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Models for Predicting Financial Distress that Affects Stock Prices of Miscellaneous Industry Companies in Indonesia: COVID-19 Analysis

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Abstract: The COVID-19 pandemic has brought the company's performance towards potential financial distress. This research has examined the effect of bankruptcy prediction models on the stock prices of miscellaneous industry companies in Indonesia. This research uses secondary data from 40 financial statements and stock prices for various industrial companies from 2016 to 2021, selected using a purposive sampling technique from 50 companies. Then, all the data were separated from the period before and during the COVID-19 pandemic, with 160 and 80 observations, or 240 observations. The research used the static panel data regression method with the best random effect model. The results indicated that the overall Fulmer model significantly affected stock prices. Before COVID-19, the Almant Modification, Grover, and Fulmer models significantly affected stock prices, while during COVID-19, the Grover model, Springate model, Zmijewski model, Ohlson model, and Fulmer model influenced stock prices significantly. However, there was no Almant prediction model that significantly affected stock prices.

Keywords: Financial distress, stock price, miscellaneous industries, Indonesia

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1. INTRODUCTION

Until now, the COVID-19 pandemic still makes an impression and is felt by most countries. Reinhart (2022) stated that the COVID-19 pandemic initially only influenced the health sector and caused a crisis that weakened the economy of various countries, including the capital market. Singh and Rastogi (2022) said that one of the economic downturns occurred due to government policies that limited territory or people and limited company operational activities. During COVID-19, government policies affected people's purchasing power and resulted in problems with company performance in miscellaneous sectors.

On the capital market side, Zhang et al. (2020) said the pandemic of COVID-19 created uncertainty over company performance, and (prospective) investors suffered unexpected losses on their investments. The various industrial sectors are vulnerable to the impact of COVID-19. However, during COVID-19, Arman and Suade (2022) mentioned the different industrial sectors as poorly performing, especially when the government implemented the COVID-19 policy. In addition, Sari (2022) conveyed a decline in stock returns as indicated by the declining stock prices in the retail industry sector during the COVID-19 pandemic.

The decline in the company's performance during COVID-19 indicated that the company's condition was not going well. Duong et al. (2022) and Viana Jr. et al. (2022) conveyed that the poor performance conditions of the company allow for potential problems of financial distress. Agrawal and Maheshwari (2019) revealed that the potential for a company's FD was very sensitive to influencing company returns. Indriyanti (2019) said that companies in an FD condition could potentially risk bankruptcy related to stock prices in the short term (Andreou et al., 2021). Thus, ElBannan (2021) conveyed the need for a specific strategy to detect potential predictive financial distress (PFDs) to know the company's risk level earlier.

PFDs are a significant issue to study, especially during periods of considerable uncertainty, for instance, the COVID-19 pandemic (Rahman et al., 2021; Idress & Qayyum, 2018; Bateni & Asghari, 2020). Jia et al. (2020) interpreted PFDs as a prediction to determine whether or not a company fails. Meanwhile, Platt and Platt (2006) defined financial distress and bankruptcy differently within a company but equated the potential for FD with a bankruptcy model as the end of company distress. Sun et al. (2014) defined FD as a company's financial problems. So, it concludes that PFDs are a financial distress predictor before being declared bankrupt.

Various literature suggests several approaches. Bateni and Asghari (2020) presented a logit model and a genetic algorithm as an accurate PFDs prediction model. Vochozka et al. (2020) stated that a neural network app was one way to predict PFDs. Alam et al. (2020) revealed that the machine learning method model was slightly better than discriminant models such as the Almant Z-Score; Wieprow and Gawlik (2021) Almant Z-Score as an accurate PFDs model. Meanwhile, Papana and Spyridou (2020) conveyed that from various PFDs models, the discriminant model was slightly superior to other prediction models. Meanwhile, Adnan Aziz et al. (2006) and Karas and Srbová (2019) conveyed that all models in determining PFDs are being debated about their advantages and disadvantages. Therefore, this study uses a discriminant model to detect PFDs.

Several empirical research results in predicting PFDs using different nations' discriminant models produced a variety of findings. Poland, Lithuania, Latvia, Estonia, Ukraine,

Hungary, Russia, Slovakia, Czech Republic, Romania, Bulgaria, and Belarus were among the Eastern European nations where Prusak (2018) was tested. According to the findings, the Czech Republic, Poland, Slovakia, Estonia, Russia, Hungary, Belarus, Bulgaria, and Latvia can still use the conventional bankruptcy prediction model, except for Lithuania, Ukraine, and Romania.

