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The Effect of Idiosyncratic Volatility on Corporate Financial Stability: Empirical Evidence on Energy Companies in Indonesia

Novia Hanida M[1*], Cipto Wardoyo[2], Rizky Formansyah[3]
Universitas Negeri Malang
Corresponding Author: Novia Hanida : novia.hanida.2404218@students.um.ac.id

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A B S T R A C T
This study aims to examine the effect of idiosyncratic volatility on corporate financial stability in the energy sector during the 2018–2024 period. Idiosyncratic volatility is measured using the Capital Asset Pricing Model (CAPM) approach, while financial stability is proxied by the Altman Z-score model. The research sample consists of 42 energy sector firms listed on the Indonesia Stock Exchange, selected through purposive sampling. Data analysis is conducted using the Structural Equation Modeling–Partial Least Squares (SEM-PLS) method with the assistance of SmartPLS software version 4.1.1.6. The results indicate that idiosyncratic volatility has a significant effect on corporate financial stability. However, the direction of the relationship is positive and does not support the initial hypothesis, which assumed a negative association. These findings suggest that an increase in firm-specific risk does not automatically reduce financial stability, particularly for firms that remain fundamentally healthy during the observation period. Thus, idiosyncratic volatility appears to reflect market perception dynamics regarding firm-specific information rather than serving as a direct determinant of corporate financial fragility.

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INTRODUCTION

Asian stock markets indicated a slowdown in the economies of Asian countries (Shaikh et al., 2021). This decline occurred as the Indonesian rupiah depreciated to IDR 15,187 in 2018, while the Composite Stock Price Index (IHSG) also showed a weakening trend, predominantly moving in the red zone and struggling to enter the green zone (Pitoko, 2018; Wareza, 2018). The energy sector was not immune, as energy stocks experienced significant fluctuations during the 2018–2020 period.

Stock price volatility may be driven by global factors. However, not all companies—particularly in the energy sector—experienced the same degree of turbulence. For example, PT Medco Energi Internasional saw its share price decline by 15.51% in 2020 (Saleh, 2020), while PT Elnusa reported a profit decrease of up to 30% in the same year (Fernando, 2021). This variation occurs because each company differs in financial performance, risk management capability, and corporate governance practices (Campbell & Malkiel, 2000). Thus, fluctuations in stock prices across firms are influenced not only by market-wide factors but also by internal company-specific factors.

Factors influencing stock price fluctuations that originate from within the firm are referred to as firm-level volatility. Meanwhile, stock price movements driven by fundamental firm-specific factors are commonly known as idiosyncratic volatility (Yenny Kumalasari, 2021). Idiosyncratic volatility reflects firm-specific risk arising from internal policies, management quality, corporate governance, and information transparency. According to Siddiqui et al. (2024), idiosyncratic volatility represents variations in a firm's stock returns that are not caused by general market factors, typically stemming from declining profits, increasing operational costs, reputational risk, or even corporate fraud. When idiosyncratic volatility increases, firms face greater operational and financial risks, thereby increasing the likelihood of declining financial stability (Ray & Chen, 2010). Song (2008) also confirms the existence of a negative relationship between idiosyncratic volatility and financial stability.

According to Xia et al. (2022), firms that are able to minimize emerging losses demonstrate higher stability and greater resilience in absorbing various shocks. Financial stability is defined as a firm's ability to maintain financial soundness while implementing its development strategies (Gorczyńska & Błach, 2016; IMF, 2005). Zutter and Smart (2022) define financial stability as a firm's ability to meet its financial obligations when due, while maintaining a healthy balance between debt and equity financing and ensuring sufficient liquidity to sustain operations. Firms that fail to maintain appropriate levels of debt, profitability, and managerial performance are more likely to experience financial distress (Firmansyah et al., 2022; Ray & Chen, 2010). Companies that rely on debt to finance assets and operations are commonly measured using leverage ratios (Gorczyńska & Błach, 2016). The greater a firm's dependence on debt financing, the higher the risk of default and the greater the likelihood of experiencing financial distress.

LITERATURE REVIEW

Signaling Theory

Signaling theory (Spence, 1973) explains that management, as the internal party possessing superior information, conveys signals to external parties to reduce information asymmetry. In the capital market context, various corporate financial disclosures function as signals regarding a firm's internal condition and future prospects. Credible signals are generally costly and difficult for low-quality firms to imitate, thereby helping investors distinguish between healthy and high-risk firms (Connelly et al., 2011). However, not all signals are interpreted positively; certain indicators may convey negative signals that influence investor perceptions of a firm's risk level and stability.

