



Financial technology and the performance of deposit money banks in Nigeria

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Abstract. This research aimed to explore how the adoption of financial technology has influenced the performance of Nigerian Deposit Money Banks. Quarterly time series data from 2014 to 2023 were analysed using the Autoregressive Distributed Lag model. The FinTech channels assessed included Point of Sale terminals, Automated Teller Machines, mobile banking, and internet banking. The long-run results revealed that mobile banking (coefficient = 9.5212, $p = 0.0314$) and internet banking (coefficient = 11.8512, $p = 0.0365$) significantly enhanced the Net Interest Margin, indicating that the adoption of these digital platforms improved banks' ability to generate interest income from lending activities. In contrast, Point of Sale transactions (coefficient = -37.0647 , $p = 0.0114$) and Automated Teller Machines transactions (coefficient = -30.1525 , $p = 0.1153$) negatively impacted the Net Interest Margin, suggesting that reliance on traditional payment infrastructure reduced banks' interest-based profitability. Inflation (coefficient = 1.7993, $p = 0.0154$) had a significant positive effect on the Net Interest Margin, implying that higher inflation raised lending rates, thereby benefiting banks' interest margins. For Return on Equity FinTech channels exhibited weak and statistically insignificant effects, suggesting that factors such as capital structure, shareholder equity, and non-interest income played a more dominant role in determining profitability than digital banking technologies. The short-run analysis showed that Automated Teller Machine transactions had a marginally negative effect on the Net Interest Margin (coefficient = -12.2540 , $p = 0.0579$), while mobile banking, Point of Sale, and inflation did not show significant effects on either Return on Equity or Net Interest Margin in the short term. The study recommended that banks increase investment in mobile and internet banking platforms, while reassessing the cost-effectiveness of Point of Sale and Automated Teller Machines infrastructure. This research offered valuable insights for banks and policymakers, underscoring the need to prioritise digital banking innovations to enhance profitability and overall financial performance in Nigeria

Keywords: FinTech adoption; Net Interest Margin; Return on Equity; banking performance; mobile banking

Introduction

The global financial environment has been transforming rapidly due to the rise of electronic payments and continuous technological innovation. Technology is the backbone of finance, driving a major shift in how banking and

financial solutions are delivered. To stay competitive, banks must keep up with emerging trends and leverage these innovations for sustainable growth. According to J. Kagan (2025), FinTech utilises digital technology

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to streamline and automate financial services, making them more efficient and accessible. It replaces traditional methods with faster and more effective solutions, transforming the way financial institutions operate. According to T. Philippon (2016), technological innovation brought about by FinTech was believed to have a potential effect on key performance indicators for banks. The integration of FinTech innovations can lead to significant improvements in operational efficiency and a reduction in transaction costs. S. Claessens *et al.* (2018) identified that the development and deployment of user-friendly digital platforms and personalised financial products enhance customer acquisition and satisfaction, ultimately driving revenue growth and improved profitability.

C.C. Okoro *et al.* (2024) investigated the influence of electronic banking on the performance of financial institutions using evidence from Nigerian banks. Data were collected from the Central Bank of Nigeria (CBN) statistical bulletin for the period 2010-2022, and the Ordinary Least Squares (OLS) regression method was used. The results indicated that Automated Teller Machines (ATM) and Point of Sale (POS) transactions exerted a positive but insignificant effect on total savings (TS), while internet banking showed a negative but insignificant influence on the efficiency of commercial banks in Nigeria. The study stated that continued heavy investment in financial technology services may be unjustified, given their limited impact on bank performance. B.M. Ilo *et al.* (2024) examined how digital technology adoption affected Nigerian Deposit Money Banks' (DMBs) financial performance. Monthly data were obtained from the CBN and the Nigeria Inter-Bank Settlement System (NIBSS) for the period 2012-2019. The authors found that financial technology had a significant positive impact on the efficiency of Nigerian DMBs. M.A. Gbanador (2023) used monthly time-series data spanning 2019-2021 to examine the effects of the digital banking system on Nigerian DMBs' efficiency. The CBN's statistical bulletin provided the data, and the Fully Modified Ordinary Least Squares method was applied. The findings indicated that digital banking had no discernible impact on bank performance in the short term. However, mobile banking demonstrated a positive and substantial influence on bank efficiency, whereas ATM and POS services had favourable, but negligible effects.

