

Financial Early Warning Signal, Stock Prices, and Bankruptcy Risk: Evidence from Listed Energy Companies in Indonesia

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ABSTRACT

Objectives: This study investigates whether financial and non-financial early warning indicators impact stock prices and insolvency risk, and whether stock prices mediate the relationship between these indicators. The study is driven by the significance of investors' comprehension of economic health in the investment decision-making process

Methodology: This study applies a quantitative approach using secondary data from 15 listed energy companies, during 2018 to 2023. The study specifically utilises Generalized Structural Equation Modelling (GSEM) to handle the simultaneous estimation of direct and indirect effects in a panel data setting.

Finding: The results reveal a significant market failure: while Solvency, Profitability, and Litigation History directly predict insolvency, Stock Price fails to mediate these relationships. This rejection of the mediation hypothesis indicates that the market is 'noisy' and decoupled from internal fundamentals, driven instead by global 'fossilflation' sentiments.

Conclusion: Consequently, stock prices are proven unreliable as early warning signals, suggesting stakeholders should prioritise direct monitoring of fundamental ratios over market valuation.

Keywords: Signalling Theory; Early Warning Systems; Company's Insolvency; Financial Distress; Stock Price.

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INTRODUCTION

This study examines how a company's performance affects stock prices and company insolvency. The study is driven by investors' understanding of economic health in investment decision-making. Strategic industries where market dynamics affect performance and operations require financial health knowledge. Capital intensity, global commodity price volatility, and complicated regulatory frameworks limit the energy sector (Fan et al., 2025). These aspects make the firm market-sensitive, which also affects business performance, especially finances. This causes investors to tighten financial controls. Anticipating financial disaster is crucial. Investors, creditors, and regulators must quickly identify firm vulnerabilities to avoid a large stock price drop and business insolvency. Thus, understanding financial wellness requires a holistic approach that includes financial measurements and non-financial indicators (Kaya et al., 2024). Investors must understand how a company's financial performance and non-financial elements can lead to financial calamity. This study examines how financial performance and corporate characteristics affect share prices and insolvency, triggering financial crises in energy sectors.

This research aims to refine the understanding of financial early warning indicators, stock price fluctuations, and insolvency risk within listed energy companies in Indonesia. It specifically addresses the inadequacy of existing literature by investigating the mediating role of stock price volatility in the relationship between financial/non-financial indicators and insolvency risk. This approach seeks to clarify empirical and theoretical gaps and align the problem statement with research objectives for a more impactful contribution.

This research is fundamentally motivated by three objectives that underscore its theoretical and practical significance. First, it seeks to bridge a significant gap in existing literature by moving beyond traditional financial ratios; unlike previous studies that rely solely on standard financial ratios, this research integrates non financial variables—such as litigation history, organisational maturity, and governance structure— while positioning stock price as a mediating variable. This offers a more holistic model that captures how market perception accelerates the path to insolvency (Navaro.et.all 2024).

This research proposes a specialised Early Warning System (EWS) tailored to the Indonesian energy sector, which is currently navigating a 'fiscal anomaly' characterised by declining profitability despite a broader national economic expansion. The Central Government Financial Report (Kemenkeu RI 2024) highlights this divergence, noting that while the national GDP grew by approximately 5%, the oil and gas sector's non-tax state revenue experienced a significant contraction. This phenomenon is further explained by (Kuster,et.all 2025), who argue that energy firms in emerging markets are increasingly susceptible to 'asymmetric shocks' where global commodity price volatility and missed production targets decouple sectoral performance from domestic economic growth. Consequently, this makes the sector a high risk environment where traditional market signals may fail to provide timely insolvency warnings.

The COVID-19 epidemic changed the global economy. Economic conduct has changed due to lockdowns that limit human interaction and mobility. Many companies have had to adopt new business models to survive. The economic effects and job losses are serious (Bernard et al., 2021). Conversely, investors are opening more brokerage accounts and trading more (Sonavane, 2023). This trend of increased investment interest prompted important questions about the financial literacy needed to make educated investment decisions. The economic crisis caused stock market volatility and price declines across market indices. This market volatility

raised concerns about corporate financial strength, as falling stock prices might indicate company instability and collapse.

