CHAPTER FOURTEEN

DIASPORA REMITTANCES AND EXCHANGE RATE DYNAMICS IN NIGERIA: THE ROLE OF ASYMMETRY

Raymond L. Aor[1], Samuel O. Ominyi[2] & Gbatsoron Anjande[3]
[1, 2, & 3]*Department of Economics, Benue State University, Makurdi*

Abstract
We examine the nexus between remittance and the exchange rate dynamics in Ngeria. We adopt the NARDL modelling approach to account for the role of asymmetry in the relationship using annual data 1980 to 2022. The findings demonstrate the presence of asymmetry when modeling the nexus between remittances and exchange rate in Nigeria, albeit the asymmetric impact is robust only in the short-run dynamics of the relationship. In other words, positive and negative growth rate changes render different and significant impact on exchange rate performance in the economy. To this end, policymakers should consider the asymmetric behavior of remittances to create more opportunities for exchange rate stability.

Keywords: Remittance, Exchange Rate, NARDL, Asymmetry

Introduction

A growing body of literature seeks to understand the nexus between remittance and exchange rate dynamics. These empirical studies have investigated the impact of remittances on exchange rates using cross-country analysis (Olanipekun, 2022; Apergis and Cooray, 2018; Acosta, Lartey, and Mandelman, 2009; Lartey, Vargas-Silva, 2009), others also have looked at country-specific analysis (Khurshid, Kedong, Calin & Khan, 2017, Shobande and Shodipe, 2019; Mandelman, 2012; Tuuli, 2015). In this paper, we explore the dynamics between diaspora remittances and the exchange rate in Nigeria. The study is motivated by the desire to understand the economic implications, promote exchange rate stability, and guide policy direction which, is crucial for international trade and economic stability. We are further motivated by the argument prevalent in the literature that the responsiveness of exchange rates to changes in remittances is non-linear, unstable, and asymmetrical. Our contribution is that we quantify the scope of the asymmetry and the pattern

of responses of the exchange rate to changes in diaspora remittances in Nigeria. Our underlying postulation is that the positive (negative) growth rate of remittances exerts different effects on the real exchange rate. We, therefore, hypothesize a non-linear (Asymmetrical) relationship between remittances and exchange rate. We avail that positive or negative changes in diaspora remittances inflow will render different outcomes on real effective exchange rates in a given economy through the interplay of demand and supply in the foreign exchange market. This implies that a higher diaspora remittances inflow will lead to an increased demand for the local currency, which places upward pressure on its value compared to other currencies in the foreign exchange market. Also, a negative growth rate of diaspora remittances inflow results in a reduced demand for the local currency, exerting a downward pressure on its value. This can ultimately lead to a depreciation of the local currency. In other words, the local currency becomes weaker compared to other currencies in the foreign exchange market. The existing literature on this relationship in Nigeria produces mixed results, for example (Okolie, Osam, and Ezeamama, 2023; Okon, 2022; Ayunku and Dickson, 2021; Nwaiado, Koegbeelo, and Ezebunwa, 2021; Karimo, 2020; Uruma, Edeh, and Uruma, 2019). Equally, the literature is limited in symmetrical analysis (linear) of the relationship; hence, there is a need to probe further into the asymmetrical (non-linear) dynamics. We, therefore, depart from the existing literature by accounting for both the linear (Symmetric) and non-linear (Asymmetric) impact of remittances on the exchange rate in Nigeria by adopting the non-linear autoregressive distributed lag (NARDL) modeling approach, which provides the basis to account for both the short and long-run dynamics of the relationship.

Theoretically, the connection between remittances and exchange rate performance can be explained via the Portfolio Balance Theory by Mundell (1963), which suggests that investors consider the relative attractiveness of different currencies when allocating their portfolios. It further explains that if an increase in the supply of a given currency occurs, such as through remittance inflows, investors may seek to rebalance their portfolios by acquiring assets denominated in such currency. The increased demand for the currency can lead to its appreciation in the foreign exchange market. In another vein, the increase in remittance inflow can lead to exchange rate depreciation. This may occur when the

supply of foreign currency (diaspora remittances) exceeds the increased for the local currency. The excess supply of foreign currency can exert a downward pressure on the exchange rate, causing depreciation in the exchange market.

