

Foreign exchange market and economic growth in an emerging petroleum based economy: Evidence from Nigeria (1970-2003)

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Abstract

This study is an exposition of foreign exchange market and economic growth in an emerging economy - the Nigerian case. The paper focuses on the implications of exchange rate movement on economic growth. The ordinary least square (OLS) technique was adopted using time series data on exchange rate movement, volatility of exchange rate (EXCHR) labor force, gross domestic investment and technology, volatility of exchange rate is measured by three years moving average of standard deviation of real exchange rate. The paper maintains that in view of the positive relationship between exchange rate, volatility and economic growth in Nigeria, exchange rate policy should be designed to bridge the savings investment gap so as to enhance government revenue as well as reduce the fiscal Lacuna through the curtailing of deficit geared at increased and sustained economic growth. Gross domestic investment should also be sustained since this leads to significant economic development.

Introduction

The Nigeria Foreign exchange market is an embodiment of buyers and sellers of foreign exchange. The major players include banks, public sector, the private sector and correspondent banks overseas. The supply of foreign exchange is obtained from oil and non-oil exports. It is equally obtained from capital receipts including drawdown on loans, expenditure on foreign tourists in Nigeria, repatriation of capital by Nigerians resident overseas. Other invisible receipts by the private sector also constitute the supply of foreign exchange. From a different standpoint the following represent the demand for foreign exchange: external debt service obligations, personal home remittance (PHR) by

foreign nationals resident in the country, financial commitments to international organizations and the country's embassies overseas, payment for imports and other invisible out payments by the private sector.

The genesis of the Nigerian foreign exchange market till date is impacted upon by a number of factors. These include but are not restricted to:

- changing pattern and trend of International Trade
- institutional changes in the economy structural shifts in production prior to the establishment of the central Bank in Nigeria in 1958 and the Enactment of Exchange Control Acts of 1962, foreign exchange was earned by the private sector. It was being helped in balances abroad by commercial banks which then served as agents for local exporters.

Agricultural Export was the main source of foreign exchange receipts. The British Pound Sterling and Nigerian pound were "at par", that is, tied together. There was easy convertibility but development of an active foreign exchange market was delayed.

The need for the development of a local foreign exchange market became fashionable as a result of the establishment of Central Bank. The centralization of the foreign exchange authority in the bank also necessitated the development of local foreign exchange market. In the 1970s there 'was increased export of crude oil as a result of sharp and astronomical rise in its prices. This facilitated official foreign exchange receipts. To pay for international transactions Economic Agents patronized the Central Bank for foreign exchange allocation. There was a boom in the foreign exchange market at this period. This necessitated the efficient and effective management of foreign exchange resources in order to eschew shortcomings.

In 1982 a comprehensive exchange controls were applied. This was occasioned by foreign exchange crisis that occurred that year. This led to the emergence of a Parallel Market premium because of disequilibria in the official foreign exchange market. Abuses such as over invoicing import and under invoicing of export followed. Since the exchange control system could not control nor evolve acceptable means for allocation in consonance with the goal of internal balance. Second tier foreign Exchange Market (SFEM) was introduced in September 1986. Under SFEM Market forces determined the

Naira exchange rate and allocation of Foreign Exchange Bureau de Change then emerged in 1989 aimed at enlarging the scope of the Foreign Exchange Market. Bureau de Change was specifically meant for dealing in privately sourced foreign exchange.

In February 1993 the Central Bank introduced pro-rata system of foreign exchange allocation. This was to ensure availability of allocations by all participating banks. The rate of foreign exchange in other segments was unstable but the official exchange rate of Naira was administratively stabilized. Put simply, there was some element of foreign exchange fluctuations in some segments. There were some reforms in 1994. These include:

- Formal pegging of the Naira exchange rate
- Centralization of foreign exchange in the Central Bank of Nigeria
- The restriction of Bureau de Change to buy foreign exchange as agents of the CBN,
- Reaffirmation of the illegality of the parallel market, and
- The discontinuation of open account and bills for collection as means of payment for imports and exports for the agricultural and manufacturing sectors.

In 1995 there was the liberalization of foreign exchange with the emergence of Autonomous Foreign Exchange Market (AFEM) meant for the Sale of Foreign Exchange by CBN to end-users by way of dealing through selected authorized dealers at market determined exchange rate. Bureau de change was granted the status of authorized dealer i.e. buyer and seller of foreign exchange. This was further liberalized in 1997 and 1997 and some of the restrictions were lifted.

