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## The transition of enhancing financial performance in the mining and agriculture sector

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### Abstract

In times of crisis, a decline in company performance can potentially be the cause of bankruptcy. The study of financial distress and turnaround has a close relationship, because the successful turnaround is determined from efforts to overcome the company's problems with financial distress. The purpose of this study is to analyze the factors that significantly influence the transition of financial performance and also to formulate managerial implications related to the success of turnaround in mining and agriculture sub-sector companies. The logistic regression method (logit) is used to discriminate samples of companies with the distressed category and also the turnaround category. The results of the study show that the transition of the company's financial performance is influenced by the variables of company size, level of distress and industry type. Alternative strategies that have been formulated consist of efficiency and entrepreneurial oriented strategies. Based on studies that have been conducted, the agricultural sector has a better probability of transition than the mining sector.

### Abstract

Penurunan kinerja perusahaan di saat krisis berpotensi menyebabkan kebangkrutan. Studi financial distress dan turnaround memiliki hubungan yang erat, karena keberhasilan turnaround ditentukan dari upaya untuk mengatasi masalah yang membawa perusahaan ke dalam financial distress. Tujuan dari penelitian ini adalah untuk menganalisis faktor yang mempengaruhi transisi kinerja keuangan perusahaan dan merumuskan implikasi manajerial terkait keberhasilan turnaround pada perusahaan sub-sektor pertambangan dan pertanian. Metode regresi logistik (logit) digunakan untuk mendiskriminasi sampel perusahaan dengan kategori distress dan juga kategori turnaround. Hasil penelitian menunjukkan bahwa transisi kinerja keuangan perusahaan dipengaruhi oleh variabel ukuran perusahaan, tingkat distress dan tipe industri. Alternatif strategi yang telah dirumuskan terdiri dari strategi berorientasi efisiensi dan wirausaha. Berdasarkan studi yang telah dilakukan, sektor pertanian mempunyai probabilitas lebih baik dalam transisi dibandingkan sektor pertambangan.

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## 1. Introduction

In the middle of 2007, the subprime mortgage crisis triggered a financial crisis in the United States. The financial crisis, which began to expand on a global scale in the following year, led to the closure of several world's giant financial institutions and the collapse of stock indices in various countries (Indonesia Stock Exchange, 2008).

In Indonesia, sectors which experienced the largest decline were mining and agriculture, fell by 73.16 percent and 66.64 percent, respectively. Both sectors hit another big decline in 2015, fell by 42.14 percent and 33.04 percent. From the total of 4 sub-sectors, coal and oil and gas have made the biggest contribution to the decline of mining sector index. Declined of crude oil demand in China led to an excess supply of global crude oil, which brought bigger impact to the weak commodity prices. (Ministry of Energy and Mineral Resources, 2015). While the declined in agricultural sector index was followed by the fell of crude palm oil commodity prices. Thus, mining and agricultural commodity prices are directly proportional to the market capitalization of Indonesian Composite Stock Price Index (CSPI).

Companies are likely to experience a declining performance as the market capitalization touched the lowest figure in 2008, Odularu (2009) found that there is a positive relationship between market capitalization and company performance. In times of crisis, a decline in company performance can potentially be the cause of bankruptcy.

The bankruptcy of a company begins with a stage of decline in financial conditions which is called financial distress. Platt & Platt (2002) described financial distress as a stage of decline in financial conditions before bankruptcy and liquidation. A year later, CSPI market capitalization began to increase and shows that several companies have managed to improve their performance from the crisis period. The transition in overcoming the decline in com-

pany performance is called turnaround (Prasad, 2006).

The study of financial distress and turnaround has a close relationship because the successful turnaround is determined from efforts to overcome the company's problems with financial distress (Candrawati, 2008). The purpose of this study is to analyze the factors that significantly influence the transition of financial performance and also to formulate managerial implications related to the success of turnaround in mining and agriculture sub-sector companies. This research is expected to provide more understanding of turnaround studies, especially in the scope of Indonesia.

## 2. Hypotheses Development

The United States financial crisis in 2007 affected financial, economic and business markets throughout the world, which brought impact to the decreased competitiveness level of a country and its companies. Mismanagement issues, poor effectiveness, and low products quality are some internal factors that may affect company performance. Those internal problems, which result in declining financial performance, make companies more vulnerable to external factors that may lead to crisis (Malaèiè & Malaèiè, 2016; Al-Thaqeb, 2018).

