INTERROGATING THE DETERMINANTS OF FOREIGN EXCHANGE MARKET PRESSURE IN NIGERIA

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ABSTRACT

In view of the perennial problem of foreign exchange market pressure in Nigeria, this paper has interrogated the determinants of foreign exchange market pressure in the Nigerian economy. The study is anchored on the Marshall-Lerner theory of demand and supply of foreign exchange. The study employed the Autoregressive Distributed Lag (ARDL) model on the Nigerian data spanning from 1970 to 2019. The findings of the study revealed that oil prices, current account position and monetary policy rate are inversely related with the foreign exchange market pressure; while inflation rate, government expenditure and foreign debts were found to be positively related with foreign exchange market pressure in Nigeria both in the short and long-run. Based on these findings, the study recommended that there should be proper demand management of foreign exchange by the Central Bank of Nigeria to conserve the scarce foreign exchange for importation of productive inputs so as to encourage local production. On the supply side of foreign exchange management, the study recommends that the economy should be diversified away from oil to non-oil production and exportation. Finally, the study recommended that government at all levels in Nigeria should enhance the internally generated revenue so as to reduce foreign debt servicing burden in the country among others.

Key Words: Determinants, Foreign Debt, Inflation Rate, Market Pressure, Marshall-Lerner Theory and Oil Prices

JEL Codes: F, F3, F 31

1. Introduction

Over the years, the Nigerian foreign exchange market has witnessed incessant pressures as evident in the frequent disparities between the official exchange rate and the parallel market rates (Ominyi, Akighir and Abayol-Ikwue, 2020). According to Englama, Saani, Duke, Ogunleye and Isma'il (2009), the sustained foreign exchange market pressure has been a major source of currency depreciation and widening premium in the foreign exchange market in Nigeria. This situation has further encouraged speculation, arbitrage activities and the emergence of a flourishing parallel market for foreign currency in the country. The premium has created incentives for authorized dealers to engage in round-tripping of funds from the official sources to the parallel market.

In view of this perennial problem of foreign exchange market pressure, the monetary authority has been evolving foreign exchange management strategies to contain with the pressures in the market. Before the Structural Adjustment Programme (SAP), Nigeria operated a fixed exchange rate management policy. However, the exchange rate liberalization under SAP gave way to flexible exchange rate regime in the country in 1986, where the forces of demand and supply were allowed to determine the exchange rate. This system started in September 1986 with a dual exchange rate system – the first and second tier foreign exchange market (SFEM) with a view to preventing sharp movements in exchange rate that could destabilize business activities. Due to the complexity of managing these systems, the first and second tier foreign exchange markets were merged into a single Foreign Exchange Market (FEM) in July 1987. This was transformed into the Autonomous Foreign Exchange Market (AFEM) in 1988 to facilitate non-oil inflows into the Deposit Money Banks and curtail demand pressure. The AFEM turned to be riddled with speculative activities and later transformed into the Inter-Bank Foreign Exchange Market (IFEM) in January 1989 (Obadan, 2012).

The failure of the IFEM to yield the desired results led to its modification in December 1990, when the retail Dutch Auction System (rDAS) was re-introduced having been first introduced in 1987. However, the continued volatility in exchange rate and the widening gap between the official and parallel markets led the CBN to further change the exchange rate mechanism. Thus, on March 5 1992, the foreign exchange market was fully deregulated with the floating of the naira. Though, volatility eased but the demand pressure persisted (CBN, 2016). In 1994, the exchange rate was temporarily fixed but the policy objectives could not be realized as the naira depreciated sharply in the parallel market. This informed the policy change in 1995 to a flexible system under the guided deregulation of the foreign exchange market; yet, the gap between the official rate and the parallel market rate continued to widen. (CBN, 2016).

The foreign exchange market was further freed up in 1999 with the re-introduction of the inter-bank foreign exchange market (IFEM) with a view to reducing rent seeking behaviour, and restore stability in the market. Following the widening premium between the official and parallel market exchange rates largely due to the ever increasing demand for foreign exchange in the country, the CBN reintroduced the retail Dutch Auction System (rDAS) in 2002. Though the system restored confidence in the market by moderating the rates, narrowing the premium and reducing rent-seeking behaviour, it was however, replaced with the wholesale Dutch

Auction System (wDAS) in February 2006 to strengthen the gains of rDAS and further free up the foreign exchange market and the pressure reduced. However, in October 2008, owing largely to the global financial crisis, there was a massive outflow of foreign exchange from the country, which increased the pressure in the foreign exchange market. This caused a sharp fall in the exchange rate, thereby making the CBN to re-introduce the rDAS in January 2009 to ease the demand pressure. In spite of this, the demand pressure persisted and the exchange rate continued to fall in all segments of the market (Obadan, 2012).

Consequently, the wDAS was re-introduced in July 2009. However, due to its inability to mitigate the demand pressures, it gave way again to the rDAS in October 2013 which was also withdrawn in February 17, 2015 following reforms in the market. Thus, the CBN closed the official window of the market and moved all demand for foreign exchange to the interbank market. This new exchange rate policy was necessitated by widened premium between the interbank/BDCs and rDAS rates, the resultant speculative demand and unwholesome practices by economic agents as well as the falling price of crude oil at the international market, which impacted negatively on the external reserves (CBN, 2016). The slump in oil prices created a wide positive gaps between the demand and supply of foreign exchange beginning from July 2014. This made the CBN to evolve intervention policies and measures to defend the market and the naira. Some of these policies include, the ban of foreign exchange on forty-one items, continuous injection of dollars into the market, currency swap deal, amongst others. Despite these efforts, the pressure in market continued with its attendant consequences on the exchange rate and foreign reserves.