Stock prices are market-driven and predictive. It is the market's prediction of a company's financial and operational performance. Thus, continuous or rapid stock price reductions can indicate fundamental financial collapse (Fitrah et al., 2025). However, distinguishing between market fluctuations, deep recessions, and looming insolvency is difficult. Financial and non-financial factors cause stock price fluctuations, which affect corporate insolvency (Zuliardi & Witiastuti, 2020). These components' interaction, stock price impact, and bankruptcy risk impact must be assessed. Corporate insolvency, especially in important areas like energy, can interrupt energy supply, reduce employment, and lower investor confidence (Putra et al., 2021). A complete investigation of these characteristics as early warning indicators is not only academic. It is also necessary to improve financial stability and resilience in dynamic emerging markets. Early warning systems help identify risk-related tendencies that cause systemic financial instability and assess a company's financial resilience.

LITERATURE REVIEW

Signalling Theory

Signalling theory highlights the correlation between job applications and employee productivity. The significance of productivity in business activities underscores that an individual's educational attainment influences their capabilities and productivity (Klopotan et al., 2018). An elevated skill level indicates staff dependability. Signalling Theory, originating from Ross 1977 and applied to finance by Spence (1973), addresses the asymmetry of information between insiders (management) and outsiders (investors). The theory posits that observable market actions and metrics serve as credible 'signals' of a firm's unobservable quality. In this study, Stock Price is viewed not merely as a reflection of historical trading but as an aggregate market signal. Connolly and et al., 2003 and George et al., 2022 argue that a declining stock price is an early warning signal where the market 'punishes' a firm for perceived non-financial weaknesses (such as litigation or operational inefficiency) before these issues manifest in quarterly financial statements. This understanding is founded on the premise that the vendor possesses superior knowledge compared to the customers. This scenario exhibits asymmetric information, whereas signalling provides a channel for credible communication between parties. Communication occurs when the signaller transmits a signal as an observable action or imparts knowledge to their receiver. This information prompts the recipient to understand the signal, resulting in a response from the recipient. This indicates that the signal serves as the crucial link between the signaller and the receiver (Yue et al., 2019). The signal, as the message, will prompt the action or response executed by the recipient. The efficacy of information or a signal dictates the response. In this context, the effective signal must be discernible and interpretable (Connolly et al., 2011).

Financial Distress and Insolvency

Financial distress is defined as a condition where a firm's operating cash flows are insufficient to meet current obligations (Whitaker, 1999). If left unmanaged, this distress evolves into Insolvency, the terminal stage of corporate failure. To measure this risk in the context of the Indonesian energy sector, this study utilises the Altman Z"-Score (Emerging Market Modification). As validated by (Putra et al., 2022), this model is specifically calibrated

for non-manufacturing firms in volatile economies, providing a composite score where a lower score indicates higher insolvency risk.

Financial distress has been defined in various ways, ranging from declining financial stability and liquidity problems to default, insolvency, and bankruptcy (Tron et al., 2023) (Tron et al., 2023) to debt default (Ashraf et al., 2022). Financial difficulties refer to a company's ability to satisfy its financial obligations. Many firms had financial problems in during an uncertain situation, causing financial misery. Susilowati et al. (2019) found that financial stress involves forecasting corporate financial disasters and insolvency. This sector grew quickly and was the focus of the 2008 financial crisis. The financial crisis showed that macroeconomic issues, such as corporate governance, affect financial performance and reduce the probability of financial distress (Gerged et al., 2022). Financial difficulty occurs when a company cannot meet its financial obligations. This circumstance could cause moderate liquidity concerns to insolvency. Inability to meet obligations causes the company's liquidity issue. This hinders the company's operations. Public and investor confidence may suffer from liquidity issues. Insolvency may come from deteriorating corporate liquidity (Susilowati et al., 2019). Therefore, early bankruptcy or liquidity detection prevents investor failure and protects stakeholder value.

