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Capital Structure and Financial Performance: Evidence from Vietnamese Insurance Listed Companies

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Abstract
Purpose: This study examines how capital structure relates to the financial performance of life and non-life insurance companies in Vietnam, an emerging market where the sector has grown quickly but has received limited empirical attention.
Methodology: A balanced panel of 27 insurers over 2018-2024 (189 firm-year observations) was analyzed. Performance is measured by Return on Assets (ROA) and Return on Equity (ROE), and capital structure by Leverage (LEV) and the Short-Term Liabilities Ratio (STD), with firm size, asset turnover, revenue growth, and insurance type as controls. After specification and diagnostic tests, fixed-effects models with Driscoll-Kraay standard errors were estimated.
Results: Leverage is positively and significantly related to both ROA and ROE, while the short-term liabilities ratio has no significant effect. Asset turnover raises ROE, whereas firm size and revenue growth lower it.
Conclusions: The drivers of profitability differ depending on whether performance is judged from total assets or from shareholders' equity, and effective liability management and asset use matter more than liability maturity.
Limitations: The sample is limited to 27 insurers, and the fixed-effects design cannot estimate the effect of insurance type.
Contributions: The study adds evidence from an emerging insurance market and separates the level of leverage from its maturity composition.

Keywords: *Capital Structure, Financial Performance, Insurance Companies, Leverage, Vietnam*

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1. Introduction

Insurance companies hold an unusual place in the financial system. They pool risks, protect households and firms against uncertain losses, gather long-term savings, and invest those funds back into the economy. Their liabilities differ from those of ordinary firms because a large share consists of obligations to policyholders, such as claims reserves and future benefits, so how an insurer finances itself is tied closely to both its profitability and its solvency. International evidence shows that insurer capitalization depends on firm characteristics as well as country-level conditions, and that insurers move their leverage toward target levels (Fier, McCullough, & Carson, 2013). More recent work confirms that capital decisions in insurance are actively managed, as reinsurance narrows the gap between actual and target leverage (Li & Shiu, 2025) and insurance groups shift internal capital to affiliates facing regulatory scrutiny (Fier & Liebenberg, 2023).

Leverage is a double-edged tool in this industry. Used well, the funds that insurers collect can support underwriting and investment and lift returns, but relied on too heavily, they raise financial risk and the chance of distress. A systematic review of 235 studies lists capital structure, firm size, risk, reinsurance, diversification, corporate governance, and market conditions among the main determinants of insurer performance (Zinyoro & Aziakpono, 2024). Sasidharan, Ranjith, and Prabhuram (2023) further showed that these determinants can change depending on whether performance is measured by ROA or ROE, which suggests that using both measures gives a fuller picture. Studies from other emerging markets point the same way, with leverage, efficiency, and size appearing as significant but sometimes opposite influences on insurer profitability (Lalon, & Das, 2022; Msomi, 2023; Msomi, Olarewaju, & Sibanda, 2025).

Vietnam offers a useful setting for studying these links. The insurance market has expanded since liberalization, with more domestic and foreign insurers and a growing split between life and non-life business (World, 2020). The operating environment has also shifted considerably, especially during and after the COVID-19 pandemic. Recovery has differed between the two segments. In the first seven months of 2024, non-life premium revenue rose by 14.19%, while life premium revenue fell by 8.0% (Ministry, 2024). The pandemic tested insurers' balance sheets worldwide, with rating downgrades putting pressure on regulatory capital and with risk-taking choices shaping how well insurers withstood the shock (Fung, Lee, Yang, & Yeh, 2024).

Despite the growth of the Vietnamese market, evidence on how capital structure affects insurer performance remains thin. Tran, Tran, and Vu (2024) provide recent evidence from Vietnamese insurers and report significant links between several debt-related measures and ROE. Studies of Vietnamese nonfinancial firms have found that leverage, market risk, and financial distress all affect performance, and that debt maturity adjusts dynamically toward a target (Nguyen, 2022; Vo, 2023; Nguyen, 2022). Results can still differ with the choice of capital structure measures, performance indicators, sample periods, and estimation methods. In particular, separating the overall level of leverage from the maturity composition of liabilities may reveal more about how insurers' financing relates to their performance.

This study therefore examines the relationship between capital structure and financial performance among Vietnamese insurance companies during 2018-2024. Performance is measured by ROA and ROE, while capital structure is represented by Leverage (LEV) and the Short-Term Liabilities Ratio (STD). Firm size, asset turnover, revenue growth, and insurance type are included as additional explanatory factors. Using panel data on life and non-life insurers and an estimator that accounts for cross-sectional dependence and heteroskedasticity, the study adds evidence on the financial consequences of capital structure in an emerging insurance market.

