# Effect Of Digital Financial Inclusion on Capital Structure Decisions: Empirical Evidence from Listed Non-Financial Firms on the Nigerian Exchange Group

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***Abstract*—Although digital banking transactions have grown rapidly in Nigeria, their firm-level financing consequences remain under-examined, since the local literature has concentrated on household access and macroeconomic outcomes rather than corporate leverage. This study examines the effect of digital financial inclusion on the capital structure decisions of listed non-financial firms on the Nigerian Exchange Group (NGXGrounded in the Pecking Order Theory and complemented by the Trade-Off and Financial Intermediation theories, the study adopts a positivist, ex-post facto longitudinal panel design. From a population of 106 NGX-listed non-financial firms, 70 firms with complete audited data over 2014 to 2023 were retained through purposive sampling, producing a balanced panel of 700 firm-year observations. Capital structure is proxied by the total debt ratio, digital financial inclusion by the value of digital banking transactions, and firm size, the natural logarithm of total assets, serves as a control. The model was estimated in EViews, with the Hausman test ($\chi^2 = 1.64$, $p = 0.44$) selecting the random-effects estimator. Digital financial inclusion exerts a positive and significant effect on the total debt ratio ($\beta = 0.009$, $p < 0.01$), corroborated by the fixed-effects estimation. The positive sign supports the access-widening logic of financial intermediation and contrasts with the leverage-reducing evidence from advanced emerging markets, indicating that the effect is context-specific to a bank-dominated frontier market. The study offers guidance for managers, lenders, regulators, and inclusion policymakers.**

***Index Terms*—Digital Financial Inclusion; Capital Structure; Total Debt Ratio; Panel Regression; Random Effects; Nigerian Exchange Group JEL Classification: G32; G21; O16; G23**

## I. INTRODUCTION

The financing decisions of firms are central to corporate finance because the combination of debt and equity employed by a firm influences its cost of capital, its exposure to financial distress, and the value that accrues to its owners. Since Modigliani and Miller (1958), scholarship has relaxed the assumption of perfect capital markets and turned to the frictions, information asymmetries, and transaction costs that make the financing mix a consequential managerial choice. These frictions are pronounced in developing and frontier markets, where capital markets are shallow and the architecture for credit allocation is still maturing, so the determinants of capital structure warrant continued empirical interrogation.

A development reshaping firms' external financing environment is the diffusion of digital financial services. Digital financial inclusion, the extension of formal financial access and usage through digital channels such as electronic payments, mobile money, agency banking, and internet-enabled transfers, has broadened the reach and lowered the cost of intermediation (Ozili, 2022). In Nigeria, the deepening of digital payment infrastructure has produced sustained growth in the volume and value of digital banking transactions. This is consequential for corporate financing because the reduced information asymmetry and broadened intermediation that accompany digital finance can reshape the accessibility and cost of external funds, and therefore the hierarchy of financing choices firms follow.

International evidence is limited and concentrated in advanced emerging economies. Using A-share listed non-financial enterprises in China, Junqi et al. (2024) report that digital finance significantly reduces corporate leverage by lowering financing costs, easing constraints, and weakening non-systemic risk, indicating the effect is neither self-evident nor uniform in direction. Whether comparable effects obtain in an African frontier market with a bank-dominated system and a thinner equity market is an open question. The NGX hosts a heterogeneous non-financial population reliant on bank credit and internal funds, yet the Nigerian inclusion literature has examined households, gender access, and aggregate growth (Ozili, 2022, 2024; Ozili & Mhlanga, 2024), leaving the financing consequences for listed corporations unaddressed.

### 1.1 Statement of the Problem

The expansion of digital financial inclusion in Nigeria has been substantial, yet its implications for the capital structure of listed non-financial firms are neither well theorised nor adequately tested. Conventional determinants such as profitability, tangibility, growth, and firm size have been examined repeatedly, but the wider digital financial environment as a structural determinant of leverage has not, even though its theorised channels, reduced information asymmetry and lower intermediation cost, bear directly on the assumptions of the dominant capital structure theories.