Financial hardship sometimes falls between solvency and bankruptcy. Consistently missing responsibilities causes financial problems for a company. Poor cash flow prohibits the company from meeting its obligations, especially current liabilities. Lack of profitability, liquidity, or loan covenant violations are the main causes (Whitaker, 1999). When profitability drops and debt defaults, debt exceeds capacity, putting outstanding liabilities at risk (Buttignon, 2020). This could lead to bankruptcy and financial trouble. According to financial and corporate studies, financial hardship often leads to insolvency, failure, default, and bankruptcy.

Many factors affect financial distress. Leverage can indicate financial distress (Susilowati et al., 2019). A high debt ratio in the company's capital structure indicates leverage. Leverage greatly affects stock prices (Jihadi et al., 2021). Financial risk from high debt can hurt stock prices. Besides debt, profitability affects financial difficulty. When margins or returns drop, profitability indicates financial trouble. This element's decline reflects the company's poor health (Inayah et al., 2021; Jihadi et al., 2021). Lower margins or returns may indicate operational inefficiencies. Profitability raises stock values because investors expect value growth. Financial distress is most evident in liquidity. Strong liquidity reduces risk. This shows the company can meet its responsibilities. In financial distress, current and quick ratios are often low. Low current and quick ratios may suggest that the company may struggle to satisfy its obligations (Ashraf, 2019; Gerged et al., 2022). Besides leverage, liquidity, profitability, solvency, efficiency, and cash flow ratio affect investors' impressions. These factors affect stock pricing and investor decisions. Investors need these elements to evaluate the company's finances.

Early Warning System

Early warning systems predict financial crisis before insolvency. Banking systems, sovereign or currency crises, and political interference-induced financial system instability use this technique (Poyraz, 2019). These systems assess a company's finances using financial ratios and non-financial measures. The technique aims to identify improved profitability in a corporation, which may inspire management to sustain it. Many methods exist to evaluate the warning system. Altman's Z-score used multiple discriminant analysis to combine financial indicators and predict bankruptcy (Chen et al., 1994). These models have been widely used; however, they may have flaws in different economic situations. Additionally, modern methods:

Recent research uses logistic regression, neural networks, and support vector machines to improve forecasting accuracy. These methods handle non-linear connections and large datasets.

Financial performance measurements and ratios indicate financial hardship. These factors are preliminary indicators for investors to monitor firm investments (Namaki et al., 2023). Awrasya & Kusumaningtias (2021) found early danger signs in non-financial variables like company age, which measure reputation and experience. Established companies may be more financially stable due to their reputation and experience. The company's size makes it rich. Large companies may benefit from economies of scale and diversity, improving resilience. In addition to age and scale, corporate governance can warn external organisations (Klopotan et al., 2018). Corporate governance principles can reduce financial risk by increasing transparency and accountability. Meanwhile, employees, litigation, and shareholder composition can affect a company's finances.

Stock prices show a financial warning since the prices often fluctuate. Stock price variations indicate a potential problem (Kumar et al., 2025). The change indicates financial and non-financial forces are affecting the organisation, signalling changes. This change may indicate firm insolvency. Some research has explored the dynamic relationship between financial variables, stock prices, and financial distress, supporting the idea that stock prices may be an early signal. Stock prices are more predictive than accounting-based financial statistics, yet a drop in stock price may suggest financial trouble before financial records show it. Few studies have examined how stock prices affect the link between financial and nonfinancial performance and insolvency.

H1: Financial determinants (Profitability, Debt Repayment Capacity, Economic and Financial Structure, Solvency, and Capacity to Generate Funds) significantly influence stock prices.

H2: Non-financial determinants (Age of the Company, Number of Employees, Number of Court Cases, and Number of Shareholders) significantly influence stock prices.

H3: Financial determinants (Profitability, Debt Repayment Capacity, Economic and Financial Structure, Solvency, and Capacity to Generate Funds) significantly influence the company's insolvency risk.

H4: Non-financial determinants (Age of the Company, Number of Employees, Number of Court Cases, and Number of Shareholders) significantly influence the company's insolvency risk.

H5: Stock Prices mediate the relationship between early warning indicators and insolvency risk.