Indriyanti (2019) examined PFDs using seven bankruptcy prediction models in 25 countries and found the Grover model to be the prediction model with the best accuracy compared to other prediction models. Bărbuță-Mișu and Madaleno (2020) used the Altman, Conan and Holder, Tafler, Springate, and Zmijewski models, founding the traditional prediction model highly determined its influence on the performance of companies with high levels of risk in several European countries. in Vietnam, Pham et al. (2018) explained that accounting and market indicators are still the primary factors in predicting bankruptcy in addition to macroeconomics. Thinh et al. (2021) state that using financial ratios is still rational in predicting financial distress, such as the Almant-Z score model.

Begovic et al. (2020) found the Alman Z-Score prediction model to have higher accuracy at the beginning of the bankruptcy process, while the Zmijewski model was better than the Almant Z-Score model before bankruptcy in Serbia. Arroyave (2018) reveals that discriminant models such as the Almant Z-Score and others can still be applied in Colombia. Chen et al. (2020) stated that various financial performance and corporate governance indicators, especially debt ratios and CEO duality in Taiwan, are used in predicting bankruptcy. Sareen and Sharma (2022) examined the bankruptcy prediction of automotive companies in India and found that the ratio of profitability and solvency is a ratio that affects financial distress. Ullah et al. (2021) found the bankruptcy prediction model as an appropriate predictive model for banking companies in Pakistan. Kliestik, Vrbka, and Rowland (2018) found a bankruptcy prediction model by combining financial ratios to have greater accuracy in the Visegrad country group for the 2015-2016 period.

In addition, research in Indonesia that examined the bankruptcy prediction model for stock returns in miscellaneous industrial sectors still found inconsistent results. Kassidy and Handoko (2022) analyzed manufacturing companies and found that the Springate and Taffler models could predict potential bankruptcy before and during the COVID-19 pandemic. Then, Lestari and Yudantara (2022), analyzing state-owned companies, found the Almant and Fulmer models positively affected the stock prices of state-owned companies. Sarumpaet (2021) analyzed national private banking companies and revealed that the Almant Z-Score prediction model affects stock prices. In contrast to Rolanda and Laksmiwati (2020) analyzing banking companies, the Fulmer model indicator did not affect stock prices. Kesuma et al. (2021) stated that the Grover model is more predictive than the Springate model in influencing restaurant and hotel stock prices during COVID-19. Research by Nugroho et al. (2021) found that FD affects chemical company stock returns. Tristanti and Hendrawan (2020) said that the Almant Z-Score model is better at predicting the bankruptcy of state-owned companies.

Meanwhile, Susilowati and Simangunsong (2019) stated that the stock prices of consumer goods companies were affected by the Almant Z-Score model. Junaeni (2018) found that Almant's prediction model influenced banking stock prices. Prasetiyani and Sofyan (2020) say that the Almant-Z Score model and the Springate model can apply better models in predicting the bankruptcy of retail trading companies. Syamni et al. (2018) revealed that

the modified Ohlson and Almant models are the dominant models that affect mining stock prices compared to the Grover, Springate, and Zmijewski models.

The literature description above shows that PFD testing used several bankruptcy prediction models, except for Indriyanti, who examined them using seven prediction models. Meanwhile, this study uses eight bankruptcy prediction models in estimating stock prices, especially during and before COVID-19. So, it becomes a novelty to test the effect of PFDs models on stock prices, especially during the COVID-19 pandemic. By testing the PFDs of some of these models, the results of this study should provide sufficiently strong evidence and empirical contribution and recommendations for stakeholders in investing in the capital market.

2. METHODS

This research was conducted on the Indonesia Stock Exchange, focusing on miscellaneous industrial sectors for the 2016-2021 period, which were issuers of the Indonesia Stock Exchange. The reason for selecting industrial sectors is because these sectors are industrial groups whose various business activities are generally directly related to the impact of the COVID-19 pandemic. This reason refers to Matenda, Sibanda, Chikodza, and Gumbo (2021), who stated that bankruptcy prediction testing still needs to be carried out due to different business characteristics. Table 1 shows the companies that can be utilized as sample sizes after purposive sampling.

