Board Heterogeneity and Asset Quality of Listed Deposit Money Banks in Nigeria

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DOI: https://doi.org/10.68050/JAMS.2026.813

Received: 18 October 2026; Accepted: 24 October 2026; Published: 31 October 2026

ABSTRACT

Concerns over the quality of bank loan portfolios, the accuracy of expected credit loss estimates and the extent to which board composition strengthens credit-risk oversight have raised questions about whether heterogeneous boards actually improve asset quality in Nigerian deposit money banks. Against this background, this study examined the relationship between board heterogeneity and asset quality of listed deposit money banks in Nigeria. Board heterogeneity was measured by board age diversity, board tenure diversity, board gender diversity, board independence diversity and board professional diversity, while asset quality was measured by loan loss provisioning accuracy (LLPA). Firm size, measured as the natural logarithm of total deposits, was included as a control variable. The study adopted an ex-post facto research design and used a balanced panel of 110 bank-year observations from eleven listed deposit money banks. The analyzable t-period covered 2015 to 2024, with actual loan write-offs from 2016 to 2025 providing the corresponding t+1 denominators. Descriptive statistics, correlation analysis, regression diagnostic tests, pooled least squares, fixed-effects and random-effects estimations, and the Hausman specification test were conducted. The Hausman result (Chi-square = 11.2310; p = 0.0815) supported the random-effects estimator. Board age diversity had a negative but insignificant relationship with LLPA (Coeff. = -1.144876; p = 0.4084), while board tenure diversity had a positive and statistically significant relationship (Coeff. = 5.306962; p = 0.0123). Board gender diversity (Coeff. = -0.058482; p = 0.9517) and board independence diversity (Coeff. = -0.298048; p = 0.7674) had negative but insignificant relationships, whereas board professional diversity had a positive but insignificant relationship (Coeff. = 3.931744; p = 0.1923). It was concluded that board heterogeneity significant influences the asset quality of deposit money banks in Nigeria. The recommendations made include; deliberate tenure balance supported by credit-risk expertise, independent director challenge of executive credit assumptions and multifaceted impairment calibration.

Keywords: Board heterogeneity, Asset Quality, deposit money banks, loan loss provision

INTRODUCTION

The banking sector serves as the primary engine of macroeconomic stability and resource allocation in emerging economies, functioning through credit creation, liquidity provision, financial intermediation and payment settlement mechanisms. In Nigeria, deposit money banks (DMBs) operate as the linchpin of the financial system. However, their operations are perpetually exposed to systemic vulnerabilities, including persistent currency devaluation, high inflation, credit concentration, and regulatory pressure as with the Central Bank of Nigeria's (CBN) recapitalization directives. Under these conditions, the asset quality of banks is not just an indicator of performance for the bank but is also a critical determinant of institutional health and financial system resilience. Asset quality reflects the intrinsic health of a bank's loan portfolio, the effectiveness of its credit underwriting standards, and the degree of insulation against loan defaults, rising non-performing loans (NPLs), and portfolio impairment (Hakimi et al., 2025; Badru et al., 2026).

The board of directors sits at the apex of corporate governance, entrusted with establishing risk appetite, monitoring executive discretion, approving high value credit facilities, and protecting stakeholder value. Yet,

traditional governance literature increasingly demonstrates that the mere physical presence of a board is insufficient to safeguard asset quality. Rather, the composition and cognitive depth of the board (board heterogeneity) determine oversight effectiveness. Board heterogeneity refers to the structural and demographic diversity of directors across dimensions such as age, tenure, gender, nationality, professional expertise, and functional background. From an upper echelons and bounded rationality perspective, a heterogeneous board enriches cognitive resources, mitigates groupthink, enhances monitoring vigilance, and broadens strategic vision (Janahi et al., 2023; Aureli et al., 2026).

Despite these theoretical advantages, the link between board heterogeneity and asset quality is neither simple nor universally clear. While diverse perspectives broaden risk appreciation, excessive fault lines or friction among demographic groups can lead to boardroom paralysis, delays in decision making, or conflicting strategic priorities. For instance, board age diversity blends the risk aversion and institutional wisdom of older directors with the technological fluency and higher risk appetite of younger directors. Similarly, board tenure diversity balances the institutional memory and contextual insight of long tenured members with the objectivity, independence, and fresh questioning brought by newly appointed directors. Where tenure is overly homogeneous, boards risk cognitive inertia or regulatory capture; and where tenure is severely fragmented, cohesion suffers.

Also, gender diversity introduces distinct behavioral patterns and ethical scrutiny into boardroom deliberations, which can curb excessive risk taking in credit expansion. Independent board members, unencumbered by equity ownership can provide unbiased oversight, particularly when evaluating insider related lending and large credit exposures. On the other hand, professional diversity ensures that the board possesses an array of competencies across finance, law, risk management, data analytics, and the real sector. This multi-disciplinary skillset is essential for detecting early signs of credit deterioration, critically evaluating complex credit instruments, and challenging aggressive loan growth strategies. Lacking this multi-dimensional diversity, boards are prone to oversight blindness, poor loan loss provisioning, and delayed recognition of impaired assets (Essien & Akpan, 2024; Sylvanus et al., 2025).