According to CBN (2020), Nigeria's external reserves have continued to decline unabated. The external reserves have maintained a downward trend since June 10, 2019 when it got to its peak of $45.175 billion. The reserves dropped from $45.175 billion in June 2019 to $38.59 billion in December 31, 2019 and further declined to $35.26 billion as at March 30, 2020; this represents 8.6% decrease. Due to the inability of the CBN to sustain the pressure in the foreign exchange market, the apex bank has now adjusted the exchange rate to 380 naira per dollar and has introduced uniform exchange rate in the market. It has merged the official rate, the rate for Bureau De Change (BDC) operators, the investors and exporters' windows and some other rates. All these are aimed at curtailing the pressure in the foreign exchange market.

The foregoing suggests that foreign exchange market pressure has remained a perennial problem in the Nigerian economy. Thus, curtailing the deleterious effects of the foreign exchange market pressure on the performance of the Nigerian economy requires that the key causal factors of the pressure be identified.

Therefore, the objective of this study is to interrogate the key determinants of foreign exchange market pressure in Nigeria and identify such important causal factors with a view to proffering policy solutions to the perennial problem of foreign exchange market pressure in Nigeria.

Towards this end, the paper is structured as follows after the introductory section; Section two is on conceptual clarification, section three deals with the theoretical review, section four dwells

on empirical literature review, section five is hinged on the methodology of the study, section six considers the empirical results and section seven provides the conclusion and policy implications of the findings.

2. Literature Review

2.1. Conceptual Literature

The concept of Foreign Exchange Market Pressure (EMP) has been variously defined in economic literature; for instance, Kumah (2007) defined EMP as an excess money phenomenon driven by abnormally large excess domestic currency demand or supply, which forces the monetary authorities to take measures to stem disruptive appreciation or depreciation of the currency. Defined this way, EMP reflects monetary disequilibrium that drives the demand for a safe-haven currency, and may be exacerbated by foreign exchange market intervention. Thus, the defining elements of EMP essentially include the simultaneous occurrence of excess demand or supply of a currency and deliberate policy action by the monetary authorities to "lean against the wind" and prevent the currency from appreciating or depreciating. According to Central Bank of Nigeria (CBN) (2016), EMP as the pressure in the foreign exchange market is related to exchange rate depreciation under a flexible exchange rate regime rather than a fixed regime. It is an index associated with movements in two key external sector variables - international reserve holdings and the nominal exchange rate, in some cases money supply. A country's exchange rate can be put under pressure when the demand for foreign currency exceeds its supply. Girton and Roper (1977) viewed EMP as the sum of the changes in exchange rate and international reserves.

For Sponlader (1999), exchange market pressure measures the total excess demand for a currency in international markets as the exchange rate change which would be required to remove this excess demand in the absence of money or foreign exchange market intervention, given that the exchange rate policy implemented generates expectations.

2.2 Theoretical Literature

The study is hinged on the theoretical postulations of the Marshall-Lerner demand and supply theory of foreign exchange. This theory was propounded by Alfred Marshall and Abba Lerner to explain how disequilibrium in foreign exchange market can cause devaluation of a country's currency thereby affecting the trade balance of the country. It is commonly referred to as the elasticities approach of balance of trade. It provides an analytical framework of how a currency devaluation will affect the balance of trade depending on the elasticities of supply and demand for foreign exchange and/or foreign goods. The approach stresses exchange rate change for Balance of Payments (BoP) adjustment. In this direction, devaluation of a currency will change the relative prices of domestic and foreign goods which in turn, will change the balance of trade. When demand or supply is elastic, it means that the quantity demanded or supplied will be relatively responsive to change in price. An inelastic demand or supply indicates that the quantity is relatively unresponsive to the price changes. Elasticity will also determine what happens to total export and import revenues following international price changes (Crockett, 1987).

Thus, the Marshall-Lerner (M-L) condition states that, given infinite elasticities of supply for exports and imports, and initial trade balance, the sum of the absolute values of the elasticities of demand for exports (e_X) and demand for imports ((e_M) should be greater than unity for devaluation to improve the trade balance. In algebraic terms, this translates to:

$e_X + e_M > |-1|$ … . .1

When $e_X + e_M < |-1|$, a depreciation of currency will make the BoP unfavourable and an appreciation will make it more favourable. If the sum of (e_X) and (e_M) equals unity, that is,

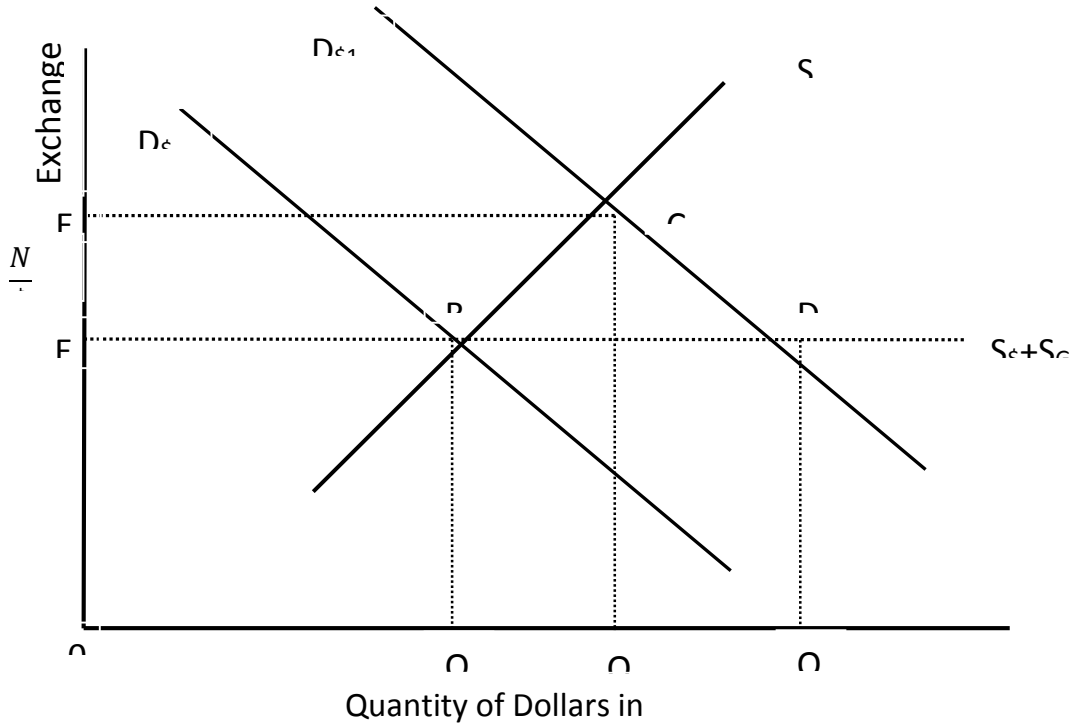
$e_X + e_M = |-1|$ … … … … … … … … … … … … … … … … … … … . .2

