

# Institutional Ownership, Firm Size, and Market Risk on Firm Stability of ASEAN Property Firms

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**Abstract**-This study examines whether institutional ownership and firm size affect corporate financial stability in ASEAN listed property firms, and whether systematic market risk (beta) moderates these relationships. Using a balanced panel of 32 firms across Indonesia, Malaysia, Thailand, the Philippines, and Vietnam over 2020–2024 (160 firm-year observations), firm stability is proxied by the Altman Z"-Score (higher values indicate higher stability/lower distress). Fixed-effects panel regressions (selected via Chow and Hausman tests) show that both institutional ownership and firm size are significantly negatively associated with the Z"-Score, implying higher distress risk for firms with higher institutional shareholding and larger asset bases during the sample period. Systematic risk shows a significant direct negative effect on stability when included alongside the main predictors, while the interaction terms (institutional ownership  $\times$  beta; firm size  $\times$  beta) are statistically insignificant, suggesting that market risk operates primarily as an independent driver rather than a moderator. The findings provide governance and risk-management implications for investors and regulators in ASEAN property markets.

**Keywords:** Firm Stability (Altman Z"-Score); Institutional Ownership; Firm Size; Systematic Risk (Beta); ASEAN Property Firms

## 1. INTRODUCTION

The property sector plays a crucial role in economic growth but is inherently vulnerable to financial instability due to its capital-intensive nature, long investment horizons, and sensitivity to macroeconomic cycles. These vulnerabilities are particularly pronounced in emerging ASEAN economies, where property firms rely heavily on external debt and customer pre-sales financing.

The ASEAN property market has seen substantial growth, yet it remains vulnerable to systemic shocks influenced by economic cycles, regulatory changes, and investor behavior. Understanding these dynamics is crucial for policymakers and stakeholders aiming to enhance financial resilience in the property sector (Hông et al., 2020)

Financial stability at the firm level is a central concern in emerging markets, where shocks to credit conditions, market sentiment, and macro-financial variables can transmit rapidly into corporate distress risk. Corporate distress in emerging markets is not only shaped by internal fundamentals, but is also highly sensitive to global liquidity cycles and risk aversion, which can amplify refinancing difficulties and profitability downturns. Recent evidence based on multi-country default data highlights that global financial variables and shifts in international risk appetite have predictive power for corporate distress risk in emerging markets, underscoring the importance of incorporating market-wide risk exposure when assessing Firm Stability (Asis et al., 2021).

The property sector deserves special attention because it is typically capital intensive, cyclical, and dependent on external financing. Across ASEAN, property firms are exposed to interest-rate movements, credit tightening, and demand shocks. The Covid-19 period provides a clear illustration of how macro shocks can deteriorate corporate health: brief reports declining Altman Z-scores and a rising share of distressed firms during the pandemic period for firms in parts of ASEAN, reinforcing the relevance of distress-risk indicators in the region. Against this background, understanding how ownership structure, firm scale, and market risk relate to firm stability is practically important for investors, lenders, and regulators (Ning & Jalil, 2023; Sari, 2022; Yeoh et al., 2025).

This paper focuses on two core firm characteristics that are frequently associated with Firm Stability: institutional ownership and firm size. Institutional owners are often expected to improve governance through monitoring and information production, potentially reducing distress risk. For example, research in a leading international finance outlet finds that institutional investors' information-gathering activities (such as corporate site visits) can significantly restrain firms' financial distress and improve market value, suggesting that institutional engagement may reduce distress via monitoring and reduced information asymmetry (Al-Janadi, 2021; Cao et al., 2024; Le & Nguyen, 2024). However, the effect of institutional ownership is not unambiguously positive in emerging markets. Institutions may have heterogeneous objectives (short-term trading versus long-term stewardship), may be affiliated with controlling groups, or may concentrate on firms with higher risk-return profiles, making the direction of the relationship an empirical question. Moreover, in emerging markets, governance frictions and weaker investor protection may shape how institutional ownership translates into stability outcomes.

The empirical evidence surrounding the size-distress relationship is particularly telling. Recent studies underscore how firm characteristics such as size and leverage interact in determining financial stability. A study by Husain et al. on the performance of real estate companies found significant correlations between firm size and financial outcomes, revealing that larger firms often face increased scrutiny and risk due to their size and complexity (Husain et al., 2025). Furthermore, the analysis of capital structure policies by Askarany et al. presents a nuanced view that explores how

governance and board diversity affect debt structures and corporate decision-making within larger firms (Askarany et al., 2025). In summary, while larger firms generally exhibit strengths that promote stability, they face inherent risks that can lead to financial distress, particularly during adverse conditions. The dichotomy of benefits and challenges associated with size highlights the complexity of capital structure management and financial decision-making in larger organizations.

