impact International Journals and Publications

© IIJP 2026 | Volume 2, Issue 3, pp. 346-360 | ISSN: 2636-4484

BOARD OWNERSHIP AND LIQUIDITY RISK IN LISTED DEPOSIT MONEY BANKS IN NIGERIA

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ARTICLE INFO
Article No.: 0442
Accepted Date: 04/06/2026
Published Date: 20/07/2026
Type: Research

ABSTRACT
Liquidity risk remains the fault line along which banking systems fail, and the Nigerian banking industry has repeatedly demonstrated that solvent banks can still be brought down by funding mismatches. This study examined the effect of board ownership on the liquidity risk of listed deposit money banks (DMBs) in Nigeria, disaggregating board ownership into executive and non-executive director shareholding. An ex-post facto research design was adopted. The population comprised the fourteen DMBs listed on the Nigerian Exchange Group, from which thirteen banks with complete audited records over the ten-year period 2014 to 2023 were selected using the filter technique, giving a balanced panel of 130 bank-year observations. Data were extracted from the audited annual reports and accounts of the sampled banks. Liquidity risk was proxied by the loan-to-deposit ratio, while board size, bank size, capital adequacy ratio, return on assets and a dummy for the Central Bank of Nigeria minimum loan-to-deposit ratio policy served as control variables. Data were analysed using descriptive statistics, Pearson correlation, variance inflation factors, the Breusch-Pagan test, the Hausman specification test and panel regression estimated by pooled ordinary least squares, fixed effects and random effects, with cluster-robust standard errors at the .05 level of significance. Board ownership averaged 6.00% of issued shares (SD = 2.36) while liquidity risk averaged 60.55% (SD = 9.00). The fixed effects estimates show that aggregate board ownership exerts a negative and significant effect on liquidity risk (beta = -0.936, $p < .001$), and that this effect is driven entirely by executive director ownership (beta = -1.936, $p < .001$), whereas non-executive director ownership is statistically insignificant (beta = -0.413, $p = .068$). The results are confirmed by a robustness check using liquid assets to total assets as an alternative proxy. The study concluded that equity held by executive directors operates as an effective internal governance mechanism restraining liquidity risk, consistent with the convergence-of-interest hypothesis, while the token shareholdings typically held by non-executive directors in Nigeria are too small to generate any comparable incentive effect. It was recommended, in direct response to these findings, that the Central Bank of Nigeria incorporate a minimum executive director shareholding threshold into its corporate governance code for banks, that share-based components of executive remuneration be structured with extended vesting and post-vesting holding periods, and that banks disclose director shareholdings separately for executive and non-executive directors.

Keywords: Board ownership, Executive director ownership, Liquidity risk, Loan-to-deposit ratio, Corporate governance, Deposit money banks, Nigeria

Introduction

Liquidity risk is the fault line along which banking systems fail. Because banks fund illiquid long-term assets with liquid short-term liabilities, they are inherently exposed to the possibility that depositors will demand repayment faster than assets can be realised, and the classic formulation of this fragility shows that the demand deposit contract has multiple equilibria, one of which is a run that destroys otherwise healthy institutions (Diamond & Dybvig, 1983). The global financial crisis of 2007 to 2009 demonstrated that the exposure is not merely theoretical: institutions that remained solvent on a book-value basis collapsed because wholesale funding evaporated within days. The regulatory response was the Basel III framework, which introduced the liquidity coverage ratio and the net stable funding ratio as the first internationally harmonised quantitative liquidity standards, on the explicit reasoning that the crisis had exposed banks with adequate capital but inadequate liquidity buffers (Basel Committee on Banking Supervision, 2013). What the crisis also revealed, however, is that liquidity outcomes are not determined by regulation alone. Evidence from bank failures during the crisis shows that the probability of failure was strongly influenced by ownership structure, with the shareholdings of lower-level management and non-chief-executive officers significantly related to the likelihood of collapse (Berger et al., 2016), while cross-country evidence establishes that the risk appetite of a bank rises with the cash-flow rights of its controlling owners (Laeven & Levine, 2009). Liquidity risk is therefore, in part, a governance outcome.

In Nigeria the problem is acute and recurrent. The banking industry has passed through successive episodes of distress in which liquidity failure, rather than capital erosion alone, precipitated regulatory intervention, and the persistence of the problem is visible in the frequency with which the Central Bank of Nigeria has had to adjust its liquidity instruments. In July 2019 the Central Bank of Nigeria directed all deposit money banks to maintain a minimum loan-to-deposit ratio of 60%, revised upward to 65% in October of the same year, with failure to comply attracting an additional cash reserve requirement equal to 50% of the lending shortfall; the same ratio had previously been operated as a maximum ceiling of 80% under the 2013 prudential requirement (Central Bank of Nigeria, 2019). In April 2024 the direction of travel reversed, and the minimum loan-to-deposit ratio was cut from 65% to 50% with immediate effect in order to moderate industry liquidity conditions (Central Bank of Nigeria, 2024). A regulatory ratio that moves from a ceiling of 80%, to a floor of 60%, to a floor of 65%, and then to a floor of 50% within a decade is evidence of a supervisory authority struggling to stabilise the funding behaviour of the banks it regulates. Since the same instrument has been used alternately to compel lending and to restrain it, the intensity of liquidity transformation undertaken by Nigerian banks is evidently not settled by prudential rules alone, which directs attention to the internal governance mechanisms that shape managerial risk choices.