A change in the exchange rate will leave the BoP deficit or surplus unchanged. It is only when the Marshall-Lerner condition is satisfied will a change in the exchange rate have its normal effects on BoP, that is, it will improve the BoP of the currency depreciating country and weaken the BoP of the appreciating country. In terms of the change in the balance of trade, the M-L condition is:

$\Delta B = dX(e_X + e_M - 1)$ … .3

Where: $\Delta B =$ change in the trade balance, d = rate of devaluation, $X =$ value of exports expressed in foreign currency, $e_M =$ elasticity of home demand for imports, $e_X =$ elasticity of foreign demand for home country's exports (Obadan, 2012). According to Obadan (2012), a diagrammatic analysis of the elasticities approach of BoT in the context of the Nigerian economy is given as follows:

Figure 1: Increase in Demand for Foreign Exchange under fixed and floating Exchange rate



Source: Obadan (2012)

In this diagram, $S_{\$}$ represents supply curve of dollars to the foreign exchange market; $D_{\$}$ represents the initial demand curve for dollars while $D_{\$1}$ represents a new demand curve for dollars following a change in demand due for example, an increase in demand for foreign exports (demand for imports by Nigerians). The demand curve is downward-sloping indicating that the higher the naira price of dollar, fewer the dollars that will be demanded. On the other hand, the supply curve is upward sloping indicating the familiar positive relationship between price and supply; in this case, the naira price of dollar and the quantity of dollars supplied. Given the initial supply and demand curves, the initial equilibrium is at B where the quantity demanded just equals the supply of dollar (Q_1). The initial exchange rate is E_1. If there is demand pressure due to increase in Nigerians demand for foreign exports, this will cause the demand curve to shift to $D_{\$1}$. There are a number of possible responses to this shift in demand. These are: first, the dollar will appreciate and the naira will depreciate with freely floating exchange rates so that the exchange rate raises to E_2 and Q_1Q_2 dollars are bought and sold; second, the Central Bank can peg the exchange rate at E_1 and provide Q_1Q_3 extra dollars (= CD) from its reserves; third, supply and demand curves can be artificially shifted by imposing controls or quotas on the supply of or demand for dollars; fourth, Quotas or tariffs could be imposed on

foreign trade to maintain the old supply and demand for dollars; and fifth, monetary policy could change in order to shift curves (Obadan, 2012). This theory is suitable for this study because it has attempted to explain the dynamics of demand and supply of foreign exchange that creates foreign exchange market pressure in the foreign exchange market in an economy

2.3 Empirical Literature

Various empirical studies have attempted to analyze the determinants of foreign exchange market pressure in different economies of the world. For instance, Siklar and Akca (2020) studied the relationship between monetary policy and the exchange market pressure in Turkey for the period of 2002 to 2018. The study employed the VAR technique and Granger causality test, and findings of the study revealed that there is a unidirectional causality running from domestic credit expansion to exchange market pressure; and a unidirectional causality running from domestic credit expansion to interest rate differential. The study also found a bidirectional causality between exchange market pressure and interest rate differential in Turkey.

In another study on Chinese economy, Liu (2020) examined the impact of uncertainty, namely, macroeconomic uncertainty and financial uncertainty on foreign exchange market stability in China. Using the Latent Threshold Time-Varying Parameter VAR approach, the study found that the relationship of uncertainties and China's foreign exchange market pressure is latent threshold nonlinear dynamic time-varying. Implying that, increases in the macroeconomic and financial uncertainties tend to increase foreign exchange market pressure in China.

Furthermore, Ammar (2019) investigated foreign exchange market pressure index and monetary policy in Iraq from 2013 to 2017. The study utilized the Autoregressive Distributed Lag (ARDL) method and found that the spread of exchange rate influences EMP and foreign reserve has negative relationship with foreign exchange market pressure; while domestic credit and money multiplier were ineffective in the case of Iraq. The study concluded that the Central Bank of Iraq (CBI) relies extensively on foreign reserves to mitigate pressure in the foreign exchange market. It was further stressed that due to the nature of Iraq economy where the major source of foreign exchange is oil exports, the CBI adopted a fixed exchange rate regime to control inflationary expectations and stabilize the foreign exchange market pressure.

In a panel analysis, Ila and Madhavi (2019) investigated 93 developing and emerging market economies during the taper tanturn episode and found the determinants of foreign exchange market in these economies to include, interest rate differential, the ratio of domestic credit to GDP, fiscal deficits, gross public debts, inflation rate, capital account balance, trade openness, GDP per capita, and exchange rate regime. Similarly, Olanipekun, Olasehinde-Williams and Hasan (2019) examined the impact of economic policy uncertainty on foreign exchange market pressure in a panel of 20 countries for the period of 2003Q1 to 2017Q4. Findings of the study indicated a long-run relationship between exchange market pressure and economic policy uncertainty. Specifically, the study found that a rise in economic policy uncertainty, consumer price index, trade openness and financial openness increases the severity of the exchange market pressure in the long-run. However, GDP, domestic credit, foreign direct investment inflows tend to cushion the effect of the pressure.