Table 1. Population and Sample Data

Miscellaneous Industrial Companies	**Population**	**Sample**	**Observation**	
			Pre COVID-19 2016-2021	**During COVID-19 2020-2021**
Machinery and Heavy Equipment	5	4	20	8
Automotive and Components	13	12	60	24
Textiles and Garments	21	14	70	28
Footwear	2	2	10	4
Cable	7	6	30	12
Electronics	3	2	10	4
Total	**51**	**40**	**160**	**80**

Based on the table, the samples in this study were 40 companies from 51 populations. Several companies were not sampled due to the inconsistent publication of financial statements. In addition, it relates to companies that have just registered in the year of this study. After the data were obtained and tabulated according to the agreed model indicators, bankruptcy prediction models were calculated in MS Excel files to know healthy, gray, and bankrupt criteria. In this study, the bankruptcy prediction model used was discriminant, totaling eight (8) bankruptcy prediction models. The prediction models include: modified Altman Z-score (1995), original Altman Z-score (1968), revised Altman Z-score (1984), Grover score (2001), Springate score (1978), 6. Zmijewski score (1983), Ohlson score (1980) and Fulmer score (1984). Meanwhile, the following was the bankruptcy prediction model used.

Table 2. Bankruptcy Model Formula

Modified Altman-Z-Score (1995)	ZM = 6,56X1 + 3,26X2 + 6,72X3 + 1,05X4	ZM = Modified Altman-Z-Score X1 = Working Capital/Total Asset X2 = Retained Earnings/Total Asset X3 = Earnings Before Interest and Taxes/Total Asset X4 = Book value of (Equity/total debt)	ZM < 1,10 = bankrupt ZM = 1,10-2,60= grey ZM > 2,60 = health
Altman Z score (1968)	Z = 1,2 X1 + 1,4 X2 + 3,3 X3 + 0,6 X4 + 0,999 X5	Z = Altman Z score X1 = Working capital/Total asset X2 = Retained Earnings/Total Asset X3 = Earnings Before Interest and Taxes/Total Asset X4 = Book value of (Equity/total debt) X5 = Sales/total assets	Z > 2,99 = healthy Z < 1,8 = bankrupt Z 1,81-2,99 = grey area
Altman Z score revisi (1984)	Z' = 0,717X1 + 0,847X2 + 3,107X3 + 0,420X4 + 0,998X5	Z = Altman Z score revision X1 = Working capital/Total asset X2 = Retained Earnings/Total Asset X3 = Earnings Before Interest and Taxes/Total Asset X4 = Book value of (Equity/total debt) X5 = Sales/total assets	Z > 1,23 = healthy Z < 2,9 = bankrupt Z 1,23-2,9 = grey area
Grover (2001)	G = 1.650X1 + 3.404X2 –0.016ROA + 0.057	GS = Grover Score X1 = Working capital/Total assets X2 = Earnings before interest and taxes/Total assets ROA = net income/total assets	GS ≤-0,02 = bankrupt GS ≥ 0,01 = health
Springate (1978)	SS = 1,03X1 + 3,07X2 +0,66X3+0,4X4	SS = Springate Score X1 = Working capital/Total asset X2 = Net profit before interest taxes/total asset X3 = Net profit before Taxes/Current liabilities X4 = Sales/Total asset	SS > 0,862 = healthy SS < 0,862= bankrupt
Zmijewski (1983)	Z = -4,3 -4,5X1 + 5,7X2 – 0,004X3	ZS = Zmijewski Score X1=ROA (Net income/ total assets) X2= Leverage (Total liabilities/total assets) X3 = Liquidity (Current assets/ current liabilities)	ZS > 0 = bankrupt ZS < 0= health
Ohlson (1980)	OS = -1,32-0,407X1 + 6,03X2 – 1,43X3 + 0,0757X4 –2,37X5 – 1,83X6 + 0,285X7 – 1,72X8 – 0,521X9	OS = Ohlson Score X1 = Log (total assets/GNP index) X2 = Total liabilities/total assets X3 = Working capital/total assets X4 = Current liabilities/current assets X5 =1 if total liabilities>total assets; 0 if otherwise X6 = Net income/total assets X7 = Cash flow from operations/total liabilities X8 = 1 if Net income negative; 0 if otherwise X9 = (NIt – NIt-1) / (NIt + NIt-1)	OS > 0,38 = bankrupt OS < 0,38 = healthy
Fulmer (1984)	H-Score = 5,52X1 + 0,212X2 + 0,073X3 + 1,27X4 - 0,12X5 + 2,335X6 + 0,575X7 + 1,082X8 + 0,894X9 - 6,075	FS = Fulmer Score X1 = Retained Earning/Total Asset X2 = Revenue/Total Asset X3 = EBIT/Total Equity X4 = Cash Flow from Operation/Total Liabilities X5 = Total Liabilities/Total Equity X6 = Current Liabilities/Total Asset X7 = Log (Fixed Asset) X8 = Working Capital/Total Liabilities X9 = Log (EBIT)/Interest Expense	H-score< 0 = bankrupt H-score> 0 = health

