EXCHANGE RATE VOLATILITY AND INSURANCE SECTOR PERFORMANCE IN NIGERIA: A LONG-RUN INVESTIGATION

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ABSTRACT

Exchange rate volatility and how it affects the banking sector has been studied by several authors with little or no consideration of its effects on the performance of the insurance industry in Nigeria. This study applied the vector error correction model to analyze the long-run effects of exchange rate volatility on insurance performance using insurance penetration and insurance density as measures of insurance performance in Nigeria. The period covered by this study is from 1986 to 2018. Findings showed the presence of a significant and positive long-run impact of exchange rate volatility on insurance performance in Nigeria. With this finding the study recommended that a defined and unified exchange rate regime should be implemented to prevent the insurance sector from making abnormal gains from currency variations/mispricing as this is necessary to build a sector that would be robust enough to absorb any exchange rate volatility that may occur in future.

Keywords: Exchange Rate Fluctuation, Insurance Penetration, Insurance Density, Macroeconomic Variables, Financial Stability.

INTRODUCTION

The financial sector stability is essential to the growth of any economy globally as it determines the level of investment, the flow of funds to the financial sector and the level of trade among countries. Economies cannot operate in isolation as they must relate with each other and this sometimes brings about distortions in their exchange rate. Exchange rate distortions, otherwise called exchange rate volatility are the unexpected movement of exchange rate. It is also a measure of risk, instability, fickleness or uncertainty. According to Mulwa (2013), exchange rate volatility explains uncertainty of international transactions both in financial assets and commodity goods. Over time, the question of how exchange rate equilibrium is estimated and what determines optimum exchange rate equilibrium as well as level of exchange rate misalignment has been a long time an unanswered empirical question of macroeconomics (Mbithi, 2013; Aliyu, 2009).

Unexpected movement in exchange rate should create a negative distortion in the financial sector (bank and non-bank) if not checked this can transcend into the economy (Basirat, Nasirpour & Jorjorzadeh, 2014; He et al., 2014; Lambe, 2015; Kemuma, 2015; Offiong et al., 2016). On the other hand, some studies such as Azeez et al. (2012) and Mahmood et al. (2011) discovered that

the volatility of exchange rate impacted positively on both the banking and economic performance as the case may be. Looking into several literatures, the banking sector has always been in the front burner when it comes to investigation on exchange rate volatility this and the conflicting results on exchange volatility raised the curiosity of the researcher to investigate how exchange rate would affect an important non- bank financial institution like the insurance sector, given its traditional and non-traditional activities in an economy.

The fluctuations in exchange rate can be a major cause of risk that many institutions are faced with, especially the insurance sector; these fluctuations in exchange rate serve as setbacks to institutions especially those whose securities are traded on the money market and also engage in foreign transactions as this would possibly expose them to the risk of currency variations. To the insurance sector, the adverse volatility in exchange rates may lead to losses or reduce investments, decline in premium collection and reduced earnings. Like the banking sector and the financial markets, the insurance sub-sector occupies an important position in allocating financial resources from the surplus to the deficit economic units for investment purposes. As a financial intermediary, insurance industry provides risk management services through which funds are mobilized and made available to other economic agents for investment purposes. Insurance sector is faced with uncertainty induced by exchange rate volatility due to the inability to predict the rate of exchange with certainty. The risk and decision to invest in the face of a volatile exchange rate may greatly impact insurance sector performance (Akinlo & Apanisile, 2014; Alhassan & Fiador, 2014; Olayungbo & Akinlo, 2016).

In Nigeria, as a result of the structural adjustment programme being fully implemented in 1986, many authors have asserted that a significant and prolonged misalignment of exchange rate may cause severe disequilibrium in the macro economy equation. Given this and various exchange rate regimes in the country this study sought to investigate on exchange rate volatility and insurance performance. It adopted its model from the analytical work of Edwards (1992) on how stabilization programme affect aggregate production in developing economies, thereby, linking exchange rate volatility and economic output. Therefore, this study employed the vector error correction model to establish the long-run effect of exchange rate volatility on the performance of the insurance sector in Nigeria. Insurance performance as economic output was disaggregated into insurance penetration and insurance density, while exchange rate volatility was measured by its standard deviation which is the average squared deviation from the mean. The major limitation of this study was lack of access to data to enhance the study's scope. Hence, the period from 1986 to 2018 was selected based on data availability.

