INVESTIGATING EXCHANGE RATE PASS-THROUGH TO CONSUMER PRICES IN NIGERIA

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Abstract

Research background: There have been several studies on the degree of exchange rate pass-through (ERPT) to consumer prices, as well as macroeconomic environment with yet no clear direction.

Purpose: This research work investigates exchange rate pass-through effects into consumer prices in Nigeria from 1960 to 2018.

Research methodology: The methodology employed by the study for estimation is the Johansen cointegration and Vector Error Correction Model (VECM) procedures.

Results: The empirical results indicate an incomplete pass-through of exchange rate into consumer prices in Nigeria. The pass-through is found to be 1.6 for the model under consideration. The impulse response function results indicate that the response of the consumer prices to the exchange rate shock decreases immediately to a negative shock in the short run, and continues along the horizon to a positive shock in the long run. Also, the response of consumer prices to interest rate shock decreases immediately and continues to fluctuate to a negative shock in both the short run long run horizon.

Novelty: The results support the view that exchange rate policy should be complimented with coordinated macroeconomic policy approaches in order to control inflationary level in the economy. The study therefore recommends that the Federal Government should adopt a tightening of the monetary policy as it will help reduce the impact of exchange rate depreciation on consumer prices.

Keywords: ERPT, Consumer prices index, cointegration, VECM, Nigeria

JEL classification: C11, C22, E31, F31, N17

Introduction

The study on the degree of exchange rate pass-through (ERPT) and inflationary level leading to a low inflationary environment was a seminal work done by Taylor (2000). The author was of the view that since inflation has a characteristic of inertia; a low inflationary level in the present would eventually result in a low inflationary level in the future and vice versa. The theory relating exchange rate and prices according to Taylor and Taylor (2004) originates from the doctrine of Purchasing Power Parity (PPP), with an assumption of no barriers to trade and costs of transportation. In a real world economy, there are frictions in international trade and hence, distortions in the PPP underlying assumption. The PPP assumption was a product of the law of one price which is still relevant in understanding the interaction effect between exchange rate and prices. This interaction goes in line with the law of one price which states that in the absence of trade frictions, and prevailing free market competition and flexibility of prices, identical goods purchased in a particular location have to be sold with the same price when expressed in a common currency. For equilibrium prices need to be established, and that goods traded in two markets are not to differ when expressed using the same currency, thus ensuring a total pass-through (Taylor, Taylor, 2004).

In an open economy, inflationary effect emanates from domestic pressure as well as external pressures due to world commodity price increment and exchange rate fluctuations. An inflationary effect in an economy depends on the exchange rate regime adopted by the particular economy. For a floating exchange rate regime, its impact is felt more on the level of prices through aggregate demand and supply. In terms of aggregate supply, currency devaluation directly affects the level of prices via goods imports purchased by local consumers (Achsani, Arie, Fauzi, Abdullah, 2010). This rate of exchange effect works in line with the aggregate demand channel of monetary policy, as interest rates decrease it will stimulate aggregate demand, leading to an increased inflationary level in the economy (Ryan, Thompson, 2000). According to the authors, monetary policy affects inflationary level easily through the exchange rate channel rather than through aggregate demand, and this gives policy makers the chance to control inflationary level through the direct exchange rate channel.

In Nigeria, the economy had experienced high inflationary level and macroeconomic instability. Thus evaluating sources of instability has become a challenge to policy makers and economists at large. The country is endowed with vast mineral resources which had driven the country's exports since the discovery of oil in the 1970s. However, a collapse of the international oil price in the 1980s led to near collapse of the country's economy, as foreign exchange earning

drastically declined and most letters of credit were dishonoured. Soludo (1993) noted that these distortions of the economy led to the adoption of a structural adjustment programme (SAP) in 1986 with the aim of establishing a realistic exchange rate policy for the economy. The country thus switched from a fixed exchange rate to a flexible exchange rate system. This policy shift significantly disrupted the Consumer Price Index and rate of exchange, thus distorting their interaction effect.

