Determinants of Capital Structure in Technology Companies Listed on the Indonesia Stock Exchange

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Abstract

This study examines the associations between business risk, asset structure, institutional ownership, and sales growth with the capital structure of technology companies listed on the Indonesia Stock Exchange. This problem is relevant because Indonesian technology issuers combine rapid expansion, intangible resources, and uneven operating income, while sector-specific evidence remains limited. This explanatory quantitative study uses annual financial statement data for 2021–2025. Purposive sampling produced 15 companies and 75 firm-year observations for the study. After natural logarithm transformation and case-wise outlier treatment, multiple linear regression was estimated using 55 observations from 11 companies. Capital structure is measured using the Debt-to-Equity Ratio (DER). Business risk is negatively and significantly associated with capital structure ($B=-0.806$; $p<0.001$), as are asset structure ($B=-0.238$; $p=0.034$) and sales growth ($B=-1.439$; $p=0.006$). Institutional ownership is positively and significantly associated with the capital structure ($B=2.626$; $p<0.001$). The model is jointly significant ($F=26.534$; $p<0.001$) and has an adjusted R^2 of 0.654. This study extends prior sector-mixed evidence by examining four determinants jointly in recent Indonesian technology-sector data, documenting the sample-reduction process, and comparing competing theoretical explanations. The coefficients are interpreted as sample-specific associations from Pooled Ordinary Least Squares rather than as causal effects or universal financing rules.

Keywords: *Asset Structure, Business Risk, Capital Structure, Institutional Ownership, Sales Growth*

1. INTRODUCTION

The capital structure captures a firm's choice between debt and equity to finance operations, investment, and growth. This choice is consequential because debt may provide tax benefits and managerial discipline, however it also exposes firms to fixed-payment commitments, financial distress costs, agency conflicts, and information asymmetry. In Indonesia, this question became more visible when the Indonesia Stock Exchange introduced a separate technology-sector classification through the IDX Industrial Classification (IDX-IC) in 2021, followed by large technology listings and continued digital investment. Cross-country evidence shows that leverage varies with firm characteristics and institutional environments rather than following a universal rule (De, Kabir, & Nguyen, 2008). Capital structure is also relevant to firm value in emerging markets, reinforcing the importance of understanding financing choices in a developing sector (Bui, Nguyen, & Pham, 2023; Ratih, 2021).

The empirical literature does not support a universal pattern of capital structure determinants. Lemmon, Roberts, and Zender (2008) demonstrate the persistence of firm-specific capital structure characteristics. Frank and Goyal (2009) show that the reliability of determinants depends on the specification and information set, while Rehan, Hussain, and Adnan (2023) report that estimates differ across sectors and between time series and panel estimators. Stoiljković, Tomić, Leković, and Matić (2023) likewise show that firm-level evidence is sensitive to institutional and industrial settings. More recent evidence from emerging markets continues to find that growth opportunities, governance, and country conditions can change the sign or strength of the leverage relationship (Khan, Akhtar, & Qasem, 2024; Mabandla, & Marozva, 2025). Accordingly, an association observed in one industry or country cannot simply be applied to another context without empirical testing.

Technology companies offer a particularly relevant setting for testing this hypothesis. Their expansion is often tied to innovation, product development, market acquisition, data, software, and other intangible resources. Such features can make financing decisions sensitive to operating income volatility, limited tangible collateral, and the need to retain financial flexibility. Indonesian evidence has begun to examine technology issuers, including post-Initial Public Offering (IPO) financing from an equity market timing perspective (Ratih, 2021) and a recent sector-focused study of asset structure

and business risk (Meilani & Wahyudin, 2021). However, the available evidence does not yet establish how business risk, asset structure, institutional ownership, and sales growth operate in the IDX technology sector. Studies in emerging economies also indicate that capital structure determinants differ from those in developed markets because of institutional quality, ownership arrangements, and financial market depth (Vo, 2017).

In this study's initial sample, the mean Debt-to-Equity Ratio (DER) of 15 technology companies fluctuated from 4.17 in 2021 to 2.22 in 2022, 1.57 in 2023, 1.38 in 2024, and 1.42 in 2025, respectively. The 2021 level suggests considerable reliance on liabilities relative to equity, whereas the subsequent decline is consistent with a more cautious or equity-supported financing pattern, followed by a small increase in 2025. These values describe the sampled firms rather than the entire technology sector sample. Nevertheless, the movement suggests that financing policies are shaped not only by expansion needs but also by risk, asset bases, shareholder monitoring, and changing sales conditions. Therefore, the pattern provides a sector-specific empirical starting point rather than a normative benchmark for an optimal DER.

Prior findings are mixed, including Indonesian studies. Business risk and growth may lead firms to be more cautious with debt, whereas tangible assets can increase collateral capacity; however, the direction and magnitude of these relationships vary by industry and market (Chang, Chen, & Liao, 2014). Indonesian studies report negative, positive, and insignificant relationships for business risk and sales growth (Brona, Rinofah, & Sari, 2022; Nengsih, & Yanti, 2020; Sari, & Budyastuti, 2022), while studies on institutional ownership also report positive and negative results (Maulana, & Aziz, 2024; Sabrina, Rinofah, & Kusumawardhani, 2021). Recent international evidence similarly treats growth opportunities and governance as context-dependent rather than mechanical determinants of leverage (Brown, Dutordoir, Veld, & Veld-Merkoulova, 2019; Ezeani, Salem, Kwabi, Boutaine, Bilal, & Komal, 2022; Mabandla and Marozva, 2025). Therefore, the inconsistency is substantive: it points to sector, period, measurement, and institutional differences that need to be considered explicitly.