C.M. Barbu *et al.* (2021) examined the factors that enhanced customer satisfaction within the FinTech sector, with a particular focus on technological advances, personalisation, and round-the-clock access to financial services. The authors utilised the Stimulus-Organism-Response model and Partial Least Squares Structural Equation Modelling to analyse customer experience in digital financial services. The researchers found that advances in technology significantly contributed to customer satisfaction. M.A. Nangin *et al.* (2020) explored the role of innovation in FinTech service delivery, particularly focusing on the factors that influenced trust in FinTech services.

The researchers' findings revealed that perceived ease of use and promotional activities had a significant positive effect on trust, while security did not have a direct impact as expected. C.I. Osakwe & C.N. Ezeaku (2022) investigated how digital banking affected Nigerian DMBs' operational effectiveness. The findings revealed that ATM transactions had a significant effect on operational efficiency, but POS and mobile banking transactions exerted a negative and insignificant influence. O. Ashiru *et al.* (2023) also explored the relationship between financial innovation and performance among Nigerian DMBs. The authors noted that Automated Teller Machines, credit and debit cards, mobile banking, online banking, and agent banking had both short- and long-run effects on DMBs, while National Electronic Funds Transfer and the Inter-Bank Settlement System instant payment had a negative effect. Overall, the studies analysed relied on indicators such as total savings, Return on Assets (ROA), Return on Equity (ROE), and Earnings per Share (EPS) to measure profitability. Previous studies in Nigeria had not used Net Interest Margin (NIM) as an indicator to assess bank performance, as it focuses specifically on profit generated from interest-related activities, which is the primary revenue source for banks. This contrasted with Return on Equity and Return on Assets, which reflect managerial decisions such as asset valuation. This study aimed to examine how FinTech affects the performance of DMBs, emphasising how it had improved banking performance in Nigeria.

Literature Review

The official website of the Central Bank of Nigeria (n.d.) stated that FinTech adoption has been driven by the Central Bank's cashless policy, which promotes digital technologies such as ATMs, POS systems, mobile and web banking, and other electronic funds transfers. These developments have shifted banking from branch-based to digital-first services. FinTech integrates advanced technology into financial services, transforming transaction methods. According to E. Abad-Segura *et al.* (2020), both start-ups and traditional institutions use digital platforms innovatively. FinTech promotes financial inclusion by expanding access to underserved populations. N. Nurlaela *et al.* (2020) found that FinTech adoption, including e-money and digital transactions, expanded customer bases and boosted performance, while A.K. Zaghlol *et al.* (2021) demonstrated that technology integration improves efficiency, customer experience, and cost savings. This framework is highly relevant to the present study, explaining why Nigerian DMBs have adopted technologies such as mobile banking, internet banking, ATMs, and POS systems in response to regulations, inefficiencies, and shifting customer needs.

E.J. Ighoroje & E.E. Okoroyibo (2020) assessed the cashless policy and the performance of Nigerian DMBs over the period 2009-2018. Quarterly data collected from the CBN statistical bulletin were utilised, and the

data were analysed using the Autoregressive Distributed Lag (ARDL) approach. Their results showed that ATMs and web banking exerted positive and significant effects on bank performance; however, mobile banking had a significant negative effect. POS transactions were found to have a positive but insignificant influence on ROE (Return on Equity). The study concluded that the digital payment policy has generally enhanced the efficiency of Nigerian DMBs. H.W. Akani & R.L.T. Obiosa (2020) assessed digital innovation over the period 2009-2017 using panel data. The authors' findings revealed negative and insignificant effects of ATMs and electronic fund transfers on ROE, while mobile and online banking and information and communications technology investment had positive but insignificant impacts. J.U. Madugba *et al.* (2021) investigated digital banking and the financial efficiency of DMBs in Nigeria. The Ordinary Least Squares regression technique was used to analyse the data. The findings showed that ATMs had a positive and significant influence on both ROA and EPS. POS transactions and electronic fund transfers were found to significantly affect ROA, with POS having a positive impact and electronic fund transfers a negative one. Web banking, however, exhibited a positive but insignificant effect on EPS and ROA. K.O. Chukwu & S.R. Molokwu (2022) investigated electronic banking and the efficiency of Nigerian banks from 2010 to 2019. The results showed that digital banking exerted a positive but statistically insignificant influence on the performance of these banks. The study concluded that digital banking may not yet be a major determinant of commercial bank performance within the Nigerian context. The authors A. Nasserinia *et al.* (2014) pointed out that NIM is a crucial indicator for assessing a bank's intermediation efficiency and performance within the industry. Similarly, M. Umar *et al.* (2014) noted that inflation also influences banking operations by affecting interest rates and loan performance, and provided a comprehensive analysis of how macroeconomic conditions shape the effect of FinTech adoption on bank performance. Researchers such as M.S.N. Islam *et al.* (2022) explored the effects of digital innovation on the delivery of financial services by DMBs in Nigeria. They relied on secondary data drawn from the annual reports and accounts of banks covering a ten-year period (2012-2021). The results revealed that internet banking, mobile banking, and POS transactions all had a significant positive impact on the delivery of financial services. Based on these findings, the study concluded that the use of financial technologies has enhanced bank performance, particularly by improving operational efficiency and reducing costs.