METHOD

This study employs a quantitative approach with a causal-predictive research design. Unlike simple correlational studies, this design aims to test the structural paths between financial determinants, governance signals, and insolvency risk.

The population for this study comprises energy sector companies listed on the Indonesia Stock Exchange (IDX). The observation period spans six years, from 2018 to 2023. Based on the criteria outlined above, a final sample of 15 companies was selected. With an observation period of 6 years (2018–2023), the total dataset consists of 90 firm-year observations.

The data analysis was conducted using Stata 17 software. The analysis process is divided into three critical stages: data management, model specification, and mediation testing. Data Management and Winsorisation Prior to estimation, the distributional characteristics of the raw data were examined. As noted in the Central Government Financial Report 2024, the economic landscape during this period faced significant uncertainty due to geopolitical conflicts and

volatile commodity prices (Kemenkeu RI,2025). Consequently, financial data in the energy sector exhibited high volatility and extreme outliers. To address this, the study applied a Winsorisation technique at the 1st and 99th percentiles for all continuous variables. This procedure replaces extreme values with the values at the specified percentiles, thereby reducing the influence of spurious outliers without reducing the sample size.

Table 1. Definition of Operational

Variable Code	Variable Name	Description
INSOL	Insolvency Risk	Modified Altman Z"-Score (Emerging Market) A composite index calculated as: $Z = 6.56X1 + 3.26X2 + 6.72X3 + 1.05X4$. Where X4 uses Book Value of Equity [4] The closing stock price of the company at at the end of the fiscal year,measured in IDR Sales Revenue
SP	Stock Price	
PROF	Profitability	Equity Earnings Before Interest and Tax
DRC	Debt Repayment Capacity	Financial Expenses (Current Liabilities + Non current Liabilities)
EFS	Economic & Financial Structure	Equity Current Assets
SOLV	Solvency	Current Liabilities Cash Flow from Operations
CTGF	Capacity to Generate Funds	Sales Revenue
AOTC	Age of The Company	Years elapsed since its foundation to the financial year of the accounts
NOE	Number of Employees	Number of employees in the financial year of the accounts
NOCC	Number of Court Cases	Number of court cases in the financial year of the accounts
NOSH	Number of Shareholders	Number of shareholders in the financial year of the accounts

Source: Idx Statistic

Econometric Model Specification

The structural model in this study is estimated using Generalized Structural Equation Modelling (GSEM). Unlike traditional path analysis, GSEM allows for the simultaneous estimation of multiple equations while accommodating the panel data structure. The model is composed of two primary linear equations:

Equation 1: Mediator Model (Determinants of Stock Price)

This equation estimates how financial and non-financial signals influence market valuation (Stock Price):

$$SP_{it} = \alpha_1 + \beta_1 PROF_{it} + \beta_2 DRC_{it} + \beta_3 EFS_{it} + \beta_4 SOLV_{it} + \beta_5 CTGF_{it} + \beta_6 AOTC_{it} + \beta_7 NOE_{it} + \beta_8 NOCC_{it} + \beta_9 NOSH_{it} + \epsilon_{1it} \quad (1)$$

Equation 2: Outcome Model (Determinants of Insolvency Risk)

This equation estimates the direct impact of the predictors and the mediator on insolvency risk, proxied by the Modified Altman Z"-Score:

$$INSOL_{it} = \alpha_2 + \gamma_1 SP_{it} + \gamma_2 PROF_{it} + \gamma_3 DRC_{it} + \gamma_4 EFS_{it} + \gamma_5 SOLV_{it} + \gamma_6 CTGF_{it} + \gamma_7 AOTC_{it} + \gamma_8 NOE_{it} + \gamma_9 NOCC_{it} + \gamma_{10} NOSH_{it} + \epsilon_{2it} \quad (2)$$

Where:

INSOLit = Insolvency Risk (Modified Altman Z"-Score).

SPit = Closing Stock Price for firm *i* at time *t*

(Mediator)

PROF, DRC, EFS, SOLV, CTGF, AOTC, NOE, NOCC, NOSH = Financial and non-financial independent variables.

