TECHNIUM
SOCIAL SCIENCES JOURNAL

Vol. 25, 2021

A new decade for social changes

www.techniumscience.com

ISSN 2668-7798

Technium Social Sciences Journal
Vol. 25, 567-582, November, 2021
ISSN: 2668-7798
www.techniumscience.com

Bankruptcy Prediction And Its Effect On Stock Prices As Impact Of The COVID-19 Pandemic

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Abstract. As COVID-19 pandemic hit the world since early 2020, one business sector in many countries that struggling to survive is tourism and its derivatives, such as restaurants and hotels. This study aims to examine the accuracy of the Springate and Grover models in predicting bankruptcy, as well as the effect on stock prices of tourism, restaurant, and hotel sector in Indonesia. The results show that all sample tourism, restaurant, and hotel companies are bankrupt under the Springate model, whilst according to Grover's model the findings are varied during the study period. Furthermore, the Grover model is implied to be more accurate than the Springate model. The effect of both prediction models on stock price appears dissimilar. Springate's prediction model suggests a positive and significant effect on stock prices, whereas there is no strong evidence about the effect of Grover's prediction model.

Keywords. Bankruptcy Prediction, Springate, Grover, Stock Price, COVID-19

1. Introduction

The world was shocked at the start of 2020 by the emergence of the COVID-19 (Corona Virus Disease 19) pandemic, which affected all countries worldwide. The crisis caused by the COVID-19 pandemic has widened in this way, causing the global economy to contract. The economic impact of the COVID-19 pandemic is also felt in Indonesia. Tourism and its derivatives, such as restaurants and hotels, are the business sectors most affected by the economy. COVID-19 has had a significant impact on international tourism, the true economic and social consequences of which are still being calculated (Almeida and Silva, 2020). Tourism cities are fragile because their economies are heavily dependent on tourism (Türkcan and Erkuş-Öztürk, 2019). The pressure on the tourism industry is most visible in the massive decrease in foreign tourist arrivals, as well as massive cancellations and bookings. The shrinkage was also caused by the postponement of domestic visits due to the Indonesian people's reluctance to

Technium Social Sciences Journal
Vol. 25, 567-582, November, 2021
ISSN: 2668-7798
www.techniumscience.com

travel due to the risk of COVID-19 (Sugihamretha, 2020). On the demand side, the loss of basic jobs, fears of contracting the virus, and the uncertainty surrounding the virus will result in lower public expenditure. Businesses reduce their cash flow, and workers may be laid off as a result of the inability of the company to pay their wages. This effect will also cause people to postpone planned vacations, which will have a direct impact on the tourism and hospitality industries (Abdullah et al., 2020).

According to the Central Statistics Agency, international tourist arrivals decreased by 45.50 percent in March 2020 compared to February 2020. Total foreign tourist arrivals in March 2020 were 64.11 percent lower than in March 2019. From January to March 2020, total foreign tourist arrivals in Indonesia totaled 2.61 million visits, a 30.62 percent decrease from the same period in 2019, when total foreign tourist arrivals totaled 3.76 million visits (Rahayu, 2020).

When compared to the same period in 2019, the decline in tourist arrivals is directly proportional to the decline in revenues and profits of companies operating in the tourism, restaurant, and hotel sectors recorded by the IDX in each of the first, second, and third quarters of 2020. The current conditions may have implications for the company's sustainability, as a decrease in tourists will result in a decrease in company income, a decrease in net profits, or an increase in company net losses, and the company may go bankrupt.

It is critical to conduct research on predicting the risk of bankruptcy. Early detection of signs of a worsening financial situation allows for corrective action. The introduction of effective tools for forecasting company failures allows for the identification of potential bankruptcy and, as a result, the reduction of losses by avoiding cooperation with such companies. Furthermore, this tool can serve as an early warning system against bankruptcy, allowing the early stages of a crisis to be identified. As a result, these companies can take early recovery actions to improve their financial position and ensure the company's viability (Prusak, 2018). Furthermore, bankruptcy forecasting is critical for investors as well as business suppliers or retailers. The bankruptcy issue necessitates an examination of the company in order to assist investors in making sound investment decisions (Ogachi et al., 2020). When financial distress occurs and bankruptcy appears to be unavoidable, the company has two options: evaluate whether it is possible to engage in a reorganization plan, make all possible efforts to recover from the situation that occurred, or the company will decide to end the difficulty experienced (Alessandra, 2014).

