Impact of Exchange Rate on Output and Growth in Gross Domestic Product in Nigeria; A Comparative Analysis

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Abstract:

This study assessed the effect of exchange rate on output level in economic at various exchange rate regimes. Government has over the years shown recognition of the role played by increased output in the presence of various exchange rate policies through huge investment in the manufacturing sector. This is reflected in the huge financial commitments into the manufacturing sector. However, the output level is not commensurate with the huge sacrifice and financial commitment into the sector. Ordinary least Square of regression was adopted in the analysis. Findings revealed that the exchange rate regimes in Nigeria do not influence the level of output, contrary to expectations. It is recommended that future policies should focus on encouraging local technology to improve productivity. Provision of infrastructural facilities should be improved to sustained growth GDP and sources of raw materials should be diversified.

Keywords; Output, Exchange Rate, Gross Domestic Product

Introduction

Nigeria has always been in the pursuit of economic growth and development. Huge investments have been developed by successive governments into the various sectors of the economy. Unfortunately, the resultant changes in the economy are not commensurate with the magnitude, quantum and depth of the investments so deployed into the economy. A lot of structural defects are still evident in the manufacturing sector despite the huge resources unvested in it. Many Nigerian industries face a lot of competition from similar goods imported from abroad due to a number of reasons; such as distortions arising from overvalued naira on the level of out and consequently on the domestic prices, employment of labor and capital utilization. An over-valued currency undermines efficient resource utilization, encourages capital flight, and cheapens import, thus causing Nigeria to be more import dependent, amongst others.

Exchange rate is said to be the "relative price of two "national monies" or, the relative price of two national outputs" or the relative price of tradeables to non tradeables" that results in simultaneous equilibrium in the internal and external sectors of an economy [10.]. Moreover, some notable influences on the exchange rate of any country include variables like demand and supply of foreign exchange, monetary and fiscal policies, and level of foreign reserves among others. These variables, if not properly managed often lead to different economic problems ranging from economic depression, rampaging inflation, high levels of unemployment, currency depreciation and balance of payment deficits. Hence, governments are constantly faced with the pressure of dealing with these variables. One of the various means this is achieved is through the use of government policies, specifically exchange rate policy which is the most common policy for achieving the equilibrium balance of payment. A great level of attention is given to balance of payments, because Nigeria, like many other low income open economies of the world, needs to pay more attention to her economic growth and development.

The output effect of exchange rate changes has long been recognized in the literature but there is however, no consensus as to the direction of the effects while the traditionalist argued that exchange rate depreciation would promote trade balance, alleviate balance of payments difficulties and accordingly expand output and employment provided the Marshall-Lernar conditions are met (Marshall-Lerner condition states that depreciation would lead to expansion in output if the sum of price elasticity of demand for export and the price elasticity of demand for imports is greater than unity). The mechanism behind these positive effects, according to [5] is that devaluation switches demand from imports to domestically produced goods by increasing the relative prices of imports and making export industries more competitive in international markets thus stimulating domestic production of tradable goods and inducing domestic industries to use more domestic inputs. The monetarists on the other hand argued that exchange rate changes have no effect on real variables in the long run. The monetarist view is that exchange rate devaluation affects real magnitudes mainly through real balance effect in the short run but leaves all real variables unchanged in the long run. This approach is based on the assumption that the Purchasing Power Parity (PPP) holds. It predicts that in the short run an increase in the exchange rate leads to increase in output and improves the balance of payments but in the long run the monetary consequence of the devaluation ensures that the increase in output and improvement in BOP is neutralized by the rise in prices. IS-LM model is one other theoretical linkage between exchange rate and output in the literature.

The present global economic arrangement appears to greatly emphasize on the significance of foreign exchange if developing economies are desirous of escaping from the clutches of underdevelopment. In matters of foreign exchange policy or regimes too, it is the political philosophy of the government that determines the choice that is made. Exchange rate is the rate at which a nation's currency is exchanges for another nation's currencies. While exchange rate regimes refer to the various ways of determining the rate at which a notion's currency exchanges for another nation's currency.

