ABSTRACT

Exchange Rate Pass-Through is an approximation of international macroeconomic transmission of prices and thus has implications for the timing of economic policy interventions. Hence, the degree and speed of pass-through is important for formulating policy responses to economic shocks. In this study, the researcher evaluated some channels and impacts of exchange rate pass-through on the Nigerian economy during the period spanning from 1981 to 2018. Unit root and co-integration tests, as well as the error regression analysis on the time series data for the period 1981-2018 were carried out. The empirical outcomes indicated that exchange rate changes pass-through interest rate and inflation rate channels on both short and long run and thus significantly affected interest rates and prices of goods and service in Nigeria during the study period. These outcomes yielded key policy insights and outlook which made the researcher to recommend amongst others that Government should ensure that the interest rates are brought to a level that will enable producers access investible funds. When there is high level of funds for production, exports would likely increase ceteris paribus, there by an increase in the foreign exchange earnings for the country and an appreciation of the naira.

Keywords: Exchange rate pass-through; interest rate and inflation rate channels.
1. BACKGROUND TO THE STUDY

Nigeria is the largest oil producer in Africa and sixth in the world and depends heavily on it (crude oil) for most of its income (foreign exchange). However, any time there is international oil price decline without foreign reserve, foreign exchange revenues became more limited, the Nigerian naira faces depreciation pressures. In reaction to this, according to Abdulrasheed, Okorie and Sanusi [1], the Central Bank of Nigeria (CBN) abandon their exchange rate anchor and allow the Naira to depreciate at least to some extent to maintain equilibrium. Simultaneously, fiscal policies have to been tightened. Despite these policy actions, depreciation pressures on the currency may continue. Policy makers in Nigeria face a difficult policy choice. On one hand, letting the currency depreciate further would help rebalance the foreign exchange market and reduce the loss of international reserves. On the other hand, preventing the currency from depreciating would help curtail inflation. Thus, understanding the relationship of exchange rate movements and consumer price index (CPI) is very important for the apex bank (CBN) on policy direction and decision-making. This therefore implies that the relationships between exchange rate and other macroeconomic variables need to be understood, building on the assumption that exchange rate dynamics has something to say about inflation rates, interest rates, economic growth and a country's international competitiveness.

In an open economy like Nigeria, exchange rate fluctuations affect the behaviour of inflation. Up till now it is not yet clear whether there is double causation between inflation and exchange rate movements. Despite growing literature on Exchange rate pass-through around the world, very few studies can be found in the case for Sub Saharan Africa. It is also not clear how the direction of exchange rate affects the domestic prices, thus a major gap remains unfilled. The relative shortage of research on ERPT for developing countries such as Nigeria warrants further investigation on Exchange Rate Pass Through (ERPT) to consumer prices and the level of inflation in Nigeria. Although consumer inflation is least affected by movements in the exchange rate, the impact can still prove to be quite significant as the naira tends to be extremely volatile. The conflicting findings of empirical studies on the size, speed and asymmetric properties call for further studies, especially in an open developing economy like Nigeria.

Kiptui, Ndolo and Kaminchia [2] proposed that an understanding of ERPT is important for a number of reasons. Firstly, the level of ERPT is an approximation of international macroeconomic transmission and thus has implications for the timing of economic policy interventions. Hence, the degree and speed of pass-through is important. For instance in forecasting inflation and formulating monetary policy responses to inflation shocks. During the late 1990s, empirical works focused on modeling ERPT by analysing firm-level strategic price-setting behaviour, mainly at industry-level pass-through in industrialised countries, with disaggregated data [3]. However, the recent volatility in exchange rates and persistent trade imbalances have galvanised interest in the effect that pass-through has on economic policy choices particularly in developing countries.

This study will set out to examine ERPT, what is the degree of ERPT to domestic prices, particularly for consumer prices and interest rate. Another gap this study intends to fill is the methodology adopted. The study adopts a modified version of the Purchasing Power Parity (PPP) in an attempt of getting other variables that might influence ERPT in Nigeria. Finally, in most of the studies reviewed, the Error Correction Mechanism was not tested despite the obvious benefits that the use would bring in a study of this nature. In most of the reviews the inclusion of the ECM was not captured and the scope of work did not stretch to 2019 like this study. The two hypotheses tested in this study are ERPT does not significantly affect Interest rate and ERPT does not significantly impact on Inflation rate.

