, gross domestic product and external reserves have a long run relationship. Corruption is elastic in relation to Nigeria external reserves, meaning that in the long run, a change in corruption will cause a more than proportionate change in the external reserves.
- The causality test indicates that there is a unidirectional causal relationship between corruption and external reserves. That is to say that External reserves management cause corruption but corruption does not cause external reserves. Also exchange rate granger cause external reserves.
- The study also shows that corruption has a negatively positive relationship with external reserves due to the fact that corruption is embedded in the management process of our external reserves.

This study recommends that:

- Drastic measures should be put in place to check corruption in both public and private sectors. The government should not just adopt a one-sided means of curbing this menace that have eating deep into the country's economy causing huge loses and damages to the economy.
- Exchange rate should be kept low and stable avoiding too much of volatility, this could be achieved if accurate monetary policies are put in place such as allowing market forces to determine the exchange rate in the long run and fixed exchange rate in the short run to allow for adjustments.
- Government should make policy changes that reduce corruption both at the demand and supply side.

This study investigates the impact of corruption on the Nigeria external reserves management. ADF unit root test, co-integration, ECM, granger causality test and OLS were the estimation technics implore in this study. The study found out that corruption has a positive but negative relationship with external reserves. This establishes the fact that corruption is embedded in the management process of our external reserve. The Process of managing the nation's external reserves causes corruption in the country and that corruption has grossly affected

the polity of Nigeria and it is seriously affecting the ability of the country to grow.

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