It should be noted that the value of the naira at any point in time also greatly depends on the exchange rate regime or policy operated at such a time. From the forgoing, questions such as; has output overtime been affected by any of the exchange rate regimes so adopted in Nigeria? Thus, the specific objective of this paper is to determine whether exchange policies adopted between 1970 and 2010 have influenced output.

2.0 Theoretical Framework.

This section discussed three basic theories of exchange rate determination are discernible, these are; (i) The Flow or Balance of Payments (ii) The Purchasing Power Parity (PPP) Theory and (iii) The Mint Parity theory. The Balance of Payment theory posits that the exchange rate is determined by the market forces of demand and supply in the foreign exchange market. According to [1], the demand for foreign exchange arises from the debt item in the Balance of Payments, whereas the supply of foreign exchange arises from credit items. On the other hand, [5] asserts that the PPP theory is simply an application of the law of one price to national price levels rather than to individual prices. This implies that under the PPP theory, exchange rates between any two countries are adjusted to reflect changes in the price levels of the two countries. The Mint Parity theory defines national currencies in mints of fine gold. Under this system, the currency in use was made of or was convertible into gold at a fixed rate [4].

However, in practice, exchange rates are determined in two main ways, namely; by government and by the market forces. When they are determined by government, they are said to be 'fixed', 'administered' or 'pegged'. But when they are determined by market forces they are considered to be 'flexible' or 'floating'. The floating/flexible exchange rate is of two forms, the free floating exchange rate (clean float) and the managed floating exchange rate (dirty float) policies [11]. The latter is a system whereby exchange rates are allowed to float in response to demand and supply forces in the foreign exchange market nut are subject to occasional government intervention. According to [6], the managed float approximates what obtains in reality and has become quite common in recent years while the clean float is academic as it does not exist anywhere in the real world.

According to [2], the greatest advantage of the fixed exchange rate policy is that it guarantees stability of the exchange rate and this stability is transmitted to domestic prices so that the general price level remains stable. [7] is of the view that SAP-valuation of the naira encouraged imports, discouraged non-oil export and helped sustain productivity.

On the other hand, [3] are of the view that the liberalization of exchange rates during SA era had brought marginal improvement to productivity and output in Nigeria. [8] is of the view that the liberalization of exchange rates has enhanced the allocation of available resources to the productive sectors. [9] observed that with the adjustment of SAP, output grew as a result of increased local sourcing of inputs and a more liberal foreign exchange rate regime. [12] also argued that fluctuations in exchange rate adversely affected output. Fluctuations in exchange rate may cause instability in purchasing power and hence, negative impact in investment in import raw materials.

2.1: History of Exchange Rate Policies in Nigeria between 1960 and 2010

The main objectives of exchange rate policy in Nigeria are to preserve that value of the domestic currency, maintain a favorable external reserves position and ensure price stability. Policies adopted in Nigeria between 1960 and 2010 are; the policy of parity with the pound sterling of 1959 – 1967; the Gold Content Approach of 1968 – 1970; the Dollar peg Approach of 1971 – 1974; the pegging against a Basket of Currencies (1975 – 1977); the import-weighted Approach of 1978 – 1982; the currency intervention system of 1983; the crawling Peg System of 1984 – 1986; the second-tier Foreign Exchange Market (SFEM) of 1986; the Dutch Action System (1987); the parallel market (1985); the interbank foreign exchange market (IFEM) (1989); Bureau De Change (BDC) (1989); Guided deregulation of the Foreign Exchange Market (1995-2012) and the establishment of the autonomous Foreign Exchange Market (AFEM).

During the flexible exchange rate regime (1986 – 1995), which coincided with the period of the Structural Adjustment Programme (SAP), there was impressive increase in output. A slight decline came in 1998 when the naira-dollar peg at N22 per Dollar was abolished to give way to guided deregulation. The trend of productivity figure maintained a positive trend since 1999.