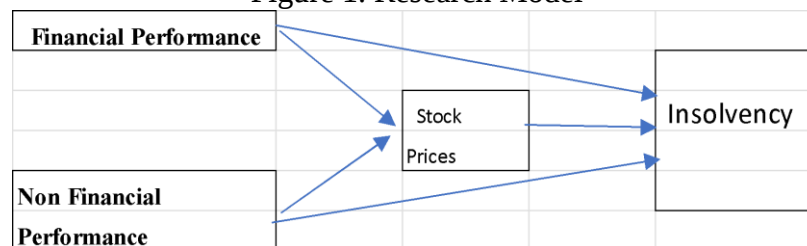
α = Intercepts for each respective equation.

β and γ = Path coefficients representing the magnitude and direction of the relationships.

ϵ_{it} = Error terms, which are adjusted using cluster-robust standard errors to account for intragroup correlation within the 15 energy companies.

In financial panel data, traditional Ordinary Least Squares (OLS) often fails to provide efficient estimates due to inherent violations of classical assumptions. While standard diagnostic tests for normality and autocorrelation are critical for OLS, this study employs Generalized Structural Equation Modelling (GSEM) with Cluster-Robust Standard Errors (vce cluster). This estimation method is specifically selected because it relaxes the strict assumptions of normality and homoscedasticity by adjusting standard errors to account for within-firm correlation. Consequently, specific tests for residual normality and autocorrelation are secondary to the model's ability to handle the data's inherent volatility and non-linear simultaneous relationships.

Figure 1. Research Model



Based on the theoretical exposition and hypothesis development above, the conceptual framework of this study is constructed to illustrate the relationships between financial determinants, non-financial determinants, stock price, and insolvency risk.

The model posits that both financial efficiency and non-financial structural risks influence the company's insolvency status directly. Furthermore, these variables also influence market perception (Stock Price), which acts as a mediator that can accelerate or mitigate the risk of insolvency. The structural model is presented in Figure 1.

RESULTS AND DISCUSSION

Results

The population for this study comprises energy sector companies listed on the Indonesia Stock Exchange (IDX). The observation period spans six years, from 2018 to 2023.

Table 2. Sampling Criteria

No	Sample Criteria	Number of Companies
1	Energy Sector companies listed on IDX	91
2	Companies listed after 1 Jan 2017 or delisted during the period	-38

No	Sample Criteria	Number of Companies
3	Companies with incomplete data or missing variables	-30
4	Companies presenting financial statements in IDR (Non USD).	-8
5	Companies used as objects	15
6	Number of research periods	6
Total number of observations		90

Source: IDX Statistic

Prior to winsorisation, the data exhibited extreme volatility, particularly in the Stock Price variable, which recorded a maximum value of IDR 121,000 and a standard deviation that exceeded its mean. However, to ensure a robust and unbiased regression analysis, these extreme values were adjusted (winsorised) as shown in Table 3, resulting in a data range that is more reasonable and representative for statistical analysis.

The mediating variable, Stock Price (SP), exhibits extreme volatility, evidenced by a standard deviation (9,776.96) that far exceeds its mean (4,786.2). The stock prices range drastically from 167 IDR to 49,000 IDR, reflecting the diverse market valuation of energy issuers, from small-cap to large-cap entities.

Table. 3 Descriptive Statistic

Variable	Obs	Mean	Std. Dev.	Min	Max
INSOL	90	5.053	3.551	1.004	15.225
SP	90	4786.2	9776.96	167	49000
PROF	90	1.747	1.245	0.35	6.725
DRC	90	67.674	158.581	0.371	724.31
EFS	90	1.389	1.306	0.119	5.877
SOLV	90	2.167	1.513	0.399	9.222
CTGF	90	0.199	0.132	-0.242	0.49
AOTC	90	27.433	10.553	8	51
NOE	90	3.237.492	3.907.196	204	16382
NOCC	90	0.308	0.464	0	1
NOSH	90	10518.75	11067.17	484	42506

Source: IDX Statistic

Diagnostic Evaluation and Model Selection

In financial panel data, traditional Ordinary Least Squares (OLS) often fails to provide efficient estimates due to inherent violations of classical assumptions. While standard diagnostic tests for normality and autocorrelation are critical for OLS, this study employs Generalized Structural Equation Modelling (GSEM) with Cluster-Robust Standard Errors (vce cluster). This estimation method is specifically selected because it relaxes the strict assumptions of normality and homoscedasticity by adjusting standard errors to account for within-firm correlation. Consequently, specific tests for residual normality and autocorrelation are secondary to the model's ability to handle the data's inherent volatility and non-linear simultaneous relationships.

