Exchange Rate Management: Implications for Trade in Nigeria

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ABSTRACT

This study examines the effects of exchange rate management and its implication for trade in Nigeria. Annual data from 1981 to 2018 on Nigeria's GDP, Global GDP, Exchange rate, Net non-oil trade, and Net commodity trade were spliced into quarterly series using the quadratic sum match method in EViews. The Markov switching model methodology was adopted to capture the impact of regime transitions on trade. The study suggests that a devaluation of the naira would lead to a further decline in net non-oil trade, suggesting that domestically produced goods are giffen in nature, (i.e., demand falls when prices fall), signaling inferior quality of non-oil exports, which therefore require value addition to compete internationally. Furthermore, the study finds that when oil exports are included in the net commodity trade, the giffen nature of Nigerian exports is concealed giving a normality to the nature of all goods exported from Nigeria. The results also show that fixed regimes are less detrimental to net trade. Though a flexible exchange rate enhances the Nigerian net position associated with the depreciation of the naira, the own income and foreign income impact on net Nigerian non-oil and total goods trade is more distortive. Policy recommendations include the adoption of a managed float exchange regime as well as the strengthening of standard agencies together with collaborations between exporters and research institutes towards improving the quality of non-oil exports.

Keywords: Foreign exchange regimes, Markov switching models, net non-oil trade, net commodity trade, International Trade

INTRODUCTION

Background of study

International trade, foreign exchange policy and its impact on an economy has been studied over the years, spanning from the argument of Ricardo, (1891) and the need for nations to specialize and trade, to more modern trade theories that speak to factors that influence trade. A topical issue is which is the most appropriate exchange rate regime to facilitate trade amongst countries, the debate however remains unresolved. This paper aims to add to the literature by attempting to analyze the impact of foreign exchange regimes on net trade in Nigeria. The paper deliberately attempts to analyze the impact of different foreign exchange regimes on non-oil trade and total trade to ascertain the feature of Nigerian non-oil trade, and which regime would best promote non-oil trade, in view of the fact that there is an urgent need to reduce the dependence of the economy on oil and its exposure to the volatility in the oil market.

The paper departs from other studies in that it adopts the markov switching approach to identify the different exchange rate regimes and in so doing facilitate a comparison of the impact of each variable on net non-oil and net trade in goods under each foreign exchange regime. Furthermore, rather than focusing on micro level data to analyze the role of foreign exchange regimes on trade, the study takes a macro level data

approach with the focus on net trade balance and attempts to identify features of Nigerian export goods (oil & non-oil). Understanding the features of Nigerian export would ensure that targeted policies are put in place to promote same in the international market. This paper is divided into 5 sections, sections 1 and 2 are the introduction and Literature review, while sections 3 and 4 discuss the methods of study as well as the analysis of data. Section 5 contains the findings, conclusion and policy recommendations.

Limitations of the study

Being that the essence of the study is to examine how exchange rate regime affects trade performance, a key variable that ought to be captured is consumer preference and its role in shaping Nigerian international trade. The computation of preference would necessitate analyzing data on domestic demand for locally produced and foreign competing goods in Nigeria. However, data and time limitation prohibited a computation of preferences to be included in the analysis. Though an attempt was made (i.e. import preference as a ratio of imported goods to nominal adjusted domestic GDP, and exports as a ratio of nominal adjusted global GDP), it was not statistically significant and thus dropped from the regression. This was however not surprising as the measure of preference would be correlated with the independent variables and suffer from multicollinearity.

The second primary limitation is the conversion of annual to quarterly data for analysis. The adoption of the quadratic sum approach on e-views is likely to conceal the true behavior of the variables and thus affect the econometric results. This is particularly so with regards to the income variables which demonstrate significant fluctuations owing to seasonality and business cycles, that are concealed by the transformation process. Nonetheless, the transformation is necessary to firstly increase the sample size, and in addition, the quarterly data injects variation in exchange rate which would otherwise not change much using annual data.

The third limitation is that of data availability. There is lack of data on some of the variables for the period 1960 – 1980, which invariably is the period in which the fixed exchange rate regime was adopted in Nigeria. Consequently, it can be argued that the paper is an exercise in partial analysis of the impact of foreign exchange regime on Nigerian trade owing to unavailable data and the results may otherwise be different if the scope is increased from 1981Q1 – 2018Q4, to 1960Q1 – 2018Q4.

The fourth limitation is that in order to minimize computation complexity, a two state regime was adopted to signify fixed and flexible exchange rate regime, however it may be argued that a third regime is practiced which is the managed float as observed by (Ayodeji, 2016), and its impact on net trade should be considered. Nonetheless, the conventional literature speaks to fixed and flexible, thus managed float infers that exchange rate is flexible but within a band in which the monetary authority deems appropriate for achieving the non-inflationary growth objective of government. As such, the paper considers that the periods of flexible exchange rate regime are inclusive of managed float exchange rate regime.

LITERATURE REVIEW

Exchange Rate Management and Trade Implications

Theoretical Review

The linkages between exchange rate and international trade are described using theories like the J- curve, absorption and elasticity theories, the monetarist and the neoclassical theories as well as the Mundell-Fleming theory (Mundell, 1960; Mundell 1962; Fleming, 1962). The underlying theoretical foundation that examines international trade, foreign exchange rate regime and macroeconomic policies (monetary and fiscal) is the Mundell-Fleming theory, which describes the interdependence of the goods market, the financial or asset markets and the foreign exchange markets, such that developments or disequilibrium in

any of the markets spill over to the others.