2. LITERATURE REVIEW

Despite a relative large number of literature, economists, scholars, policy-makers etc are interested in studying exchange rate management in the developing economies particular as it manifest in the day to day economic activities of the people. This is due to its importance to relative price that connects domestic and world market commodities and assets which also signals the competitive power of an economy’s exchange rate vis-à-vis the global market. As a result, there is no uniform definition of the term Exchange Rate Pass-Through (ERPT). Goldberg and Knetter [4]...
defined ERPT as the percentage change in local currency import prices resulting from a one per cent change in the exchange rate between the exporting and importing economies. Similarly, Frankel, Parsley and Wei (2005) opined that the transmission of exchange rate fluctuations to domestic prices is referred to as Exchange Rate Pass-Through.

Exchange rate pass-through to prices is incomplete if exchange rate changes elicit less than equi-proportionate changes in prices. In other words, it means that the change in the exchange rate of a given country is not transmitted with the same amplitude to internal prices. The incomplete transmission of exchange rate variations to domestic prices depends on the level of development and the country size. Pass-through to prices can be asymmetric when exchange rate depreciation elicits a price response of a different magnitude to an appreciation or when smaller changes elicit a different proportionate response from larger changes. The time dimension is critical: very long run or “equilibrium” measures differ from estimates of pass-through within a shorter period (one or two years, perhaps), is usually considered most relevant for monetary policy. This situation, coupled with a more open trade regime and the growth in imports, leaves an economy like Nigeria open to the effects of exchange rate behaviour on import, interest rate, producer and consumer prices, which all contribute to inflation [5].

Classic exchange rate pass-through typically has two stages. In the first stage, changes in the nominal exchange rate are reflected in the prices of imports in local currency terms. These changes are then passed on – in whole or in part – to the consumer in the second stage [6]. An associated concept in ERPT definition is pricing-to-market (PTM), which refers to the pricing behaviour of firms exporting their products to a destination market following an exchange rate change. Broadly defined, pricing-to-market refers to the percentage change in prices in the exporter’s currency due to a one percent change in the exchange rate. This idea is used as the theoretical explanation of the low degree of exchange rate pass-through that is found in countries with huge import share in GDP.

The theoretical literature shows that the magnitude of ERPT to consumer prices depends on the inflation environment and volatility of the exchange rate itself [7]. It is argued that firms tend to pass-on increased production costs due to exchange rate depreciation in a high-inflation than in a low-inflation environment due mainly to higher inflation expectations the former breeds. Similarly, pass-through is higher when exchange rate is more volatile, chiefly because firms expect the rising costs to be permanent.

Furthermore, many microeconomic monetary models of exchange rate and balance of payments assume a one-to-one relationship between exchange rate changes and changes in domestic prices mainly on the basis of law of one price, however, empirical research on exchange rate pass through has rejected this hypothesis [4]. The present study, therefore adopts the Krugman's [8] pricing-to-market as the micro theoretical foundation for the possibility of less-than one-for-one relationship between exchange rate, interest rate and domestic inflation under the Purchasing Power Parity model. The PPP postulates that the price of any given commodity remains the same in all economies when measured in the same currency. It is therefore sometimes referred to as the Law of One Price (LOOP) under which arbitrage plays an important role in effecting the price parity across geographical locations. Notwithstanding the infraction to this law often engendered by transportation charges and no differential taxes applied in the two markets, it is generally believed that the law is plausible [9].