The countercyclical nature of large remittances inflows to an economy holds the potential for predicting episodes of exchange rate appreciation and depreciation. It is argued that in periods of economic downturn in home economies, migrants send larger volumes of remittances to support their loved ones (Altruistic Motive). The enhanced diaspora remittances inflows result in local currency appreciation. In another vein, during improved economic conditions in home economies, migrants send fewer diaspora remittances, likely leading to local currency depreciation, making remittances more valuable in naira, which can boost the Nigerian economy. However, a depreciating naira can also lead to inflation, which may erode the gains of remittances on the economy. The intuitive expectation of remittances as financial flow hinges on the fact that when converted into naira upon receipt, it increases the demand for naira, consequently appreciating the currency. Hence, a positive growth rate of diaspora remittances inflows into Nigeria is hypothesized to support naira appreciation, while a negative growth rate depreciates the local currency. However, the real-world relationship between remittances and the exchange rate is marked by complexity and nuances, hence the need for the study

Literature Review

There is a growing strand of literature on the effect of remittances on various macroeconomic fundamentals. It is well-recognized in the literature that remittance promotes financial development (Anwar, Mang, and Plaza 2021), lower fertility (Anwar and Mughal 2016), and improves life expectancy (Zhunio, Vishwasrao, and Chiang 2012). However, the relationship between remittances and the exchange rate of recipient economies remains contested among scholars and policymakers. The underlying question is whether remittances appreciate, depreciate, or are neutral to the exchange rate of recipient economies. Although there is a growing body of literature on this scholarship, the conclusion remains mixed, and a need to explore novel mechanisms to appreciate the nature of the relationship better. Several studies have confirmed the positive

effect of remittances on the exchange rate (Joof and Touray, 2021; Ratha and Moghaddam, 2020; Murshed and Rashid, 2020; Hien, Thi Hong Vinh and Thi Phuong Mai, 2020; Urama, Edeh, and Urama, 2019; Sultonov, 2019).

A Further survey of the literature on Nigeria reviews that Adejumo and Ikhide (2019) using the dynamic ordinary least squares (DOLS) to assert the effects of remittances inflows on exchange rate find a depreciating effect of remittances inflow on the foreign exchange market in Nigeria. Urama *et al*. (2019) found a positive and significant relationship between remittances and the exchange rate in Nigeria by applying the autoregressive distributed lag modeling approach. Other studies with similar findings as above on Nigeria include Afolabi (2017). The above review presents a clear case for a need for more consensus on the subject and further and thorough investigations on the subject matter.

Therefore, we differ from the existing literature on the methodological front by using a non-linear autoregressive distributed lag (NARDL) modeling framework. This methodology provides the impetus for the study to account for both the symmetric and asymmetric impact of remittances on the exchange rate. This would provide a thorough understanding of the relationship, provide accurate analysis that reveals patterns, influence policy decisions, and enhance predictive capabilities. It further allows the study to account for both the long and short-run dynamics of the analysis.

Methodology

We used annual time series for Nigeria covering the period 1980 to 2022. Foreign exchange rate (exch.) is the dependent variable measured in the local currency unit per US dollar period. Remittance (Rem.) is the main predictor of interest in the model; it is measured using the current US dollar. The Current Account Balance (CAB) is measured as the balance of payment in current US dollars, while the consumer price index (CPI) is measured in annual percentages. The data is sourced from the World Development Indicators Database 2023.

We adopt the non-linear autoregressive distributed lag NARDL approach of Shin *et al*. (2014) to model the relationship between remittances and

exchange rate dynamics in Nigeria. This modeling approach has certain advantages. First, it allows for estimating the cointegrating dynamics between the dependent and the independent variables. Second, it allows for linear and non-linear estimation of the relationship. Third, it also disentangles the short and long-run effects of the independent variable on the dependent variable. Fourth, it accommodates a mixed order of integration of the variables, which is nearly impossible for other modeling techniques. However, we consider both symmetric (ARDL) and asymmetric (NARDL) for robustness. These specifications are presented as follows:

Symmetric ARDL

This follows the standard framework of Pesaran *et al*. (2001) as given

$$\Delta EXCH = \alpha_0 + \sum_{J=1}^{N_1} \lambda_1 \Delta EXCH_{t\_i} + \sum_{J=0}^{N_2} \lambda_2 \Delta REM_{t\_J} + \sum_{J=0}^{N_3} \lambda_3 \Delta X_{t\_1} + \alpha_1 EXCH_{t\_1} + \alpha_2 REM_{t\_1} + \alpha_3 X_{t\_1} + \varepsilon_t \text{.....(1)}$$

Where $EXCH_{t-i}$ is the real exchange rate, REM_{t-1} is the remittance inflows, X_{t-1} is representative of other predictors of exchange rate that are included in the model such as; the current account balance (CAB), and the consumer price index (CPI). The long-run parameters for the intercept and slope coefficients are computed thus $-\frac{\alpha_0}{\alpha_1} and \frac{\alpha_2}{\alpha_1}$ respectively since in the long-run it is assumed that $\Delta EXCH_{T\_i} = 0$ and $\Delta REM_{t\_j} = 0$. The short-run estimates are obtained as $\lambda_1 and \lambda_2$ for exchange rate and remittances respectively. Given that differenced variables more than one lag, determining the optimal lag combination for the ARDL becomes necessary. The optimal lag length can be selected using the Akaike Information Criterion (AIC), The Hannan-Quinin Information Criterion (HIC) or the Schwartz Information Criterion (SIC). The lag combination with the least value of the chosen criterion among the competing lag orders is considered the optimal lag. Consequently, the preferred ARDL model is used for testing the cointegrating relationship which is referred to as the Bounds testing for long-run relationships among variables as it involves the upper and lower bounds. The test adopts an F-distribution and if the calculated F-statistics is greater than the upper bound, there is cointegration, when it is less than the lower bound, there is no

cointegration, when it lies between the upper and the lower bounds, then the test is considered inconclusive. In the spirit of our model, the null hypothesis of no cointegration can be expressed as $H_0 : \alpha_1 = \alpha_2 = 0$ while the alternate of cointegration is symbolized as $H_1 : \alpha_1 \neq \alpha_2 \neq 0$. The short-run dynamics of the equation (1) can be respecified to account for the error correction term as follows:

$$\Delta EXCH = \delta v_{t_{-1}} + \sum_{j=1}^{N_1} \lambda_i \Delta EXCH_{t_{-i}} + \sum_{j=0}^{N_2} \lambda_2 \Delta REM_{t_{-j}} + \sum_{j=0}^{N_3} \lambda_3 \Delta X_{t_{-j}} + \varepsilon_t \text{.....(2)}$$

Where $v_{t_{-1}}$ is the systematic error correction term, the parameter δ is the speed of adjustment.

Asymmetric ARDL (NARDL) Model

Here, we decomposed remittances into positive and negative partial sum changes to account for the role of asymmetries in the relationship. According to Shin *et al* (2014), the NARDL model is specified as follows:

$$\Delta EXCH = \alpha_0 + \sum_{j=1}^{N_1} \lambda_1 \Delta EXCH_{t_{-1}} + \sum_{J=0}^{N_2} \lambda_2^{+} \Delta REM_{t_{-1}}^{+} + \sum_{J=0}^{N_3} \lambda_2^{-} \Delta REM_{t_{-1}}^{-} + \sum_{J=0}^{N_4} \lambda_3 \Delta X_{t_{-j}} +$$

$$\alpha_1 EXCH_{t_{-1}} + \alpha_2^{+} REM_{t_{-1}}^{+} + \alpha_2^{-} REM_{t_{-1}}^{-} + \alpha_3 X_{t_{-1}} + \varepsilon_t \text{.....(3)}$$

In equation (3), the remittance variable (REM) has been decomposed into positive and negative changes respectively. The decomposed series are defined as follows:

$$REM\_pos_t = \sum_{j=1}^{t} \Delta REM\_pos_j = \sum_{j=1}^{t} \max(\Delta REM_j, 0) \text{.....(4)}$$

$$REM\_neg_t = \sum_{j=1}^{t} \Delta REM\_neg_j = \sum_{j=1}^{t} \min(\Delta REM_j, 0) \text{.....(5)}$$