The Indonesian technology sector remains less examined than manufacturing, banking, and broad cross-industry samples. Technology issuers may combine uncertain cash flows, substantial intangible resources, and investment needs that arise before revenue is fully realized. Most Indonesian studies in the source literature examine manufacturing, property, consumer, mining, banking, and health companies; the sector-focused evidence is comparatively recent and uses different variable combinations (Meilani and Wahyudin, 2021; Ratih, 2021). Findings from these sectors cannot be assumed to describe technology firms because collateral, growth cycles, monitoring arrangements, and operating-risk exposure differ. Therefore, business risk, asset structure, institutional ownership, and sales growth should be evaluated jointly. Theories are used here as competing but complementary explanations, not as an assumption that one prediction applies uniformly to every firm.

This study examines the associations between business risk, asset structure, institutional ownership, and sales growth with capital structure among Indonesian technology companies during 2021–2025. Its novelty is stated in four connected ways as follows. First, it focuses explicitly on the IDX technology classification rather than inferring technology sector behavior from other industries. Second, it uses a recent five-year period that captures the transition from pandemic-era disruption to normalization of operations and continued digital investment. Third, it tests the four determinants in one model, allowing the results for each variable to be interpreted conditional on the others. Fourth, it makes the model-building process visible by reporting the natural log transformation, case-wise treatment, final sample, and pooled Ordinary Least Squares (OLS) limitations. Therefore, this study extends previous research through sector-specific evidence and transparent model construction. The results are interpreted as statistical associations rather than causal effects because of model specifications. This study addresses the separate effects of the four factors and their joint significance without equating capital structure with performance or firm value.

The 2021–2025 period is useful because it captures a phase in which technology issuers had to reconcile market adaptation, operating normalization, and changing financing conditions after the

formal separation of the technology sector in IDX-IC. The available data do not identify every qualitative financing strategy used by each firm; therefore, the analysis is deliberately restricted to the quantitative patterns in financial ratios and ownership that can be verified in annual reports. This restriction increases traceability but also means that debt maturity, loan covenants, private credit terms, and the exact purpose of each financing decision are outside the model. The period should consequently be read as a defined institutional and economic window, not as evidence that the estimated signs will remain unchanged in every future cycle.

The practical contribution is not a blanket recommendation to increase or decrease debt. Rather, the findings are intended to show why a leverage policy should be tailored to a firm's operating profile. Firms with highly volatile operations require more conservative debt limits, whereas firms with stronger institutional monitoring must still assess cash adequacy, repayment capacity, and investment risk before relying on external finance. For investors and creditors, this study offers a structured starting point for comparing financing policies across technology issuers while preserving the distinction between an observed ratio and an optimal capital structure.

2. LITERATURE REVIEW

2.1 Trade-off Theory, Pecking Order Theory, and Agency Theory

The trade-off theory describes debt choice as a balance between the benefits of borrowing and expected bankruptcy or financial distress costs. When operating risk increases, the expected costs of distress also rise, which can make firms more cautious in their use of debt (Kale, Noe, & Ramirez, 1991). In contrast, the pecking order theory proposes a financing hierarchy, internal funds are preferred first, followed by debt, and equity is used when information asymmetry makes external finance comparatively costly (Myers, 1984). Therefore, the theories produce different expectations for some variables. For example, tangible assets may support borrowing as collateral under trade-off theory, but a firm with sufficient internal funds may use less debt under the pecking order hierarchy. Recent empirical comparisons continue to show that determinant estimates vary by sector and estimator choice (Rehan, Hussain, & Adnan, 2023; Stoiljković, Tomić, Leković, & Matić, 2023).

Agency theory directs attention to ownership structure and debt as possible mechanisms for limiting conflicts between managers and shareholders. Institutional owners may strengthen monitoring, whereas debt can constrain discretionary free cash flow. Nevertheless, the empirical implications depend on governance quality, ownership concentration, and the incentives of controlling shareholders (Brown, Dutordoir, Veld, & Veld-Merkoulova, 2019). Recent evidence on board monitoring and capital structure dynamics reinforces that governance is not a uniform input: monitoring may improve the credibility of debt, but institutional investors may also prefer capital preservation when operating uncertainty is high (Ezeani, Salem, Kwabi, Boutaine, Bilal, & Komal, 2022; Sun, Ding, Guo, & Li, 2016). The three perspectives are complementary in this study, the trade-off theory clarifies distress-related caution, the pecking order theory clarifies financing flexibility, and agency theory clarifies how shareholder monitoring may shape financing decisions.

The integrated perspective also explains why an empirical coefficient can differ from the simple theoretical prediction. Asset structure may increase collateral under trade-off theory, however, a firm with sufficient internal funds may still use less debt under the pecking-order hierarchy. Likewise, institutional ownership may strengthen debt discipline under agency theory only when the owner actively monitors the management. Indonesian evidence illustrates this tension asset structure has been reported as negative or insignificant in some sectors, while institutional ownership has been reported as positive, negative, or insignificant (Maulana, & Aziz, 2024; Pardosi, & Martono, 2023; Puspitasari, 2022; Sabrina, Rinofah, & Kusumawardhani, 2021; Wardani, & Minanari, 2024). Empirical testing is required to identify the patterns that emerge in a defined sector and period.