After calculating all the predictive models, the companies were predicted to have the potential to be healthy and bankrupt. Once the companies' conditions were known, the accurate prediction models of the eight models became independent variables. And lastly, it was regressed with stock prices as the dependent variable. Based on the data and data processing presented above, the data was tabulated in Excel under the data structure that fits the research model. The research model used in this study was the panel regression model. Before conducting panel regression testing, this research tested the classical assumption tests of normality, autocorrelation, heteroscedasticity, and multicollinearity. The panel regression model is as follows:

$$LnHS_{itAll} = \beta_0 + \beta_1 ZM_{it} + \beta_2 ZO_{it} + \beta_3 ZR_{it} + \beta_4 Gr_{it} + \beta_5 SS_{it} + \beta_6 Zji_{it} + \beta_7 Ohs_{it} + \beta_8 Fu_{it} + \varepsilon_{it} \quad (1)$$

$$LnHS_{it\ Before} = \beta_0 + \beta_1 ZM_{it} + \beta_2 ZO_{it} + \beta_3 ZR_{it} + \beta_4 Gr_{it} + \beta_5 SS_{it} + \beta_6 Zji_{it} + \beta_7 Ohs_{it} + \beta_8 Fu_{it} + \varepsilon_{it} \quad (2)$$

$$LnHS_{it\ during} = \beta_0 + \beta_1 ZM_{it} + \beta_2 ZO_{it} + \beta_3 ZR_{it} + \beta_4 Gr_{it} + \beta_5 SS_{it} + \beta_6 Zji_{it} + \beta_7 Ohs_{it} + \beta_8 Fu_{it} + \varepsilon_{it} \quad (3)$$

Model 1, Model 2, and Model 3 explain that model 1 aims to estimate as a whole, model 2 to assess before the COVID-19 pandemic, and model 3 testing during the COVID-19 pandemic. Where can be explained: LhHS = Sample Stock Price, ZM = Almant Model - Z-Modification, ZO = Almant - Z- Orignal Model, ZR = Almant - Z-Revised Model, Gr = Grover Model, SS = Springate Model, Zji = Zmijewski Model, Ohs = Ohlson score model, Fu = Fulmer model, β 0, 1,2….8 = Research regression coefficient, ε = error term, and i, t = samples and time of the research.

3. RESULTS

Table 3 describes the results of bankruptcy prediction during the research period based on the eight PFD models. The table consists of 3-panel sections. Panel 1 explains 40 companies with healthy, bankrupt, and gray criteria predictions in various industrial sectors from 2016 to 2021. Panel 2 describes the PFD of 40 companies in the 2016-2019 period, and Panel 3 is an overview of PFD during the Covid pandemic from 2020 to 2021. Table 2 shows that the Fulmer PFD model has more predictions of soundness criteria, 191, 126, and 65, respectively. The Almant-Z-Modication model is a PFD model with more predictions of the second healthy criteria, with the number of each -160, 104, and 56 panels, respectively. Furthermore, PFD Grover has several predictions of soundness criteria in each panel: 143, 121, and 22, respectively.

On the other hand, Table 3 explains the number of Zmijewski's PFD model as the model with the most predictions of bankrupt companies. Panel 1 found 194, Panel 2 had 133, and Panel 3 had 61. Then followed PFD Ohlson with each panel with 136 bankrupts, 133 bankrupts, and 98 bankrupts, respectively, and PFD Springate with 141 bankrupts, 96 bankrupts, and 45 bankrupts, respectively. While the prediction results with gray criteria, the Almant-Z-Revised PFD is the prediction with the dominant gray criteria followed by the original Almant-Z PFD and Modified Almant-Z. However, the average percentage of healthy and bankrupt criteria is only slightly different, except when compared to the gray area predicted results.