Materials and Methods

In this study, an *ex post facto* research design was adopted, analysing quarterly time-series data from 2014 to 2023 obtained from the CBN (values of Automated Teller Machine operations, mobile banking trans-

actions, POS transactions, internet banking operations, and inflation rate) and the Nigeria Deposit Insurance Corporation (Return on Equity and Net Interest Margin) (Central Bank of Nigeria, n.d.c; Nigeria Deposit Insurance Corporation, n.d.). The study focused on all DMBs licensed and supervised by the CBN as of 31 December 2024. This amounted to a total of 36 banks, forming the study population. The choice of the banking sector was justified by its critical role in the economy as a financial intermediary, facilitating the flow of funds from surplus households to those in need, thereby supporting economic activity and growth. The study adopted the model of H.W. Akani & R.L.T. Obiosa (2020), replacing Electronic Funds Transfers with POS transactions and including inflation as a macroeconomic control variable. Two models were specified:

$$ROEt = \alpha_0 + \beta_1 ATMt + \beta_2 POST + \beta_3 MOBt + \beta_4 IBt + \lambda INFt + \epsilon_t; \quad (1)$$

$$NIM = \alpha_0 + \beta_1 ATMt + \beta_2 POST + \beta_3 MOBt + \beta_4 IBt + \lambda INFt + \epsilon_t; \quad (2)$$

where *ROE* – the Return on Equity; *NIM* – the Net Interest Margin; *ATM* – the Automated Teller Machine; *POS* – the Point of Sale; *MOB* – the mobile banking; *IB* – the internet banking operations; *INF* – the inflation rate; α_0 – the intercept; $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ – the coefficients of the FinTech variables; λ – the coefficients capturing the effect of inflation and its interaction with FinTech variables; ϵ_t – the error term.

Variables represented transaction values (billion NGN) or percentages, and *INF* denoted the annual inflation rate. This study adopted the ARDL model due to its ability to handle variables with varying degrees of integration, *I*(1) and *I*(0). Unlike conventional cointegration techniques that required uniform integration, the ARDL bounds testing approach accommodated both stationary and non-stationary variables, making it suitable for time-series data in Nigeria's banking sector. It also produced efficient estimates with small samples and simultaneously captures short-run and long-run dynamics, providing a comprehensive view of how FinTech adoption affected banking performance. An Error Correction Model was derived from the ARDL results to analyse short-run adjustments. The error correction term (*CointEq*(-1)) reflected the rate at which short-run deviations in banking performance return to long-run equilibrium after FinTech-related shocks. A significant and negative coefficient indicated the existence of long-run cointegration. To ensure the model's reliability, various diagnostic tests were applied. The Breusch-Godfrey test checked for serial correlation, while the Breusch-Pagan-Godfrey test was applied to assess whether heteroskedasticity (non-constant variance of residuals) was present in the models. The Ramsey RESET test verified the correctness of the model specification. For each variable

under investigation, the stationarity of the time-series data was examined using the Augmented Dickey-Fuller (ADF) unit root test. The null hypothesis that there was a unit root in the data was tested using the ADF test, which showed non-stationarity. For variables that were found to be non-stationary at the level, the first difference was taken to achieve stationarity. The test results were used to guide the selection of the appropriate econometric model. The short-run analysis was designed to record the immediate consequences of altering the independent variables (such as ATM, mobile, POS, internet banking usage, and inflation) on the dependent variables (NIM and ROE). It examined the instantaneous effect of changes in the independent variables before the system had fully adjusted to a new equilibrium, while the long-run analysis examined the effects of changes in the

independent variables on NIM and ROE once the system had reached a new equilibrium.