We further respecified equation (3) to account for the error correction term as follows:

$$\Delta EXCH = \xi v_{t-1} + \sum_{j=1}^{N_1} \lambda_1 \Delta EXCH_{t_{-1}} + \sum_{j=0}^{N_2} \lambda_2^+ \Delta REM_{t_{-1}}^+ + \sum_{j=0}^{N_3} \lambda_2^- \Delta REM_{t_{-1}}^- + \sum_{j=0}^{N_4} \lambda_3 \Delta X_{t_{-1}}$$

$$+\varepsilon_t \text{.....(6)}$$

As it is applicable with the linear ARDL, the long-run is estimated only in the presence of cointegration, thus pre-testing for cointegration is necessary under the NARDL. We also employ the Wald test to place restrictions in order to ascertain whether the asymmetries matter in the short and long run. For the Wald test, the null hypothesis of no asymmetries $H_0 : \alpha_2^+ = \alpha_2^-$ for the long run and $H_0 : \lambda_2^+ = \lambda_2^-$ for the short run is tested against the alternative presence of asymmetries $H_1 = \alpha_2^+ \neq \alpha_2^-$ for the long run and $H_1 = \lambda_2^+ \neq \lambda_2^-$ for the short run.

Results and Discussion

Typical with the procedure for modelling time series, we subject each of the variables in the model to unit root testing. For robustness purposes, we present both the Augmented Dickey-Fuller (ADF) test and the Philip Perron (PP) test and the results are presented in Table 1. Given the requirements of the bounds testing procedure that variables must not be integrated of order two i.e. I(2), we subject each of the variable series to the ADF and PP unit root test. Both the ADF and PP unit tests are in agreement with the implementation of the stated model. The unit root test result as presented in Table 1 indicates all the series attained stationarity after first differencing for both ADF and PP with the exception of the consumer price index which is stationary at levels using both the ADF and PP testing procedure. The test's outcome validates and satisfies the requirement for the NARDL modelling approach.

Table 1: Results of Unit Root Test

Augmented Dickey-Fuller (ADF)				**Phillips Peron**		
Variable	*Level*	*First Difference*	*I(d)*	*Level*	*First Difference*	*I(d)*
EXCH	*2.953701*^{A}	*-4.24159592*^{A***}	*I(1)*	*3.359017*^{A}	*-4.156249*^{A***}	*I(1)*
REM	*-0.539796*^{A}	*-5.488383*^{A***}	*I(1)*	*-1.848668*^{B}	*-5.469405*^{A***}	*I(1)*
CAB	*-1.802503*^{A}	*-6.731090*^{A***}	*I(1)*	*-2.339368*^{A}	*-6.546790*^{A***}	*I(1)*
CPI	*-3.844173*^{B**}	*-6.062636*^{A***}	*I(0)*	*-2.998964*^{A**}	*-12.58932*^{A***}	*I(0)*

Note: [a] Indicates a model with constant but without deterministic trend; [b] is the model with constant and deterministic trend; [c] is the model with none. Exogenous lags are selected based on the Schwarz Information Criterion. ***, **, * imply that the series is stationary at 1%, 5%, and 10% respectively.

Table2: Bounds Test for Linear ARDL and Non-Linear ARDL (NARDL)

Panel A			**Panel B**		
Model: Linear ARDL			Model: NARDL		
Critical value	*Lower Bound*	*Upper Bound*	*Critical value*	*Lower Bound*	*Upper Bound*
1%	3.65	4.66	1%	3.29	4.37
5%	2.79	3.67	5%	2.56	3.49
10%	2.37	3.2	10%	2.2	3.09
F-Statistics	6.932248		F-Statistics	8.779121	
Critical values from Narayan (2005)					

Source: Extract from E-view 12 Output, August 2023

Table 2 shows the f-statistics of 6.932248 for linear ARDL (Panel A) and 8.779121 for non-linear ARDL (Panel B), respectively. This implies that the F-statistics calculated from the linear and non-linear ARDL models are greater than both the lower and upper-bound critical values at a 1% level of significance. This indicates symmetric and asymmetric long-run relationships between sustainable remittance and the explanatory variables. Hence, the long-run relationship, therefore, can take linear and

non-linear forms. Hence, we can model both the linear ARDL and non-linear ARDL for the stated relationship for policy decisions