Most of the empirical literatures on ERPT have focused on developed economies such as the USA and the UK. Menon [10] and McCarthy [11] conducted a survey on ERPT which summarised 43 empirical studies on developed economies, the majority of which were for the USA. Their studies showed that the degree of ERPT varies significantly across different economies. They concluded that the main factors that influence the degree of ERPT are the size and openness of the economies. In Nigeria, Obi, Obada and Abu (2010) studied the determinant of exchange rate. They discovered that interest rate differential is shown to be statistically and economically significant in explaining the exchange rate pass through and inflation targeting which also confirms the work of Annosofie (2005) and was later confirmed by Aron, MacDonald and Muellbauer [12]. Furthermore, Adelowokan [13] found evidence of the pass-through effect to interest rates. Adeyemi and Samuel [14] investigated the ERPT to consumer prices in Nigeria using the VECM approach and data for the period 1970 to 2015. Results from their impulse response functions (IRF) analysis indicated considerable degree of ERPT to
consumer prices in Nigeria, amounting to about 83 per cent in the long term. The study showed that the exchange rate was more important in explaining the rising inflation in Nigeria than money supply.

3. RESEARCH METHODS

3.1 Theoretical Framework

Exchange Rate Pass-Through literature takes its roots from the theory of One Price and the Purchasing Power Parity (PPP) literature which states that identical products should sell for the same common currency price in different countries [15]. The PPP is a theory of exchange rate determination and a way to compare the average costs of goods and services between countries. The theory also assumes that the actions of importers and exporters motivated by cross country price differences, induces changes in the spot exchange rate. In another vein, PPP suggests that transactions on a country's current account, affect the value of the exchange rate on the foreign exchange market. PPP theory is based on an extension and variation of the "theory of PPP" as applied to the aggregate economy. PPP doctrine posits that exchange rate is influenced by the prices of goods across borders when measured in the same currency. Therefore, a functional presentation of the PPP theory is:

\[
EXCH = f(Pr, TOP, Inf) \tag{3.1}
\]

Where,

- \(EXCH\) = Exchange Rate
- \(Pr\) = Price
- \(TOP\) = Trade Openness
- \(Inf\) = Inflation Rate

3.2 Model Specification

Empirically, it has been established that the understanding of the impact of exchange rate movements on prices would serve as policy guide in designing appropriate economic policy response to currency movements. On this basis, the econometric model for investigating the channels of exchange rate pass-through in Nigeria between 1990 and 2015 is formulated using the monetary and non-monetary prices framework employed by Aliyu, Yakub, Sanni and Duke [16] as recorded by Adelowokan [13]. They employed a vector autoregressive model with six variables of interest that included exchange rate (ER), oil price (OILP), import price (IMP), openness of the economy (OPN), output (YT), consumer price index (CPI) and a short-term interest rate (IR). Modifying Aliyu et al. [16], Adelowokan [13] in his study considered monetary prices (interest rate and inflations rates) as the channels through which exchange rate pass through. Adelowokan [13] specified multiple regression models as follows:

3.2.1 Interest rate channel

\[
ir_t = \alpha_0 + \alpha_1er + \alpha_2er_{t-1} + \alpha_3yt + U_t \tag{3.2}
\]

3.2.2 Inflation rate channel

\[
cpi_t = \beta_0 + \beta_1er + \beta_2er_{t-1} + \beta_3yt + U_t \tag{3.3}
\]

Where,

- \(er\) = Exchange rate of naira vis-à-vis U.S dollar.
- \(yt\) = National Income.
- \(er_{t-1}\) = First lag of exchange rate of naira vis-à-vis U.S dollar.
- \(U_t\) = The disturbance term.
- \(\alpha_0, \beta_0\) = Intercept or constant.
- \(\alpha_1 - \alpha_3, \beta_1 - \beta_3\) = Parameters or Co-efficient of explanatory variables;
- \(ir_t\) = Interest rate
- \(cpi_t\) = Consumer price Index (Proxy for Inflation rate)

Therefore, for this study the researcher included international (foreign) reserves. The International Reserves (Foreign Reserves) was included because according to Ndungu [17] International Reserves is another channel of ERPT.

