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Research Paper

DOES FINANCIAL DISTRESS LEAD TO CORPORATE FRAUD?

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ABSTRACT

This research analyzes the effect of financial distress in encouraging corporate fraud. This study applies the panel regression analysis method in analyzing data on 210 companies collected from companies on the Indonesia Stock Exchange (IDX) during 2015-2019. Based on the results of descriptive statistical tests, on average, companies listed on the IDX are not indicated to have financial distress and also not indicated to have committed corporate fraud. The results of the hypothesis test in this study provide empirical evidence that financial distress, especially with the indicator measurement of Z-score, Zmijewski Score and Grover Score, has a significant effect on corporate fraud. Among all the indicators for measuring financial distress, the Grover score is the indicator that has the greatest influence on corporate fraud. Development of the conceptual framework and indicators re-grouping in measuring financial distress may have theoretical implications for the development of future financial distress and corporate fraud theories.

Keywords: Grover Score, F-score, Springate Score, Zmijewski Score, Z-Score

JEL code: G01, K42, M41, O16, O53

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INTRODUCTION

Financial statements serve as a crucial source of information for investors and creditors in making financial decisions, and also function as a tool for companies to attract potential funding (Rostami & Rezaei, 2022; Tang & Fiorentina, 2021). Nevertheless, when a company is experiencing financial difficulties, this unfavorable condition will be reflected in its financial reports. Such disclosures may lead to a loss of investor or creditor confidence. To prevent this and maintain access to funding, companies may resort to various strategies to conceal their actual financial condition (Meiliana et al., 2024).

One of the most famous corporate fraud cases is Enron Corporation in 2001. The bankruptcy of Enron Corporation caused huge losses to stakeholders. Investors suffered losses reaching tens of billions of dollars due to the decline in stock prices from US$ 90.75 per share in mid-2000 to US$ 0.40 per share at the end of 2001. Added to this was the negligence of the public accounting firm Arthur Andersen, known as "the big five" largest public accounting firms in the world, in carrying out its duties as the external auditor of Enron Corporation (Healy & Palepu, 2003).

This scandal triggered widespread public distrust in the stock market and pushed the U.S. government to enact the Sarbanes-Oxley Act (SOX) of 2002 to enhance the accuracy and reliability of corporate financial reporting. Consequently, efforts to develop and implement good corporate governance mechanisms intensified globally. A survey by (Pricewaterhousecoopers, 2016) found that 44% of companies believed law enforcement agencies lacked sufficient resources to eradicate economic crime, leaving much of the burden of prevention and detection to corporations themselves. This reinforces the importance of consistent governance implementation as a proactive approach to anticipating and preventing fraud.

Given the severe impact of corporate fraud on economies, many governments and regulators have introduced various policies to detect and mitigate such misconduct. In the U.S., significant regulations include the Foreign Corrupt Practices Act (FCPA) of 1977, OECD Anti-Bribery Convention of 1997, and SOX of 2002, all aimed at enhancing transparency and accountability. The UK, similarly, enacted the Proceeds of Crime Act (POCA) of 2002, the UK Bribery Act of 2010, and further reforms following the LIBOR and FX scandals, such as the Financial Services Act of 2012 and Banking Reform Act of 2013 (Johnson, 2021). The cases described above show that financial statement fraud still exist until now.

Empirical research shows that corporate fraud is often preceded by signs of financial distress (Maccarthy, 2017). (Halteh & Tiwari, 2023) argue that predicting financial distress can be a proactive way of combatting financial crime. Their study integrates financial distress indicators into fraud risk frameworks using advanced machine learning techniques. This suggests that the early identification of financially distressed firms could be valuable for fraud detection and prevention. This perspective emphasises the importance of clear methodological boundaries and encourages the development of integrated models that can distinguish between firms at risk of failure and those likely to engage in fraudulent behaviour.