The direction of the relationship is, moreover, theoretically ambiguous. The Pecking Order Theory implies that an environment which improves access to lower-cost funds may reduce reliance on external debt, whereas the Financial Intermediation perspective implies that wider credit access may raise observed leverage, and the cross-country evidence reflects this tension (Junqi et al., 2024). Absent firm-level Nigerian evidence, managers, lenders, and regulators lack a defensible basis for anticipating how the continuing growth of digital finance will affect corporate financing structures. This study addresses that deficiency by estimating the effect of digital financial inclusion on the total debt ratio of listed non-financial firms on the NGX over 2014 to 2023, while controlling for firm size.

### 1.2 Objective, Research Question, and Hypothesis

The fundamental objective of this study is to determine the effect of digital financial inclusion on the capital structure decisions of listed non-financial firms on the Nigerian Exchange Group. To achieve this, the critical Research Question is asked: What is the effect of digital financial inclusion on the capital structure decisions of listed non-financial firms on the Nigerian Exchange Group? A corresponding tentative answer to this question is also provided in the form of the Null Hypothesis (H01): Digital financial inclusion has no significant effect on the capital structure, proxied by the total debt ratio, of listed non-financial firms on the Nigerian Exchange Group.

### 1.3 Significance and Contribution of the Study

The study makes three contributions. It introduces digital financial inclusion as a structural determinant of corporate leverage in an African frontier market, extending an inclusion discourse so far centred on households and macroeconomic outcomes and examined at firm level mainly in Chinese data (Junqi et al., 2024). It provides evidence for corporate managers and lenders, who require an evidence base for how the deepening of digital finance conditions the accessibility and cost of external funds. It also guides capital market regulators and inclusion policymakers by clarifying whether the corporate sector experiences digital finance as a force that expands or contracts reliance on debt. The remainder of the paper reviews the conceptual, theoretical, and empirical literature and develops the hypothesis (section two), then sets out the methodology (section three).

## II. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

### 2.1 Conceptual Review

#### 2.1.1 Capital Structure Decisions

Capital structure refers to the composition of the financing sources a firm uses to fund its assets and operations, expressed as the relative proportions of debt and equity, and the capital structure decision concerns the deliberate selection of this mix to minimise the cost of capital while sustaining the firm's capacity to meet its obligations. In empirical research it is commonly operationalised through

leverage ratios, of which the total debt ratio (total debt divided by total assets) is among the most widely adopted because it captures overall reliance on borrowed funds relative to the asset base (Abdeljawad & Jaradat, 2025). The present study adopts the total debt ratio as its dependent variable.

2.1.2 Digital Financial Inclusion

Digital financial inclusion denotes the provision and uptake of formal financial services through digital channels by individuals and firms previously underserved or excluded, encompassing electronic payments, mobile money, agency banking, and internet-enabled transfers, and is distinguished from conventional inclusion by its reliance on technology to reduce cost and extend reach (Ozili, 2022). In Nigeria it has advanced through a coordinated expansion of digital payments infrastructure, and the volume and value of digital banking transactions provide an observable, system-level indicator of its depth. Ozili (2024) documents measurable, if uneven, gains in Nigeria across successive periods, while Ozili and Mhlanga (2024) note the close association between financial inclusion and the related notions of digital finance and financial technology. The study measures digital financial inclusion through the volume and value of digital banking transactions as the independent variable. According to Amah and Charlrs-Olimene (2025) financial technology (Fintech) - especially through its crucial dimensions of digital payment systems, blockchain and cryptocurrency technologies - has revolutionized Nigeria's financial ecosystem by enhancing customer satisfaction and expanding financial accessibility.

2.1.3 Firm Size

Firm size is a pervasive determinant of capital structure and is included as a control to guard against omitted variable bias. Larger firms typically enjoy greater diversification, lower relative bankruptcy risk, and superior access to credit markets, attributes that influence both the availability and the cost of debt and therefore the observed leverage ratio (Abdeljawad & Jaradat, 2025). It is measured as the natural logarithm of total assets, a transformation that mitigates the distortion arising from the wide dispersion of firm asset values in a heterogeneous listed population.