In another cross-sectional study, Hossfeld and Pramor (2018) investigated the relationship between global liquidity and exchange market pressure (EMP) in 32 emerging market (EM) economies. Using baseline regression models, the study found that surges in monetary liquidity, credit provision, and short-term funding in advanced economies (AEs) are robustly associated with appreciation pressure on EM currencies. In another study, Aziz and Widodo (2017) investigated Exchange Market Pressure using evidences from ASEAN inflation targeting countries. The study examined the relationship between EMP and its determinants in ASEAN inflation targeting countries for the period of 2006Q1 to 2016Q4, the results showed that all variables have obeyed the theoretical expectations, except change in real income for Indonesia and Thailand, and change in world prices for Philippines.

In an attempt to ascertain the relationship between exchange market pressure, stock prices and commodity prices, Hegerty (2018) investigated these relationships in the Czech Republic, Hungary, Poland, Ukraine, Bulgaria and Romania. The study used the VAR approach on the data spanning from 1998 to 2017 for these countries. Findings of the study showed that the Czech Republic was relatively insulated from international transmissions, while Hungary was more susceptible to global spillovers and Poland was exposed to events originating elsewhere in the Central Eastern European (CEE) region. Ukraine showed bidirectional causality between its EMP and stock indices and it was also found that pressure on the hryvnia increases if the commodity or oil prices decline.

Within the African region, Mogaji (2017) did an empirical assessment of market pressure within the West African Monetary Zone (WAMZ) focusing on foreign exchange market pressure in Gambia, Ghana, Guinea, Liberia, Nigeria and Sierra Leone. The study employed the model-independent statistical method on both annual and monthly data spanning between 2001 and 2015. The findings revealed mixed forms of absorption of market pressure in the WAMZ, with the majority of member countries of the WAMZ (including the lead Economy-Nigeria) absorbing exchange market pressure domestic currency depreciation relative to reserves depletion. The study concluded that the adoption of a single exchange rate in a common exchange market should be therefore considered with caution. Because of the possible and expected massive influence of Nigeria in the foreign exchange market; foreign inflation may not hugely impact the proposed exchange rate and the external value of the proposed single currency.

Furthermore, Aizenman and Binici (2015) investigated exchange market pressure in OFCD and emerging economies; focusing on domestic versus external factors influencing EMP. The study considered the channels through which domestic and external global factors such as risk appetite, global liquidity, U.S. monetary policy, and commodity prices affected the exchange market pressure before and after the global financial crisis as well as the role of these factors during the Federal Reserve's tapering episode. The study found that external factors played a significant role in driving exchange market pressure for both OECD countries and emerging market countries, with a larger impact on the latter.

In the investigation of the relationship between exchange market pressure and regional price spillovers in Russia, Ukraine, and Belarus, Hegerty (2014) used the Vector Autoregressive (VAR) method and found that the alternative EMP measures do not outperform the baseline

measure, and that overall, the "benchmark" measure showed a number of co-movements among the three countries' EMP series, stock prices, and oil prices. Impulse response functions and variance decompositions revealed evidence of one-way transmission from Russia to Ukraine and Belarus, and from Russian stock prices to the ruble.

The study by Aizenman and Hutchison (2010) evaluated how the global financial crisis emanating from the U.S. was transmitted to emerging markets economies. Using a panel data approach and controlling for variety of factors associated with EMP, the study found clear evidence that emerging markets with higher total foreign liabilities, including short- and long-term debt, equities, FDI and derivative product had greater exposure and were much more vulnerable to foreign exchange market pressure. Again, Feridun (2008) examined the determinants of EMP and currency crisis in Turkey during September 2009 to April 2001 using Autoregressive Distributed Lag (ARDL), the binary logit and ordered logit models and found that speculative pressure in the exchange market and currency crisis in Turkey were linked to the repeals in the capital flows. Also, Deressa (2005) examined empirically the existence of the link between EMP and monetary policy in Ethiopia using the VAR technique. The result revealed that the measure of the stance of monetary policy, that is domestic credit growth, has a significant and positive impact on EMP, implying that an expansionary monetary policy increases EMP in line with the traditional theory.

All these empirical studies reviewed are different from the current study in that, the studies are mostly on developed and emerging economies which have more robust financial markets and are more export-oriented than the Nigerian economy, hence the imperativeness of this study on the Nigerian economy that exports mainly crude oil whose prices are not stable thereby affecting the supply of foreign exchange in the economy. Also, given the fact that the Nigerian economy is import dependent which tends to increase the demand for foreign exchange. These two attributes of the Nigerian economy have some serious implications for foreign exchange market pressure and hence, the imperativeness of this study.

3 Methodology

The methodology of this study is focused on the modelling and estimation of the determinants of EMP in Nigeria as well as the data requirements for the model and the sources of the data.

3.1 Model Specification

In order to model the determinants of foreign exchange market pressure in Nigeria, the dynamics of the Marshall-Lerner (M-L) theory of demand and supply of foreign exchange were employed using both the demand and supply factors of the theory. Thus, following the postulations of the Marshall-Lerner (M-L) theory and adopting the modelling procedure of Ila and Madhavi (2019) and Siklar and Akca (2020) with some modifications based on the dynamics of the Nigerian foreign exchange market, the determinants of foreign exchange market pressure in Nigeria can be specified as follows:

$$emp = f(oilp, cap, infl, mpr, gexp, fd) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 4$$

Where; emp is foreign exchange market pressure measured as the sum of changes in the exchange rate, foreign reserves and/or interest rates. Exchange Market Pressure (EMP) consists of a weighted average of the exchange rate, relative interest rates and foreign exchange reserves.

