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Remittance Flows and Exchange Rate Volatility in Nigeria: The Roles of Geopolitical Risk and Policy Uncertainty

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Using the GARCH-MIDAS model, we examine how remittances affect exchange rate volatility in Nigeria from April 2006–May 2024, a period covering major global and domestic shocks. We find that remittances can amplify exchange rate fluctuations, especially during periods of elevated economic policy uncertainty and heightened geopolitical risk. Out-of-sample forecast evaluation using the Diebold–Mariano test confirms the robustness of these results. Our findings indicate that remittances' impact on exchange rate stability is conditional, highlighting the importance of policy transparency and careful monitoring in remittance-dependent economies.

I. Introduction

Remittances are a critical source of foreign exchange for many developing economies, often helping to smooth fluctuations in local currency demand. By providing a stable inflow of foreign currency, sustained remittance flows may reduce exchange rate volatility. However, growing exposure to global geopolitical tensions and domestic policy uncertainty raises concerns about whether remittances continue to play a stabilizing role in currency markets under heightened risk conditions. While much of the literature attributes remittance behavior to altruism or self-interest (Ratha, 2017), recent studies highlight the importance of global uncertainty and risk factors in shaping financial flows and exchange rate dynamics. In particular, geopolitical risk (GPR) and economic policy uncertainty (EPU) can heighten investor uncertainty, trigger capital reallocation, and increase exchange rate volatility. This raises a critical question: do remittances stabilize exchange rates, or do they amplify volatility when geopolitical and policy-related risks are elevated?

Nigeria provides a particularly relevant case for addressing this question. The country is one of the largest recipients of remittances in Africa, with inflows playing a vital role in supporting household consumption and foreign exchange availability. At the same time, Nigeria has experienced persistent exchange rate volatility, recurrent policy uncertainty, and exposure to global geopolitical shocks. The coexistence of large remittance inflows and heightened macroeconomic and policy risks makes Nigeria an ideal

laboratory for examining whether remittances stabilize or destabilize exchange rate dynamics under uncertainty.

Despite a growing literature on the relationship between remittances and exchange rates (Habib & Medad, 2024; Joof & Touray, 2021; Zennati et al., 2025), and studies examining remittances in relation to either geopolitical risk (Caldera & Iacoviello, 2018) or economic policy uncertainty (Güvenen et al., 2021; Hussain et al., 2023), existing evidence largely treats these factors in isolation. Yet recent global events, from trade tensions to armed conflicts, suggest that geopolitical shocks can intensify policy uncertainty, potentially altering the way remittance inflows interact with exchange rate volatility. Empirical evidence on this joint interaction remains scarce, particularly for remittance-dependent economies in Africa.

This study contributes to the literature in three important ways. First, it provides new evidence for Nigeria on whether remittances stabilize or amplify exchange rate volatility when geopolitical risk and economic policy uncertainty are taken into account. Second, it jointly examines the interaction between remittances, GPR, and EPU within a unified volatility framework, moving beyond the fragmented approach of earlier studies. Third, by employing the GARCH-MIDAS methodology, the study integrates high-frequency exchange rate data with low-frequency remittance and uncertainty indicators, allowing global and domestic risks to influence exchange rate volatility through a long-run component.

Using monthly remittance (REM), GPR, and EPU data spanning the period April 2006 to May 2024, together with

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Table 1. Preliminary results for high-frequency series

	Exchange Rate		REM	GPR	EPU
	Level	Returns			
Summary Statistics					
Mean	284.06	100.06	2069.25	97.90	169.63
Std. Dev	235.22	1.46	16816.68	28.65	75.95
COV					
Skewness	3.32	10.74	14.62	3.06	0.70
Kurtosis	16.30	263.81	215.18	19.89	2.94
No. Observation	4768			218	
Frequency	Daily			Monthly	
Start Date	April 3, 2006			April, 2006	
End Date	May 31, 2024			May, 2024	
Conditional Heteroscedasticity and Autocorrelation tests					
	K=10		K=20		K=30
ARCH-LM test	5.27***		3.28***		3.11***
Ljung-Box (Q-stat.)	53.76***		64.90***		91.25***
Ljung-Box(Q ² -stat.)	54.31***		64.62***		89.09***

Note: Autocorrelation is tested using the Ljung-Box Q and Q² statistics, whereas the ARCH-LM F-statistic assesses homoscedasticity. ***, **, and *, denote statistical significance at 1%, 5%, and 10% levels, respectively.

high-frequency exchange rate observations, this study applies a GARCH-MIDAS framework to assess the conditional impact of remittances on exchange rate volatility. The empirical findings reveal that remittances tend to increase exchange rate volatility, particularly during periods of elevated economic policy uncertainty, while the destabilizing effect associated with geopolitical risk is present but comparatively weaker. These results suggest that the exchange rate effects of remittances are highly context-dependent and shaped by the broader risk environment rather than being inherently stabilizing.