2.2 Theoretical Framework

The study is anchored in the Pecking Order Theory and complemented by the Trade-Off and Financial Intermediation theories, which together explain how the deepening of digital financial inclusion conditions the financing hierarchy, the optimal level of debt, and the accessibility of external funds.

2.2.1 Pecking Order Theory (Primary Theory)

The Pecking Order Theory, advanced by Myers and Majluf (1984) and elaborated by Myers (1984), holds that information asymmetry between managers and investors generates a preference ordering among financing sources: firms prefer internal funds first, then debt, and equity only as a last resort, because adverse selection costs are lowest for internal funds and highest for new equity. Leverage therefore responds primarily to the financing deficit rather than to a fixed target. The theory is the primary anchor because digital financial inclusion bears directly on its assumptions: by reducing information asymmetry and transaction costs, digital finance can alter the relative cost of moving down the financing hierarchy and reshape the intensity with which firms draw on debt. Testing the framework on the Palestine Exchange, Abdeljawad and Jaradat (2025) find the financing deficit to be the dominant driver of debt issuance, with profitability and growth negatively associated with leverage, in line with pecking order predictions.

2.2.2 Trade-Off Theory (Complementary Theory)

The Trade-Off Theory, associated with Kraus and Litzenberger (1973) and rooted in the corrected propositions of Modigliani and Miller (1958), posits that firms approach an optimal capital structure by balancing the tax advantage of debt against the costs of financial distress and bankruptcy, so that leverage is a target-seeking variable. The theory complements the pecking order perspective by introducing the cost-of-distress consideration that bounds prudent borrowing. To the extent that digital financial inclusion lowers the cost of debt and improves lenders' capacity to monitor borrowers, it may shift the trade-off toward higher optimal leverage, a channel that runs counter to the constraint-easing, leverage-reducing channel emphasised in some recent evidence.

2.2.3 Financial Intermediation Theory (Complementary Theory)

The Financial Intermediation Theory, traceable to Gurley and Shaw (1960), explains how intermediaries reduce information asymmetry and transaction costs between savers and borrowers, channelling funds to productive uses and widening access to external finance. Digital financial systems represent an intensification of this function, lowering the cost of screening, monitoring, and transacting and extending the boundary of formal access. Within this study the theory clarifies the mechanism by which digital financial inclusion may influence leverage: by deepening intermediation and broadening access to external credit, digital finance can increase the feasible scale of debt financing, even as the same forces alter the firm's preference between internal and external sources.

2.3 Empirical Review and Hypothesis Development

The literature directly linking digital financial inclusion to corporate capital structure is recent and geographically concentrated. Junqi et al. (2024), using a large panel of Chinese A-share non-financial enterprises, find that digital finance significantly reduces leverage in both short-term and long-term components, attributing the effect to lower financing costs, eased constraints, and weakened non-systemic risk, with heterogeneity across ownership types and firm sizes. More broadly, Khan and Khan (2023) report across developing countries that financial inclusion improves welfare and financial stability, underscoring the systemic significance of expanding formal access. In Nigeria, however, the literature concentrates on access and macroeconomic outcomes: Ozili (2022) surveys access gaps and policy strategy, Ozili (2024) analyses the trend and growth implications of women's digital financial inclusion, and Ozili and Mhlanga (2024) examine the conceptual currency of inclusion alongside digital finance and financial technology. None models the effect of digital financial inclusion on the capital structure of listed firms.

Two observations follow. First, the direction of the effect is unsettled, since the constraint-easing channel that reduces leverage coexists with an access-widening channel that may raise it, and the net effect is sensitive to institutional context. Second, the Nigerian evidence base treats inclusion as a household and macroeconomic phenomenon and has not extended to corporate capital structure on the NGX. This combination constitutes the gap the study fills. Because the net direction cannot be predicted with confidence in advance, the hypothesis is stated in the null form, consistent with a two-sided test.