Within this framework, idiosyncratic volatility and financial stability represent important signals for external stakeholders. Idiosyncratic volatility reflects firm-specific risk that cannot be explained by overall market movements (Campbell & Malkiel, 2000). A high level of idiosyncratic volatility indicates greater operational and financial uncertainty, thereby sending a negative signal regarding the firm's internal condition. Conversely, lower volatility reflects better risk management and more stable corporate fundamentals.

Financial stability, commonly proxied by the Z-score, indicates a firm's ability to sustain its operations and avoid financial distress. A low Z-score strengthens the signal of potential financial distress, whereas a higher score indicates healthier financial conditions. From a signaling theory perspective, firms with high idiosyncratic volatility tend to send negative signals to investors regarding their financial stability.

Several empirical studies support this relationship. Ray and Chen (2010) and Ang et al. (2006) find that idiosyncratic volatility is negatively associated with firm stability, where firms with higher volatility are more vulnerable to financial distress. Song (2008) also demonstrates that firm-specific risk is positively correlated with financial distress conditions. Furthermore, Zhou et al. (2016) find that higher financial reporting quality is associated with lower idiosyncratic risk, suggesting that transparency can reduce perceived market risk. Based on the theoretical foundation and prior empirical findings, this study proposes the hypothesis that idiosyncratic volatility negatively affects corporate financial stability.

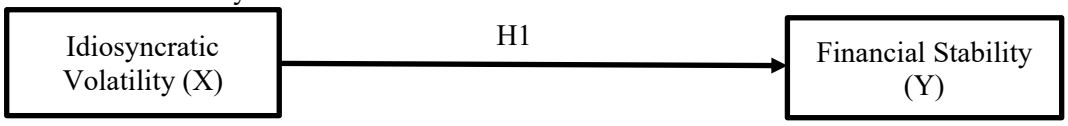


Figure 1. Research Model

METHOD

This study employs a quantitative research design. Data were collected using a documentation method from the official websites of the sampled firms as well as from https://www.investing.com. The selection of energy sector firms is based on the high level of stock price volatility and the occurrence of several significant internal corporate scandals within the Indonesian energy sector

during the 2018–2024 observation period. Using purposive sampling, a total of 42 energy sector companies listed on the Indonesia Stock Exchange were selected as the research sample. The data were analyzed using the Structural Equation Modeling–Partial Least Squares (SEM-PLS) method with the assistance of SmartPLS software version 4.1.1.6.

Referring to the studies of Lassoued (2018), Nguyen et al. (2022), Orazalin et al. (2019), Ray and Chen (2010), and Song (2008), corporate financial stability is measured using the Altman Z-score model, which is formulated as follows:

Financial Stability (Z) = $6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$

Dimana:

X_1 = *(Current Assets − Current Liabilities) / Total Assets;*

X_2 = *Retained Earnings / Total Assets;*

X_3 = *EBIT / Total Assets;*

X_4 = *Book Value of Equity / Total Liabilities.*

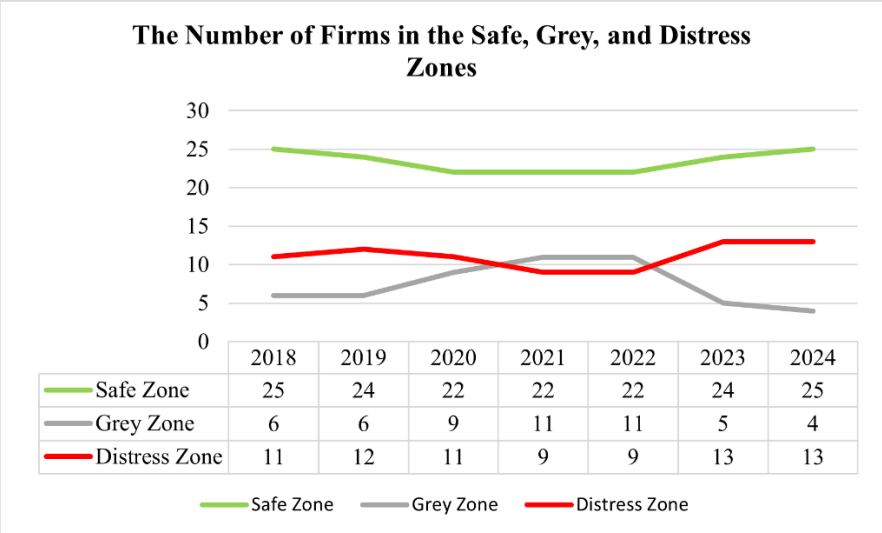
Idiosyncratic volatility is estimated using the Capital Asset Pricing Model (CAPM) as proposed by Pristiwati and Widianingsih (2022).