The extent of these distortions have been the subject of debates among scholars. However, there had been inconsistencies in their findings. For instance, some studies showed that exchange rate explains inflationary pressure (see Kotil, 2020; Imimole, Enoma, 2011; Odusola, Akinlo, 2001; Montiel, 1989). Other studies find a partial exchange rate pass-through to consumer prices (see Kurtović, 2019; Adekunle, Ajao, 2018; Helmy, Fayed, Hussien, 2018). While studies conducted by Kamas (1995), and Omotor (2008) indicated no significant effect of exchange rate to consumer prices. This study therefore tends to answer the following questions: What is the degree of ERPT to consumer prices in Nigeria? What is the effect of monetary policy on consumer prices in Nigeria? The objective of this study is therefore to investigate ERPT to consumer prices in Nigeria, in a quest to reconcile with previous studies. Also, the study tends to evaluate the effect of monetary policy on consumer prices in Nigeria. The periods covered span from 1960 to 2018. The remaining part of the paper includes the literature review on exchange rate pass-through to consumer prices in section two; section three presents the methodological approach adopted for the study, while section four is the data presentation and analysis of the results. Section five includes the summary, conclusion and recommendation.

1. Literature review

Studies on the degree of exchange rate pass-through to consumer prices among countries have shown no clear direction. Hence, there had not been a general consensus on the interaction effect between exchange rate and inflation. Kotil (2020) noted that there had been an increased in empirical studies on ERPT in both developed and emerging economies, and the literature had focused on two approaches. According to the author, the first approach is on factors affecting the transition effect, while the second approach focuses on pass-through duration and its magnitude. For instance, while investigating ERPT in Argentina, Montiel (1989) showed that exchange rate among other factors significantly explain inflationary pressure. Studies with a similar conclusion include, Odusola and Akinlo (2001) and Imimole and Enoma (2011) in their studies

of the Nigerian economy. Kurtović (2019) while estimating the degree of ERPT to import prices in Serbia finds a partial pass-through to import prices in the short run.

Also, Bada, Ajibola, Inuwa, Idowu, Sani, Anigwe and Udoko (2016) on an examination of ERPT into export and aggregate prices in Nigeria, find that pass-through elasticities are 0.24 and 0.30 for baseline models. Savoie-Chabot and Khan (2015) in a review of ERPT to consumer prices in Canada, suggest that about 0.6% of the consumer prices inflation is explained by the ERPT. And Ogundipe and Egbetokun (2013) on the ERPT to consumer prices in Nigeria showed that exchange rate explains inflation than money supply. However, other studies in their findings which include, Kamas (1995) on Columbia countered the positive exchange rate inflation nexus, showing that exchange rates play no role in explaining inflationary level variation in the economy. The findings showed no significant effect among exchange rate coefficients. While Omotor (2008) noted the importance of a flexible exchange rate regime as a reform policy on inflation.

A depreciating exchange rate affects directly the inflationary level in an economy, by increasing the domestic price of imported items and indirectly by increasing foreign demand for domestic output. The exchange rate effect works in conjunction with the aggregate demand channel of monetary policy, whereby an interest rate reduction stimulates aggregate demand, and increases inflation (Ryan, Thompson, 2000). A depreciated currency increases the cost of imports, which feeds through domestic inflation (Kandil, Morsy, 2010). For a smaller economy, fixing the exchange rate of its currency to that of a large, low inflation economy, is one of the measures to reduce inflation and keep it low (Kadioglu, Ozdemir, Yilmaz, 2000). Since monetary policy affect inflation more quickly through exchange rate than an aggregate demand channel, it gives room for the policy makers to control the inflationary level in the economy, by using a direct exchange rate channel (Ryan, Thompson, 2000).

In this line of reasoning, Edwards and Magendzo (2006) were of the view that the harder the exchange rate peg, the more effective it becomes in enhancing credibility. While Aisen and Veiga (2005) explained that exchange rate Peg differ markedly based on the degree to which governments are constrained in adjusting them. The authors asserted that there are ‘hard’ pegs such as the adoption of a foreign currency, a currency shared between several countries, or an exchange rate backed by tight rules, linking monetary policy to foreign exchange reserves. Also, there exists a ‘soft peg’, where there exists a lack of constraints on the adjusted parity, thus indicating no significant cost of devaluation. One would expect the disciplinary effect of a peg to be much greater in the former case than the latter (Aisen, Veiga, 2005).