H01: Digital financial inclusion has no significant effect on the capital structure, proxied by the total debt ratio, of listed non-financial firms on the Nigerian Exchange Group.

2.4 Conceptual Framework and Research Gap

The conceptual framework expresses the hypothesized relationship in which digital financial inclusion, measured by the volume and value of digital banking transactions, influences the capital structure decision, proxied by the total debt ratio, with firm size, the natural logarithm of total assets, retained as a control. Figure 1 presents the framework.

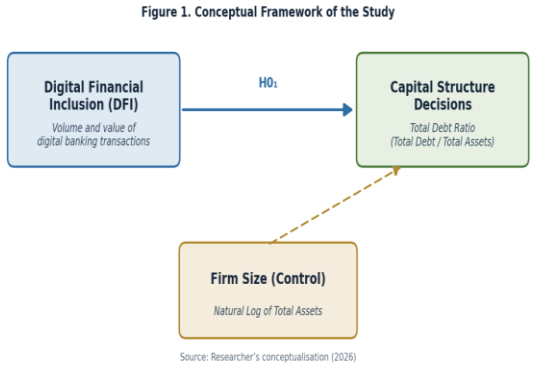


Figure 1. Conceptual framework of the study. Source: Researcher's conceptualization (2026).

The framework crystallises the research gap: the bidirectional reasoning, in which the pecking order and intermediation channels point in opposing directions, has been tested for firm-level leverage mainly in Chinese data (Junqi et al., 2024), while the Nigerian inclusion literature has not extended to corporate capital structure. The study therefore tests a single, theoretically grounded relationship in a previously unexamined national setting.

## III. METHODOLOGY

3.1 Research Design and Philosophy

The study adopts a positivist research philosophy, which holds that economic phenomena can be studied

through objective, quantifiable evidence and that theory-derived hypotheses can be tested against it. The orientation is appropriate because the study seeks to establish, through measurable variables and statistical inference, whether a generalizable relationship exists between digital financial inclusion and corporate capital structure. Consistent with this philosophy, the study employs a quantitative, ex-post facto design, since the financing outcomes recorded in audited statements and the system-level digital banking transactions have already occurred and are not subject to manipulation. The data are structured as a longitudinal panel, which permits the joint modelling of cross-sectional heterogeneity and temporal variation and improves the efficiency of the estimates relative to a cross-sectional or time-series design.

3.2 Population and Sampling

The population comprises the 106 non-financial firms listed on the Nigerian Exchange Group. Financial firms are excluded because their capital structures are shaped by regulatory capital requirements that differ fundamentally from those of non-financial firms, compromising the comparability of the leverage measure. A purposive technique retains firms with complete and continuously available audited financial data across 2014 to 2023, yielding 70 firms. Because each contributes ten annual observations, the sample forms a balanced panel of 700 firm-year observations. The criterion is justified because the panel estimators require continuity of firm-level data, and retaining firms with complete records preserves the integrity of the panel and avoids the biases that attend the unsystematic treatment of missing observations.

Table 1. Population, Sample, and Observations

| Parameter | Value |
|---|---|
| Listed non-financial firms (population) | 106 |
| Firms with complete data, 2014 to 2023 (sample) | 70 |
| Study period (years) | 10 |
| Firm-year observations (balanced panel) | 700 |

Source: Researcher's compilation (2026), based on Nigerian Exchange Group listings.

3.3 Data and Sources

The study relies on secondary, quantitative panel data. Firm-level capital structure and firm size data are extracted from the audited annual reports of the sampled firms, specifically the statement of financial position, for each year of the study period. The digital financial inclusion data, the volume and value of digital banking transactions, are drawn from the statistical publications of the Central Bank of Nigeria and the records of the national payments system, which provide consistent, system-level series on electronic transactions. The use of audited financial statements and official payments statistics supports reliability, since both sources are subject to independent assurance and regulatory oversight.