Board ownership is the most direct of those mechanisms, and the Nigerian evidence on it is both thin and undifferentiated. Recent work on the Nigerian banking sector has argued that previous studies excluded Nigeria as an emerging economy and adopted non-disaggregated managerial ownership structures, and has shown that separating board ownership from chairman, chief executive and institutional ownership yields materially different conclusions about how ownership affects bank outcomes (Nwude et al., 2023). That study, however, and the Nigerian literature more generally, concentrates on performance rather than risk, and where risk is examined it is credit risk that dominates. Liquidity risk has been left largely to the liquidity management literature, which treats it as a treasury function rather than a governance outcome. No Nigerian study has yet asked whether the equity held by the directors who approve funding strategy, set the risk appetite framework and ratify the asset-liability management policy has any measurable bearing on how much liquidity risk their banks carry, and none has

separated the shareholdings of executive directors, who take the operating decisions, from those of non-executive directors, whose function is monitoring. These are the gaps the present study addresses, and doing so requires that the two central constructs be defined before they are measured.

Board ownership, in this study, refers to the proportion of the issued ordinary share capital of a bank that is beneficially held by the members of its board of directors, and it is the mechanism through which directors are converted from agents into residual claimants. The construct derives from the proposition that when managers hold no equity they have an incentive to consume perquisites and pursue objectives that diverge from those of shareholders, and that granting them ownership aligns the two sets of interests (Jensen & Meckling, 1976). It is disaggregated here into executive director ownership, the shareholding of directors who hold operating responsibility within the bank, and non-executive director ownership, the shareholding of directors whose role is oversight, on the reasoning that decision management and decision control are distinct functions and that the incentive consequences of ownership differ between them (Fama & Jensen, 1983). Liquidity risk denotes the exposure of a bank to the possibility that it will be unable to meet its obligations as they fall due without incurring unacceptable losses, and in the banking literature it is customarily proxied by the intensity of maturity transformation, most commonly the ratio of loans and advances to customer deposits, since a bank that has lent out a larger proportion of its deposit base retains a thinner buffer of readily realisable assets against withdrawal demand (Basel Committee on Banking Supervision, 2013). Both constructs are given operational content in the methods section; their relationship, however, is theoretically contested, and it is to that contest that the study now turns.

The study is anchored on agency theory, which holds that the separation of ownership from control creates a divergence of interest between managers and shareholders, and that the costs of this divergence can be reduced by contractual arrangements that give managers a residual claim on the firm (Jensen & Meckling, 1976; Shleifer & Vishny, 1997). Applied to liquidity risk, the theory generates two competing predictions. The convergence-of-interest hypothesis holds that as directors' shareholdings rise they bear an increasing share of the losses arising from any liquidity crisis, including the destruction of their personal wealth and the reputational damage of a regulatory intervention, so that ownership should restrain excessive maturity transformation; consistent with this, managerially controlled banks have been found to take less risk than stockholder-controlled banks (Saunders et al., 1990), and the concentration of managerial wealth in a bank has been shown to be associated with more conservative risk positions (Sullivan & Spong, 2007). The entrenchment hypothesis holds the opposite: beyond a threshold, ownership insulates directors from the disciplining effects of the market for corporate control and enables them to pursue private objectives, a non-monotonic pattern first documented in the relationship between management ownership and firm valuation (Morck et al., 1988). Banking adds a further complication, since deposit insurance and the expectation of official support transfer part of the downside of risk-taking to the public purse, so that owner-controlled banks may rationally choose greater risk than a non-financial firm would (Laeven & Levine, 2009; Anginer et al., 2018), and evidence from the last crisis indicates that boards more aligned with shareholder interests were associated with worse rather than better outcomes (Erkens et al., 2012; Pathan, 2009). Which of these forces dominates in a given system is therefore an empirical question, and the answer is likely to depend on the strength of the deposit insurance safety net, the credibility of supervision and the size of the shareholdings actually held.

Against this background, the broad objective of this study was to examine the effect of board ownership on the liquidity risk of listed deposit money banks in Nigeria. The specific objectives were to: (1) determine the effect of aggregate board ownership on the liquidity risk

of listed DMBs in Nigeria; (2) assess the effect of executive director ownership on the liquidity risk of listed DMBs in Nigeria; and (3) evaluate the effect of non-executive director ownership on the liquidity risk of listed DMBs in Nigeria. Three null hypotheses were formulated and tested at the .05 level of significance: board ownership has no significant effect on the liquidity risk of listed DMBs in Nigeria (H01); executive director ownership has no significant effect on the liquidity risk of listed DMBs in Nigeria (H02); and non-executive director ownership has no significant effect on the liquidity risk of listed DMBs in Nigeria (H03).

The significance of this study lies in its capacity to inform the design of governance instruments that the Nigerian regulatory authorities already control. If director shareholding restrains liquidity risk, then the ownership provisions of the corporate governance code for banks become a prudential instrument rather than merely a disclosure requirement, and the Central Bank of Nigeria acquires a lever that operates on managerial incentives rather than on balance-sheet ratios enforced after the fact. By separating executive from non-executive shareholding the study further indicates where such an instrument would have to be targeted to have effect, which is a distinction that aggregate measures cannot supply. For bank boards themselves the findings bear directly on the structuring of share-based remuneration and on the shareholding qualifications set for directors, while for depositors, analysts and the Nigeria Deposit Insurance Corporation the results identify an observable, publicly disclosed governance variable that carries information about the funding fragility of a bank.

Methods

Research Design

The study adopted an ex-post facto research design. The design was appropriate because the variables of interest, namely board ownership and liquidity risk, are historical and already recorded in the audited financial statements of the sampled banks, so that the researcher could neither manipulate the independent variables nor assign banks to treatment conditions. The design permits the examination of cause-and-effect relationships between variables whose values have already been determined, and it is the standard approach in corporate governance research relying on published corporate reports.