In recent years, a number of researchers have developed models to assess the probability of financial failure (Tiryaki, 2021). There are at least five models that can be used in estimating bankruptcy that have been obtained from various research conducted by experts who focus on bankruptcy in various companies around the world. These models include the Altman Z-Score Model, Springate Model, Zmijewski Model, Foster Model, and Grover Model (Salim and Sudiono, 2017). According to Tiryaki (2021), although there are many financial failure predictive models in the literature, it is unclear which model predicts better than the other. Given the significance of predicting financial failure for businesses, it is critical to predict failure with high accuracy. Because of the various measurements used to estimate corporate bankruptcy, the findings differ across bankruptcy prediction models. Bankruptcy prediction models estimate company performance with varying degrees of accuracy. As a result, investors, managers, and policymakers should not rely solely on one bankruptcy model to forecast company performance (Syamni et al., 2018).

The market price of a stock can influence investors' decision to invest in the issuer company. Stock prices can also be used to gauge the success of a company's management. The average stock price of tourism, restaurant, and hotel sector companies recorded by the IDX

Technium Social Sciences Journal
Vol. 25, 567-582, November, 2021
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www.techniumscience.com

fluctuated in the first, second, and third quarters of 2020, but when compared to the same period the previous year, it appears that there has been a significant stock price decline.

The purpose of this study is to examine bankruptcy predictions using the Springate and Grover models, the level of accuracy of each model, and their impact on stock prices of tourism, restaurant, and hotel sector companies listed on the Indonesia Stock Exchange from Quarter I to Quarter III of 2020. The research on bankruptcy prediction using this model and its effect on the company's stock price is still limited, and this study attempts to fill those gaps.

In order to address the gaps and objectives of this research, the research questions are as follows: (1) How to predict bankruptcy using the Springate and Grover model in tourism and restaurant and hotel sector companies listed on the Indonesia Stock Exchange between the first and third quarters of 2020? (2) Which prediction model provides more accurate bankruptcy prediction results for tourism, restaurant, and hotel sector companies listed on the Indonesia Stock Exchange between the first and third quarters of 2020?; and (3) Does the prediction of bankruptcy using the Springate and Grover models affect the stock prices of tourism, restaurant, and hotel sector companies listed on the Indonesia Stock Exchange between the first and third quarters of 2020?

2. Literature Review

2.1. Bankruptcy Prediction Theory

According to Salim and Sudiono (2017), "A bankruptcy is a situation in which a company does not have enough money to run its operations". According to Duda and Schmidt (2010) "the method of estimating the risk of bankruptcy or financial difficulty of public companies is referred to as bankruptcy prediction.". Bankruptcy analysis is intended to provide early warning of impending bankruptcy. Previous signs of bankruptcy have been identified, and management will make changes and achieve results to resolve the crisis (Abdullah et al., 2020). Bankruptcy predictions aim to advise parties on a company's financial success and whether or not it will face financial difficulties in the future. Because bankruptcy is a serious and costly issue, predicting the onset of financial problems will provide early warnings where management can be greatly assisted. In order to avoid bankruptcy, management should implement the necessary changes as soon as possible (Effendi et al., 2016).

Altman was the first to implement a multivariate default prediction model. He proposed his famous pattern under the title Z-score, regarded as a commercial bankruptcy forecast. Altman blends the models offered by these five ratios, which he feels are the highest (Aminian, et al., 2016). Springate continued Altman's research and use of audit analytics to pick four appropriate financial ratios, to classify healthy and bankrupt companies, and after research, presented models in 40 firms with 92.5 percent of accurate predictions (Aminian, et al., 2016). Grover's model is a model developed through the design and reassessment of the Altman Z-Score model. Jeffrey S. Grover used a sample of the 1968 Altman Z-score model, adding thirteen additional financial ratios. The dataset used was 70 companies, 35 bankrupt companies and 35 non-bankrupt companies from 1982 to 1996 (Salim and Sudiono, 2017). It takes X_1 and X_3 from the Altman model and then applies the profitability ratio shown by the ROA (Husein and Pambekti, 2015).