This theoretical integration also sets boundaries for the hypotheses. The hypotheses do not imply that every technology company follows the same debt path or that a single mechanism is permanently dominant. Instead, they identify directional expectations that can be tested using comparable firm-year data. A significant coefficient is interpreted as evidence about the final sample

and the selected proxy, while an inconsistent coefficient would be a reason to examine sector characteristics, measurement choices, and financing institutions more closely. This distinction is important because a pooled regression can reveal a conditional association without demonstrating that a specific financing mechanism caused the observed change in the DER.

2.2 Business Risk and Capital Structure

Business risk denotes uncertainty in a firm's ability to generate operating income. When Earnings Before Interest and Taxes (EBIT) is volatile, debt service commitments can increase the probability of financial distress. This consideration is particularly relevant for technology firms, whose revenues may be affected by product adoption, platform competition, and technological change. The trade-off theory predicts that firms with higher operating risks will avoid additional debt to limit expected distress costs. This argument is consistent with the theoretical and empirical link between business risk and leverage developed by Kale, Noe, and Ramirez (1991). Indonesian evidence remains mixed: Brona, Rinofah, and Sari (2022) and Sari and Budyastuti (2022) report weak or insignificant relationships in other sectors, while the technology-focused evidence in Meilani and Wahyudin (2021) uses a different model and proxy sets. In this study, business risk is measured through earnings variability, namely EBIT variation relative to total assets, the measure consequently centers on operating stability rather than a single year's sales level.

H_1: Business risk is negatively associated with the capital structure

Focusing on EBIT variability is consequential because debt creates obligations that do not decline automatically when operating income weakens. A company may sustain investment through internal resources for a period, but its flexibility is reduced when interest and principal payments are due. Therefore, the hypothesis concerns the capacity to maintain operations under earnings uncertainty, not simply the size of revenue in a particular year.

2.3 Asset Structure and Capital Structure

The asset structure represents the proportion of net fixed assets to total assets. Tangible assets are commonly expected to increase collateral capacity, lower creditors' exposure, and facilitate debt access. From this perspective, a higher proportion of fixed assets can support higher leverage. Technology firms complicate this prediction because the primary source of value may be software, data, intellectual property, innovation capability, and user networks rather than fixed physical assets. Therefore, a rising fixed-asset ratio may coexist with greater use of internal financing or investments that do not require additional debt. Indonesian evidence is also inconsistent: Puspitasari (2022) reports a negative asset structure relationship, whereas Pardosi and Martono (2023) and Wardani and Minanari (2024) report no significant relationship in their respective sectors. Cross-country evidence on tangibility is sensitive to institutional and firm characteristics (Rehan, Hussain, & Adnan, 2023). The null hypothesis does not reject the collateral function of assets; it tests whether a more conservative financing pattern appears in this sector.

H_2: Asset structure is negatively associated with the capital structure

The proposed sign is thus sector-specific rather than a rejection of the normal collateral mechanisms. When digital projects and product development are central to growth, a larger stock of tangible assets may not be accompanied by a proportional increase in borrowing. Testing this contrast between a general collateral prediction and the technology sector context is more informative than assuming the sign ex ante.

2.4 Institutional Ownership and Capital Structure

Institutional investors may have the resources to monitor managers and assess the quality of their financing choices. Stronger monitoring can reduce agency problems, improve fund use discipline, and strengthen creditors' confidence in financing and investment decisions. Institutional investors can also differ from individual investors in their risk preferences; therefore, a positive association with leverage cannot be presumed in every setting. Prior studies highlight the relevance of ownership and governance to financing decisions (Ezeani et al., 2022; Sun et al., 2016). Indonesian

studies provide competing results such as Maulana and Aziz (2024) report a positive relationship, Sabrina et al. (2021) report a negative relationship, and Wardani and Minanari (2024) report no significant relationship. The expected positive sign in this study reflects the monitoring argument, not a claim that institutions invariably demand more debt. Because the measure is aggregate, it does not distinguish between active monitors and passive portfolio owners.

H_3: Institutional ownership is positively associated with the capital structure

A positive result would be consistent with the possibility that monitoring makes the productive use of debt more credible to shareholders and creditors. A negative result would also be theoretically plausible if institutional investors favor capital preservation. Therefore, the test examines the association in the observed ownership environment while avoiding the assumption that all institutional investors have identical monitoring intensity or investment horizons.

2.5 Sales Growth and Capital Structure

Sales growth indicates expanding operations and may increase financing demand. It requires working capital, marketing expenditure, system capacity, and service development. Simultaneously, growing firms may retain earnings or use equity to preserve flexibility when future cash flows and investment opportunities remain uncertain. This preference is compatible with the pecking order theory for firms facing information asymmetry and substantial growth opportunities. Evidence from emerging markets shows that the relationship between growth and capital structure is not universal (Khoa and Thai, 2021; Mabandla and Marozva, 2025; Ramli et al., 2019). Indonesian studies also differ Sari and Budyastuti (2022) report no significant sales growth relationship, whereas other recent studies in the thesis literature report significant relationships in non-technology sectors. Therefore, sales growth is treated as both an opportunity indicator and a financing need.

H_4: Sales growth is negatively associated with the capital structure

H_5: Business risk, asset structure, institutional ownership, and sales growth are jointly associated with the capital structure

In this sense, sales growth is both an opportunity signal and a demand for funds for the firm. Rising sales can require marketing, working capital, system capacity, and service development before cash flows become sufficient. If uncertainty remains high, management may retain earnings or issue equity so that financial risk does not increase with operating risk. This reasoning motivates the negative test for the technology company sample.