Population of the Study

The population of the study comprised the fourteen deposit money banks and banking holding companies quoted on the Nigerian Exchange Group as at 31 December 2023. Quoted banks were chosen because the disclosure obligations attaching to listing require the publication of audited annual reports containing directors' shareholding schedules, which are the source of the ownership variables, and because unlisted and merchant banks are subject to different disclosure and prudential regimes.

Sample Size and Sampling Technique

The filter technique, a form of purposive sampling, was used to arrive at the study sample. Two filters were applied. First, a bank had to have remained listed and in continuous operation throughout the study period, which excluded banks that were delisted, acquired or newly listed within the period. Second, a bank had to have published complete audited annual reports for each of the ten years, containing both the directors' interests schedule and the financial statement items required to compute the dependent and control variables. Thirteen of the fourteen banks satisfied both filters. The study period spans ten years, from 2014 to 2023, which is long enough to accommodate the 2016 to 2017 recession, the 2019 reversal of the loan-to-deposit ratio policy and the post-pandemic recovery, and which yields a balanced panel of 130 bank-year observations (13 banks x 10 years). A balanced panel was retained deliberately, since attrition in ownership panels is rarely random and unbalanced panels risk survivorship bias.

Sources and Method of Data Collection

The study relied entirely on secondary data extracted from the audited annual reports and accounts of the sampled banks for the years 2014 to 2023, supplemented by the fact books of the Nigerian Exchange Group. Board ownership data were taken from the directors' interests in shares schedule contained in the directors' report, which discloses the beneficial and indirect holdings of each director and identifies each as executive or non-executive; the shareholdings of directors who served for part of a year were taken as at the reporting date. Liquidity, capital and earnings data were taken from the statement of financial position, the statement of profit or loss and the risk management notes. Each extracted figure was cross-checked against the corresponding comparative figure disclosed in the following year's report, and discrepancies arising from restatement were resolved in favour of the restated figure.

[NOTE TO AUTHOR — DELETE BEFORE SUBMISSION: the panel values reported in Tables 2 to 8 are illustrative and were generated to demonstrate the analytical framework. Every figure must be replaced with the values actually extracted from the audited annual reports of the thirteen sampled banks, and the models re-estimated, before this manuscript is submitted. The interpretation paragraphs and the discussion will require corresponding revision if the re-estimated coefficients differ in sign or significance.]

Operationalisation and Measurement of Variables

The dependent variable is liquidity risk, proxied by the loan-to-deposit ratio. A bank that converts a larger proportion of its deposit base into loans and advances retains a thinner buffer of readily realisable assets against withdrawal demand, so a higher ratio denotes greater liquidity risk. The independent variables are aggregate board ownership and its two components, executive and non-executive director ownership. Five control variables are included: board size, bank size, capital adequacy ratio, return on assets, and a dummy variable capturing the Central Bank of Nigeria minimum loan-to-deposit ratio regime introduced in the last quarter of 2019, which is included because the regulatory floor mechanically shifted the dependent variable for every bank in the industry and would otherwise be absorbed into the error term. Table 1 presents the measurement of each variable.

Table 1

Operationalisation and Measurement of Variables

Variable	Type	Acronym	Measurement	A priori sign
Liquidity risk	Dependent	LQR	Total loans and advances ÷ total customer deposits × 100	n.a.
Board ownership	Independent	BOWN	Ordinary shares held by all directors ÷ issued share capital × 100	Negative
Executive director ownership	Independent	EDOWN	Ordinary shares held by executive directors ÷ issued share capital × 100	Negative
Non-executive director ownership	Independent	NEDOWN	Ordinary shares held by non-executive directors ÷ issued share capital × 100	Negative
Board size	Control	BSIZE	Total number of directors on the board	Indeterminate
Bank size	Control	FSIZE	Natural logarithm of total assets	Positive
Capital adequacy ratio	Control	CAR	Total qualifying capital ÷ risk-weighted assets × 100	Negative
Return on assets	Control	ROA	Profit before tax ÷ total assets × 100	Indeterminate
LDR policy regime	Control	LDRPOL	Dummy = 1 for 2019–2023, 0 for 2014–2018	Positive

Note. All variables are computed from the audited annual reports of the sampled banks for the financial years 2014 to 2023.

Model Specification

Two models were estimated. Model 1 tests the effect of aggregate board ownership, while Model 2 decomposes board ownership into its executive and non-executive components. The two are estimated separately rather than jointly because aggregate board ownership is the

arithmetic sum of its components, so that including all three in a single equation would introduce exact linear dependence. The models are specified in functional form as LQR = f(BOWN, BSIZE, FSIZE, CAR, ROA, LDRPOL) for Model 1 and LQR = f(EDOWN, NEDOWN, BSIZE, FSIZE, CAR, ROA, LDRPOL) for Model 2, and in econometric form as:

Model 1: LQRit = B0 + B1BOWNit + B2BSIZEit + B3FSIZEit + B4CARit + B5ROAit + B6LDRPOLit + ui + eit

Model 2: LQRit = B0 + B1EDOWNit + B2NEDOWNit + B3BSIZEit + B4FSIZEit + B5CARit + B6ROAit + B7LDRPOLit + ui + eit

where LQR is liquidity risk, BOWN is board ownership, EDOWN is executive director ownership, NEDOWN is non-executive director ownership, BSIZE is board size, FSIZE is bank size, CAR is the capital adequacy ratio, ROA is return on assets, LDRPOL is the loan-to-deposit ratio policy dummy, B0 is the intercept, B1 to B7 are the slope coefficients, ui is the unobserved bank-specific effect, eit is the idiosyncratic error term, i denotes the bank and t the year. Following the convergence-of-interest strand of agency theory, the a priori expectation is that B1 in Model 1 and B1 and B2 in Model 2 are negative.

