

# Policy lags and exchange rate dynamics in Nigeria: Any evidence?

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**Abstract:** The study investigates policy lags and exchange rate dynamics in Nigeria. The downswing in the Nigerian economy attributed to recurring exchange rate fluctuations justifies this empirical investigation. The period of investigation spans 1970 – 2016 and the data were obtained from the various issues of the Central Bank of Nigeria (CBN) Statistical Bulletin and the Annual Statistics of the National Bureau of Statistics (NBS). Anchored on the monetary theory of exchange rate, the Markov-Switching Dynamic Regression (MSDR) was employed as the technique of analysis. The findings show that the supply of broad money in Nigeria is endogenous in nature as it serves as the adjustment variable for the stabilization of exchange rate in the economy. Also, the results obtained indicated that changes in the exchange rate affect the overall government income and that the Nigerian economy is still foreign dependent. An expansionary monetary policy takes three (3) years to stabilize exchange rate in Nigeria while an expansionary fiscal policy only takes one and a half ( $1\frac{1}{2}$ ) years. By implication, monetary policy is half-effective as the fiscal policy. Besides, there is evidence of fiscal dominance in Nigeria. The study found two exchange regimes of fixed- and managed-float. More so, fixed exchange rate regime in Nigeria was just not persistent but that the probability of transiting to a managed-float regime was relatively lower.

**Keywords:** exchange rate dynamics, fiscal, monetary, Markov-switching regime, policy lags.

**JEL Classifications:** E52, E62, F31, C22, E61

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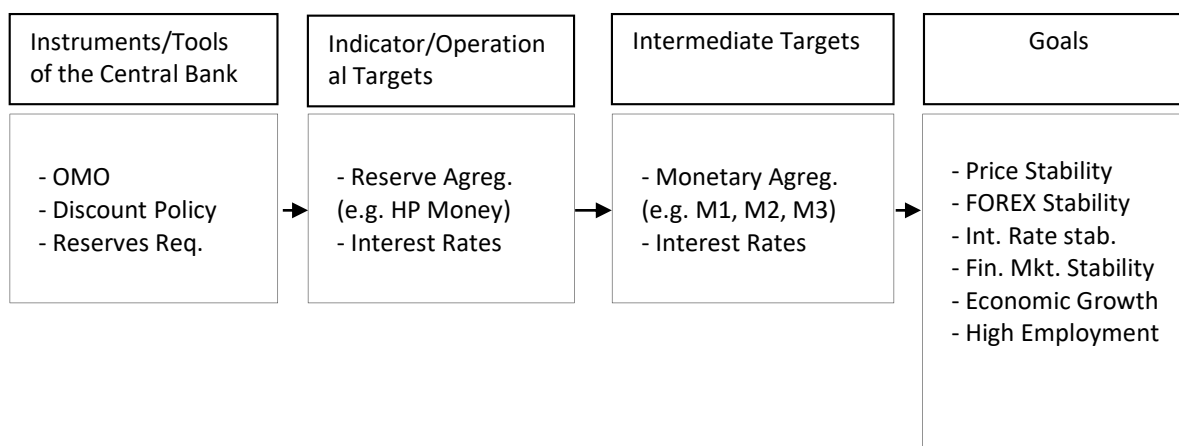
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## 1. INTRODUCTION

Macroeconomic policies are deliberate attempts directed towards achieving quantitative economic targets and objectives that are capable of stabilizing and improving the economy. These policies are dichotomized into monetary policies and fiscal policies. The former are under the control of the monetary authority; usually known as the central banks, while the latter have to do with the various strategies deployed by the government to make use of its various sources of revenue and expenditure to achieve both internal and external balances for the economy. The policy objectives that are set out to be achieved are economic growth, price stability, full employment equilibrium, equitable distribution of income and balance of payment equilibrium. There is plethora of both theoretical and empirical evidences that the efficacy as well as the potency of these policies towards achieving the set-out objectives are not in doubt but the literature is silent on the time frame with which these policies would yield result of achieving the set objectives. In fact, it has been posited that macroeconomic policies come with lags. Therefore, the eventual attainment of stated macroeconomic objectives in Nigeria has been controversial as successive government have laid claim to this achievement and it becomes difficult to provide an economic score-card for each government and governance in the country.

From a specific standpoint, the conducts of monetary policies are expected to go through a structural transmission process before macroeconomic objectives are achieved. The starting point is the use of policy instruments such as open market operations (through the sales and purchase of treasury bills and certificates to control the level of money supply in the economy), discount rates (to ascertain the rate with which central bank, being the lenders of last resort, can lend to the commercial banks); among others. These policy instruments can only directly affect operational targets such as the high-powered money and long-term interest rate. It is these policy instruments that can be employed to achieve some set of intermediate targets such as the broad money supply and short-term interest rate. The set of macroeconomic objectives can be achieved with the use of these intermediate targets (see Figure 1).



**Figure 1:** Transmission of monetary policies to macroeconomic objectives  
**Source:** Mishkin & Serletis (2016)

This suggests that time is usually required before the deployment of macroeconomic policies could translate to the attainment of macroeconomic objectives. It is this required time that is regarded to as lags in economic science. Broadly, macroeconomic policies are confronted with inside and outside lags. The inside lags are those bordering on problem recognition and problem diagnosis (i.e. taking decisions) while outside lag has to do with how the decisions effected would impact on the economy. More so, monetary policies entails data lag, recognition lag, legislative lag, transmission lag and effectiveness lag while the fiscal policies include recognition lag, administrative lag and action lag. These lags can be described in the following sequence.