A third element systematic market risk may shape stability directly and may also condition how governance and scale affect stability. Systematic risk (commonly measured by beta) captures the sensitivity of a firm’s stock returns to market movements and reflects exposure to non-diversifiable risk. In emerging markets, beta dynamics can shift around information events and macro conditions, and systematic risk interdependence across markets can intensify during stress periods (A.A Saleem et al., 2021). Therefore, systematic risk may plausibly (i) reduce stability directly by raising the cost of equity and increasing vulnerability to market drawdowns, and (ii) moderate the influence of institutional ownership and firm size by amplifying the consequences of governance weaknesses or scale-related financing constraints during downturns (Asafo et al., 2022).

Based on these considerations, this study investigates ASEAN-listed property firms and tests whether institutional ownership, firm size, and systematic market risk explain variations in firm stability in Indonesia, Malaysia, Thailand, the Philippines, and Vietnam over 2020–2024. The study contributes by (i) employing the Altman Z"-Score—a proxy designed for non-manufacturing firms and emerging-market contexts—as a measure of firm-level financial stability in the ASEAN property sector, and (ii) examining both the direct effect of beta and its potential moderating role in the governance–stability and size–stability relationships under a fixed-effects panel framework.

## 2. RESEARCH METHODS

### 2.1 Basic Research Framework

This research is quantitative and explanatory, using secondary financial and market data to test hypothesized relationships between ownership structure, firm characteristics, market risk, and Firm Stability. The study focuses on property companies listed on stock exchanges in five ASEAN countries: Indonesia, Malaysia, Thailand, the Philippines, and Vietnam. The sample consists of 32 listed property firms observed for five years (2020–2024), resulting in a balanced panel of 160 firm-year observations.

The dependent variable (Y) is Firm Stability, proxied by the Altman Z"-Score (Braunsberger & Aschauer, 2025). The Altman family of Z-score models is widely used for distress risk and corporate failure prediction, and recent literature reviews continue to position Z-score variants as practical tools for distress screening across settings, including emerging markets and non-manufacturing firms (Green, 2020 ; Zhao et al., 2024). The independent variables are: Institutional Ownership (X1) and Firm Size (X2). The moderating variable is Systematic Market Risk (Z) measured by beta ( $\beta$ ) (Afzal et al., 2023). Two interaction terms are constructed: X1Z and X2Z.

The hypotheses are as follows:

H1 : Institutional ownership significantly affects Firm Stability (Altman Z"-Score).

H2 : Firm size significantly affects Firm Stability (Altman Z"-Score).

H3 : Systematic market risk significantly affects Firm Stability.

H4 : Systematic market risk moderates the relationship between institutional ownership and Firm Stability (X1Z significant).

H5 : Systematic market risk moderates the relationship between firm size and Firm Stability (X2Z significant).

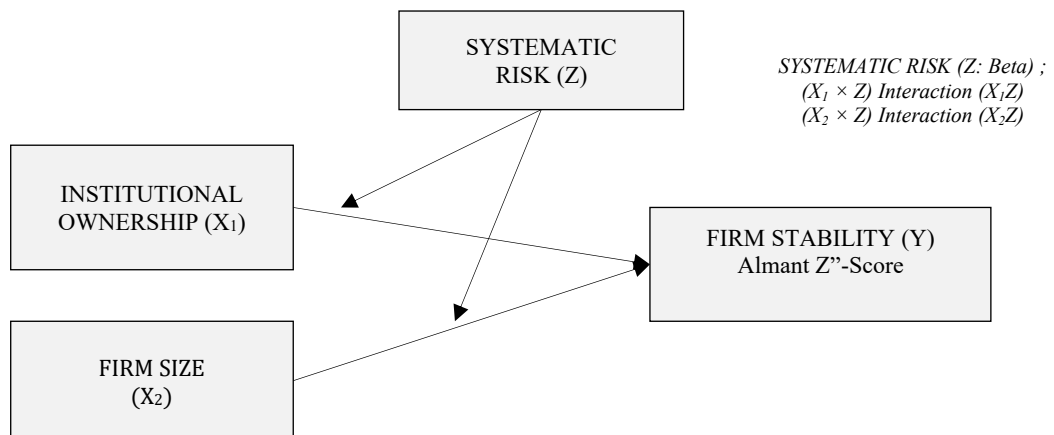


Figure 1. Research Framework

The modified Z-score demonstrates substantial significance in emerging markets, where conventional financial metrics may not fully capture the unique risk factors present in the property and real estate sectors. Variations in regulatory conditions, economic fluctuations, and market maturity pose challenges that underscore the necessity for tailored financial assessments. Rahman explores the application of the Altman Z-score model in forecasting financial distress for real estate

companies in emerging markets, emphasizing its relevance in evaluating financial risks amid economic uncertainty (Rahman. 2022).