By using the Weymark (1995) extended the definition of the EMP index developed by Girton and Roper (1977) and incorporating interest rate changes. The EMP index by Weymark (1995) as used in this study is defined as:

$$EMP_t = \Delta e_t - B\Delta r_t + Y\Delta i_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 5$$

Where; i_t is the interest rate; and Y is the reserve –to-deposit ratio. This index gives us a picture of what the exchange rate change would have been if the Bank did not intervene in the exchange market or increase interest rates to defend the currency. It shows that depreciation of domestic currency, loss of international reserves and increase in domestic interest rates will increase the EMP index. $oilp$ is oil prices which is expected to be inversely related with EMP; cap is the Capital Account Position measured as the differential between the export revenue and the import bills in the country. It is expected to be negatively related with foreign exchange market pressure; $infl$ is the rate of inflation which is expected to be positively related with foreign exchange market pressure; mpr is the monetary policy rate as a measure of monetary policy stance is expected to be negatively related with foreign exchange market pressure; $gexp$ is government expenditure as a measure of fiscal policy stance is expected to be positively related with foreign exchange market pressure; and fd is foreign debt is expected to be positively related with foreign exchange market pressure.

The stochastic form of model 4 is expressed as follows:

$$emp = \beta_0 + \beta_1 oilp + \beta_2 cap + \beta_3 infl + \beta_4 mpr + \beta_5 gexp + \beta_6 fd + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots 6$$

The study employed the Autoregressive Distributed Lag (ARDL) Model to estimate model 6. The choice of the ARDL technique amidst other competing techniques stems from the fact that, the ARDL test procedure provides valid results whether the variables are I(0) or I(1) or mutually co-integrated; it also allows for simultaneous testing of the long-run and short-run relationships between the variables in a time series single equation model and it provides very efficient and consistent test results in small and large sample sizes (Pesaran and Shin, 2001).

Thus, the ARDL specification of model 3 is expressed as follows:

$$\Delta empt = \beta_0 + \sum_{i=1}^{p} \beta_{1i} emp_{t-1} + \sum_{i=0}^{p} \beta_{2i} \Delta oilp_{t-1} + \sum_{i=0}^{p} \beta 3i \Delta capt - 1 + \sum_{i=0}^{p} \beta_{4i} \Delta \inf l_{t-1} + \sum_{i=0}^{p} \beta_{5i} \Delta mpr_{t-1}$$
$$+ \sum_{i=0}^{p} \beta_{5i} \Delta fd_{t-1} + \sum_{i=0}^{p} \beta_7 \Delta g \exp_{t-1} + \varphi_1 emp_{t-1} + \varphi_2 oilp_{t-1} + \varphi_3 cap_{t-1} + \varphi_4 \inf l_{t-1}$$

$$+\varphi_5 mpr_{t-1} + \varphi_6 fd_{t-1} + \varphi_7 g\exp_{t-1} + \varepsilon_{1t} \text{ - } \quad \text{ - } \quad \text{ - } \quad \text{ - } \quad \text{ - } \quad 7$$

In the ARDL technique, the existence of a long-run relationship among the variables is examined by Bounds test using the F statistic. If the calculated F statistic is higher than the upper bound critical value, I (1) for the number of explanatory variables (k), the null hypothesis will be rejected. If the F statistic is lower than the lower bound critical value I (0), null hypothesis cannot be rejected. The F statistic being between I (0) and I(1) puts forth an indecision about co-integration among the variables under consideration.

3.2 Data Needs

Data on these variables included in model 4 were sourced from CBN statistical bulletins of various issues, National Bureau of Statistics statistical bulletins of various issues and direction of trade for the period of 1790 to 2019.

4 Results and Discussion

Before estimating the ARDL model, the unit root properties of the series used in the model were tested to avoid spurious regression estimates.

Unit Root Test

Even though the ARDL technique does not require the pretesting of the unit root properties of the series, but the Augmented Dickey Fuller (ADF) and KPSS tests were used in order to avoid estimating the model with series that are integrated of higher order. Thus, the results are presented in Table 1

Table 1: Unit Root Properties of the Series

Variables	ADF			KPSS		Order of Integration
	Level	First Diff.	Critical values 5%	LM stat. Fist Diff.	Critical values 5%	
Emp	-1.4880	-5.9040	-2.9281	0.3000	0.4630	I(1)
Cap	3.1702	-4.136	-2.9252	0.3676	0.4630	I(1)
Infl	-1.4735	-6.9301	-2.9266	0.3058	0.4630	I(1)
Mpr	-1.7068	-10.3090	-2.9252	0.1157	0.4630	I(1)
Gexp	5.3280	-7.4918	-3.5085	0.2417	0.4630	I(1)
Fd	-1.3843	-3.6734	-2.9251	0.0963	0.4630	I(1)
Oilp	-1.4859	-5.9026	-2.9281	0.4000	0.4630	I(1)

Source: Authors' Computation

The results of the stationarity tests in Table 1 revealed that none of the series were stationary at level. However, after differencing the series once, the results of both the ADF and KPSS tests indicated that all the series became stationary. This leads to the rejection of the null hypothesis and the acceptance of the alternate hypothesis that all the series used in the model are stationary

at first difference. The implication is that all the series used in the model have mean reverting ability. That is, any shock to series will fade away with the passage of time.

Bounds Tests

Following the unit roots results which indicated that the variables have mean reverting ability in the long-run, the bounds tests for the determination of the existence of long-run relationship between foreign exchange market pressure and its determinants in Nigeria was estimated and the results are presented in Table 2.

Table 2: Bounds Tests for the existence of long-run Relationships

F-Statistics	5% critical Bounds	
	I(0)	I(1)
11.68	2.45	3.61

Source: Authors' Computation using Eviews 10

The bounds test results show that, there is the presence of the long-run relationship between foreign exchange market pressure and its determinants in Nigeria; since the F-statistic value of 11.68 is greater than the upper bound value of 3.61.

Given the existence of long-run equilibrium between the foreign exchange market pressure and its determinants, the short-run and long-run models of the ARDL were estimated and the results are presented in Table 3.