*Recognition ⇒ Decision ⇒ Implementation / Action ⇒ Impact / Time – Effect*

While both the government and monetary authorities are charged with stabilizing the economy, the timing of these lags vary due to the differences in mandate of the authorities. This study is set out to achieve three objectives. The first is to capture the various episodes of exchange rate dynamics in Nigeria. Secondly, it is to estimate the time duration it will take for monetary and fiscal policies to impact on the economy. Thirdly, it is to investigate the time-varying regime switching behavior of exchange rate in Nigeria; in tandem with changing monetary and fiscal policies in Nigeria. In addition to this introductory section, this study would be considered in four other sections. Section two considers the review of extant literature; both theoretically and empirically. Section three sets the methodological framework; in terms of materials and methods while Section four deals empirical estimations and discussion of findings. Section five; being the last section, conclude and provide policy suggestions.

## **2. LITERATURE REVIEW**

The theoretical literature on policy lags was well rooted in the seminal study of Friedman (1973) on the transmission mechanisms of monetary policy. Friedman (1973) posited that the effects of monetary policy is long and variable. This suggests that the transmission of policy to both prices and outputs exceeds a year and comes with uncertainty. Many authors have sought to investigate the lags in macroeconomic policies; with the sole focus on monetary policies. Rosenbaum (1985) conducted a meta-analysis of the lags in the effect of monetary policy and found mix results but with consensus validating the Friedman's (1973) proposition of long and variable effects of monetary policy on the economy. The mix results obtained were attributed to modelling distinctions between the reduced-form and structural form models. The studies of Osinubi (2005) and Asghar and Hussain (2014) investigated the lags in effect of monetary policy for the Nigerian and Pakistani economies respectively. While the former's study reinforced the Friedman's (1973) proposition, the latter invalidated it as it was found that monetary policy significantly impacted on prices after nine months in Pakistan. Nonetheless, the study of Batini and Nelson (2001) investigated the United States of America and the United Kingdom while Gruen, Ramali and Chandra (1997) investigated the Australian economy for lags in monetary policy. In both cases, the Friedman's (1973) proposition was validated.

In the same vein, the dynamics of exchange rate can be considered as the structural mechanism of exchange rate. The structural mechanism traces the path of exchange rate movement. It discusses how exchange rate is determined with the use of some intervening variables. It began by looking at the use of expansionary monetary policy which reduces interest rate in the domestic economy (Arfiani, 2019). The reduction in the domestic interest rate leads to capital outflow as institutional investors would embark on portfolio adjustments. This translates to capital outflow as investors seek higher returns on their assets in alternative portfolio anywhere in the world. This is the view enunciated by Milton Friedman who championed the monetarist school and opined that economic phenomena are determined by money. The alternative view in this regard is the classical propositions championed by Smith (1776). The classical position is that there is money neutrality. This implies that money is a veil and does not affect real variables in the economy.

From empirical viewpoint, Szapary and Jakab (1998) were the first, to our notice, that studies exchange rate policy in transition economies with a focus on the Hungarian economy. The authors reviewed the experience of Hungary with the preannounced crawling band exchange rate system during 1995-1997. It was argued that crawling band would be more beneficial for achieving the dual objectives of price stability and maintaining competitiveness and that premature fixed regime could be more damaging. It was suggested that several factors such as restructuring on production and export, credibility issue and price stability condition are germane factors considered when considering fixed regime. Also, Markiewicz (2006) conducted an empirical research to assess the choice of exchange rate regime in Transition economies and employed the use of Ordered Logit Model for the official (de-jure) and the actual (de-facto) exchange rate classifications. The study found that the de-facto regimes described better the exchange rate strategies implemented in Transition Economies (TE). As obtained from the results, four major factors were found to appropriately characterize the episodes of exchange rate regime in TEs. The economic size and geographical concentration of trade are prominent while countries with increasing inflation, higher budget deficits and more developed financial sector favoured flexible regime. However, it was found that countries with higher political stability preferred currency peg regime.

Besides, the study of Bird & Mandilaras (2014) which examined the transition in exchange rate regimes in the aftermath of the global economic crisis is the only study bordering on the reflection of our study. The authors focused on the relevant period of 2008 – 2012 and employed the IMF data bank on de-jure exchange rate. Within the Wilson (1927) testing procedure, the authors calculated exchange rate regime transition probabilities and their significance. Bird & Mandilaras (2014) indicated that even though there was some evidence of state dependence; especially for peg regime, there was also an evidence of state reversion as evidence obtained showed that countries that shift often flip back to their previous regime. Besides, Yoshino, Kaji and Asonuma (2014)

examined the optimal transition path for China’s exchange rate regime and investigated how China could successfully transit from a peg regime to a floating regime. The period of investigation spanned 1999Q1 – 2010Q4 and the general equilibrium framework served as the technique. Although, as a second best option, the results showed that a gradual adjustment to a basket peg regime is the most appropriate path for China to take as this had a minimum welfare loss as compared to the case of sudden adjustment.