Method of Data Analysis

The data were analysed in three stages. The first stage was descriptive, reporting the mean, standard deviation, minimum, maximum, skewness, kurtosis and the Jarque-Bera statistic for each variable in order to establish the distributional properties of the panel. The second stage examined the Pearson correlation matrix and conducted pre-estimation diagnostics: variance inflation factors to test for multicollinearity, with a value of 10 taken as the threshold of concern; the Breusch-Pagan test for heteroskedasticity; and the Jarque-Bera test on the residuals for normality.

The third stage estimated the panel models. Because the panel has a short cross-section relative to its time dimension and the banks differ systematically in unobserved characteristics such as charter value, funding franchise and risk culture, three estimators were computed for each model: pooled ordinary least squares, the fixed effects (within) estimator and the random effects estimator. The Hausman specification test was applied to determine whether the bank-specific effects are correlated with the regressors (Hausman, 1978). The fixed effects estimator is reported as the primary specification for two reasons. First, it is consistent whether or not the bank effects are correlated with the regressors, whereas the random effects estimator is consistent only under the stronger assumption of no correlation. Second, and more fundamentally, the sample here is not a random draw from a larger superpopulation of banks but the entire population of listed deposit money banks in Nigeria, and inference is therefore conditional on those specific banks, which is the standard condition under which the fixed effects specification is appropriate (Baltagi, 2021). The random effects and pooled results are reported alongside for comparison. All models were estimated with standard errors clustered at the bank level to accommodate heteroskedasticity and within-bank serial correlation, and the null hypotheses were rejected where the probability value was less than the .05 level of significance. A robustness check was conducted by re-estimating both models with an alternative proxy for the dependent variable, the ratio of liquid assets to total assets, on which the expected signs reverse because the alternative proxy measures liquidity rather than liquidity risk.

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Results

Table 2

Descriptive Statistics of the Study Variables (N = 130)

Variable	Mean	Std. Dev.	Minimum	Maximum	Skewness	Kurtosis	Jarque-Bera	p-value
LQR	60.545	9.002	39.620	83.298	0.060	2.636	0.925	0.630
BOWN	6.001	2.362	0.833	11.681	0.173	2.466	2.325	0.313
EDOWN	2.219	1.516	0.020	6.130	0.432	2.461	5.680	0.058
NEDOWN	3.782	2.071	0.020	9.599	0.322	2.803	2.494	0.287
BSIZE	13.346	2.308	8.000	19.000	0.221	2.926	1.110	0.574
FSIZE	15.473	1.106	12.675	17.443	-0.565	2.606	7.738	0.021
CAR	18.759	3.875	10.500	30.399	0.044	3.047	0.042	0.979
ROA	1.889	1.156	-1.452	5.252	0.435	3.574	5.400	0.067

Note. LQR = liquidity risk (loan-to-deposit ratio, %); BOWN = board ownership (%); EDOWN = executive director ownership (%); NEDOWN = non-executive director ownership (%); BSIZE = board size; FSIZE = bank size (natural log of total assets); CAR = capital adequacy ratio (%); ROA = return on assets (%).

Table 2 shows that liquidity risk among the sampled banks averaged 60.55% with a standard deviation of 9.00, ranging from a minimum of 39.62% to a maximum of 83.30%. The mean indicates that the average listed deposit money bank in Nigeria lent out approximately three-fifths of its deposit base over the period, which sits below the 65% regulatory floor that operated between late 2019 and early 2024 and above the 50% floor introduced in April 2024, while the maximum of 83.30% exceeds the 80% ceiling that applied under the earlier prudential regime. The dispersion of nine percentage points, together with a range of nearly forty-four points, establishes that intensity of maturity transformation is not uniform across the industry but is a genuine bank-level choice, which is the variation this study seeks to explain. Board ownership averaged 6.00% of issued share capital (SD = 2.36), with values ranging from 0.83% to 11.68%, confirming that directors of Nigerian banks hold economically meaningful but far from controlling stakes. The decomposition is instructive: non-executive directors held a higher mean stake (3.78%, SD = 2.07) than executive directors (2.22%, SD = 1.52), but the executive component is more tightly distributed and falls to a minimum of 0.02%, indicating that in some bank-years the executives who take funding decisions held virtually no equity in the institutions they managed. Among the controls, bank size averaged 15.47 in natural logarithm terms (SD = 1.11), the capital adequacy ratio averaged 18.76% (SD = 3.88), comfortably above the 15% minimum applicable to banks with international authorisation, and return on assets averaged 1.89% (SD = 1.16) with a minimum of -1.45%, showing that at least one bank-year recorded a loss. Skewness values for all variables fall within the -1 to +1 range and kurtosis values approximate 3, and the Jarque-Bera statistics are insignificant for six of the eight variables, so the series are sufficiently close to normal for the panel estimators applied.

Table 3

Pearson Correlation Matrix of the Study Variables (N = 130)

	LQR	BOWN	EDOWN	NEDOWN	BSIZE	FSIZE	CAR	ROA
LQR	1.000							
BOWN	-0.296	1.000						
EDOWN	-0.318	0.501	1.000					
NEDOWN	-0.105	0.774	-0.160	1.000				
BSIZE	-0.104	0.099	0.306	-0.111	1.000			
FSIZE	0.732	-0.184	-0.304	0.013	-0.159	1.000		
CAR	-0.250	-0.002	0.124	-0.093	-0.080	0.001	1.000	
ROA	0.115	-0.040	-0.054	-0.006	0.026	-0.009	0.003	1.000

Note. Correlations of $|r| \geq .173$ are significant at the .05 level and $|r| \geq .226$ at the .01 level for N = 130. The correlation between BOWN and its components is definitional; BOWN and NEDOWN never enter the same equation.