It is this conceptual and methodological gap that forms the basis of the present study. While previous research has examined distress and fraud separately, few studies have undertaken a comparative analysis of financial distress models in the context of fraud detection specifically. As (Halteh & Tiwari, 2023) have highlighted, aligning distress prediction with fraud prevention offers a promising, data-driven strategy for mitigating financial misconduct.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

This study attempts to provide empirical evidence regarding the influence of financial distress conditions on a company in encouraging the company to commit corporate fraud. (Habib et al., 2018) categorize financial distress in companies into 4 (four) general categories, namely:

1. Failure occurs when the realization of the investment return rate, after being adjusted for consideration of existing investment risks, produces a value that is significantly smaller when compared to the return rate of similar investments. Failure can also occur

when the income generated by the company is insufficient to cover the operational costs that the company must spend.

2. Insolvency indicates the company's inability to settle and/or pay off short-term debts to creditors. Insolvency will usually affect the company's liquidity level.
3. Bankruptcy is a condition in which a company submits an official legal declaration to the court to stop its operational activities and file for protection with the court against claims and/or bills from creditors. A bankruptcy declaration by a company can be real evidence that the company is experiencing financial distress.
4. Failure to pay debts (default) can be divided into 2 conditions, namely technical default which means the company violates the conditions and/or articles that have been regulated in the contract and legal default which means the company's failure to pay off debts, both principal installments and interest installments.

Research on the effect of financial distress on corporate fraud was conducted by (Johnson et al., 2009). In this study, (Johnson et al., 2009) found a positive relationship between financial distress and corporate fraud. (Jia et al., 2009) also conducted a study to analyze the effect of financial distress on the possibility of corporate fraud. In this study, (Jia et al., 2009) concluded that entities that implement corporate fraud have a significantly more substantial debt composition when compared to non-fraud entities.

(Donelson et al., 2016; Nelson, 2012a, 2012b) also studied the effect of financial distress on corporate fraud. The results of these three studies concluded that there was a significant effect between the financial distress variable and corporate fraud. The results of the studies by (Donelson et al., 2016; Nelson, 2012a, 2012b) are consistent with the conclusions of previous studies conducted by (Jia et al., 2009; Johnson et al., 2009).

(Hasnan et al., 2013) who continued the research of (Noor & Chin, 2002) also used the Altman Z-Score measurement to determine whether or not corporate fraud practices occurred in a company. In research in finance and accounting, prediction errors on a model can cause huge losses for potential investors, so the need for a reliable and consistent prediction model is the main objective in research in finance and accounting (Altman, Iwanicz-Drozdowska, Laitinen, & Suvas, 2017). Research conducted by (Altman et al., 2017) found that the Altman Z-Score can be applied in predicting financial distress in various conditions, both on a domestic and international scale.

(Maccarthy, 2017) in his research used the Altman Z-Score as a complementary pair with the Beneish M-score in detecting corporate fraud in companies. First, (Maccarthy, 2017) analyzed the Beneish M-score to determine whether the company's financial statements had been manipulated or not, and then continued with the use of the Altman Z-Score to evaluate the company's financial condition in a healthy or unhealthy condition. The results of this study concluded that the use of these two measurements, namely the Beneish M-score and the Altman Z-Score, simultaneously and more accurately in detecting corporate fraud in a company. (Maccarthy, 2017) also stated that the Altman Z-Score can only be effectively used in companies whose financial statements are not manipulated.

H1: Z-Score has a significant effect on the occurrence of corporate fraud.

(Rajasekar, Ashraf, & Deo, 2014) conducted a study on financial distress using the Springate score on state-owned companies in India. The study by (Rajasekar et al., 2014) found that these companies tend to experience financial distress when there is a delay in the distribution of fresh funds from the government to the company. The results of the study by (Rajasekar et al., 2014) concluded that in conditions of financial distress, the company experiences a working capital deficit and a large number of external bonds.