3.4 Variable Measurement and Operationalization

Table 2 sets out the operational definition, role, measurement, and data source for each variable.

Table 2. Measurement of Variables

| Code | Variable | Role | Measurement | Data Source |
|---|---|---|---|---|
| CS | Capital structure | Dependent | Total debt divided by total assets | Audited annual reports (statement of financial position) |
| DFI | Digital financial inclusion | Independent | Volume and value of digital banking transactions | CBN statistical publications and national payments system records |
| SIZE | Firm size | Control | Natural logarithm of total assets | Audited annual reports (statement of financial position) |

Source: Researcher's compilation (2026).

3.5 Model Specification

The relationship is estimated using a panel regression model that regresses the capital structure of firm i in year t on digital financial inclusion and the firm-size control, specified as follows.

$CSit = \beta0 + \beta1DFIit + \beta2SIZEit + \varepsilon it$

Here CS is the capital structure of firm i in year t, measured by the total debt ratio; DFI is digital financial inclusion, measured by the volume and value of digital banking transactions; and SIZE is firm size, the natural logarithm of total assets. The term β0 is the intercept, β1 and β2 are slope coefficients, and ε is the stochastic error term, with i indexing the firm and t the year. The coefficient β1 is the parameter of primary interest, since its sign and statistical significance determine whether the null hypothesis of no effect is retained or rejected.

3.6 Estimation Procedure and Diagnostic Tests

The model is estimated in EViews. The data are first organized into a panel workfile arranged by firm and year. Descriptive statistics summaries the central tendency, dispersion, and distribution of the variables, and a correlation matrix provides an initial assessment of the bivariate associations and flags potential collinearity. The choice between the fixed-effects and random-effects estimators is determined by the Hausman test of correlated random effects: the fixed-effects estimator is preferred where firm-specific effects are correlated with the regressors, and the random-effects estimator where no such correlation is present. The null hypothesis of the test is that the random-effects estimator is consistent and efficient, and its rejection favours the fixed-effects specification.

A set of diagnostics safeguards the inferences. Multicollinearity is assessed through the variance inflation factor, heteroscedasticity through the Breusch-Pagan test, and autocorrelation through the Durbin-Watson statistic. Where departures from the classical assumptions arise, robust standard errors are applied. The estimation outputs, comprising the descriptive statistics, correlation matrix, Hausman test, regression estimates, and diagnostics, are reported in tabular and graphical form generated within EViews.

3.7 Validity, Reliability, and Ethical Considerations

Validity and reliability are supported by the nature of the data and methods. Construct validity is enhanced by operationalizing each variable through established measures, namely the total debt ratio, the volume and value of digital banking transactions, and the natural logarithm of total assets. Internal validity is supported by the panel design and the firm-size control, which reduce omitted variable bias, and by the diagnostic testing that addresses multicollinearity, heteroscedasticity, and autocorrelation. Reliability is supported by the use of audited annual reports and official regulatory statistics, both subject to independent assurance, so that measurement can be replicated from publicly verifiable sources.

Because the study relies exclusively on secondary data from publicly available audited statements and official statistical publications, it does not involve human participants, and the ethical risks of primary data collection do not arise. The study nonetheless observes research integrity standards governing secondary data, including accurate representation of sources, faithful extraction of figures, and transparent disclosure of all measurement and estimation procedures, so that the analysis is fully traceable and reproducible.

## IV. RESULTS AND DISCUSSION

This section presents the empirical results obtained from the estimation of the panel regression model in EViews. The 700 firm-year observations spanning 70 listed non-financial firms over the 2014 to 2023 period were organised into a balanced panel workfile, dated by year and indexed by firm. Digital financial inclusion is operationalised as the natural logarithm of the value of digital banking transactions (LNDFI), a transformation that places the indicator on a scale comparable with the firm-size control and moderates the influence of the pronounced level shift in the series after 2019; the value and volume series are near-perfectly correlated ($r = 0.99$), so the value series is retained as the representative measure. The analysis proceeds from the descriptive characterisation of the variables, through the correlation and multicollinearity assessment, to the panel estimation and model-selection tests, and concludes with the test of the hypothesis and the discussion of findings.