Furthermore, the utility of this model extends beyond merely predicting distress; it provides critical insights to stakeholders, such as investors and managers, regarding the financial health of firms, thereby aiding decision-making processes during volatile market conditions. Research has documented the model's effectiveness in assessing the consequences of economic disruptions, illustrating its value in guiding investment strategies and management practices during challenging times. It is critical to note that the references noted for this assertion, however, do not specifically address the model's application during a pandemic, indicating a need for further investigational support in that context (Nebo et al., 2023; Sareen & Sharma, 2022).

The following table summarizes key studies that utilized Altman Z-Scores as a proxy in measuring company financial stability. This compilation includes information on the authors and year of publication, title of the study, research variables, research methods, and main findings from the respective studies.

**Table 1.** Authors Who Use the Altman Z-Score as a Proxy for Firm Stability

Author/ Year	Title	Research Variables	Research Method	Results
Bondar & Mudzakar (2023)	Bankruptcy Prediction Model: Altman (Z-Score), Springate (S-Score), Zmijewski (X-Score)	Bankruptcy prediction, financial data	Comparative analysis of bankruptcy prediction models	The Z-score model demonstrated strong predictive capability of bankruptcy risks among companies on the LQ 45 index.
Gülal et al. (2023)	Predicting Financial Distress in the BIST Industrials Index: Evaluating Traditional Models and Clustering Techniques	Financial distress indicators	Comparative study of traditional models	The Z-score method showed limitations in distinguishing financially successful companies in the Turkish manufacturing sector.
Heniwati and Essen, 2020.	Which Retail Firm Characteristics Impact On Financial Distress?	Financial ratios	Quantitative Analysis	Demonstrates the efficacy of financial ratios, including Altman's Z-Score, in predicting corporate financial distress...
Khurana and Sharma, 2024	Does intellectual capital reduce the probability of default?	Z-Score, intellectual capital	Empirical Analysis	A negative correlation was found between intellectual capital and default risk using the Altman Z-Score as a measure of stability..
Nengsih (2024)	Financial Modelling of Metal and Mineral Mining Companies in Indonesia using Altman Z-scores	Bankruptcy risk, financial ratios	Quantitative analysis of financial ratios using Z-scores	The Z-score effectively identified companies at risk of bankruptcy, providing an early warning system for financial difficulties.
Onsay (2021)	Untying Empirical Knots: Deterioration of Profitability, Economic Failure, and Financial Insolvency	Profitability, insolvency, financial distress	Empirical analysis using Z-scores	Confirmed the reliability of Altman's Z-score in predicting financial distress and potential bankruptcy scenarios.
Purwanti et al. (2023)	Gender Diversity Perspective as Moderation: Does Profitability and Capital Structure Affect Financial Distress during the Coronavirus Period?	Profitability, capital structure, financial distress	Quantitative research including Z-scores	Suggests that financial distress, as indicated by Z-scores, can be affected by profitability and capital structure under diverse leadership.
Rago et al. (2023)	Financial Distress Risk Levels of Listed Small and Medium Enterprises in the Philippines	Financial distress, profitability, liquidity	Descriptive analysis using Z-score	Companies categorized at SAFE levels demonstrated strong financial health, while those at DISTRESS faced significant liquidity issues.

This collection reveals a diverse application of the Altman Z-Score as a key proxy for assessing financial stability across various industries and geographical contexts. It underscores the model's relevance in forecasting bankruptcy and

providing insights into corporate financial health. Given its widespread use in different studies, it is evident that the Altman Z-Score remains a pivotal tool for researchers exploring financial distress indicators.

After conducting research involving various manufacturing companies and generating two bankruptcy detection formulas, Altman further investigated the bankruptcy potential of companies beyond the manufacturing sector, including both publicly traded and private companies. The final Z-Score formula is flexible, as it can be utilized across various business sectors, whether they are publicly traded or private, and is particularly suitable for use in developing countries such as Indonesia (Braunsberger & Aschauer, 2025; Pantoja et al., 2021). This research culminated in a third Z-Score formula applicable to diverse types of companies, denoted as follows:

$$Z''\text{-Score} = 6.56X1 + 3.26X2 + 6.72X3 + 1.05X4$$

Where:

X1 : the ratio measuring liquidity by comparing liquid assets to total assets.

X2: the ratio evaluating accumulated profits during the company's operation.

X3: the ratio indicating the importance of profit achievement, particularly in meeting the interest obligations of investors.

X4: the ratio reflecting the inverse of the debt-to-equity ratio.