3.2.3 Interest rate channel

The researcher modified model 3.2, thus we have;

\[
INTR_t = \beta_0 + \beta_{12}ER_t + \beta_2Y_t + \beta_3FR_t + U_t \tag{3.4}
\]

The ECM is introduced into the model to check the speed of adjustment and is specified as follows:

\[
INTR_t = \alpha_0 + \alpha_1\Delta ER_t + \alpha_2Y_t + \alpha_3FR_t + \alpha_4ECM + \beta_t \tag{3.5}
\]

Where,

- \(\Delta ER_t\) = Interest Rate
- \(\Delta ER_t\) = Exchange Rate changes of naira vis-à-vis U.S dollar
3.3 Estimation Techniques

This study estimated ERPT on interest rate and inflation rate in Nigeria during the period 1990-2018 using time series annual data. The estimation technique used in this study is the Ordinary Least Squares (OLS) technique, which is regarded as the Best Linear Unbiased Estimator (BLUE) that can be used in evaluating models of this nature (Gujarati 2002). The estimation, however, presupposes that the variables possess desirable empirical properties of stationary and convergence (co-integration). However, if these desirable properties are not achieved we use the Error Correction specification to estimate the equation before using the ordinary least square technique. The regression analysis was used to test for the magnitude and direction of relationship between the independent variables and the dependent variables. Also the Augmented Dicker-Fuller Test (ADF) was used to test for the presence or otherwise unit root test in the series. The t-statistic was used to test for the individual significance of the independent variable to the dependent variable.

4. RESULTS AND DISCUSSION

4.1 Unit Root Test

Granger (1986) has demonstrated that if time series variables are non-stationary, all regression findings with these time series will be at variance with the conventional theory of regression with stationary series. That is, regression coefficients with non-stationary variables will be spurious and deceptive. To get over this problem, the researcher test for stationarity of the time series data. Conventional method of Phillips-Perron (PP) test statistic was used to test whether variables used in the study are stationary or not.

In Table 1, Exchange Rate (ER) and Foreign Reserves (FR) are stationary at levels 1(0), since the PP value of each of the variables at levels is greater than the McKinnon 5% critical values. While Inflation Rate (INFR), Interest Rate (INTR) and National Income (Y) are stationary at first difference 1(1).

4.2 Johansen Co-integration Test Result

The results of Johansen co-integration test for the models are shown in Tables 2 and 3 below. In Tables 2 and 3, there exist three co-integrating equations at 5% significant level for Interest Rate and Inflation Rate respectively. This is because, the likelihood ratio is greater than critical values at 5%. This shows that there is long run relationship. Also, it implies that the alternate
hypothesis of the existence of a unique co-integration (long run) is accepted. That is, the dependent variables can be efficiently anticipated using the specified explanatory variables.

4.3 Long Run Statistic Regression Result

The confirmation of the existence of long run relationship between the variables from the Johansen co integration technique prompted the application of the Ordinary Least Squares test to ascertain the collective as well as the individual impacts of the independent variables on the dependent variable and the direction of the relationship that exist between them on the long run. The results of the OLS models for the two channels are presented in Tables 4 and 5.

<table>
<thead>
<tr>
<th>Table 1. Phillips-Perron (PP) test statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>INF</td>
</tr>
<tr>
<td>ER</td>
</tr>
<tr>
<td>FR</td>
</tr>
<tr>
<td>INTR</td>
</tr>
<tr>
<td>Y</td>
</tr>
</tbody>
</table>

Source: E-views Version 10 Regression Output 2020

<table>
<thead>
<tr>
<th>Table 2. Co-integration rank test assuming linear deterministic trend (Trace)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series: INFR ER Y FR</td>
</tr>
<tr>
<td>Eigen value</td>
</tr>
<tr>
<td>0.881554</td>
</tr>
<tr>
<td>0.836396</td>
</tr>
<tr>
<td>0.592482</td>
</tr>
<tr>
<td>0.411620</td>
</tr>
</tbody>
</table>

**(**) denotes rejection of the hypothesis at 5%(1%) significance level
L.R. test indicates 3 cointegrating equation(s) at 5% significance level
Source: E-views Version 10 Regression Output 2020

<table>
<thead>
<tr>
<th>Table 3. Co-integration rank test assuming linear deterministic trend (Trace)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series: INFR ER Y FR</td>
</tr>
<tr>
<td>Eigen value</td>
</tr>
<tr>
<td>0.943574</td>
</tr>
<tr>
<td>0.594991</td>
</tr>
<tr>
<td>0.494998</td>
</tr>
<tr>
<td>0.390570</td>
</tr>
</tbody>
</table>