In Nigeria, the urgency of this empirical relationship is heightened by recent macroeconomic shifts and governance failures. High macroeconomic volatility, combined with regulatory scrutiny over insider lending, loan write-offs, and provisioning accuracy ratios, presents a demanding test for bank boards. While prior empirical studies have examined corporate governance and bank performance, significant gaps remain regarding how multidimensional board heterogeneity, quantified using demographic and cognitive measures directly influences asset quality in Nigerian deposit money banks. Most existing studies isolate single demographic traits (e.g., gender or board size alone) or focus on broad accounting profitability (ROA/ROE), neglecting to examine how the provisioning decisions taken by board members to safeguard the asset quality of banks align with actual loan write offs. Given the current regulatory recapitalization drive and rising default risks across key economic sectors, establishing how boardroom diversity shapes loan quality is imperative. This study is therefore designed to examine the effect of board heterogeneity on the asset quality of listed deposit money banks in Nigeria.

The continuing pressure on the asset quality of deposit money banks raises concern about the effectiveness of board oversight in the Nigerian banking sector. Banks may comply with formal corporate governance rules and still experience weak credit appraisal, rising impairment provisions, loan concentration and delayed recognition of deteriorating exposures. The issue is more serious because loan loss provisions directly affects profit, capital planning and stakeholders' perception of bank stability. When provisioning rises sharply, it signals higher expected credit losses and paucity of credit monitoring procedures (Badru et al., 2026; Sylvanus et al., 2025).

Although board heterogeneity is expected to improve monitoring, empirical evidence remains mixed. Some studies show that more diverse boards strengthen governance and reduce credit risk (Ali et al., 2022; Mousa et al., 2023), while other studies indicate that diversity may create coordination problems, slow decision-making or make monitoring ineffective when directors lack relevant competence (Aifuwa et al., 2020). In particular, less attention has been given to how board age diversity, board tenure diversity, board professional diversity,

board independence diversity and board gender diversity affect asset quality through loan loss provisioning accuracy in listed deposit money banks in Nigeria. Existing local studies have focused more on board gender, board size, earnings quality or non-performing loans, leaving a gap in evaluating the relationship between provisioning and actual asset quality (Essien & Akpan, 2024; Hakimi et al., 2025). This study therefore addresses this gap by establishing empirically that the board heterogeneity influences the loan loss provision accuracy.

REVIEW OF RELATED LITERATURE

Board heterogeneity

Board heterogeneity refers to the differences that exist among members of a board of directors. It encompasses observable demographic characteristics such as age and gender as well as or job-related attributes, including professional qualification, functional experience, tenure and independence status. It introduces variety, separation and disparity into groups thereby expanding the total pool of information, operational paradigms, and problem-solving perspectives available to the collective entity (Harrison & Klein, 2007; Mathieu et al., 2018). These differences affect the way board members process information, engage with management and define the constructs that drive the decisions they make. However, although board heterogeneity can improve decision making by introducing different perspectives that challenge insular board cultures, force management to articulate and defend credit assumptions Bernile et al., (2018), it can, if mismanaged, increase conflict, slow decision making, and foster factionalism that weakens monitoring efficiency (Van Peteghem et al., 2018; Zhang & Ma, 2022). Within the Nigerian banking industry, where macroeconomic volatility and credit defaults historically challenge financial stability, a heterogeneous board is theorized to mitigate cognitive biases, prevent groupthink, and enhance risk-monitoring capabilities (Aifuwa et al., 2020; Lawal & Temile, 2021). However, the benefits depend on whether diversity is properly coordinated (Janahi et al., 2023; Aureli et al., 2026).

Board heterogeneity was viewed through the lenses of board age diversity, board tenure diversity, board gender, board independence and board professional diversity. Age diversity captures generational balance, tenure diversity captures the mixture of fresh and long-standing board knowledge, board gender diversity looks at the ratio of male to female directors on the board, board independence diversity looks at the ratio of independent to dependent directors on the board while board professional diversity captures the spread of functional expertise among directors. These dimensions are expected to influence asset quality because directors with different backgrounds may approach credit appraisal and impairment reviews differently (Essien & Akpan, 2024; Hakimi et al., 2025).

Asset quality

Asset quality reflects the underlying risk profile, economic viability, and creditworthiness of a bank's asset portfolio, which is primarily composed of commercial, retail, and institutional loans and advances (Central Bank of Nigeria [CBN], 2014; Basel Committee on Banking Supervision [BCBS], 2019). The quality of a bank's assets dictates its solvency, profitability, capital adequacy, and overall operational resilience. Poor quality assets lead to credit losses, erodes capital reserves and increases financing costs. If left unchecked, poor asset quality can lead to bank distress and systemic contagion (Barth et al., 2004). Asset quality is affected by credit appraisal, borrower performance, collateral quality, macroeconomic conditions and internal governance. For this reason, regulators and investors closely monitor indicators such as non-performing loans, loan loss provisions and impairment charges (Badru et al., 2026; Takahashi & Vasconcelos, 2024).