Furthermore, the ratios can be elaborated as:

X1: Working Capital to Total Assets ratio,

X2: Retained Earnings to Total Assets ratio,

X3: EBIT to Total Assets ratio,

X4: Market Value of Equity to Book Value of Debt ratio.

The findings from this study indicate that the Altman Z-Score model is effective for credit analysis in predicting corporate bankruptcy, particularly within the Indonesian context, while enabling assessments across a wide spectrum of industries. Such versatility demonstrates its adaptability to various market conditions, affirming significant relevance in contemporary financial analysis frameworks.

Systematic risk in the property sector encompasses unavoidable market risks, including economic changes, interest rates, and industry conditions that can significantly influence pricing and asset valuation. While existing literature has discussed the impact of market volatility on the real estate sector, specific references provided here do not substantiate the claims being made about cost of equity and debt (Liow & Song, 2021; Gottmann, 2023).

In periods of uncertainty in the property market, it is widely accepted that lenders may increase interest rates to account for heightened risks, thus raising the overall cost of debt for firms. This phenomenon is a well-documented aspect of financial economics, although it requires more robust references to support detailed claims.

Furthermore, Marcella & Utami (2024) emphasized the high leverage, resulting from accumulated debt, can influence financial stability within the property sector. Research suggests that companies with higher leverage levels are more vulnerable to market fluctuations and may find it challenging to meet debt obligations, particularly during times of rising interest rates. Effective debt management is crucial for property firms to maintain stability amid volatile conditions, a consensus found in multiple financial studies.

**Table 2.** Variable Definitions and Measurements

Variable	Definition	Measurement /Proxy	Expected Sign
Y	Firm Stability	Altman Z''-Score (higher = more stable)	—
X <sub>1</sub>	Institutional ownership	% shares held by institutions	(±)
X <sub>2</sub>	Firm size	Ln (Total Assets)	(±)
Z	Systematic market risk	Beta (β) vs market index	(-)
X <sub>1</sub> Z	Moderation term	X <sub>1</sub> × Z	—
X <sub>2</sub> Z	Moderation term	X <sub>2</sub> × Z	—

## 2.2 Econometric Model and Estimation Procedure

Panel data regression is employed to exploit both cross-sectional and time-series variation. The baseline models are estimated using Panel Least Squares with firm fixed effects (cross-section dummy variables). Fixed effects are appropriate when unobserved firm-specific characteristics are correlated with explanatory variables. Model selection is determined through:

a. Chow test (CEM vs FEM): Cross-section Chi-square p-value = 0.0000 < 0.05, selecting FEM.

b. Hausman test (FEM vs REM): Cross-section random p-value = 0.0039 < 0.05, selecting FEM.

Thus, FEM is selected and the Lagrange Multiplier (LM) test is not required.

The six estimated models (as provided by the research outputs) are:

$$\text{Model (1): } Y_{it} = \alpha_i + \beta_1 X1_{it} + \varepsilon_{it} \tag{1}$$

$$\text{Model (2): } Y_{it} = \alpha_i + \beta_1 X1_{it} + \beta_3 Z_{it} + \varepsilon_{it} \tag{2}$$

$$\text{Model (3): } Y_{it} = \alpha_i + \beta_1 X1_{it} + \beta_3 Z_{it} + \beta_4 (X1Z)_{it} + \varepsilon_{it} \tag{3}$$

$$\text{Model (4): } Y_{it} = \alpha_i + \beta_2 X2_{it} + \varepsilon_{it} \tag{4}$$

$$\text{Model (5): } Y_{it} = \alpha_i + \beta_2 X2_{it} + \beta_3 Z_{it} + \varepsilon_{it} \tag{5}$$

Model (6): 
$$Y_{it} = \alpha_i + \beta_2 X_{2it} + \beta_3 Z_{it} + \beta_5 (X_2 Z)_{it} + \varepsilon_{it} \tag{6}$$

Interaction terms are defined as  $X1Z = (\text{institutional ownership} \times \text{beta})$  and  $X2Z = (\text{firm size} \times \text{beta})$ . In the baseline estimation, the interaction terms are constructed from uncentered variables; therefore, multicollinearity between main effects and interaction terms may inflate standard errors. As a standard robustness procedure, future work may mean-center the components before forming interaction terms to reduce collinearity and improve interpretability of conditional effects. In addition, a combined specification (robustness/confirmation) is reported in the results section to show the joint inclusion of  $X1$ ,  $X2$ , and  $Z$ , and an extended combined interaction specification including  $X1Z$  and  $X2Z$ .

