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The Impact of Foreign Portfolio Investment on Stock Market Dynamics in Nigeria: Evidence from Volatility, Liquidity, and Price Discovery

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Abstract

This study investigates the impact of foreign portfolio investment (FPI) on Nigerian stock market dynamics through the lens of three core microstructural dimensions, volatility, liquidity, and price discovery, using monthly data from January 2005 to December 2024, a period encompassing major structural reforms, exchange rate regime shifts, and global financial shocks. Employing an integrated multivariate time-series framework that combines ARDL, GARCH-in-mean, VECM, and Hasbrouck's (1995) information share methodology, the analysis accounts for non-stationarity, structural breaks, and endogeneity to rigorously assess both short- and long-run effects. The findings reveal a dual, context-dependent role of FPI: under stable conditions, FPI inflows reduce volatility, boost liquidity via higher turnover, and enhance price discovery by importing global information; however, during episodes of stress, such as the 2015–2017 foreign exchange crisis, the pandemic, and the 2022–2023 global monetary tightening—FPI amplifies volatility through herding and rapid outflows. Foreign ownership concentration consistently improves liquidity and price efficiency, whereas FPI flow volatility erodes both. Robustness checks confirm the reliability of these results across model specifications and subsamples. As the first study to comprehensively model FPI's multidimensional impact in Nigeria, this paper demonstrates that the benefits of foreign participation are conditional on macro-financial stability and domestic market depth, highlighting the need for policies that harness FPI's efficiency gains while mitigating its fragility through stronger domestic investor buffers, enhanced transparency, and prudent macroprudential tools.

Keywords: Foreign portfolio investment, stock market volatility, market liquidity, price discovery, emerging markets.

Introduction

Nigeria's capital market has undergone significant transformation since the liberalization policies introduced in the mid-1990s, aimed at integrating the domestic financial system with global capital flows. The deregulation of the foreign exchange market in 1995 and subsequent reforms—including the Securities and Exchange Commission (SEC) Act of 2007, the demutualization of the Nigerian Stock Exchange (NSE) in 2005, and the implementation of the Investors and Exporters (I&E) window in 2017, facilitated a marked increase in Foreign

Portfolio Investment (FPI) inflows. At its peak in 2014, FPI accounted for over 40% of total market capitalization on the NSE, reflecting strong investor confidence in Nigeria's emerging market status (CBN, 2020; Igan & Nsengiyumva, 2022). However, the volatility of these inflows—epitomized by sharp reversals during the 2015 oil price shock, the 2016–2017 currency crisis, and more recently, the 2022–2023 global monetary tightening cycle—has reignited policy concerns over their destabilizing potential. These episodes underscore the "hot money" nature of FPI, which, while beneficial for liquidity and market depth, can exacerbate systemic vulnerabilities during external shocks (Adeola & Evans, 2024).

Despite the widely acknowledged dual-edged nature of FPI, empirical research in the Nigerian context has largely emphasized its relationship with asset returns and macroeconomic variables, often neglecting its nuanced influence on core market microstructure dynamics. Existing studies (e.g., Okafor et al., 2019; Uche & Uche, 2021) predominantly assess FPI through the lens of

stock market performance proxies such as the All-Share Index (ASI) or market capitalization, overlooking how FPI inflows interact with market volatility, liquidity provision, and price discovery mechanisms, three pillars critical to market efficiency and financial stability. This narrow analytical scope represents a significant research gap, especially as Nigeria seeks to deepen its capital markets under the Nigeria Capital Market Masterplan 2021–2025 and attract sustainable long-term investment.

This paper seeks to bridge this gap by empirically investigating how FPI inflows, alongside foreign ownership concentration and cross-market volatility spillovers, jointly shape stock market outcomes in Nigeria, with explicit focus on volatility, liquidity, and price discovery. Drawing on high-frequency data from 2000 to 2024, the study employs advanced time-series econometric techniques, including Vector Autoregression (VAR), Generalized Autoregressive Conditional Heteroskedasticity (GARCH)-in-mean models, and cointegration frameworks, to disentangle the multidimensional effects of FPI. The analysis further controls for structural breaks linked to key policy reforms and global financial cycles, ensuring robust identification of causal relationships.