The effectiveness of using the Springate score in detecting financial distress in companies that run their businesses according to sharia law in Indonesia has been carried out by (Husein & Pambekti, 2014). In their study, (Husein & Pambekti, 2014) found that the Springate score can be effectively applied to detect financial distress in companies. The results of the study by (Husein & Pambekti, 2014) are in accordance with the conclusions in the study by (Imanzadeh et al., 2011).

In 2016, (Aminian, Mousazade, & Khoshkho, 2016; Fedorova et al., 2016) published their research results that tried to compare the use of Altman Z-Score and Springate score to detect financial distress in companies. The results of (Aminian et al., 2016)'s research showed that both Altman Z-Score and Springate score can be used significantly in detecting financial distress in companies. (Fedorova et al., 2016)'s research found that Springate score is most suitable for detecting financial distress in the information, communication, agriculture, finance and insurance sectors. The results of (Aminian et al., 2016)'s research also concluded that the use of Altman Z-Score is better than Springate score in detecting financial distress in companies.

H2: Springate score has a significant effect on the occurrence of corporate fraud.

Zmijewski score is a development of the Altman Z-Score model developed by (Zmijewski, 1984). (Imanzadeh et al., 2011) tried to continue (Zmijewski, 1984) research by examining the Zmijewski Score in companies in Iran. The results of (Imanzadeh et al., 2011) research concluded that the use of the Zmijewski score can be relevantly used to detect financial distress in companies.

The effectiveness of using the Zmijewski score in detecting financial distress in companies that run their businesses according to sharia law in Indonesia has been carried out by (Husein & Pambekti, 2014). In their research, (Husein & Pambekti, 2014) found that the Zmijewski score can be effectively used to detect financial distress in companies. (Husein & Pambekti, 2014) research also found that the Zmijewski score is superior to the Springate score in predicting financial distress in companies. The results of (Husein & Pambekti, 2014) research are inconsistent with the results of (Imanzadeh et al., 2011) research.

(Fedorova et al., 2016; Singh & Mishra, 2016) conducted research on the effectiveness of the Zmijewski score in detecting financial distress in companies. (Singh & Mishra, 2016) research revealed that the Zmijewski score can be used to detect the possibility of financial distress in companies. (Fedorova et al., 2016) research found that the Zmijewski score is most suitable for detecting financial distress in the Russian economy. (Singh & Mishra, 2016) research also concluded that it is necessary to develop existing financial distress prediction models to increase the level of model accuracy along with current developments.

(Aminian et al., 2016) research tries to compare the use of the Altman Z-Score, Springate score and Zmijewski score to detect financial distress in companies. The results of their research show that the three measurements, namely the Altman Z-Score, Springate score and Zmijewski score can be significantly used to detect financial distress events in companies. The results of the study also concluded that the use of Altman Z-Score is better than Springate score and Zmijewski score in detecting financial distress in companies, while Springate score is better than Zmijewski score in detecting financial distress in companies.

H3: Zmijewski score has a significant effect on the occurrence of corporate fraud.

Although the Grover score formula does not contain a debt component which is one of the absolute indicators in detecting financial distress, the results of (Edi & Tania, 2018) study found that the Grover score's ability to detect financial distress exceeds the Z-Score and Zmijewski score. Similar results were also presented in the study of (Kholifah, Djumali &

Hartono, 2020). In their study, (Kholifah et al., 2020) concluded that the Grover score can effectively detect financial distress conditions that occur in companies.
H4: Grover score has a significant effect on the occurrence of corporate fraud.

RESEARCH METHODOLOGY

Indonesia Stock Exchange/BEI companies in the non-financial sector will be the object of this study. The company's annual report will be studied during the period 2015-2019. This study took 210 company samples covering 31% of the total 671 IDX companies at the end of 2019, where there were 461 companies that did not meet the research criteria and were not studied further because they were engaged in the financial, property, real estate or construction industries and did not publish complete annual report information.