This measures asset quality using loan loss provisioning accuracy ratio. The ratio captures the expected credit losses provided for by the Board and compares it with actual loans written off in the following year. The measure evaluates the prospective estimation accuracy of the board's credit oversight by matching discretionary and statutory loan provisions made in year t with actual credit losses and loan write offs realized in year t+1. A high loan loss provisioning accuracy ratio suggests greater accuracy in the board's forecasting of credit decay while a lower ratio may indicate poor expected credit loss estimation and a tendency to use

discretionary provisioning latitude for earnings management. The measure is suitable because it reflects both management's assessment of expected credit losses and actual credit losses under financial reporting standards (Elashmawy, 2025; Essien & Akpan, 2024).

Loan loss provisioning accuracy

Loan loss provisioning accuracy is calculated as the ratio of loan loss provisions in year t divided by net loan write-offs in year t+1. It reflects the alignment between the amount set aside by a bank to cover expected credit losses from its loan portfolio and the banks' realized credit losses. An LLPA value equal to 1.0 (or 100%) indicates optimal provisioning accuracy indicating that the board's risk oversight and estimation models in year t accurately anticipated the true scale of credit defaults that materialized in year t+1. It reflects a neutral and transparent accounting quality devoid of optimism or distress-driven over-provisioning (Apostolou et al., 2014; Beatty & Liao, 2014). A loan loss provisioning accuracy that is substantially less than 1 means that the Board underestimated future credit default and set aside insufficient impairment buffers relative to actual credit defaults. Under-provisioning not only leaves the institution vulnerable to unexpected capital erosion when default write-offs occur but could also be an indication of opportunistic earnings management, where management intentionally minimizes current impairment charges to inflate reported net income, artificially protect capital adequacy ratios, or secure performance-linked executive compensation (Curcio & Hasan, 2015).

On the other hand, a loan loss provisioning accuracy substantially above 1 indicates that management projected higher impairment losses relative to actual credit write-offs in year t+1. Over-provisioning can result from extreme, defensive accounting conservatism or deliberate income smoothing where management depresses reported earnings during profitable years to create excess impairment buffers that can be reversed to boost earnings during future downturns (Bushman & Williams, 2012). While over-provisioning protects solvency, it distorts accounting transparency, compresses regulatory capital, suppresses dividend distributions, and misallocates economic resources.

By measuring the absolute deviation of LLPA from unity, this captures the net estimation accuracy of loan loss provisioning, providing an objective metric for evaluating how effectively heterogeneous boards oversee credit risk forecasting. Loan loss provisioning accuracy is used as the dependent variable because it provides a provisioning-based measure of asset quality linking the predictive capability of board heterogeneity characteristics with the asset quality of listed deposit money banks in Nigeria.

Board age diversity

Board age diversity refers to the variance in chronological age and generational distribution across corporate directors. Age can be used to assess life experience, exposure to different economic cycles, and the ability to survive different scenarios. Older board members possess institutional memory, established professional networks, and perspectives forged through past systemic crises but may exhibit higher cognitive rigidity, resistance to emerging financial technologies, and a disincentive to address long-term credit risks. Talavera et al., (2018). Younger directors are usually more technology savvy and forward looking in their evaluation of risks. A board with a balanced age structure may combine the experience of older directors with the energy, technological awareness and market sensitivity of younger directors. This combination can improve discussion quality and reduce one-sided judgement in credit oversight. Evidence from banking studies suggests that age-diverse boards can strengthen monitoring because directors from different generations bring different cognitive frames to risk assessment (Janahi et al., 2023).

The board age diversity was measured using Blau index based on young, middle-aged and senior director categories. The variable is expected to influence loan loss provisioning accuracy because an age-balanced board may detect credit weaknesses earlier and ask stronger questions about portfolio quality. However, excessive generational differences may create communication gaps and slow board consensus where credit risk decisions require speed (Aureli et al., 2026).

Ho1: There is no significant relationship between board age diversity and loan loss provisioning accuracy of

listed deposit money banks in Nigeria.

Board tenure diversity

Board tenure diversity describes the extent to which board members differ in the number of years they have served on the board. Tenure reflects board members' familiarity with the bank's internal operating procedures, historical credit portfolios, counterparty behaviors, and organizational culture. This institutional memory allows long-tenured members to identify subtle deviations from policy that newer directors might overlook (Huang & Sheng, 2013; Livnat et al., 2021). However, extended tenure can compromise independence, foster social assimilation and personal ties with executive management, promote cognitive inertia and an acceptance of established albeit obsolete credit assessment routines (McNulty et al., 2013). In contrast, newly appointed board members bring fresh perspectives and external market knowledge to board decisions. A tenure-diverse board balances historical institutional insight with continuous external vigilance, preventing cognitive stagnation (Hakimi et al., 2025).

The board tenure diversity was measured using Blau's index based on the classifications of short, medium and long-tenured directors. Tenure diversity is important in assessing the asset quality of banks because it can influence how directors interpret loan performance trends, impairment triggers and their overall credit risk appetite but can produce conflict between older and newer directors if they have different perspectives on the strategic direction of the organization and thereby weaken coordination in credit risk oversight. However, this is not noticeable when considering loan loss provision. Thus the second hypothesis is postulated as follows:

Ho2: No significant relationship exists between board tenure diversity and loan loss provisioning accuracy of listed deposit money banks in Nigeria.