$R_i = \alpha_i + \beta_i (R_m - rf) + e_i$

Where R_i denotes the return of firm i, $R_m$represents the market return (IDX Composite/Indonesia Composite Index), and rf refers to the risk-free rate proxied by the interest rate of Bank Indonesia Certificates. The residual term (e_i) captures firm-specific return variation and is used as a proxy for idiosyncratic risk. The parameter α_i represents the intercept, while β_i measures the sensitivity of stock returns to market movements.

RESULT AND DISCUSSION

Based on the assessment of financial stability using the Altman Z-score model, the annual distribution of firms classified into the safe zone, grey zone, and distress zone during the period 2018 to 2024 is presented in the following diagram.



	2018	2019	2020	2021	2022	2023	2024
Safe Zone	25	24	22	22	22	24	25
Grey Zone	6	6	9	11	11	5	4
Distress Zone	11	12	11	9	9	13	13

Figure 2. Number of Companies Based on Altman Z-Score Criteria.

Measurement Model

This study was analyzed using SmartPLS version 4.1.1.6. According to Garson (2018) and Hair et al. (2017), the research model is categorized as a formative model with a single-item construct, in which the measurement indicator forms the construct and is represented by a single indicator. Therefore, the analytical procedure for this model includes testing for multicollinearity, as well as estimating the level of significance and outer weights obtained through the bootstrapping procedure.

Multicollinearity Test (VIF)

The criteria for assessing multicollinearity based on Hair et al. (2017) state that multicollinearity is not present if the Variance Inflation Factor (VIF) value is less than 10. Table 1 presents the results of the multicollinearity test conducted using SmartPLS version 4.1.1.6.

Table 1. Multicollinearity Test

Variable Relationship	VIF	Description
Idiosyncratic Volatility → Financial Stability	1.276	No Multicollinearity

Based on Table 1, the VIF value for the effect of Good Corporate Governance on financial stability is 1.019 (< 5), the interaction between Good Corporate Governance and idiosyncratic volatility on financial stability is 1.272 (< 5), and the effect of idiosyncratic volatility on financial stability is 1.276 (< 5). Based on these results and the established criteria, it can be concluded that there is no multicollinearity problem among the variables in this study.

Structural Model

The structural model in this study is evaluated through several stages, including the assessment of R-square, the analysis of effect size (F-square), and the significance testing using the bootstrapping procedure.

R-square Test

Table 2. R-Square Test

Dependent Variable	R-Square	Adjusted R-Square
Financial Stability	0.060	0.051

Based on the results of the R-square test on the financial stability variable in Table 2, the R-square value is 0.060. Referring to the commonly used evaluation criteria of 0.67 (strong/substantial), 0.33 (moderate), and 0.19 (weak), this value indicates that the explanatory power of the independent variables on financial stability is very weak. This means that only 6% of the variation in financial stability can be explained by the independent variables in this study, while the remaining 94% is influenced by other factors not included in the model. Nevertheless, idiosyncratic volatility is fundamentally one of many factors that may potentially affect a firm's financial stability.