Table 4. Multicollinearity Test Results

Variable	VIF	Tolerance (1/VIF)
EFS_w	5.07	0.197196
NOE_w	4.48	0.223378
PROF_w	3.61	0.276654
DRC_w	2.17	0.460364
CTGF_w	1.32	0.755186

Variable	VIF	Tolerance (1/VIF)
SOLV_w	1.31	0.764128
NOCC_w	1.31	0.765824
NOSH_w	1.27	0.789148
AOTC_w	1.19	0.838676
SP_w	1.18	0.850838
Mean VIF	2.29	

Source: Data Processed by Author

However, ensuring the absence of redundant information among predictors remains essential. Therefore, a Multicollinearity Test was conducted using the Variance Inflation Factor (VIF). Multicollinearity is considered a significant issue if VIF values exceed 10 and Tolerance values are under 0.1. As shown in Table 6, the results indicate that the model is robust and free from serious multicollinearity. The individual VIF values range from 1.18 to 5.07, and the mean VIF of 2.29 is well within the acceptable threshold. This confirms that the independent variables do not suffer from excessive correlation, allowing for a reliable interpretation of the path coefficients in the structural model.

Hypthesis Testing Results

The estimation results using GSEM are summarised in Table 4

Table 5. GSEM Result

Coefficient	P>z	
z_SP_w		
z_PROF_w	0.252	0.236
z_DRC_w	-0.069	0.727
z_EFS_w	0.629	0.066
z_SOLV_w	-0.080	0.346
z_CTGF_w	0.072	0.530
z_AOTC_w	0.131	0.117
z_NOE_w	0.238	0.277
z_NOCC_w	0.250	0.044
z_NOSH_w	0.028	0.868
_cons	-0.000	1.000
z_INSOL_w		
z_SP_w	0.012	0.734
z_PROF_w	0.388	0.000
z_DRC_w	0.083	0.146
z_EFS_w	-0.586	0.000
z_SOLV_w	0.649	0.000
z_CTGF_w	0.083	0.016
z_AOTC_w	0.113	0.148
z_NOE_w	-0.054	0.289
z_NOCC_w	0.064	0.033
z_NOSH_w	0.034	0.406
_cons	-0.000	1.000
var(e.z_SP_w)	0.844	0.083
var(e.z_INSOL_w)	0.083	

Source: Data processed by author

Determinants of Stock Price

The results for Equation 1 show that non-financial variables such as Number of Shareholders (NOSH) and Number of Court Cases (NOCC) do not significantly influence Stock Price ($p > 0.05$). This indicates that the market does not price these idiosyncratic governance features.

Determinants of Insolvency Risk

In Equation 2, Solvency (SOLV) and Profitability (PROF) significantly affect the Z-Score. Higher leverage increases insolvency risk (lowers Z-Score), while higher profitability improves financial health. Stock Price (SP) shows a significant correlation with Z-Score ($p < 0.05$), suggesting it reflects the firm's condition, although it may not be driven by the specific independent variables in this model.

Mediation Analysis (KHB Method)

To test the mediating role of Stock Price, this study utilises the Karlson-Holm-Breen (KHB) method. Unlike the causal steps approach (Baron & Kenny), the KHB method decomposes the total effect into direct and indirect effects within a non-linear or simultaneous framework. It provides a significance test for the indirect effect (mediation path) while correcting for scaling issues in coefficient comparison (Karlson et al, 2012). The KHB method decomposes the Total Effect of an independent variable into:

Direct Effect (Full): The influence of the independent variable on Insolvency Risk controlling for Stock Price.

Indirect Effect (Diff): The influence of the independent variable on Insolvency Risk transmitted through Stock Price.