Again, Yoshino and Asonuma (2017) examined an optimal exchange rate regime transition policy for three East Asian countries of China, Malaysia and Singapore. The study was a dynamic transition analysis based on small open-economy dynamic stochastic general equilibrium model. The results showed that these ‘Asian Tigers’ would be better off shifting gradually from a dollar peg to a basket peg; with China taking the lead. These cursory reviews clearly shows that there are retinue of studies that have considered the determining factors in choosing the exchange rate regimes that were considered appropriate but there are still gross dearth of empirical works to investigate the dynamics of exchange rate in the face of policy lags – as captured by transition from one regime to another. While Bird & Mandilaras (2014) attempted this with the Wilson (1927) testing procedure, the criticisms that plagued this procedure made the results less desirable. This study seeks to cover the void in the empirical literature with the use of Markov Switching Dynamic Regression model to investigate the lags duration and persistence of both monetary and fiscal policies on exchange rate dynamics in Nigeria. This is the objective thrust of this study.

### 3. MATERIALS AND METHODS

The theoretical framework for this study is the monetarist view to exchange rate which opines that exchange rate dynamics in the economy follow a structural transmission process. There are retinues of empirical studies that have considered the structural transformation of monetary policies. These studies have largely employed the use of Structural Vector Autoregression (SVAR) and Computable General Equilibrium (CGE) models. It is argued in this study that SVAR model is a deterministic structural model and could not be appropriate to capture the episodes of lags in monetary policies. This is because monetary policies in a developing economies such as Nigeria is characterized by jumps and breaks that such model as SVAR cannot capture. It is on this premise that this study found most appropriate the use of Markov Switching Dynamic Regression (MSDR) model.

The methodological literature has richly documents the framework for the MSDR (see for example, Goldfeld & Quandt, 1973; Guidolin, 2011a; 2011b). Generally, there are two types of the MSRM; the fixed probability and time-varying probability types. The former assumes that the transition probability is constant while the latter presupposes a time-varying transition probability that allows the dynamics of exchange rate to move in tandem with the policy tool employed. These two types of the MSDR model is specified as:

$$y_t = \lambda_{s_t} + \phi y_{t-1} + v_s ; s_t \in \{0,1\} \tag{1}$$

$$y_t = \lambda_{s_t} + \beta \sum_{t=1}^T X_t + \pi_t \delta_s + v_s \tag{2}$$

In tandem with the empirical model specified in equation (1), the methodological model for this study is, therefore, specified thus:

$$exchr_t = \lambda_{s_t} + \beta_1 m_2\_grwt + \beta_2 int\ r + \beta_3 trebill\_rate + \beta_4 gov\ exp\_grwt + \beta_5 govrev\_grwt + v_s \tag{3}$$

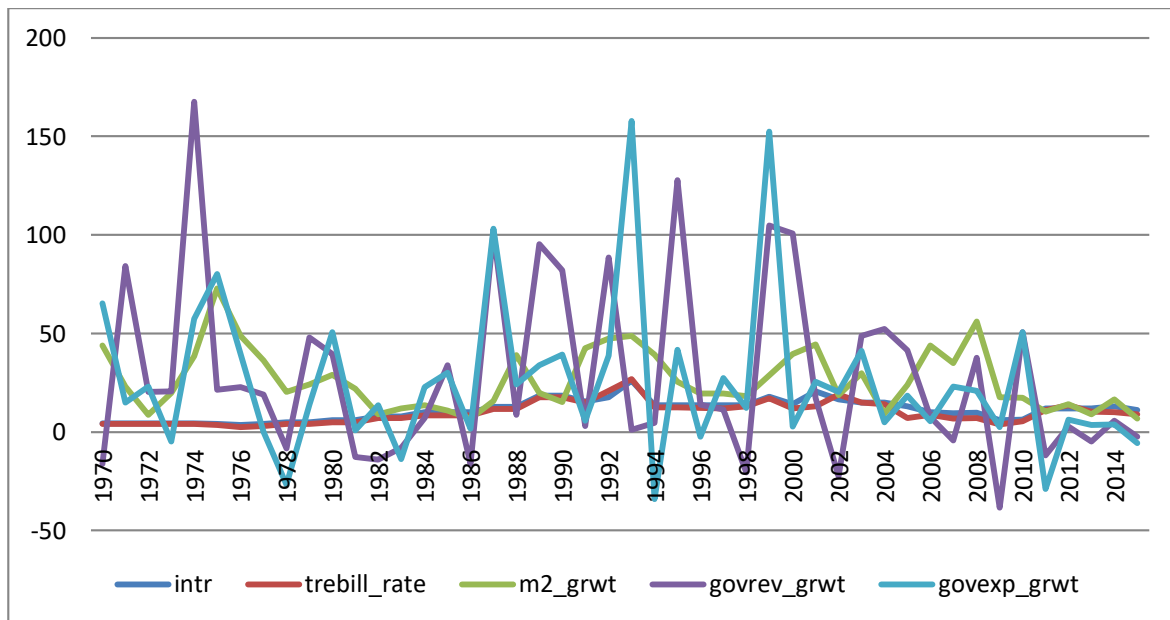
The data sources for this study are the National Bureau of Statistics (NBS) annual statement; the Central Bank of Nigeria Statistical Bulletin (various issues) and the World Bank Development Indicator (2016).