Board gender diversity

Board gender diversity refers to the presence and proportion of female versus male directors on a corporate board, and how that mix affects the board's composition and decision-making capacity. It's a demographic dimension of board composition that goes beyond token representation. In practice researchers measure it as the percentage of women directors, the Blau index where 0 = all one gender and 0.5 = perfect 50/50 balance, or an indicator for "critical mass" when at least 3 women sit on the board. Luh, (2026) exposed that gender brings variation in experience, socialization, and networks, so a gender-diverse board has a broader set of perspectives available during oversight and strategy discussions.

From a governance perspective, female participation on audit and risk committees correlates with higher accounting conservatism, more rigorous earnings quality oversight, and a lower tolerance for discretionary earnings management through loan loss provisions (Amorelli & Garcia-Sanchez, 2020). Gender-diverse boards are less likely to fall into groupthink since directors with different life experiences interpret information and risk differently as opined by Koester et al. (2020). Studies by Amadi and Williams (2024) as well as Umar et al. (2024) argued that female directors can also provide a degree of independence from dominant shareholder networks, strengthening the board's watchdog role.

Ali and Zoghlami, (2023) postulated that board gender diversity carries signaling and resource benefits outside the boardroom. Stakeholders read gender balance as a marker of modern governance and social accountability. Zhang et al. (2022) added that firms with visible gender diversity signal openness to diverse talent and stakeholder concerns, which can improve reputation, attract broader customer and employee bases, and potentially reduce financing costs. Board gender diversity can change how boards deliberate and monitor operations internally while building legitimacy and access to resources externally Kooay and Sapiei, (2025). Gender diversity has become central to board composition debates, even though its link to performance varies across contexts and depends on whether women have real influence rather than just a seat.

Ho5: Board gender diversity has no significant relationship with loan loss provisioning accuracy of listed deposit money banks in Nigeria.

Board independence diversity

Board independence diversity refers to the degree of variation in the independence status of directors within a board, capturing how evenly a board is composed of independent non-executive directors, non-independent non-executive directors, and executive directors. Wobo and Ofurum, (2021) postulated that unlike a simple measure of independence that just calculates the proportion of independent directors, independence diversity focuses on the mix and balance of these categories. A board with high independence diversity has a meaningful presence of each director type, so no single group dominates decision-making. The concept therefore moves beyond compliance with minimum independent-director thresholds to examine whether the board's structural composition allows for a true balance of insider knowledge and outsider objectivity. In this study sense, independence diversity is about the distribution of agency roles on the board rather than just the count of independent members Chamo et al. (2025).

Board independence is important because it addresses the agency problem between shareholders and managers by ensuring that oversight is not captured by those being overseen. Independent directors have no material ties to the company or its executives, so they are positioned to challenge management proposals, scrutinize related-party transactions, and protect minority shareholder interests without fear of career reprisal. Bayar et al. (2022) recorded that when a board achieves meaningful independence diversity, it gains both the firm-specific knowledge that executive directors bring and the objective judgment that outsiders provide, which reduces the risk of groupthink and managerial entrenchment. Ozili, (2023) opined that markets and regulators treat board independence as a signal of governance quality because firms with stronger independent oversight tend to make more disciplined capital allocation decisions, face lower costs of capital, and build greater stakeholder trust. In emerging markets like Nigeria where ownership is often concentrated, independence diversity is especially vital since independent directors serve as the main buffer against expropriation by controlling shareholders and against weak institutional enforcement.

Ho4: There is no significant relationship between board independence diversity and loan loss provisioning accuracy of listed deposit money banks in Nigeria.

Board professional diversity

Board professional diversity measures the variation in academic qualifications, functional backgrounds, professional certifications, and technical skill sets across board members (García-Sánchez et al., 2017). The required skillsets span finance, accounting, law, risk management, technology, economics and business management because credit decisions involve financial analysis, legal enforceability, collateral review, sectoral knowledge and risk modelling. Integrating these specialized skill sets prevents reliance on management representations and equips the board with the cognitive resources required to evaluate complex asset quality indicators (García-Sánchez et al., 2017; Garba et al., 2020). A professionally diverse board may therefore provide stronger oversight over loan approval, provisioning and recovery strategies (Essien & Akpan, 2024; Sylvanus et al., 2025).

The board professional diversity is measured using Blau index based on finance/accounting; legal/risk/technology; and other professional categories. This variable is expected to improve loan loss provisioning accuracy because professional diversity ensures that a board possesses a comprehensive balance of capabilities across core disciplines which can improve credit appraisal, ECL review and portfolio monitoring. However, professional diversity may produce limited benefits where directors do not actively participate in board deliberations.

Ho5: Board professional diversity has no significant relationship with loan loss provisioning accuracy of listed deposit money banks in Nigeria.