2.2. Comparison of the Accuracy of Bankruptcy Prediction Models

Using only one model to predict bankruptcy can lead to inaccurate estimates, which can lead to poor policy recommendations (Syamni et al., 2018). Syamni et al. (2018) then revealed disparate results from bankruptcy prediction models as a result of the various measures used to forecast corporate bankruptcy. Bankruptcy prediction models vary in their accuracy in forecasting business results, but investors, administrators, and decision makers do not rely solely on a single bankruptcy model to forecast company performance.

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Vol. 25, 567-582, November, 2021
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Several relevant studies have previously been conducted by other researchers, with Nugroho and Parwito (2018) concluding that the Springate method, with 9 percents accuracy, is the most accurate bankruptcy method for estimating bankruptcy from a comparison of the three bankruptcy methods Altman, Springate, and Zmijewski. According to Imanzadeh et al. (2011), Springate's modeling is more conservative than Zmijewski's modeling in terms of bankruptcy prediction. According to Aminian et al. (2016), the estimation of corporate bankruptcy from the Grover modeling produces better results than the Altman, Springate, and Zmijewski modeling, and according to Pakdaman (2018), the ability of the Grover model to predict bankruptcy is at the highest level when compared to the Altman and Springate models.

2.3. Bankruptcy Predictions and Stock Prices

In the context of research on the effect of bankruptcy estimation on stock prices, the findings of Syamni et al. (2018) concluded that bankruptcy estimation using the Springate model had no significant effect on stock prices, whereas bankruptcy estimation using the Grover model had a negative and significant effect on the share price of mining companies in Indonesia. This condition implies that the higher the prediction score, the lower the stock price, and vice versa. According to Effendi et al. (2016) the Springate bankruptcy prediction model is applied in analyzing its effect on the stock price of telecommunications companies, and the Springate model affects stock prices. Meanwhile, research from Endri and Yerianto (2019) concludes that estimating bankruptcy using the Altman Z-Score modeling has a significant and positive effect on stock prices. The relationship with a positive sign indicates that the higher the prediction score, the higher the stock price, and vice versa. That is, the lower the company's likelihood of bankruptcy, the higher the stock price.

2.4. Hypothesis

Figure 1 shows the theoretical framework that was used to analyze bankruptcy predictions, levels of accuracy of bankruptcy prediction models, and their effect on stock prices in companies listed on the IDX that operate in the tourism, restaurant, and hospitality sectors.

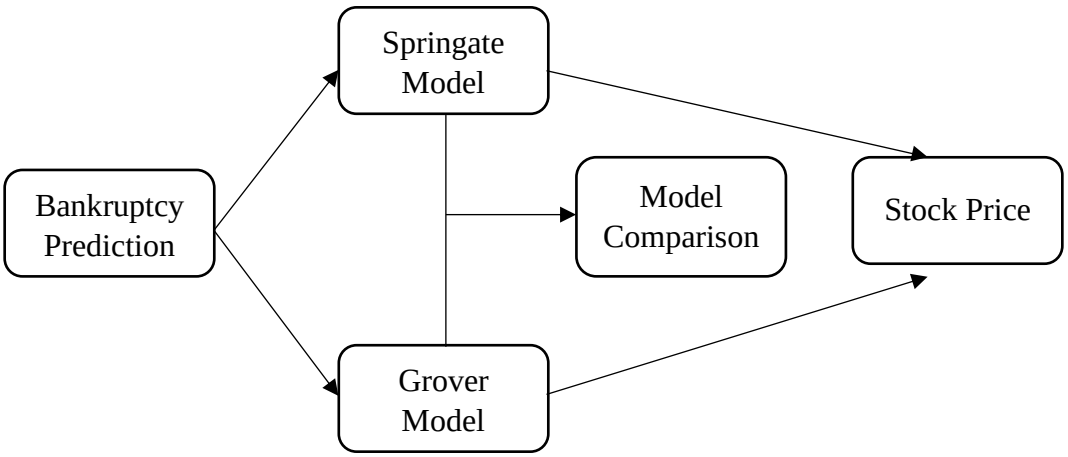

Figure 1. Theoretical Framework

Considering the findings of previous research and literature reviews, the following research hypothesis was chosen:

H1 : According to the Springate model, companies in the tourism and restaurant sectors, as well as hotels, listed on the Indonesia Stock Exchange from Quarter I to Quarter III of 2020 are potentially bankrupt.