2.2: Exchange Rate and Output in Nigeria (1970-2010)

Steady increase of the outputs over the years at current basic prices between 1970 and 2010 and figures on annual average exchange rate of the naira vis-à-vis the United States dollar is shown in table 2.1 bellow;

Table 2.1: Output at Current Prices and Effective Annual Exchange
Rate Naira/US$ 1.0 (1970 – 2010).

Year	Nominal Exchange Rate, N/US 1.00 (X_1)	Annual Average Exchange Rate (X_2)	Output at current basic prices (N Million)
1970	99.9	0.7143	378.4
1971	100.0	0.6944	415.8
1972	101	0.6599	511.1
1973	94.3	.06579	622.4
1974	100.8	0.6293	1589
1975	100.4	0.6168	1170.4
1976	107.8	0.6266	1464.3
1977	102.6	0.6466	1695.6
1978	101.6	0.6351	2915.8
1979	98.2	0.6027	3815.6
1980	106.3	0.3461	5162.2
1981	110.4	0.6052	4700
1982	109.9	0.6731	5047.6
1983	109.8	0.7506	5543
1984	113.2	0.7672	4847.5
1985	100	0.8924	6422.6
1986	51.9	1.7323	6591.1
1987	14.7	3.9691	7468.5
1988	13	4.5367	11017.8
1989	8.9	7.3657	12475.5
1990	7.7	8.0378	14702.4
1991	6.3	9.9095	19356
1992	3.7	17.2984	27004
1993	3	22.05	38987.1
1994	2.9	21.8861	62897.7
1995	0.7	81.0228	105289.6
1996	0.8	81.2528	132897.1
1997	0.8	81.6494	144107
1998	0.8	83.8072	141496.4
1999	0.2	92.3428	150946.5
2000	0.2	100.8016	168037
2001	81.2	111.701	199079.3
2002	88.9	126.2577	236825.5
2003	100.6	134.0378	287739.4
2004	107.1	132.3704	349316.3
2005	106.6	130.6016	412706.6
2006	105	128.2796	478524.1
2007	106.4	126.573	520883
2008	79.67	120.3	585573.04
2009	96.73	146	612308
2010	96.57	148	647822

Source: CBN Statistical Bulletin (Various issues)

3.0: Methodology

This paper adopts the simple regression analysis. The two variables under study are dependent (productivity /output) and independent exchange rate. Output over a certified period is regressed against the exchange rate of the naira (with respect to the value of the dollar) for the three major different periods of exchange rate policy. Dummy variables are used to capture other factors that influence productivity. The student's t-test is used to test the level of significance of the variable. The data on output and exchange rates used for the analysis were

obtained from publications of the Nigeria Bureau of Statistics (NBS) and various issues of the Central Bank of Nigeria (CBN) Statistical Bulletin.

This paper is based on the research hypotheses:

H_1: Output is influenced by the Exchange Rate Regimes. As earlier noted, this study employs the Ordinary Least Squares (OLS) nonlinear regression model to analyze the problem. The model is specified in the form of a polynomial as follows;

$Ot = a_o + a_1 + a_2 + a_3 D_{1t} a_4 D_{2t} + a_5 D_{3t} + a_6 D_{4t} + U_t$

Where:

O_t = Output associated with the tth Exchange Rate Regime.

a_o = The interception of the model; a_1, a_2 = the slope of the model

X_1 = Nominal Effective Exchange Rate

X_2 = Annual average exchange rate N/US$ 1.0

a_3 = Measures of expected ot during fixed Exchange Rate Regime

a_4 = Measures the difference in ot during a change from fixed exchange rate.

a_5 = Measures the difference in ot associated with a change from managed
     Floating Exchange Regime to pegged-to-a currency basket system.

a_6 = Measures the difference in ot during a change from pegged system to free
     floating

D_{1t} = {1 if output obtained under Fixed Regime {0 otherwise.

D_{2t} = {1 if output obtained under managed Float Regime {0 otherwise.

U_t = a random term to capture all other factors that affect Ot.