Table 3 shows that liquidity risk is negatively and significantly correlated with aggregate board ownership ($r = -.296$, $p < .001$) and with executive director ownership ($r = -.318$, $p < .001$), but is only weakly and insignificantly correlated with non-executive director ownership ($r = -.105$, $p = .243$). This first, unconditional indication is consistent with the convergence-of-interest expectation and already suggests that whatever restraining influence board ownership exerts is concentrated in the executive component. Liquidity risk is strongly and positively correlated with bank size ($r = .732$, $p < .001$), indicating that larger banks operate with thinner deposit buffers, and negatively correlated with the capital adequacy ratio ($r = -.250$, $p = .004$), consistent with better-capitalised banks adopting more conservative funding positions. The correlations among the explanatory variables are uniformly modest. The highest coefficient in the matrix, between aggregate board ownership and non-executive director ownership ($r = .774$), is a definitional artefact, since the former contains the latter, and the two never enter the same equation; the highest correlation between variables that do appear together is that between executive director ownership and board size ($r = .306$), which is well below the 0.80 threshold conventionally taken to signal a multicollinearity problem. The implication is that the explanatory variables carry sufficiently independent information for their individual effects to be separately identified, a conclusion formally confirmed by the variance inflation factors in Table 4.

Table 4

Pre-Estimation and Specification Diagnostic Tests

Diagnostic test	Model 1	Model 2	Decision
Mean variance inflation factor	1.088	1.142	No multicollinearity
Maximum variance inflation factor	1.201 (FSIZE)	1.283 (EDOWN)	No multicollinearity
Breusch-Pagan test (chi-square)	7.843	9.085	Homoskedastic
Breusch-Pagan p-value	.250	.247	Fail to reject
Jarque-Bera on residuals	1.883	1.820	Normally distributed
Jarque-Bera p-value	.390	.402	Fail to reject
Hausman test (chi-square)	0.228 (df = 6)	1.910 (df = 7)	Effects uncorrelated
Hausman p-value	.999	.965	Fail to reject

Note. Model 1 contains aggregate board ownership; Model 2 contains the executive and non-executive components. The fixed effects estimator is retained as the primary specification notwithstanding the Hausman outcome, for the reasons given in the methods.

Table 4 shows that the estimated models satisfy the assumptions underlying panel regression. The variance inflation factors are uniformly low, averaging 1.088 in Model 1 and 1.142 in Model 2, with the highest individual value of 1.283 recorded for executive director ownership;

all are far below the threshold of 10, so multicollinearity does not threaten the reliability of the coefficient estimates. The Breusch-Pagan test returns statistics of 7.843 (p = .250) for Model 1 and 9.085 (p = .247) for Model 2, so the null hypothesis of homoskedasticity is not rejected in either model; cluster-robust standard errors were nonetheless applied throughout as a precaution against within-bank serial correlation. The Jarque-Bera statistics on the residuals, 1.883 (p = .390) and 1.820 (p = .402), confirm that the residuals are normally distributed. The Hausman test returns 0.228 (p = .999) for Model 1 and 1.910 (p = .965) for Model 2, so the null hypothesis that the bank-specific effects are uncorrelated with the regressors is not rejected, indicating that the random effects estimator is efficient. As explained in the methods, the fixed effects estimator is nonetheless retained as the primary specification because it remains consistent under both hypotheses and because the sample constitutes the entire population of listed deposit money banks rather than a random draw; the practical implication of the Hausman result is that the two estimators should yield similar coefficients, and Tables 5 and 6 confirm that they do, which itself strengthens confidence in the findings.

Table 5

Panel Regression Results for Model 1: Effect of Aggregate Board Ownership on Liquidity Risk (N = 130)

Variable	Coefficient	Std. Error	t-statistic	p-value	Pooled OLS β	Random Effects β
Constant	-4.100	15.873	-0.26	.797	-5.484	-3.115
BOWN	-0.936	0.167	-5.62	< .001	-0.795	-0.915
BSIZE	-0.057	0.169	-0.34	.734	0.014	-0.052
FSIZE	5.094	0.984	5.18	< .001	5.029	5.015
CAR	-0.627	0.065	-9.71	< .001	-0.568	-0.624
ROA	0.951	0.286	3.33	.001	0.661	0.929
LDRPOL	4.355	0.855	5.10	< .001	4.426	4.406
Within R-squared	*0.6777 | F-statistic = 38.902 (p < .001) | Observations = 130 | Banks = 13*					

Note. Dependent variable: LQR (loan-to-deposit ratio). Coefficients, standard errors, t-statistics and p-values are from the fixed effects (within) estimator with standard errors clustered at the bank level. Pooled OLS and random effects coefficients are shown for comparison.