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H2 : According to the Grover model, companies in the tourism and restaurant sectors, as well as hotels, listed on the Indonesia Stock Exchange from Quarter I to Quarter III of 2020 are potentially bankrupt.

H3 : In predicting the bankruptcy of tourism and restaurant sector companies, as well as hotels listed on the Indonesia Stock Exchange from Quarter I to Quarter III of 2020, the Grover model outperforms the Springate model.

H4 : The results of bankruptcy predictions using the Springate model have a positive and significant influence on the stock prices of tourism and restaurant sector companies, as well as hotels, on the Indonesia Stock Exchange from the first to third quarters of 2020.

H5 : The results of bankruptcy predictions using the Grover model have a positive and significant influence on the stock prices of tourism and restaurant sector companies, as well as hotels, on the Indonesia Stock Exchange from the first to third quarters of 2020.

3. Research Methodology

3.1. Data Source

Secondary data is used, specifically the financial statements of companies in the tourism, restaurant, and hospitality sectors recorded by the IDX, which include balance sheets and profit and loss reports for the first quarter to third quarter of 2020, as well as IDX statistical reports (IDX Quarterly Statistics) for the first quarter to third quarter of 2020, which display the company's performance.

3.2. Population and Sample

The population in this study consists of thirty eight companies from the tourism, restaurant, and hospitality sectors listed by the IDX. The sampling method used in this study was purposive sampling. Purposive sampling is a method of taking or determining research samples that are not done at random but are determined in advance based on research needs (Effendi et al., 2016). The following criteria have been established for conducting research sampling: (1) Companies in the tourism, restaurant, and hotel sectors listed on the Indonesia Stock Exchange (IDX) in 2020; (2) Companies in the tourism, restaurant, and hotel sectors listed on the Indonesia Stock Exchange (IDX) and with stock closing price data available through the IDX (IDX Quarterly Statistics) statistical report for the first to third quarters of 2020; (3) Companies listed on the Indonesia Stock Exchange (IDX) in the tourism, restaurant, and hotel sectors that publish financial reports in the form of balance sheets and profit and loss statements for the first to third quarters of 2020; and (4) Companies listed on the Indonesia Stock Exchange (IDX) in the tourism, restaurant, and hotel sectors that do not generate net profit from the first to third quarters of 2020.

3.3. Bankruptcy Prediction Model Formula

The analysis in this study is carried out in three steps: predicting bankruptcy using the Springate and Grover models as formulas 3.1 and 3.2, comparing prediction models, and analyzing the effect of bankruptcy predictions using both the Springate and Grover models on stock prices of tourism sector companies, restaurants, and hotels listed on the IDX for the period of study.

The formula for the prediction model of Springate (1978) is as follows:

$$SS = 1{,}03X_1 + 3{,}07\ X_2 + 0{,}66\ X_3 + 0{,}4\ X_4 \qquad \text{…….……..} \quad (3.1)$$

Where:

X_1 = *Working Capital to Total Asset*
X_2 = *Earning Before Interest and Tax to Total Asset*
X_3 = *Earning Before Tax to Current Liabilities*

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Vol. 25, 567-582, November, 2021
ISSN: 2668-7798
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X_4 = *Sales to Total Asset*

The criteria for evaluating the Springate prediction model are (Syamni et al., 2018):
1) *Springate Score* > 0,862 = healthy
2) *Springate Score* < 0,862 = bankrupt

The formula for the prediction model of Grover (2001) is as follows:

$$G = 1{,}6505X_1 + 3{,}404X_2 - 0{,}016ROA + 0{,}057 \quad \text{…….. (3.2)}$$

Where:
X_1 = *Working Capital to Total Asset Ratio*
X_2 = *EBIT to Total Asset Ratio*
ROA = *Net Earning to Total Asset Ratio*

The criteria for evaluating Grover's prediction model according to Tiryaki (2021):
1) *Grover Score* ≥ 0,01 = healthy
2) *Grover Score* ≤-0,02 = bankrupt
3) Companies that have a score between the upper and lower limits are in the grey area category.