The Mundell-Fleming model also predicts that an expansionary monetary policy would induce reduction in domestic interest rate in the money market, an expansion of output in the goods market, depreciation of local currency, which would impact international trade by making export cheaper as well as imports more expensive (Kenneth and Igbanogo, 2016). It articulates monetary and fiscal policies in the context of a small open economy under both fixed and flexible exchange rates; it provides insights into which policy, i.e. monetary or fiscal is more effective under a fixed or floating exchange rate regime. The model argues that monetary policy is more effective under a floating exchange rate regime than under a fiscal policy action of a given size. It explains the effect of floating exchange rate regime on the effectiveness of domestic spending (fiscal policy action) with a fixed stock of money.

A key proposition of the model is the idea that a policy instrument should be assigned to the target over which it has the strongest relative influence. Thus, the decision of whether monetary policy (interest rates) should be directed towards internal or external balance is shown to depend on the choice of an exchange rate regime. The model posits that monetary and fiscal policies are both more effective for restoring internal balance under a flexible than a fixed exchange rate regime. Furthermore, monetary policy is more effective at restoring internal balance than fiscal policy in a situation of perfect capital mobility (Boughton 2003, Galbis 1975). Hence, monetary policy should be directed at problems of external stability while fiscal policy should play a larger role in domestic stabilization (Fleming, 1962).

Consequently, monetary policy therefore lacks independence as an instrument of income stabilization in an open economy. Lastly, with the assumption of perfect capital mobility of the Mundell-Fleming model, lowered interest rate in foreign economy could lead to greater capital inflow to domestic economy, this occurs irrespective of the exchange rate regime adopted, volatility in an economy's exchange rate that results in depreciation of the exchange rate may result in improvement in the current account balance, depending on the nature of the country's elasticity of demand.

Empirical Review

A significant amount of literature exits on the nexus the between exchange rate management and international trade. These include (Estevadeordal et al, 2003; Lopez-Cordova & Meissner, 2004; Meissner, 2003; Eichengreen & Irwin,1995 and Ritschl & Wolf, 2003) that examined the Gold standard in the interwar years and its effects on trade, (Rose, 2000; Rose & Van Wincoop,2001; Glick & Rose, 2002; Frankel & Rose, 2002; and Tenreyro, 2003) examined currency unions (fixed exchange rate regime) and trade, and (Labonte, 2007; Klein & Shambaugh 2006; Brada and Mendez, 1988) examined exchange rate regimes and long run promotion of international trade and investment.

Studies on exchange rate regimes and their impact on trade in developed and developing nations, and across various continents have differing results. Adam Cobham (2007),Qureshi & Tsangarides (2011) study of currency unions and Fritz-Krockow & Jurzyk (2004) study of 24 Caribbean and Latin America countries, used gravity models to ascertain the impact of foreign exchange regimes on trade, and both studies found that fixed exchange rate regimes are more pro-trade. Brada & Méndez (1988) and Santana-Gallego & Pérez-Rodríguez (2019) applied the same model, however, found that floating exchange rate enhanced bilateral trades flows and other intermediate exchange rate regimes (i.e. variants between fixed and floating regimes) promoted trade, respectively.

Similarly, utilizing the Error Correction Model (ECM), Fountas and Aristotelous (2005) and Chaudhary, Hashmi & Kharn (2016) found that floating exchange rates regimes were more conducive to trade, between the UK and US and between Asian sub regions respectively. Glick & Wihlborg (1997) employed an exchange rate flexibility measure across 30 countries and found that flexible exchange rate regimes promote

international trade. Abrams (1980), utilizing a macroeconomic model provides evidence that floating exchange rate regimes impacts trade positively among developed countries.

However, Herve, Shen and Amed (2010), Odili, and Ariwa, (2017), and Victoria, (2019) in their study using cointegration analysis, to determine the impact of foreign exchange regimes on trade across varying countries and subregions in Africa respectively, found that fixed exchange rate regimes improved trade. Bergin, and Lin, (2008), using panel data analysis from 65 country pairs, also found that fixed exchange rate regimes promoted trade. Finally, Olubode, Oluseyi, and Hassan, (2018) with the aid of ARDL model, found that in Nigeria, flexible exchange rate regime negatively impacts trade flows.

METHODOLOGY

In line with the review of literature and given that the focus of this paper is on how foreign exchange rate regime impacts international trade between Nigeria and the rest of the world the key variables used in this study are:

Nigerian nominal Gross Domestic Product (GDP) – the focus was on the expenditure measure of Nigerian nominal Gross Domestic Product (GDP) which was adjusted for the impact of trade. The rationale for this is to ensure that the true income effect on net trade is captured.

Global nominal GDP – Global nominal GDP data, the expenditure measure of global nominal GDP was utilized, and it was adjusted for the impact of international trade.

US$1/Naira Exchange rate – The international value of the Naira, vis-à-vis international currencies. For ease of analysis, the benchmark exchange rate of choice was United States Dollars (i.e. US$) to a unit of the Nigerian currency Naira. This was chosen, because the US$ is a universally accepted international currency of trade in the global arena.

Net non-oil Trade – The net non-oil trade (NNOT) was derived as the difference between net non-oil import and net non-oil exports. This was done to disaggregate the impact of FX regime on the trade in non-oil goods, in view of the pressing need to diversify the economy to boos non-oil export proceed.