#### 4. RESULT AND DISCUSSION

In order to investigate how policy lags has impacted on the dynamics of exchange rate in Nigeria. Background information on the growth of monetary policies over the years would provide some useful insights. Also, the types of regimes that the exchange rate has exhibited over the years cannot be over-emphasized and would be highly instructive.

##### 4.1. Overview of Macroeconomic Policies in Nigeria

The trends in Figure 2 relates to the growths of treasury bill rates, interest rate, growth of broad money supply, growth of government revenue and the growth of government expenditure in Nigeria for the period 1970–2015. The trend shows that both the monetary policy rate and the treasury-bill rate have been relatively stable for the period under consideration; especially for the period 1970 – 1985. This shows that interest rate liberalization policy embarked upon during the Structural Adjustment Program (SAP) of the 1986 period, which allows the interest rate to be determined by the market forces as against being indirectly enforced, suggests a marginally increased interest rate. However, the growths of broad money supply, government revenue and government expenditure are unstable and do follow some characteristic and structural behavior (see Figure 1). Noticeably, the periods 1970–1975, 1988–1991, 1994-1996 and 2003–2006 have growth rates of government revenue higher than its government expenditure counterpart.



**Figure 2.** Trends of Monetary and Fiscal Policies in Nigeria, 1970 – 2015

**Source:** The CBN Statistical Bulletin (Various Issues)

This suggests that during the period that succeeded the civil war in Nigeria or better still, during the second National development planning in Nigeria, the economy grows revenue higher than expenditure. Similar trend was also observed for the immediate period after the SAP era and the twilight of military incursion in Nigeria. For all other periods, it is the case that government expenditure tappers above its revenue counterpart. The implication of this for exchange rate dynamics in Nigeria is that the government ran a budget surplus for these selected periods and budget deficit for the other periods. For the period of budget surplus, it complemented the balance of payment accounts to further the appreciation of the domestic currency while it led to currency depreciation when in deficit. The simple intuition drawn from this trend is that the reform programmes and monetary policy strategies to enhance the dynamics of exchange rate has been grossly short-lived. One possible explanation is the policy inconsistencies coupled with policy

overlaps that has characterized the Nigerian economy. The data shows some structural breaks and jump (see Table 1). The unit-root with structural breaks suggests that both monetary and fiscal policies in Nigeria experienced some breaks and policy shifts. This is evident in the test statistics for the monetary policy rate (*int r*), treasury bill rate (*trebill\_rete*), the growth of money supply (*m2\_grwt*), government expenditure (*govrev\_grwt*), and government revenue (*govexp\_grwt*).

**Table 1.** Structural breaks unit-root tests for macroeconomic policies in Nigeria

Series	Structural Break-Point Period	Test Statistics	
<i>int r</i>	<i>Intercept</i>	1989	-0.516
	<i>Trends</i>	1999	-0.334
	<i>Intercept &amp; trends</i>	1994	-0.128
<i>trebill_rate</i>	<i>Intercept</i>	2004	-2.747
	<i>Trends</i>	1994	-3.277
	<i>Intercept &amp; trends</i>	1990	-3.597
<i>m2_grwt</i>	<i>Intercept</i>	2006	-3.142
	<i>Trends</i>	1994	-3.510
	<i>Intercept &amp; trends</i>	1990	-3.864
<i>govrev_grwt</i>	<i>Intercept</i>	1992	-5.674*
	<i>Trends</i>	1984	-4.484*
	<i>Intercept &amp; trends</i>	1992	-6.106*
<i>govexp_grwt</i>	<i>Intercept</i>	1988	-5.348*
	<i>Trends</i>	2002	-3.899*
	<i>Intercept &amp; trends</i>	1988	-5.990*
<i>exchr</i>	<i>Intercept</i>	1988	-6.262*
	<i>Trends</i>	2001	-5.221*
	<i>Intercept &amp; trends</i>	1988	-6.195*