Table 3: Short-Run Estimates of Foreign Exchange Market Pressure and its Determinants

[ARDL (2,0,1,0,0,1,2)]

Dependent Variable: emp

Variables	Coefficients	Std. Errors	T-statistic	Probabilities
D (emp(-1)	0.2321	0.1448	1.6024	0.1183
D(oilp)	-0.3168	0.1317	-2.4066	0.0267
D(cap)	-1.2615	0.2904	-4.3441	0.0001
D(infl)	0.8980	0.3682	2.9932	0.206
D(mpr)	-0.4366	0.1108	-3.9422	0.0092
D(gexp)	0.0946	0.0304	3.1109	0.0038
D(fd)	14.962	13.5158	1.1070	0.2761
D(fd(-1))	39.9192	16.7749	2.3797	0.0231
Ecm(-1)	-0.2187	0.0807	-2.7115	0.0120
Adj. R^2 = 0.7026	F-statistic=10.0559	Prob(F-stat.)=0.000		

Source: Authors' Computation using Eviews 10

The results from the table reveal that oil prices have a negative and statistically significant relationship with foreign exchange market pressure in the short-run. This means that 1% reduction in oil prices will increase foreign exchange market pressure by 0.317%. This finding is in tandem with the findings of Hegerty (2014, 2019) and Ammar (2019) who found that reduction in oil prices tends to increase the foreign exchange market pressure for oil exporting countries. For Nigeria, this may be attributed to the fact that oil exports constitute the chunk of the foreign exchange earnings to the Nigerian economy. Thus, a dip in oil prices will reduce the supply of foreign exchange earnings and given the import dependent nature of the economy, the supply of foreign exchange will be in short of its demand. The excess of demand over the supply of foreign exchange will lead to disequilibrium in the market and a pressure will arise in the market.

Furthermore, the results in the table have indicated a negative and statistically significant relationship between capital account position and foreign exchange market pressure in the short-run. This implies that 1% reduction in the current account position in Nigeria will lead to increase in the foreign exchange pressure by 1.261%. This finding corroborates the finding of Ila and Madhavi (2019) who found capital account balance to be inversely related with the foreign exchange market pressure in the 93 developing and emerging market economies investigated. In the case of the Nigerian economy, this may be ascribed to the fact that when the current account is in deficit (that is, when imports of goods and services exceed exports of goods and services), it puts pressure on the exchange rate due to the reduction in export revenue that in turn reduces the ability of the central bank to manage the exchange rate. The current account deficit is unsustainable if it cannot be financed by drawing down on external reserves, through borrowing, or through increased exports of goods and services (CBN, 2016). When this happens, the exchange rate would depreciate as economic agents increase their demand in the foreign exchange market to purchase the available scarce foreign exchange leading to intense pressure on foreign exchange.

The results also showed that inflation has positive relationship with foreign exchange market pressure. That is, 1% increase in the rate of inflation will lead to increase in the foreign exchange market pressure by 0.897%. The result is in line with the findings of Olanipekun *et al* (2019), Aizenman and Binic (2015) and Ila and Madhavi (2019) who variously found positive relationship between inflation rate and foreign exchange market pressures in the economies investigated. In the case of the Nigerian economy, this positive relationship may be attributed to the fact that, domestic inflation increases the prices of locally produced goods which in turn, renders the locally produced goods uncompetitive with foreign goods. The resultant effect of this is the reduction in the foreign exchange earnings from such goods. When this happens, the supply of foreign exchange reduces and this creates disequilibrium in the foreign exchange market resulting in foreign exchange market pressure.

Again, the short-run results have shown that there is a negative and statistically significant relationship between monetary policy rate and foreign exchange market pressure in Nigeria. This means that 1% reduction in the monetary policy rate will lead to increase in the foreign

exchange market pressure by 0.437%. This finding corroborates the findings of Deressa (2005), Aizenman and Binic (2015), Hossfeld and Pramor (2018) and Siklar and Akca (2020) who found in their various studies that expansion in domestic credit leads to foreign exchange market pressure. In the case of Nigeria, this may be due to the fact that a reduction in the monetary policy rate by the CBN presupposes an expansionary monetary policy stance in the economy. This expansionary monetary policy stance leads to the desire of economic agents to borrow in order to increase consumption and investment. This desire to increase consumption in an import dependent economy like Nigeria tends to increase the demand for the available scarce foreign exchange. Thus, the supply of the foreign exchange remaining constant due to the monolithic nature of the economy, this creates disequilibrium in the foreign exchange market leading to foreign exchange market pressure in the economy.

The table has also revealed a positive and statistically significant relationship between government expenditure and foreign exchange market pressure in the short-run. This implies that 1% increase in government expenditure will lead to 0.095% increase in foreign exchange market pressure in the short-run. This result is in tandem with the findings of Ila and Madhavi (2019) who found positive relationship between fiscal deficit and foreign exchange market pressure in the 93 developing and emerging market economies investigated. This positive relationship may be ascribed to the fact that increased government expenditure in an import dependent economy like Nigeria presupposes increases in the volume of imports. The increase in the volume of imports will in turn precipitates a surge in the demand for foreign exchange. The supply of foreign exchange remaining constant, this will cause foreign exchange market pressure in the economy.

It is also evident from the results that foreign debts in both the current and lagged periods are positively related with the foreign exchange market pressure in the short-run. The coefficients of the lagged foreign debts are statistically significant indicating that 1% increase in foreign debts in the previous will lead to 39.92% increase in the foreign exchange market pressure in the short-run. This result exhibits an interesting scenario that the effects of foreign debts on the foreign exchange market is through debts repayments. That is, debts acquired attract repayments in the subsequent periods. This finding is in line with the findings of Ila and Madhavi (2019) who found positive relationship between gross public debts and foreign exchange market pressure in the 93 developing and emerging market economies investigated; and Aizenman and Hutchison (2010) who found that emerging markets economies with higher total foreign liabilities such as short and long-term debts were much more vulnerable to foreign exchange market pressure. In case of Nigeria, this results may be ascribed to the high external debt profile where about 1.8trillion naira of annual budget goes for debt servicing alone. This means that, foreign debt repayment (principal and interest) constitutes a serious drain on Nigeria's foreign reserves (especially now that is becoming unsustainable) with its attendant consequences of limiting the Central Bank's ability to maintain a stable exchange rate and reducing pressure in the foreign exchange market.