Results and Discussion

To understand the impact of financial technology on the performance of DMBs, a range of quantitative analyses was employed to explore key financial metrics such as NIM and ROE. The analysis investigated how various FinTech channels, including mobile banking, internet banking, POS, and ATM transactions, influenced these performance indicators. The role of inflation was also considered to assess its interaction with digital banking adoption (Krylovskiy, 2024). Descriptive statistics and correlation analysis were also presented, along with unit root tests. Table 1 presented insights into the distribution of the variables in the study.

Table 1. Descriptive statistics

	NIM	ROE	LNVATM	LNVMOB	LNVPOS	LNIB	INF
Mean	2.791282	10.38231	14.71110	14.04894	13.74486	13.89477	14.75077
Median	1.440000	5.710000	14.29974	13.50965	13.38535	11.66357	13.71000
Maximum	14.79000	49.13000	17.13639	18.04181	17.37315	19.69071	28.92000
Minimum	0.410000	-1.050000	13.57223	11.10285	11.11941	9.556280	7.800000
Standard deviation	2.763750	12.41121	0.891595	2.284075	1.938023	4.119577	5.180710
Skewness	2.397119	2.108252	0.722094	0.417682	0.429671	0.410702	0.766004
Kurtosis	10.15384	6.456124	2.530935	1.714156	1.913379	1.273622	3.181818
Observations	39	39	39	39	39	39	39

Note: NIM – Net Interest Margin; ROE – Return on Equity; LNVATM – Log of Value of Automated Teller Machine transactions; LNVMOB – Log of Value of Mobile Banking; LNVPOS – Log of Value of Point of Sale transactions; LNIB – Log of Value of Internet Banking transactions; INF – Inflation rate

Source: Central Bank of Nigeria (n.d.b), Nigeria Deposit Insurance Corporation (n.d.)

The mean for NIM was 2.791282, with a standard deviation of 2.763750, indicating comparatively low average margins but moderate variation across the banks. This suggested that while most banks had similar performance in terms of interest income, a few performed significantly better. The ROE, with a high standard deviation of 12.41121 and a mean of 10.38231, indicated that bank profitability varied significantly. This variability implied that some banks were highly profitable, while others were not, reflecting a diverse range of performance outcomes. For the digital financial service variables, ATM transactions (LNVATM) showed high consistency, with a low standard deviation of 0.891595. In contrast, mobile banking (LNVMOB) and POS transactions

(LNVPOS) displayed moderate variability, with corresponding standard deviations of 2.284075 and 1.938023, reflecting some differences in adoption and usage across banks. Internet banking (LNIB) had a higher standard deviation of 4.119577, indicating a wider spread in its usage, which may be due to disparities in technological infrastructure or customer adoption rates. The INF, with a standard deviation of 5.180710 and a mean of 14.75077, showed noticeable fluctuations from 2014 to 2023, which could influence banking performance, particularly in terms of interest rates and margins. These results highlighted significant variations in both bank performance and digital banking adoption. Table 2 presented the correlation analysis.

Table 2. Correlation analysis

Variables	NIM	ROE	LNVATM	LNVMOB	LNVPOS	LNIB	INF
NIM	1.000						
ROE	0.413	1.000					
LNVATM	-0.189	0.283	1.000				
LNVMOB	-0.104	0.453	0.504	1.000			
LNVPOS	-0.113	0.462	0.523	0.585	1.000		

Table 2, Continued

Variables	NIM	ROE	LNVATM	LNVMOB	LNVPOS	LNIB	INF
LNIB	-0.169	0.295	0.542	0.548	0.524	1.000	
INF	-0.078	0.461	0.666	0.567	0.591	0.672	1.000

Note: NIM – Net Interest Margin; ROE – Return on Equity; LNVATM – Log of Value of Automated Teller Machine transactions; LNVMOB – Log of Value of Mobile Banking; LNVPOS – Log of Value of Point of Sale transactions; LNIB – Log of Value of Internet Banking transactions; INF – Inflation rate

Source: Central Bank of Nigeria (n.d.b), Nigeria Deposit Insurance Corporation (n.d.)