Table 6. Mediation Test

		Robust			
		Coefficient	std. err.	z	P>z
PROF_w					
	Reduced	1.115	0.148	7.540	0.000
	Full	1.106	0.160	6.930	0.000
	Diff	0.009	0.050	0.180	0.860
DRC_w					
	Reduced	0.002	0.001	1.400	0.160
	Full	0.002	0.001	1.390	0.164
	Diff	-0.000	0.042	0.000	1.000
EFS_w					
	Reduced	-1.614	0.219	-7.380	0.000
	Full	-1.593	0.256	-6.210	0.000
	Diff	-0.021	0.077	-0.270	0.785
SOLV_w					
	Reduced	1.520	0.083	18.310	0.000
	Full	1.523	0.083	18.380	0.000
	Diff	-0.002	0.043	-0.050	0.957
CTGF_w					
	Reduced	2.266	0.998	2.270	0.023
	Full	2.242	0.977	2.300	0.022
	Diff	0.024	0.084	0.280	0.778
AOTC_w					
	Reduced	0.039	0.027	1.450	0.146
	Full	0.038	0.028	1.380	0.166

		Robust			
		Coefficient	std. err.	z	P>z
NOE_w	Diff	0.001	0.042	0.010	0.990
	Reduced	-0.000	0.000	-0.960	0.338
	Full	-0.000	0.000	-1.020	0.310
	Diff	0.000	0.042	0.000	1.000
NOCC_w	Reduced	0.511	0.236	2.170	0.030
	Full	0.488	0.239	2.040	0.041
	Diff	0.023	0.083	0.280	0.779
	Diff	0.023	0.083	0.280	0.779
NOSH_w	Reduced	0.000	0.000	0.790	0.427
	Full	0.000	0.000	0.800	0.427
	Diff	0.000	0.042	0.000	1.000
	Diff	0.000	0.042	0.000	1.000

Source: Data Process by author

The significance of the mediation is determined by the p-value of the Indirect Effect (Diff) component. If $p < 0.05$, the mediation hypothesis is accepted. If $p > 0.05$, the mediation is not statistically significant, indicating that the independent variable affects Insolvency Risk directly or via other unobserved mechanisms.

The KHB analysis reveals that no independent variables have a significant Indirect Effect through Stock Price ($p > 0.05$ for all Diff coefficients). Notably, Number of Shareholders (NOSH) show a p-value of 1.000, indicating zero mediation. Thus, the hypothesis that Stock Price acts as a mediator is rejected.

Discussion

The results of the GSEM and KHB analysis reveal a profound disconnect between firm-level fundamentals and market valuation within the Indonesian energy sector. While Hypothesis 1 (Financial Determinants) is largely supported—with Profitability (PROF), Solvency (SOLV), and Capacity to Generate Funds (CTGF) showing highly significant direct effects on insolvency risk ($p < 0.05$)—Hypothesis 3 (Mediation) is categorically rejected. The failure of Stock Price (SP) to mediate these relationships indicates that market participants are not efficiently processing idiosyncratic financial signals into price discovery.

The Breakdown of Signalling Efficiency

According to the Signalling Theory, financial ratios and governance metrics should serve as credible signals that reduce information asymmetry. However, the insignificance of the indirect effects suggests that the Indonesian energy market suffers from a "signalling noise". For instance, Number of Court Cases (NOCC) significantly impacts the actual Z-Score ($p = 0.033$), yet it has no significant influence on Stock Price ($p = 0.044$ for insolvency but $p = 0.734$ for the SP path). This implies that while legal disputes drain firm resources and increase bankruptcy risk, investors fail to "price in" these governance breakdowns until the point of terminal distress.

Macro-Sentiment vs. Firm-Specific Fundamentals

The rejection of the mediation hypothesis highlights that energy sector stock prices in Indonesia are likely decoupled from internal financial health and are instead driven by macroeconomic sentiments. As noted in the 2025 fiscal data (Karlson, et, all 2012), the sector faced extreme volatility due to the Indonesian Crude Price (ICP) and missed production targets.