Net Commodity/goods Trade – The net commodity Trade (NNT) was derived as the difference between total imports of goods and total exports of goods. It was used in the study to illustrate the extent to which the impact of foreign exchange regime on Nigerian international commodity trade is distorted or otherwise by the heavy dependence on the oil sector for the bulk of her foreign currency export proceeds.

Model Specification

The dataset was obtained from the Nigeria Bureau of statistics, the CBN's Annual Statistical bulletin 2019 and the World Bank. The period of the study was 1981Q1 to 2018Q and was selected based on available data. Data from 1960 -1980 was unavailable for some of the variables, thus the study attempts a partial analysis for the period under review and affirms that a period of 1960 – 2018 which represents the period in which the fixed exchange rate regime was adopted in Nigeria may provide varying results from those determined in this paper.

In order to account for the effects arising from the transition from one exchange rate regime to another, the Markov switching model was adopted for this study. Generally, the less restrictive MS-VAR which allows parameters of the process to be conditioned on the state of ,S_t in the MS-VAR model is specified as;

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$$\boldsymbol{y_t} = \begin{bmatrix} \beta_{1i} & + \sum_{i=1}^{p} A_{1i}\, y_{t-i} & + \sum_{1i}^{\frac{1}{2}} e_t \\ \vdots & \vdots & \vdots \\ \beta_{ns_t} & + \sum_{i=1}^{p} A_{ns_t}\, y_{t-i} & + \sum_{ns_t}^{\frac{1}{2}} e_t \end{bmatrix} - - - - - - - - - - - - eqn\ (1)$$

Where $e_t \sim i.i.d\ (0, I_k)$

$$\boldsymbol{y_t} = \begin{bmatrix} \beta_{1i} & + \sum_{i=1}^{p} A_1\, y_{t-i} & + \sum_{1}^{\frac{1}{2}} e_t \\ \vdots & \vdots & \vdots \\ \beta_{ns_t} & + \sum_{i=1}^{p} A_n\, y_{t-i} & + \sum_{n}^{\frac{1}{2}} e_t \end{bmatrix} - - - - - - - - - - - - eqn\ (2)$$

$$\boldsymbol{y_t} = \begin{bmatrix} \beta_{1} & + \sum_{i=1}^{p} A_{1i}\, y_{t-i} & + \sum_{1}^{\frac{1}{2}} e_t \\ \vdots & \vdots & \vdots \\ \beta_{n} & + \sum_{i=M}^{p} A_{ns_t}\, y_{t-i} & + \sum_{n}^{\frac{1}{2}} e_t \end{bmatrix} - - - - - - - - - - - - eqn\ (3)$$

$$\boldsymbol{y_t} = \begin{bmatrix} \beta_{1} & + \sum_{i=1}^{p} A_1\, y_{t-i} & + \sum_{1i}^{\frac{1}{2}} e_t \\ \vdots & \vdots & \vdots \\ \beta_{n} & + \sum_{i=1}^{p} A_n\, y_{t-i} & + \sum_{ns_t}^{\frac{1}{2}} e_t \end{bmatrix} - - - - - - - - - - - - eqn\ (4)$$

n= number of regimes

s_t= switch across regimes

P= number of lags of the AR taking into account y_t as a k dimension Time Series.

Where each regime has an intercept A_i and an AR term

$A_i - - - - - - - - - Ap$

$\sum$ which is the Variance-Covariance Matrix common to all regimes. The model allows the parameters to vary according to the state of the economy controlled by the unobserved variable S_t.

The unobserved realization of the regime

$S_t = \epsilon\{1 - - - - - n\} - - - - - - - - - - - - - - - - - eqn\ (5)$.

In the first-order Markovian assumption, the probability of being in a regime is a function of the previous state. As such, the Markov stochastic process is defined by the transition probability below;

$P_{ij} = \Pr\left\{S_{t+1} = {}^{j}/_{S_t} = 1\right\}, \sum_{j=1}^{n} P_{ij}$=1 for all p_{2n} $i, j \in \{1 - --, n\} - - - eqn$ (6).

These probabilities are assumed to be time invariant, as such, $P_{ij}(t) = P_{ij}$ for all t.

Note that s_t follows for all processes unto the n state.

Therefore, the transition probability matrix is given as:

$$P = \begin{bmatrix} p_{11} & \cdots & p_{1,m} \\ \vdots & \ddots & \vdots \\ p_{n,1} & \cdots & p_{n,m} \end{bmatrix} - equ\ (7)$$

Where the Variance covariance Matrix is given as

$$\sum = \begin{bmatrix} \sigma_{11}^2 & 0 & 0 \\ 0 & \sigma_{21}^2 & 0 \\ 0 & 0 & \sigma_{m,n}^2 \end{bmatrix} - - - - - - - - - - - - - - - - - - equ\ (8)$$

The log-likelihood function $(Log\ L)$ associated with $equ\ (1-7)$ is given as :

$$Log\ L = \sum_{t=1}^{T} Log\ f((y_t|s_t) - - - - - - - - - - - - - - - - - - equ\ (9),$$

Where

$$f(y_t|s_t) = \frac{1}{\sigma_{s_t}\sqrt{2\pi}} exp\left\{-\frac{1}{2\sigma_{s_t}{}^2}(y_t - A_{s_t})^2\right\} - - - - - - - - - - (10)$$

Given that s_t are unobserved, the estimation process may be not be simple. Below is an adopted notions from Ayodeji, (2016).

$$f(y_t, s_t|\phi_{t-1}) = f(y_t|s_t, \phi_{t-1})\, p(s_t|\phi_{t-1}) - - - - - - - - - - - - equ\ (11)$$