F-Square Test

Table 3. Hasil Uji F-Square

Relationship	F-Square
Idiosyncratic Volatility → Financial Stability	0.020

The evaluation criteria for the f-square value indicate that f^2 values of 0.02, 0.15, and 0.35 represent small, medium, and large effect sizes, respectively (Garson, 2018). Based on the results in Table 3, the effect of idiosyncratic volatility shows a very small effect size ($f^2 = 0.020$). Overall, these findings indicate that the contribution of idiosyncratic volatility to financial stability is relatively limited.Path Koefisients

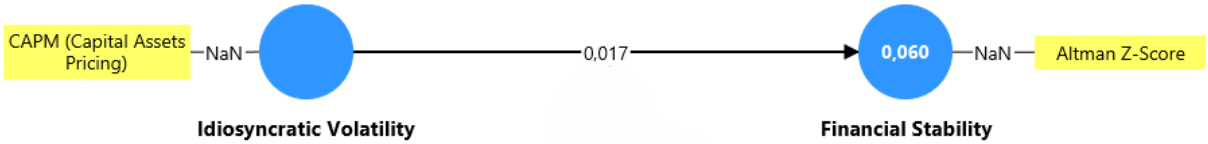


Figure 3. Structural Model SmartPLS ver 4.1.1.6

Table 4. Signifikansi Test

Hipotesis	Original sample (O)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Idiosuncratic Volatility -> Financial Stablity	0,156	0,065	2,394	0,017

The results of hypothesis testing based on the SmartPLS path coefficient analysis show mixed findings regarding the determinants of corporate financial stability. Idiosyncratic volatility is found to have a significant effect on financial stability, with a path coefficient value of 0.156, a t-statistic of 2.394, and a p-value of 0.017. Although the effect is statistically significant, the positive coefficient contradicts the negative direction proposed in the hypothesis; therefore, the hypothesis is rejected. This result indicates that idiosyncratic volatility does not reduce financial stability as initially expected.

Song (2008) states that the negative relationship between idiosyncratic volatility and financial distress only occurs when firms experience extremely severe distress conditions. Meanwhile, the study by Ray and Chen (2010) supports the findings of this research, showing that the negative effect of idiosyncratic volatility weakens when the level of distress and firm leverage are taken into account. The argument of Chen (2010) is further reinforced by Ang et al. (2006). Although Ang et al. (2006) find that idiosyncratic volatility negatively affects financial stability, the direction of the relationship may change depending on other firm-specific factors. Bollerslev et al. (2009) support Ray and Chen (2010), stating that idiosyncratic volatility is negatively related to financial stability when firms experience extreme distress. Bollerslev et al. (2009) explain that distressed firms contain high shock volatility effects, so the negative relationship originates from unexpected volatility. In contrast, in this study, the shock volatility effect or extreme values in the data were tested using skewness analysis to ensure reliable bootstrapping results. This procedure suppresses the

shock effect, leaving a more stable and anticipated risk component (expected volatility).

Based on signaling theory proposed by Michael Spence (1973), market indicators such as stock return volatility function as signals that convey information about firm-specific conditions to investors. In general, high idiosyncratic volatility is often interpreted as a negative signal because it reflects uncertainty, firm-specific risk, or potential financial distress (Ang et al., 2006; Connelly et al., 2011). Within this framework, an increase in volatility should be associated with a decline in financial stability.

However, the findings of this study indicate that such an interpretation does not always apply. Volatility does not merely signal weakening corporate fundamentals, but may also reflect market adjustments and responses to new information. On the other hand, financial stability represents the firm's internal structural condition (Campbell & Malkiel, 2000), whereas idiosyncratic volatility reflects market perceptions and responses (Fama & French, 1987; Pastor, 2002). The differing characteristics of these two variables help explain why the relationship found in this study does not indicate a decline in financial stability as volatility increases.

CONCLUSION

This study aims to analyze the effect of idiosyncratic volatility on corporate financial stability in the context of global economic turbulence during the 2018–2024 period. The empirical results indicate that idiosyncratic volatility has a significant effect on financial stability, but with a positive direction of relationship. This finding suggests that an increase in firm-specific risk does not automatically reduce financial stability, particularly for companies that remain fundamentally sound throughout the observation period.

These results confirm that idiosyncratic volatility does not always represent financial fragility; rather, it may reflect market dynamics and investor responses to firm-specific information. Thus, the relationship between idiosyncratic volatility and financial stability is contextual and highly influenced by the firm's fundamental condition.

Theoretically, this finding reinforces the perspective that market-based risk measured by stock returns and accounting-based financial stability indicators do not necessarily move in the same direction. Therefore, idiosyncratic volatility is more appropriately understood as an indicator of market risk perception rather than as a direct determinant of corporate financial instability. This study implies that under relatively healthy corporate conditions, idiosyncratic volatility does not weaken financial stability, but instead reflects information dynamics and market expectations regarding the firm's prospects.

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