3.4. Bankruptcy Prediction Model Comparison

The formula can be used to determine and compare the level of accuracy of each bankruptcy prediction model (Hungan and Sawitri, 2018):

$$\textit{Level of Accuracy} = \frac{\text{Total Healthy Prediction}}{\text{Total Company Sample}} \times 100\% \quad \text{…..... (3.3)}$$

$$\textit{Level of Error} = \frac{\text{Total Bankrupt Prediction}}{\text{Total Company Sample}} \times 100\% \quad \text{…..... (3.4)}$$

3.5. Panel Data Regression Analysis

Following the measurement of the scores on each bankruptcy prediction model, the panel data regression model is estimated to investigate the effect of bankruptcy estimation modeling on the company's stock price. The score of the bankruptcy prediction model studied in this study is then used to predict stock prices as an independent variable. Panel data, longitudinal data, time series data, and cross section data are all terms used in econometrics and statistics to describe a data set containing repeated observations on a set of variables chosen from a set of observation units. Observations include both temporal and spatial dimensions (Brilinger et al., 2019). Panel data regression modeling serves the same purpose as multiple linear regression in that it estimates the value of the constant or intercept (α) and the regression coefficient or slope (βi). The use of panel data in regression results in intercept (α) and slope (βi) for each entity/company and time period. To predict panel data regression modeling, assumptions about the intercept, slope, and disturbance variables must be made (Effendi et al., 2016). Regarding panel data regression modeling used in research processed by Effendi et al. (2016) and Syamni et al. (2018), are as follows:

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ISSN: 2668-7798
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$$LnSP_{it} = \alpha + \beta_1 SS_{it} + \beta_2 GS_{it} + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots (3.5)$$

Where:

LnSP	=	Natural logarithm of Stock Price
α	=	constant or intercept
β_1 - β_2	=	regression coefficient or Slope
SS	=	Springate Score
GS	=	Grover Score
ε	=	panel data regression error
i	=	object (company)
t	=	time (in this case is the quarterly financial report)

4. Result and Discussion

4.1. Bankruptcy Prediction

The scores of each bankruptcy prediction model are calculated using the formulas 3.1 and 3.2 based on the results of the calculation of the financial ratios of the Springate and Grover models.

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ISSN: 2668-7798
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Table 1. *Recapitulation of Calculation Results and Assessment Criteria*

Issuers	Quarter I				Quarter II				Quarter III			
	Springate		Grover		Springate		Grover		Springate		Grover	
	Result	Criteria	Result	Criteria	Result	Criteria	Result	Criteria	Result	Criteria	Result	Criteria
AKKU	(0,126)	B	(0,100)	B	(0,133)	B	(0,102)	B	(0,135)	B	(0,105)	B
BAYU	0,633	B	0,751	S	0,598	B	0,699	S	0,570	B	0,637	S
BUVA	(0,277)	B	(0,372)	B	(0,332)	B	(0,436)	B	(0,392)	B	(0,503)	B
CLAY	(0,167)	B	(0,096)	B	(0,763)	B	(0,171)	B	(1,011)	B	(0,299)	B
DFAM	0,131	B	0,218	S	(0,065)	B	0,152	S	0,008	B	0,170	S
FAST	0,293	B	0,246	S	0,075	B	0,007	GA	(0,087)	B	(0,215)	B
FITT	(0,248)	B	(0,114)	B	(0,652)	B	(0,295)	B	(0,817)	B	(0,383)	B
HOME	0,777	B	1,322	S	0,772	B	1,322	S	0,765	B	1,321	S
HOTL	(0,079)	B	(0,070)	B	(0,172)	B	(0,129)	B	(0,238)	B	(0,177)	B
HRME	(0,043)	B	0,089	S	(0,249)	B	0,066	S	(0,284)	B	0,038	S
JIHD	(0,047)	B	(0,010)	GA	(0,177)	B	(0,052)	B	(0,269)	B	(0,089)	B
JSPT	0,103	B	0,213	S	(0,025)	B	0,133	S	(0,076)	B	0,124	S
KPIG	0,114	B	0,222	S	0,225	B	0,247	S	0,088	B	0,206	S
MAMI	0,150	B	0,196	S	0,156	B	0,191	S	0,167	B	0,194	S
MAPB	(0,100)	B	(0,245)	B	(0,277)	B	(0,430)	B	(0,249)	B	(0,476)	B
MINA	0,009	B	0,419	S	(0,484)	B	0,325	S	(0,938)	B	0,314	S
NASA	0,026	B	0,139	S	(0,025)	B	0,126	S	(0,044)	B	0,123	S
NATO	(0,169)	B	0,351	S	(1,237)	B	0,342	S	(2,439)	B	0,338	S
PANR	0,182	B	0,181	S	0,108	B	0,082	S	0,013	B	(0,007)	GA
PDES	(0,305)	B	(0,164)	B	(0,919)	B	(0,564)	B	(1,311)	B	(0,919)	B
PGLI	(0,101)	B	0,144	S	(0,250)	B	0,112	S	(0,404)	B	0,014	S
PJAA	(0,004)	B	(0,018)	GA	(0,159)	B	(0,106)	B	(2,200)	B	(1,711)	B