Theoretical framework

Upper echelons theory

Upper echelons theory was developed by Hambrick and Mason (1984). The theory argues that organizational outcomes are partly predicted by the characteristic backgrounds, values and cognitive biases of top executives and directors. It assumes that decision makers interpret strategic issues based on their experiences, risk appetite, education, age, tenure and professional exposure. This theory was a shift from the rational microeconomic view of the firm as an entity that responded to the interplay of the market forces of demand and supply. It recognized the fact that firms are run by people who are compelled to take decisions under time constraints, incomplete information and with varying degrees of cognitive appreciation.

Therefore, under the volatile, uncertain, complex and ambiguous environment where businesses operate, the profiles of board members serve as a cognitive filter through which they perceive reality and therefore the composition of the board can influence the quality of risk and investment decisions they make and this will in turn impact the performance of the organization (Hambrick & Mason, 2007)

This theory is relevant to this because in listed deposit money banks, directors influence credit policy, risk appetite, impairment review and loan monitoring. Board members lack certainty about future macroeconomic shifts, borrower default probabilities, or collateral recovery values. Consequently, they use their cognitive biases, personal experiences, and risk orientations when reviewing management's credit proposals and provisioning estimates. A board with a mix of age groups, tenure experiences, gender, independent members and professional skills may interpret credit risk more carefully by bringing both a historical and modern perspective to risk management, avoiding group think and ensuring that decisions are not colored by the compensation concerns of executive directors thereby guaranteeing that board decisions support better asset quality.

METHODOLOGY

This study adopted an ex-post facto research design because the study relied on historical secondary data obtained from the annual reports of listed deposit money banks. The population of this study consisted of 15 deposit money banks listed on the Nigerian Exchange Group (NGX) within the period covered by the study. The sample size of this study consisted of eleven (11) listed deposit money banks in Nigeria.

Secondary data were used in the analysis. Data on board age composition, board tenure categories, board gender, board independence, board professional background, loan loss provisions, loan write-offs and total deposits were obtained from annual reports and accounts of the selected listed deposit money banks in Nigeria from 2015 to 2024, while actual loan write-offs from 2016 to 2025 provided the corresponding t+1 denominators required for LLPA.

The data were analysed with descriptive statistics and panel least squares regression model. However, relevant diagnostic tests were conducted to assess normality, linearity, homoscedasticity and the absence of severe autocorrelation.

Model specification

This study investigates the relationship between asset quality (AQ) and board heterogeneity (BH). The asset quality was proxied by loan loss provision; and board heterogeneity was measured by board age diversity (BAD), board tenue diversity (BTD), board gender diversity (BGD), board independent diversity (BID) and board professional diversity (BPD).

The study modified and adopted the model specified in related board diversity and bank asset quality in expressing the econometric function of this study as presented below:

$$AQ = f(BH) \quad - \quad - \quad - \quad - \quad (i)$$

AQ = f(BAD, BTD, BGD, BID, BPD) - - - (ii)

LLPA = β0 + β1BAD + β2BTD + β3BGD + β4BID + β5BPD + μ - - (iii)

Data analysis

Data were analysed using descriptive statistics, correlation analysis and panel regression model after diagnostic tests were carried out for residual normality, functional-form linearity, homoscedasticity and first-order serial correlation.

Descriptive statistics

The results of descriptive statistics is presented in the table below:

Table 1 - Descriptive statistics results

	LLPA	BAD	BTD	BGD	BID	BPD	FSIZE
Mean	1.283096	0.608507	0.639661	0.245457	0.289742	0.614095	28.633809
Median	1.257145	0.62	0.641975	0.25	0.3	0.62	28.675767
Maximum	2.421065	0.657778	0.666667	0.333333	0.4	0.652778	30.610661
Minimum	0.706049	0.493827	0.56	0.142857	0.166667	0.571429	26.48189
Std. Dev.	0.397571	0.034596	0.019793	0.044875	0.046419	0.019389	1.020675
Skewness	0.592915	-1.784848	-1.588372	-0.166012	-0.100913	-0.238396	-0.132468
Kurtosis	2.616628	6.659181	6.356942	2.392146	2.774214	2.257697	2.227249
Jarque-Bera	7.118688	119.77324	97.903506	2.198745	0.420352	3.567406	3.05862
Probability	0.028457	0	0	0.33308	0.810442	0.168015	0.216685
Sum	141.14059	66.935731	70.362703	27.000297	31.871626	67.550501	3149.719
Sum Sq. Dev.	17.22887	0.130459	0.0427	0.219505	0.234868	0.040977	113.55383
Observations	110	110	110	110	110	110	110

Source: Researcher's computation (2026) using E-views 10.0

From the results of analysis above, the mean LLPA was 1.283096, while the median was 1.257145. Because a ratio of 1.000000 represents equality between the provision recognized in year t and the actual write-off recorded in year t+1, the mean showed that provisions were, on average, 1.2831 times the subsequent write-offs. Stated in percentage terms, the average provision exceeded the following year's write-off by 28.31%. The minimum of 0.706049 records under-provisioning relative to the subsequent write-off, whereas the maximum of 2.421065 records provisions more than twice the subsequent write-off. The standard deviation of 0.397571 confirmed considerable dispersion around the mean. The positive skewness of 0.592915 showed a longer right tail, and the Jarque-Bera probability of 0.028457 rejects normality for LLPA at the 5% level.