Table 1. Classification of Company Samples Tested in the Research

Description	Quantity	
Number of companies listed on IDX	671	Companies
Number of companies which does not meet criteria	461	Companies
Number of companies used as sample	210	Companies
Number of years analysed	5	Years
Total data to be analysed	1.050	Data
Total outlier data	80	Data
Total data analysed	970	Data

Source: (Secondary Data Processed, 2025)

By taking into account company data for 5 years from the period 2015-2019, 1,050 company data were obtained to be studied in the study. After the outlier test was carried out, there were 80 company data that were excluded from this study because they did not meet the requirements in the outlier test using SPSS, so there were 970 final data that would be forwarded to the hypothesis testing stage. The classification of the company samples tested can be seen in Table 1 above.

The data will be analyzed according to the panel regression analysis method using the Eviews version 10 software program (Ghozali & Ratmono, 2017). Measurement of the dependent variable, namely corporate fraud, uses the F-Score formula by referring to research conducted by (Hung, Ha & Binh, 2017). Measurement of the independent variable is carried out with the following provisions:

Table 2. Dependent Variable

Score	Formula	Sources
Altman Z	$1.2\partial_1 + 1.4\partial_2 + 3.3\partial_3 + 0.6\partial_4 + 1.0\partial_6$	(Zaki, 2017)
Altman Z'	$0.717\partial_1 + 0.847\partial_2 + 3.107\partial_3 + 0.420\partial_5 + 0.998\partial_6$	(Zaki, 2017)
Altman Z"	$6.56\partial_1 + 3.26\partial_2 + 6.72\partial_3 + 1.05\partial_5$	(Zaki, 2017)
Springate	$1.03\beta_1 + 3.07\beta_2 + 0.66\beta_3 + 0.4\beta_4$	(Aminian et al., 2016)
Zmijewski	$-4.3 - 4.5\pi_1 + 5.7\pi_2 + 0.004\pi_3$	(Aminian et al., 2016)
Grover	$1{,}650\Omega_1 + 3{,}404\Omega_2 - 0{,}016\Omega_3 + 0{,}057$	(Edi & Tania, 2018)

Note:	
$\partial_1 = \beta_1 = \Omega_1$	= Net WC / Total assets
∂_2	= RE / Total assets
$\partial_3 = \beta_2 = \Omega_2$	= EBIT / Total assets
∂_4	= MV of equity / BV of debts
∂_5	= BV of equity / BV of debts
$\partial_6 = \beta_4$	= Total sales / Total assets
β_3	= EBT / Total current liability
$\pi_1 = \Omega_3$	= EAT / Total assets
π_2	= Total liability / Total assets
π_3	= Total current assets / Total current liability

RESULTS AND DISCUSSION

The descriptive statistics results show that Z-Score, Z-Score' and Z-Score" each have an average value of 4.39017, 2.23295 and 3.97141. This shows that according to the Z-Score and Z-Score" calculations, on average the financial condition of IDX companies is in a healthy condition, while according to the Z-Score' calculation, the average financial condition of IDX companies is in the grey area so that its financial health cannot be ascertained. Overall, the results of the Z-Score calculation empirically prove that there is no financial distress in IDX companies. The average Springate score has a value of 0.89161, which means that on average IDX companies are in a healthy financial condition.

Table 3. Descriptive Statistic for *Non-Dummy* Variable

Variabel	*N*	*Minimum*	*Maximum*	*Mean*	*Std. Deviation*
ZSCORE	1.050	-7.5469	265.2159	4.3902	12.5868
ZSCORE'	1.050	-6.0089	54.9565	2.2330	2.5011
ZSCORE"	1.050	-23.4293	137.6253	3.9714	6.8665
SPRINGATE	1.050	-71.2059	15.8045	0.8916	2.5599
ZMIJEWSKI	1.050	-6.7220	17.3397	-1.5953	2.0185
GROVER	1.050	-6.2007	11.6829	0.5435	0.7839
FSCORE	1.050	-76.9855	498.9768	0.6896	16.3538
Valid N (listwise)	1.050				

Source: (Secondary Data Processed, 2025)

The results of the Grover score calculation also state that the financial condition of companies on the IDX is healthy with an average value of 0.54345. The interpretation of the results of the Grover score calculation is consistent with the results of the Z-Score and Springate score calculations.