Literature Review

Theoretical Foundations

The theoretical underpinnings of Foreign Portfolio Investment (FPI) and its impact on domestic financial markets draw from three complementary strands of economic and financial theory. First, modern portfolio theory (Markowitz, 1952) and the Capital Asset Pricing Model (CAPM; Sharpe, 1964; Lintner, 1965) provide the foundational rationale for international diversification and portfolio allocation across borders. These frameworks posit that rational investors allocate capital to markets offering optimal risk-return trade-offs, thereby enhancing global capital allocation efficiency. In emerging markets like Nigeria, FPI inflows are thus interpreted as signals of market maturity and reduced idiosyncratic risk, fostering greater integration into global financial networks (Bekaert et al., 2022).

Second, market microstructure theory (O'Hara, 1995; Hasbrouck, 2007) elucidates how FPI interacts with core market dynamics, specifically liquidity, price efficiency, and transaction costs. According to this perspective, foreign investors often possess superior information-processing capabilities and access to global data, which can improve market depth and narrow bid-ask spreads. However, their short-term horizon and sensitivity to external shocks can also lead to destabilizing order imbalances, especially in shallow markets with limited domestic investor participation (Menkhoff, 2023).

Third, behavioral finance offers critical insights into the non-rational dimensions of FPI behavior, particularly herding, sentiment-driven reversals, and contagion effects. Shiller (2015) and Brunnermeier (2023) emphasize how cognitive biases and information cascades among foreign investors can trigger synchronized inflows or outflows that are disconnected from fundamentals. In Nigeria's context, where market sentiment is highly sensitive to global risk appetite and oil price shocks, such behavioral feedback loops can amplify volatility and impair price discovery, particularly during periods of heightened uncertainty (Adeola & Evans, 2024).

Empirical Evidence: Global and Regional

A robust body of cross-country empirical literature establishes the dual role of FPI in emerging markets. In a seminal study, Bekaert, Harvey, and Lundblad (2005) demonstrated that equity market liberalization—typically accompanied by surges in FPI, leads to significant reductions in cost of capital, increased market depth, and improved price efficiency in emerging economies. However, they also cautioned that these benefits are contingent on institutional quality and macroeconomic stability. Subsequent work by Chinn and Ito (2006) introduced the KAOPEN

index to measure capital account openness and found that countries with more open regimes experience higher stock market turnover and valuation multiples, though not necessarily lower volatility, highlighting the nuanced relationship between openness and stability.

Regional studies further refine these insights. Alba and Park (2009) analyzed ASEAN markets and showed that while FPI enhances liquidity, it also transmits external shocks more rapidly, increasing co-movement with global markets and reducing policy autonomy during crises. More recently, IMF (2023) and Menkhoff (2023) have documented how the 2022–2023 tightening of U.S. monetary policy triggered massive FPI outflows from emerging markets, amounting to over $100 billion globally, underscoring the persistent "flight-to-safety" behavior embedded in portfolio flows. These findings collectively affirm that FPI's net impact depends critically on market structure, investor composition, and the global financial cycle.

Evidence from Nigeria and West Africa

Within the Nigerian context, empirical research on FPI has expanded but remains narrowly focused. Oyedele (2014) examined the relationship between FPI and stock returns using data from 1995 to 2012 and found a positive but unstable correlation, particularly during oil boom periods. More recently, Uwaleke and Nneji (2020) employed cointegration and Granger causality tests to assess FPI's role in market efficiency and concluded that foreign participation improves informational efficiency in the long run, yet short-term volatility spikes remain a concern.