2. Literature Review and Hypotheses Development

2.1 Theoretical Background

2.1.1 Trade-off Theory

Trade-off Theory, developed initially by Kraus and Litzenberger (1973), proposes that firms choose their capital structure by weighing the benefits of debt against its costs. Debt can bring tax advantages and allows a firm to expand without relying only on equity, but too much debt raises financial risk, financing costs, and the expected costs of distress. The argument is particularly relevant to insurers, which take on risks from policyholders and must keep enough capacity to pay future claims. Capital decisions therefore affect not only financing costs but also an insurer's ability to absorb unexpected losses. Altuntas et al. (2015) found that optimal capital structure varies across countries and that country-level factors explain a large part of the differences in insurers' capitalization. Regulatory regimes matter as well. Siopi et al. (2023) showed that reinvestment, cash holdings, long-term investments, and loss-related expenses predict European insurers' solvency ratios, and Sheehan et al. (2023) found that portfolio diversification can lower the capital non-life insurers must hold. From this perspective, moderate use of liabilities may help an insurer grow and use its capital efficiently, while excessive leverage may raise risk and erode profitability.

2.1.2 Pecking Order Theory

The Pecking Order Theory of Myers (1984) argues that information asymmetry between managers and outside investors leads firms to prefer internal funds, then debt, and to use new equity only as a last resort. For insurers, financing decisions may therefore reflect differences in internal profitability, growth opportunities, and access to outside capital, with expanding insurers taking on more liabilities when internal funds run short. Recent evidence continues to support the theory, as Abdeljawad and Jaradat (2025) found that funding shortfalls were the main driver of debt issuance in an emerging market. The theory also implies that leverage may partly mirror a firm's underlying financial condition rather than act as an independent driver of performance, which matters when interpreting the link between leverage and profitability.

2.1.3 Agency Theory

Agency Theory provides a third perspective. Jensen and Meckling (1976) argued that conflicts of interest arise between managers and owners when control is separated from ownership. Debt can ease these conflicts because regular repayment obligations discipline managers, but excessive debt can create new conflicts between shareholders and creditors, since owners may be tempted to take on riskier projects when much of the potential loss would fall on creditors. In insurance, this problem is serious because risk-taking directly affects the ability to meet obligations to policyholders. Fung et al. (2024) showed that asset and product risk-taking raised the performance of property-casualty insurers while financial risk lowered it, and Arhinful and Radmehr (2023) found that different forms of leverage can have opposite effects on firm performance. Together with the trade-off and pecking order views, Agency Theory supports treating capital structure as an important determinant of insurer performance.

2.2 Empirical Research on Insurance Companies

Research on insurer performance now covers many countries, segments, and methods. The systematic review by Zinyoro and Aziakpono (2024) found that accounting-based measures dominate the literature, with ROA, ROE, and profit margin among the most common, which supports the use of ROA and ROE in this study. Macroeconomic conditions, market structure, and institutional development were identified as important external factors alongside firm-level determinants. The institutional context matters. Altuntas et al. (2015) concluded that optimal capital structure differs across countries, so evidence from mature markets should not simply be applied elsewhere, and Fier et al. (2013) showed that leverage is a strategic choice rather than just an accounting ratio. In India, Sasidharan et al. (2023) found that premium growth and market share were positively related to ROA, leverage was positively related only to ROE, and size was negatively related to ROE. In Bangladesh, Lalon and Das (2022) found that most macroeconomic variables did not affect general insurers' profitability, with inflation as the exception.

Evidence from Vietnam is particularly relevant. Tran et al. (2024) examined capital structure and profitability among Vietnamese insurers for 2013-2023 and confirmed that capital structure is an important issue in this market. Among Vietnamese nonfinancial firms, leverage supported the performance of small and medium-sized enterprises during the COVID-19 pandemic (Nguyen Kim, 2022), while market risk reduced the performance of listed firms (Vo, 2023). Studies in other emerging markets show that ownership and transparency also shape financial outcomes, including work on family ownership and cash holdings, foreign ownership and risk-adjusted returns, and audit quality and creditor trust (Bangun & Saraswati, 2026). Overall, previous studies agree that capital structure matters for insurer performance, that the leverage-profitability relationship is mixed, and that size, growth, efficiency, and segment differences must be considered.

2.3 Research Gap

Although the literature on insurer performance is extensive, several gaps remain. The relationship between leverage and performance is still inconclusive. Zinyoro and Aziakpono (2024) report mixed evidence, and Sasidharan et al. (2023) find leverage insignificant for ROA but significant for ROE, which suggests that the effect of leverage depends on how performance is measured. Existing evidence is also concentrated in developed insurance markets, with relatively little research on

emerging markets (Zinyoro & Aziakpono, 2024), and Vietnam therefore offers a relevant setting for extending the evidence. Previous studies have generally focused on overall leverage, while the maturity composition of liabilities has received less attention, so separating overall leverage from short-term liabilities may shed more light on how insurers' obligations relate to performance. Finally, although Tran et al. (2024) provide recent evidence from Vietnamese insurers, further investigation with an updated panel, multiple performance measures, and an estimator robust to cross-sectional dependence is warranted. This study responds to these gaps by examining Vietnamese insurers during 2018-2024 using both ROA and ROE, distinguishing overall Leverage (LEV) from Short-Term Liabilities (STD), and controlling for firm size, asset turnover, revenue growth, and insurance type.

2.4 Capital Structure, Financial Performance, and Hypotheses

2.4.1 Leverage and financial performance

Leverage shows how far a firm relies on liabilities to finance its assets and operations, and in insurance it carries special meaning because insurers manage large contractual liabilities to policyholders while holding capital to absorb unexpected losses. In theory, the relationship between leverage and performance is ambiguous, since external funds may support underwriting and investment while high leverage may reduce flexibility and squeeze profitability. Zinyoro and Aziakpono (2024), reviewing 235 studies published between 1990 and 2021, identified capital structure as a major determinant of non-life insurer performance but found the evidence on leverage to be mixed, which they attributed to differences in measures, methods, samples, and institutional settings.