4.1 Descriptive Statistics

Table 3 reports the descriptive statistics for the dependent variable, the independent variable, and the control. The total debt ratio (CS) averages 0.284, indicating that the sampled firms finance approximately twenty-eight per cent of their assets

with debt, a moderate average leverage for a bank-dependent non-financial sector that also draws substantially on internal funds. The dispersion is wide, with a standard deviation of 0.288 and a range from zero to 1.717, and the series is right-skewed (1.631) and leptokurtic (6.488), reflecting a heterogeneous population that includes both unlevered firms and a minority whose total debt exceeds total assets owing to accumulated losses. The Jarque-Bera statistic rejects normality for all three variables, a common feature of large micro-panels that is accommodated through the panel estimators and robust inference applied below.

Table 3. Descriptive Statistics

| Statistic | CS | DFI (log) | SIZE |
|---|---|---|---|
| Mean | 0.284025 | 10.81668 | 17.17238 |
| Median | 0.236014 | 9.492666 | 17.16150 |
| Maximum | 1.716711 | 14.19086 | 22.36125 |
| Minimum | 0.000000 | 8.392188 | 11.51293 |
| Std. Dev. | 0.288393 | 2.309314 | 2.332152 |
| Skewness | 1.630583 | 0.386623 | -0.064801 |
| Kurtosis | 6.487610 | 1.292407 | 2.498522 |
| Jarque-Bera | 656.8647 | 102.0511 | 7.969200 |
| Probability | 0.000000 | 0.000000 | 0.018600 |
| Sum | 198.8172 | 7571.674 | 12020.66 |
| Sum Sq. Dev. | 58.13620 | 3727.720 | 3801.815 |
| Observations | 700 | 700 | 700 |

Source: Author's EViews 12 output (2026).

4.2 Correlation and Multicollinearity Analysis

Table 4 presents the correlation matrix. The total debt ratio is positively but weakly correlated with digital financial inclusion (0.078) and with firm size (0.179), a first indication that higher digital financial inclusion is associated with greater rather than lower corporate leverage. The correlation between the two explanatory variables is negligible (0.056), signaling that multicollinearity is unlikely to distort the estimates. This is confirmed by the variance inflation factors in Table 5, both equal to 1.003, far below the conventional threshold of ten, so the regressors carry independent information.

Table 4. Correlation Matrix

| Variable | CS | DFI (log) | SIZE |
|---|---|---|---|
| CS | 1.000 | | |
| DFI (log) | 0.078 | 1.000 | |
| SIZE | 0.179 | 0.056 | 1.000 |

Source: Author's EViews 12 output (2026).

Table 5. Variance Inflation Factors

| Variable | Tolerance (1/VIF) | VIF |
|---|---|---|
| Constant (C) | — | — |
| Digital financial inclusion (LNDFI) | 0.997 | 1.003 |
| Firm size (SIZE) | 0.997 | 1.003 |

Note: A VIF below 10 indicates the absence of problematic multicollinearity. Source: Author's computation from EViews output (2026).

4.3 Panel Regression Estimation and Model Selection

The model was estimated under three specifications, the pooled (common-effect) ordinary least squares, the cross-section fixed-effects, and the cross-section random-effects estimators, whose results are reported together in Table 6. The appropriate specification was selected by formal tests. To establish whether firm-specific effects are present, the redundant fixed-effects test in Table 7 returns a cross-section F of 57.10 and a cross-section Chi-square of 1388.97, both significant at the one per cent level, decisively rejecting the null that the firm effects are redundant and confirming that the pooled estimator is inappropriate. The choice between the fixed-effects and random-effects estimators was then made by the Hausman test of correlated random effects in Table 8, which returns a statistic of 1.638 with two degrees of freedom and a probability of 0.441; the null that the random-effects estimator is consistent and efficient cannot be rejected, so there is no systematic correlation between the firm-specific effects and the regressors. The random-effects specification is accordingly adopted as the preferred model. The variance decomposition of the random-effects estimation is itself informative, with the cross-section component accounting for about eighty-five per cent of the total error variance (Rho = 0.8524), confirming that firm-level heterogeneity dominates and that a panel treatment is essential.