3. RESEARCH METHODOLOGY

3.1 Design, Population, and Sample

This explanatory quantitative study uses secondary data from annual financial statements published by the Indonesian Stock Exchange and company websites. The population comprises 47 technology-sector companies listed under the IDX-IC classification during 2021–2025. Purposive sampling retained firms that remained classified in the technology sector throughout the observation period, issued annual financial statements consecutively, and disclosed complete data for all the study variables. The criteria are intended to keep the firm-year series comparable and avoid interpreting missing disclosures as measured zero values. Sector classification and financial reports refer to official Indonesia Stock Exchange publications.

Table 1. Sample selection

No	Criterion	Number
1	Technology companies listed on the IDX during 2021–2025	47
2	Did not issue complete financial statements consecutively	(30)
3	Incomplete data for study variables	(2)
Initial sample companies		15

No	Criterion	Number
Initial observations (15 companies × 5 years)		75
Final-model observations after transformation and outlier treatment		55

Table 1 shows the unit of analysis is firm-year. The initial tests used 75 observations. Natural log transformation was applied to the DER, business risk, asset structure, and sales growth. Because the transformed residuals still did not meet the normality criterion, case-wise treatment removed four companies consistently from the model. Therefore, the final inferential analysis used 11 companies and 55 observations. The reduction is not a cosmetic deletion of four isolated rows, all five yearly observations for each identified company were removed because the casewise procedure treated the firm as a persistent source of extreme residuals. This decision follows the source thesis model and is retained as an explicit limitation of generalization.

Outliers were not assumed to be data errors. They were removed according to the case-wise procedure used in the source model to meet the specified residual diagnostic criterion. The procedure improved the reported normality result from p=0.021 after transformation to p=0.200 in the final model, but it also reduced the coverage of the technology sector and may have made the estimates sensitive to the chosen treatment. Therefore, this study reports both the initial and final observation counts, identifies the rule used, and avoids presenting the final coefficients as representative of every IDX technology issuer. A full-sample sensitivity model was not estimated in the source analysis; this omission is carried forward as a limitation and direction for future research.

For traceability, each ratio was calculated from the annual financial statements and aligned with the relevant firm-year. The DER directly relates liabilities to equity, while the explanatory ratios reduce the influence of different firm scales. Nevertheless, ratios cannot capture all dimensions of financing quality, including loan terms, debt maturity, covenants, or internal funding sources that are not separately modelled. These measurement limits are considered when translating regression evidence into managerial implications. The operational definitions follow the source thesis so that the article remains comparable to the underlying dataset and statistical output.

Annual report data provide a consistent public source across firms, but they also restrict the analysis to disclosed accounting information. The study cannot observe privately negotiated credit terms, the precise sequence of financing decisions during a year, or unreported managerial expectations. These constraints are especially relevant in technology businesses, where investment decisions may precede observable revenues and accounting outcomes. Therefore, the method favors transparent comparability over a claim to capture every financing consideration.

3.2 Variables and Analytical Model

Capital structure, the dependent variable, is proxied by the DER. Business risk is measured through earnings variability, namely the standard deviation of EBIT relative to total assets. Asset structure is measured as net fixed assets divided by total assets, institutional ownership is institutional shares divided by outstanding shares, and sales growth is the annual change in net sales. The formulas follow the operationalization in the source thesis.

Table 2. Operational definitions

Variables	Proxy and Formula	Role
Capital structure	DER = Total liabilities / Total equity	Dependent
Business risk	Standard deviation of EBIT / Total assets	Independent
Asset structure	Net fixed assets / Total assets	Independent
Institutional ownership	Institutional shares / Outstanding shares	Independent
Sales growth	(Sales t − Sales $t-1$) / Sales $t-1$	Independent

Table 2 shows the variables used in this study, consisting of capital structure as the dependent variable and business risk, asset structure, institutional ownership, and sales growth as independent variables. Capital structure is measured using the Debt-to-Equity Ratio (DER), while each independent variable is represented by a specific proxy and formula to capture its influence on financing decisions. These measurements provide a structured approach to examining how internal and external factors are associated with firms' capital structure decisions.

The natural-log transformation of DER, business risk, asset structure, and sales growth follows the model-building stage in the source study. Institutional ownership remains a proportion because the scale remains directly interpretable. The estimated model is as follows:

$$LN_DER_{it} = \alpha + \beta_1 LN_BR_{it} + \beta_2 LN_AS_{it} + \beta_3 IO_{it} + \beta_4 LN_SG_{it} + \varepsilon_{it} \quad (1)$$

Formula 1 shows the effect of business risk, asset structure, institutional ownership, and sales growth on capital structure. In this model, capital structure measured by the logarithm of the Debt-to-Equity Ratio (LN_DER) is treated as the dependent variable, while the logarithmic transformations of business risk, asset structure, and sales growth, along with institutional ownership, are used as explanatory variables. The error term (ε) represents other factors affecting capital structure that are not included in the model.

The analysis covered descriptive statistics, residual normality using the Kolmogorov–Smirnov test, multicollinearity using tolerance and Variance Inflation Factor (VIF), heteroscedasticity using the Glejser test, autocorrelation using Durbin–Watson, multiple linear regression, the F test, and the coefficient of determination. Statistical significance was assessed at 5%. The source model uses Ordinary Least Squares (OLS) for firm-year data analysis. In this study, that estimator is described as pooled OLS because the 55 firm-year records are estimated in one regression without firm fixed effects, random effects, or explicit year effects. Therefore, coefficients are interpreted as associations, not causal effects or firm-specific panel estimates.