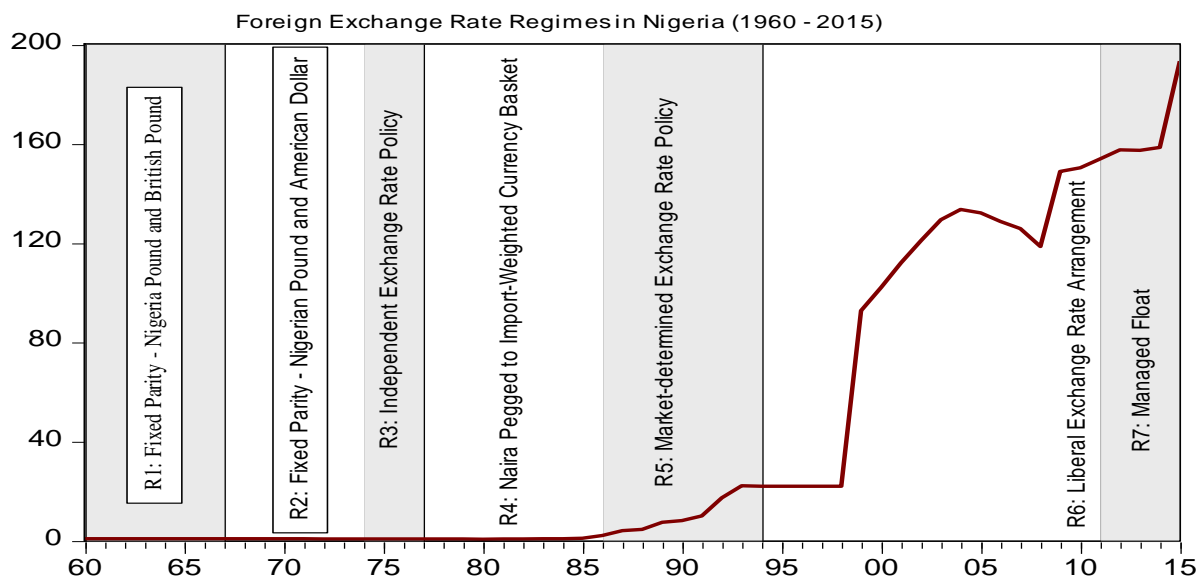
Source: RATS Output

#### 4.2. Stylized Facts on Exchange Rate Regimes in Nigeria

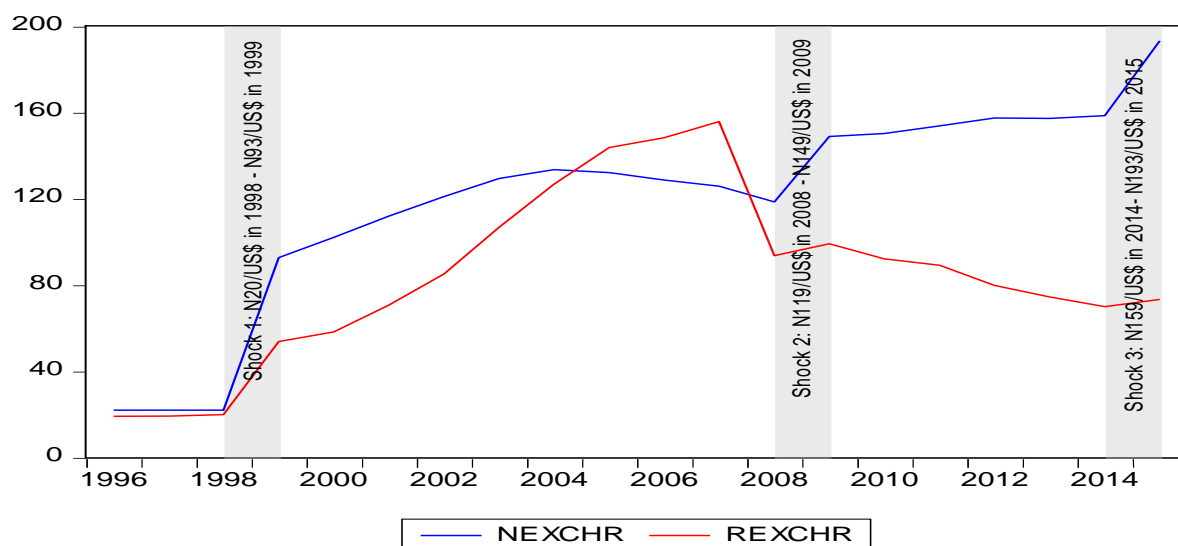
The exchange rate regimes in Nigeria was characterized by three different regimes of fixed exchange rate system, market determined rates and managed-float system (see Figure 3). The fixed exchange rate regimes comprise of four different arrangements. The first was between 1960 – 1967 when there is a fixed parity between the Nigerian pound and the British pound. The Nigerian pound goes for one-to-one of the British pound during this period until the British pound was devalued in 1967. The advent of civil war and the fear of possible damages of devaluation on the economy, the Nigerian pound were rather pegged to the American Dollar in 1967. This marked the beginning of the second phase of the foreign exchange rate regime in Nigeria. This regime was short-lived as the occurrence of international financial crisis in the 1970s forced the Nigeria dollar to maintain a fixed parity with the British pound; once again.

Due to the force for ‘sympathy devaluation’ of the Nigerian pound during this era and the need to hold a strong currency; the policy of single currency pegging was altogether abandoned in 1974. This led to the third stage of independent exchange rate policy where the authority was free to peg the domestic currency to any strong currency in the market and further pursue a policy of progressive appreciation of the naira over the period 1974 - 1976. This was aided by the oil boom in the 1970s. In furtherance of this, stage four of the fixed exchange rate regime, where the naira was pegged to an import-weighted basket of currencies, emanated between 1976 and 1985 (see Figure 2). This was informed by the dwindling fortune of the economy and to further ensure the stability of the volatile Naira. The Naira was pegged to a basket of seven currencies such as the US dollar, the British pound sterling, the German mark, the French franc, the Dutch guilder, the Swiss franc and the Japanese Yen. As evident in Figure 2, the Naira stabilizes throughout these periods of fixed

exchange rate regimes. The second regime was the era of market determined exchange rate policy which became effective in 1986 consequent upon the structural adjustment programme (SAP) of the government.