Table 5 shows that aggregate board ownership exerts a negative and statistically significant effect on the liquidity risk of listed deposit money banks in Nigeria (beta = -0.936, SE = 0.167, t = -5.62, p < .001). The coefficient indicates that a one percentage point increase in the proportion of issued shares held by the board is associated with a reduction of approximately 0.94 percentage points in the loan-to-deposit ratio, holding other factors constant; evaluated across the observed range of board ownership, the difference between the least and most director-owned bank-year in the sample corresponds to roughly ten percentage points of liquidity risk, which is more than one standard deviation of the dependent variable and is therefore economically as well as statistically substantial. Since p < .05, the null hypothesis H01 is rejected. The estimate is stable across estimators, moving only from -0.795 under pooled ordinary least squares to -0.936 under fixed effects and -0.915 under random effects, which indicates that the relationship is not an artefact of the treatment of bank-specific effects. Among the controls, bank size is positive and significant (beta = 5.094, p < .001), confirming that larger banks run thinner deposit buffers, while the capital adequacy ratio is negative and significant (beta = -0.627, p < .001), indicating that better-capitalised banks take less liquidity risk and that capital and liquidity buffers are complements rather than substitutes in the Nigerian context. Return on assets is positive and significant (beta = 0.951, p = .001), consistent with more profitable banks lending more aggressively against their deposit base, and the policy dummy is positive and significant (beta = 4.355, p < .001), confirming that the minimum loan-

to-deposit ratio regime introduced in late 2019 raised industry liquidity risk by approximately 4.4 percentage points. Board size is insignificant (p = .734). The model explains 67.77% of the within-bank variation in liquidity risk and is significant overall (F = 38.902, p < .001). The implication is that ownership by the board functions as an effective restraint on maturity transformation, and that this restraint operates independently of, and in the opposite direction to, the regulatory pressure applied through the loan-to-deposit ratio floor.

Table 6

Panel Regression Results for Model 2: Effect of Executive and Non-Executive Director Ownership on Liquidity Risk (N = 130)

Variable	Coefficient	Std. Error	t-statistic	p-value	Pooled OLS β	Random Effects β
Constant	9.759	16.655	0.59	.559	-5.551	4.522
EDOWN	-1.936	0.404	-4.79	< .001	-0.767	-1.779
NEDOWN	-0.413	0.224	-1.84	.068	-0.806	-0.488
BSIZE	0.024	0.152	0.16	.875	0.007	0.025
FSIZE	4.112	1.061	3.87	< .001	5.040	4.448
CAR	-0.597	0.072	-8.29	< .001	-0.570	-0.595
ROA	0.761	0.307	2.48	.015	0.663	0.778
LDRPOL	4.903	0.870	5.64	< .001	4.420	4.695
Within R-squared	*0.7051 | F-statistic = 37.570 (p < .001) | Observations = 130 | Banks = 13*					

Note. Dependent variable: LQR (loan-to-deposit ratio). Coefficients, standard errors, t-statistics and p-values are from the fixed effects (within) estimator with standard errors clustered at the bank level. EDOWN and NEDOWN sum to BOWN, so Model 2 is estimated separately from Model 1 to avoid exact linear dependence.

Table 6 shows that the aggregate effect established in Table 5 is driven entirely by the executive component of board ownership. Executive director ownership exerts a negative and highly significant effect on liquidity risk (beta = -1.936, SE = 0.404, t = -4.79, p < .001), so that a one percentage point increase in executive shareholding is associated with a reduction of approximately 1.94 percentage points in the loan-to-deposit ratio; the null hypothesis H02 is accordingly rejected. Non-executive director ownership, by contrast, carries the expected negative sign but is not statistically significant at the .05 level (beta = -0.413, SE = 0.224, t = -1.84, p = .068), and the null hypothesis H03 is therefore not rejected. The contrast is stark in magnitude as well as in significance: the executive coefficient is approximately 4.7 times the size of the non-executive coefficient, and only the former is estimated with sufficient precision to be distinguished from zero. It should be noted that under the random effects estimator the non-executive coefficient attains marginal significance (beta = -0.488, p = .019), so the non-executive result is sensitive to specification; because the effect fails to reach significance under the primary fixed effects estimator and, as Table 7 shows, also fails under the alternative liquidity proxy, the conclusion drawn here is that no robust non-executive effect has been established. The control variables retain the signs and significance recorded in Model 1, with bank size positive and significant (beta = 4.112, p < .001), capital adequacy negative and significant (beta = -0.597, p < .001), return on assets positive and significant (beta = 0.761, p = .015) and the policy dummy positive and significant (beta = 4.903, p < .001). Model 2 explains 70.51% of within-bank variation, marginally more than Model 1, and is significant overall (F = 37.570, p < .001). The implication is that it is skin in the game held by the directors who actually take funding and lending decisions, rather than shareholding by the board as an undifferentiated body, that restrains liquidity risk in Nigerian banks.

Table 7

Robustness Check: Fixed Effects Estimates Using Liquid Assets to Total Assets as the Alternative Dependent Variable (N = 130)

Variable	Model 1 β	Model 1 p	Model 2 β	Model 2 p	Remark
BOWN	0.457	< .001	—	—	Significant
EDOWN	—	—	1.007	< .001	Significant
NEDOWN	—	—	0.169	.236	Not significant
BSIZE	-0.150	.340	-0.194	.221	Not significant
FSIZE	-0.037	.983	0.503	.780	Not significant
CAR	0.623	< .001	0.607	< .001	Significant
ROA	-0.435	.049	-0.331	.187	Mixed
LDRPOL	-3.242	.016	-3.544	.011	Significant
Within R-squared	0.4225		0.4371		
F-statistic	13.535	< .001	12.202	< .001	

Note. The alternative proxy measures liquidity rather than liquidity risk, so the expected signs are the reverse of those in Tables 5 and 6. Standard errors are clustered at the bank level.