In summary, the findings from this study showed that exchange rate volatility impacted on insurance density and penetration in Nigeria positively in the long-run. Though contrary to theoretical prepositions, the dynamic nature of the Nigeria financial space as dominated by multiple exchange rates and undefined exchange rate regimes gives the avenue through which volatility in exchange rate may lead to gains in insurance sector performance as the case may be. The rest of this paper was presented thus: Section 2 presented the relevant literature review; section 3 is the methodology, while section 4 presented the results and discussion of findings. Lastly, section 5 outlines the conclusion and recommendation of the study.

LITERATURE REVIEW

Schumpeter (1911) postulated the finance-growth theory by emphasizing that financial activities are critical to economic growth in any nation as long as their productivity is improved by promoting entrepreneurial drives and technological innovations. He furthered opined that

productive savings mobilization, re-investment of mobilized funds, efficient allocation of resources would enhance economic growth. He believed that such efforts would create the expected macroeconomic framework for which financial development can be integrated. Given the premise of the theory, the transmission mechanism of the finance-growth theory is premised on the "supply-leading" hypothesis that the level of economic growth (sectoral growth) is induced by the degree of financial sector development; while the "demand-following" hypothesis asserts that the degree of financial sector development granger-cause the level of economic growth (Alhassan & Fiador, 2014). As such, an exchange rate regime or volatility would negatively impact on the long-run growth of economic sectors especially when the economy is underdeveloped financially or vice versa.

Over the years, insurance sector in Nigeria has undergone various developmental reforms and changes in globalization in financial services geared towards market penetration, coverage density, efficiency and performance of the insurance industry (Ani et al., 2013). Whilst this, the exposure of the insurance sector to movements in exchange rate do not clearly reveal a defined impact on its performance given that the unpredictable variations in exchange rate would possibly increase both operational and performance uncertainties. These movements in exchange rate are transmitted to domestic prices through imports, exports and domestic good prices in foreign currency, and the lagged association between exchange rate movements and economic performance are due largely to mispricing. In this regard, several authors are of the view that variations in exchange rate would negatively impact the financial performance of firms. The association linking volatility in exchange rate and the performance of the insurance sector is established on the premise that financial development enhances improvement in savings and investment efficiency which drives economic activities toward growth and development (Balcilar et al., 2018; Balcilar et al., 2019; Kemuma, 2015).

Though related literature on the linkage between exchange rate volatility and insurance is grossly limited, however, several studies have made significant efforts to establish how the insurance sector reacts to uncertainties in economic dynamics on the basis that it is rational to maintain that volatility will also have some influence on purchasing behaviour of insurance sector, and the large volume of funds circulating in the insurance sector (Gupta et al., 2019), thus, becoming an avenue of risk for the sector as they are naturally exposed to currency rate jeopardies (Kemuma, 2015; Offiong et al., 2016).

In recent developments, Balcilar et al. (2020a & 2020b) suggested that there existed a long-run effect of insurance penetration on the growth of economy, and when disaggregated into various options, found evidence in consonance of the impacts on economic growth in the short-term and long-term. Additionally, they revealed that the insurance sector is not insusceptible to the wave of uncertainties in economic policy, however, these uncertainties in economic policy advances insurance premiums in both the short-run as well as the long run, although the impact in the long-run outweighs the short-run impact. These studies opined that economic growth is enhanced by the financial sector through its roles in savings mobilization, facilitating trading, risks diversification, efficiently allocating resources, hedging, pooling and exertion of corporate control etc. However, empirical evidences exist on the effect of exchange rate volatility on the performance of the economy with mixed outcomes. The insurance industry been a part of the financial sector with the business of risk transfer and highly volatile investments in the financial markets would experience the effect of currency appreciation and depreciation.