Board age diversity had a mean of 0.608507, a median of 0.620000 and a maximum of 0.657778. Since the three-category Blau index has an upper value of approximately 0.6667 when the categories are almost evenly distributed, the average BAD value records a relatively high degree of age heterogeneity across the sampled boards. The standard deviation of 0.034596 is small relative to the mean, indicating that age diversity differs across banks but remains concentrated within a narrow range. The negative skewness of -1.784848 and Jarque-Bera probability of 0.000000 show a strongly left-skewed, non-normal distribution.

Board tenure diversity records the highest average among the three Blau-index variables, with a mean of 0.639661 and median of 0.641975. Its maximum is 0.666667 and its standard deviation is only 0.019793. The sampled boards therefore maintained a consistently broad spread across short-, medium- and long-tenure categories. BTD is negatively skewed (-1.588372), and its Jarque-Bera probability of 0.000000 rejects

normality. Board professional diversity has a mean of 0.614095, median of 0.620000 and standard deviation of 0.019389. Its Jarque-Bera probability of 0.168015 does not reject normality at 5%.

Board gender diversity has a mean of 0.245457. Female directors therefore constituted approximately 24.55% of board membership on average over the study period. The values range from 0.142857 to 0.333333, with a standard deviation of 0.044875. Board independence diversity has a mean of 0.289742, indicating that independent directors represented approximately 28.97% of board membership on average. The BID distribution is close to symmetric, with skewness of -0.100913 and a Jarque-Bera probability of 0.810442. Firm size has a mean logarithmic value of 28.63380 9 and a standard deviation of 1.020675, reflecting the substantial scale differences in total deposits across the eleven banks.

Correlation analysis

Correlation analysis was conducted to determine the direction and degree of pairwise association among the study variables and to examine whether the explanatory variables exhibit relationships large enough to create severe multicollinearity. Table 2 below presents the correlation matrix.

Table 2 - Correlation matrix

	LLPA	**BAD**	**BTD**	**BGD**	**BID**	**BPD**	**FSIZE**
LLPA	1	-0.187352	0.221588	0.051874	0.092943	0.179381	-0.145451
BAD	-0.187352	1	-0.022079	0.010795	-0.086186	-0.48446	0.571306
BTD	0.221588	-0.022079	1	0.281049	0.294714	-0.163863	0.094005
BGD	0.051874	0.010795	0.281049	1	0.457626	0.003843	0.209178
BID	0.092943	-0.086186	0.294714	0.457626	1	0.246868	0.073512
BPD	0.179381	-0.48446	-0.163863	0.003843	0.246868	1	-0.664874
FSIZE	-0.145451	0.571306	0.094005	0.209178	0.073512	-0.664874	1

Source: Researcher's computation (2026) using E-views 10.0

From the results, LLPA is negatively correlated with board age diversity (-0.187352) and firm size (-0.145451). It is positively correlated with board tenure diversity (0.221588), board gender diversity (0.051874), board independence diversity (0.092943) and board professional diversity (0.179381). These coefficients describe pairwise association only; the regression models subsequently estimate each relationship while holding the other explanatory variables constant.

Regression diagnostic tests

The diagnostic tests were conducted before the panel-model decision was made. The tests covered residual normality, functional-form linearity, homoscedasticity, and first-order serial correlation. The results indicated that there was no violation of normality rule.

Regression analysis

The results of regression analysis are presented in table 4 below:

Table 4 - Cross-section random-effects regression result

		S.D.			Rho	
Cross-section random		0.039393			0.010538	
Idiosyncratic random		0.381717			0.989462	
Variable	Coefficient		Std. Error	t-Statistic		Prob.
C	-3.94056		3.588849	-1.098		0.2748
BAD	-1.14488		1.37933	-0.83002		0.4084

BTD	5.306962		2.083693	2.546903		0.0123
BGD	-0.05848		0.963771	-0.06068		0.9517
BID	-0.29805		1.005238	-0.2965		0.7674
BPD	3.931744		2.995514	1.312544		0.1923
FSIZE	0.007401		0.058502	0.126505		0.8996

Weighted Statistics

R-squared	0.101938	Mean dependent var.	1.219786
Adjusted R-squared	0.049624	S.D. dependent var.	0.394665
S.E. of regression	0.384748	Sum squared residuals	15.24717
F-statistic	1.948576	Durbin-Watson stat	1.8102
Prob(F-statistic)	0.079931		

Unweighted Statistics

R-squared	0.10564	Mean dependent var.	1.283096
Sum squared resid	15.40881	Durbin-Watson stat	1.791558

Source: Researcher's computation (2026) using E-views 10.0

From the results of regression analysis, the predictive model of the relationship between the board heterogeneity and loan loss provisioning accuracy can be estimated as follows:

LLPA = -3.941 -1.1449BAD + 5.3070BTD -0.05848BGD - 0.2980BID + 3.9317BPD + μ

From the results of analysis above, board age diversity has a coefficient of -1.144876. Holding the other variables constant, an increase of 0.01 in BAD corresponds to a decrease of approximately 0.011449 in LLPA. The probability value of 0.4084 is greater than 0.05, so the relationship is not statistically significant. The observed negative coefficient therefore does not provide statistical evidence that differences in age composition systematically alter the provision-to-subsequent-write-off ratio across the sampled banks.