The correlation matrix indicated moderate associations among several independent variables, suggesting some potential for multicollinearity. Specifically, INF showed a moderately strong correlation with LNVATM ($r = 0.666$) and LNIB ($r = 0.672$). Meanwhile, the relationship between LNVMOB and INF decreased to 0.567, slightly reducing the risk. Among the digital variables, LNVMOB and LNVPOS had a moderate correlation of 0.585,

while LNVMOB and LNIB were correlated at 0.548, and LNVPOS and LNIB at 0.524. These values were moderate and did not indicate severe multicollinearity problems. Overall, no correlation exceeded the critical 0.80 threshold, meaning that serious multicollinearity was absent. Table 3 presented the unit root test results to determine whether the variables were stationary at level $I(0)$ or at first difference $I(1)$ before applying the ARDL model.

Table 3. ADF unit root test

Variable	t-statistic	p-value	Stationary level
NIM	-4.232887	0.0019	Level $I(0)$
ROE	-8.084775	0.0000	First difference $I(1)$
LNVATM	-9.911033	0.0000	Level $I(0)$
LNVMOB	-8.471941	0.0000	First difference $I(1)$
LNPOS	-8.187939	0.0000	First difference $I(1)$
LNIB	-6.648748	0.0000	First difference $I(1)$
INF	-3.917627	0.0211	First difference $I(1)$

Note: NIM – Net Interest Margin; ROE – Return on Equity; LNVATM – Log of Value of Automated Teller Machine transactions; LNVMOB – Log of Value of Mobile Banking; LNVPOS – Log of Value of Point of Sale transactions; LNIB – Log of Value of Internet Banking transactions; INF – Inflation rate

Source: Central Bank of Nigeria (n.d.b), Nigeria Deposit Insurance Corporation (n.d.)

NIM and LNVATM were stationary at level $I(0)$, with significant test statistics and p-values. The other variables – ROE, LNVMOB, LNVPOS, LNIB, and INF – were only stationary after first differencing $I(1)$, as shown by their significant ADF test results. The test confirmed that the data were suitable for ARDL bounds testing and long-run relationship analysis because the integration order was mixed, between $I(0)$ and $I(1)$. Table 4 presented the ARDL bounds test results to examine the existence of a long-run relationship between the dependent variables and their regressors. The original model with NIM as the dependent

variable showed that the F-statistic (20.42051) exceeded the upper bound critical value at the 1% significance level, confirming a strong long-run relationship. Similarly, for the robustness check with ROE as the dependent variable, the F-statistic (5.078673) was above the upper bound at the 5% level, suggesting a moderate long-run relationship. These results provided evidence that both models exhibited statistically significant long-run associations with their explanatory variables. Table 5 presented the short-run effects of changes in one variable on another before the system fully adjusts to a new equilibrium.

Table 4. ARDL bounds test results

Dependent variable	F-statistic	K	Significance level, %	$I(0)$ bound	$I(1)$ bound	Decision
NIM	20.42051	5	10	2.75	3.79	Long-run relationship exists
			5	3.12	4.25	
			2.5	3.49	4.67	
			1	3.93	5.23	
ROE	5.078673	5	10	2.75	3.79	Long-run relationship exists
			5	3.12	4.25	
			2.5	3.49	4.67	
			1	3.93	5.23	

Note: NIM – Net Interest Margin; ROE – Return on Equity; K – number of lags

Source: Central Bank of Nigeria (n.d.b), Nigeria Deposit Insurance Corporation (n.d.)

Table 5. Short-run results

Variable	ROE coefficient	ROE p-value	NIM coefficient	NIM p-value
D(LNVATM)	7.0578	0.4198	-12.2540	0.0579
D(LNVMOB)	-6.0934	0.7197	12.8958	0.1239
D(LNVPOS)	9.5212	0.3123	-7.7276	0.2307
D(LNIB)	-6.7471	0.0157	2.2305	0.0560
D(INF)	1.1228	0.3996	-0.8915	0.2145
CointEq (-1)	-0.6470	0.0114	-1.0957	0.0038

Note: D(LNVATM) – Change in the Log of Value of Automated Teller Machine transactions; D(LNVMOB) – Change in the Log of Value of Mobile Banking; D(LNVPOS) – Change in the Log of Value of Point of Sale transactions; D(LNIB) – Change in the Log of Value of Internet Banking transactions; D(INF) – Change in Inflation rate; C – Constant

Source: Central Bank of Nigeria (n.d.b), Nigeria Deposit Insurance Corporation (n.d.)