Table 3: Estimated Long-run and Short-run Coefficients of Linear and Non-linear ARDL Models

Linear ARDL Model			**NARDL Model**		
Variable	Coefficient	p-value	Variable	Coefficient	p-value
Panel A	**Long-Run Estimates**				
REM	-0.066601	0.1339	REM_POS	-0.051268	0.1686
			REM_NEG	-0.321857	0.0173
CAB	-0.007355	0.3170	CAB	-0.034957	0.0003
CPI	-0.003087	0.4024	CPI	-0.289118	0.0000
C	1.573388	0.0330	C	1.332035	0.0005
Panel B	**Short-Run Estimates**				
REM	-0.042503	0.6571	REM_POS	0.134370	0.0018
			REM_NEG	-0.208430	0.0659
CAB	-0.001752	0.8856	CAB	-0.009364	0.2580
CPI	0.000998	0.8240	CPI	0.317736	0.0001
C	2.208844	0.0428	C	1.334561	0.0116

Source: Extract from results

Table 3 holds the estimates of the long-run (Panel A) and short-run (Panel B) coefficients of the model to ascertain the symmetric and asymmetric impact of remittances on the real effective exchange rate. The estimated linear ARDL model in Table 3 (Panel A & B) shows that REM has a negative and insignificant effect on the exchange rate in Nigeria. This implies that a unit change (increase) in the coefficient of REM, would lead to -6.6 and -4.2 per cent depreciation of the foreign exchange both in the long run and short run. However, given the insignificant nature of the coefficients of the independent variable on the dependent variable, hence, the study lacks strong evidence to suggest that increases in remittances into Nigeria will result in Naira depreciation. The result for the linear ARDL further shows a lack of strong evidence to interpret the impact of other variables on the exchange rate as they all appeared insignificant.

From the NARDL coefficients in Table 3 (Panel A), which accounts for the long-run dynamics of the relationship REM_POS and REM_NEG both exhibited a negative influence on the exchange rate, however only the REM_NEG exhibited a significant impact in the long run—implying that a percentage decrease in remittance in the long run would lead to -32.1 per cent depreciation of Naira currency in Nigeria. This finding is instructive as it affirms the relevance of remittance inflows on the stability of the exchange rate in Nigeria. It further collaborates as a negative growth

rate of remittance in Nigeria could depreciate our currency substantially, it agrees with the findings of Adejumo and Ikhide (2019). This finding confirms the presence of asymmetry, given that both positive and negative growth rates in remittances inflow into Nigeria render differing influences on the exchange rate in the long run. The result holds similar to the coefficients of the correlates in the model where both the current account balance and consumer prices index render negative and significant influence on the exchange rate in the long run in Nigeria, albeit, the magnitude of impact appears to be higher on account of consumer price index. In other words, a change (decrease or increase) in the current account balance will influence a 3.4 per cent change in the exchange rate in Nigeria. This result speaks to the relevance of the current account in exchange rate stability in Nigeria. In a similar way, the consumer price index reveals a negative and significant effect on the exchange rate. An increase in the index will lead to a 28 per cent depreciation in the exchange rate.

The Short-run NARDL result is presented in Table 3 (Panel B). Here, the episodes of positive and negative changes in remittance both exhibit significant influence on the exchange rate, however, the direction of the influence varies. The positive changes to remittances render a positive and significant influence while the negative changes to remittances render a negative and significant influence on the dynamics of the exchange rate. The result further implies that a unit increase in the positive growth changes in remittances will lead to a 13.4 per cent appreciation in the exchange rate in Nigeria in the short run, this further agrees with the findings of Uroma *et al* (2019). In a similar vein, a unit decrease in the negative growth changes in remittances will lead to a 20.8 per cent depreciation in the exchange rate in Nigeria. The import of the short-run findings rests on the role of liquidity in the foreign exchange market. During episodes of positive changes which signifies periods of enhanced remittances inflows which result in increased foreign currency liquidity and inadvertently lowers the demand pressure and appreciation of the local currency. In a similar manner, during periods of negative changes, this leads to a reduction in the liquidity in the exchange market leading to increased demand pressure which ultimately depreciates the local currency. Furthermore, the consumer price index appears to render a positive and significant impact on exchange rate dynamics in the model.