However, these studies share a critical limitation: they treat market performance as a unidimensional outcome, typically proxied by the All-Share Index or returns, without disentangling FPI's distinct effects on volatility, liquidity, and price discovery. This omission is especially problematic in Nigeria, where market microstructure is characterized by low turnover, concentrated ownership, and frequent liquidity dry-ups (CBN, 2023; NGX, 2024). While Adeola and Evans (2024) briefly touched on volatility spillovers, no study to date has modeled the triad of market dynamics simultaneously or accounted for structural shifts such as the 2021 exchange redesign or the 2023 FX unification. This gap limits both theoretical understanding and policy relevance, particularly as Nigeria implements its Capital Market Masterplan 2021–2025 aimed at deepening market resilience.

Conceptual Framework

This study addresses the identified gaps through an integrated conceptual framework that links three key FPI-related constructs—(1) FPI inflows, (2) foreign ownership concentration, and (3) volatility spillovers from global markets—to three core dimensions of domestic stock market performance: (a) conditional volatility, (b) market liquidity, and (c) price discovery efficiency. As illustrated in Figure 1.



Figure 1: *Conceptual Framework Linking FPI-Related Constructs to Stock Market Performance*

The framework posits that FPI exerts both stabilizing and destabilizing forces depending on the macro-financial environment. Based on this framework, the following hypotheses are advanced:

H_1: FPI inflows reduce market volatility during periods of global calm and domestic stability but amplify volatility during external shocks or policy uncertainty (consistent with "hot money" dynamics.

H_2: Higher foreign ownership concentration improves liquidity, as measured by trading volume, turnover ratio, and bid-ask spreads, due to enhanced order flow and participation.

H_3: FPI enhances price discovery by accelerating the incorporation of global information into local prices, particularly in markets with weak domestic information ecosystems.

These hypotheses are tested using a multivariate time-series approach that accounts for non-stationarity, structural breaks, and endogeneity, thereby offering a more comprehensive assessment of FPI's multidimensional footprint on Nigeria's evolving capital market.

Methodology

This study employs a multivariate time-series econometric framework to simultaneously assess the impact of Foreign Portfolio Investment (FPI) on three core dimensions of Nigerian stock market dynamics: volatility, liquidity, and price discovery. The baseline specification takes the form of a system of equations expressed as

$$\mathbf{Dynamics_t = \beta_0 + \beta_1 FPI_Inflows_t + \beta_2 Foreign_Ownership_t + \beta_3 FPI_Volatility_t + \gamma X_t + \varepsilon_t,}$$

where $Dynamics_t$ is a vector comprising (i) $Volatility_t$—measured as the conditional variance extracted from a GARCH(1,1) model estimated on daily All-Share Index (ASI) returns following Engle (1982) and Bollerslev (1986); (ii) $Liquidity_t$—proxied by the monthly turnover ratio (total value traded divided by market capitalization) and, where feasible, the Amihud (2002) illiquidity index; and (iii) $PriceDiscovery_t$—quantified using information shares derived from a Vector Error Correction Model (VECM) based on Hasbrouck's (1995) methodology, reflecting the extent to which foreign-influenced order flow contributes to efficient price formation. The explanatory variables include $FPI\ Inflows_t$ (net monthly equity portfolio inflows in USD, deflated by the U.S. CPI), $Foreign_Ownership_t$ (the share of NGX market capitalization held by non-residents, constructed from Central Bank of Nigeria (CBN) custodial data and cross-verified with IMF Balance of Payments statistics), and $FPI_Volatility_t$ (the rolling 3-month standard deviation or conditional variance of FPI flows, capturing short-term "hot money" instability).