Country-level studies show the same variation. Sasidharan et al. (2023) examined 21 Indian general insurers over ten years and found that leverage did not significantly affect ROA but had a positive and significant relationship with ROE. Msomi (2023), using data on 121 non-life insurers in 48 African countries, found that leverage reduced performance, and Msomi et al. (2025) reported a similar negative link in sub-Saharan Africa, while Siddik et al. (2022) showed that financial insolvency lowered both ROA and ROE among Bangladeshi non-life insurers. Evidence from other sectors adds nuance. Priyan et al. (2024) found that higher debt raised ROA among East African firms, Owusu and Garr (2024) found that higher capitalization lowered both ROA and ROE in Ghanaian banks, and Ludwiga et al. (2025) reported a positive effect of capital structure on firm value in Indonesia, although other Indonesian studies found no significant effect (Nurmalasari et al., 2025; Yanti et al., 2022). Taken together, leverage appears to matter for performance, but its effect depends on the context.

Trade-off Theory suggests that liabilities bring both benefits and costs, and previous evidence has not reached a uniform conclusion, with leverage significant only for ROE among Indian insurers and negative among African insurers (Msomi, 2023). This study therefore proposes that leverage is associated with financial performance, while leaving the direction of the relationship to be tested empirically.

H_1a: The leverage ratio has a significant effect on the ROA of Vietnamese insurance companies

H_1b: The leverage ratio has a significant effect on the ROE of Vietnamese insurance companies

2.4.2 Debt maturity and financial performance

Total leverage captures the overall reliance on liabilities, but their maturity adds another dimension. A higher share of short-term liabilities may signal greater liquidity pressure and less room to match assets with liabilities, although the consequences may differ across insurance business models. Research on nonfinancial firms shows that debt maturity is a meaningful strategic choice. Provaty et al. (2022) found that firms with unusual strategies rely more on short-term debt because of information asymmetry and governance concerns, and Nguyen (2022) showed that Vietnamese listed firms adjust their debt maturity toward an optimal level at about 46% a year. Studies of insurers, by contrast, have paid more attention to overall leverage than to maturity (Zinyoro & Aziakpono, 2024). In this study, leverage captures the size of financial obligations, while the short-term liabilities ratio captures an important aspect of their composition. Short-term obligations may increase refinancing

and liquidity pressure, but they may also offer more flexibility and, in some conditions, lower costs (Provaty et al., 2022). Given this ambiguity and the limited evidence for insurers, STD is tested as an additional dimension of capital structure.

H_2a: The short-term liabilities ratio has a significant effect on the ROA of Vietnamese insurance companies

H_2b: The short-term liabilities ratio has a significant effect on the ROE of Vietnamese insurance companies

2.5 Other Determinants of Financial Performance and Hypotheses

2.5.1 Firm Size

Firm size is one of the most widely studied influences on insurer performance. Larger insurers may enjoy economies of scale, wider distribution networks, better risk diversification, and easier access to capital, but growth may also bring complexity, coordination costs, and agency problems. Zinyoro and Aziakpono (2024) and Msomi et al. (2025) report that larger insurers tend to perform better, whereas Sasidharan et al. (2023) found no effect of size on ROA and a negative effect on ROE among Indian general insurers. Outside insurance, Ahmed et al. (2023) showed that firm size strengthened the link between capital structure and profitability, and Mansikkamäki (2023) found that the role of size depends on a firm's current profitability. Firm size therefore needs to be controlled for so that differences in scale do not distort the estimated effect of leverage.Because size may raise performance through economies of scale and diversification or lower it through complexity and managerial costs (Ahmed et al., 2023; Sasidharan et al., 2023), no direction is specified for this relationship.

H_3a: Firm size has a significant effect on the ROA of Vietnamese insurance companies

H_3b: Firm size has a significant effect on the ROE of Vietnamese insurance companies

2.5.2 Asset Turnover

Asset turnover shows how efficiently a firm uses its assets to generate revenue. The measure is relevant to insurers because they manage large financial and operational assets while earning premium and investment income, so differences in asset use may lead to different profitability even among insurers with similar capital structures. Neale et al. (2025) found that technology spending improved insurers' allocative efficiency, Ofori-Boateng et al. (2022) showed that efficiency rather than market power explained the performance of Ghanaian general insurers, and Eton et al. (2025) found that better working capital management improved the performance of small firms. Including asset turnover separates the effect of capital structure from that of operational efficiency. Following this reasoning, more efficient asset use is expected to improve performance (Neale et al., 2025).

H_4a: Asset turnover has a positive effect on the ROA of Vietnamese insurance companies

H_4b: Asset turnover has a positive effect on the ROE of Vietnamese insurance companies

2.5.3 Revenue Growth

Revenue growth can reflect higher premium income, a larger customer base, or wider market coverage, and it may create economies of scale. Rapid growth can also strain resources, since expansion requires spending on distribution, underwriting capacity, claims handling, and risk management, so it does not automatically raise profitability. Sasidharan et al. (2023) found that premium growth had a positive effect on ROA among Indian insurers, and Hodula et al. (2023) showed that premium growth in Europe follows the business cycle, savings, and financial development. Controlling for growth helps ensure that the estimated effect of capital structure does not simply reflect differences in how fast insurers are expanding. On balance, and in line with the evidence from Indian insurers, revenue growth is expected to improve performance.