Table 4: Wald Test for NARDL

F-statistic	Value	Df	Probability
Long-run	6.018636	(2,12)	0.0155
Short-run	3.951696	(10,12)	0.0139

Source: Extract from results

Table 4 represents the long and short-run asymmetries (Wald Test) results. The probability values of the F-statistics are significant. Hence, it rejects the null hypothesis REM_POS=REM_NEG=0 for the long run as well as the short run. Hence proof of the existence of long-run and short-run asymmetries in the relationship. This finding is instructive for policy implementation.

Table 5: Diagnostics Test

		Linear ARDL	**NARDL**	
LM Test	*F-statistic*	*Prob.*	*F-statistic*	*Prob.*
Coefficients	2.2843	0.1193	18.1609	0.1005
Heteroskedasticity Test ARCH				
Coefficients	1.2219	0.3112	1.07761	0.4676

Source: Extract from results

The diagnostic results for the linear ARDL and the non-linear NARDL are presented in Table 5. The F-statistics and the p-values of the corresponding test indicate the absence of serial correlation and heteroscedasticity in all the model specifications. The models for CUSUM (Fig. 2a, 3a) and CUSUMSQ (Fig. 2b, 3b) reveal the movement of the recursive residuals oscillated within and outside the critical bounds suggesting that the regression equation was stable considering that the test statistic does not exceed the 5 per cent and 2 per cent significance level for symmetry and asymmetry models. The extracted long-run cumulative dynamic multipliers in Figure 4 show that the exchange rate takes about 12 to 13 quarters to react to a unit change (increase or decrease) in the remittances.