Table 3. Description of Bankruptcy Predictions

Period Prediction	Model-Model	Healthy	Bankrupts	Grey	Amount	%	%	%	%
Panel 1. All	Almant-Z-Modication	160	62	18	240	66.7	25.8	7.5	100
	Almant-Z-Original	82	101	57	240	34.2	42.1	23.8	100
	Almant-Z-Revisi	67	82	91	240	27.9	34.2	37.9	100
	Grover	143	97	0	240	59.6	40.4	0.0	100
	Springate	99	141	0	240	41.3	58.8	0.0	100
	Zmijewski	46	194	0	240	19.2	80.8	0.0	100
	Ohlson	104	136	0	240	43.3	56.7	0.0	100
	Fulmer	191	49	0	240	79.6	20.4	0.0	100
Mean						46.5	44.9	8.6	
Panel 2. Before Covid	Almant-Z-Modication	104	42	14	160	65.0	26.3	8.8	100
	Almant-Z-Original	47	69	44	160	29.4	43.1	27.5	100
	Almant-Z-Revisi	38	55	67	160	23.8	34.4	41.9	100
	Grover	121	39	0	160	75.6	24.4	0.0	100
	Springate	64	96	0	160	40.0	60.0	0.0	100
	Zmijewski	27	133	0	160	16.9	83.1	0.0	100
	Ohlson	62	98	0	160	38.8	61.3	0.0	100
	Fulmer	126	34	0	160	78.8	21.3	0.0	100
Mean						46.0	44.2	9.8	
Panel 3. During Covid	Almant-Z-Modication	56	20	4	80	70.0	25.0	5.0	100
	Almant-Z-Original	35	32	13	80	43.8	40.0	16.3	100
	Almant-Z-Revisi	29	27	24	80	36.3	33.8	30.0	100
	Grover	22	58	0	80	27.5	72.5	0.0	100
	Springate	35	45	0	80	43.8	56.3	0.0	100
	Zmijewski	19	61	0	80	23.8	76.3	0.0	100
	Ohlson	42	38	0	80	52.5	47.5	0.0	100
	Fulmer	65	15	0	80	81.3	18.8	0.0	100
Mean						47.3	46.3	6.4	

	Time Period	**Mean**	**Standard deviation**	**Maximum**	**Minimum**
Panel 4. Stock Price	All	1426.76	251.69	12325	50
	Before	1419.59	2228.81	10800	50
	During	1441.462	224.32	12325	50

Finally, Panel 4 in Table 3 explains the average value of the overall stock price. During the COVID-19 pandemic, there were no deviations that were too large. Meanwhile, if it was separated before COVID-19, there was a sizeable price deviation. It can be seen from the comparison of the SD values for the entire period and during COVID-19, which was lower than the average value. In contrast, the period before COVID-19 SD was higher than the average value.

Furthermore, Table 3 below explains regression estimation results to test the effect of bankruptcy prediction models on stock prices for various industrial sectors in Indonesia after testing the classical assumptions: normality, heteroscedasticity, autocorrelation, and multicollinearity. Gujarati and Porter (2009) revealed that it might be negligible. Even so, this study has a few problems concerning the multicollinearity test. The table describes the overall results of Panel 1 testing, Panel 2 testing before, and Panel 3 testing during COVID-19. The research model used based on the regression results shows the three panels in the following table, with the random effect model as the best model because the

results of the Hausman test are not significant in the three models. So, the random effect model is chosen.

The overall test results (Panel 1) show that the constant (C) and Fulmer's PFD model affect stock prices, while other PFD models do not. In addition, the overall test results show that the ability of the model to explain the effect of PFD is very weak. This finding is consistent with Lestari and Yudantara's (2022) focus on state-owned companies that the Fulmer model affects the company's stock price. These findings indicate that Fulmer's model is predictive of influencing stock prices.