Regarding classical assumption testing, this study follows a common practice in several empirical panel-data papers in applied business and finance outlets that proceed with panel estimation without reporting a full suite of classical assumption tests, focusing instead on model selection and goodness-of-fit. This approach is consistent with the authors' stated benchmarking references (Hirman et al., 2025). Nevertheless, this paper acknowledges this as a limitation and recommends robustness checks with heteroskedasticity-robust or clustered standard errors in future work.

### 3. RESULTS AND DISCUSSION

This section presents the fixed-effects estimation results and discusses their meaning for ASEAN property firms during 2020–2024. All models are estimated on a balanced panel of 160 observations (32 firms  $\times$  5 years) with cross-section fixed effects.

#### 3.1 Model Selection Results

The selection of the fixed-effects model is supported by both tests. The Chow test rejects the pooled/common effects model, indicating significant firm-specific heterogeneity across property firms in ASEAN. The Hausman test rejects the random-effects specification, implying that unobserved firm characteristics are correlated with the regressors. These results justify FEM as the main estimator in this study.

**Table 3.** Panel Model Selection Tests

Test	Null Hypothesis	Statistic / p-value	Decision
Chow (CEM vs FEM)	Pooled model adequate	Cross-section Chi-square p = 0.0000	Select FEM
Hausman (FEM vs REM)	Random effects consistent	Cross-section random p = 0.0039	Select FEM

*Note: Since the FEM was chosen from Chow and Hausman, the LM test is not necessary*

#### 3.2 Main Regression Findings

Table 4 reports six fixed-effects (FE) panel regressions that examine how institutional ownership ( $X1$ ) and firm size ( $X2$ ) relate to firm stability ( $Y$ ), proxied by the Altman  $Z''$ -Score, while also assessing the role of systematic market risk ( $Z$ ) as both a direct predictor and a potential moderator. The FE specification is important because it controls for time-invariant firm-specific characteristics such as persistent differences in project portfolio structure, land-bank strategy, corporate culture, or long-run governance patterns thereby emphasizing within-firm changes over time rather than cross-firm differences

**Table 4.** Fixed-Effects Regression Results (Models 1–6)

Model	Predictors	Key Coefficients (t; p)	Adjusted R <sup>2</sup>	Conclusion
(1)	$Y = f(X1)$	$X1 = -2.4982 (-2.049; 0.0425)$	Adj R <sup>2</sup> = 0.8435	Institutional ownership significantly reduces stability (negative effect on $Z''$ ).
(2)	$Y = f(X1, Z)$	$X1 = -2.0194 (-1.754; 0.0818)$ $Z = -1.6324 (-4.219; 0.0000)$	Adj R <sup>2</sup> = 0.8618	Systematic risk is significantly negative; $X1$ becomes marginal (10% level).
(3)	$Y = f(X1, Z, X1Z)$	$X1 = -0.7048 (-0.406; 0.6858)$ $Z = -0.6178 (-0.574; 0.5672)$ $X1Z = -1.6133 (-1.010; 0.3146)$	Adj R <sup>2</sup> = 0.8618	Interaction is not significant; no moderation evidence for $X1$
(4)	$Y = f(X2)$	$X2 = -0.9389 (-4.125; 0.0001)$	Adj R <sup>2</sup> = 0.8574	Firm size significantly reduces stability (negative effect on $Z''$ ).

Model	Predictors	Key Coefficients (t; p)	Adjusted R <sup>2</sup>	Conclusion
(5)	$Y = f(X_2, Z)$	$X_2 = -1.0359 (-4.975; 0.0000)$ $Z = -1.8589 (-5.197; 0.0000)$	Adj R <sup>2</sup> = 0.8817	Both firm size and systematic risk are significantly negative.
(6)	$Y = f(X_2, Z, X_2Z)$	$X_2 = -1.1339 (-3.582; 0.0005)$ $Z = -4.9815 (-0.657; 0.5127)$ $X_2Z = 0.1261 (0.412; 0.6810)$	Adj R <sup>2</sup> = 0.8809	Interaction is not significant; no moderation evidence for X <sub>2</sub> .