4.0 Presentation and Analysis of Data

This section presented and analyzed data collected from different reliable source like CBN Statistics Bulletin and Nigeria Bureau of Statistics between 1970 and 2010. This was done to determine the impact of foreign exchange on manufacturing output in Nigeria within the same from the period.

Regression Analysis and Results

The results of the regression analysis are presented as follows;

Regression 1;

From table 4.1, D_1 is a dummy variable representing the period of fixed exchange rate. R^2 shows that 95% of the variation in Ot is explained by the X, X_2 and D_1. F* is greater than F two-tailed, thus, F* is significant. This implies that X, X_2 and D_1 are jointly significant. T-Ratio shows that a_0 is not significant, but a_1 and a_2 are significant. $t_{0.025}$ is greater than t* for a_3, thus a_3 is not significant in the equation. Therefore, we reject H_1.

Table 4.1 Regression Results of Fixed Exchange Rate and Output.

Repressor	Coefficient	Standard Error	Calculated T-ratio	Test (two-tailed)
Constant	1112.1	11388.3	0.811	2.074
X	2178.0	221.1821	9.8469	2.074
X^2	-10.2540	3.1379	-3.2678	2.074
D_{1t}	-2244.7	3257.2	-0.6891	2.074
R^2 = 0.9571			F-Statistic F* = 163.6941	
R^2 = 0.9513			F- Two tailed Test = F0.01,3,22 – 4.82	
DW-Statistic = 1.8929			Standard Error Regression = 5169.7	

Regression 2;

From table 4.2, D_2 is a dummy variable representing the period 1973 to 1978. R^2 or R^2 shows that 95% of the variation in Ot is explained by X, X_2 and D_2. F* is significant. This implies that X, X_2 and D_2 are jointly significant. T-Ration shows that a_0 is not significant, but a1 and a_2 are significant. $t_{0.025}$ is greater t* for a_4 thus a_4 is not significant in the equation. Therefore, we reject H_1.

Table 4.2 Regression Results of various Exchange Rate Regimes and Output.

Repressor	Coefficient	Standard Error	Calculated T-ratio	Test (two-tailed), 0.25 (n-k=22)
Constant	1175.4	1553.6	0.7566	2.074
X	2172.2	229.6406	7.4592	2.074
X^2	-10.1864	3.1603	-3.1603	2.074
D_{2t}	-1301.5	2579.0	-0.5047	2.074
R^2 = 0.9567 $\overline{R}^2$ = 0.9508 DW-Statistic = 1.8673			F-Statistic F* = 162.0182 F- Two tailed Test = F0.01,3,22 – 4.82 Standard Error Regression = 5195.2	

Regression 3;

From table 4.3, D_3 is a dummy variable representing the period 1979 to 1985. R^2 or $\overline{R}^2$ shows that 95% of the variation in is explained by X, X_2 and D_3 F* is greater than F two-tailed Test, thus F* is significant, this implies that X. X_2 and D_3 are jointly significant. T-Ratio shows that a_0 is not significant, but a_1 and a_2, are significant. $t_{0.025}$ is greater than t* for a_5 thus a_5 is not significant in the equation. Therefore, we reject H_1.

Table 4.3: Currency of various Regime and Productivity (output)

Repressor	Coefficient	Standard Error	Calculated T-ratio	Test (two-tailed)
Constant	-968.3310	1514.1	-06.6395	2.074
X	2350.5	217.7213	10.7960	2.074
X^2	-12.2412	3.0435	-4.0221	2.074
D_{3t}	4273.4	2327.9	1.8357	2.074
R^2 = 0.9620 $\overline{R}^2$ = 0.9568 DW-Statistic = 2.1106			F-Statistic F* = 185.7241 F- Two tailed Test = F0.01,3,22 – 4.82 Standard Error Regression = 4865.8	

Regression 4;

From table 4.4, D_4 is a dummy variable representing the period 1986 to 2010. R^2 or $\overline{R}^2$ shows that 95% of the variation Ot is explained by X, X_2 and D_4. F* is greater than F two-tailed Test, thus F* is significant. This implies that X, X_2 and D_4 are jointly significant. T-Ratio shows that a_0 is not significant, but a_1 and a_2 are significant. $t_{0.025}$ are greater that t* for D_4, thus D_4 is not significant in the equation. Therefore, we reject H_1.