H_5: Revenue growth has a positive effect on the ROA of Vietnamese insurance companies

H_5: Revenue growth has a positive effect on the ROE of Vietnamese insurance companies

2.5.4 Insurance Type

Life and non-life insurers differ in contract duration, claims patterns, liability structures, underwriting practices, and investment strategies, and these differences can affect both capital needs and profitability. Hodula et al. (2023) found that market concentration matters only for life premiums while price effects matter only for non-life premiums, and Zinyoro and Aziakpono (2024) note that determinants of performance vary across segments. Controlling for insurance type is therefore important in a study that combines both segments, so that differences in business models are not wrongly attributed to capital structure.Because these differences may lead to different profitability patterns, insurance type is expected to matter for performance.

H_6: Insurance type has a significant effect on the financial performance of Vietnamese insurance companies

3. Research Methodology

3.1 Research Model

Building on the theories, evidence, and hypotheses set out in Section 2, this study examines whether capital structure is associated with the financial performance of Vietnamese insurers. Performance is assessed with Return on Assets (ROA) and Return on Equity (ROE), which separate the profitability of the whole asset base from the profitability generated for shareholders (Nguyen & Nguyen, 2020). The main explanatory variables are the Leverage Ratio (LEV), which captures how far an insurer relies on liabilities, and the Short-Term Liabilities Ratio (STD), which reflects their maturity structure (Nguyen & Nguyen, 2020). The distinction matters because two insurers may have similar total leverage but different liability structures and therefore different financial pressure (Hai et al., 2024; Nguyen & Truong, 2026). Firm Size (SIZE), Asset Turnover (ATO), Revenue Growth (GROWTH), and Insurance Type (TYPE) are included as control variables, reflecting the importance of firm-specific characteristics in explaining differences in insurers' financial performance (Zinyoro & Aziakpono, 2024).

3.2 Variable Measurement

Table 1 presents the definitions and measurement of the variables used in the empirical analysis.

Table 1. Variable definitions and measurement

Variable	Symbol	Measurement	Role
Return on Assets	ROA	Profit before tax / Average total assets	Dependent
Return on Equity	ROE	Profit before tax / Average shareholders' equity	Dependent
Leverage ratio	LEV	Total liabilities / Total assets	Main independent
Short-term Liabilities Ratio	STD	Short-term liabilities / Total liabilities	Main independent
Firm size	SIZE	Natural logarithm of total assets	Control
Asset turnover	ATO	Revenue / Average total assets	Control
Revenue growth	GROWTH	Annual growth rate of revenue	Control
Insurance type	TYPE	1 = life insurance; 0 = non-life insurance	Control

Table 1 lists the eight variables used in the study, their symbols, how each is calculated, and the role each plays in the models. ROA and ROE are the two dependent variables and are both based on profit before tax, divided by average total assets and average shareholders' equity, respectively. LEV and STD are the two main independent variables, with LEV measured as total liabilities over total assets and STD as short-term liabilities over total liabilities. SIZE, ATO, GROWTH, and TYPE serve as

controls, and TYPE is a dummy variable equal to 1 for life insurers and 0 for non-life insurers. Using averages of assets and equity in the profitability ratios reduces the distortion that could arise when balance sheet items change sharply during a year.

ROA captures an insurer's ability to earn profits from its total assets, while ROE reflects the return on shareholders' equity, and using both reduces the chance that the findings depend on a single indicator. LEV represents the share of assets financed by liabilities, while STD captures the maturity composition of those liabilities rather than their level. SIZE is measured as the natural logarithm of total assets to reduce skewness, ATO measures asset use, GROWTH captures annual revenue growth, and TYPE distinguishes life from non-life insurers.

3.3 Data and Sample

The study uses firm-level panel data on Vietnamese insurers from 2018 to 2024, collected from audited annual financial statements and publicly available disclosures. Firms with insufficient information for the required variables and years were excluded, as were reinsurance companies, whose business models and financial structures differ materially from those of direct insurers. The final sample consists of 27 insurance companies observed over seven years, giving 189 firm-year observations in a balanced panel. Because it covers both life and non-life insurers, the sample allows differences between the two segments to be taken into account, and its balanced structure ensures consistent coverage across firms.