Where

ϕ_{t-1} defines the available information to time $(t-1)$. More so,

$$f(y_t|\phi_{t-1}) = \sum_{s_t=1}^{k} f(y_t|s_t, \phi_{t-1})\, p(s_t|\phi_{t-1}) - - - - - - - - - - - - - - equ\ (12)$$

Incorporating $equ\ (12)\ into\ equ\ (9)$ we obtain:

$$Log\ L = \sum_{t=1}^{T} log \sum_{s_t=1}^{k} f(y_t|s_t, \phi_{t-1})\, p(s_t|\phi_{t-1}) - - - - - - - - - - - - - - - - - equ\ (13)$$

The states' probability estimate $p(S_t = j)$ computation follows the algorithm:

i. The steady state probability is given as $p(s_1 = 1 \left| \phi_{0\,,----,} p(s_t = k|\phi_0) \right.)$

ii. For $t = 2, \ldots\ldots\ldots\ldots k$,

a. At time t, the each state probability conditional on ϕ_{t-1} is given as;

$p(s_t = j \mid \phi_{t-1}) = \sum_{i=1}^{k} p_{ij} p(s_t = i \mid \phi_{t-1})$;

b. Considering the models parameters, which are $A_1 \ldots\ldots A_n,\ \sigma_1 \ldots\ldots \sigma_k$ with the transition probabilities of $p_{11}, p_{12}, \ldots\ldots\ldots p_{kk}$,

c. An update of the probabilities of each state gives;

$$p(s_t{=}j \mid \phi_{t-1}) = \frac{f(y_t|s_t = j, \phi_{t-1})\, p(s_t = j|\phi_{t-1})}{\sum_{j=1}^{k} f(y_t|s_t = j, \phi_{t-1})\, p(s_t = j|\phi_{t-1})} - - - - - - - - - equ\ (14)$$

As stated in Ayodeji, (2016), Finding the parameters that maximize $Log\ L$ as stated in $equ\ (13)$, the smoothing probabilities might be useful and which can be expressed as; $(p(s_t = j|\phi_t))$. The time duration the system is expected to remain in a particular state is given by;

$$E\ (d_t) = \sum_{j=1}^{\infty} jp(d_t = j) \sim \frac{1}{1 - p_{ij}} - - - - - - - - - - - - - equ\ (15)$$

$Equation\ (1)$ represents the simple Markov model of switching dynamics where all parameters are allowed to vary. In $Equation\ (2-4)$ each parameter is allowed to vary individually. In $equation\ (6)$ the two state regime is captured and $equation\ (5-8)$ captures the transition probabilities and $equ\ (9-14)$ shows the likelihood function of the probabilities while $equ\ (15)$ expresses the time duration the system will remain at a given regime.

Among several alternative statistical packages (EViews, STATA, R, MATLAB etc.) for implementing the switching regression, this study opted for EViews. This is because it offers a simpler interface than others and it allows for the possibility of extracting the standard error using the delta provision in the EViews dashboard.

Analysis Of Data

Stylized Facts

A cursory look as some of the variables and their trends over time is provided in this section. Figure 1 shows the development in the quarterly Net Non-Oil Trade (NNOT) and Net Trade (NNT) from 1981Q1 to 2018Q4. The figure shows a gradual quarterly decline in net non-oil trade between 1981 and 1995, following which the quarterly decline was more pronounced indicating a rapidly deteriorating non-oil trade balance between 1995 and 2015. However, an opposite development is observed in Net trade (which is inclusive of trade in oil). There was a gradual quarterly increase in NNT between 1981 and 1995, following

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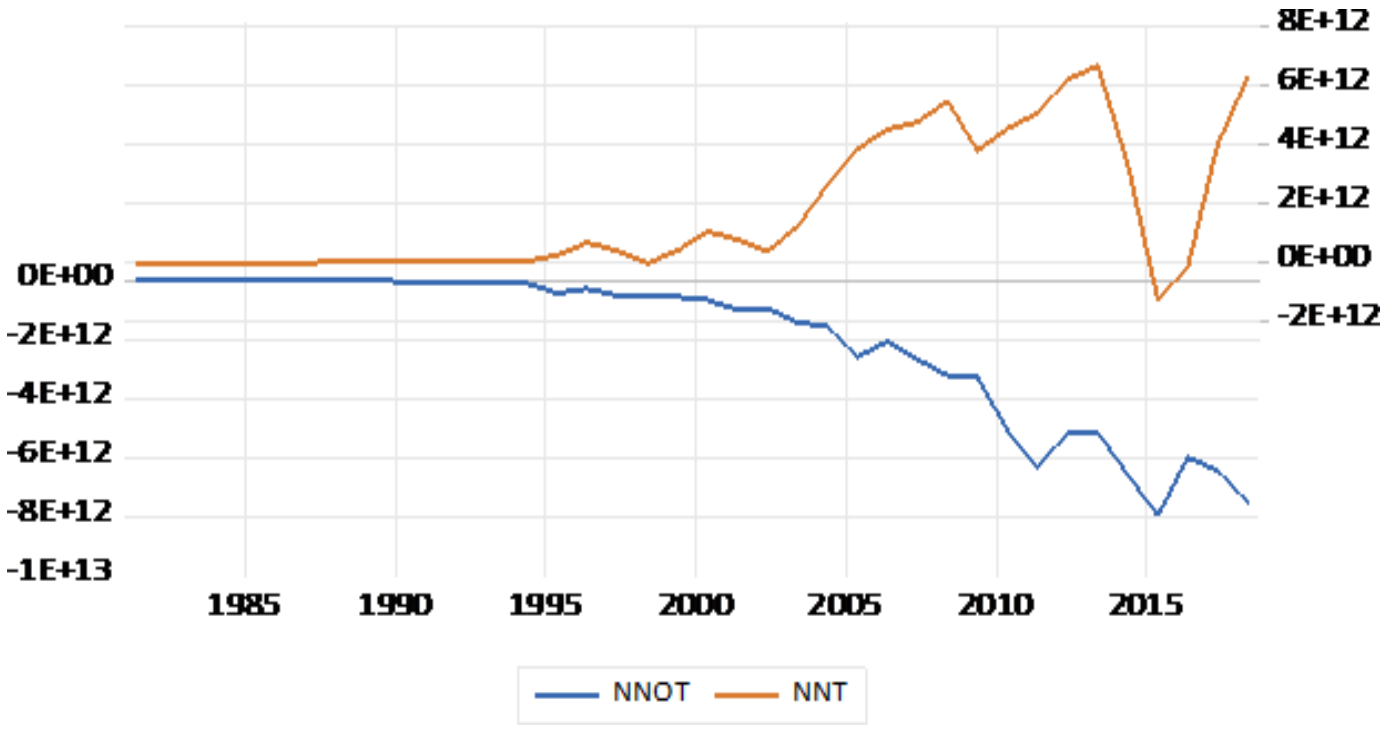
which there was a sharp increase in the quarterly NNT up until 2013, after which it declined sharply up until 2015, but subsequently increased sharply between 2015 and 2018.

