

EXCHANGE RATE PASS -THROUGH IN NIGERIA: EVIDENCE FROM VECTOR AUTOREGRESSIVE APPROACH

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Abstract: The impact of external shocks and strong correlations between exchange rates and price necessitate the need for extensive study on exchange rates pass – through and its implication on inflation target in Nigeria. The research aimed to investigate the direct and indirect effect of exchange of exchange rates pass through in for the periods of 1985 to 2014, using vector error correction model (VECM). Our data shows the presence of unit root at level but after taking first difference it become stationary using ADF and PP statics, however, by employing Johansen test of cointegration we found variables are cointegrated, hence having long run relationship. Similarly our findings show that error correction term (ECM) is correctly sign and significant approximately 63 percent is corrected to converge towards equilibrium within first year. We further employed impulse response function and variance decomposition to examine the degree of pass-through on price in Nigeria and evidence from findings reveal that pass through on import price is greater than that on consumer prices consistence with the previous finding. We have identify the influence of exchange rate is modest and incomplete and has serious implication with the regard to formulation and implementations of monetary authorities in Nigeria. It was therefore recommended due to continues integration in the world market, it become necessary to control imported inflation since effect on consumer price in the Nigerian economy is apparent. This will improve the standard of living and wealth of the nation.

Key words: exchange rate, consumer prices, Johansen test of cointegration, VECM

Introduction: Exchange rate pass-through can be view as the degree of sensitivity of import prices to a one percent change in exchange rates in the importing nation's currency. Peter (2003) defined (EPT) the effect of a change in the exchange rate to domestic prices as results of the changes by authority concern. According to Aliyu (2007), when balance-of-payments EPT assume a one-for-one response of import prices to exchange rates, which is known as complete exchange rate pass-through while a less than one-to-one response is known as partial or incomplete ERPT. This has serious implications for the effect of monetary policy on domestic prices as well as for the transmission of macroeconomic shocks and the volatility of the real exchange rate especially when it's incomplete. Generally, three most important factors may determine the extent of pass-through of exchange rate to domestic prices: the pricing behavior by exporters in the producer countries, the responsiveness of mark-ups to competitive conditions and the existence of distribution costs that may drive a wedge between import and retail prices Aliyu (2007). Most important factors the size of the export market and the degree of competition the exporter faces in that market.

Following the sharp depreciation of Nigerian currency as a result recent changes in oil price in 2014, there is possibility of rises in price especially in long run, evidence from capital market has shown that many investors have lost confidence to invest in the nation's economy, and therefore, the reliability and effectiveness of exchange rate can reasonably doubt. The question is that are what would be the

extent and magnitude of exchange rate pass-through on macroeconomic performance and its implications on inflation target on the monetary policy transmission mechanism. Given the current reality it becomes imperative to assess the impact of exchange rates on domestic price and its implication on Nigerian Economy particularly the current aimed of inflation target under medium term framework under flexible exchange rates regime. The research will therefore aim to assess the effect of exchange rates pass – through, extend and speed in Nigeria for the periods of 1985 to 2014 using time series analysis.

The paper is constructed as follows: apart from introduction in section one, section two provides some the literature reviews, section three will employ methodological framework, the VECM framework, while section four dwell for estimation and analysis and section five conclude main findings and draws a policy recommendations.

Literature Review: Substantial study has been put in place in the area of ETP across the globe using different method covering different time horizon. Among of these studies include: Goldberg (2004), Hamid et al. (2003), Wattanakanoon (2011), Hamori et al. (2003); Jambo (2014); Jabara (2009); Isrefi (2007); Kun et al. (2013); Ezezew(2014) and Lafleche (1996) among others, most of the findings from these studies can be summarized as: The exchange rate pass-through estimates were found to be low approximately 0.47 for all imports excluding oil and 0.26 for consumer goods over 4 quarters in US, and bilateral exchange- rate pass-through range from 0.59 for Latin America to 0.0 for the NIEs; exchange rate

pass through were found to be incomplete in four East-Asian countries, however, the degree of pass through were found to be high on import price than consumer price under the periods of the reviews; dynamic pass-through elasticity were found to be 0.2 and still puts exchange rate as a potentially important source of inflation but incomplete in Malawi; but exchange rates were found to be weak in east African Community; evidently partial pass through in 23 OECD countries in short run but its fully in long run and that countries with higher rates of exchange rate volatility are also those with higher pass through elasticities in Latin America; in Thailand pass through account for 4.7 percent from exchange rate to price level and the error of the deviation from the actual value of inflation will be corrected by 14.06 percent in each period; real shock play dominant role as driving forces in exchange rates fluctuation and that flexible exchange rates may be preferable as exchange rates regimes in sub-Saharan Africa and contrary from previous finding indicates exchange rates pass through were found to be complete in Albania.