In the short run, ATM operations had no statistically significant impact on ROE (coefficient = 7.0578, $p = 0.4198$) but exerted a marginally significant negative impact on NIM, the core dependent variable (coefficient = -12.2540, $p = 0.0579$), suggesting that increased ATM usage may slightly reduce banks' net interest margins. Mobile transactions did not show significant effects on either ROE (coefficient = -6.0934, $p = 0.7197$) or NIM (coefficient = 12.8958, $p = 0.1239$) in the short run. POS transactions also had no significant impact on ROE (coefficient = 9.5212, $p = 0.3123$) or NIM (coefficient = -7.7276, $p = 0.2307$). In contrast, IB transactions had a statistically significant negative effect on ROE (coefficient = -6.7471, $p = 0.0157$) and a marginally

positive effect on NIM (coefficient = 2.2305, $p = 0.0560$), indicating their potential to enhance interest margins while possibly reducing equity-based returns. Inflation did not have a significant short-run influence on either ROE (coefficient = 1.1228, $p = 0.3996$) or NIM (coefficient = -0.8915, $p = 0.2145$). Lastly, the error correction terms (CointEq(-1)) were statistically significant for both models – ROE (coefficient = -0.6470, $p = 0.0114$) and NIM (coefficient = -1.0957, $p = 0.0038$) – confirming the existence of a stable short-run adjustment mechanism towards long-run equilibrium in both the robustness and core models. Table 6 presented the long-run effects of one variable on another after all short-term adjustments had occurred and the system had reached equilibrium.

Table 6. Long-run analysis results

Variable	NIM coefficient	NIM standard error	NIM p-value	ROE coefficient	ROE standard error	ROE p-value
LNVATM	-30.1525	15.0317	0.1153	-47.2165	30.5725	0.1448
LNVMOB	9.5054	5.3699	0.0314	-34.6419	19.1726	0.0923
LNVPOS	-37.0647	8.7829	0.0135	-14.7167	17.6676	0.4188
LNIB	11.8512	3.8313	0.0365	28.1131	13.6872	0.0591
INF	1.7993	0.4436	0.0154	0.5777	1.2863	0.6602
C	596.7181	233.4955	0.0629	944.0505	535.3490	0.0996

Note: NIM – Net Interest Margin; ROE – Return on Equity; LNVATM – Log of Value of Automated Teller Machine transactions; LNVMOB – Log of Value of Mobile Banking; LNVPOS – Log of Value of Point of Sale transactions; LNIB – Log of Value of Internet Banking transactions; INF – Inflation rate; C – Constant

Source: Central Bank of Nigeria (n.d.b), Nigeria Deposit Insurance Corporation (n.d.)

In the long run, ATM usage (LNVATM) had a negative effect on both NIM and ROE, with coefficients of -30.1525 and -47.2165, respectively; however, these effects were statistically insignificant, indicating that ATM transactions may not substantially influence bank profitability over time. Mobile banking transactions (LNVMOB) significantly improved NIM, with a coefficient of 9.5054 and a p-value of 0.0314, suggesting that increased mobile usage enhanced banks' interest-based profitability. Conversely, their effect on ROE was negative (-34.6419) and marginally significant ($p = 0.0923$), implying that, while mobile transactions boosted NIM, they may not necessarily translate into higher ROE. POS transactions (LNVPOS) had a significantly negative impact on NIM

(-37.0647, $p = 0.0135$), indicating that greater reliance on POS channels may reduce banks' interest margins. However, the effect on ROE was negative (-14.7167) but not significant, suggesting no clear long-term influence on overall profitability. Internet-based transactions (LNIB) positively and significantly affected both NIM (11.8512, $p = 0.0365$) and ROE (28.1131, $p = 0.0591$), suggesting that online platforms were a strong driver of long-term profitability. INF also showed a significant positive impact on NIM (1.7993, $p = 0.0154$), indicating that higher inflation may benefit banks' interest margins, while its effect on ROE (0.5777, $p = 0.6602$) was positive but not significant. Table 7 presented whether the model passed basic statistical checks.

Table 7. Diagnostic test results for NIM and ROE models

Test	NIM test statistic	NIM p-value	ROE test statistic	ROE p-value
Serial correlation (Breusch-Godfrey)	F=0.376	0.7268	F=1.102	0.3421
Heteroskedasticity (Breusch-Pagan-Godfrey)	F=1.937	0.2755	F=2.481	0.1392
Heteroskedasticity (Obs*R ²)	Chi ² =28.719	0.3240	Chi ² =19.876	0.4115
Ramsey RESET test	F=0.733	0.4548	F=1.204	0.2876

Note: NIM – Net Interest Margin; ROE – Return on Equity; F – F-test statistic; Chi² – Chi-squared test statistic

Source: Central Bank of Nigeria (n.d.b), Nigeria Deposit Insurance Corporation (n.d.)