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www.techniumscience.com

Issuers	Quarter I				Quarter II				Quarter III			
	Springate		Grover		Springate		Grover		Springate		Grover	
	Result	Criteria	Result	Criteria	Result	Criteria	Result	Criteria	Result	Criteria	Result	Criteria
PNSE	0,008	B	0,057	S	(0,302)	B	(0,078)	B	(0,442)	B	(0,179)	B
PSKT	(0,031)	B	0,145	S	(0,193)	B	0,086	S	(0,311)	B	0,044	S
PTSP	0,072	B	(0,014)	GA	(0,388)	B	(0,429)	B	(0,491)	B	(0,594)	B
PZZA	0,166	B	0,032	S	0,337	B	0,041	S	0,466	B	0,008	GA
SHID	0,089	B	0,261	S	(0,022)	B	0,239	S	(0,119)	B	0,204	S
SOTS	(0,097)	B	0,007	GA	(0,247)	B	(0,074)	B	(0,353)	B	(0,158)	B

Note: S = Healthy; B = Bankrupt; GA = Grey Area

Technium Social Sciences Journal
Vol. 25, 567-582, November, 2021
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Based on table 1, it is possible to conclude that all tourism, restaurant, and hotel companies listed on the IDX are potentially bankrupt using the Springate bankruptcy prediction model, either in the first, second, or third quarters of 2020. Meanwhile, according to the Grover bankruptcy prediction model, there are 17 (seventeen) companies in the healthy category, 7 (seven) companies in the bankrupt category, and 4 (four) other companies in the grey area category in the First Quarter of 2020, while in the First Quarter of 2020 II in 2020, where the number of companies in the healthy categor In the third quarter of 2020, there were 13 (thirteen) companies classified as healthy and bankrupt, with 2 (two) remaining in the grey area.

4.2. Bankruptcy Prediction Model Comparison

The comparison between the Springate and Grover bankruptcy prediction models can be explained using formulas 3.3 and 3.4 as follows:

Table 2. *Comparison of Bankruptcy Prediction Model Analysis Results*

Models	Quarter I		Quarter II		Quarter III	
	Level of Accuracy	***Level of Error***	***Level of Accuracy***	***Level of Error***	***Level of Accuracy***	***Level of Error***
Springate	0%	100%	0%	100%	0%	100%
Grover	61%	25%	54%	43%	46%	46%

According to table 2, the accuracy level of the Springate prediction model in the first quarter of 2020 is 0%, with the entire sample of companies in the bankrupt category, whereas the accuracy level of Grover's prediction model is 46%, with 13 (thirteen) of the total 28 (twenty eight) samples of the companies studied being categorized as bankrupt.

4.3. Data Panel Regression

The first step in performing panel data regression analysis is determining the estimation model, whether it is a common effect model, a fixed effect model, or a random effect model. Several stages of testing are carried out to determine the estimation model that will be used. The first is the Chow test to determine whether the estimation model to be used is the Common Effect method or the Fixed Effect method.