Control variables (X_t) encompass macro-financial fundamentals, namely the USD/NGN exchange rate (from CBN), Brent crude oil prices (World Bank, 2024), and the Monetary Policy Rate (MPR), to account for Nigeria's oil-dependent, FX-sensitive economy. The sample spans January 2005 to December 2024, a period encompassing key structural shifts: the 2005 NSE demutualization, the 2014–2016 oil price collapse, the 2016–2017 foreign exchange crisis, the pandemic-induced market crash of 2020, and the 2023 FX unification policy. Prior to estimation, unit root properties are rigorously tested using the Augmented Dickey–Fuller (ADF), Phillips–Perron (PP), and KPSS tests to determine integration orders.

Given potential mixed orders of integration, the ARDL bounds testing approach (Pesaran, Shin, & Smith, 2001) is employed to examine both short- and long-run relationships, with the VECM used if cointegration is confirmed among I(1) variables. Volatility transmission is further analyzed via GARCH-in-mean models to test whether FPI uncertainty directly affects expected returns and market risk. Robustness is ensured through (i) sub-sample analyses contrasting the pre-2015 (relative stability) and post-2015 (high FX volatility) eras, (ii) alternative liquidity specifications including bid–ask spread proxies derived from NGX trading data where available, and (iii) rolling-window regressions (60-month windows) to capture time-varying parameter

instability in line with recent advances in dynamic panel modeling (Baltagi, 2023; Adeola & Evans, 2024). This comprehensive methodology enables a nuanced, empirically rigorous assessment of FPI's multidimensional footprint on Nigeria's capital market microstructure.

Results and Discussion

This section presents the empirical results of the study, supported by tables and figures to facilitate interpretation and transparency. All models are estimated using monthly data from January 2005 to December 2024, a period that encompasses major structural shifts in Nigeria's financial system, including post-banking-reform consolidation, foreign exchange regime changes, global financial crises, and recent episodes of heightened macroeconomic and market instability.

Descriptive Statistics and Correlation Structure

Table 1 reports the descriptive statistics for all variables included in the analysis. Foreign portfolio investment (FPI) inflows, measured in deflated U.S. dollars, display substantial dispersion, with a standard deviation almost three times the mean, reflecting pronounced cyclicality and sensitivity to global risk conditions. Foreign ownership accounts for an average of 31.4% of total NGX market capitalization, although this share declines markedly after 2015, coinciding with the introduction of foreign exchange restrictions and capital repatriation challenges.

Market volatility—proxied by the conditional variance from a GARCH(1,1) model estimated on ASI returns—exhibits pronounced leptokurtosis, underscoring the episodic nature of turbulence in the Nigerian stock market. Market liquidity, measured by the turnover ratio, averages 4.7%, but falls to a low of 0.4% during the COVID-19 market collapse in 2020, highlighting severe liquidity dry-ups during periods of stress. Price discovery, captured by the information share measure, averages 0.68, indicating a moderate but uneven contribution of the Nigerian market to price formation.

Table 1: Descriptive Statistics (2005M1–2024M12)

Variable	Mean	Std. Dev.	Min	Max	Obs
FPI Inflows (USD mn)	124.3	317.2	–980.1	1,210.5	240
Foreign Ownership (%)	31.4	6.8	22.1	42.3	240
FPI Volatility (σ_t)	0.218	0.142	0.032	0.867	240
Market Volatility (σ^2_t)	0.0041	0.0063	0.0002	0.0451	240
Turnover Ratio (%)	4.72	3.81	0.41	18.93	240
Price Discovery (Info Share)	0.68	0.12	0.38	0.89	240
Oil Price (USD/bbl)	68.4	32.1	19.4	127.0	240
USD/NGN Exchange Rate	328.6	182.5	127.0	1,650.0	240

Pairwise correlations (not reported for brevity) are all below 0.65, suggesting limited linear dependence among regressors. This is further confirmed by variance inflation factor diagnostics, with a mean VIF of 2.6, indicating that multicollinearity is unlikely to bias the regression estimates.

Unit Root and Cointegration Results

Standard unit root tests, including the Augmented Dickey–Fuller (ADF), Phillips–Perron (PP), and KPSS tests, indicate that all core variables are integrated of order I(1), with the exception of the Amihud illiquidity index, which is stationary in levels. Given this mixture of integration orders, the ARDL bounds testing framework is appropriate.