However, the results shown by the Zmijewski score calculation are in contrast to the results of the Z-Score, Springate score and Grover score. The average value of the Zmijewski score is -1.59528, which means that the financial condition of the IDX companies is experiencing financial distress. Overall, the majority of the financial distress calculation formula indicators (4 out of 6) provide empirical evidence that during the 2015-2019 period, companies listed on the IDX were in a healthy condition and free from financial distress. The results of descriptive statistics show that the average F-Score of IDX companies is 0.68955. The value of the results of the descriptive statistical test on this F-Score indicator proves that the average IDX company is not indicated to have manipulated financial reports because it reaches an average F-Score value smaller than the limit of 1 according to the research of (Hung et al., 2017). The standard deviation value in the results of the descriptive statistical test is 16.35378 so it can be concluded that there is a large variation in the F-Score indicator in the sample of companies studied in this study.

Table 4. Chow Test & Hausman Test

Type of test	Probability Score	Interpretation
Chow	0.0022	Choose fixed-effect model
Hausman	0.0000	Choose fixed-effect model

Source: (Secondary Data Processed, 2025)

The results of the chow test in Table 4 above show a probability value of 0.00218. The results of the chow test are below 0.05 so that the selected model is the fixed-effect model. The results of the Hausman test show a probability value of 0.00000. The results of the Hausman test are below 0.05 so that the selected model is the fixed-effect model. The results

of the Hausman test are consistent with the results of the chow test, so the panel regression model selected in this study is the fixed-effect model.

Table 5. T-test Result for *F-Score*

Independent Variable	Coefficient	Std. Error	t-Statistic	Prob.
(Constant)	-0.5069	0.1277	-3.9694	0.0001
ZSCORE	-0.0194	0.0138	-1.4015	0.1615
ZSCORE'	0.4429	0.1232	3.5959	0.0003
ZSCORE"	-0.2244	0.0437	-5.1384	0.0000
SPRINGATE	-0.1730	0.1311	-1.3197	0.1873
ZMIJEWSKI	-0.1773	0.0663	-2.6758	0.0076
GROVER	1.0104	0.2315	4.3643	0.0000

Source: (Secondary Data Processed, 2025)

The results of the t-test analysis presented in Table 5 provide substantial empirical evidence regarding the predictive power of financial distress models in detecting corporate fraud. Specifically, the Z-Score', Z-Score", Zmijewski Score, and Grover Score exhibit p-values below the threshold of 0.05, indicating that these models have a statistically significant relationship with fraudulent financial reporting. Based on this analysis, Hypothesis 1 (H1), Hypothesis 3 (H3), and Hypothesis 4 (H4) fail to be rejected, suggesting that these financial distress models individually demonstrate significant explanatory power in relation to fraud occurrence.

This finding aligns with previous studies such as (Altman et al., 2017; Aminian et al., 2016; Donelson et al., 2016; Edi & Tania, 2018; Fedorova et al., 2016; Hasnan et al., 2013; Jia et al., 2009; Johnson et al., 2009; Maccarthy, 2017; Singh & Mishra, 2016), which consistently highlight the role of financial instability as a strong precursor to fraudulent corporate behavior. In essence, deteriorating financial health increases the likelihood of management engaging in fraudulent activities, often as a means to mask declining performance or avoid regulatory scrutiny.