Board tenure diversity has a coefficient of 5.306962 and probability of 0.0123. A 0.01 increase in BTD corresponds to an increase of approximately 0.053070 in LLPA, holding the other variables constant. The relationship is positive and statistically significant. Because the sample mean LLPA is already above unity at 1.283096, an increase in BTD is associated with a higher amount of provision relative to the actual write-off recorded in the following year. The coefficient therefore reflects a material relationship between tenure heterogeneity and the level of provisioning relative to realized write-offs.

Board gender diversity has a coefficient of -0.058482 and probability of 0.9517. Board independence diversity has a coefficient of -0.298048 and probability of 0.7674. Both coefficients are negative, but neither is statistically significant at 5%. The data therefore do not establish significant relationships between these two diversity dimensions and LLPA after controlling for the other board variables and firm size. Board professional diversity has a coefficient of 3.931744 and probability of 0.1923. The positive coefficient is not statistically significant at 5%, so the observed variation in professional-background mix does not independently explain LLPA in the preferred model. Firm size has a coefficient of 0.007401 and probability of 0.8996; the scale of total deposits therefore has no statistically significant relationship with LLPA in the estimated random-effects equation.

Test of hypotheses

Hypothesis one

H01: There is no significant relationship between board age diversity and loan loss provisioning accuracy of

listed deposit money banks in Nigeria.

The cross section random-effects result shows that board age diversity has a coefficient of -1.144876 and probability value of 0.4084. Since the probability value is greater than 0.05, the null hypothesis was supported. Board age diversity therefore has no statistically significant relationship with loan loss provisioning accuracy of listed deposit money banks in Nigeria during the study period.

Hypothesis two

H02: No significant relationship exists between board tenure diversity and loan loss provisioning accuracy of listed deposit money banks in Nigeria.

Board tenure diversity has a coefficient of 5.306962 and probability value of 0.0123. Since the probability value is less than 0.05, the null hypothesis is rejected. Board tenure diversity therefore has a positive and statistically significant relationship with loan loss provisioning accuracy of listed deposit money banks in Nigeria.

Hypothesis three

H03: Board professional diversity has no significant relationship with loan loss provisioning accuracy of listed deposit money banks in Nigeria.

Board professional diversity has a coefficient of 3.931744 and probability value of 0.1923. Since the probability value is greater than 0.05, the null hypothesis was supported. Board professional diversity therefore has no statistically significant relationship with loan loss provisioning accuracy of listed deposit money banks in Nigeria.

Hypothesis four

H04: There is no significant relationship between board independence diversity and loan loss provisioning accuracy of listed deposit money banks in Nigeria.

Board independence diversity has a coefficient of -0.298048 and probability value of 0.7674. Since the probability value is greater than 0.05, the null hypothesis was supported. This implies that board independence diversity therefore has no statistically significant relationship with loan loss provisioning accuracy of listed deposit money banks in Nigeria.

Hypothesis five

H05: Board gender diversity has no significant relationship with loan loss provisioning accuracy of listed deposit money banks in Nigeria.

Board gender diversity has a coefficient of -0.058482 and probability value of 0.9517. Since the probability value is greater than 0.05, the null hypothesis was supported. Board gender diversity therefore has no statistically significant relationship with loan loss provisioning accuracy of listed deposit money banks in Nigeria.

DISCUSSION OF FINDINGS

The coefficient of determination of the relationship between board heterogeneity and loan loss provisioning accuracy stood at 0.10194 indicating that variation in board heterogeneity will lead to 10.19% change in the loan loss provisioning accuracy. The other 89.81% is accounted for by other factors not considered in the model.

Discussions on the sub-variables are presented below.

Board age diversity and loan loss provisioning accuracy

The study found a negative but statistically insignificant relationship between board age diversity and LLPA. The coefficient establishes that higher age diversity moved in the direction of a lower provision-to-subsequent-write-off ratio after controlling for the other board characteristics and firm size, but the probability of 0.4084 does not establish a statistically reliable relationship. The finding therefore does not support a direct effect of age heterogeneity on provisioning accuracy in the sampled Nigerian banks.

This result differs from Janahi et al. (2023), who found that age-diverse boards strengthened monitoring and were associated with lower loan-risk indicators in banks. The difference is consistent with the different outcome measures: Janahi et al. examined monitoring and loan-risk indicators, whereas the present study compares provisions in year t directly with actual write-offs in year t+1. Under Upper Echelons Theory, age remains a relevant cognitive characteristic of directors, but the present evidence shows that age variation by itself did not materially explain the ratio between expected credit-loss provisions and subsequent realized write-offs.