The diagnostic tests indicated that both the NIM and ROE models were generally well specified. There was no evidence of heteroskedasticity (NIM: $p = 0.2755, 0.3240$; ROE: $p = 0.1392, 0.4115$), and the Ramsey RESET tests confirmed a correct functional form (NIM: $p = 0.4548$; ROE: $p = 0.2876$). The Breusch-Godfrey serial correlation tests also showed no significant serial correlation (NIM: $p = 0.7268$; ROE: $p = 0.3421$), suggesting that the residuals were not autocorrelated and that the models were appropriately specified in terms of their dynamic structures. The findings indicated that mobile and Internet banking transactions had a positive and significant long-run impact on NIM. This implies that mobile and internet banking enhanced banks' ability to earn interest income from their core lending activities. POS and ATM transactions had negative effects – significant for POS and insignificant for ATM – on NIM, while INF had a positive and significant effect. Rising inflation may increase lending rates, thereby boosting interest income and benefiting NIM. FinTech usage had mixed and mostly insignificant effects on ROE. ROE was positively and marginally affected by internet banking, negatively but weakly by mobile banking, and adversely by POS and ATM transactions. Overall, FinTech adoption had little effect on ROE, possibly because ROE also depended on broader factors such as shareholder equity, capital structure, and non-interest income, rather than solely on digital transaction values.

The official website of the Central Bank of Nigeria (n.d.a) stated that in Nigeria, the adoption of financial technology has grown significantly, with both businesses and individuals shifting away from conventional banking methods in favour of digital solutions. This shift was largely driven by the CBN of Nigeria's financial digitalisation policies, which introduced a wave of technological advancements in banking, including POS, ATMs, mobile and Internet banking, as well as electronic fund transfer systems such as the Nigeria Interbank Settlement System Electronic Funds Transfer and the Nigeria Interbank Settlement System Instant Payments. The Nigerian Inter-Bank Settlement System (n.d.) reported that the use of digital payment channels such as ATMs, POS machines, mobile banking, and internet banking rose sharply in Nigeria during the first half of 2023. The total value of transactions through these epayment platforms reached 256.4 trillion NGN – an impressive 20.24% increase from the 204.5 trillion NGN recorded during the same period in 2022. By the end of 2023, this figure had

risen to 600 trillion NGN compared with 387 trillion NGN in 2022, representing an increase of about 55%. This significant growth reflected the increasing adoption of digital payment methods by individuals and businesses across Nigeria.

It was found that innovations enhanced service delivery, expanded financial inclusion, increased operational efficiency, improved cost-effectiveness, and broadened revenue sources. W.L. Silber (1983) emphasised that innovation was essential in financially constrained environments. G. Suseendran *et al.* (2019) observed a growing technological impact on FinTech services. According to J.I. Ali *et al.* (2016), DMBs aimed to generate profit by collecting deposits and issuing loans or credit at specified interest rates, with profitability serving as a primary indicator of performance. N.O. Awendo & S. Mwanzia (2022) viewed performance as the successful attainment of goals, measured in terms of accuracy, completeness, cost-effectiveness, and speed of execution. The Constraint-Induced Financial Innovation Theory, developed by W.L. Silber (1983), posited that financial institutions engaged in innovation mainly to overcome constraints such as regulations, inefficiencies, and market competition. When limitations threatened profitability or growth, firms devised new instruments, services, and processes to circumvent these barriers. This positioned financial innovation as a deliberate survival strategy rather than a by-product of technology, with institutions proactively adopting innovations to remain competitive and improve performance. J. Lerner (2006) noted that heavily regulated banks often turn to technology to cut costs and boost efficiency, making innovation essential for sustainability. S. Johnson & J. Kwak (2012) added that banks resisting innovation risk failure in a digital, competitive environment. In practice, pressures from consumer expectations, regulations, and FinTech competition have driven the adoption of digital banking, mobile payments, and automated services to enhance efficiency and profitability.