Empirically, various studies have sought to reveal the exact influence of exchange rate volatility on the overall performance of the financial institutions across the globe. Their findings

vary due largely on the data proxies, the level of development in the financial system, the degree of policy uncertainties and the duration of these studies. These are the core reasons for the indeterminate (positive or negative) impact of the volatility in exchange rate on the performance of the financial institutions (bank and non-bank institutions). Studies that support the negative effect of exchange rate volatility of the financial sector includes Owoeye & Ogunmakin (2013), Chipilli (2013); Kemuma (2015); Lambe (2015); Mbogo (2015); Odili (2015); and Offiong, Udoka & James (2019); while those in support the positive effect of exchange rate volatility on financial sector performance are Mbithi (2013) and Onyango (2014).

METHODOLOGY

To examine the effect of exchange rate volatility on the performance of the insurance sector in Nigeria, this study adopted an annual time-series data from CBN 1986-2018 and specified a study model with two equations to capture the dynamic nature of insurance sector performance measures (insurance penetration and insurance density). This study measures insurance penetration as the level of insurance sector development in Nigeria by dividing insurance sector premiums by the gross domestic product (GDP), insurance density ratio was captured by the ratio of insurance sector premium to the total population. Although insurance penetration and insurance density were relatively similar, differing only by the denominator, per capita figures were relatively insensitive to territorial changes and control for the scale of the economy (Balcilar et al., 2018). Exchange rate volatility on the other hand was measured by the average squared deviation from the mean of the exchange rate.

Theoretically, there is a high correlation between inflation rate, interest rate and exchange rate. The monetary authority during the process of interest rate manipulation exerts great influence on both inflation and exchange rates. On the other hand, inflation rate that is constantly low would exhibits an escalating currency value, thereby, leading to increased economic growth. Therefore, it is theoretically assumed that there existed a linkage between macroeconomic variables factors like inflation, interest rate and insurance sector premiums.

Annual time series data on exchange rate volatility (EXCRFL), inflation rate (INFL), interest rate (INTR), insurance penetration (INPTN), and insurance density (INDST) were sourced from the Central Bank of Nigeria (CBN) statistical bulletins for various years for this study. The theoretical underpinnings that bridged the relationship between volatility in exchange rate and insurance performance is quite complex as seen in the literature reviewed, as such, exchange rate volatility and the performance of the insurance sector are both potentially endogenous and stationary at first difference order of integration using the augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests. This justified the adoption of vector error correction by this study. The VECM allows the examination of the dynamic patterns of the inter-relationship between exchange rate volatility and the performance of the insurance sector which is impossible using the static ordinary least squares model. The VECM model assumes two separate equations to capture insurance performance proxies such as insurance penetration and insurance density as specified:

Equation one: insurance penetration as a dependent variable

$$INPTN = f (EXCRFL, INTR, INFL) \qquad\qquad 1$$

Equation two: insurance density as a dependent variable

$$INDST = f\ (EXCRFL,\ INTR,\ INFL) \qquad\qquad 2$$

Given a transformed cointegration formula:

$$\Delta y_t = \prod y_{t-1} + \sum_{i=1}^{p-1}\Gamma_i\Delta y_{t-1} + \mu_t \qquad\qquad 3$$

Where

$$\prod = \sum_{i-1}^{p} A_i - 1 \qquad\qquad 4$$

$$\Gamma_i = -\sum_{j-i+1}^{p} A_j \qquad\qquad 5$$

If yt has co-integration relationship, then $\prod y_{t-1} \sim I(0)$ and formula (3) can be written as follows:

$$\Delta y_t = \alpha\beta' y_{t-1} + \sum_{i=1}^{p-1}\Gamma_i\Delta y_{t-1} + \mu_t \qquad\qquad 6$$

Where:

$\beta' y_{t-1} = ecm_{t-1}$ reflected long-term equilibrium associations amongst variables.

RESULTS AND DISCUSSION

Augmented Dickey-Fuller (ADF) and Phillip-Perron Unit Root Tests

In order to ascertain if the variables of interest were stationary, the ADF and PP unit root tests statistic values were expected to be greater than Mackinnon critical values at one percent, five percent and ten percent level of significance respectively using their absolute (values) terms. The unit root test statistics result was conducted without trend and intercept and was presented in Table 1. The analysis of the ADF and PP unit root tests showed that the variables of interest in this study were not found to be stationary at levels. However, all the variables became stationary after they were differenced one time. This is because ADF and PP unit root test statistics values were found to be greater than the critical values at conventional one per cent, five per cent and ten per cent levels of significance. In other words, all the variables of interest had the same order of integrated I(1).