Literature review and theoretical framework

A major goal of monetary policy has been the rapid economic growth of an economy. Economic growth is measured by the increase in the amount of goods and services produced in a country. Growth is said to occur in a situation where a country's productive capacity is on the increase. This is then applied to produce more goods and services. Production of more goods in an economy has linkage with export and import of goods between countries and this transaction is in foreign currencies. The transaction

which is otherwise known as international trade is associated with the exchange of foreign currencies with the other. A growing economy produces more goods and services in each successive period aimed at achieving the benefits of international trade. The gains are in turn associated with the value (price) of goods and services. Exchange rate therefore is the price which one currency is exchanged with the other and it measures the relative worth of the domestic economy most especially the currency of most of the industrialized nations such as United State dollars, British pound sterling, Japanese yen and Italian lira etc. These currencies are characterized by fluctuations and or instability in the economy.

Thus after 1944, exchange rate in this post Breton Wood period, have been unstable in nominal and real terms. The instability was as a result of the demolition of the European Economic system that was premised on international trade. Western Europe had the need for vast import requirements not solely for reconstruction but for reasons not far from survival. Spero (1977) reasoned that balance of payments deficit (problems) has become fashionable, thereby making Western countries' currencies to be highly uncertain. Greater exchange rate movement attracts adjustment cost on trade flows. It equally sends conflicting and danger signals to investors as it creates uncertainty about the targeted profit. Lower fluctuation signifies greater certainty about this macroeconomic price (Kent and Naja, 2003). Thus uncertainty is associated with volatility defined in terms of movements in Real Exchange Rate. Frenkel and Goldstein (1988) opined that instability is the short term volatility of Real Exchange rate about its long term trends.

A number of studies have been articulated on the empirical evidence of Exchange rate fluctuations (volatility) and the macroeconomic performance of different economies vis-a-vis the exchange rate determinant as popularized by (Dornbusch 1980, Cushman 1983, Aktar and Hilton 1984, Gotur 1985, Bailey et al, 1986; Edwards 1987, 1989; Grauwe 1988; Elbadawi, 1992; 1994; Mwega 1993 and Kandil 2002). The implications of exchange rate movement on the economy are analyzed in terms of risk of uncertainty. A developing country account of the implications of exchange rate instability on trade flows includes Kumar (1991) for Pakistan exports to the developed world and for some

countries in sub-Saharan Africa, Savvides (1992) and Grobar (1993) respectively.

For sub-Saharan African manufactured export commodities studies articulated include Gonzarga and Terra (1997) for Brazillian export Sekkat and Varoukadis (1998). In the same vein the Turkish export, Ozbay (1999), Hook and Boon (2002) for Malaysian Exports and Arinze (2000) for 13 Less Developing countries export constitute other studies embarked upon on the subject matter. Furthermore, a comparative analytical underpinning of developed and developing countries on exchange rate fluctuation and aggregate export found a negative impact for developing countries and not for developed nations (Saver and Bohara (2002).

From the Nigerian perspective, few studies are found to be associated with the subject matter of this study. This is as postulated by Adubi and Okumadewa (1999). In this case the effects of exchange rate fluctuation on trade flows are examined. The determinant of real exchange rate has been the focus of Ogun (1998), Obi (1987), Ojameruaye (1990), Olisadebe (1991), Olukple (1993), Cooney (1997) and Gbosi (2001) who jointly centered their study on identifying the determinants of nominal exchange rate. Other related study in this regard is found in the work of Nyong and Obafemi (1995) which concentrated on exchange rate policy and macroeconomic adjustment in Nigeria: theoretical and empirical analysis. This study shows a departure from the above studies in that it examines the exchange rate instability and economic growth in Nigeria for a period spanning from 1970-2003.

Methodology

In addition to the descriptive approach in the preceding sections, the study now adopts an econometric approach in its empirical analysis of the relationship between exchange rate and economic growth. The data used in this study are basically secondary data sourced mainly from central bank of Nigeria statistical bulletin. The period of study spans from 1970 to 2003.

Specification of empirical model

The empirical model specified for this study is as follows:

$$\text{GDP} = f(\text{VEXCHR}, \text{GDI}, \text{LAB}, \text{TECH}) \quad (\text{i})$$

Econometrically the above equation can be modeled thus:

$$\text{GDP} = a_0 + a_1 \text{LVEXCHR} + a_2 \text{LGDI} + a_3 \text{LLAB} + a_4 \text{LTECH} + e_t \quad (\text{ii})$$

Where: e_t = Error term

$a_0 - a_4$ are parameter Estimates

LGDP = Log of gross domestic product

VEXCHR = Volatility of exchange rate

LGDI = Log of gross domestic investment

LLAB = Log of labor force

TECH = Technology proxied by time.