The speed of adjustment of -0.218738 has the right sign and correct magnitude, and it is statistically significant. This means that if there is any disequilibrium between foreign exchange market pressure and its determinants in short-run, equilibrium will be re-established in the long-run. The adjusted R-Squared value of 0.703 means that the explanatory variables included in the model have explained variation in the foreign exchange market pressure by 70.30%; and the F-statistic value of 10.06 with the probability value of (0.0000) shows high joint effect of the explanatory variables included in the model on the variations in the foreign exchange market pressure in Nigeria.

Furthermore, the long-run estimates of the model are presented in Table 4.

Table 4: Long-Run Estimates of Foreign Exchange Market Pressure and its Determinants

[ARDL (2,0,1,0,0,1,2)]

Dependent Variable: emp

Variables	Coefficients	Std. Errors	T-statistics	Probabilities
Oilp	-0.4162	0.1020	4.0814	0.0017
Cap	-0.6137	0.2125	2.8878	0.0165
Infl	0.5595	0.0417	13.4309	0.0008
Mpr	-0.5019	0.1439	3.4869	0.0079
Gexp	0.0280	0.0165	1.7013	0.0980
Fd	0.3302	0.0209	12.0706	0.0001
Constant	-19.1028	2.7735	-6.8876	0.0032

Source: Authors' computation using Eviews 10

The long-run estimates of the model have also shown that there is a negative and statistically significant relationship between oil prices, current account position, monetary policy rate, and foreign exchange market pressure in the long-run. On the other hand, the long-run estimates have indicated that there exist positive and statistically significant relationships between inflation, government expenditure, foreign debts and foreign exchange market pressure in the long-run in Nigeria given the period of this study.

In order to validate the performance of the model, the following diagnostic tests, Ramsey RESET test for model mis-specification, Breusch-Godfrey LM test for autocorrelation, and Breusch-Pagan-Godfrey heteroscedasticity test were performed and results are presented in Table 5.

Table 5: Diagnostic Tests for ARDL (2,0,1,0,0,1,2)

Tests	**Statistics**	**Probability values**
Ramsey RESET test (F-statistic)	0.5210	0.4770
Autocorrelation (Breusch-Godfrey LM test)	1.0560	0.3600
Heteroskedasticity (Breusch-Pagan-Godfrey)	0.9256	0.5334

Source: Authors' computation using Eviews 10

All the diagnostic tests have revealed that the null hypotheses should be accepted implying that the model does not suffer from mis-specification problems, autocorrelation and

Heteroskedasticity problems; implying that the model is valid for policy formulation and implementation. Furthermore, the stability of the estimates was tested using the CUSUM plot as shown in the following figure.

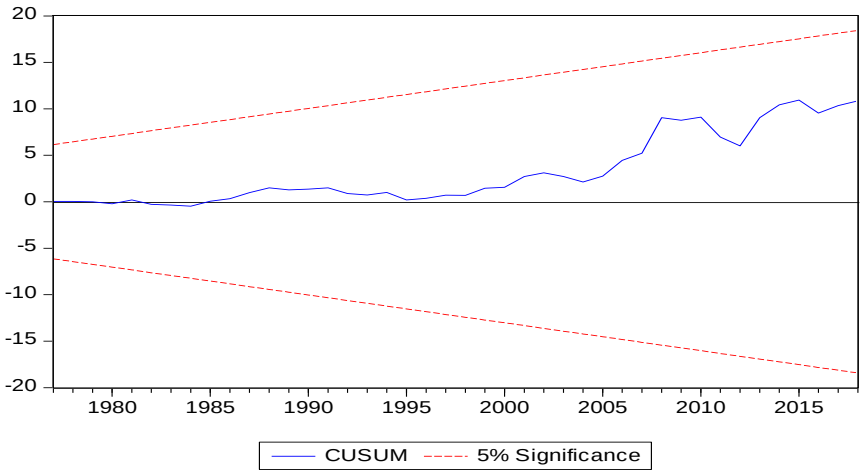


Figure 2: CUSUM Plots of the Estimates

The CUSUM plot shows that that the estimates are stable in the long-run since the CUSUM line is within the bounds of the 5% significance level. This suggests that there will be no change in the behavior of the variables in the long-run. The implication is that, the model is valid for policy formulation and implementation in the Nigerian economy.

5 Conclusion and Policy Recommendations

Based on the findings of this study, it is concluded that the major determinants of foreign exchange market pressure in the Nigerian economy are oil prices, current account deficit, inflation rate, expansionary monetary policy, increased government expenditure and foreign debts. Emergent from these findings and conclusion, the study has made the following recommendations. First, the CBN should intensify efforts on the demand management of the foreign exchange market in the country. This requires that the allocation of foreign exchange should be more to the importation of productive inputs and intermediate goods and services that will contribute positively to the domestic production of goods and services. To achieve this, the CBN can extend the policy of foreign exchange restrictions to other commodities especially agricultural products so as to conserve the scarce foreign exchange for the importation of productive inputs. This will encourage the production of such goods domestically and this will go a long way in reducing the demand pressure for foreign exchange.

Second, the federal government should be more pragmatic with the diversification of the Nigerian economy away from oil. The non-oil sector should be encouraged to produce with local content for export. To achieve this, the government should channel developmental funds to development banks such as bank of industry, bank of agricultural, the Nigerian Export-Import Bank, NIRSAL microfinance bank to support agri-business as well as the small and medium scale Enterprises. Under the agri-business and small and medium Enterprises initiative,

concerted efforts should be made to ensure that the funds get to the right individuals who will productively engage the received funds. The Anchor Borrowers Programme of the CBN should be strengthen to achieve higher agricultural value addition in the country in order to increase the exports of the non-oil sector. If the domestic production of agricultural products and manufacturing products is enhanced, Nigeria can leverage on the opportunities of the African Continental Free Trade Area Agreement (AfCFTA) to increase her non-oil exports to other African countries.