The Nigerian government adopted an interest rate peg from the 1960s on a par with the British pound. Equally administrative measures were applied in line with pegging, to sustain the parity with the anchor currency. When in 1967, the British pound was devalued, the Federal government, in a quest to make imports cheaper for the import substituting industries that relied on foreign inputs, pegged the domestic currency to the dollar. However, when in 1971, the United States government could not keep to their obligation of converting the dollar into gold; the Nigerian naira was adjusted in line with US dollars, against a basket of 12 currencies (Osako, Masha, Adamgbe, 2003). Between the periods from 1972 to 1985, the Nigerian economy witnessed a boom – bust cycle, with the rate of exchange going in line with oil price movement.

The increased oil price led to an increase in government revenue and foreign exchange rate earning. The exchange rate earlier adopted, remained unchanged except in 1972, when the British pound was floated and the parity between pound sterling and the Nigerian pound was discarded. The country adopted a decimal based currency, the naira and pegged it with the US dollar (Osako et al., 2003). However, the authors noted that as a result of the fall in the global crude oil price in 1981, the Nigerian currency, the naira started a gradual depreciation against the US dollar and pound sterling. Until the adoption of SAP, the country's exchange rate policy encouraged the overvaluation of the naira, shown in real exchange rate appreciation during the 1970s.

Further, recent empirical studies on the exchange rate – inflation nexus were evaluated and yet no general consensus on the interaction effect between exchange rate and inflation was evident. Among the studies include, Kotil (2020) who examined ERPT to domestic prices in Turkey covering the period of 2005 to 2019. Utilizing the VAR model procedure, the results indicate a greater response to consumer prices than the producer prices. Kurtović (2019) estimated the degree of exchange rate pass through to import prices in Serbia using a time series data from the period from 2008Q1 to 2014Q4. The study employed the ARDL cointegration approach for estimation and the empirical results indicate a partial pass-through to import prices in the short run.

Adekunle and Ajao (2018) evaluated ERPT asymmetry in Nigeria from 2001 to 2015 using the Auto-regressive Distributed lag model procedure. The empirical results showed an incomplete pass-through to consumer prices in the short run. Helmy et al. (2018) examined exchange rate pass-through to domestic prices in Egypt covering the period from 2003 to 2015. Employing the Structural Vector Auto-regression procedure, the results indicated an incomplete and partial pass-through in both the consumer prices, producer prices and import price. Mirdala (2014) investigated exchange rate pass-through to consumer prices in European transition

economies from 2000 to 2012 using the VAR model. The empirical results shows different patterns of pass-through to domestic prices based on the exchange rate regime and baseline model adopted.

Also, Ogundipe and Egbetokun (2013) evaluated ERPT to consumer prices in Nigeria using the VAR model approach. The study showed that exchange rate explains inflation rather than money supply in Nigeria. While Imimole and Enoma (2011) investigated the depreciation effect of exchange rate on the inflationary level in the Nigerian economy from 1986 to 2008 employing the ARDL technique. The study found that exchange rate depreciation, money supply and real gross domestic product are the main determinants of inflation in Nigeria. The study also indicates that exchange rate depreciation positively affects the inflationary level of the economy in the long run.

From the literature reviewed, the following are therefore observed: Most of the previous studies have not investigated the extent at which interest rate influences consumer prices in Nigeria. Therefore an important explanatory variable is omitted in the analysis of exchange rate – inflation dynamics in Nigeria. In addition to exchange rate pass-through, this study fills the literature gap by investigating the extent to which interest rate affect consumer prices in Nigeria.