OLS was retained to reproduce the source thesis design and provide a transparent reading of the final model. It does not control for all unobserved firm-specific characteristics or year shocks, and repeated observations within firms may be related to this. Satisfactory classical diagnostics do not eliminate omitted variable bias, endogeneity, or other sources of heterogeneity. This limitation is especially relevant in capital structure research because leverage can persist over time and financing choices may affect the observed explanatory variables (Lemmon et al., 2008; Rehan et al., 2023). Consequently, the estimates should be read as conditional correlations in the retained sample rather than as a definitive ranking of financing causes.

Therefore, the resulting specification should be understood as a parsimonious explanatory model. Its value lies in placing four theoretically relevant firm characteristics in the same estimation and documenting each stage used to obtain the final model. It was not designed to identify a financing-policy counterfactual or to forecast the leverage of an individual issuer. These purposes would require richer variables, a larger panel, firm- and year-effect estimators, and an identification strategy tailored to causal inference. Keeping this boundary explicit responds to the reviewer's concern about using OLS for repeated firm-year observations.

3.3 Model Construction Stage

The stages below clarify how the initial data became the final model. Transformation was performed to improve the residual distribution. Case-wise diagnostics were then applied because the residuals from the transformed model still did not meet the normality criterion. The change in the number of firms affects the scope of generalization and is, therefore, reported explicitly.

Table 3. Transformation and outlier-treatment stages

Stage	Observations	Treatment	K–S p-value	Status
Initial data	75	No transformation	0.000	Not normal
After transformation	75	LN applied to DER, BR, AS, and SG	0.021	Not normal
Final model	55	Casewise, 4 companies removed	0.200	Meets criterion

Table 3 shows the results of the Kolmogorov–Smirnov (K–S) normality test conducted at different stages of data processing. The initial data and transformed data did not meet the normality criterion, with p-values below 0.05. After casewise treatment and the removal of four companies, the final model consisted of 55 observations and achieved a K–S p-value of 0.200, indicating that the residuals satisfied the normality assumption.

4. RESULTS AND DISCUSSION

4.1 Descriptive Statistics

Table 4 reports the descriptive statistics of the final model. Capital structure, business risk, asset structure, and sales growth are reported on natural log scales. Institutional ownership remains a significant proportion. Therefore, the minimum, maximum, and mean values of the variables prefixed by LN should not be read as untransformed ratios.

Table 4. Final-model descriptive statistics

Variables	N	Minimum	Maximum	Mean	SD
LN_Capital_Structure	55	−3.03	1.37	−0.7229	1.01913
LN_Business_Risk	55	−3.64	−0.47	−2.8257	0.91804
LN_Asset_Structure	55	−3.79	−0.22	−1.9136	0.80489
Institutional_Ownership	55	0.040	0.926	0.52175	0.24507
LN_Sales_Growth	55	0.47	1.33	0.7212	0.16693

Table 4 shows the mean institutional ownership is 0.52175, indicating that institutions hold more than half of the shares on average in the final-model companies. The capital structure exhibited the largest variation on the transformed scale. The range of institutional ownership, from 0.040 to 0.926, also indicates substantial variation in shareholder structures. The means do not describe one homogeneous technology-firm profile, the ensuing regression assesses conditional associations after considering the other explanatory variables.

The descriptive profile should not be used to infer a linear relationship. A firm at either end of the ownership range may also differ in terms of profitability, maturity, asset composition, or market position. Consequently, a regression framework is necessary to assess whether the reported associations remain after the variables included in the model are considered jointly. Simultaneously, the final sample size requires the coefficients to be read with appropriate caution.

4.2 Classical Assumption Tests

Classical assumptions were tested on the final model after transformation and outlier treatment. Table 5 indicates normally distributed residuals under the Kolmogorov–Smirnov criterion, and no detected multicollinearity, heteroscedasticity, or autocorrelation under the stated thresholds. These diagnostics support the specified OLS model but do not replace the substantive interpretation of the sample size and model design.

Table 5. Summary of classical assumption tests

Test	Result	Criterion	Conclusion
Residual normality	K–S p=0.200	p>0.05	Meets criterion
Multicollinearity	VIF 1.039–1.220	VIF<10	Not detected
Heteroscedasticity	Glejser p=0.111–0.843	p>0.05	Not detected

Test	Result	Criterion	Conclusion
Autocorrelation	DW=2.107	1.6845	Not detected

Table 5 shows VIF values close to one indicate that severe linear dependence among the explanatory variables is not evident. The Durbin–Watson statistic of 2.107 lies within stated bounds. Diagnostics should be considered alongside the construction process, residual normality does not resolve model-selection concerns or possible endogeneity, and a low VIF does not prove the absence of all dependence. Consequently, the discussion focuses on coefficient signs, relative associations, and the limits imposed by the study design.

4.3 Regression Results and Hypothesis Tests

Table 6 shows that all explanatory variables have statistically significant coefficients at the 5% significance level. The coefficient signs indicate the direction of the association in the final model. The log-transformed variables are interpreted on their transformed scales, whereas the institutional ownership remains a proportion.