**Figure 3.** The Exchange Rate Regimes in Nigeria, 1960-2015  
**Source:** The CBN Statistical Bulletin (Various Issues)



**Figure 4.** The Exchange Rate Shocks in Nigeria, 1996-2015  
**Source:** The CBN Statistical Bulletin (Various Issues)

With this arrangement, the rate of domestic currency to foreign currency is purely determined by the market forces of demand for and supply of foreign currency. This era lasted till 1994 until further reforms of liberal exchange arrangement was undertaken in 1995 which led to the introduction of an autonomous foreign exchange market (AFEM) and the recognition of the Bureau De Change as an authorized buyers and sellers of foreign exchange to end-users in Nigeria. A further liberalization in October, 1999 led to the introduction of the inter-bank foreign exchange market (IFEM), the Dutch Auction System (DAS) and the Wholesale Dutch Auction System (WDAS) in 2001 and 2006 respectively. The third exchange rate regime is the managed-float system effective from November, 2011 where the domestic currency responds to market forces within a soft exchange

rate band of  $\pm 3\%$  in order to accommodate continued downward foreign exchange market pressure. However, Figure 6 shows that only the fixed exchange rate regime could stabilize the domestic currency. Since 1986, however, the domestic currency has been unstable and the movements brought about three episodes of shocks. In fact, the real exchange rate suggests that the purchasing power of the Naira is not competitive in reference to the US Dollar throughout the periods except for the period 2003 – 2007 (see Figure 4).

#### 4.3. Model estimations and discussion of findings

The estimations for this study are to address the three remaining research objectives. These research objectives are that to trace the direction of causality between exchange rate and macroeconomic policies in Nigeria. The second is to estimate the time duration with which monetary and fiscal policies would impact on the economy while the last is to investigate time-varying regime switching behavior of exchange rate in tandem with changing monetary and fiscal policies in the country. Specifically, the granger causality test shows that exchange rate granger causes broad money supply, government expenditure and government revenue in Nigeria. This is because the null hypotheses for no granger causality were rejected at the 5 percent level of significance.

**Table 2.** Pairwise Granger causality tests

Direction of Causality	F-stat	Prob.	Remarks
$\text{int } r \not\subset \text{exchr}$	0.3153	0.731	-
$m_2 \not\subset \text{exchr}$	1.6616	0.203	-
$\text{exchr} \not\subset m_2$	5.1159	0.011*	Endogenous MS
$\text{trebill\_rate} \not\subset \text{exchr}$	0.2797	0.758	-
$\text{govexp} \not\subset \text{exchr}$	0.1294	0.879	-
$\text{exchr} \not\subset \text{govexp}$	4.4900	0.018*	$\text{exchr} \rightarrow \text{govexp}$
$\text{govrev} \not\subset \text{exchr}$	0.1336	0.875	-
$\text{exchr} \not\subset \text{govrev}$	10.2609	0.0003*	$\text{exchr} \rightarrow \text{govrev}$
$\text{trebill\_rate} \not\subset \text{govrev}$	2.9062	0.067***	$\text{trebill\_rate} \rightarrow \text{govrev}$
$\text{govrev} \not\subset m_2$	27.621	3e-08*	$\text{govrev} \rightarrow m_s$
$m_2 \not\subset \text{govrev}$	11.296	0.0001*	$m_2 \rightarrow \text{govrev}$
$\text{govexp} \not\subset m_2$	8.638	0.0008*	$\text{govexp} \rightarrow m_2$
$m_2 \not\subset \text{govexp}$	2.6994	0.080***	$m_2 \rightarrow \text{govexp}$

**Source:** E-views Output. Note:  $\not\subset$  implies does not granger causes;  $\rightarrow$  denotes granger causes

The implication is that the supply of broad money in Nigeria is endogenous in nature as it serve as the adjustment variable for the stabilization of exchange rate in the economy. The money supply is usually sold to buy foreign currency in order to avoid currency appreciation and the money supply is usually bought in order to sell foreign currency so as to avoid currency depreciation in the domestic economy. Also, the exchange rate determines government revenue in Nigeria because the major source of income for the economy is denominated in foreign currency. Therefore, the changes in the exchange rate affect the overall government income. This further shows that the Nigerian economy is still foreign dependent. More so, the government expenditure is also granger caused by the exchange rate. On the whole, it suggests that exchange rate determines macroeconomic policies in Nigeria. Besides, the granger causality between monetary and fiscal policies indicates that the latter is dominant. The results showed that there is fiscal dominance in Nigeria even though the granger causality between both policies is bi-directional; there is highly significance if causality



moves from fiscal policy to monetary policy. However, the proposition that both monetary and fiscal policies are employed to achieve set of macroeconomic objectives is confirmed in this study.

**Table 3.** Fixed transition probability Markov switching estimates

Variable	Coefficient Estimates		Variance Estimates		Prob. of Transition Estimates				Duration of Persistence	
	State1	State2	$\delta_1$	$\delta_2$	$P_{11}$	$P_{12}$	$P_{21}$	$P_{22}$	$s_1$	$s_2$
<i>m2_grwt</i>	16.542*	42.055*	6.226	11.256	0.78	0.22	0.35	0.65	4.5	2.9
<i>govrev_grwt</i>	3.359	72.676*	18.597	42.717	0.59	0.41	0.72	0.28	2.4	1.4
<i>govexp_grwt</i>	16.227*	122.159*	22.775	36.055	0.91	0.09	1.00	0.00	10.7	1.0
<i>exchr</i>	2.444**	80.998*	5.871	90.758	0.89	0.11	0.44	0.56	8.7	2.3

Source: STATA Output

The estimates suggest that the duration of effect for the monetary policy is four and a half ( $4\frac{1}{2}$ ) years with low money supply (that is, monetary contraction) but three (3) years with high monetary supply (that is, quantitative easing). Lower government revenue has the shorter duration of about two-and-a-half year but about one-and-a-half year for high government revenue. The best strategy is the use of expansionary fiscal policy with 1 year duration of persistence while low government expenditure would take about 11 years duration of persistence (see Table 3). Towards the attainments of the fourth objective, and to underscore the time-varying effects of macroeconomic policies on exchange rate dynamics in Nigeria, estimates detailed in Table 4 are strongly indicative.