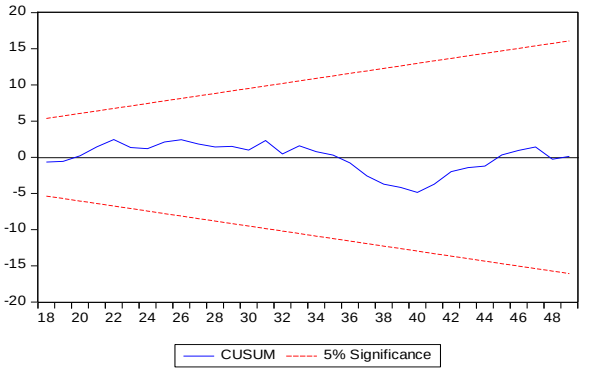

Figure 2a: *CUSUM for Linear ARDL*

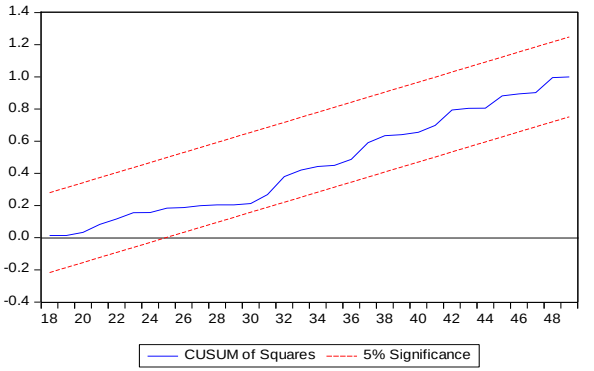

Figure 2b: *CUSUM Square for Linear ARDL*

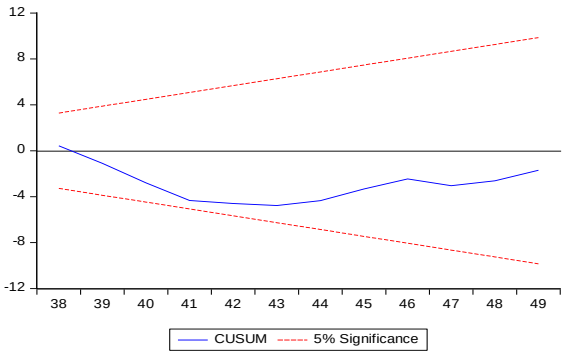

Figure 3a: *CUSUM for NARDL*

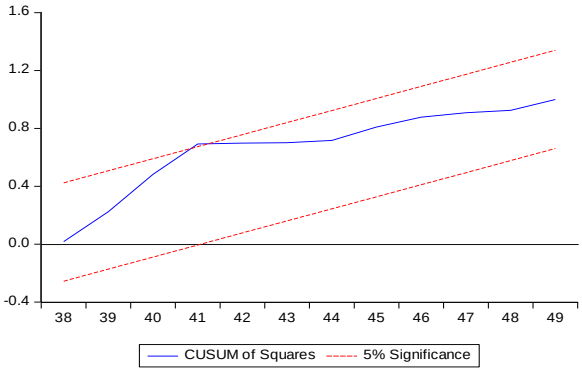

Figure 3b: *CUSUM Square for NARDL*

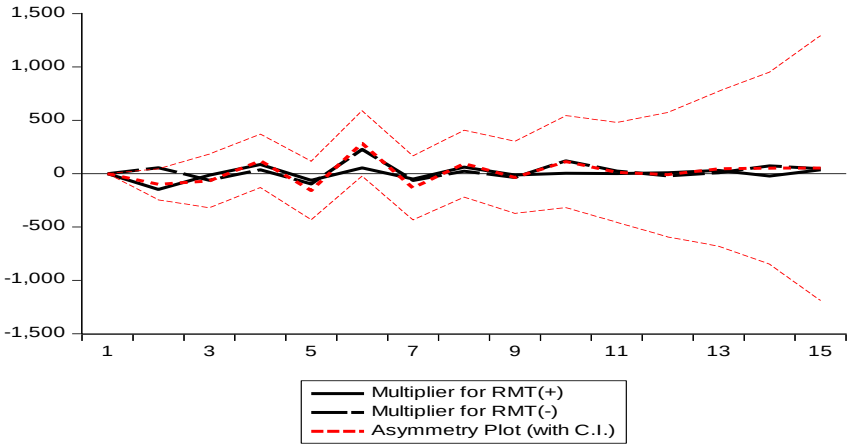

Figure 4: *Dynamic Multiplier Graph*

Conclusion

The study explored the asymmetric impact of remittances on foreign exchange market dynamics in Nigeria by utilizing annual data collected from CBN statistical bulletin and World Bank's development indicators over the period of 1980 to 2022. This study finds evidence of asymmetries both in the short and long run, however, they are more pronounced in the short run. We used the NARDL modelling approach to account for the asymmetric impact as well as the short and long-run dynamics of the relationship.

The study found a cointegrating relationship among the variables using the bounds modelling approach to cointegration through the linear ARDL and non-linear ARDL. Specifically, the estimated long-run and short-run linear ARDL model show that the influence of remittances on exchange rate dynamics is negative both at the short and long-run thresholds, however, the influence is not significant. Secondly, on the estimated non-linear ARDL model, we found the presence of asymmetries for both short and long-run episodes. For the long-run estimates, the negative growth changes in remittances exhibit a currency-depreciating impact on the exchange rate, though the short-run dynamics indicate that the positive growth changes exude positive and significant influence while the negative growth changes display negative but significant influence. The study therefore recommends leveraging remittances to create exchange rate stability in the short run by creating an enabling environment in the financial sector to support easy flows of remittances. The monetary authorities must deliberately seek to incentivise diaspora transfers to encourage cash flows. Also, the need to leverage different diaspora and diaspora-related groups to increase remittance flows to salvage the Nigerian economy is urgent.

References

Olanipekun, D.B. (2022) Remittances, exchange rate and Dutch disease in Sub-SaharanAfrica. *Iranian Review*. 26(1), 161-181

Tuuli, M. (2015). The impact of remittances on the real exchange rate: Empirical evidence from Ghana. *Journal of Economic Cooperation and Development*. 36(3), 43-66

Lartey, E.K.K; Mandelman, F.S, Acosta, P.A. (2009). Remittances, exchange rate regimes and Dutch disease: A panel data analysis. *Working Paper, Federal Reserve Bank of Atlanta*.

Mandelman, F.S. (2012). Monetary and exchange rate policy under remittances fluctuations. *Journal of Development Economics*. 12(3) 345-357)

Apergis, N. and Cooray, A. (2018). Asymmetric real exchange rates and poverty: The role of remittances. *Emerging Market Review*. 13(1), 12-27.