II. Data and Methodology

A. Data

The monthly GPR index captures real-time perceptions of geopolitical tensions and associated uncertainties (Baker et al., 2016; Caldara & Iacoviello, 2022). For this study, we utilize monthly GPR and EPU indices spanning April 2006 to May 2024, together with monthly REM data sourced from the Statistical Bulletin of the Central Bank of Nigeria. This period is determined by data availability and consistency and covers major global and domestic shocks including the global financial crisis, oil price collapses, the COVID-19 pandemic, and recent geopolitical tensions that are relevant for exchange rate volatility dynamics in Nigeria. Weekly exchange rate data are sourced from investing.com to capture high-frequency volatility. Preliminary statistics confirm the suitability of our estimation approach. The average daily exchange rate is 284.06 with returns averaging 100.06. Remittances, GPR, and EPU average 2069.25, 97.91, and 169.63, respectively, with substantial

variability. All series exhibit positive skewness, with remittances and GPR leptokurtic, while EPU is platykurtic. ARCH and Ljung-Box tests reject the null of homoscedasticity and absence of autocorrelation across multiple lags ($K = 10, 20, 30$), confirming volatility clustering in exchange rates. These features support the application of the GARCH-MIDAS framework to examine the joint effects of remittances, geopolitical risk, and economic policy uncertainty on exchange rate volatility.

B. Methodology

This study employs the GARCH-MIDAS framework because the analysis combines high-frequency exchange rate returns with lower-frequency remittance, geopolitical risk, and economic policy uncertainty indicators. The GARCH component captures short-run exchange rate volatility dynamics, while the MIDAS component allows monthly REM, GPR, and EPU variables to enter the long-run volatility component. Following Engle et al. (2013), the return equation is specified as:

$$r_{i,t} = \mu + \sqrt{\tau_t h_{i,t}} \varepsilon_{i,t}, \varepsilon_{i,t} | \Phi_{i-1,t} \sim N(0, 1),$$

$$i = 1, \dots, N_t \quad (1)$$

where $r_{i,t}$ denotes the exchange rate return on day i in month t , μ is the unconditional mean, $h_{i,t}$ represents the short-run volatility component, and τ_t denotes the long-run volatility component.

The short-run component follows a unit-mean GARCH(1,1) process:

$$h_{i,t} = (1 - \alpha - \beta) + \alpha \frac{(r_{i-1,t} - \mu)^2}{\tau_t} + \beta h_{i-1,t}, \alpha > 0, \beta > 0, \alpha + \beta < 1 \quad (2)$$

where α captures the short-run reaction of volatility to new shocks, while β measures volatility persistence.

The long-run volatility component is specified as:

$$\tau_t = m + \theta \sum_{k=1}^K \phi_k(\omega_1, \omega_2) X_{t-k} \quad (3)$$

where m is the intercept of the long-run volatility component, X_{t-k} represents the lagged low-frequency explanatory variable, such as REM, GPR, or EPU, and θ measures the effect of that variable on long-run exchange rate volatility. The MIDAS weighting function $\phi_k(\omega_1, \omega_2)$ assigns normalized weights to the lagged values of X , with the weights constrained to the sum of one.

The beta weighting scheme is given by:

$$\phi_k(\omega_1, \omega_2) = \frac{\left(\frac{k}{K}\right)^{\omega_1-1} \left(1 - \frac{k}{K}\right)^{\omega_2-1}}{\sum_{j=1}^K \left(\frac{j}{K}\right)^{\omega_1-1} \left(1 - \frac{j}{K}\right)^{\omega_2-1}}, \quad k = 1, \dots, K \quad (4)$$

This weighting structure ensures that the lag coefficients are properly normalized and allows the model to capture the delayed effect of low-frequency predictors on high-frequency volatility.