In Nigeria however, similar studies have focus on the exchange rates pass through among which are; Adeyemi-Ogundipe (2013), Smet et al. (2002); Aliyu (2008); The result of the long-run analysis indicated that a 10.0 per cent permanent increase in crude oil prices increases the real GDP by 7.72 per cent, similarly a 10.0 per cent appreciation in exchange rate increases GDP by 0.35 per cent; Their finding reveals that the exchange rates elasticity is 0.54 per cent in the long-run, due to a percent change in oil price volatility, while it appears to be 0.02 per cent in short run.

Research Methodology: The focus of the research is to investigate exchange rate pass through with the particular reference to Nigeria using vector error correction (VEC) methodology.

Model Specification: $er = \beta_0 + \beta_1 imp + \beta_2 cpi + \beta_3 y + \beta_4 oilp + \beta_5 fdi + \beta_6 str + \mu_t$ 3.7

The expected sign of the coefficients are: $\beta_3, \beta_4, \beta_6 > 0$, and β_1, β_2 and $\beta_5 < 0$.

Result And Discussion:

Unit Root Test: The result for unit test is presented in table 1.1 using ADF and PP test both in level and first differences with the constant and trend. The test therefore shows FDI is stationary at level; hence it can also be stationary after taking first differences while other variables are found to be stationary after taking first differences. Thus we proceed to test cointegration since variables are integrated of the same order I (1). Similarly the AIC is utilized in the selection of the lag length and ordering of the variables, respectively. The results are available when ever needed.

The result from the above tables indicate that variables has a unit root at level except for (fdi), while after taking first difference it become stationary, therefore the h unit roots hypothesis is rejected at 1% and 5% and concludes are stationary respectively.

Johansen Test of Cointegration: The next step is to examine the possibility of long-run relationship among these variables. We are to excess how the exchange rate volatility (depreciation) reacts in the long run on the variables selected in the model in Nigerian context. The results from the maximum eigenvalue test indicate three cointegrated equations whereas trace test suggest the existence of two cointegrating equations at the 5 per cent significance level among the variables. The results of Johansen test are available when ever needed.

Long run Result: As the speed of adjustment coefficients provide additional base for inferring short run dynamic among these variables. If we select $r = 1$ and normalize the cointegrating vector with respect to exchange rates, then the long run equilibrium relationship can be shown as: The normalized equations and value is vector cointegration is presented as:

$lnex = -1.171 lnimp - 1.52 ln cpi + 18.65 lny + 0.63 lnfdi - 8.19 lnoil - 1.22 lnstr$ 4.1

$lnex = -0.95 ln cpi - 1.74 lny + 0.74 lnfdi + 0.48 lnoil - 2.47 lnstr$ 4.2

Although equation (4.2) has important implications that cannot be discarded, we restricted the analysis on equation (4.1) because it reflects most of the theoretical expectation. The cointegrating parameters in the above equation show that the explanatory variables are significant impact on exchange rates variable (the standard errors in the parentheses indicate that the coefficients are statistically significance at 5 % and 10 %. The import prices (lnimp), price (ln cpi), income (lny) and (lnoil) is correctly sign and are significantly different from zero. All things being equal, a rise in the crude oil prices is associated with the positive effects on oil earnings in the Nigerian economy and accumulation of foreign reserve, this in turn cause an appreciation of exchange rate. Higher import prices, rises in price level and cause depreciation of the exchange rate. Evidence from findings indicates import price, oil price and price index have negative effect on the exchange rates in the model. The vector cointegration coefficients reveal 1 percent change in the four variables results 1.71, 1.52, 8.7 and 1.22 percent depreciation of exchange rates. However, a 1 percent change in GDP and foreign direct investment (lnfdi) by 18.6, 0.63 will yield an appreciation of exchange rate respectively. This implies as long oil prices is volatile the exchange rates in Nigeria would continue to be unstable. The negative sign of prices justifying the saying that exchange rates depreciation have

effect on commodity price in long run especially in import dependent country like Nigeria.

Short-run Analysis: A Vector Error-Correction Model (VECM)

In time series analysis a variables exhibit long run relationship is expected to have an error-correction component, showing how equilibrium will converge towards short run adjustments. This implies whether the parameter of the error correction term is correctly sign and is significantly different from zero, (vector of exchange rates). One lags length is used as appropriately suggest by lag selection criteria, and short run dynamic of exchange rates and its determinants is examine using vector error correction model.

The results from VECM shows error correction model is correctly sign (negative) and significance. The ECM is significance and highly significance chosen level of

significance. This implies the coefficient is -0.63 suggesting about 63% disequilibrium of exchange rates is corrected in the current year under the period of investigation. Therefore, when exchange rates are above or below equilibrium, it adjusts approximately by 63% within first year to ensure equilibrium is restored. The goodness of the adjusted R^2 is 47 %.

Recommendation: It was further recommended that the influence of exchange rate is therefore modest and incomplete, hence monetary authority have significant role in stabilizing consumer price but they will exercise this with care. Furthermore, it become necessary to control imported inflation due to its serious and lasting effect on consumer price in the Nigerian economy. This will reduce producer cost hence domestic increase in price and increase in the profit margin there improving the standard of living.

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