3.4 Estimation Strategy

Because the dataset combines observations on insurers over several years, the study uses panel data regression. Descriptive statistics and a correlation matrix are examined first, and multicollinearity is assessed with the Variance Inflation Factor (VIF). Three panel specifications are then estimated, namely Pooled Ordinary Least Squares (Pooled OLS), the Fixed Effects Model (FEM), which controls for unobserved time-invariant characteristics of each firm, and the Random Effects Model (REM), which assumes that firm effects are random and unrelated to the explanatory variables. The general specifications are given in Equations 1 and 2.

$$ROAit = \beta 0 + \beta 1 LEVit + \beta 2 STDit + \beta 3 SIZEit + \beta 4 ATOit + \beta 5 GROWTHit + \beta 6 TYPEi + \varepsilon it \quad (1)$$

$$ROEit = \beta 0 + \beta 1 LEVit + \beta 2 STDit + \beta 3 SIZEit + \beta 4 ATOit + \beta 5 GROWTHit + \beta 6 TYPEi + \varepsilon it \quad (2)$$

In Equations 1 and 2, the subscript i denotes the insurance company and t denotes the year. Equation 1 explains return on assets and Equation 2 explains return on equity, and both use the same set of explanatory variables so that the results for the two performance measures can be compared directly. The coefficients β1 and β2 capture the effects of leverage and the short-term liabilities ratio, which are the main interest of the study, while β3 to β6 capture the effects of the control variables. TYPE carries only the subscript i because an insurer's business type does not change over the sample period, which, as discussed later, means that its coefficient cannot be identified once firm fixed effects are included. The error term ε captures all other influences on performance that are not included in the model.

The Breusch-Pagan Lagrange Multiplier (LM) test assesses whether a random-effects model is preferable to pooled OLS, and the Hausman test distinguishes between fixed and random effects. Because financial panel data often show heteroskedasticity, serial correlation, and dependence across firms exposed to common shocks, the final inference also accounts for violations of the classical error assumptions, and the preferred model is chosen on the basis of these tests rather than statistical significance.

3.5 Diagnostic Tests

Several diagnostic procedures check the reliability of the estimates. The VIF detects multicollinearity that could inflate standard errors. Heteroskedasticity, serial correlation within firms, and cross-sectional dependence across insurers operating in the same market are tested, and robust standard

errors are used where these problems appear. The aim is not simply to obtain significant coefficients but to ensure that the estimated relationship between capital structure and performance rests on an appropriate econometric specification.

4. Results and Discussions

4.1 Model Selection and Diagnostic Results

The empirical analysis used a balanced panel of 27 Vietnamese insurers over 2018-2024, giving 189 firm-year observations. Fixed-effects (FE) and Random-Effects (RE) models were first estimated, followed by a series of specification and diagnostic tests. The results are summarized in Table 2.

Table 2. Model selection and diagnostic tests

Test	ROA	p-value	ROE	p-value	Interpretation
F-test for individual effects	1.53	0.0587	2.95	0	Supports panel effects, particularly for ROE
Hausman test	12.51	0.0284	22.38	0.0004	FE preferred
Pesaran CD test	4.745	0	2.084	0.0371	Cross-sectional dependence exists
Wooldridge test	0.224	0.6403	0.078	0.7817	No first-order autocorrelation
Modified Wald test	-	-	306,092.88	0	Heteroskedasticity exists in ROE

Note: FE = fixed effects; CD = cross-sectional dependence. The Hausman test rejects the null hypothesis of no systematic difference between FE and RE estimates for both models. The Wooldridge test fails to reject the null hypothesis of no first-order autocorrelation. The Modified Wald test indicates groupwise heteroskedasticity for the ROE model.

Table 2 reports five tests for each of the two models, together with their statistics, p-values, and a short interpretation. The F-test for individual effects is significant for ROE ($p = 0.000$) and close to significance for ROA ($p = 0.0587$), which supports the presence of firm-specific effects, especially in the ROE model. The Hausman test favors the fixed-effects specification in both models, and the Pesaran CD test reveals cross-sectional dependence in both. The Wooldridge test finds no first-order autocorrelation, while the Modified Wald test points to strong heteroskedasticity in the ROE model. Taken together, the table shows that a fixed-effects estimator is appropriate but that its conventional standard errors need to be corrected.

The Hausman test gives consistent evidence in favor of the fixed-effects specification. For the ROA model, the test yields $\chi^2(5) = 12.51$ with $p = 0.0284$, and for the ROE model $\chi^2(5) = 22.38$ with $p = 0.0004$, so the null hypothesis that the differences between FE and RE coefficients are not systematic is rejected in both cases. The diagnostic tests also show significant cross-sectional dependence. Pesaran's test produces a statistic of 4.745 ($p < 0.001$) for ROA and 2.084 ($p = 0.0371$) for ROE, which suggests that insurers are affected at the same time by common market, regulatory, and macroeconomic conditions, as observed during the pandemic (Liedtke, 2021). The Wooldridge test, by contrast, shows no first-order serial correlation, with p-values of 0.6403 for ROA and 0.7817 for ROE.

For the ROE model, the Modified Wald test strongly rejects homoskedasticity ($\chi^2(27) = 306{,}092.88$, $p < 0.001$), indicating groupwise heteroskedasticity. These results together indicate that conventional FE standard errors may not give reliable inference. The final regressions are therefore estimated with a fixed-effects model and Driscoll-Kraay standard errors, which account for both cross-sectional dependence and heteroskedasticity.

4.2 Regression Results

Based on the model selection and diagnostic results in Section 4.1, the fixed-effects model with Driscoll-Kraay standard errors is used for the final estimation. Table 3 reports the results for performance measured by ROA and ROE.