Table 6. Multiple linear regression results

Variables	B	SE	Beta	t	p
Constant	−3.789	0.553		−6.852	<0.001
LN_Business_Risk	−0.806	0.098	−0.726	−8.214	<0.001
LN_Asset_Structure	−0.238	0.109	−0.188	−2.184	0.034
Institutional_Ownership	2.626	0.343	0.631	7.651	<0.001
LN_Sales_Growth	−1.439	0.498	−0.236	−2.890	0.006

Table 6 shows the four variables are significantly associated with capital structure and explain 65.4% of the variation in the DER in the final model. The absolute standardized coefficient shows that business risk has the strongest association (β=−0.726), followed by institutional ownership (β=0.631), sales growth (β=−0.236), and asset structure (β=−0.188). The remaining 34.6% suggests that factors not included in the model, such as profitability, firm size, liquidity, investment opportunities, and macroeconomic conditions, may also be relevant.

The estimated equation requires a cautious interpretation. Negative coefficients for the transformed variables do not indicate one-to-one changes in the untransformed ratios. The institutional ownership coefficient is interpreted within the same specification but on the ownership proportion scale. The estimates do not prescribe a universal debt level, they summarize the associations in the final sample after the other model variables are held constant.

Table 7. Model Fit

R	R^2	Adjusted R^2	F	p-value	N
0.824	0.680	0.654	26.534	<0.001	55

Table 7 shows the adjusted R^2 should also be viewed in context. A value of 0.654 indicates substantial explanatory capacity in the final sample, but it does not show that every material determinant was included. Profitability, firm size, liquidity, firm age, investment opportunities, and credit market conditions may be correlated with the variables studied. Their omission means that the model cannot isolate the causal effect of any factor.

Standardized coefficients offer a useful ordering of attention rather than a universal ranking of importance. Business risk has the largest association in the final model, but beta magnitudes are affected by variable selection, measurement scales, and the companies retained after outlier treatment. The appropriate interpretation is that operating stability should be considered jointly with institutional monitoring, asset composition, and growth financing needs in the conditions represented by this sample.

Table 8. Summary of hypothesis decisions

Hypothesis	Predicted Direction	Observed Direction	p-value	Decision
H_1: Business risk → capital structure	Negative	Negative	<0.001	Supported
H_2: Asset structure → capital structure	Negative	Negative	0.034	Supported
H_3: Institutional ownership → capital structure	Positive	Positive	<0.001	Supported
H_4: Sales growth → capital structure	Negative	Negative	0.006	Supported
H_5: All variables → capital structure	Significant	Significant	<0.001	Supported

Table 8 summarizes the hypothesis testing results for the relationship between the independent variables and capital structure. The findings indicate that all proposed hypotheses are supported, with business risk showing a significant negative relationship with capital structure (p<0.001), asset structure showing a significant negative relationship (p=0.034), institutional ownership showing a significant positive relationship (p<0.001), and sales growth showing a significant negative relationship (p=0.006). The simultaneous test also confirms that all variables jointly have a significant effect on capital structure (p<0.001), supporting H_5.

4.4 Discussion

Business risk is negatively and significantly associated with capital structure, supporting H_1. As operating income volatility rises, technology firms in the final model tend to reduce debt relative to equity. This result is consistent with the trade-off theory higher operating risk raises potential distress costs and makes fixed debt payments less attractive (Kale, Noe, & Ramirez, 1991). This is also consistent with the negative direction reported by some Indonesian studies, while differing from the positive or insignificant findings reported in other sectors (Brona, Rinofah, & Sari, 2022; Meilani, & Wahyudin, 2021; Sari, & Budyastuti, 2022). This disagreement supports a sector-contingent interpretation rather than a claim that business risk has a universal effect.

Business risk has the largest absolute standardized coefficient, which places operating stability at the center of the final model. For technology companies, leverage decisions should not be based solely on expansion needs, they should also be related to the capacity to generate recurring and predictable EBIT. Because business risk is measured through EBIT variability, the interpretation concerns operating risk, as defined in this study, rather than total market risk. In the underlying data, the simple correlation between business risk and capital structure is −0.515, and the conditional standardized coefficient is −0.726. A stronger conditional association indicates that the operating-risk relationship becomes more visible after asset structure, institutional ownership, and sales growth are considered jointly. In practice, sensitivity analysis of EBIT, cost control, and income diversification may help managers and creditors assess a more realistic debt service capacity.

Asset structure is negatively and significantly associated with capital structure, thus supporting H_2. This direction differs from the general collateral prediction that tangible assets increase debt capacity. In technology firms, a higher fixed-asset proportion may coexist with internal funding, efficient asset use, or investments that do not automatically require further borrowing. This result is consistent with the negative findings reported by Puspitasari (2022) however, it differs from the positive or insignificant results reported in other industries (Pardosi, & Martono, 2023; Wardani, & Minanari, 2024). The comparison suggests that the meaning of the fixed-asset ratio depends on what assets represent in the firm's production and growth process.

This pattern should not be interpreted as evidence that tangible assets lack collateral value. Cross-country literature documents that the tangibility–leverage relationship differs by institutional

structure, production technology, and firm type (Chang, Chen, & Liao, 2014). Physical assets can support operations, while the main sources of firm value remain software, customer bases, data, and innovation capability. In the underlying sample, the simple correlation between asset structure and capital structure is weakly positive (r=0.109), whereas the conditional coefficient is negative (β=−0.188). This contrast indicates that the negative result is conditional on the other variables in the model, rather than a simple descriptive relationship. Further research should separate asset types and use more detailed collateral measures before drawing causal conclusions.