In Models (1)–(3), the analysis focuses on institutional ownership. Model (1) shows that X<sub>1</sub> has a negative and statistically significant association with stability ( $\beta = -2.4982$ ;  $p = 0.0425$ ). In standard agency theory, institutional investors are often expected to improve monitoring quality and reduce agency costs, which could enhance stability (e.g., through better discipline in financing and investment decisions). That said, the direction of the institutional ownership effect is often context-dependent, especially in emerging markets where “institutional investors” can be heterogeneous in objectives and monitoring intensity. Empirical corporate governance studies in emerging markets have documented that governance mechanisms can be linked to distress outcomes, but the strength and direction of specific governance proxies can vary by market structure and investor composition. A negative coefficient in the ASEAN property setting is therefore plausible if institutional ownership reflects, for example, institutions’ preference for higher-risk/high-return firms, or if institutional ownership increases when firms face stress (a selection or turnaround-investing pattern). Another mechanism is that some institutional holders may be passive or short-horizon, so a higher ownership share does not necessarily translate into stronger monitoring. Evidence from a high-quality international finance outlet supports this nuance: institutional investors’ *active information acquisition* (e.g., corporate site visits) is associated with reduced financial distress, implying that the stabilizing channel depends on investor behavior—not merely ownership percentage. In that light, your Model (1) result can be interpreted as showing that, during 2020–2024, the “quantity” of institutional ownership in ASEAN property firms did not consistently map into stabilizing governance, or it co-moved with periods of weakened stability.

Model (2) introduces Z and shows a strong negative direct effect of systematic risk on stability ( $\beta_Z = -1.6324$ ;  $p = 0.0000$ ), while IO becomes statistically weaker ( $p = 0.0818$ ). This pattern is consistent with the idea that distress risk and stability in emerging markets have meaningful exposure to broader financial conditions and systematic components. Research on emerging-market distress emphasizes that global and macro-financial factors can help explain distress risk, especially around stress episodes when refinancing conditions tighten and investors’ risk appetite changes. (Elbanan, 2021) emphasized For property firms—whose cash flows and balance sheets are highly sensitive to interest rates, credit availability, and cyclical demand—systematic risk exposure can be a particularly strong predictor of stability. Regional evidence during the pandemic period also highlights deterioration in Z-score-based financial health indicators for firms in parts of ASEAN, reinforcing the argument that market-wide shocks translate into measurable stability declines. From a modeling perspective, when Z (beta) is included, it may absorb part of the variation previously attributed to X<sub>1</sub> because both can co-move with market sentiment and financing conditions: ownership can shift during stress, and the market systematically reprices risk. The increase in adjusted R<sup>2</sup> from 0.8435 (Model 1) to 0.8618 (Model 2) supports the view that adding systematic market exposure improves explanatory power, indicating that stability is not only a governance outcome but also a risk-exposure outcome.

Model (3) adds the interaction term X<sub>1</sub>×Z (X<sub>1\_Z</sub>) to test moderation formally. The interaction is not significant ( $p = 0.3146$ ), implying that systematic risk does not statistically change (strengthen or weaken) the relationship between institutional ownership and stability. This distinction matters: Z can be a powerful predictor of stability while still not functioning as a moderator. In many applied finance contexts, beta is interpreted as a “pricing” and exposure metric whose primary influence is direct: higher systematic exposure is associated with higher vulnerability during market drawdowns, which can worsen firms’ financing access. For example, evidence shows systematic risk can increase following stock price crashes and is related to greater default risk and financing difficulty, supporting a direct risk-to-distress channel (Roy et al., 2025). The non-significant interaction suggests that while systematic risk is harmful on average, it does not differentially amplify or dampen the effect of ownership structure on stability within your sample period.

Models (4)–(6) shift attention to firm size. Model (4) shows X<sub>2</sub> has a negative and highly significant relationship with stability ( $\beta = -0.9389$ ;  $p = 0.0001$ ). The size–stability relationship is theoretically ambiguous. Larger firms often enjoy diversification and better financing access, which could increase resilience. Yet, in the property sector, “larger” can also mean higher leverage capacity, larger project pipelines, and more rigid commitments that become burdensome when demand slows or credit tightens. In such settings, size can become a proxy for greater exposure to cyclical downturns and refinancing risk. Evidence from emerging markets also indicates that firm characteristics—such as profitability, liquidity, and size—are linked to distress likelihood, with results often reflecting sector-specific financing realities rather than a universal “large firms are safer” narrative (Elbanan, 2021). In the ASEAN property context, the negative coefficient is consistent with the interpretation that scale during 2020–2024 coincided with higher balance-sheet strain or increased sensitivity to property-cycle shocks.

Model (5) incorporates Z alongside X<sub>2</sub> and finds both predictors are negative and significant (X<sub>2</sub>  $p = 0.0000$ ; Z  $p = 0.0000$ ), with adjusted R<sup>2</sup> rising to 0.8817. Substantively, this indicates that stability is shaped by a combination of internal scale-related factors and external market exposure. The strong performance gain in model fit relative to Model (4) (0.8574 to 0.8817) reinforces the earlier insight from Models (1)–(2): systematic risk adds explanatory content beyond

firm characteristics. This is aligned with the broader emerging-market distress literature that emphasizes systematic components in corporate distress risk and the role of macro-financial environments (Elbanan, 2021).