Table 3. Fixed-effects regression results with Driscoll-Kraay standard errors

Variables	ROA	ROE
LEV	0.1899 (0.042)	2.9073 (0.085)
STD	-0.0054 (0.618)	-0.2147 (0.101)
SIZE	-0.0031 (0.514)	-0.0799 (0.096)
ATO	0.2496 (0.153)	4.4144 (0.020)
GROWTH	-0.000044 (0.146)	-0.000722 (0.006)
Observations	189	189
Number of firms	27	27
Within R^2	0.2207	0.4369
F-statistic	13.31	15.82
Prob. > F	0.0034	0.0021

*Notes: The figures in parentheses are p-values. Standard errors are corrected using the Driscoll-Kraay procedure with one lag. *, , and * indicate significance at the 1%, 5%, and 10% levels, respectively.*

Table 3 presents the estimated coefficients for the five time-varying explanatory variables in the ROA and ROE models, with p-values in parentheses. Both models use all 189 observations from 27 firms and are jointly significant, with F-statistics of 13.31 (p = 0.0034) for ROA and 15.82 (p = 0.0021) for ROE. The within R^2 is 0.2207 for ROA and 0.4369 for ROE, meaning that the explanatory variables account for a considerably larger share of the variation in ROE over time. Leverage has a positive coefficient in both models, while asset turnover, revenue growth, and firm size reach significance only in the ROE model. The coefficients in the ROE model are also much larger in absolute value, which is expected because equity is a smaller base than total assets.

The results show that the explanatory variables behave differently depending on whether performance is measured by ROA or ROE. Leverage is significant in both models, while asset turnover and revenue growth are significant only in the ROE model. This difference suggests that the factors driving profitability from the perspective of total assets are not necessarily the same as those affecting returns to shareholders, a pattern also observed among Indian insurers (Sasidharan et al., 2023).

Leverage (LEV) has a positive and statistically significant effect on ROA (β = 0.1899, p = 0.042), which supports H_1a. It is also positively associated with ROE (β = 2.9073, p = 0.085), which supports H_1b at the 10% level. The positive relationship suggests that insurers with a higher share of liabilities relative to assets tend to perform better. In insurance, liabilities include large insurance-related obligations and policyholder funds rather than only conventional interest-bearing debt. A higher LEV may therefore partly reflect an insurer's ability to mobilize and use financial resources generated by its core business. This finding is consistent with the industry-specific nature of insurer capital structures documented by Altuntas et al. (2015) and complements Sasidharan et al. (2023), who found leverage significant for ROE but not for ROA among Indian general insurers. It also stands in contrast to the negative leverage effects reported for African insurers, which underlines how much the institutional setting matters (Msomi, 2023; Msomi et al., 2025).

The Short-Term Liabilities Ratio (STD) has a negative but statistically insignificant effect on both ROA (β = -0.0054, p = 0.618) and ROE (β = -0.2147, p = 0.101), so H_2a and H_2b are not supported. The share of short-term liabilities does not independently explain insurer profitability. This may reflect the particular nature of insurance liabilities, whose economic effects depend not only on their maturity but also on their contractual features, timing, and expected settlement. In this sample, overall leverage appears more relevant to performance than the maturity structure of liabilities.

Firm Size (SIZE) is negatively associated with both measures, although the effect is significant only for ROE (β = -0.0799, p = 0.096) and not for ROA (β = -0.0031, p = 0.514). H_3a is therefore not

supported, while H_3b receives weak support in the negative direction. Greater scale does not necessarily improve profitability. Larger insurers may benefit from economies of scale, but organizational complexity and administrative costs may offset these gains, especially when additional assets and resources are not used efficiently. The result is in line with Sasidharan et al. (2023) and differs from the positive size effects reported by Msomi et al. (2025) and Ahmed et al. (2023).

Asset Turnover (ATO) is positively associated with both ROA and ROE, but the effect is significant only for ROE (β = 4.4144, p = 0.020) and not for ROA (β = 0.2496, p = 0.153). H_4a is therefore not supported, while H_4b is supported. More efficient use of assets contributes to higher returns for shareholders. The difference between the two measures further suggests that asset use may be particularly important in turning an insurer's asset base into returns attributable to equity holders, which agrees with the emphasis on efficiency in recent insurance research (Neale et al., 2025; Ofori-Boateng et al., 2022).

Revenue Growth (GROWTH) has a negative effect on both ROA and ROE. The effect is insignificant for ROA (β = -0.000044, p = 0.146) but significant for ROE (β = -0.000722, p = 0.006). H_5a is therefore not supported, and H_5b is not supported in the hypothesized positive direction. Rapid revenue expansion does not necessarily improve returns to shareholders. Growth may require additional spending on distribution, customer acquisition, underwriting, risk management, and claims handling. If profits do not rise at the same pace as revenue, expansion may lower ROE. The result highlights the importance of profitable and sustainable growth rather than revenue growth alone, and it echoes Mansikkamäki (2023), who found that initial profitability predicts future performance better than initial growth.

The TYPE variable is not reported in the fixed-effects regression because it does not change over time for any insurer and is therefore absorbed by the firm-specific effects. As a result, the effect of insurance type cannot be separately identified in the FE specification. This should not be read as evidence that life and non-life insurers perform identically. It simply reflects the structure of the fixed-effects model, which estimates effects from changes within firms over time. Because an insurer's business type does not change during the sample period, its coefficient cannot be estimated.