In the context of Indonesia, the tendency for financially distressed companies to commit fraud is particularly concerning. Fraudulent practices often remain undetected by the public due to limited transparency and weak enforcement of whistleblower protections. The absence of robust legal frameworks and public disclosure mechanisms further amplifies the information asymmetry, exposing stakeholders to heightened risk and potential losses.

Conversely, the t-test results indicate that the Springate Score yielded a p-value above 0.05 (specifically 0.1873), signifying a lack of statistical significance. Thus, Hypothesis 2 (H2) is rejected, indicating that the Springate model does not significantly explain corporate fraud in the examined sample. This result diverges from earlier findings by (Aminian et al., 2016; Fedorova et al., 2016; Husein & Pambekti, 2014; Imanzadeh et al., 2011; Rajasekar et al., 2014), and suggests that the Springate model may not adequately capture the nuances of fraud-related distress in the Indonesian context or the selected period of observation.

Moreover, the Grover Score stands out with the highest beta coefficient value (1.010), indicating it has the most substantial effect among all the distress models tested. This result suggests that among the models assessed, Grover's formula is the most effective in predicting corporate fraud. Its high coefficient reinforces the model's relevance in fraud detection frameworks and underscores its practical utility for stakeholders aiming to identify red flags in financial statements.

Table 6. F-test result for F-Score

Dependent Variable	F	Sig	Result
F-Score	2.2287	0.0000	Significant

Source: (Secondary Data Processed, 2025)

The F-test results in Table 6 above show the F-Score significance value below 0.05, which is 0.00000. This result states that overall all independent variables have a significant effect on corporate fraud. The results of this test also conclude that financial distress conditions can cause corporate fraud in companies in Indonesia.

The R2 test results in Table 7 below show that the F-Score has an adjusted R square value of 0.20149. This result states that overall all independent variables can influence 20.15% of the corporate fraud variable, while the difference of 79.85% is influenced by variables not studied in this research model.

Table 7. R^2 Result for F-Score

Dependent Variable	R *Square*	*Adjusted R Square*
F-Score	0.3655	0,2015

Source: (Secondary Data Processed, 2025)

CONCLUSION AND SUGGESTION

This study analyzes the effect of financial distress on the possibility of corporate fraud in BEI companies during the period 2015-2019. In the results of the descriptive analysis test on the research sample, it can be concluded that the average financial condition of companies in Indonesia did not experience financial distress in the period 2015-2019. From the results of the hypothesis test, it can be concluded that the Z-Score, Zmijewski score and Grover score have a significant effect on corporate fraud. This shows that unhealthy financial conditions will increase the possibility of the company committing corporate fraud. Especially in Indonesia, corporate fraud practices are still very difficult for the general public to detect. This is due to the lack of government regulations governing the whistleblower system that can expose corporate fraud practices in the business environment. The lack of information that can be accessed by the general public regarding corporate fraud practices in the business environment is the main cause of the high risk that must be borne by the general public for losses caused by corporate fraud cases.

The findings of this research on corporate fraud cases in Indonesia offer valuable insights that can serve as strategic input for regional stakeholders, particularly investors and government regulatory bodies in Southeast Asia. As economic integration within the region continues to deepen facilitated by cross-border investments and collaborative trade agreements fraud incidents occurring in one member state can potentially trigger wider repercussions across neighboring markets. Therefore, for regional investors, this study underscores the importance of conducting thorough due diligence, especially when engaging with companies in high-risk environments. Meanwhile, for policymakers and regulatory agencies, these findings highlight the need to strengthen internal control frameworks in line with international governance standards to ensure the integrity and sustainability of economic growth throughout Southeast Asia.

The limitations of this study are related to the quantity and quality of research data that only focus on the availability of secondary data which results in limited data choices in the hypothesis test of this study. Recommendations and/or suggestions that can be developed by subsequent researchers are to add new formulas and/or indicator measurements for financial distress and corporate fraud and develop collection methods so that they can expand the scope of the data coverage of subsequent research.

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