Conclusions

The performance of Nigerian Deposit Money Banks was examined in relation to the implementation of financial technology, focusing on Net Interest Margin and Return on Equity. The results from the longrun analysis provided valuable insights into how various FinTech channels influenced banking performance. Specifically, it was

discovered that Internet and mobile banking significantly improved Net Interest Margin, with coefficients of 9.5212 ($p = 0.0314$) and 11.8512 ($p = 0.0365$), respectively. These findings suggested that the adoption of digital banking platforms enhanced banks' profitability by improving their interest-based margins. In contrast, the usage of Point of Sale and Automated Teller Machines negatively impacted Net Interest Margin. Point of Sale transactions had a significant negative effect on Net Interest Margin (coefficient = -37.0647 , $p = 0.0114$), while Automated Teller Machine transactions showed a negative, but statistically insignificant impact (coefficient = -30.1525 , $p = 0.1153$). These results indicated that traditional physical infrastructure may not be as beneficial as digital platforms in improving banks' financial performance. Inflation had a significant positive effect on Net Interest Margin (coefficient = 1.7993 , $p = 0.0154$), suggesting that higher inflation may increase lending rates, thereby benefiting banks' interest margins. However, the impact of FinTech adoption on Return on Equity was found to be weak and statistically insignificant. This suggested that factors other than digital banking, such as capital structure, shareholder equity, and non-interest

revenue, were likely to have a more significant effect on banks' overall performance. The diagnostic tests confirmed the robustness of the models, with no evidence of heteroskedasticity or serial correlation, indicating that the models were well specified and reliable. Based on these results, it was recommended that banks in Nigeria invest more in mobile and internet banking, while reassessing the cost-effectiveness of Point of Sale and Automated Teller Machine infrastructure. Additionally, policymakers should aim to stabilise inflation to sustain the performance gains driven by FinTech adoption. Further research could explore the long-term impact of FinTech adoption on banks' overall financial stability and its interaction with regulatory frameworks in emerging markets.

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Conflict of Interest

None.

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Фінансові технології та результати діяльності депозитних банків у Нігерії

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Анотація. Це дослідження мало на меті з'ясувати, як впровадження фінансових технологій вплинуло на діяльність депозитних банків Нігерії. Було проаналізовано квартальні часові ряди за 2014-2023 роки з використанням моделі авторегресивного розширеного лагу. Оцінювані канали фінтеху включали POS-термінали, банкомати, мобільний та інтернет-банкінг. Довгострокові результати показали, що мобільний банкінг (коефіцієнт = 9,5212, $p = 0,0314$) та інтернет-банкінг (коефіцієнт = 11,8512, $p = 0,0365$) істотно підвищували чисту процентну маржу, що свідчило про покращення здатності банків генерувати процентні доходи від кредитних операцій завдяки використанню цифрових платформ. Натомість операції через POS-термінали (коефіцієнт = -37,0647, $p = 0,0114$) та банкомати (коефіцієнт = -30,1525, $p = 0,1153$) негативно впливали на чисту процентну маржу, що означало, що залежність від традиційної платіжної інфраструктури знижувала прибутковість банків, засновану на відсотках. Інфляція (коефіцієнт = 1,7993, $p = 0,0154$) мала значущий позитивний вплив на чисту процентну маржу, що вказувало на те, що зростання інфляції підвищувало кредитні ставки та сприяло збільшенню процентного доходу банків. Щодо рентабельності власного капіталу, канали фінтеху продемонстрували слабкі та статистично незначущі ефекти. Це свідчило про те, що такі фактори, як структура капіталу, власний капітал акціонерів та непроцентні доходи відігравали важливішу роль у формуванні прибутковості, ніж цифрові банківські технології. Короткостроковий аналіз показав, що операції через банкомати мали незначний негативний вплив на чисту процентну маржу (коефіцієнт = -12,2540, $p = 0,0579$), тоді як мобільний банкінг, POS-операції та інфляція не продемонстрували суттєвого впливу ні на рентабельність власного капіталу, ні на чисту процентну маржу в короткостроковому періоді. Дослідження рекомендувало банкам активніше інвестувати у мобільний та інтернет-банкінг, а також переоцінити ефективність використання інфраструктури POS-терміналів і банкоматів. Робота надала цінну інформацію для банків та регуляторів, підкреслюючи необхідність пріоритетного розвитку цифрових банківських інновацій для підвищення прибутковості та загальної фінансової ефективності в Нігерії

Ключові слова: впровадження фінтеху; чиста процентна маржа; рентабельність власного капіталу; ефективність банків; мобільний банкінг