Table 3. *Estimation Model Results*

Type of Test	Probability Value	Output Model
Chow Test	0,0000	Fixed Effect Model
Hausmann Test	0,5983	Random Effect Model
Lagrange Multiplier Test	0,0000	Random Effect Model

Based on table 3, the probability value of the Chow test is 0.0000, so the fixed effect model is chosen and the Hausman test is used to determine whether to use the fixed effect model or the random effect model. The Hausman test has a probability value of 0.5983, and the random effect model is followed by the Lagrange Multiplier test. The Lagrange Multiplier test has a probability value of

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Vol. 25, 567-582, November, 2021
ISSN: 2668-7798
www.techniumscience.com

0.0000, indicating that the best estimation model is random effect. The following are the panel data regression results using the random effect model:

Table 4. *Results of Panel Data Regression Analysis of Random Effect Model*

Dependent Variable: Y
Method: Panel EGLS (Cross-section random effects)
Date: 06/23/21 Time: 16:52
Sample: 2020Q1 2020Q3
Periods included: 3
Cross-sections included: 28
Total panel (balanced) observations: 84
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.705227	0.273354	20.87118	0.0000
X1	0.422890	0.173241	2.441053	0.0168
X2	-0.366046	0.293925	-1.245375	0.2166

Effects Specification

	S.D.	Rho
Cross-section random	1.419847	0.9499
Idiosyncratic random	0.325973	0.0501

Weighted Statistics

Root MSE	0.318171	R-squared	0.077550
Mean dependent var	0.738434	Adjusted R-squared	0.054773
S.D. dependent var	0.333265	S.E. of regression	0.324010
Sum squared resid	8.503566	F-statistic	3.404802
Durbin-Watson stat	1.429968	Prob(F-statistic)	0.038036

Unweighted Statistics

R-squared	0.004910	Mean dependent var	5.619713
Sum squared resid	165.5378	Durbin-Watson stat	0.073457

Based on table 4, the findings regarding the effect of each independent variable on the dependent variable can be explained as follows:

The t-count of the bankruptcy prediction variable with the Springate model (X_1) is 2.441053, which is greater than the t-table value of 1.98932, and the probability value of 0.0168 is less than 0.05, according to the test results. This indicates that a positive and significant influence on the results of bankruptcy predictions using the Springate (X_1) model on stock prices (Y) in tourism, restaurant, and hotel sector companies listed on the IDX from Quarter I to Quarter III of 2020 was discovered.

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The t-count of the bankruptcy prediction variable with the Grover model (X_2) is -1.245375, which is less than the ttable value of 1.98932, and the probability value of 0.2166 is greater than 0.05, according to the test results. This indicates a negative and insignificant effect on the results of bankruptcy predictions using the Grover model (X_2) on stock prices (Y) in tourism, restaurant, and hotel sector companies listed on the IDX from Quarter I to Quarter III of 2020.

The emergence of the COVID-19 pandemic around the world has implications for the community's decline in tourism activities and has an impact on the decline in income for the tourism, restaurant, and hotel sectors on the Indonesia Stock Exchange during the period from Quarter I to Quarter III of 2020, affecting the company's future sustainability. The stock price of the company will also be influenced by negative market sentiment, which is concerned about the current situation and the company's declining performance. As a result, early detection is required for businesses to avoid the possibility of bankruptcy, which will have an impact on stakeholders, as well as to formulate and implement preventive policies. The study's findings aim to provide information to the company's own management, government, investors, and other stakeholders about the company's current state and whether it has the potential to go bankrupt, as well as whether bankruptcy prediction tools can affect the company's stock price.

Predicting bankruptcy is one of the early stages that can be carried out to improve company performance. The financial statements can reveal signs of impending bankruptcy. The Springate and Grover bankruptcy prediction models are used in this study to forecast bankruptcy. Using the Springate prediction model, it is possible to see that all tourism, restaurant, and hotel sector companies listed on the IDX between the first and third quarters of 2020 are listed as bankrupt. This is due to the fact that all companies from Quarter I to Quarter III 2020 have a Springate score of 0.862. These findings highlight the implications of the COVID-19 pandemic for business actors in the tourism, restaurant, and hotel sectors since the pandemic's inception, which was caused by a decrease in tourists and consumers, which in turn had an impact on company income. If the company's income falls and is followed by a drop in profits and/or losses, it will have an impact on the company's financial performance, and if it is sustained, it will cause the company to go bankrupt.