Adejumo, A.D and Ikhide, S.I. (2017). Remittances inflows, real exchange rate movement and sectoral performance in Nigeria. *European Journal of Economics and Business Studies* vol. 3(1)

Okon, E.O. (2022). Interactive effects of exchange rate with remittances on informal remittances channel: A dynamic analysis. *Journal of Business, Economics and Finance.* 11(3), 110-121.

Ayunku, P.E., and Dickson, R.K (2021). Inflation rate, Exchange rate, remittance inflows and economic performance in Nigeria: A granger causality approach. *International Journal of Human Resources Studies.* Vol.11(1).

Karimo, T.M. (2020) Impact of exchange rate differential and exchange rate movement on the dynamics if Nigeria's international capital inflows. *CBN Journal of Applied Statistics*. 11(2), 29-63

Nwiado, D., Korgeelo, C. and Ezebunwa, O.K. (2021) Migrant remittances and Naira price of dollar. *Global Journal of Arts, Humanities and Social Science*. 9(4), 15-45

Khurshid, A., Kedong, Y., Calin, A. C., and Khan, K. (2017). The effects of workers' remittances on exchange rate volatility and exports dynamics-new evidence from Pakistan. *Romanian Economic Journal*, 20(63)

Shobande, O.A. and Shodipe, O.T. (2019). Remittances and real exchange rate: Latest evidence from Cochrane Orcutt Econometric Model. *Academic Journal of Economic Studies*. 5(2), 166-172

Urama, N.E. Edeh, H.C. and Urama, E.C. (2019). Do migrant remittances cause Dutch disease in Nigeria. *Journal of International Migration*. 12(2), 26-41

Okolie, P.I.P. Osam, M. and Ezeamama, M.C. (2023). The impact of exchange rate on foreign reserves and diaspora remittances in Nigeria. *European Review in Accounting and Finance.* 7(1), 1-17

Mundell, R.A (1963). Capital mobility and stabilization under fixed and flexible exchange rates. *Canadian Journal of Economics and Political Science*, 2(1), 475-585

Anwar, A. Mang, C.F and Plaza, S. (2021). Remittances and Inequality: A Metal-Analytic Review. *Available at SSRN*

Anwar, M. and Mughal, M.Y. (2016). Migrant remittances and Fertility. *Applied Economics*, 48(36), 3394-3415

Zhumo, M.C. Vishwasrao, S. and Chiang, E.P. (2012). The influence of remittances on education and health outcomes: A cross-country study. *Applied Economics*. 44(35), 4605-4616.

Joof, F. and Touray, S. (2021). The impact of remittance flow on real effective exchange rate: Empirical evidence from the Gambia, *MPRA Paper 106045, University Library of Munich, Germany.*

Artatrana, R. and Masoud, M. (2020). Remittances and the Dutch disease phenomenon: evidence from the bounds error correction modelling and a panel space. *Applied Economics, Taylor & Francis Journals*. 52(30), 3327-3336.

Muntasir, M. and Seemran, R. (2020). An empirical investigation of real exchange rate responses to foreign currency inflows: Revisiting the Dutch disease phenomenon in South Asia. *The Economics and Finance Letters*, Conscientia Beam, vol. 7(1), 23-46.

Nguyen, P. H. Cao T. H. V. Vu, T. P. M. and Le, T. K. X. (2020). Remittances, real exchange rate and the Dutch disease in Asian developing countries. *The Quarterly Review of Economics and Finance.* 77, 131-143.

Sultonov, M. (2019). Remittances, bilateral trade and linkage between foreign exchange markets: Evidence from the Commonwealth of Independent States (CIS). *International Journal of Economic Policy Studies*, *Springer*, vol. 13(1), 65-74,

Shin, Y., Yu, B., and Greenwood-Nimmo, M. (2014). Modelling Asymmetric Co-integration and Dynamic Multipliers in a Non-linear ARDL Framework. *In W. Horrace, & R. Sickles (Eds.), Festchrift in Honor of Peter Schmidt: Econometric Methods and Applications (pp. 281-314). New York, NY: Springer*.

Pesaran, M.H., Shin, Y. and Smith, R. (2001) Bounds Testing Approaches to the Analysis of Level Relationships. Journal of *Applied Econometrics*, 16, 289-326.