Figure 1: Developments in Net non-oil trade and net commodity trade in Nigeria (1981Q1 – 2018Q4)



Data Collection and Transformation

The data used in this study ranges from 1981Q1 to 2018Q4. The variables used for the study consist of:

1. The quarterly RGDP figures were derived from annual nominal figures that was spliced using quadratic sum match method on E-Views. The annual Nigerian nominal GDP figures were obtained from the National Bureau of Statistics (NBS) website. The nominal GDP by expenditure approach was used which enabled the disaggregation of the trade component from Nigerian Nominal GDP. The annual global GDP was obtained from the World Bank website, which also includes global import and export allowing for the disaggregation of trade from Nominal global GDP. In order to have similar basis for comparison of income effect, the global nominal GDP was converted to the Naira equivalent using the prevailing annual exchange rate. The disaggregation of the trade component from Nominal GDP is to enable the paper to ascertain the true effect of income (domestic and foreign) on Nigerian net trade (non-oil & all commodities)

The derivation of national nominal and global income is presented in equation

National income =Nominal GDP -(Export -Import)

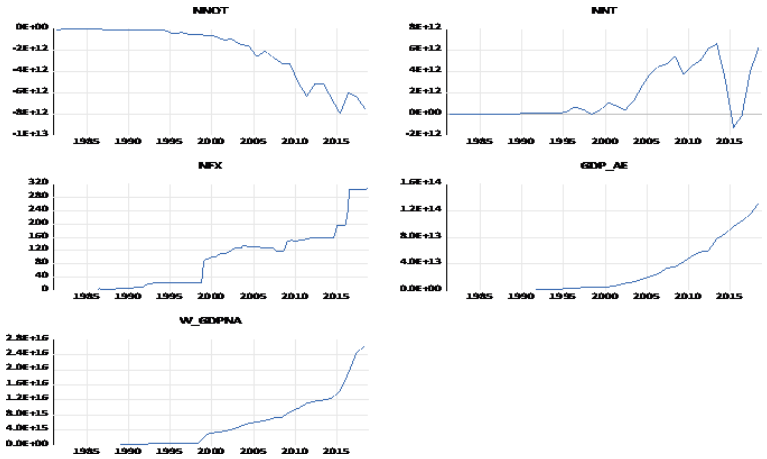
Global income =Global GDP -(Export -Import)

2. Quarterly nominal Naira/US$ exchange rate is the end period quarterly nominal exchange rate rates, which was obtained from the CBN's annual statistical bulletin 2019.

Descriptive Statistics

Figure 2 shows the quarterly developments of the variables used in the estimation of the Markov regime switching model. The key characteristics of the model variables are summarized in table 1.

Figure 2: Quarterly Developments in net non-oil trade, net commodity trade, Naira/US$ exchange rate, Domestic income and Global income (1981Q1 – 2018Q4)



The basic statistical features of the model variables (i.e. the mean, the minimum and maximum values, standard deviation, skewness, kurtosis and the Jarque-Bera) are summarized in Table 2. These descriptive statistics provide a historical background for the behavior of the data. The result suggests that all the variables are not normally distributed. All the variables except the Net Non-oil Trade (NNOT) are skewed to the right (i.e. positively skewed). Finally, Net Non-oil Trade (NNOT) and Net Trade (NNT) ratio are platykurtic being thin tailed (i.e. negative or wide and flat distribution), National income (GDP_AE) and Global income (W_GDPNA) are leptokurtic being thick tailed (i.e. positive and thin distribution), while exchange rate is mesokurtic and normally distributed.