2. Research methodology

Since the objective is to ascertain the level of pass-through of exchange rate into consumer prices in Nigeria, the Vector Error Correction model (VECM) approach is adopted to capture the level of pass-through to consumer prices. It is realized that many empirical researchers follow a well-quoted paper by McCarthy (2007) to use the VAR method to examine the pass-through effect of exchange changes into consumer prices. We set up a model with three endogenous variables: nominal effective exchange rate (EXCHR), consumer price index (CPI) and interest rate (INTR). An interest rate is included in the model to allow for the effects of monetary policy. The country's monetary policy is concerned with keeping domestic inflation within their target ranges, so it is likely to offset the effects of exchange rate fluctuation on domestic prices (Hahn, 2003). Neglecting the short-term interest rate will result in the common omitted variables problem (Lian, 2006).

2.1. The Vector Error Correction Model (VECM)

This study adopted the Vector Error Correction Model (VECM) which is a restricted form of a Vector Auto Regression (VAR) model. It is designed for testing cointegrating variables that integrated order one $I(1)$ in a system. The VAR reduced form model is written as follows:

$$Y_t = A_0 + \sum_{i=1}^K A_i Y_{t-i} + \phi X_t + \varepsilon_t \quad (1)$$

where Y_t and Y_{t-1} represent $(j \times 1)$ column vectors, while j depicts the number of dependent variables. Y_t comprises the number of observations at a period t , while Y_{t-1} comprise lagged ith values of the dependent variables. A_0 represent $(j \times 1)$ vectors of the intercept term, X_t shows the $(m \times 1)$ columns of vectors of m independent variables. ε_t is a $(j \times 1)$ vector of stochastic variables. Also, the $I(1)$ variables are considered to be cointegrated, then, the VAR model can be presented as a differenced of order one error correction form as follows:

$$\Delta Y_t = A_0 + \Pi Y_{t-1} + \sum_{i=1}^K A_i^* \Delta Y_{t-i} + \phi X_t + \varepsilon_t \quad (2)$$

where ΔY_t represent the first change of Y_t . Π depicts the coefficient matrix with all evidences of a long-run relationship in all Y_t variables, and the rank Π described as $\Pi = \alpha\beta'$ represents the numbers of cointegrating relations (r). α and β represent the $(j \times r)$ matrix. The α_i coefficient evaluates the jth variables' speed of adjustment towards the equilibrium, and β_i depicts the variable's long-run estimator; also, the A_i^* matrix includes information on the cointegrating system's short-run dynamics. According to Enders (2010), the VECM deals with $I(1)$ variables when cointegrated even without taking the first difference. Thus, the model conserves the system's multiple cointegrating relationships, and hence avoids any misspecification issues (Enders, 2010).

2.2. Model specification

In this study, Vector Y is comprised of three variables. The variables model is specified as follows:

$$Y_t = f(CPI, EXCHR, INTR) \quad (3)$$

Set definition:

CPI – consumer price index,

EXCH – nominal Exchange Rate,

INTR – interest rate (the domestic monetary policy variable).

Stating the model in a more explicit and linear form, the empirical equation is therefore stated as follows:

$$Y_t = \alpha_0 + \alpha_1 CPI + \alpha_2 EXCHR + \alpha_3 INTR + v_t \quad (4)$$

v_t – error term,

α_0 – the intercept,

α 's – the parameters to be estimated.

For statistical reasons, the variables are transformed into a logarithm. The assumption states that the logarithm of the expected value of the response variable is a linear combination of the explanatory variables. The model is therefore stated as follows:

$$Y_t = \beta_0 + \beta_1 \text{LOG}(CPI) + \beta_2 \text{LOG}(EXCHR) + \beta_3 INTR + \mu_t \quad (5)$$

If the null hypothesis of no cointegration is rejected, an error-correction term is therefore estimated. The VECM model is therefore specified as follows:

$$\Delta CPI_t = \alpha_0 + \sum_{i=1}^n \alpha_{1i} CPI_{t-1} + \sum_{i=0}^n \alpha_{2i} \Delta EXCHR_{t-1} + \sum_{i=0}^n \alpha_{3i} \Delta INTR_{t-1} + \lambda ECM(-1) + \mu_t \quad (6)$$

where:

$ECM(-1)$ – the error correction term,

λ – the error coefficient.

3. Data/results analysis

3.1. The descriptive statistics

The descriptive statistics for the variables are shown in Table 1.