**(**) denotes rejection of the hypothesis at 5%(1%) significance level
L.R. test indicates 3 cointegrating equation(s) at 5% significance level
Source: E-views Version 10 Regression Output 2020

<table>
<thead>
<tr>
<th>Table 4. Summary of the LR statistic regression results (Dependent Variable: INTR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>C</td>
</tr>
<tr>
<td>ER</td>
</tr>
<tr>
<td>FR</td>
</tr>
<tr>
<td>Y</td>
</tr>
</tbody>
</table>

R–Squared 0.829075, Adjusted R–Square 0.768031, F–Statistic 13.58147, Prob (F – Statistic) 0.000060, Durbin Watson Statistic 1.900441

Note: * is significant at 5% level of significance.
Source: E-views Version 10 Regression Output 2020
Table 4 shows that the R-squared ($R^2$) that measures the proportion of the variations in the dependent variable attributed to the independent variables is 0.829075. This implies that all the independent variables could explain about 82.91 per cent of the variations in Interest Rate (INFR). The remaining variation is the error term and can be attributed to other variables not included in the model. The Durbin Watson Statistic estimate was 1.900441, approximately '2' implying that there is no serial autocorrelation among the explanatory variables in the estimated models. The probability ($F$-Stat) suggests that the model is statistically significant since its prob value is 0.000060 which is less than 0.05. With the coefficient of the constant as 15.00417, it implies that when all the independent variables are held constant, INFR will be 15.00417 units.

Exchange Rate (ER) is statistically significant in explaining Interest Rate (INTR) in Nigeria. A unit increase in ER results to approximately 0.0041862 unit increase in INTR in Nigeria. According to Aliyu et al. [16], the increase in ER changes may induce producers to seek for more foreign currency for importation of raw materials for production, this will automatically increase cost for securing investible funds. This is consistent with the apriori expectation. The FR has a significant but indirect impact on INTR using the rule of thumb. An increase in FR to approximately 0.001136 unit decrease in INTR on the long run. This is consistent with the apriori expectation. Furthermore, the National Income (Y) has significant indirect impact on INTR in Nigeria using the rule of thumb. Increase in National Income (Y) will cause the INTR to decrease by 0.011176 on the long run. This confirms the work of Okafor (2011). This is consistent with the apriori expectation. The Foreign Reserve (FR) has significant but indirect impact on Inflation Rate using rule of thumb. An Increase in Foreign Reserve (FR) leads to approximately 0.960338 unit decrease in Inflation Rate on the long run. This is consistent with the apriori expectation.

As shown in the regression results of Inflation Rate in Table 5, the R-squared ($R^2$) is 0.795625. This implies that all the independent variables could explain about 79.56 per cent of the variations in Inflation Rate. The remaining variation is the error term and can be attributed to other variables not included in the model. The Durbin Watson Statistic estimate was 2.120051, implying that there is no serial autocorrelation among the explanatory variable in the estimated model. The probability ($F$-Stat) suggests that the model is statistically significant since its prob value is 0.000603 which is less than 0.05. Since, the coefficient of the constant as -14.54146, it implies that when all the independent variables are held constant, INFR will be 14.54146 units.

The Exchange Rate (ER) is statistically significant and has a direct relationship with Inflation Rate (INFR). A unit increase in Exchange Rate changes (ER) results to approximately 0.61335 unit increase in the prices of goods and services in Nigeria. This is consistent with the appriori expectation (Oyintolwa, 2010). Furthermore, the National Income (Y) has insignificant and indirect impact on Inflation Rate (INFR) using rule of thumb. Increase in National Income (Y) will cause the Inflation Rate to decline by 0.000276 on the long run. This confirms the work of Okafor (2011). This is consistent with the apriori expectation. The Foreign Reserve (FR) has significant but indirect impact on Inflation Rate using rule of thumb. An Increase in Foreign Reserve (FR) leads to approximately 0.960338 unit decrease in Inflation Rate on the long run. This is consistent with the apriori expectation.