Table 1: Descriptive Statistics

	NNOT	NNT	NFX	GDP_AE	W_GDPNA
Mean	-5.14E+11	4.28E+11	89.19405	6.72E+12	1.37E+15
Median	-1.48E+11	9.27E+10	99.26705	1.28E+12	8.35E+14
Maximum	-8.28E+08	1.76E+12	306.9211	3.49E+13	6.61E+15
Minimum	-2.02E+12	-4.33E+11	0.572200	3.43E+10	1.72E+12
Std. Dev.	6.36E+11	5.77E+11	87.17624	9.34E+12	1.72E+15
Skewness	-1.020367	0.854936	0.835819	1.400982	1.484455
Kurtosis	2.565137	2.230431	3.077153	3.761492	4.670595
Jarque-Bera	27.57343	22.26737	17.73540	53.39551	73.50032
Probability	0.000001	0.000015	0.000141	0.000000	0.000000
Observations	152	152	152	152	152

Unit-Root Tests

The integral degrees of the variable included in the model was ascertained prior to undertaking detailed analysis, in order to inform the appropriate estimation model for the research. Table 2 presents the results of the unit roots test for the model variables, suggesting that all the model variables are integrated of order one I(1).

Table 2: Conventional Unit Root Tests

	ADF (Probability)	P-P (probability)	Order of integration

S/N	Variable	Levels	First Difference	Levels	First Difference	
1	National Income (GDP_AE)	1.000	0.9995	1.000	0.0002	I(1)
2	Global Income (W_GDPNA)	0.9805	0.0135	1.000	0.0169	I(1)
3	Naira Foreign Exchange (NFX)	0.9937	0.000	0.9981	0.0000	I(1)
4	Net non-oil trade (NNOT)	0.9993	0.0811	0.9943	0.0000	I(1)
5	Net Trade (NNT)	0.7003	0.0031	0.4423	0.0002	I(1)

Notes: These tests considered the constant term without trend. The probability values are based on Mackinnon (1996)'s one sided p values.

FINDINGS, CONCLUSION AND POLICY RECOMMENDATION

Discussion of Results

The results of the markov switching estimated model are presented in Tables 3 and 4. Table 3 shows that the variables are all statistically significant. In addition, they have the a priori signs except the foreign exchange variable. The coefficient of the foreign exchange variable indicates that a devaluation of the Naira vis-à-vis the US$ would result in further decline in net non-oil trade. A possible interpretation of this is that the domestically produced non-oil goods for exports are giffen goods. The exports are mostly primary products often used as raw materials, requiring further processing and value addition for final consumption.

The result thus suggests a need for a significant shift in non-oil exports away from its predominantly primary form, to ensuring that it is transformed, and value is added to these exports, this may enable our exports command a higher price and demand at the international market. The results also point to the significant dependence on imports to satisfy domestic consumption. Theoretically, a devaluation is expected to result in improvement in trade position as exports become more internationally competitive while domestic imports become less competitive, however, in a situation where import is price inelastic, devaluation results in only a marginal reduction in imports volume. Furthermore, the import bill rises significantly, owing to the relatively higher price being paid for every unit of imported good. This coupled with the fact that the non-oil exports are giffen goods, indicates an urgent need to improve the quality and consumption of made in Nigeria goods, the need to reinforce the roles of standards organizations in Nigeria to ensure that exports meet and surpass international standards.

A review of the results and regime probability graph indicates that regime 1 is consistent with the period of fixed exchange rate, while regime 2 is consistent with the period of exchange rate flexibility. The coefficient of the foreign exchange rate indicate that non-oil goods have a more pronounced giffen nature under the flexible rate structure than the fixed. This is not unexpected as exchange rate under a fixed regime is unlikely to exhibit much volatility vis-à-vis a flexible regime. The own income effect is also more pronounced under a flexible exchange rate regime relative to the fixed exchange rate regime. A possible explanation of which is that there may be scarcity of foreign exchange to meet needs owing to market rigidities under a fixed pricing structure despite an increase in demand. The flexible market structure allows for the price mechanism to efficiently allocate foreign exchange in line with market forces, as such more responsive to the associated demand pressures for foreign exchange owing to changes in income. The impact of global income on net non-oil trade is again more pronounced under the flexible exchange rate regime vis-à-vis the fixed exchange rate regime, this again is attributed to the efficacy of the market system in the allocation of foreign exchange to users under a flexible exchange rate regime. This invariably facilitates trade, as demand pressure changes in line with changes in global income levels.

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Table 3: Estimated Markov Switching regression for Non-oil Trade

Dependent Variable: NNOT

Method: Markov Switching Regression (BFGS / Marquardt steps)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
Regime 1				
NFX	-2.87E+09	3.31E+08	-8.689827	0.0000
GDP_AE	-0.098845	0.006273	-15.75720	0.0000
W_GDPNA	0.000369	5.78E-05	6.374992	0.0000
LOG(SIGMA)	23.49589	0.090708	259.0284	0.0000
Regime 2				
NFX	-5.20E+09	7.96E+08	-6.529778	0.0000
GDP_AE	-0.116446	0.011031	-10.55620	0.0000
W_GDPNA	0.000526	8.81E-05	5.968142	0.0000
LOG(SIGMA)	26.05289	0.086842	300.0043	0.0000
Transition Matrix Parameters				
P11-C	3.435499	0.664004	5.173915	0.0000
P21-C	-3.338742	0.675869	-4.939922	0.0000
Mean dependent var	-5.14E+11	S.D. dependent var		6.36E+11
S.E. of regression	1.45E+11	Sum squared resid		3.02E+24
Durbin-Watson stat	0.221514	Log likelihood		-3990.035
Akaike info criterion	52.63204	Schwarz criterion		52.83098
Hannan-Quinn criter.	52.71285			