Table 1. The descriptive statistics

	LOG(CPI)	LOG(EXCHR)	INTR
1	2	3	4
Mean	1.072519	2.134158	5.422420
Median	0.819219	2.000344	4.000000
Maximum	5.481234	5.900828	11.064170
Minimum	-2.710778	-0.604404	0.316667
Std. Dev.	2.881443	2.488622	2.562175
Skewness	0.086623	0.170762	0.237301
Kurtosis	1.433186	1.293870	2.315750

1	2	3	4
Jarque-Bera	6.108766	7.442650	1.704719
Probability	0.047152	0.024202	0.426408
Sum	63.278590	125.915300	319.922800
Sum Sq. Dev.	481.557500	359.208000	380.754900
Observations	59	59	59

Source: authors' computation from the Eviews results.

From the table above, the results indicate that all the variables, LOG(CPI), LOG(EXCHR) and INTR have positive mean values with 59 observations. The standard deviation showed that the highest standard deviation is recorded by the LOG(CPI), while the least standard deviation is recorded by the LOG(EXCHR). The probabilities of the Jarque-Bera test of normality for the variables indicates that two of the variables have values greater than a 5% level of significance.

3.2. The unit root test

In order to test for the unit root among the variables under consideration, we conducted a stationarity test procedure using the Augmented Dickey-Fuller (ADF) method. The ADF test procedures are therefore presented as follows:

Table 2. The Unit root test

Augmented Dickey Fuller ADF test						
variable	level difference (ld)	probability (ld)	order of integration (ld)	first difference (fd)	probability (fd)	order of integration (fd)
LOG(CPI)	0.100403	0.9630	I(0)	-4.047481**	0.0024	I(1)
LOG(EXCHR)	0.474948	0.9844	I(0)	-5.752638**	0.0000	I(1)
INTR	-2.177206	0.2166	I(0)	-8.046483**	0.0000	I(1)

Note: *, **, *** – indicate stationarity at either 1%, 5% and 10% respectively.

Source: author's computation from the Eviews result.

The results indicate that all the variables are not stationary at the level difference $I(0)$. Thus a need to difference the variables; at first difference $I(1)$, all the variables are stationary and integrated of order one at the 5% level of significance. A Johansen cointegration is therefore, conducted.

3.3. Cointegration

To establish whether a long-run relationship exists among the variables under study, a cointegration test was conducted using the multivariate procedure developed by Johansen and Juselius (1990) as follows.

Table 3. Cointegration

Null Hypothesis	Alternative Hypothesis	TRACE TEST		Maximum EigenValue Test	
		statistics	95% critical value	statistics	95% critical value
None*	$r \leq 1$	35.550210	29.797070	24.758360	21.131620
At most 1	$r \leq 2$	10.791850	15.494710	10.787510	14.264600
At most 2	$r \leq 3$	0.004342	3.841466	0.004342	3.841466

* Denotes rejection of the hypothesis at the 0.05 level.

Source: authors' computation from the Eview results.

From the table above, the trace likelihood ratio and the Maximum Eigen Value results point out that the null hypothesis of no cointegration among the variables is rejected in favour of the alternative hypothesis up to one cointegrating equation at the 5% significant level.

3.4. Lag Length selection

In order to determine the lag order of the estimation of the VECM model, the study conducted a lag length selection criterion. From the following criterions, Akaike Information Criterion (AIC), Schwarz Criterion (SC) and the Hannan-Quinn information criterion (HQ), the tests indicated a 2 lag for both the AIC and SC and HQ test procedures respectively.

Table 4. lag length selection for the model

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-288.2010	NA	6.595693	10.400040	10.508540	10.442100
1	-51.63771	439.33190	0.001950	2.272775	2.706779	2.441038
2	-26.41381	44.14183*	0.001096*	1.693350*	2.452857*	1.987810*
3	-17.50196	14.64090	0.001108	1.696499	2.781508	2.117155

* Indicates lag order selected by the criterion.

Source: authors' computation from the Eview results.

From the test results above, we utilized the AIC test results since it is supported with the LR test statistic and the final prediction error. Therefore, the VAR model with constant and VAR (2) lags is estimated.