Table 1 **UNIT ROOT TESTS**								
VARIABLES	LEVELS				FIRST DIFFERENCES			
	Trend		Trend and Intercept		Trend		Trend and Intercept	
	ADF	PP	ADF	PP	ADF	PP	ADF	PP
INDST	-2.6103	-1.8419	-2.8114	-2.7916	-6.0460	-6.6070	-4.4034	-3.9026
INPTN	-0.5149	-0.3487	-0.5566	-0.5566	-2.9314	-4.2025	-3.7711	-7.9979
EXCRFL	-3.0021	-2.4238	-3.3133	-2.4008	-3.8537	-9.4411	-5.2315	-9.2481
INTR	-2.6266	-2.6195	-2.8189	-2.7298	-4.1527	-10.019	-4.7651	-5.7298
INFL	-2.4981	-2.7153	-2.5920	-3.1721	-4.6787	-6.7375	-3.6768	-6.5302

Johansen Co-integration Test

Given that the linear combination of the series were found to be stationary at order "I(1)", then a long-run cointegration test should be conducted. Using the Johansen and Jesulius (1990)

multi-variate co-integration approach, two cointegration tests were conducted to capture insurance penetration and insurance density. Table 2 revealed that the result of the unrestricted cointegration rank test (trace) indicated three (3) cointegrating equations with their trace and maximum eigenvalue statistics greater than their critical values. The study held on this basis that there existed a long run relationship between/among the variables in the model. The Johansen cointegration test findings showed that these series would move together in the long run, meaning that these variables (INDST, EXCRFL, INTR, INFL) and (INPTN, EXCRFL, INTR, INFL) related with one another in the long run respectively. The cointegration of these variables indicated that null hypothesis "no cointegration at five per cent level" were rejected. Considering that the series were integrated of order I(1) and the presence of long run cointegration, the most suitable estimation technique was the vector error correction model (VECM). In line with the scope of this study, only the long-run dynamics of the VECM was captured as the core interest of this study.

Table 2 UNRESTRICTED COINTEGRATION RANK TEST				
Hypothesized	Insurance penetration		Insurance density	
	Trace statistics	Max. eigenvalue	Trace statistics	Max. eigenvalue
None	50.58235*	18.18437*	54.85613*	27.58434*
At most 1	32.39798*	16.41874*	29.79707*	24.13162*
At most 2	15.97924*	8.384684*	13.49471*	15.26460*
At most 3	7.594553	7.594553	3.841466	3.841466

Trace and Maximum Eigenvalue tests indicate 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level

Vector Error Correction Model (Long Run Analysis)

The VECM result was conducted for both insurance sector penetration (INPTN) and insurance sector density (INDST) equations of the model. Given that the explanatory variables were included in their log forms, the VECM long run estimates revealed that insurance performance in Nigeria was positively influenced by the volatility in exchange rate. The coefficient of the constant term showed that holding exchange rate volatility parameters constant in Nigeria, insurance penetration rate (INPTN) and insurance density rate (INDST) increased by 1.4462 and 26.6423 per cent in the long run. The result also revealed a positive relationship between exchange rate volatility and insurance sector performance. Though contrary to theoretical preposition and findings from majority of studies (Owoeye & Ogunmakin (2013); Chipilli (2013); Kemuma (2015); Lambe (2015); Mbogo (2015); Odili (2015); Balcilar et al., 2018; Offiong et al. (2019)), the peculiarity of the Nigerian financial system with undefined exchange rate regimes and multiple exchange rates could be responsible for the positive effect of exchange rate volatility on insurance penetration and density in Nigeria. It could be argued from these findings that the insurance sub-sector may be benefiting from arbitrage of high volatility in exchange rate. In addition, the nature of the financial system in Nigeria, and the need for the insurance industry to stay afloat, makes its players to participate in various non-traditional insurance businesses, as such, this may be responsible for the positive response of the insurance sector performance to exchange rate volatility. This findings is also in tandem with studies such as Mbithi (2013) and Onyango (2014).equation 7 (excerpts from Table 3) showed that, exchange rate volatility may have enhanced insurance sector penetration in Nigeria by 0.4563 per cent in the long run and was significant statistically at the five per cent level, all things being equal. The total value of interest rate hindered insurance sector penetration by 1.5389 per cent in the long run and was significant statistically at five per cent level, all things