Figure 3: Regime Probability Graph for Net Non-Oil Trade

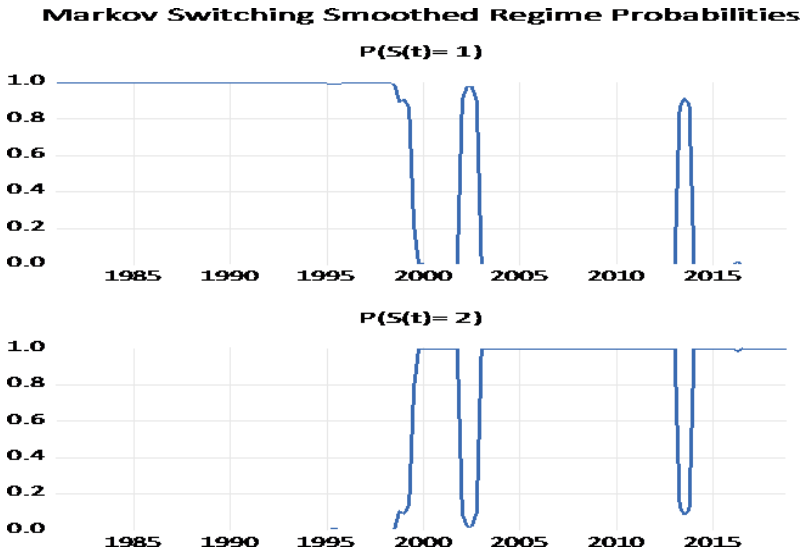

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Table 4 indicates that the probability of remaining in fixed exchange rate regime if already under a fixed exchange rate regime is 96.88 per cent, while the probability of moving to a flexible exchange rate regime if the system is under a fixed exchange rate regime is 3.12 per cent. Conversely, the probability of remaining in a flexible exchange rate regime, if the market is already running a flexible exchange rate is 96.57 per cent, while the probability of moving to a fixed exchange rate regime if the system is currently running a flexible exchange rate structure is 3.43 per cent.

Table 4: Transition probabilities based on net non-oil trade

P(i, k) = P(s(t) = k | s(t-1) = i)			
(row = i / column = j)			
		1	2
All periods	1	0.968796	0.031204
	2	0.034266	0.965734

Table 5 indicates that regime 1 (i.e. fixed exchange rate) has an expected duration of 32 quarters, while regime 2 (i.e. flexible exchange rate) had an expected duration of 29 quarters.

Table 5: Expected duration of regimes based on net non-oil trade

Constant expected durations:		
	1	2
All periods	32.04689	29.18364

Table 6 shows that the variables have the a priori signs, additionally they are all statistically significant except the foreign exchange variable in regime 1. Unlike the results from the analysis based on Nigerian non-oil trade, the coefficient of the foreign exchange variable indicates that a devaluation of the Naira vis-à-vis the US$ would result in an increase in net trade. This would suggest that traded good from Nigeria are normal goods and a depreciation which translates to a fall in domestic prices of exported goods results in an increase in export. Furthermore, as is expected devaluation would result in an increase in the domestic price of imports, and a corresponding decline in their demand. However, a critical look at exports indicate that the bulk of exports is oil, the price of which is not determined domestically but in the global oil market. Fundamentally, it is priced in US$, thus a depreciation/devaluation of the naira does not cause a change or reduction in the price of oil exported from Nigeria, conversely, it only results in a decline in the imports of oil products owing to the rise in their domestic prices. The inclusion of oil trade conceals the giffen nature of non-oil exports and gives a false sense of normality of all goods exported from the Nigerian economy.

A review of the results presented in table and regime probability graph indicates that regime 1 is consistent with the period of fixed exchange rate, while regime 2 is consistent with the period of exchange rate flexibility. The coefficient of the foreign exchange rate indicate that traded goods are normal in nature, though not statistically significant under the fixed exchange rate regime. The reduction of the international value of the Naira vis-à-vis the US$, has a more pronounced effect under the flexible exchange rate regime owing the more superior allocative efficiency of the market mechanism in the determination of the utilization of foreign exchange. Additionally, the volatility under the flexible exchange rate regime, is transmitted faster and amplified by market sentiments vis-à-vis the fixed exchange rate regime with limited foreign exchange volatility and a system in which allocation of foreign exchange is not freely market determined.

As was the case of non-oil trade, the own income effect is also more pronounced under a flexible exchange rate regime relative to the fixed exchange rate regime. The explanation provided for the non-oil analysis is applicable and is grounded on the rationale that the allocative efficiency is more pronounced when the

international value of the naira is purely market determined. Consequently, exchange rate developments under the flexible exchange rate structure are more responsive relative to fixed exchange rate regime, to the associated market pressures for foreign exchange owing to changes in income. The impact of global income on net trade is again more pronounced under the flexible exchange rate regime vis-à-vis the fixed exchange rate regime, this again is attributed to the efficacy of the market system in allocation of foreign exchange to users under a flexible exchange rate regime. This invariably facilitates trade, as demand pressure changes in line with changes in global income levels

Dependent Variable: NNT

Method: Markov Switching Regression (BFGS / Marquardt steps)