3.5. Long-run coefficient estimation

From the cointegration test conducted, it was evidenced that that there exist cointegrating vectors among the variables. The VECM approach is therefore utilized to estimate the long-run pass-through effect from exchange rate to consumer prices.

Table 5. The long-run VECM estimation

Variable	CointEq1	Std error	t-statistic
LOG(CPI(-1))	1.000000		
LOG(EXCHR(-1))	-1.662484	0.21424	-7.76005
INTR(-1)	0.680750	0.21691	3.13839
C	-1.249198		

Source: authors' computation from the Eview results.

From the table above, the long-run coefficient results from the VECM and output shows that deviations from the long run affect changes in the variables under consideration. From the results, the LOG(EXCHR(-1)) indicate a negative sign and is statistically significant. This indicates a negative feedback between the exchange rate and consumer prices in Nigeria. The results suggest that in the long-run, a one percent increase in the exchange rate (currency depreciation), decreases consumer prices by 1.6%. Hence, an increase in the rate of exchange by 100%, leads to 1.6% pass-through ratio into consumer prices. It therefore shows that exchange rate pass-through elasticity into consumer prices in Nigeria for the period under review is 1.6%. The coefficient of the interest rate INTR (-1) shows a positive sign and is statistically significant. Thus, a 1.0% increase in the rate of interest, increases consumer prices by 0.68%.

3.6. The short-run VECM test procedures

Table 6. The VECM estimation results

Error correction:	D(LOG(CPI))	D(LOG(EXCHR))	D(INTR)
ECM(-1)	-0.011905	0.049753	-0.634085
Std error	0.01548	0.04045	0.20007
t-statistic	-0.76908	1.23008	-3.16933

Determinant resid covariance: 0.000427.

Source: authors' computation from the Eview results.

From the short run estimate results, the coefficient of the error correction term (ECM(-1)) shows that the variable, D(INTR) is statistically significant. It shows that deviations from the long run equilibrium affect the interest rate.

3.7. Impulse responses function

Figure 1 shows the effect of monetary policy transmission shocks on the current account and the response of other macroeconomic aggregates to current account deficit shocks.

Figure 1. The impulse response function

Source: authors' computation from the Eview results.

The impulse response function results from Figure 1, shows that the response of LOG(CPI) to itself increases instantly and significantly to its own shocks, and continues with a positive sign along the horizons in the long run. The response of LOG(CPI) to the exchange rate LOG(EXCH) shock decreases immediately to a negative shock in the short run, and continues along the horizon to a positive shock in the long run. The result conforms to the findings of Bada et al. (2016) that CPI reacted negatively to the shocks of the exchange rate in the first four quarters and became positive after the fifth quarter and continues positively to the twelfth quarter in Nigeria. The response of LOG(CPI) to INTR decreases immediately and continues to fluctuate to a negative shock in both the short run and long run horizon. The response of the LOG (EXCH) to itself increases instantly and significantly continues with a positive sign along the horizons in the long run. The results are in line with the findings of Bada et al. (2016) that the pass-through effect of exchange rate to itself was significant and persistent, thus indicating that exchange rate depreciation leads to further depreciation.

The pass through ratio of LOG (EXCH) to LOG(CPI) indicates a smaller magnitude in the short run, but instantly increases to a positive shock along the horizon in the long run. The results conform to the findings of Taylor (2000) who noted that the establishment of a strong nominal anchor in many countries in recent years was responsible for a low pass-through of exchange rate depreciation to inflation. The ratio of pass through to INTR indicates a positive shock but continues to increase to a positive shock to a later horizon in the long run.

3.8. Variance Decomposition

Table 7. Variance Decomposition of LOG(CPI)

Period	S.E.	LOG(CPI)	LOG(EXCHR)	INTR
1	0.092335	100.00000	0.000000	0.000000
2	0.182909	99.71089	0.177908	0.111206
3	0.264690	97.05975	2.799248	0.140999
4	0.333103	92.60043	7.296909	0.102659
5	0.393198	87.64205	12.271900	0.086048
6	0.447877	83.61022	16.307320	0.082454
7	0.498259	80.94379	18.982810	0.073400
8	0.545455	79.29002	20.647730	0.062255
9	0.590335	78.18402	21.762780	0.053194
10	0.633174	77.34241	22.611310	0.046282

Source: author's computation from the Eviews result.