Table 4.4: Regression Results of Flexible Exchange Rate Regime and Productivity (output).

Repressor	Coefficient	Standard Error	Calculated T-ratio	Test (two-tailed), 0.25 (n-k=22)
Constant	1015.6	1294.6	0.7845	2.074
X	2481.4	354.1159	7.00774	2.074
X^2	-14.4086	4.9835	-2.8913	2.074
D_{4t}	-3372.2	3495.1	-09648	2.074
R^2 = 0.9581 Adjusted R^2 = 0.9522 DW-Statistic = 1.8795			F-Statistic F* = 167.1642 F- Two tailed Test = F0.01,3,22 – 4.82 Standard Error Regression = 5118.0	

Overall Regression Analysis;

From table 4.5, D is a dummy variable representing the period 1970 to 2010. R^2 or $\overline{R}^2$ shows that 95% of the variation in ot is explained by X, X_2 and D. F* is greater than F two-tailed Test, thus F* is significant. This implies that the model is robust since F shows that joint significance of the variables. The t-ratio shows that a_0 is not significant in the equation. Thus we accept H_O, namely, the level of output in the Nigerian economy is not influenced by the exchange rate regime, and hence we reject H_1.

Table 4.5: Overall Regression Results of Various Exchange Rate Regimes and Productivity (output).

Repressor	Coefficient	Standard Error	Calculated T-ratio	Test (two-tailed), 0.25 (n-k=22)
Constant	-525.7959	3390.2	-0.1551	2.074
X	2143.3	273.4783	7.8371	2.074
X^2	-9.9551	3.5254	-2.8238	2.074
D	520.1604	1299.2	-0.4004	2.074
R^2 = 0.9565 Adjusted R^2 = 0.9508 DW-Statistic = 1.8673			F-Statistic (Calculated) F* = 161.2999 F- Two tailed Test = F0.01,3,22 – 4.82 Standard Error Regression = 5206.2	

Discussion of Findings

The study showed that the various exchange rate regimes did not affect the manufacturing sector/ output nor reduce the Gross Domestic Product. Rather, there has been economic growth because improvement in the output has diversified revenue base for the country and there will be no total reliance on oil prices for budgetary allocation. Moreover, increase on productivity/output meant employment of a large proportion of labour as can be observed in emerging economies of the world, and they constitute the engine room of economic growth. Result seems to contradict report of growth figures reported by the government. Nigeria's economic managers are fond of reeling out economic indices and informing the country that the economy is doing well. Very often, they adjudge the economy as doing well with economic growth rate. Government has at various points over the years comforted the nation that the economy has grown by as much as 7 per cent but the question is. No economy can grow by as much as 7 per cent without absorbing more labour in an economy where close to 40 per cent of the able-bodied labour force willing to work cannot find jobs.

Government attempts to stabilize exchange rate and avoid its misalignment i.e persistent and prolonged deviation from equilibrium exchange rate value, under the managed-float system or regime did not yield positive results as the value of the naira continued to depreciate.

5.0 Conclusion and Recommendations

This study did a comparative analysis of the impact of various exchange rate regimes on productivity (output) in Nigeria from 1970 to 2010. Findings revealed that there were no impacts on productivity by the changes in exchange rate within the period reviewed. Rather, devaluation encourages export and trade competitions. It is recommended that:

i. Policies aimed at encouraging local technology to improve productivity should be focused by the government.

ii. Improvement in the provision of infrastructural facilities to enhance efficiency of manpower for sustained growth in Gross Domestic Product (GDP) and employment should be given a priority.

iii. There should be diversification of sources of raw materials to encourage savings as well as employment generation.

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