III. Results

The GARCH-MIDAS estimates reported in [Table 2](#) provide initial insights about the role of REM in shaping exchange rate volatility in Nigeria. Both model specifications exhibit strong volatility persistence, as reflected by statistically significant ARCH (α) and GARCH (β) coefficients, confirming the presence of both short-term shocks and long-term volatility dynamics in the exchange rate. This persistence highlights the relevance of modeling exchange rate volatility using a mixed-frequency framework that accommodates both high- and low-frequency influences. In the GARCH-MIDAS-RV specification, the slope coefficient (θ) is negative and statistically significant, indicating that past realized volatility contributes to a gradual stabilization of exchange rate fluctuations over time. By contrast, the GARCH-MIDAS-REM model shows a positive and statistically significant slope coefficient for remittances, suggesting that higher remittance inflows are associated with increased exchange rate volatility rather than stabilization. The adjusted beta polynomial weights (ω) are statistically significant in both models, confirming the effective incorporation of low-frequency information into the long-run volatility component. The long-run intercept (m) is positive in the realized volatility model but negative in the remittance-based specification, reinforcing the view that remittances, while economically beneficial, may exert a destabilizing influence on exchange rate volatility under certain conditions.

[Table 3](#) extends the baseline analysis by explicitly accounting for the interaction between remittances and external risk factors, namely EPU and GPR. In the GARCH-MIDAS specification reported in column 1 of [Table 3](#), the slope coefficient (θ) is positive and statistically significant, indicating that remittances amplify exchange rate volatility more strongly during periods of elevated economic policy uncertainty. This finding suggests that policy ambiguity,

Table 2. GARCH-MIDAS estimates

Parameter	GARCH-MIDAS-RV	GARCH-MIDAS-REM
μ	0.0016*** (0.0002)	0.0003 (0.0001)
α	0.0502*** (0.0081)	0.0505*** (0.0082)
β	0.9003*** (0.0125)	0.9004*** (0.0126)
θ	-0.0028*** (0.0005)	0.0411*** (0.0072)
ω	5.0040*** (0.4521)	4.9991*** (0.4515)
m	0.0001*** (0.00002)	-0.0001*** (0.00002)

Note: The parameter μ corresponds to the unconditional mean of exchange rates. ARCH and GARCH terms are represented by α and β , respectively, while θ serves as the slope coefficient. The terms ω and m indicate the adjusted beta polynomial weight and the long-run intercept. Standard errors are provided in parentheses. ***, **, and *, denote statistical significance at 1%, 5%, and 10% levels, respectively.

arising from unpredictable fiscal measures, inconsistent regulatory frameworks, or uncertain monetary policy weakens the stabilizing potential of remittance inflows and intensifies currency fluctuations. In contrast, the GARCH-MIDAS model presented in column 2 of [Table 3](#) yields a smaller, though still statistically significant, slope coefficient. This implies that while geopolitical risk influences the relationship between remittances and exchange rate volatility, its impact is less pronounced than that of economic policy uncertainty. Both interaction models continue to display significant ARCH and GARCH effects, confirming that remittances interact with uncertainty to affect both short-run shocks and long-run volatility persistence in the exchange rate. Overall, the results indicate that economic policy uncertainty represents the dominant channel through which remittances affect exchange rate volatility in Nigeria, while geopolitical risk plays a secondary role. From a policy perspective, these findings underscore the importance of policy credibility and transparency in harnessing the potential stabilizing benefits of remittance inflows. Reducing policy uncertainty can help prevent remittances from becoming a source of exchange rate instability, particularly in economies that rely heavily on external financial inflows.

To assess the robustness of the empirical findings, we conduct an out-of-sample forecast evaluation using the Diebold–Mariano (DM) test. Specifically, the GARCH-MIDAS models incorporating remittances alone ([Table 2](#)) and their interactions with EPU and GPR (see [Table 3](#)) are used to generate one-step-ahead exchange rate volatility forecasts over a hold-out sample. Forecast performance is evaluated relative to a benchmark GARCH-MIDAS model without uncertainty interactions, using standard loss functions for volatility forecasting. The DM test results reported in [Table 4](#) indicate that the models incorporating the $REM * EPU$ interaction and $REM * GPR$ specification significantly outperform the benchmark model, in this case the GARCH-MIDAS-REM. These findings confirm that ac-

Table 3. GARCH-MIDAS estimates with the role of EPU and GPR

Parameter	GARCH-MIDAS (REM*EPU)	GARCH-MIDAS (REM*GPR)
μ	0.0004** (0.0002)	-0.0005 (0.0002)
α	0.1934*** (0.0151)	0.0500*** (0.0081)
β	0.7365*** (0.0213)	0.9001*** (0.0125)
θ	0.1508*** (0.0224)	0.0825*** (0.0113)
ω	1.2439*** (0.1345)	5.0000*** (0.4520)
m	-0.0004*** (0.00005)	-0.0001*** (0.00002)

Note: The parameter μ corresponds to the unconditional mean of exchange rates. ARCH and GARCH terms are represented by α and β , respectively, while θ serves as the slope coefficient. The terms ω and m indicate the adjusted beta polynomial weight and the long-run intercept. Standard errors are provided in parentheses. ***, **, and * denote statistical significance at 1%, 5%, and 10% levels, respectively.

counting EPU and GPR materially improves the predictive content of remittance-based volatility models, reinforcing the robustness of the main results.