The variance decomposition of the LOG(CPI) shows that apart from innovations to the CPI itself, LOG(EXCHR) contributes significantly to the variations in the CPI. The results conform to the findings of Bada et al. (2016), that CPI accounts for about 100% of its own variance and declined in the fourth quarters; and that the influence of the exchange rate in the CPI increases from the fifth to eight quarters respectively.

Table 8. Variance Decomposition of LOG(EXCHR)

Period	S.E.	LOG(CPI)	LOG(EXCHR)	INTR
1	0.241270	0.128152	99.87185	0.000000
2	0.390973	1.361923	94.81362	3.824452
3	0.519208	1.235589	93.99776	4.766654
4	0.623770	0.858248	94.13291	5.008842
5	0.713855	0.951959	93.20600	5.842037
6	0.798604	1.382504	91.77044	6.847060
7	0.882647	1.903325	90.60639	7.490282
8	0.965813	2.357126	89.75853	7.884345
9	1.046491	2.715981	89.08724	8.196775
10	1.123865	3.016556	88.53768	8.445760

Source: author's computation from the Eviews result.

The results from the table above indicates that shocks to the LOG(EXCHR) itself, the LOG(CPI) and INTR accounts for most of the variability in the overall periods. The shock to LOG(EXCHR) itself increased from the beginning and continues with its variability in the long term period. From the results, a shock to LOG(CPI) though over the medium run periods, is

relative and thus contribution increases. This indicates that the basic transmission mechanism runs from monetary policy to the exchange rate and then to prices.

3.9. Diagnostic test

To evaluate the robustness of the estimated VECM results, some diagnostic tests were carried out, see below:

Table 9. Diagnostic Tests

VEC Residual Serial Correlation LM Tests				
Null Hypothesis: no serial correlation at lag order h				
Lags	LM-Stat	Prob.		
1	18.08818	0.0342		
2	19.96125	0.0182		
Probs from chi-square with 9 df				
VEC Residual Heteroskedasticity Tests: No Cross Terms (only levels and squares)				
Joint test				
Chi-sq	df	Prob.		
131.3152	84	0.0007		
VEC Residual Normality Tests				
Null Hypothesis: residuals are multivariate normal				
Component	Skewness	Chi-sq	df	Prob.
1	0.389113	1.413151	1	0.2345
2	2.089178	40.73686	1	0.0000
3	0.175739	0.288253	1	0.5913
Joint		42.43826	3	0.0000

Source: authors' computation from the Eviews results.

From Table 9 above, both the VEC residual serial correlation LM tests, and the VEC residual heteroskedasticity test estimate showed the absence of a serial correlation in the VEC estimates and that the residuals are homoscedastic. The VEC normality test results indicate that the variables are normally distributed.

Conclusions

This study was motivated by interest in ascertaining the extent to which changes in ERPT to consumer prices in Nigeria within the period from 1960 to 2018 occurred. It also explains the transmission mechanism of exchange rate to consumer prices. The study equally examined the effect of monetary policy on consumer prices in Nigeria. The study also adopted the VECM procedure after conducting the stationarity and cointegration tests. The long-run VECM results

show a long run negative exchange rate-inflation nexus and positive interest rate-inflation dynamics. In contrast, the short-run coefficient estimate results indicate that deviations from the long run equilibrium affect the interest rate negatively.

The impulse response function results indicate that the response of consumer prices to exchange rate shock decreases immediately to a negative shock in the short run, and continues along the horizon to a positive shock in the long run. The shock to interest rate decreases immediately and continues to fluctuate to a negative shock in both the short run long run horizon. The variance decomposition results show that apart from innovations to itself, exchange rate and interest rate contributes significantly to the variations in consumer prices in Nigeria. This indicates that exchange rate policy should be complimented with monetary policy in order to control inflation in Nigeria. The study therefore recommends that the Federal Government should adopt a tightening monetary policy as it will help reduce the impact of exchange rate depreciation on consumer prices in Nigeria.

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