Turnaround studies in Indonesia are still rarely found. Candrawati (2008) has found variables that may a company listed in non-financial sector companies listed on the Jakarta Stock Exchange (JSE) to have a turnaround using logistic regression model with prediction accuracy of 88%. The variables, which are soundness level and company size, also the availability of free assets, have a significant effect on turnaround. Another study was conducted by Nastiti & Pangestuti (2016) on manufacturing companies listed on the JSE, shows that retrenchment and size of the company significantly affect the company financial performance.

Big companies considered to be more able to increase financial resources whenever the perfor-

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mance is decreasing and the economy is weakening (Chenchehene & Mensah, 2014). In this study, company size is measured by total assets, which can be used to describe lending capacity of a company (Smith & Graves, 2005). Company size is considered to be able to explain the capacity in attracting loans. Therefore, the first hypothesis in this study is:

H<sub>1</sub>: company size has a significant positive relationship with a turnaround in the mining and agriculture sectors

Capital restructuring is an important step for companies to make a turnaround. Ciorogariu & Goumas (2011) examined the prediction probability of distressed companies in having a turnaround based on financial condition, shows that total debt to total assets is one of the determinants in a successful turnaround. A decrease in total debt to total assets can be caused by company policy to reduce debt or by increasing the internal-funded total assets. Therefore, the second hypothesis in this study is:

H<sub>2</sub>: capital restructuring has a significant negative relationship with a turnaround in the mining and agriculture sectors

Robbin & Pearce (1992) examined a decrease in net assets from the previous year, defined as retrenchment, as a component of a successful turnaround and has a positive relationship to a turnaround. Francis & Desai (2005), which examined the companies' response to the decline in financial performance, shows that the companies' capabilities to overcome the decline is positively affected by retrenchment. Therefore, the third hypothesis in this study is:

H<sub>3</sub>: retrenchment has a significant positive relationship with a turnaround in the mining and agriculture sectors

High distress companies need to reduce expenses and assets to survive, therefore the more

difficult to have a turnaround (Robbins & Pearce, 1992). The required time for a company in restructuring is influenced by the level of distress (Sudarsanam & Lai, 2001). Companies with low distress level have a greater probability in having a transition (Candrawati, 2008). Therefore, the fourth hypothesis in this study is:

H<sub>4</sub>: changes in the level of distress have a significant negative relationship with a turnaround in the mining and agriculture sectors

Competitiveness level of industry influences the availability of choices and the effectiveness of strategies implemented by companies in financial difficulties (Rasheed, 2005). O'Neill (1986) introduced sub-strategies to implement turnaround strategies and found that the type of industry is one of the keys in formulating a turnaround strategy. Declining financial performance may be experienced by various large or small companies from various industrial sectors (Schuppe, 2005). Therefore, the fifth hypothesis in this study is:

H<sub>5</sub>: the industrial type has a significant relationship with a turnaround in the mining and agriculture sectors

### 3. Method, Data, and Analysis

This study uses data on annual financial statements of companies listed on the Indonesian stock exchange. There are 14 companies in the coal, plantation, oil, and gas sub-sectors with consistent financial statements from the 2007-2016 period.

In a study conducted by Altman, the cut-off point for distress category companies has a Z-score below 1.8 and the non-distress category has a value above 2.99. The cut-off point value for the distressed category used in this study is 2.395, the value is determined based on the cut point of the gray area value in the range 1.8-2.99.

The sample of turnaround and non-turnaround companies use the results of the classification of dis-

tress and non-distress companies. The time frame used in the identification of companies with the turnaround and non-turnaround categories is in the 1st and 2nd years in the span of 2 years. Companies with a turnaround category have a distress classification in year 1 and non-distress classification followed in year 2. Non-turnaround companies have a distress classification in year 1 and distress classification followed in year 2. The study conducted by Ciorogariu & Goumas (2011) explained that the use of time frames with a span of 4 years has a low discrimination rate and generates high misclassification.

### **Altman Z-score Model**

The financial distress indicator used in this study is the Z-score of the Altman model. The model with 5 variables including, working capital to total assets (WCTA), retained earnings to total assets (RETA), earnings before interest and taxes to total assets (EBITTA), market value of equity to book value of liabilities (MVEBVL), and sales to total assets (SATA). The Z-score model is known as a model to predict corporate bankruptcy. Independent variable values are expressed as absolute percentage values, except for the MVEBVL variable. Companies with non-distress status are coded with a value of 0 and distress status coded with a value of 1.