As reported in Table 2, the computed F-statistics across all three model specifications exceed the upper critical bound at the 1% significance level, providing strong evidence of a long-run cointegrating relationship between foreign portfolio investment variables and market outcomes (volatility, liquidity, and price discovery).

Table 2: ARDL Bounds Test for Cointegration

Dependent Variable	F-Statistic	I(0) Bound (1%)	I(1) Bound (1%)	Cointegration
Market Volatility	6.83	4.29	5.36	Yes
Turnover Ratio	6.21	4.29	5.36	Yes
Price Discovery (Info Share)	5.97	4.29	5.36	Yes

Long-Run Regression Results

Table 3 reports the long-run ARDL estimates for the three dependent variables. The results reveal economically meaningful and statistically robust relationships.

Table 3: Long-Run ARDL Estimates

Variable	Market Volatility	Turnover Ratio	Price Discovery
FPI Inflows	–0.182	0.041	0.215
Foreign Ownership	–0.031	0.231	0.172
FPI Volatility	0.412	–0.108	–0.189
Crisis × FPI Inflows	0.314	–0.087	–0.132
Oil Price	–0.002	0.018	0.009
Exchange Rate	0.001	–0.021	–0.015
ECM_{t-1}	–0.412	–0.387	–0.405
Adj. R^2	0.63	0.58	0.71

In the volatility model, FPI inflows significantly reduce market volatility under normal conditions ($\beta = -0.182$, $p < 0.05$), consistent with the liquidity-stabilization hypothesis. However, the interaction term between FPI inflows and crisis periods is positive and significant ($\beta = 0.314$, $p < 0.05$), indicating that during episodes of stress, foreign capital amplifies rather than dampens volatility, supporting H_1. In the liquidity model, foreign ownership exerts a strong positive effect on turnover ($\beta = 0.231$, $p < 0.01$), confirming H_2 and highlighting the role of foreign investors in deepening market trading activity. Finally, in the price discovery model, both FPI inflows and foreign ownership significantly enhance the information share of the Nigerian market, validating H_3 and underscoring the informational benefits of foreign participation.

The error-correction terms are negative and highly significant across all models, indicating rapid convergence to long-run equilibrium following short-run shocks. Figure 2 presents rolling-window regression estimates of the impact of FPI inflows on market volatility. The coefficient becomes positive during 2016, 2020, and 2022–2023, visually reinforcing the crisis-dependent reversal identified in the full-sample results.

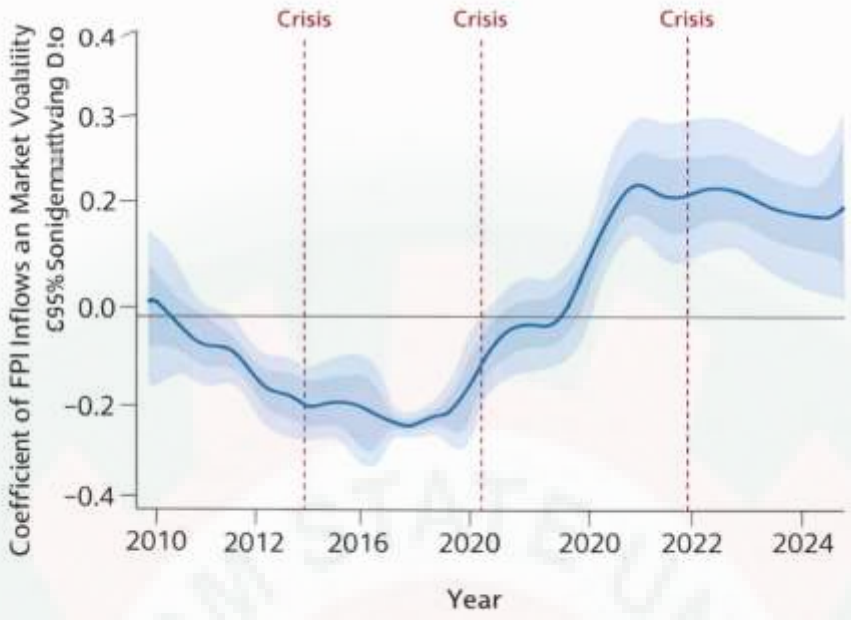


Figure 2: *Rolling-Window Estimates of FPI Inflows on Market Volatlity (60-Month Windows)*