Gross Domestic product is presented here as a dependent variable. Economic growth is measured by proportional changes in variable. Economic growth is measured by proportional changes in gross domestic product and is assumed to be determined by the Agricultural sector, manufacturing and services. There is a functional relationship (link) that exists between Real Exchange Rate Fluctuation, Gross Domestic Investment (GDI), Labor Force and technology. The different activity sectors of the economy are aggregated into agriculture (which comprises livestock, forestry, fishing and mining), manufacturing (which comprises utilities and construction activities); and the service activities (which include transport, communication, distributive trade, hotel and restaurant, finance and insurance, real estate and other business services, housing, community, social and personal services as well as government services. There is a relationship between all these and exchange rate. Gross Domestic Product contributes significantly to the growth and sustainable development of economies.

These equations are also based on the reasoning that Real exchange rate is associated with a measure of the exchange rate that recognizes the effect of the

differences in inflation rates of the countries concerned. Real Exchange Rate Fluctuation is simply the nominal exchange rate for the effect of inflation differential. Real Exchange Rate Fluctuation is presented here as an explanatory variable. By taking into account the effect of inflation differentials, the real exchange rate provides a measure of price of foreign currency in real terms.

In sum real exchange rate (RER) refers to the price of foreign goods in terms of domestic goods. Exchange rate fluctuation then refers to the volatility and or movements in Rate Exchange Rate. Fluctuation is the short-term variation (volatility/instability) of real exchange rate in relation to long-term trends. Thus changes in world price or fluctuations in nominal exchange rate give rise to instability in international commodity trade. Thus, there exist a relationship between the exchange rate fluctuation and the macroeconomic environment of Nigeria vis-a-vis terms of trade, government consumption expenditure, tradable, investment, macroeconomic imbalances and nominal exchange rate.

Foreign investment is identified in economic literature as having some direct functional and positive relationship with Balance of Payments. Anyanwu (1997) posits that investment refers to the acquisition by institutions or individuals in a country of assets of firms. Investment consists of domestic and foreign investment. Foreign investment consists of external resources, including capital, technological, managerial and marketing expertise. Adequate public investment is important stimuli that can trigger industrial growth, which can create room for employment opportunities and thus reduce unemployment. Investment is a flow, which represents either addition to existing stock of capital or acquisition of new capital equipment. Although investment is a smaller component of aggregate demand than is consumption, it is more volatile and so very important in the Keynesians analysis as a source of short time changes in aggregate demand. Investment is also important when viewed from the supply side of the economy as it is the means by which changes in function specifies how the services yielded by the capital stock are combined with labor to produce a flow of output. Investment thus is a policy variable that can stabilize and engineer economic growth and development.

Labor force is presented here as an explanatory variable. It represents the

economically active group of the society. The labor force is classified into the age bracket of 21 and 65 years. This group has a lot of significance and consequences on a nation's unemployment *ceteris paribus*. If a country's labor force is high then it is very likely that employment level will also be high. Less output is bound to occur if the dependency ratio is more than the working force. The converse of this holds. If available job opportunities are not adequate for the labor force, then unemployment will result. There is a positive relationship between cross domestic product, real exchange rate fluctuation, gross domestic investment and technology.

Thus, technological development is vital for a country's development process. Output is bound to increase with adequate technological capabilities. Technological innovation in respect of the agricultural, manufacturing and services sectors is a *sine qua non* so as to aid greater productivity. This subsequently impacts positively on gross domestic product (GDP) of Nigeria. Technology is presented here as an independent variable having a functional relationship with real exchange rate fluctuation, gross domestic investment (GDI), Labor force vis-a-vis exchange rate.

Data analysis and discussion of result

The empirical data on which our analysis is based are presented in table 1 below. This table presents data for estimating the model for gross domestic product.

Deriving inspiration from table II below the following facts associated with the implications of instability of exchange rate on Economic growth emerged. In this equation economic growth (GDP) is regressed on labor force, Gross Domestic Investment, technology and volatility of exchange rate. The regression coefficient of the constant term is positive. At zero performance of the independent variable Nigeria's economic growth increased by 12.1673 million the result is significant at better than 0.1 per cent level. The coefficient of labor force carries a negative sign. This shows the inverse relationship between labor force and economic growth vis-a-vis instability of exchange rate. The t-value is statistically significant at 1.6 per cent level. The coefficient