Table 6: Estimated Markov Switching regression for Net Trade in Goods

Variable	Coefficient	Std. Error	z-Statistic	Prob.
Regime 1				
NFX	2.59E+08	2.17E+08	1.192446	0.2331
GDP_AE	-0.02808	0.004318	-6.50296	0
W_GDPNA	0.000124	3.24E-05	3.840687	0.0001
LOG(SIGMA)	22.34768	0.11405	195.9465	0
Regime 2				
NFX	3.39E+09	1.78E+09	1.908335	0.0563
GDP_AE	-0.05441	0.023974	-2.26961	0.0232
W_GDPNA	0.000347	0.000194	1.78543	0.0742
LOG(SIGMA)	26.90089	0.06604	407.3393	0
Transition Matrix Parameters				
P11-C	3.224132	0.651568	4.948268	0
P21-C	-3.54703	0.641663	-5.52788	0
Mean dependent var	4.28E+11	S.D. dependent var		5.77E+11
S.E. of regression	4.50E+11	Sum squared resid		2.91E+25
Durbin-Watson stat	0.071178	Log likelihood		-4055.15
Akaike info criterion	53.48878	Schwarz criterion		53.68772
Hannan-Quinn criter.	53.5696			

Figure 5: Regime Probability Graph for Net Trade in Goods

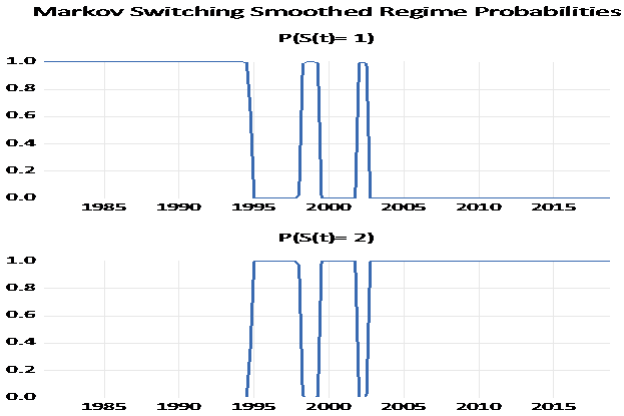

Table 7 indicates that probability of remaining in fixed exchange rate regime if already under a fixed

exchange rate regime is 96.17 per cent, while the probability of moving to a flexible exchange rate regime if the system is under a fixed exchange rate regime is 3.83 per cent. Conversely, the probability of remaining in a flexible exchange rate regime, if the market is already running a flexible exchange rate is 97.20 per cent, while the probability of moving to a fixed exchange rate regime if the system is currently running a flexible exchange rate structure is 2.80 per cent.

Table 7: Transition probabilities based on Net Trade in Goods

P(i, k) = P(s(t) = k | s(t-1) = i)			
(row = i / column = j)			
		1	2
All periods	1	0.961732	0.038268
	2	0.028003	0.971997

Table 8 indicates that regime 1 (i.e. fixed exchange rate) has an expected duration of 25 quarters, while regime 2 (i.e. flexible exchange rate) had an expected duration of 36 quarters.

Table 8: Expected duration of regimes based on Net Trade in Goods

Constant expected durations:		
	1	2
All periods	26.13175	35.71022

It is observed from the estimation results, that the coefficient of the fixed regimes for each of the variable is less than those of the flexible regime. This thus suggests, that fixed exchange rate helps moderate the distortions to trade associated with changes in the model variables, this is attributed to lower foreign exchange volatility improved trade confidence in the international value of the domestic currency. This, however, entails market inefficiency associated with the weaker signals and allocative inefficiency of price rigidity. Given the pressing need to diversify the economy away from oil exportation, a relatively fixed exchange rate regime is less detrimental to net trade owing to changes in foreign exchange rate, domestic and global income. The inclusion of oil trade significantly moderates the impact of the model variables on Nigeria's total trade and concealing the giffen nature of non-oil exports. Given the result of the estimation based on net tradeable goods, flexible exchange rate enhances Nigerian net trading position associated with depreciation of the Naira, however, it remains more detrimental to net trade with changes in domestic and foreign income.

CONCLUSION & POLICY RECOMMENDATION

The paper has shown that flexible exchange rate has a more distortive impact on net Nigerian non-oil and total goods trade. Significantly, the paper reveals that the non-oil exports have the features of giffen goods (i.e. demand falls when prices fall), signaling inferior quality of non-oil Nigerian export. Since there is a pressing need to diversify the export base of the Nigerian economy away from oil sector, the following policies are recommended to facilitate its rapid actualization:

1. Strengthening of standard agencies to ensure that the quality of exports is comparable or superior to international standards.
2. Enhance collaboration between exporters and tertiary institutions/research institutes to undertake research into improving the quality and adding value to Nigerian exports to induce a higher price and demand.
3. Establish a tripartite relationship between the monetary authority, research/tertiary institutions and exporters to identify and facilitate funding of research into the enhancement of the quality of Nigerian

export

4. Set up a dedicated export research intervention fund to encourage consistent research into improving the quality and variety of Nigerian export by the private sector. The fund would be domiciled with the Development Finance Department and would be jointly administered by the Ministry of Trade, Bank of Industry, Nigerian Export and Import Bank, Manufacturing Association of Nigeria & NAFDAC.
5. Though the results indicate that fixed exchange rate is better relative to flexible exchange rate in facilitating non-oil trade, in order to fasten the diversification of the Nigerian economy, it is recommended that a managed float approach currently deployed is adopted. This combines the benefits of low volatility of fixed exchange rate regime, and allocative efficiency of the flexible rate regime to enable the market appropriately to deploy foreign exchange to non-oil export sector and trade with the highest returns for the Nigerian economy.
6. Sustain the Bank's intervention initiatives in key sectors involved in the domestic production of substitutes to the major imported commodities that are price inelastic and worsens the trade balance with the depreciation of the Naira.

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