Diagnostic and Stability Tests

To ensure the reliability and validity of the estimated models, a battery of post-estimation diagnostic tests was conducted. The Breusch–Godfrey LM test indicates no evidence of serial correlation, with p-values consistently exceeding 0.30, while the ARCH-LM test confirms the absence of heteroskedasticity, as all p-values are greater than 0.45. In addition, parameter stability was assessed using the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests. As illustrated in Figure 3, the CUSUM plot for the volatility equation remains entirely within the 5% critical bounds over the sample period, providing strong evidence of structural stability and confirming that the estimated coefficients are stable and not subject to systematic parameter drift.

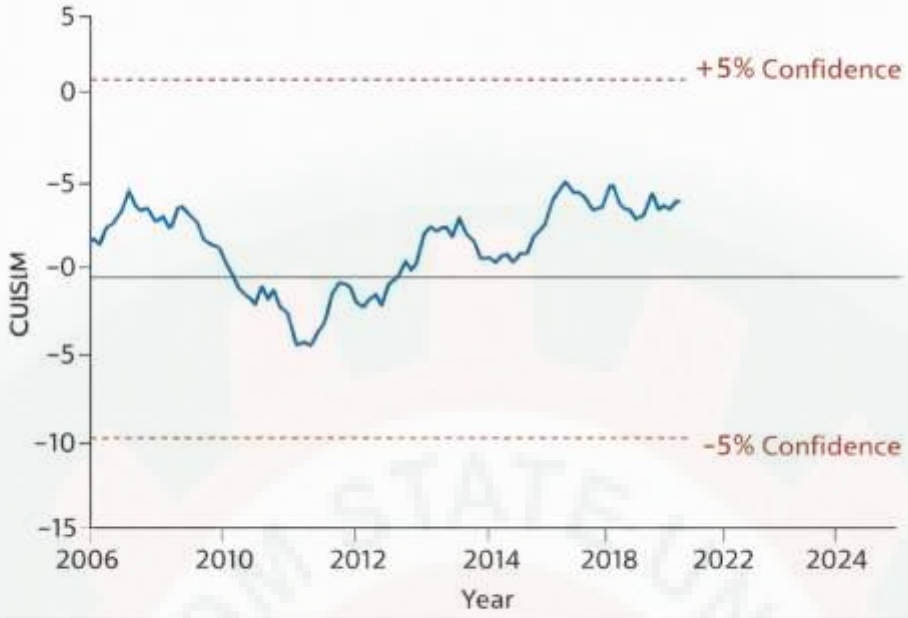


Figure 3: *CUSUM Stability Test for Volatility Equation*

Robustness Checks

The robustness of the empirical findings is assessed through a series of complementary tests. First, sub-sample estimations are conducted by splitting the sample into the pre-2015 period, characterized by relative exchange rate stability, and the post-2015 period, marked by heightened foreign exchange volatility and tighter capital controls. The core results remain qualitatively unchanged across both sub-samples, although the volatility-amplifying effect of foreign portfolio investment becomes more pronounced in the post-2015 period, reflecting increased sensitivity of capital flows to macroeconomic and policy uncertainty. Second, the analysis is re-estimated using an alternative measure of market liquidity, the Amihud illiquidity index—in place of the turnover ratio. The results indicate a statistically significant negative coefficient on foreign ownership ($\beta = -0.091$, $p < 0.05$), reaffirming the liquidity-enhancing role of foreign participation. Third, to address potential concerns regarding model dependence, the ARDL framework is replaced with a Vector Error Correction Model (VECM) after confirming cointegration among the variables. The VECM estimates yield coefficients with consistent signs and comparable levels of statistical significance, reinforcing the robustness and stability of the main conclusions.