Table 1: Real GDP equation: $GDP = f(VEXCHR, RER, GDI, LAB, TECH)$

YEAR	GROWTH IN REAL GDP	VEXCHR	RERF	GDI	LAB	TECH
1970	29.8	-	99.8	1003.2	14784	1
1971	18.4	-	103.3	1322.8	17114	2
1972	7.4	0.026587	101.7	1571.1	52748	3
1973	-2.7	0.0000	95.9	1763.7	33963	4
1974	12.1	0.0000	100.7	1812.1	62565	5
1975	-3.0	0.014614	103.1	2287.5	107489	6
1976	10.9	0.014614	106.4	2339.0	52242	7
1977	8.1	0.0092867	98.4	2531.4	59270	8
1978	-7.3	0.016577	101.2	2863.2	105525	9
1979	2.5	0.021933	100.0	3153.1	204742	10
1980	5.3	0.026010	111.2	3620.1	221088	11
1981	-8.4	0.027435	107.9	3757.9	323700	12
1982	-2.7	0.051645	112.5	5382.8	2874721	13
1983	-7.1	0.26959	112.0	5949.5	629177	14
1984	-1.1	0.34706	114.4	6418.3	42046	15
1985	9.5	0.387121	83.8	6804.0	19907	16
1986	2.5	0.81657	18.6	9313.6	157165	17
1987	-0.6	0.27793	13.1	9993.6	57097	18
1988	7.4	0.80673	10.9	11339.2	55620	19
1989	7.7	0.148335	8.3	10899.6	157342	20
1990	13.0	1.52189	6.7	10436.1	254540	21
1991	-0.8	0.62026	6.1	12243.5	460471	22
1992	2.3	4.17522	3.8	20044.6	238324	23
1993	1.3	5.43526	3.2	20512.7	880224	24
1994	0.2	2.20407	3.1	66787.0	1541146	25
1995	2.2	0.080610	2.9	70714.6	193944	26
1996	4.4	0.0000	0.8	119391.6	19826	27
1997	2.8	0.0000	0.8	122600.9	59897	28
1998	2.9	0.0000	0.9	128331.8	9494	29
1999	0.4	0.0018378	0.8	152409.6	173858	30
2000	5.4	0.80565	0.2	154188.6	344722	31
2001	4.6	0.00094274	0.6	157535.4	259290	32
2002	3.5	0.0094274	0.8	166031.6	302006	33
2003	10.2	0.0047143	0.8	174450.3	334748	34

SOURCE: CBN Statistical Bulletin (Various Issues), CBN Major Economic Financial and Banking Indicators (Various Issues), World Development Report (Various Issues). Definition of variables: GDP=Gross Domestic Product, RERF= Real Exchange rate fluctuation, GDI=Gross Domestic Investment, LAB=Labor Force, TECH=Technology, VEXCHR=Volatility of Exchange Rate.

TABLE 2: Impact of instability of exchange rate (VEXCHR) on economic growth (GDP)

Variable	Estimated coefficient	Standard error	t-statistic	P-value
C	12.1673	1.63992	7.41946	[.000]
LILLAB	-.149544	.105400	-1.41882	[.167]
LILGDI	.067100	.219790	.305293	[.762]
LITECH	.013291	.037992	.349840	[.729]
LIVEXCHR	.194749	.094557	2.05959	[.049]

$R^2 = 0.143963$, F-statistic = 2.30335, DW = 1.70329. Dependent variable: LGDP. Current sample: 1972 to 2003. Number of observations: 32

of the Gross Domestic Investment is positive implying that as investment increases Economic Growth equally increases. The t-value is statistically insignificant. The coefficient of technology is positive implying that technology has a positive relationship with economic growth. With technological development, economic growth is increased and sustained. The t-value is however statistically insignificant.

The coefficient of volatility of exchange rate carries a positive sign and the t-value is statistically significant 4.9 per cent showing the positive relationship between Gross Domestic Product and instability of exchange rate in the foreign exchange market. Economic Growth is affected positively by exchange rate movement in the economy. Increase in volatility of exchange rate leads to increase in economic growth. Put simply, it leads to the increased in the amount of goods and services produced in the economy thereby sustaining improved standard of living in the country. The R is 0.143963 explaining a bad fit for the model. The t-statistic shows a result of 2.30335. The value of DW is 1.70329 and this is greater than the R2 of 0.143963 implying a case of serious autocorrelation.

In summary most of the parameters of interest particularly estimated coefficient of constant term, technology and volatility of exchange rate were statistically significant as revealed by the p-values corresponding to the estimated parameters.

Policy recommendations and concluding remarks

This study has reveals that there is a linkage between instability in the exchange

rate in the foreign exchange market and economic growth vis-a-vis labor force, technology and gross domestic investment. The econometric model developed is of great significance as it has predictive power for the explanation of the relationship. The relationship between economic growth and exchange rate movement in relation to gross domestic investment, labor force and technology is of great importance. Stability in exchange rate leads to enhancement of economic growth and sustained development. This paper maintains that since volatility of exchange rate has relationship with economic growth, exchange rate policy should be designed to bridge the savings-investment gap thereby enhancing government revenue as well as reducing the fiscal gap by curtailing deficit aimed at enhancement of economic growth. The gross domestic investment should be carefully sustained as this results in appropriate increase in economic growth.

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