Table 6. Panel Regression Results (Dependent Variable: CS)

| Variable | Pooled OLS | Fixed Effects | Random Effects |
|---|---|---|---|
| C | -0.179212* (-1.949) | 0.246047 (0.995) | 0.015396 (0.089) |
| DFI (LNDFI) | 0.008465* (1.820) | 0.009915*** (4.960) | 0.009129*** (4.800) |
| SIZE | 0.021644*** (4.700) | -0.004034 (-0.271) | 0.009893 (0.975) |
| R-squared | 0.0366 | 0.8675 | 0.0406 |
| Adjusted R-squared | 0.0338 | 0.8526 | 0.0378 |
| F-statistic | 13.223 | 57.931 | 14.747 |
| Prob(F-statistic) | 0.0000 | 0.0000 | 0.0000 |
| Durbin-Watson | 0.2745 | 1.0754 | 0.9477 |
| Observations | 700 | 700 | 700 |

Note: t-statistics in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. The fixed-effects R-squared includes the cross-section effects; the random-effects statistics are weighted. Source: Author's EViews 12 output (2026).

Table 7. Redundant Fixed-Effects Test (Test cross-section fixed effects)

| Effects Test | Statistic | d.f. | Prob. |
|---|---|---|---|
| Cross-section F | 57.098725 | (69, 628) | 0.0000 |
| Cross-section Chi-square | 1388.974605 | 69 | 0.0000 |

Source: Author's EViews 12 output (2026).

Table 8. Correlated Random Effects - Hausman Test (Test cross-section random effects)

| Test Summary | Chi-Sq. Statistic | Chi-Sq. d.f. | Prob. |
|---|---|---|---|
| Cross-section random | 1.637797 | 2 | 0.4409 |

Source: Author's EViews 12 output (2026).

4.4 Test of Hypothesis

The hypothesis is tested on the preferred random-effects model in Table 6. The coefficient on digital financial inclusion is 0.009129, with a standard error of 0.001902, a t-statistic of 4.800, and a probability of 0.0000, indicating a positive effect that is statistically significant at the one per cent level. The fixed-effects estimation corroborates this, returning a coefficient of 0.009915 with a t-statistic of 4.960 and the same level of significance, so the inference is robust to the choice of estimator. Since the probability value is far below the 0.05 threshold, the null hypothesis (H01) that digital financial inclusion has no significant effect on the capital structure, proxied by the total debt ratio, of listed non-financial firms on the Nigerian Exchange Group is rejected. The control, firm size, carries a positive but statistically insignificant coefficient in the random-effects model (0.009893; $p = 0.330$), although it is significant in the pooled estimation, indicating that the size-leverage association operates across firms rather than within firms over time.

4.5 Discussion of Findings

The coefficient implies that a one-unit rise in the logarithm of the value of digital banking transactions is associated with an increase of approximately 0.9 percentage points in the total debt ratio, holding firm size constant. Cumulated over the study period, during which the logarithm of digital banking value rose by roughly 5.8 points, this corresponds to an upward shift in average leverage of about five percentage points, an effect that is modest in magnitude yet economically meaningful for a sector whose average debt ratio is 0.284. The weighted R-squared of the random-effects model is low at about four per cent, which is expected given that a single system-level inclusion series and a size control are not designed to capture the firm-specific drivers that, as the variance decomposition shows, dominate the cross-sectional variation in leverage.