Model (6) introduces the  $X2 \times Z$  interaction ( $X2\_Z$ ). The interaction is not significant ( $p = 0.6810$ ), again indicating the absence of moderation. Interestingly,  $Z$  itself becomes insignificant in Model (6) ( $p = 0.5127$ ). This is not uncommon in interaction models because the main effects become conditional effects (interpreted at  $Z = 0$ ), and the inclusion of an interaction term can increase collinearity, thus inflating the standard errors. The main statistical conclusion remains the same: moderation is not supported because the interaction term is not significant. From a practical standpoint, these results imply that systematic risk reduces stability broadly (as shown in the non-interaction model), but does not systematically change the size-stability slope across firms as a moderator does.

Taken together, Table 4 supports a coherent interpretation. First, both governance structure ( $X1$ ) and firm scale ( $X2$ ) can be associated with lower stability in the ASEAN property sector, with  $X$  being the more consistently significant predictor across specifications. Second, systematic market risk ( $Z$ ) behaves primarily as a direct predictor of stability in the models without interaction terms, consistent with distress risk having a systematic component and with evidence linking heightened systematic risk to financing frictions and default risk around market stress. Third, despite the strong direct effect of  $Z$ , the interaction terms  $X1\_Z$  and  $X2\_Z$  are insignificant, indicating that risk exposure does not statistically moderate the ownership-stability or size-stability relationship in your sample.

This pattern also helps reconcile why institutional ownership is significant in the single-predictor model but weaker after adding  $Z$  and/or interaction terms. One plausible explanation is that institutional ownership percentage is an imperfect proxy for monitoring intensity an issue highlighted by evidence that active institutional behaviors (such as site visits and information production) are the channels that reduce distress. Another explanation is that the 2020–2024 period contains high macro-financial volatility (pandemic recovery, tightening cycles, and risk repricing), making systematic exposure a dominant factor for property firms' stability. Regional analyses noting deterioration in  $Z$ -score-type distress indicators during the pandemic period provide context for why systematic forces could dominate firm-level governance signals in explaining stability movements. Finally, the relatively high adjusted  $R^2$  values across models (roughly 0.84–0.88) indicate that firm fixed effects plus the included predictors capture substantial variation in stability, supporting the empirical relevance of both firm characteristics and market risk exposure.

Overall, the discussion of Table 4 suggests that stability in ASEAN property firms over 2020–2024 is best explained by direct effects especially the persistent role of firm size and the direct contribution of systematic market exposure rather than by interaction-based moderation. This provides a clear empirical message for the proceedings: market risk matters for stability, but not as a moderator in the statistical sense required by interaction significance; instead, it operates as an independent driver of stability dynamics in the sector and period studied.

### 3.3 Combined Model Evidence (Joint Inclusion of $X1$ , $X2$ , and $Z$ )

A combined FEM regression including  $X1$ ,  $X2$ , and  $Z$  simultaneously provides additional confirmation that all three predictors are jointly relevant:

$$C = 32.7708 \text{ (} t = 6.338; p = 0.0000 \text{)}$$

$$X1 = -2.4174 \text{ (} t = -2.302; p = 0.0230 \text{)}$$

$$X2 = -1.0702 \text{ (} t = -5.213; p = 0.0000 \text{)}$$

$$Z = -1.7841 \text{ (} t = -5.050; p = 0.0000 \text{)}$$

$$\text{Adjusted } R^2 = 0.8856; \text{ F-stat } p = 0.0000; \text{ Durbin-Watson } \approx 1.93$$

This model implies that, after controlling for firm fixed effects, higher institutional ownership, larger firm size, and higher systematic risk are each associated with lower Firm Stability (lower  $Z$ ). The high adjusted  $R^2$  indicates that the fixed-effects specification explains a substantial share of within-firm variation in stability over time.

A further combined interaction model (including  $X1$ ,  $X2$ ,  $Z$ ,  $X1Z$ ,  $X2Z$ ) shows that only firm size remains statistically significant, while both interaction terms remain insignificant. This pattern reinforces the conclusion that moderation is not supported by the interaction specification in the current sample.

### 3.4 Discussion of Hypotheses

#### 3.4.1 H1 (Institutional ownership $\rightarrow$ stability): Supported (negative significant).

Model (1) indicates a statistically significant negative relationship between institutional ownership and stability. A plausible interpretation in ASEAN emerging markets is that institutional ownership may not uniformly represent long-term monitoring. Institutional investors can be heterogeneous, including short-horizon institutions or affiliated entities, which may tolerate higher leverage or risk-taking in pursuit of returns. Another explanation is selection/reverse causality: institutions may increase holdings in firms undergoing restructuring or undervaluation, which can coincide with lower  $Z$  scores. Importantly, prior high-quality evidence shows that certain forms of institutional engagement (e.g., active information acquisition through site visits) can restrain distress, implying that the *quality and behavior* of institutional investors can matter as much as the ownership percentage itself (Cao et al., 2024). Thus, the negative coefficient in this study can be read as an indication that institutional ownership in ASEAN property firms during 2020–2024 may not consistently translate into stabilizing monitoring outcomes, or that institutional holdings may be concentrated in firms with inherently higher distress risk.