5. Conclusion

According to the Grover model, the majority of the companies listed by the IDX in the tourism, restaurant, and hotel sectors in the first and second quarters of 2020 are in the healthy category, while there are similarities in the number of companies in the healthy category and bankrupt in the third quarter of 2020. According to Grover's prediction model, there is a consistent decrease in the number of companies classified as healthy, and an increase in the number of companies classified as bankrupt from the first to third quarters of 2020. This is due to a decrease in company profitability as a result of policies in the form of social restrictions, both at home and abroad, affecting the arrival rate of domestic and foreign tourists. These findings demonstrate the consequences of the COVID-19 pandemic, which were felt by most business actors in the tourism, restaurant, and

Technium Social Sciences Journal
Vol. 25, 567-582, November, 2021
ISSN: 2668-7798
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hotel sectors since the outbreak's inception, and were caused by a decrease in tourists and consumers, which had an impact on company income. This analysis using the Grover model reveals a trend of a decrease in the number of companies in the healthy category and an increase in the number of companies in the bankrupt category, implying that if the COVID-19 pandemic continues to occur without any policies to improve company performance, it will be sustainability affects a decrease in the company's performance.

Based on the results of the analysis of bankruptcy estimates using each prediction model, different results were obtained between the Springate prediction model and the Grover prediction model, with the accuracy of the Springate prediction model being 0% from the first to third quarters of 2020, while the accuracy of the prediction model was 0%. Grover has 61 percent in the first quarter, 43 percent in the second quarter, and 46 percent in the third quarter. This shows that Grover's prediction modeling outperforms Springate's prediction modeling. This could be because the Grover model implements a profitability ratio in its component formula, namely Return On Assets, which reflects the company's ability to earn profits based on the number of assets it owns. The findings of this analysis support the findings of Syamni et al. (2018) who state that different findings across bankruptcy prediction models are due to different measurements used to estimate corporate bankruptcy. The findings of this study agree with the findings of Aminian et al. (2016) and Pakdaman (2018), as well as Hungan & Sawitri (2018) who discovered that Grover's prediction modeling outperformed Springate's prediction modeling in terms of accuracy.

According to the test results, there was a positive and significant impact on the results of bankruptcy predictions using the Springate (X_1) model on stock prices (Y) in tourism, restaurant, and hotel companies listed on the IDX from Quarter I to Quarter III of 2020. These findings confirm the investor's tendency that if there are no massive policies, both from internal companies and from the government, to restore this sector, then the company will face bankruptcy in the long run, potentially resulting in losses for investors. This is closely related to signaling theory, which is concerned with how companies convey signals to users of financial statements about information and company prospects, where company information is used as a signal by investors to make investment decisions. The findings of this study agree with the findings of Effendi et al. (2016) who discovered that Springate's modeling had an effect on the stock prices of telecommunications companies listed on the Indonesia Stock Exchange.

According to the test results, there was a negative and insignificant effect on the results of bankruptcy predictions with the Grover model (X_2) on stock prices (Y) in tourism, restaurant, and hotel companies listed on the IDX from Quarter I to Quarter III of 2020. This can be interpreted to mean that the Grover model's predictions of bankruptcy have no effect on changes in a company's stock price. Different findings in the Grover model compared to the Springate model can occur due to negative investor perceptions with the direct impact of the COVID-19 pandemic on tourism, restaurants, and hotels, so that even though the Grover model output states that there are still some companies that are classified as healthy, investors did not respond positively. This study's findings differ from those of

Syamni et al. (2018), who discovered that the Grover model has a negative and significant effect on the stock prices of coal mining companies in Indonesia.

Regarding the theoretical contribution, this study has first investigated several bankruptcy prediction models that are rarely used in comparison to other models, such as the Altman Z-Score. Second, demonstrating differences in prediction model accuracy, and third, providing information about the effect of bankruptcy prediction models on the company's stock price.

Regarding the practical contribution of this research, first, for the government to be able to encourage the implementation of various policies in an effort to restore the tourism sector and its derivatives, namely restaurants and hotels, including controlling the COVID-19 pandemic as an upstream of the current problems to increase public confidence in carrying out tourism activities and to be able to encourage the implementation of various policies in an effort to restore the tourism sector and its derivatives, namely restaurants and hotels, Second, providing input to company management on the importance of periodic analysis of the company's bankruptcy potential using various predictive models, so that preventive measures can be made and implemented to avoid the possibility of the company going bankrupt, as well as publishing reports related to the bankruptcy prediction analysis, to provide additional information to investors. Third, so that investors can consider information about bankruptcy prediction analysis, particularly the Springate model, which empirically has a significant influence on stock prices, and use it as a reference before engaging in investment activities.

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