The positive sign locates the result within the access-widening logic of the Financial Intermediation Theory rather than the constraint-easing logic of the Pecking Order Theory. As the value of digital banking transactions expands, the screening, monitoring, and transaction costs borne by intermediaries fall, the boundary of formal credit widens, and the feasible scale of debt financing for listed firms increases, so observed leverage rises. The finding contrasts directly with Junqi et al. (2024), who report that digital finance reduces leverage among Chinese A-share enterprises by easing constraints and lowering risk. The divergence is plausibly institutional: Nigeria operates a bank-

dominated system with a comparatively thin equity market, so the deepening of digital finance is expressed more as an expansion of debt capacity than as a migration toward equity or internal funds, whereas in the deeper Chinese market the same deepening can relax constraints in a manner that reduces borrowing. The contrast reinforces the central claim that the financing consequences of digital financial inclusion are context-specific and cannot be transposed uncritically from advanced emerging markets to an African frontier market. Two further diagnostics qualify the inference: the Breusch-Pagan test does not reject homoscedasticity at the five per cent level (LM = 5.82; p = 0.054), while the low Durbin-Watson statistics signal positive serial correlation, an expected feature of highly persistent leverage series that motivates the dynamic extension proposed below.

## V. CONCLUSION AND RECOMMENDATIONS

### 5.1 Summary of Findings

The study determined the effect of digital financial inclusion on the capital structure decisions of listed non-financial firms on the Nigerian Exchange Group over 2014 to 2023. Using a balanced panel of 700 firm-year observations from 70 firms and a random-effects estimator selected by the Hausman test, the study finds that digital financial inclusion exerts a positive and statistically significant effect on the total debt ratio at the one per cent level, a result corroborated by the fixed-effects estimation, while firm size is positively but insignificantly related to leverage once firm effects are controlled. The null hypothesis is accordingly rejected.

### 5.2 Conclusion

The study concludes that digital financial inclusion is a structural determinant of corporate leverage in Nigeria and that, in this bank-dominated frontier market, its influence is expansionary: the deepening of digital banking activity is associated with greater reliance on debt among listed non-financial firms. The mechanism is best understood through the Financial Intermediation Theory, whereby the reduction of intermediation costs and the widening of formal credit access enlarge the feasible scale of debt financing. The direction of the effect, opposite to that documented for a leading advanced emerging market, demonstrates that the corporate financing implications of digital financial inclusion are conditioned by the architecture of the national financial system and must be assessed on a context-specific basis rather than assumed from cross-country generalizations.

### 5.3 Recommendations

Three sets of recommendations follow. For corporate managers, the continued growth of digital financial inclusion signals progressively wider access to debt; managers should treat this expanded capacity as an opportunity to be exercised within prudent limits, monitoring their exposure to financial distress so that easier access does not become imprudent leverage. For lenders and capital-market operators, the positive association indicates a growing, digitally mediated supply of and appetite for debt; institutions should continue to invest in the digital infrastructure that lowers screening and monitoring costs while strengthening credit-risk assessment to preserve asset quality as lending volumes rise. For regulators and inclusion policymakers, the result establishes that the inclusion agenda has consequences beyond households, extending to the leverage of the listed corporate sector; the promotion of digital financial inclusion should therefore proceed alongside attentive prudential oversight of corporate indebtedness, so that the developmental gains of inclusion are not offset by a build-up of financial fragility among quoted firms.

### 5.4 Limitations and Suggestions for Further Research

The study is subject to limitations that also define an agenda for future work. Digital financial inclusion is measured by a system-level series common to all firms within a year, so the estimated effect is identified from variation shared across firms over time and cannot be fully separated from other secular macro-financial trends; firm-level measures of digital-finance usage would permit cleaner identification. Leverage is captured by a single proxy, the total debt ratio, and a small number of observations exceed unity owing to negative equity; future work could disaggregate leverage into short-term and long-term components and model its maturity structure. The parsimonious specification has low explanatory power, inviting the inclusion of further firm-level determinants such as profitability,

tangibility, and growth opportunities. Finally, the pronounced serial correlation evident in the Durbin-Watson statistics indicates that leverage is highly persistent, so a dynamic panel estimated by the generalized method of moments would be a natural extension, allowing the speed of adjustment toward target leverage to be modelled while addressing potential endogeneity.

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