4.3 Hypothesis Testing and Overall Findings

Table 4 summarizes the results of hypothesis testing based on the fixed-effects regression with Driscoll-Kraay standard errors. The findings provide partial support for the proposed relationships between capital structure, firm characteristics, operational efficiency, revenue growth, and financial performance.

Table 4. Summary of hypothesis testing

Hypothesis	Expected relationship	ROA	ROE	Overall conclusion
H_1a	LEV → ROA	Positive, significant (p = 0.042)	-	Supported
H_1b	LEV → ROE	-	Positive, significant at 10% (p = 0.085)	Supported
H_2a	STD → ROA	Negative, insignificant (p = 0.618)	-	Not supported
H_2b	STD → ROE	-	Negative, insignificant (p = 0.101)	Not supported
H_3a	SIZE → ROA	Negative, insignificant (p = 0.514)	-	Not supported
H_3b	SIZE → ROE	-	Negative, significant at 10% (p = 0.096)	Supported

Hypothesis	Expected relationship	ROA	ROE	Overall conclusion
H₄a	ATO → ROA	Positive, insignificant (p = 0.153)	-	Not supported
H₄b	ATO → ROE	-	Positive, significant (p = 0.020)	Supported
H₅a	GROWTH → ROA	Negative, insignificant (p = 0.146)	-	Not supported
H₅b	GROWTH → ROE	-	Negative, significant (p = 0.006)	Not supported
H₆	TYPE → Financial performance	Not estimable under FE	Not estimable under FE	Not tested

Note: "Supported" indicates that the estimated relationship is statistically significant and consistent with the hypothesized direction. Statistical significance is evaluated at the 5% level unless otherwise indicated. Results at the 10% level are explicitly identified. TYPE is time-invariant and is absorbed by the firm fixed-effects estimator.

Table 4 sets out each of the eleven hypotheses, the expected relationship, the estimated result for ROA or ROE, and the overall conclusion. Four hypotheses are supported, namely *H₁a* and *H₄b* at the 5% level and *H₁b* and *H₃b* at the 10% level. Six hypotheses are not supported, either because the coefficient is insignificant or because, as for *H₅b*, the significant effect runs opposite to the hypothesized positive direction. H6 on insurance type cannot be tested under fixed effects. The table makes clear that capital structure and efficiency matter more for ROE than for ROA, since three of the four supported hypotheses concern ROE.

Overall, capital structure plays an important role in explaining the performance of Vietnamese insurers, although its effects differ across measures. Leverage is positively associated with both ROA and ROE, while STD is not significant, so the overall level of liabilities appears more relevant than the share classified as short-term. Asset turnover is positively associated with ROE but not ROA, and revenue growth is negatively related to ROE but not to ROA, which shows that factors driving shareholder returns may differ from those driving returns on total assets.

The negative relationship between revenue growth and ROE deserves attention. Growth is commonly expected to improve performance, but for insurers expansion may require extra distribution costs, underwriting commitments, and claims capacity, so the quality and profitability of growth may matter more than revenue growth itself. The inability to estimate TYPE under fixed effects does not imply that life and non-life insurers are alike, since a different specification would be needed to estimate this time-invariant characteristic. Taken together, performance among Vietnamese insurers is shaped more by leverage and operational efficiency than by liability maturity or firm size.

4.4 Hypothesis Testing Summary

Overall, the results provide partial support for the proposed hypotheses, as summarized in Table 5.

Table 5. Overview of hypothesis outcomes

Hypothesis	Relationship	Result
H_1a	LEV → ROA	Supported (+)
H_1b	LEV → ROE	Supported at 10% (+)
H_2a	STD → ROA	Not supported
H_2b	STD → ROE	Not supported
H_3a	SIZE → ROA	Not supported
H_3b	SIZE → ROE	Supported at 10% (-)
H_4a	ATO → ROA	Not supported
H_4b	ATO → ROE	Supported (+)
H_5a	GROWTH → ROA	Not supported
H_5b	GROWTH → ROE	Not supported; significant negative effect
H_6	TYPE → Performance	Not estimated under FE

Table 5 condenses the hypothesis results into a single column so that the overall pattern can be seen at a glance. The sign in parentheses shows the direction of each supported relationship, positive for leverage and asset turnover and negative for firm size. The entry for H5b notes that the hypothesis is not supported even though revenue growth has a significant effect, because the effect is negative rather than positive. The final row records that H6 could not be estimated under fixed effects. Read together with Table 4, the summary shows that leverage is the only variable with a significant effect on both performance measures.

4.5 Discussion

The findings indicate that capital structure is relevant to the performance of Vietnamese insurers, but its effects vary across measures, and performance depends not simply on the scale of liabilities or revenue but on how financial resources and assets are used.