**Table 4.** Time-Varying Transition Probability Markov Switching Dynamic Regression Estimates

Variables	State 1			State 2		
	Coeff.	z	P> z	Coeff.	z	P> z
<i>exchr_1</i>	1.162	52.05	0.000	0.766	8.47	0.000
<i>m2_grwt</i>	-0.196	-0.33	0.741	-0.449	-4.00	0.000
<i>Intr</i>	-1.265	-1.20	0.228	0.441	0.81	0.418
<i>trebill_rate</i>	1.129	1.15	0.250	0.031	0.06	0.954
<i>govexp_grwt</i>	0.242	0.96	0.337	0.233	4.56	0.000
<i>govrev_grwt</i>	0.2422	0.83	0.407	0.006	0.13	0.896

Source: STATA Output (Author calculation).

As evident in Table 4, only the growth of broad money supply and that of government expenditure matter for the movement of exchange rate policy in Nigeria when the economy operates on a managed-float regime (i.e. State 2). For the case of fixed exchange rate regime, however, none of macroeconomic policies affect exchange rate in Nigeria. This finding conforms to that obtained under the stylized facts.

The transitional probabilities show high persistence of 94 percent and 85 percent for States 1 and 2 respectively. The periods of persistence are approximately 16 years and 7 years for the respective State. The cross transition probability is negligible (see Table 5). The implication is that it takes much longer years to sustain a fixed exchange rate regime in Nigeria than a managed-float exchange rate regimes and the probability of transition from a fixed exchange rate regime to a managed-float regime is 6 percent while the probability of transiting from a managed-float to a fixed exchange rate regime is 15 percent. The conclusion is that fixed exchange rate is not just persistent in Nigeria but that the probability of transiting to a managed-float regime is relatively lower.

**Table 5.** Transition probabilities and duration of persistence of exchange rate dynamics in Nigeria

Transition Probabilities of Exchange Rate Dynamics in Nigeria	
Expected Probabilities	Estimates
$P_{11}$	0.94
$P_{12}$	0.06
$P_{21}$	0.15
$P_{22}$	0.85
Duration of Persistence of Exchange Rate Dynamics in Nigeria	
Expected Probabilities	Estimates
$S_1$	16.4
$S_2$	6.5

Source: E-Views Output (Author calculation).

## 5. CONCLUSIONS

The results obtained from the structural breaks unit-root indicates that there was evidence of breaks and policy shifts in Nigeria for the period under consideration. Specifically, the Nigerian economy was characterized by two major exchange rate regimes; exchange rate intervention and market-determined regimes. Although, the policy with the shortest duration of persistence is the use of expansionary government expenditure, the empirical investigations show that money supply is grossly endogenous in Nigeria and that fiscal policy is the dominant policy in the country. However, reform program and monetary policy strategies to enhance the dynamics of exchange rate in Nigeria have been less effective. As such, the dynamics of exchange rate have come with shocks and portend lack of competitiveness for exportable goods in the country. Stemming from the foregoing conclusion; it is recommended that the Nigerian government should directly employ macroeconomic policies to stimulate the growth process. More so, there should be policy consistencies in order to maintain economic stability. In order to have monetary autonomy, flexible exchange regime should be favored.

## REFERENCES

- Asghar, N., & Hussain, Z. (2014). The Lags in Effect of Monetary Policy: A Case Study of Pakistan. *Pakistan Economic and Social Review*, 52(1), 1 – 14.
- Arfiani, I. S. (2019). Analisis Empiris Hubungan antara Ekspor, Impor, Nilai Tukar dan Pertumbuhan Ekonomi di Indonesia. *Jurnal Ekonomi Pembangunan*, 17(2), 81-98. DOI:<https://doi.org/10.29259/jep.v17i2.9485>.
- Batini, N., and Nelson, E. (2001). *The Lag from Monetary Policy Actions to Inflation: Friedman Revisited*. External MPC Unit Discussion Paper No. 6, Bank of England.
- Bird, G., & Mandilaras, A. (2014). Transition in Exchange Rate Regimes in the Aftermath of the Global Economic Crisis. *Applied Economic Letters*, 22(7), 567 – 571.
- CBN (2015). Annual Statistical Bulletin. Central Bank of Nigeria, Abuja.
- CBN (2012). Annual Statistical Bulletin. Central Bank of Nigeria, Abuja.
- CBN (2010). Annual Statistical Bulletin. Central Bank of Nigeria, Abuja.
- Friedman, M. (1973). *Money and Economic Development: The Horwitz Lectures of 1972*. New York: Praeger Publishers Incorporation.
- Friedman, M. (1956). Structural Transmission Mechanisms in a Typical Economy. *Journal of Economic Policy*, 29, 5 – 19.
- Goldfeld, S. M., & Quandt, R.E. (1973). A Markov Model for Switching Regression. *Journal of Econometrics*, 1, 3 – 16.