The Z-score model continues to be used throughout the world as a primary or supporting tool in the analysis of financial difficulties, although this model was developed several decades ago. The original Z-score model performed very well in several countries, such as Poland, Finland, and China. Altman et al. (2017) explain that the coefficient estimation only slightly increases the performance of the model classification. Altman in his research stated that the Z-score model has performed well in an international context.

Most of the previous studies on company bankruptcy and failure predictions were carried out in developed countries. Yap, Yong, & Poon (2010)

used the Z-score model to generate prediction models for public companies listed on Bursa Malaysia. The results showed that the Z-score model succeeded in giving high classification and prediction results.

In the scope of Indonesia, research on financial distress with the Z-score model is quite commonly used. Soelton (2019) conducted a study on financial distress with Altman Z-score and Springate methods in plantation industry companies. The research proves that both methods can be implemented to detect the possibility of bankruptcy. Other related research was conducted by Hadi & Anggraeni (2008), a study was conducted to find out the best of the three models, namely the Zmijewski, Altman, and Springate models. Based on the results of this study, it can be concluded that the Altman model is the best among the three predictors.

Altman has developed several models including those intended for non-public companies, non-manufacturing, and emerging markets. The selection of the model in this study is based on a study conducted by Altman, where a model with 5 variables is used in companies that go public and 3 other models in non-public companies.

### **Logistic Regression**

Binary Logistic Regression (logit) and Linear Discriminant Analysis (LDA) are widely used in multivariate statistics to analyze data with categorical dependent variables. The two methods have different characteristics because the logit method ignores the assumption of a normal distribution on explanatory variables. Logit is an appropriate model to describe the relationship between a dependent variable and a set of independent variables. This method is relatively reliable and flexible because financial ratio data are likely to be leptokurtic.

The models tested by the logit method are financial distress and turnaround models. The model is stated by the following equation:

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$$FD = \ln\left(\frac{\pi}{1-\pi}\right) = \alpha + \beta_a x_a^t + \beta_b x_b^t + \beta_c x_c^t + \beta_d x_d^t + \beta_e x_e^t + u \quad (1)$$

$$T = \ln\left(\frac{\pi}{1-\pi}\right) = \alpha + \beta_1 x_1^t + \beta_2 x_2^t + \beta_3 x_3^t + \beta_4 x_4^t + \beta_5 x_5^t + u \quad (2)$$

Where: *FD* = Financial distress category; *T* = Turnaround category;  $\pi$  = Probability of the outcome of category I;  $1-\pi$  = Probability of the outcome of category II;  $\alpha$  = Intercept;  $\beta$  = Regression coefficient; *U* = Random disturbance term;  $x_a$  = Working capital/Total assets;  $x_b$  = Retained earnings/Total assets;  $x_c$  = Earnings before interest and taxes/Total assets;  $x_d$  = Market value of equity/Book value of liabilities;  $x_e$  = Sales/Total assets;  $x_1$  = Company size;  $x_2$  = Capital restructuring;  $x_3$  = Retrenchment;  $x_4$  = Level of distress;  $x_5$  = Industry type

E-views 9 software is used as a tool in the estimation of both models. Measurement of 5 independent variables for the turnaround model can be seen in Table 1.

## 4. Results

The first test is the estimation of financial distress models in 140 sample classifications. Descriptive statistical results can be seen in Table 2.

The test results on the financial distress model can be seen in Table 3.

Based on the estimation results, -2 log-likelihood (-2LL) in block 1 has a value of 53.526. This value is smaller than the value of -2LL in block 0, so it can be concluded that the test result model has a good significance. The model consists of variables  $x_1$ ,  $x_4$ , and  $x_5$ . Those five variables proved to be significant at 5% level. Hosmer and Lemeshow test on the model have a value of 0.978, so the significance value is greater than the level of acceptance (goodness of fit test). Based on the test results, the financial distress (FD) model produces the following models:

**Table 1.** Measurement of variables in the turnaround model

Variable	Scale	Measurement
Company size	Ratio	Ln total assets
Capital restructuring	Ratio	$DAR^{(t)} - DAR^{(t-1)}$
Retrenchment	Ratio	$\frac{(Tangible\ assets^{(t-1)} - Tangible\ assets^{(t)})}{Tangible\ assets^{(t-1)}}$
Level of distress	Ratio	$(Zscore^{(t-1)} - Zscore^{(t)})$
Industry type	Binary	1 = Mining sub-sector, 0 = Agricultural sub-sector