VI. Conclusion

This study employs the GARCH-MIDAS framework to examine the relationship between remittances and exchange

rate volatility in Nigeria, with particular emphasis on the roles of geopolitical risk and economic policy uncertainty. By integrating high-frequency exchange rate data with low-frequency remittance and uncertainty indicators, the analysis distinguishes between short-term volatility shocks and long-run risk-driven dynamics. The empirical results show that remittances tend to amplify exchange rate volatility, especially during periods of elevated economic policy uncertainty. While geopolitical risk also weakens the stabilizing role of remittances, its effect is comparatively smaller. Out-of-sample forecast evaluation using the Diebold–Mariano test further confirms that models incorporating the remittances–policy uncertainty interaction provide superior volatility forecasts, underscoring the robustness of the main findings. These results highlight the context-dependent nature of remittances: although they represent a vital source of foreign exchange, their impact on exchange rate stability depends critically on the surrounding policy environment. From a policy perspective, enhancing policy credibility, transparency, and macroeconomic coordination can help mitigate the volatility-enhancing effects of remittance inflows. For remittance-dependent economies such as Nigeria, maintaining predictable and coherent economic policies is essential for harnessing the stabilizing potential of migrant income while limiting exchange rate vulnerabilities.

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Table 4. Out-of-sample forecast performance

	$h=10$	$h=20$	$h=30$
GARCH-MIDAS (REM*EPU) Vs GARCH-MIDAS (REM)	-5.7831***	3.1435***	-9.4768***
GARCH-MIDAS (REM*GPR) Vs GARCH-MIDAS (REM)	-9.0753***	-5.4197***	-3.5455***

Note: This table reports the modified Diebold–Mariano (DM) test statistics comparing the out-of-sample predictive accuracy of the extended GARCH-MIDAS-X models, where $X = \text{REM*EPU}$ and REM*GPR against the benchmark GARCH-MIDAS-X model (GARCH-MIDAS (REM)). A significantly negative DM statistic indicates that the extended GARCH-MIDAS-X model provides superior forecast performance relative to the GARCH-MIDAS (REM), while the reverse is the case for a positive and statistically significant DM statistic. ***, **, and * denote statistical significance at 1%, 5%, and 10% levels, respectively.



References

- Baker, S. R., Bloom, N., & Davis, S. J. (2016). Measuring economic policy uncertainty. *The Quarterly Journal of Economics*, 131(4), 1593–1636. <https://doi.org/10.1093/qje/qjw024>
- Caldara, D., & Iacoviello, M. (2018). Measuring geopolitical risk. *American Economic Review*, 112(4), 1194–1225. <https://doi.org/10.1257/aer.20191823>
- Caldara, D., & Iacoviello, M. (2022). Measuring geopolitical risk. *American Economic Review*, 112(4), 1194–1225. <https://doi.org/10.1257/aer.20191823>
- Engle, R. F., Ghysels, E., & Sohn, B. (2013). Stock return volatility and macroeconomic fundamentals. *Review of Economics and Statistics*, 95(3), 776–797. https://doi.org/10.1162/REST_a_00322
- Güvenen, F., Karahan, F., Ozkan, S., & Song, J. (2021). What do data on millions of U.S. workers reveal about life-cycle earnings risk? *Quarterly Journal of Economics*, 136(4), 1675–1740. <https://doi.org/10.1093/qje/qjab014>
- Habib, A., & Medad, F. (2024). *Remittances and macroeconomic volatility in African countries* (International Monetary Fund Working Paper No. 16/234). <https://doi.org/10.5089/9781513585202.001IMF>
- Hussain, M. (2023). Economic uncertainty and international remittances. *Journal of Economic Studies*, 50(5), 1123–1139. <https://doi.org/10.1108/JES-03-2022-0195>
- Joof, F., & Touray, M. (2021). *The impact of remittance flow on real effective exchange rate: Empirical evidence from The Gambia* (MPRA Paper No. 106045). <https://doi.org/10.2139/ssrn.3739031IDEAS/RePEc+2IDEAS/RePEc+2>
- Ratha, D. (2017). *Remittances: Development impact and policy challenges* (World Bank Policy Research Working Paper No. 10227). <https://doi.org/10.1596/1813-9450-10227>
- Zennati, F. (2025). Global remittance trends and economic stability. *Journal of International Money and Finance*, 56, 1–23. <https://doi.org/10.1016/j.jimonfin.2024.102708>