- Gruen, D., Romalis, J., and Chandra, N. (1997). *The Lags of Monetary Policy*. Economic Group. Meetings of Central Bank Model Builders and Econometricians at the Bank of International Settlements.
- Guidolin, M. (2011a). Markov-Switching in Portfolio Choice and Asset Pricing Models: A Survey. In *Advances in Econometrics: 273 – Missing Data Methods: Time Series Methods & Applications* ed. D.M. Drukker, 87 – 178, Bingley, Emerald, UK.
- Guidolin, M. (2011b). Markov-Switching Models in Empirical Finance: In *Advances in Econometrics: Vol 273 – Missing Data Methods: Time Series Methods & Applications* ed. D.M. Drukker, 1 – 86, Bingley, Emerald, UK.
- Markiewicz, A. (2006). Choice of Exchange Rate Regime in Transition Economies: An Empirical Analysis. *Journal of Competitive Economics*, 34 (3), 484 – 498.
- Mishkin, F. S. and Serletis, A. (2016). *Economics of money, banking and financial market–business School Edition*. 4<sup>th</sup> ed. Canada: Pearson Education Publisher.
- Osinubi, T.S. (2005). Lags in the Effect of Monetary Policy in Nigeria. *Pakistan Economic and Social Review*, 43(1), 39 – 57.
- Rosenbaum, M.S. (1985). Lags in the Effect of Monetary Policy. *Economic Review*, Federal Reserve Bank of Atlanta.
- Smith, A. (1776). *An Inquiry into Nature and Causes of the the Wealth of Nations*. Book V, Chapter 3, Article III: Of Public Debt.
- Szapary, G; & Jakab, Z.M. (1998). Exchange Rate Policy in Transition Economies: The Case of Hungary. *Journal of Comparative Economics*, 26(4), 691 – 717.
- Yoshino, N., Kaji, S. & Asonuma, T. (2014). Dynamic Transition of Exchange Rate Regime in China. *China and the World Economy*, 22(3), 36 – 55.
- Yoshino, N., & Asonuma, T. (2017). *Optimal Dynamic Path During the Transition of Exchange Rate Regime: Analysis of the People’s Republic of China, Malaysia and Singapore*. Asian Development Bank Institute Working Paper Series, No. 765, Tokyo. Available at: <http://www.adb.org/publications/optimal-dynamic-path-during-transition-exchange-rate-regime-analysis-prc>
- WDI (2016). *World Development Indicators*. World Bank Group, Washington DC, USA.

**APPENDIX: Granger Causality Tests**

Pairwise Granger Causality Tests

Date: 11/01/17 Time: 08:11

Sample: 1970 2015

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
M2 does not Granger Cause INTR	44	1.15125	0.3268
INTR does not Granger Cause M2		0.29382	0.7470
TREBILL_RATE does not Granger Cause INTR	44	1.47668	0.2409
INTR does not Granger Cause TREBILL_RATE		1.11402	0.3385
EXCHR does not Granger Cause INTR	44	0.12962	0.8788
INTR does not Granger Cause EXCHR		0.31531	0.7314
GOVEXP does not Granger Cause INTR	44	0.03339	0.9672
INTR does not Granger Cause GOVEXP		2.28185	0.1156
GOVREV does not Granger Cause INTR	44	0.26752	0.7667
INTR does not Granger Cause GOVREV		1.92990	0.1588
TREBILL_RATE does not Granger Cause M2	44	0.54225	0.5858
M2 does not Granger Cause TREBILL_RATE		0.47861	0.6232
EXCHR does not Granger Cause M2	44	5.11586	0.0106
M2 does not Granger Cause EXCHR		1.66155	0.2030
GOVEXP does not Granger Cause M2	44	8.63785	0.0008
M2 does not Granger Cause GOVEXP		2.69942	0.0798
GOVREV does not Granger Cause M2	44	27.6207	3.E-08
M2 does not Granger Cause GOVREV		11.2962	0.0001
EXCHR does not Granger Cause TREBILL_RATE	44	0.15110	0.8603
TREBILL_RATE does not Granger Cause EXCHR		0.27968	0.7575
GOVEXP does not Granger Cause TREBILL_RATE	44	0.05192	0.9495
TREBILL_RATE does not Granger Cause GOVEXP		0.76947	0.4702
GOVREV does not Granger Cause TREBILL_RATE	44	0.18383	0.8328
TREBILL_RATE does not Granger Cause GOVREV		2.90621	0.0666
GOVEXP does not Granger Cause EXCHR	44	0.12936	0.8790
EXCHR does not Granger Cause GOVEXP		4.48981	0.0176
GOVREV does not Granger Cause EXCHR	44	0.13358	0.8754
EXCHR does not Granger Cause GOVREV		10.2609	0.0003
GOVREV does not Granger Cause GOVEXP	44	58.8514	2.E-12
GOVEXP does not Granger Cause GOVREV		1.17521	0.3194