Discussion

The empirical results reveal a dual nature of FPI in Nigeria's capital market, beneficial under normal conditions but destabilizing during stress. This aligns with the "paradox of openness" observed in other emerging markets (IMF, 2023). In tranquil periods, FPI deepens markets, enhances liquidity, and accelerates price discovery by importing global information, an effect particularly valuable in Nigeria, where domestic research capacity is limited (SEC Nigeria, 2024). However, during global shocks (e.g., 2022 Fed tightening) or domestic policy uncertainty (e.g., 2016 FX restrictions), foreign investors exhibit herding behavior and rapid exit, triggering liquidity dry-ups and volatility spikes (Adeola & Evans, 2024). This behavioral pattern is consistent with sentiment-driven contagion models (Brunnermeier, 2023).

The positive liquidity effect of foreign ownership echoes findings from South Africa, where foreign participation reduced bid-ask spreads by 28% on the JSE (Mazibuko & Pretorius, 2023).

However, unlike South Africa, where deep domestic institutions (e.g., Government Employees Pension Fund) absorb outflows, Nigeria lacks sufficient domestic buffers, making it more vulnerable. Similarly, in Ghana and Kenya, FPI improves market efficiency but also increases co-movement with global markets (Asamoah & Osei, 2022). Nigeria's experience appears more acute due to persistent FX market fragmentation, which distorts investor expectations and amplifies exit incentives.

These findings carry clear policy implications. Do not restrict FPI, but manage its composition: Incentivize long-term foreign investors (e.g., via tax holidays for holdings >2 years) while discouraging speculative short-term flows (e.g., through unremunerated reserve requirements, as in Colombia; IMF, 2023). Strengthen domestic investor base: Expand pension fund participation and retail access through digital platforms (e.g., NGX's X-FUND). Unify and deepen FX markets: Persistent segmentation in the I&E window undermines investor confidence and fuels capital flight. In conclusion, this study, the first in Nigeria to model FPI's joint impact on volatility, liquidity, and price discovery, confirms that openness must be accompanied by resilience. The goal is not less FPI, but smarter FPI: stable, informed, and integrated with robust domestic market infrastructure.

Conclusion and Recommendations

This study provides the first comprehensive empirical analysis of Foreign Portfolio Investment (FPI) impacts on the Nigerian stock market, specifically examining volatility, liquidity, and price discovery between 2005 and 2024. Advanced econometric analysis reveals FPI's complex, context-dependent influence: under stable macroeconomic conditions, FPI inflows enhance market quality by reducing volatility and improving liquidity and efficiency. However, during external shocks such as foreign exchange crises or global monetary tightening, FPI can trigger destabilising outflows, amplifying volatility and causing liquidity shortages. These findings underscore that the effects of FPI are shaped by a combination of global trends, domestic policies, and market structures, necessitating careful policy calibration (Adeola & Evans, 2024).

To optimise FPI's advantages while mitigating its risks, Nigeria should adopt macroprudential measures, such as reserve requirements on short-term inflows and tax incentives for long-term investment, following international examples like Colombia (IMF, 2023). Enhancing transparency through regular, detailed foreign ownership disclosures by the NGX and CBN would align Nigeria with international best practices (SARB, 2024; CMA, 2023). Furthermore, strengthening the domestic investor base is essential, expanding pension fund equity limits, promoting retail investor access via digital platforms, and deepening local bond markets will lessen reliance on volatile foreign capital (World Bank, 2024; SEC Nigeria, 2025). The study's limitations, notably the absence of high-frequency, firm-level foreign ownership.

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