From the study, it shows that ERPT via INFR is high. This is in agreement with the study of Ogundipe & Egbeokun [18] who found the ERPT to INFR to be fairly high. This is consistent with those found in most developing countries. For instance, McCarthy, 2000; Ito & Sato 2007; Sanusi, [19] found substantially large pass-through elasticity for several developing countries.

### Table 5. Summary of the long run statistic regression results (Dependent Variable: INFR)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>14.54146</td>
<td>5.348061</td>
<td>2.719016</td>
<td>0.0236</td>
</tr>
<tr>
<td>ER</td>
<td>0.613335</td>
<td>0.098155</td>
<td>6.248653</td>
<td>0.0001*</td>
</tr>
<tr>
<td>Y</td>
<td>-0.960338</td>
<td>0.303712</td>
<td>-3.162005</td>
<td>0.0082*</td>
</tr>
<tr>
<td>FR</td>
<td>-0.000276</td>
<td>0.000465</td>
<td>-0.594266</td>
<td>0.5670</td>
</tr>
</tbody>
</table>

R–Squared 0.795625, Adjusted R–Square 0.730972, F–Statistic 12.61311, Prob (F – Statistic) 0.000603, Durbin Watson Statistic 2.120051

Note: * is significant at 5% level of significance.

Source: E-views Version 10 Regression Output 2020
4.4 Error Correction Mechanism (ECM)

The existence of co-integration between the dependent variable and the controlled as well as intervening variables necessitated the application of error correction mechanism for each of the exchange rate channels. Thus, to capture the short run relationship between the variables (dependent and independent), as well as the speed of adjustment the ECM was computed. The result is presented in Tables 6 and 7.

The result in Table 6 shows that the independent variables explain 75% systematic variation of the dependent variable (INTR), while 15% is unexplained. This is validated by the R-bar-square of 68%. This suggests that the multi-regression data fit the lines. The F-statistic which is used to test for the overall significance of the estimated equation shows that all the explanatory variables are not equal to zero. Under 5% significance levels, it confirms that at least one of the explanatory variables indeed affects or could explain the dependent variable.

All the independent variables are statistically significant but FR and ER agreed to apriori expectations. With the coefficient of the constant as 14.38960, it implies that when the independent variables are held constant, INTR will be 14.38960 units. The coefficient of ER changes shows a positive value of 0.057584, implying that one unit increase in ER changes will bring about an increase in INTR by 0.057584 units. This is in line with Aliyu et al. [16], who opined that an increase in exchange rate will cause interest rate on investible funds to rise as more funds would now be required to get the required foreign exchange for imports. The coefficient of FR is negative which is in line with our apriori expectations. The inverse relationship presented in the results shows that a one unit increase in FR would result in approximately 0.285291 unit decrease in INTR. Income (Y) shows a positive value of 0.002482, implying that one unit increase in Y will bring about an increase in INTR by 0.002482 units. The relationship between National Income and Interest Rate is positive for a developing economy [20,16].

The coefficient of ECM of -0.583856 suggests a fairly fast adjustment. Nearly 58 per cent of the disequilibrium of the previous year’s shock adjusts back to equilibrium in the current year. The results showed that the error correction term (ECM) is correctly specified. It satisfies a-priori expectations and statistically insignificant at the five percent level. The negative sign confirms that INTR and its regressors (ER, Y and FR) are indeed cointegrated. Furthermore, the result of the DW statistic is 2.032307 which showed the absence of auto-correlation and the unbiasedness of the model.

Table 7 below shows that the R-squared ($R^2$) that measures the proportion of the variations in the dependent variable attributed to the independent variables was 0.846067. This implies that all the independent variables could explain about 84.61 per cent of the total variations in Inflation Rate (INFR). The remaining variation is the error term and can be attributed to other variables not included in the model. The Durbin Watson Statistic was 2.008311, implying that there is serial autocorrelation in the estimated models. The probability (F-Stat) suggests that the model is statistically significant at 5% since its pro value is 0.000429. The coefficient of the error term is negative and statistically significant at 5%. The result showed that 85% of the error in the previous year disequilibrium is corrected in the current year.