Institutional ownership is positively and significantly associated with the capital structure, supporting H_3. Stronger monitoring by institutional shareholders may improve financing discipline and increase the credibility of productive debt utilization. This interpretation is consistent with agency theory and evidence linking ownership structure to financing decisions (Sun, Ding, Guo, & Li, 2016). This is also consistent with the positive relationship reported by Maulana and Aziz (2024), although it differs from the negative finding of Sabrina, Rinofah, and Kusumawardhani (2021) and the insignificant finding of Wardani and Minanari (2024). These comparisons show why the ownership environment and sector should be considered when interpreting the sign.

This finding is also compatible with the view that governance affects capital structure dynamics, even though governance arrangements differ across markets (Ezeani, Salem, Kwabi, Boutaine, Bilal, & Komal, 2022). In the underlying sample, institutional ownership has a simple correlation of 0.481 with capital structure and a conditional standardized coefficient of 0.631. Therefore, the positive sign may reflect the possibility that monitoring makes the productive use of debt more credible to both shareholders and creditors. Institutional ownership should not be interpreted as the sole cause of a higher DER, firms with particular financing profiles may be more attractive to institutional investors. The aggregate ownership ratio cannot distinguish active monitors from passive holders, investment horizons, or ownership concentration. These distinctions are promising for future causal and governance-focused research.

Sales growth is negatively and significantly associated with the capital structure, supporting H_4. Growing firms in the final model appear to prefer financing choices that preserve flexibility, such as retained earnings or equity, rather than relying on debt. This pattern is consistent with the pecking order theory for firms facing information asymmetry and high investment opportunities (Myers, 1984). This differs from the positive financing-demand prediction often found in non-technology settings and the insignificant results (Sari & Budyastuti, 2022). Therefore, the negative association adds a sector-specific qualification to the common assumption that growth automatically produces more leverage.

The negative sign also indicates that sales growth is not equivalent to immediately available free cash flow. A firm with rising sales may still require substantial working capital, customer acquisition spending, and product development investment. Recent evidence on growth opportunities similarly indicates that financing choices respond to firm and market contexts (Khoa, & Thai, 2021; Mabandla, & Marozva, 2025). In the underlying sample, the simple correlation between sales growth and capital structure is weakly negative (r=−0.096), while the conditional standardized coefficient is −0.236. This difference suggests that the association becomes more apparent when operating risk, asset structure, and institutional ownership are controlled. Therefore, managers should separate cash-generating sales growth from growth that still requires up-front investment when selecting retained earnings, equity, or debt.

H_5 is supported by the F-test. Substantively, the results reinforce the view that the capital structure of the technology sector cannot be explained by a single indicator. Evidence from several markets suggests that firm characteristics, governance, and country conditions jointly shape leverage choices (Khan, Akhtar, & Qasem, 2024; Rehan, Hussain, & Adnan, 2023). The joint result is compatible with the thesis framework in which trade-off theory explains risk and collateral, pecking

order theory explains flexibility during growth, and agency theory explains the monitoring role of institutional ownership. Although the adjusted R^2 of 65.4% indicates meaningful explanatory power, it also leaves scope for unobserved financial and institutional factors.

The broader managerial implication is that communication among management, institutional shareholders, and creditors should address operating-risk sources and financing plans together. Transparent information about cash flow projections, working capital needs, and fund use can help external parties distinguish resilient growth from expansion, which creates greater liquidity pressure. This aspect is not directly tested in the regression, but it is relevant when the reported associations are translated into financing decisions. This also explains why the four variables should be considered as a group rather than being used as isolated triggers for borrowing or deleveraging.

The findings also identified a clear boundary for their use. They should not be converted into a mechanical borrowing rule because the regression does not observe debt maturity, covenant conditions, market timing, or the quality of the investment projects. A firm may have a relatively low DER because it chooses internal financing, lacks debt capacity, or is between investment cycles. The negative asset structure and sales growth signs may also reflect the technology sector's reliance on intangible resources and equity-supported expansion, but that explanation cannot be established as a causal mechanism by the present design. Qualitative analysis of the financing purpose should accompany a ratio-based assessment.

For management, a practical use of the findings is to build a financing-decision matrix that links EBIT projections, working-capital needs, the quality of assets that may support financing, the character of institutional monitoring, and the schedule of debt obligations. Such a matrix does not replace project feasibility analysis, but it prevents sales growth from being read separately from cash pressure and operating risk. For institutional shareholders, the results support monitoring fund use and investment discipline rather than a narrow focus on the year-end DER alone.

For investors and creditors, the results are best used for comparative purposes. Ratios and regression evidence can serve as a starting point for assessing the consistency of financing policy across years but should be supplemented by cash flow analysis, liability-maturity profiles, asset quality, ownership concentration, and the firm's business strategy. This approach is more appropriate for technology companies, which can grow rapidly while still facing high operating volatility and a high share of intangible investments. Therefore, comparisons with manufacturing or other collateral-intensive industries should be treated as contextual contrasts, not as direct benchmarks.

A further interpretive implication concerns the interaction between the variables. A firm with rapid sales growth may still be able to use debt if its EBIT is stable, its assets provide credible collateral, and its governance supports prudent investment. Conversely, a firm with strong institutional ownership may remain cautious if its operating risks are high. The regression estimates do not test formal interactions, but the joint significance of the model supports reading the financing policy as a portfolio of related considerations rather than a response to an isolated ratio. This conditional reading is the main reason why the article reports both the individual coefficients and the F test.