The increase in the exportation of non-oil sector will reduce the dependence of the economy on oil whose prices are largely influenced by the external factors. Also, increase in the exports of non-oil will increase the supply of foreign exchange to the economy and this will immensely reduce the demand pressure on the foreign exchange in the country. Thirdly, the government should device ways to enhance the internally generated revenue so as to reduce external borrowings that tend to increase foreign exchange market pressure through the debt servicing burden. In this regard, the Federal Inland Revenue Service and the Customs as well as other revenue collecting agencies should be more pragmatic in their revenue collecting mechanisms. Leakages and corrupt practices should be eschewed. The recent increase in the Value Added Tax (VAT) should be properly harnessed to increase the internally generated revenue of the country. This can be achieved through the implementation of the VAT reforms in the Finance Act 2020, by maintaining the increase in VAT rate to 7.5%. Also, to maximize government revenues efforts should be made to unlock value from federal government assets that are lying idle or under-utilized.

Furthermore, government expenditure should be streamlined and there should be elimination of non-essential items. This is achievable via the following policies; elimination of non-critical and administrative capital expenditure, expansion of the biometric-based integrated personnel and payroll information system (IPPIS) to cover all ministries, departments and agencies and the rationalization of government agencies.

Finally, there should be improvement in the foreign exchange to the CBN by directing oil companies and oil service companies to sell foreign exchange to the CBN rather than the NNPC.

REFERENCES

Aizenman, J., and Binici. M. (2015). Exchange Market Pressure in OECD and Emerging Economies: Domestic Vs. External Factors and Capital Flows in the Old and New Normal. *Journal of International Money and Finance,* 66 (3), 65–87.

Aizenman, J., and Hutchison, M. (2012). Exchange Market Pressure and Absorption by International Reserves: Emerging Markets and Fear of Reserve Loss during the 2008–2009 Crisis. *Journal of International Money and Finance,* 31 (5), 1076–91.

Ammar, H.K. (2019). Foreign Exchange Market Pressure Index and Monetary Policy in Iraq. *Economic Annals,* 102(219), 61-82.

Aziz, J. and Widodo, R. (2017). Currency crises: in search of common elements. *IMF Working paper*, No 67. Washington, D.C.

Central Bank of Nigeria (2016). Foreign Exchange Market Pressure. *Education in Economics series*, No. 6. Central Bank of Nigeria: Research Department.

Crocket, A. (1987). Exchange rate policy. In EDI, *National Economic Policy Making: The Key elements.* Washinton, D.C: The World Bank.

Deressa, A. (2005). Exploring the link Between Exchange Market Pressure and Monetary Policy in Ethiopia. *Ethiopian Journal of Economics*, 14(2), 33–53.

Eichengreen, B., Rose, A. K., and Wyplosz, C. (1996). Contagious Currency Crises. *National Bureau of Economic Research; NBER Working Paper* No. 5681. Cambridge, Mass: MIT Press.

Englama, A., Saani, H. T., Duke, O.O., Ogunleye, T.S. and Isma'il, F.U. (2009). Determinants of Demand Pressure in Nigeria's Foreign Exchange Market: An Empirical Analysis. *CBN Economic and Financial Review*, 47(2), 1-26

Feridun, M. (2008). determinants of Exchange Market Pressure in Turkey: An Econometric Investigation. *Journal of Emerging Markets Finance and Trade*, 45(2), 65–81.

Girton, L. & Roper, D. (1977). A Monetary Model of Exchange Market Pressure Applied to the Postwar Canadian Experience. *American Economic Review*, 67(4), 537-548.

Hegerty, S. W. (2014). Exchange market pressure and stock-price spillovers in emerging markets. *Applied Economics Quarterly*, 60(1), 41-74.

Hegerty, S.W. (2018). Exchange Market Pressure, Stock Prices, and Commodity Prices in Central Eastern European Region. *Journal of Economics and Management*, 31(1),74-94.

Ila, P. and Madhavi, P. (2019). Financial Shocks and Exchange Market Pressure. Asian *Development Bank (ADB) Working Paper Series* No. 581. May, 2019.

Kumah, F. (2007). A Markov-switching approach to measuring exchange market pressure. *IMF Working Paper* No. 242, Washington: D.C.

Liu, J. (2020). Impact of Uncertainty on Foreign Exchange Market Stability: Based on the LT – TVP – VAR Model. *China Finance Review International.* 7(20), 16-35.

Mogaji, P.K. (2017). Empirical Assessment of Exchange Market Pressure within the West African Monetary Zone. *MPRA Paper* No. 99039. Retrieved at https://mpra.ub. Uni-munchen.d/99039 on 18/8/2020.

Obadan, M. I. (2012). *Foreign Exchange Market and the Balance of Payments: Elements, Policies and the Nigerian Experience*. Benin, Goldmark press.

Olanipekun, I.O., Olasehinde-Williams, G., and Hasan, G. (2019). Impact of Economic Policy Uncertainty on Exchange Market Pressure. *SAGE Open*, 1(2), 1-13.

Ominyi, S., Akighir, D.T. and Abayol-Ikwue, R. (2020). Foreign Exchange Market Demand Pressure and Economic Growth in Nigeria. *Journal of Economics and Sustainable Development*, 11(4), 191 – 201.

Siklar, I. and Akca, A. (2020). Exchange Market Pressure and Monetary Policy: The Turkish case. *Ekonomika,* 99(5), 110-130.

Spolander, M. (1999). December). Measuring exchange market pressure and central bank intervention. *Bank of Finland Studies working paper* No E: 17, Bank of Finland: Helsinki

Weymark, D. (1995). Estimating Exchange Market Pressure and the Degree of Exchange Market Intervention for Canada. *Journal of International Economics*, 5(39), 273-295.