The positive relationship between leverage and performance is broadly consistent with Trade-off Theory, which holds that external financing provides benefits up to the point where its costs become excessive (Kraus & Litzenberger, 1973). Leverage in insurance, however, includes large insurance-related obligations, so the finding suggests that insurers able to mobilize and manage their liabilities effectively earn higher returns, not that more leverage is always better. It is consistent with the insurer-specific nature of capital structure identified by Altuntas et al. (2015) and with evidence that insurers manage leverage toward targets (Fier et al., 2013; Li & Shiu, 2025). Compared with Indian insurers, where leverage mattered only for ROE, this study finds a positive relationship with both measures, which may reflect differences in regulation, market development, and sample periods. The result also agrees with Vietnamese evidence that leverage supported firm performance during the pandemic (Nguyen Kim, 2022), but differs from the negative effects reported for African insurers and Ghanaian banks (Owusu & Garr, 2024).

The short-term liabilities ratio, by contrast, is insignificant for both measures. The result may reflect the distinctive contractual and risk characteristics of insurance liabilities, which make their overall level more informative than a simple maturity classification. This differs from evidence on nonfinancial firms, where debt maturity is linked to information asymmetry and governance, and suggests that maturity measures designed for ordinary firms may not capture what matters most in insurers' balance sheets (Nguyen, 2022; Provaty et al., 2022) . The positive effect of asset turnover on ROE indicates that more efficient use of assets improves shareholder returns, consistent with evidence that efficiency drives insurer performance (Ofori-Boateng et al., 2022; Zinyoro & Aziakpono, 2024). The negative relationship between revenue growth and ROE suggests that rapid expansion does not

necessarily produce higher shareholder returns, so profitable and sustainable growth matters more than revenue growth alone.

The weak negative association between firm size and ROE suggests that greater scale does not automatically lead to better performance, although it should be read with caution because it is significant only at the 10% level and only for ROE. Overall, leverage appears to matter more than liability maturity, while asset use and the quality of growth are particularly relevant to shareholder returns. The study contributes Vietnam-specific evidence, examines both ROA and ROE, separates overall leverage from liability maturity, and complements Tran et al. (2024) in showing that insurer performance is shaped by several financial and firm-specific factors.

4.6 Managerial and Policy Implications

For insurance managers, the positive relationship between LEV and performance suggests that liabilities can support profitability when well managed, but higher leverage should not be pursued without regard for solvency (Siopi, Poufinas, Chen, & Agiropoulos, 2023). Managers should also evaluate asset allocation and investment decisions according to their contribution to sustainable returns, as reflected in the positive effect of ATO on ROE, and technology investment may help, since it has been linked to higher allocative efficiency among insurers (Neale, Drake, Jin, & Lai, 2025) and better financial decision making in banking (Murniati, Nia, Rika, Syata, & Basri, 2026). Growth strategies should emphasize profitability rather than revenue alone, given the negative effect of GROWTH on ROE.

For regulators, the findings highlight the importance of monitoring the quality and sustainability of insurers' capital and liability structures rather than only their absolute level, while leaving insurers enough flexibility to allocate resources efficiently. Diversification and internal capital markets can help insurers meet capital requirements, and greater transparency about liabilities, investments, and risk exposure would help investors and policyholders, since credible disclosure raises the trust of investors and creditors (Fier, & Liebenberg, 2023; Sheehan, Humberg, Shannon, Fortmann, & Materne, 2023; Bangun, & Saraswati, 2026).

5. Conclusions

5.1 Conclusion

This study examined how capital structure affects the financial performance of Vietnamese insurance companies, using a balanced panel of 27 insurers over 2018-2024 with 189 firm-year observations. Performance was measured by ROA and ROE, and capital structure by leverage and the short-term liabilities ratio. Leverage has a positive and statistically significant effect on both ROA and ROE, which suggests that liabilities can contribute to insurer performance when they are managed effectively. The short-term liabilities ratio has no significant effect on either measure. Among the control variables, asset turnover has a positive and significant effect on ROE, while revenue growth has a significant negative effect on ROE. Firm size is negatively associated with ROE at the 10% level and has no significant effect on ROA. Overall, the effective use of financial resources matters more than simply increasing liabilities or revenue, and the differences between the ROA and ROE results show that capital structure decisions may affect asset-based profitability and shareholder returns in different ways.

For insurance managers, the results point to disciplined leverage management, closer attention to the efficiency of asset use, and growth strategies that put profitability ahead of revenue expansion. For regulators, they point to supervision that looks at the quality and sustainability of capital and liability structures, together with greater transparency about insurers' liabilities, investments, and risk exposure.

5.2 Research Limitations

The study has several limitations. The sample covers 27 insurers over seven years, which limits how far the findings can be generalized. The model does not include several insurance-specific variables, such as loss ratios, reinsurance, premium retention, investment income, solvency ratios, and

ownership structure, which may also influence performance. Because insurance type does not change over time, the fixed-effects design cannot estimate the difference between life and non-life insurers. The analysis also relies on accounting-based measures of performance and does not capture market-based or efficiency-based measures.

5.3 Suggestions and Directions for Future Research

Future research could add insurance-specific variables such as loss ratios, reinsurance, premium retention, investment income, solvency, and ownership structure. Separate analyses of life and non-life insurers, or estimators such as hybrid or correlated random-effects models, would allow the effect of insurance type to be estimated directly. Alternative performance measures, including market-based and efficiency-based indicators, could test whether the findings hold beyond accounting returns. Dynamic panel methods could also explore whether leverage and performance influence each other over time. Extending the study period and comparing Vietnam with other emerging insurance markets would further improve understanding of the relationship between capital structure and performance.

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