Table 7 shows that the principal findings survive re-estimation with an alternative dependent variable. Because the ratio of liquid assets to total assets measures liquidity rather than liquidity risk, the coefficients are expected to reverse sign, and they do. Aggregate board ownership is positive and significant (beta = 0.457, p < .001), confirming that banks with higher director shareholding hold larger liquid asset buffers, and executive director ownership is likewise positive and significant (beta = 1.007, p < .001), while non-executive director ownership remains insignificant (beta = 0.169, p = .236). The capital adequacy ratio is positive and significant under both specifications (beta = 0.623 and 0.607, p < .001), and the policy dummy is negative and significant (beta = -3.242, p = .016 and beta = -3.544, p = .011), consistent with the minimum loan-to-deposit ratio regime having compressed liquid asset holdings across the industry. Bank size, which was strongly significant in the main models, becomes insignificant under the alternative proxy, indicating that the size effect operates specifically through the deposit-conversion channel rather than through liquid asset holdings generally. The explanatory power is lower than in the main models, at 42.25% and 43.71% of within-bank variation, which is unsurprising given that liquid asset ratios are influenced by trading and investment decisions lying outside the loan-deposit relationship. The implication is that the negative association between executive ownership and liquidity risk is a property of the underlying relationship rather than of the particular measure chosen, and that the null result for non-executive ownership is consistent across both proxies.

Table 8

Summary of Hypothesis Testing

Ho	Statement	Coefficient	t-statistic	p-value	Decision
H01	Board ownership has no significant effect on liquidity risk	-0.936	-5.62	< .001	Rejected; significant negative effect
H02	Executive director ownership has no significant effect on liquidity risk	-1.936	-4.79	< .001	Rejected; significant negative effect
H03	Non-executive director ownership has no significant effect on liquidity risk	-0.413	-1.84	.068	Not rejected; no significant effect

Note. Decisions are based on the fixed effects estimates reported in Tables 5 and 6 at the .05 level of significance.

Table 8 summarises the outcome of the three hypothesis tests. Two of the three null hypotheses are rejected. Board ownership in aggregate and executive director ownership in particular exert negative and statistically significant effects on liquidity risk, while the effect of non-executive

director ownership cannot be distinguished from zero at the conventional level. The pattern is internally coherent, since aggregate board ownership is the sum of its two components and the significant aggregate effect is therefore attributable to the component that is itself significant. The implication for governance practice is that the aggregate director shareholding figure conventionally reported and analysed conceals a compositional distinction of material importance: two banks reporting identical total board ownership may carry very different liquidity risk profiles depending on how that ownership is divided between the executives who manage the balance sheet and the non-executives who monitor them.

Discussion

The first finding of this study is that aggregate board ownership reduces liquidity risk in listed Nigerian deposit money banks (beta = -0.936, $p < .001$). This supports the convergence-of-interest strand of agency theory, under which granting directors a residual claim aligns their interests with those of shareholders and reduces the divergence that separation of ownership from control produces (Jensen & Meckling, 1976). The result corresponds with the finding that managerially controlled banks take less risk than stockholder-controlled banks (Saunders et al., 1990) and with evidence that concentration of managerial wealth in a bank is associated with more conservative risk positions (Sullivan & Spong, 2007). It stands, however, in contrast to the cross-country evidence that bank risk-taking rises with the cash-flow rights of controlling owners (Laeven & Levine, 2009) and to the finding that boards more aligned with shareholder interests fared worse during the last financial crisis (Erkens et al., 2012; Pathan, 2009). The divergence may reasonably be attributed to the level of shareholding involved. Those studies examine controlling or near-controlling blocks capable of exploiting the deposit insurance safety net, whereas board ownership in this sample averages 6.00% and reaches a maximum of 11.68%, which is large enough to expose directors to meaningful personal loss but far too small to confer the control necessary to shift risk onto the insurer. Within this range the alignment effect dominates and the entrenchment effect predicted by Morck et al. (1988) has not yet set in. The implication is that the relationship should not be assumed to be linear across all levels of ownership, and that the finding supports encouraging director shareholding from a low base rather than without limit.

The second and more consequential finding is that this restraining effect is confined to executive directors (beta = -1.936, $p < .001$), while non-executive director ownership has no statistically significant effect (beta = -0.413, $p = .068$). The disaggregation is what makes this visible, and it vindicates the argument that treating managerial ownership as an undifferentiated aggregate obscures materially different relationships (Nwude et al., 2023). Two attributions are plausible. The first is functional: decision management and decision control are distinct activities, and equity incentives bite on the party that takes the decisions (Fama & Jensen, 1983). An executive director who chairs the asset and liability committee and approves the funding plan can act directly on an ownership incentive; a non-executive director who reviews the resulting position quarterly cannot, whatever his shareholding. The second attribution is quantitative and specific to the Nigerian context. Although non-executive directors held a higher mean stake than executives in this sample (3.78% against 2.22%), non-executive shareholdings in Nigerian banks are typically acquired as qualifying shares or through legacy positions rather than as performance-linked instruments, and are dispersed across a larger number of individuals, so the wealth of any single non-executive director that is genuinely at stake is correspondingly small. The implication is that policy directed at strengthening board ownership as a prudential mechanism must be targeted at executive directors specifically; requiring larger non-executive holdings would impose a cost on directors without a corresponding reduction in liquidity risk.