Board tenure diversity and loan loss provisioning accuracy

Board tenure diversity recorded a positive and statistically significant coefficient. This is the only board heterogeneity dimension for which the null hypothesis was rejected. The result shows that a wider distribution of directors across short-, medium- and long-tenure categories is associated with a higher LLPA. At the sample mean, where LLPA already exceeds unity, the relationship corresponds to greater provisioning relative to the actual write-off subsequently recorded.

The finding is related to Hakimi et al. (2025), who reported that board tenure was consequential for bank credit-risk outcomes and found tenure to increase non-performing loans in their banking sample. Although non-performing loans and LLPA capture different aspects of asset quality, both results establish that tenure characteristics can materially affect credit-risk outcomes. The result also fits the Upper Echelons Theory position that accumulated experience and length of exposure to organizational routines shape the judgments made by top decision makers. In this study, tenure heterogeneity was the board-composition characteristic with measurable explanatory power for the provision/write-off relationship.

Board gender diversity and loan loss provisioning accuracy

Board gender diversity had a negative and statistically insignificant relationship with LLPA. Female directors represented approximately 24.55% of board membership on average, but variation in that proportion did not significantly explain LLPA after the other board characteristics and firm size were held constant. The null hypothesis on board gender diversity was therefore supported.

This finding differs from Luh (2026), who found that women in leadership and on boards reduced loan loss provisions when credit growth increased, and from Badru et al. (2026), who reported that female representation improved loan quality by reducing non-performing loans. Those studies establish significant gender effects for provisioning or non-performing-loan outcomes, whereas the present analysis finds no significant gender effect for the ex-post provision/write-off ratio. However, when one considers that only 24% of women on average were represented on the boards of banks, the statistical insignificance of their effect on loan loss provisioning accuracy might be better understood.

Board independence diversity and loan loss provisioning accuracy

Board independence diversity had a negative but statistically insignificant relationship with LLPA. The coefficient direction corresponds to a lower ratio as the proportion of independent directors rises, but the probability of 0.7674 does not establish a significant relationship. The result therefore does not show that the proportion of independent directors, after the other board variables are controlled, systematically changed provisioning relative to subsequent loan write-offs during the period.

Hakimi et al. (2025) found that board independence reduced non-performing loans, while Badru et al. (2026) reported that non-executive representation improved loan quality in Nigerian banks. The present result is directionally consistent with lower credit-risk outcomes but differs in statistical significance. The distinction again reflects the dependent variable: LLPA assesses the relation between expected credit-loss provisions and realized write-offs rather than the stock of non-performing loans.

Board professional diversity and loan loss provisioning accuracy

Board professional diversity had a positive but statistically insignificant relationship with LLPA. The result means that the spread of directors across finance/accounting, legal/risk/technology and other professional backgrounds did not independently explain the provision-to-subsequent-write-off ratio at the 5% level. Professional variety was high on average, but the variation across bank-year observations was narrow, with a standard deviation of 0.019389.

The finding differs from Essien and Akpan (2024), who reported that experience diversity and financial expertise significantly reduced discretionary loan loss provisions among listed Nigerian deposit money banks. Their dependent variable focused on discretionary provisioning and earnings quality, while the present study measures the ratio of total provisions to actual next-year write-offs. The difference confirms that professional diversity can relate differently to provisioning discretion and to ex-post alignment between provisions and realized write-offs.

CONCLUSION AND RECOMMENDATIONS

The empirical results establish that board heterogeneity does not have a uniform relationship with LLPA. Board tenure diversity is the only dimension with a statistically significant relationship, and the relationship is positive. Board age diversity, board professional diversity, board independence diversity and board gender diversity are not statistically significant. The joint random-effects equation is also not significant at the 5% level. The study therefore concludes that variation in board tenure composition materially relates to the level of provisioning relative to subsequent write-offs, while the other measured board diversity dimensions do not independently explain LLPA within the period covered by the study.

The following recommendations are proffered:

1. Banks should retain age diversity as a governance-strengthening feature but should not treat age composition alone as a determinant of provisioning accuracy. Board evaluation should connect generational diversity with credit-risk knowledge, current market information and active participation in risk oversight.

2. Listed deposit money banks should maintain a deliberate balance of short-, medium- and long-tenured directors, while subjecting impairment estimates to strong credit-risk review. The significant positive relationship between tenure diversity and LLPA requires attention to whether tenure mix is accompanied by provisioning levels that remain appropriately calibrated to realized credit losses.

3. Gender inclusion should continue as an important board-governance objective, while banks should ensure that female directors have substantive participation in risk, credit and audit oversight. The absence of a significant gender coefficient in this study model does not provide a basis for treating numerical gender representation as a standalone mechanism for provisioning accuracy.

4. The effectiveness of independent directors should be strengthened through timely access to credit-risk information, authority within board risk and audit committees, and documented challenge of management assumptions. The insignificant BID coefficient shows that numerical independence alone did not explain the provision/write-off ratio.

5. Nomination committees should move beyond the numerical presence of different professional backgrounds and assign directors with finance, accounting, legal, risk and technology expertise to roles where those competencies directly influence impairment review, credit monitoring and recovery decisions.

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