Table 4. Regression Estimation Results

Estimation	Variables	Coefficient	t-statistics	Probability
Panel 1 All	C	6.2832***	33.170	0.0000
	Almant-Z-Modication	-0.0095	-0.676	0.4994
	Almant-Z-Original	0.0688	1.2366	0.2175
	Almant-Z-Revision	-0.1199	-1.6048	0.1099
	Grover	0.0543	1.4428	0.1504
	Springate	0.0290	1.2073	0.2285
	Zmijewski	-0.0119	-0.7682	0.4431
	Ohlson	0.0005	0.4839	0.6289
	Fulmer	0.0143**	2.5948	0.0101
	R^2	0.0478		
	F-statistic	1.4518		
	Model	Random Effect Model		
Panel 2 Before	C	6.1961***	39.8508	0.0000
	Almant-Z-Modication	-0.0424*	-1.6953	0.0921
	Almant-Z-Original	-0.0131	-0.2245	0.8226
	Almant-Z-Revisi	0.0057	0.0405	0.9677
	Grover	0.3066**	2.2601	0.0252
	Springate	0.0082	0.7598	0.4485
	Zmijewski	0.0243	1.1906	0.2357
	Ohlson	0.0007	1.2731	0.2049
	Fulmer	0.0427***	2.9774	0.0034
	R^2	0.1121		
	F-statistic	2.3840**		
	Model	Random Effect Model		
Panel 3 During	C	6.0968***	126.8020	0.0000
	Almant-Z-Modication	0.0011	0.0493	0.9608
	Almant-Z-Original	-0.0251	-0.2570	0.7978
	Almant-Z-Revisi	-0.0392	-0.3705	0.7121
	Grover	-0.3579***	-22.1369	0.0000
	Springate	0.4584***	15.5980	0.0000
	Zmijewski	-0.0791***	-7.8424	0.0000
	Ohlson	0.0053***	6.8490	0.0000
	Fulmer	6.0968***	126.8020	0.0000
	R^2	0.6552		
	F-statistic	16.8666***		
	Model	Random Effect Model		

Panel 2 examines the effect of PFD on stock prices for companies in various industrial sectors, giving better results than testing Panel 1. The results of testing Panel 2 show that the Almant-Z-Modication, Grover, and Fulmer models affect stock prices with a significance level of 10% each, 5%, and 1%, where the Grover model has a higher value coefficient than the other models. Meanwhile, Almant-Z-Original, Almant-Z-Revised, Springate, Zmijewski, and Ohlson did not affect stock prices for miscellaneous industries at any single level of significance. Then, the model used in this study shows a better model because the significant F value is 5 %, even though the model's ability to explain the new

stock price is 11.21%. This finding is consistent with research by Indriyanti (2019) and Kesuma et al. (2021), mentioning the Grover model as a predictive model influencing stock prices.

Furthermore, Panel 3 shows that during the COVID-19 pandemic, this research model is good. The f-test results show that the significance is 1% and that the coefficient of determination (R2) is 65.52%. Then, based on the regression results, it shows that the PFD models Almant-Z-Modication, Almant-Z-Original, and Almant-Z-Revised three do not affect stock prices in various industrial sectors because both before and during the COVID-19 pandemic significantly and positively affect stock prices. The positive direction indicates that a large amount of sample data is used, which shows that most companies are still in a healthy position.

Meanwhile, the PFD Grover, Springate, Zmijewski, Ohlson, and Fulmer models affect the stock prices of miscellaneous industrial sectors in Indonesia during COVID-19 with the significant coefficient values of each variable at the 1% level. Based on the overall findings, before and during the COVID-19 pandemic, it significantly and positively affected stock prices. The positive direction indicated that the sample data used showed that most companies were in a healthy position.

This finding is consistent with the research of Lestari and Yudantara (2022) that the Grover model can influence BUMN share prices; Syamni et al. (2018) presented the Grover, Springate, and Zmijewski models, although they were not dominant; Kesuma et al. (2021) focused on restaurant companies who found the Grover and Springate models affected stock prices; Indriyanti (2019) focuses on many countries with the findings that the Grover model can predict bankruptcy; and Kassidy and Handoko (2022) focusing on manufacturing companies who found the Springate model could be used to predict bankruptcy. The comparative results of these studies show that there are differences between them. Matenda et al. (2021) stated that the differences in these findings were due to differences in the characteristic groups of each industry being analyzed.

4. CONCLUSION

The bankruptcy prediction model was summarized based on the estimation results of the regression models presented in the three panels. The random effect model can be justified as the best model in this research based on the three research models. This study discovered that Fulmer's bankruptcy prediction model is a predictive model that can forecast the impact on stock prices. Fulmer's prediction model significantly influenced stock prices during and before COVID-19 compared to other bankruptcy prediction models. Thus, it can be concluded that the prediction model regularly affects stock prices before and during the COVID-19 pandemic.

This study found that before COVID-19, the Grover model was significantly dominant compared to the Fulmer and Almant Modification models and influenced stock prices. Meanwhile, during COVID-19, this study finds the Fulmer, Grover, Springate Model, Zmijewski Model, and Ohlson Models significantly influenced stock prices, with the Fulmer Model dominantly influencing it. This study is limited by the period of the study sample size. The sample size before the COVID-19 pandemic was higher compared to during COVID-19. For further research, the researcher suggests using a dummy model for each bankruptcy prediction model by categorizing healthy and bankruptcy criteria.

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