Comparisons with prior studies should also remain conditional. The negative asset structure and sales growth associations in this sample may not be replicated in industries in which fixed assets dominate value creation or in firms whose growth produces immediate operating cash flows. Likewise, the positive association between institutional ownership and debt financing may not apply where institutional investors are passive or where governance does not improve access to debt. The contribution of this study is to make the technology sector pattern visible, compare it with contradictory findings, and state clearly the sample construction, rather than claim a permanent rule for all Indonesian issuers.

5. CONCLUSIONS

5.1 Conclusion

Using the final model of 55 firm-year observations, this study finds that business risk, asset structure, and sales growth are negatively and significantly associated with capital structure, whereas institutional ownership is positively and significantly associated. The four variables are jointly significant and explain 65.4% of the variation in the DER. Business risk has the strongest association with the standardized coefficient. The theoretical contribution is a sector-specific comparison of trade-offs, pecking orders, and agency explanations. The empirical contribution provides transparent evidence from Indonesian technology issuers from 2021 to 2025. For management, leverage should be considered alongside operating volatility control, asset composition, institutional monitoring quality, and financing planning during sales growth. For investors and creditors, the findings provide an initial lens for assessing the sustainability of financing policies in technology companies; however, they should not be used as the sole basis for investment or lending decisions. No single leverage ratio can be considered optimal for all technology issuers.

5.2 Research Limitations

This study has several limitations. First, the observations were reduced from 75 to 55 after outlier treatment. Second, pooled OLS was applied to repeated firm-year data without firm or year-specific effects. Finally, profitability, firm size, liquidity, macroeconomic conditions, and explicit growth opportunity measures were excluded. Removing four companies also limits generalization, and no full-sample sensitivity estimate is available to show whether the signs are robust to the alternative outlier rules. The use of aggregate institutional ownership further limits the interpretation of the quality of monitoring. Overall, the policy implication is conditional no single leverage ratio can be considered optimal for all technology issuers. Financing choices should be aligned with operating stability, the quality of assets that can support financing, the character of shareholder monitoring, and cash requirements over the firm's growth cycle.

5.3 Suggestions and Directions for Future Research

Future work can extend the evidence by applying firm- and year-effects panel models, testing whether the associations remain after controlling for unobserved issuer characteristics, and comparing alternative leverage measures, such as debt-to-assets or long-term debt ratios. Alternative operating risk proxies and distinctions among institutional investor types would also improve the explanation of how technology companies select financing sources. A pre-specified outlier rule and full-sample sensitivity analysis should be reported alongside the preferred specifications.

A more detailed research design could combine annual report data with information on debt maturity, credit conditions, investment project characteristics, and the intensity of institutional engagement. Such evidence would help separate the demand for debt from supply side access to debt and would clarify whether the observed relationships are stable through different stages of technological growth. Comparing pooled OLS, fixed effects, and random effects would also show how much of the reported association is attributable to persistent issuer characteristics rather than within-firm changes in the same.

Thus, the present article should be read as evidence of disciplined financing analysis rather than as a formula for leverage. The central message is that operating stability, shareholder monitoring, asset composition, and sales dynamics must be evaluated together. This perspective is particularly useful when technology firms confront uncertainty about future earnings while simultaneously pursuing growth and access to external capital. A more robust next-stage design would pre-specify the treatment of influential observations, retain the full firm-year panel where possible, and report sensitivity analyses before selecting the preferred model. These procedures would make it easier to assess whether the conclusions depend on the distributional adjustment used here. They would also permit a direct comparison between pooled OLS estimates and estimates that account for firm-level persistence, an issue highlighted in the capital structure literature.

For policy users, the most defensible application is a disciplined review. Management can test debt capacity under different EBIT and sales scenarios, institutional shareholders can ask how external funds will be allocated, and creditors can assess whether anticipated operating cash flows are compatible with repayment schedules. Combining these questions helps avoid a narrow reliance on any single balance sheet ratio and fits the interdependent nature of the variables examined in this study. The evidence is deliberately bounded by the data and methods. It neither establishes that institutional ownership causes higher leverage nor that asset expansion or sales growth causes firms to reduce their debt. Instead, it documents statistically significant patterns after the stated transformations and sample treatments. A clear separation between empirical association, theoretical interpretation, and managerial application is essential if the results are to be used responsibly in future research and financing deliberations.

This synthesis also clarifies the practical implications of the findings. Technology firms should evaluate financing decisions through the combined lens of recurring operating income, cash requirements during growth, asset quality, and actual monitoring behavior of institutional owners. External users should distinguish between a low DER caused by conservative internal financing and a low DER caused by weak debt capacity. Such distinctions cannot be recovered from the current ratios alone, but they are necessary if the empirical associations are to inform responsible financing analyses. Taken together, the evidence supports a conditional reading of the capital structure in the Indonesian technology sector. Operating volatility is associated with lower leverage, institutional ownership with higher leverage, and asset composition and sales growth with lower leverage when the variables are considered jointly. The signs are meaningful within the retained sample, but they do not override the contradictory results documented in other sectors or the limitations of the pooled OLS design. Therefore, this study treats the observed coefficients as an empirically bounded contribution: they sharpen the sector-specific discussion, identify where the source thesis pattern differs from general collateral and growth predictions, and provide a transparent base for a stronger panel design.

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AUTHOR CONTRIBUTIONS

RR contributed to the conceptualization, data collection, literature review, data analysis, and initial manuscript preparation. DD contributed to the research methodology, validation, supervision, and critical revision of the manuscript. DA contributed to data interpretation, manuscript review, and refinement of the final version. All authors have read and approved the final manuscript.

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