Table 6. Summary of the error-correction model of interest rate channel

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>14.38960</td>
<td>3.410558</td>
<td>4.219134</td>
<td>0.0518</td>
</tr>
<tr>
<td>ER</td>
<td>0.057584</td>
<td>0.024108</td>
<td>2.388641</td>
<td>0.0245*</td>
</tr>
<tr>
<td>FR</td>
<td>-0.285291</td>
<td>0.136228</td>
<td>-2.094218</td>
<td>0.0470*</td>
</tr>
<tr>
<td>d(Y)</td>
<td>0.002482</td>
<td>0.000397</td>
<td>6.252883</td>
<td>0.0000*</td>
</tr>
<tr>
<td>ECM(-1)</td>
<td>-0.583856</td>
<td>0.259798</td>
<td>-4.494798</td>
<td>0.0748</td>
</tr>
</tbody>
</table>

R–Squared 0.745307, Adjusted R–Square 0.678574, F–Statistic 31.10517, Prob (F – Statistic) 0.000446, Durbin Watson Statistic 2.032307

Note: * is significant at 5% level of significance
Source: E-views Version 10 Regression Output 2020
Table 7. Summary of the error-correction model of inflation rate

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>20.64332</td>
<td>3.069714</td>
<td>6.724837</td>
<td>0.0214</td>
</tr>
<tr>
<td>ER</td>
<td>0.248647</td>
<td>0.089625</td>
<td>2.774316</td>
<td>0.0130*</td>
</tr>
<tr>
<td>FR</td>
<td>0.357787</td>
<td>0.239545</td>
<td>1.493610</td>
<td>0.1483</td>
</tr>
<tr>
<td>d(Y)</td>
<td>-0.011567</td>
<td>0.003629</td>
<td>-3.187475</td>
<td>0.0859</td>
</tr>
<tr>
<td>ECM(-1)</td>
<td>-0.533150</td>
<td>0.170742</td>
<td>-3.122538</td>
<td>0.0046*</td>
</tr>
</tbody>
</table>

R-Squared 0.846067, Adjusted R–Square 0.711233, F–Statistic 46.01542, Prob (F – Statistic) 0.000429, Durbin Watson Statistic 2.008311

Note: * is significant at 5% level of significance

ER changes have significant and direct impact on INFR in the short run using rule of thumb. A 1% increase in the ER changes leads to 0.248647 unit increase in prices of goods and services in Nigeria. This is in line with the findings of Adeyemi & Samuel [14]. FR has direct and insignificant impact on INFR. This does not conform to the apriori expectation. Finally, The National Income (Y) has insignificant and inverse impact on INFR using rule of thumb. Increase in Y leads to 0.011567 unit decrease in exchange rate in the short run. This conforms to the apriori expectation. The ECM is rightly signed and suggests a high speed of adjustment of 84 per cent.

5. CONCLUSION

This study investigated some channels of Exchange Rate Pass-Through on the Nigeria Economy the Nigerian economy during the period spanning from 1981 to 2018. ERPT is an approximation of international macroeconomic transmission of prices and thus has implications for the timing of economic policy interventions. The empirical outcomes indicated that Exchange rate changes pass-through interest rate and inflation rate channels on both short and long run and thus significantly affect interest rates and prices of goods and service in Nigeria during the study period. These outcomes yielded key policy which included that fact that interest rates and prices should be greatly monitored as they are very vulnerable to exchange rate changes. The insights from this made the researcher to make some recommendations.

6. POLICY RECOMMENDATIONS

It is recommended that:

1. Government should reduce the Monetary Policy Rate (minimum discounting rate) to ensure that the interest rates are brought to a level that will enable producers to access investible funds. When there is high level of funds for production, exports would likely increase ceteris paribus and there by an increase in the foreign exchange earnings for the country.

2. Since exchange rate pass through interest rate, it is recommended the CBN should reduce cost of borrowing for production.

3. Government should implement an exchange rate regime that would reduce the cost of acquiring foreign exchange. The current dual exchange regime as currently evidence does not promote easy access as it has further led to a hike in cost of foreign currencies.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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