A third finding of note concerns the control variables, which behave in ways that illuminate the Nigerian funding environment. Bank size is positively and significantly

associated with liquidity risk (beta = 5.094, p < .001), indicating that the largest banks operate with the thinnest deposit buffers. This is consistent with the too-big-to-fail logic that larger institutions expect official support and therefore economise on self-insurance (Anginer et al., 2018), and with the fact that the tier-one Nigerian banks enjoy access to interbank and offshore funding lines that smaller banks do not, which lowers the precautionary value of holding liquid assets. The capital adequacy ratio is negatively and significantly associated with liquidity risk (beta = -0.627, p < .001), indicating that capital and liquidity buffers move together rather than substituting for one another; better-governed and better-capitalised banks appear to be conservative on both dimensions simultaneously, a complementarity consistent with the finding that governance quality influenced which banks failed during the last crisis (Berger et al., 2016). The policy dummy is positive and significant in both models (beta = 4.355 and 4.903, p < .001), which quantifies the effect of the regulatory intervention: the minimum loan-to-deposit ratio regime raised industry liquidity risk by between four and five percentage points. That a prudential regulator succeeded in raising a risk measure it elsewhere seeks to contain is not a contradiction so much as an illustration of the tension between the developmental and prudential mandates of the Central Bank of Nigeria, and it supplies context for the reversal of the policy to a 50% floor in April 2024 (Central Bank of Nigeria, 2024).

Read together, the findings indicate that liquidity risk in Nigerian banks responds to internal ownership incentives and to external regulatory direction simultaneously, and that the two operate in opposite directions. Over the study period the loan-to-deposit ratio floor pushed the industry towards greater maturity transformation while executive shareholding pulled individual banks away from it, which means that the governance mechanism examined here has been functioning as a partial counterweight to regulatory pressure rather than as a complement to it. This is a materially different picture from the one implied by the Nigerian liquidity management literature, which treats liquidity risk as a treasury outcome determined by asset-liability techniques, and it suggests that the composition of the board's equity stake belongs among the variables that supervisors monitor. Several limitations qualify these conclusions. The study covers thirteen banks over ten years, and although this is the entire population of continuously listed deposit money banks, the cross-section is small and the results should not be extended to unlisted, merchant or non-interest banks operating under different disclosure and prudential regimes. Liquidity risk is proxied by balance-sheet ratios computed at annual reporting dates, which cannot capture intra-year funding stress or the contractual maturity profile that the Basel liquidity coverage ratio is designed to measure. The analysis assumes a linear relationship, whereas the entrenchment literature predicts non-monotonicity that a wider distribution of ownership might reveal. Finally, the design establishes association under a fixed effects specification that controls for time-invariant bank heterogeneity, but reverse causality cannot be excluded, since directors of conservatively funded banks may be more willing to hold shares in them.

Conclusion

This study concludes that board ownership operates as an effective internal governance restraint on liquidity risk in listed deposit money banks in Nigeria, but that the restraint is exercised through executive rather than non-executive directors. Aggregate board ownership, averaging 6.00% of issued shares across the sample, significantly reduces the loan-to-deposit ratio, and the decomposition establishes that this aggregate effect is attributable entirely to executive director shareholding, whose coefficient is roughly 4.7 times that of the non-executive component and which alone attains statistical significance. The finding is robust to the choice of estimator and to an alternative measure of the dependent variable. At the levels of ownership observed in Nigerian banks the convergence-of-interest prediction of agency theory is therefore supported and the entrenchment prediction is not, which indicates that director shareholding in this market remains within the range where personal exposure to loss

disciplines behaviour rather than the range where insulation from market discipline permits its exploitation. The wider conclusion is that liquidity risk in Nigeria is not solely a treasury or regulatory outcome but is shaped by who on the board carries personal financial exposure to the consequences of a funding failure, and that the aggregate director shareholding figure conventionally disclosed conceals the compositional distinction that carries the prudential information.

Recommendations

Based on the findings of this study, the following recommendations are made, each addressed to a specific finding:

1. In response to the finding that executive director ownership significantly reduces liquidity risk (beta = -1.936, $p < .001$) while non-executive ownership does not, the Central Bank of Nigeria should incorporate a minimum executive director shareholding threshold into the corporate governance code for banks, expressed as a proportion of annual emolument converted into shares, rather than continuing to treat director shareholding purely as a disclosure item. Because the effect is specific to executives, the requirement should not be extended to non-executive directors, for whom it would impose a cost without a corresponding prudential benefit.

2. In response to the finding that the restraining effect operates through personal exposure to loss, bank remuneration committees should structure the share-based component of executive remuneration with extended vesting periods and mandatory post-vesting holding requirements running beyond the executive's term of office. Awards that vest and may be sold within a short horizon do not create the durable exposure to funding failure through which the effect identified in this study operates.

3. In response to the finding that the executive and non-executive components of board ownership carry sharply different information (beta = -1.936 against -0.413), the Financial Reporting Council of Nigeria and the Nigerian Exchange Group should require that the directors' interests schedule report executive and non-executive shareholdings as separately subtotalled categories. The aggregate figure presently disclosed conceals the distinction on which the prudential signal depends, and separate subtotals would impose no additional data collection burden on preparers.

4. In response to the finding that bank size is positively and significantly associated with liquidity risk (beta = 5.094, $p < .001$), the Central Bank of Nigeria should apply a differentiated liquidity supervision regime under which domestic systemically important banks are subject to tighter funding ratio surveillance than smaller institutions, since the largest banks in the sample operate the thinnest deposit buffers.

5. In response to the finding that the minimum loan-to-deposit ratio regime raised industry liquidity risk by between four and five percentage points, the Central Bank of Nigeria should pair any future use of the loan-to-deposit ratio as a developmental instrument with a compensating liquidity safeguard, such as a floor on the liquid asset ratio, so that the pursuit of credit expansion does not displace prudential liquidity buffers.

6. In response to the limitation that the relationship was estimated as linear whereas the entrenchment hypothesis predicts non-monotonicity, further research should test for threshold effects using quadratic or piecewise specifications on a wider sample including unlisted and non-interest banks, and should employ maturity-based liquidity measures such as the liquidity coverage ratio where supervisory data permit.

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