### 3.4.2 H2 (Firm size → stability): Supported (negative significant).

Model (4) reports a strong negative association between firm size and stability. In the property sector, larger scale often coincides with capital-intensive project portfolios and higher debt reliance, which can compress  $Z''$  during downturns. During the 2020–2024 period, many property firms faced elevated refinancing pressure and demand uncertainty; these sector conditions can disproportionately affect large developers with extensive pipelines and high fixed commitments. The result suggests that size in ASEAN property firms may reflect *exposure and leverage capacity* more than diversification benefits, at least in the observed period.

### 3.4.3 H3 (Systematic risk → stability): Supported (negative significant in Models 2, 5, and combined model).

Systematic risk is significantly negative when included without interaction terms, consistent with the idea that market exposure increases vulnerability during broad market declines. Emerging-market distress risk is known to be sensitive to global financial conditions; thus, greater beta exposure can align with lower stability when market-wide stress rises (Asis et al., 2021).

### 3.4.4 H4 and H5 (Moderation via X1Z and X2Z): Not supported.

Both interaction terms are statistically insignificant in Models (3) and (6), and remain insignificant in the combined interaction specification. Several factors may explain this outcome. First, interaction tests can be sensitive to multicollinearity between the interaction term and its components, particularly if variables are not mean-centered before constructing interactions. Second, beta estimation windows and market proxies can influence measurement error in  $Z$ , weakening interaction detection. Third, moderation may be context-specific: systematic risk may depress stability broadly across firms, but may not differentially strengthen the governance–stability or size–stability relationship in the ASEAN property sector over 2020–2024. Accordingly, the evidence suggests that systematic risk operates primarily as a direct predictor of stability rather than a conditioning variable in this setting.

## 3.5 Implications

From a managerial perspective, the negative effects of size and systematic risk imply that property firms should strengthen liquidity buffers, extend debt maturities, and manage exposure to market downturns through prudent capital structure and risk-management practices. For investors, relying solely on institutional ownership as a governance signal may be insufficient; assessing the *type* of institutional investors and the degree of active monitoring is important. For regulators and exchanges, improving disclosure quality and governance enforcement may enhance the ability of institutional investors to play a stabilizing role, consistent with evidence that institutional information acquisition and monitoring can restrain distress (Cao et al., 2024). In the fixed-effects estimations, institutional ownership ( $X1$ ) is significant in the single-predictor model (Model 1), while firm size ( $X2$ ) is consistently negative and significant across models. Systematic market risk ( $Z$ ) shows a strong negative direct effect when included without interaction terms (Models 2 and 5). However, interaction terms ( $X1\_Z$  and  $X2\_Z$ ) are statistically insignificant (Models 3, 6, and the full moderation model), indicating that systematic risk acts primarily as a direct predictor rather than a moderator in this setting.”

## 4. CONCLUSION

This study investigates whether institutional ownership and firm size influence corporate financial stability, measured by the Altman  $Z''$ -Score, and whether systematic market risk moderates these relationships in ASEAN-listed property firms. Using a balanced panel of 32 firms across Indonesia, Malaysia, Thailand, the Philippines, and Vietnam for 2020–2024 and estimating firm fixed-effects models selected via Chow and Hausman tests, the findings show that institutional ownership has a statistically significant negative effect on Firm Stability, and firm size also has a statistically significant negative effect on stability. Systematic market risk (beta) displays a strong direct negative association with stability when included alongside the main predictors. However, the interaction terms between beta and institutional ownership, and between beta and firm size, are not statistically significant, indicating no evidence of moderation in the tested specifications. The main limitation is that classical assumption diagnostics and robust variance corrections were not reported in the estimation outputs; future research should consider clustered or heteroskedasticity-robust standard errors, alternative beta estimation windows, and additional firm controls (e.g., leverage, profitability, liquidity) to strengthen causal interpretation. Overall, the results highlight that, in ASEAN property markets during 2020–2024, governance via institutional ownership and scale effects may be associated with lower stability, while market-wide exposure is a consistent direct predictor of stability risk. Policy implication: ASEAN macro-prudential authorities and market supervisors should monitor leverage and refinancing risks of large listed property developers more closely, especially during tightening cycles.

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