being equal. The total value of inflation rate hindered insurance sector penetration in Nigeria in the long run by 0.3240 per cent and was found to be significant at the conventional five per cent level of significance, all things being equal.

$$INPTN = 1.44462 + 0.4563*EXCRFL - 1.5389*INTR - 0.3240*INFL \qquad 7$$

$$INDST = 26.6423 + 1.7288*EXCRFL - 6.4676*INTR - 4.0486*INFL \qquad 8$$

Looking at insurance sector density (INDST) as a dependent variable in equation (8), the VECM long run estimates in the equation 8 (excepts from Table 3) revealed that, the total value of exchange rate volatility could have enhanced insurance sector density in Nigeria in the long run by 1.7288 per cent and was significant statistically at five per cent level, all things being equal. The total value of interest rate hindered insurance sector density by 6.4676 per cent in the long run and was statistically significant at the conventional five per cent level, all things being equal. The total value of inflation rate hindered insurance sector density by 4.0486 per cent in the long run and was statistically significant at the conventional five per cent level of significance, all things being equal.

Table 3 VECTOR ERROR CORRECTION ESTIMATES (LONG-RUN DYNAMICS)					
Standard errors in ( ) & t-statistics in [ ]					
Cointegrating Eq:	CointEq1	CointEq2			
LINPTN(-1)	1.000000	0.000000			
LINDST(-1)	0.000000	1.000000			
LINTR(-1)	1.538989	6.467699			
	(0.21265)	(0.97088)			
	[7.23705]	[6.66166]			
LINFL(-1)	0.324042	4.048626			
	(0.07941)	(0.36254)			
	[4.08076]	[11.1675]			
LEXCRFL(-1)	-0.456344	-1.728817			
	(0.02539)	(0.11593)			
	[-17.9713]	[-14.9122]			
C	-1.446288	-26.64239			

CONCLUSION AND RECOMMENDATIONS

This study examines the long-run effect of exchange rate volatility on the performance of the insurance sector in Nigeria from the period 1986 to 2018. This study is critical and timely in Nigeria because numerous studies on the effect of exchange rate volatility on the financial sector have always centered on the banking sector, hence, the curiosity to investigate what effect exchange rate volatility exerts on an important non-bank financial institution like insurance given the peculiar nature of the Nigerian financial system and insurance business (traditional and non-traditional insurance businesses).

In carrying out this study, the VECM was employed in estimating two separate equations in order to capture the dependent variables (insurance penetration and insurance density) of the study. From the empirical analyses and major findings this study concluded that:

1. The analysis of the ADF and PP unit root tests showed that none of the variables were stationary at levels, but, at first differences, they all became stationery.

2. Furthermore, cointegration relationship between exchange rate volatility measures and insurance sector performance measures was confirmed, hence, the existence of a long-run relationship between variables.
3. In the long run, exchange rate volatility would positively impact insurance sector penetration and density contrary to theoretical and *a priori* expectations in Nigeria.
4. Lastly, the long-run effects of interest rate and inflation rate as explanatory variables would negatively impact on insurance sector performance as theoretically expected.

As a result of the findings, the study recommends the need for a defined exchange rate regime and a unified exchange rate within the Nigerian financial system. This is necessary because sectors like the insurance industry in Nigeria may have benefitted immensely from the unstable financial system in Nigeria being characterized by undefined regime and multiple rates. It is envisaged that as the Nigerian financial system develops this norm may change. Therefore, with a stable and unified exchange rate, the abnormal gains from currency variations/mispricing (high or low) can be addressed. The insurance industry should see these gains as temporary and should not rest on their oars but rather strive to build a sector that would be robust enough to absorb any exchange rate volatility that may occur in future.

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