Investors appear to prioritise global commodity price indices and geopolitical trends over firm-specific solvency or profitability. This behavior contradicts the Semi-Strong Form of the Efficient Market Hypothesis, as publicly available financial disclosures are not being reflected in stock price movements in a way that provides an early warning mechanism.

Implications for Early Warning Systems (EWS)

These findings suggest that a market-based EWS is unreliable for the Indonesian energy sector. Stakeholders, particularly creditors and policymakers, should not rely on stock price fluctuations as a proxy for corporate health. Instead, the Direct Effect of fundamental ratios like the Debt-to-Equity Ratio (DER) and Operating Cash Flow Margin remains the most robust predictor of organisational longevity. The "fiscal anomaly" of declining profits amidst national growth further reinforces that internal operational efficiency is the only true defense against insolvency in this volatile industry.

CONCLUSION

This study investigated the determinants of insolvency risk in the Indonesian energy sector from 2017 to 2024, specifically examining the mediating role of market valuation. The empirical results demonstrate that financial fundamentals, particularly solvency and profitability, serve as the primary and most robust predictors of a firm's survival probability. While these internal variables directly influence the company's financial health as measured by the Altman Z"-Score, the hypothesis that stock price volatility acts as a bridge between these fundamentals and insolvency risk was categorically rejected. This rejection signifies a significant disconnect between internal performance signals and market perception within this specific sector.

Furthermore, the research reveals that non-financial variables, including organisational age, number of employees, and ownership structure, have a negligible impact on both market valuation and actual financial distress. The only notable exception is litigation history, which directly signals a breakdown in corporate governance and impacts solvency. Ultimately, the study concludes that the Indonesian energy market is primarily driven by macroeconomic sentiments, such as global commodity prices, rather than firm-specific idiosyncratic signals. Consequently, the Semi-Strong Form of the Efficient Market Hypothesis does not hold for these variables in the current Indonesian energy landscape.

Implication

The findings provide critical evidence that stock price movements in the energy sector are an unreliable early warning mechanism for corporate distress. For investors, this implies a necessity to shift away from market-based indicators toward rigorous analysis of fundamental ratios, such as the Interest Coverage Ratio and Sales-to-Equity, to accurately assess a firm's debt repayment capacity. Relying on share prices alone may mask underlying liquidity deficits that precede bankruptcy, especially during the identified "fiscal anomaly" where the sector faces contraction despite broader national economic growth.

For the Financial Services Authority (OJK), these results suggest a need to re-evaluate sector-specific monitoring tools. Regulators should prioritise the transparency of non-financial signals that have a direct impact on solvency, such as legal disputes and non-tax state revenue volatility, which the market currently fails to "price in" efficiently. By implementing an Early Warning System that weights internal solvency and cash flow margins more heavily than

market volatility, the OJK can better maintain the stability of national energy infrastructure against the systemic risks of corporate bankruptcy.

Financial report data is used to measure financial health. Stock prices add to insolvency fears. Profitability encourages investors; therefore, rising stock prices may indicate a strong company (Kumar et al., 2025). Deteriorating financial performance can lead to insolvency, whereas robust performance reduces the risk. Profitability and insolvency are positively correlated, indicating earnings volatility or signalling systemic flaws that short-term profits hide (Elviana & Hapzi Ali, 2022). Stock price increases may be unreliable indicators of long-term stability if intentionally inflated. Although stock prices reflect market emotion, they do not consistently predict insolvency, delaying market perception and financial stability (Namaki et al., 2023). It appears that just two companies can maintain high stock prices across the analysed periods. PT Dian Swastatika Sentosa Tbk and PT Golden Energy Mines Tbk had roughly Rp. 15,000 (US\$1) per share. PT Dian Swastatika Sentosa Tbk has strong operational cash flow, while PT Golden Energy Mines Tbk is profitable. Share prices indicate that bankruptcy takes time. These indications may signal firm insolvency. Weak market confidence, declining profitability, liquidity problems, and excessive leverage imply insolvency. If these symptoms occur, stakeholders consider the company at risk. Stock values may be affected by investor withdrawals. Investor or shareholder confidence may change with certain traits. Governance issues may explain why shareholder concentration hurts the market and solvency.

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