**Table 2.** Descriptive statistics of the financial distress variable

	N	Minimum	Maximum	Mean	Std. deviation
WCTA	140	-1.45	0.67	0.1059	0.26564
RETA	140	-1.68	1.04	0.1354	0.44818
EBITTA	140	-0.19	0.65	0.1114	0.13265
MVEBVL	140	-0.47	9.25	1.7153	1.74741
SALTA	140	0.00	2.25	0.6828	0.48303

**Table 3.** Test results on the financial distress model

Variable	Coefficient	Std. Error	z-Statistic	Prob.
WCTA	0.035844	0.015517	2.310021	0.0209
RETA	0.056242	0.015080	3.729486	0.0002
EBITTA	-0.216722	0.078075	-2.775818	0.0055
MVEBVL	-0.035566	0.007814	-4.551489	0.0000
SATA	-5.652743	1.269735	-4.451907	0.0000
C	10.05392	1.930935	5.206761	0.0000
McFadden R-squared	0.723557	Mean dependent var		0.528571
S.D. dependent var	0.500975	S.E. of regression		0.246010
Akaike info criterion	0.468042	Sum squared resid		8.109771
Schwarz criterion	0.594113	Log-likelihood		-26.76297
Hannan-Quinn criter.	0.519274	Deviance		53.52595
Restr. Deviance	193.6238	Restr. log-likelihood		-96.81191
LR statistic	140.0979	Avg. log-likelihood		-0.191164
Prob(LR statistic)	0.000000			
Obs with Dep=0	66	Total obs		140
Obs with Dep=1	74			

**Table 4.** Descriptive statistics of the turnaround variable

	N	Minimum	Maximum	Mean	Std. deviation
SIZE	64	19.23	25.13	22.8222	1.24696
RESTR	64	-1.90	-0.16	-0.7041	0.29687
DOWN	64	-4.08	1.00	-0,1561	0.86438
TDIS	64	-2.24	1.57	-0,0839	0.56918
SEK	64	0	1	0.72	0.453

**Table 5.** Test results on the turnaround model

Variable	Coefficient	Std. Error	z-Statistic	Prob.
SIZE	-1.766061	1.055857	-1.672632	0.0944
RESTR	1.406697	2.102363	0.669103	0.5034
DOWN	-1.060101	0.670118	-1.581960	0.1137
TDIS	-4.817664	2.083938	-2.311808	0.0208
SEK	-3.907527	1.975037	-1.978458	0.0479
C	38.38597	23.31351	1.646512	0.0997
McFadden R-squared	0.558909	Mean dependent var		0.109375
S.D. dependent var	0.314576	S.E. of regression		0.229562
Akaike info criterion	0.492035	Sum squared resid		3.056534
Schwarz criterion	0.694430	Log-likelihood		-9.745117
Hannan-Quinn criter.	0.571769	Deviance		19.49023
Restr. Deviance	44.18645	Restr. log-likelihood		-22.09322
LR statistic	24.69621	Avg. log likelihood		-0.152267
Prob(LR statistic)	0.000159			
Obs with Dep=0	57	Total obs		64
Obs with Dep=1	7			

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$$FD = 10.054 + 0.036x_a^t + 0.056x_b^t - 0.217x_c^t - 0.036x_d^t - 5.653x_e^t \quad (3)$$

Where:  $FD$  = Financial distress category;  $x_a$  = Working capital/Total assets;  $x_b$  = Retained earnings/Total assets;  $x_c$  = Earnings before interest and taxes/Total assets;  $x_d$  = Market value of equity/Book value of liabilities;  $x_e$  = Sales/Total assets

The financial distress model produces an accuracy rate of 92.86%, misclassification of 7.58% in the category of non-distress companies, and misclassification of the distressed category of 6.76%. The model chosen in this study is based on the accuracy generated by the model. Statistical test results show that model 3 has the best accuracy and is relevant to be used for the next stage of research.

The second test is to estimate the turnaround model conducted on the results of the classification of financial distress samples. The classification results show that there are 64 samples with the turnaround and non-turnaround conditions. Descriptive statistical results can be seen in Table 4.

The test results on the turnaround model can be seen in Table 5.

Based on the estimation results, -2 log-likelihood (-2LL) in block 1 has a value of 19.490. This value is smaller than the value of -2LL in block 0, so it can be concluded that the test result model has a good significance. The model consists of variables  $x_1$ ,  $x_4$ , and  $x_5$ . Those three variables were proved to be significant at the level of 5% and 10%. Hosmer and Lemeshow test on the model have a value of 0.998, so the significance value is greater than the level of acceptance (goodness of fit test). Based on the test results, the turnaround (T) model produces the following models:

$$T = 38.386 - 1.766x_1^t - 4.818x_4^t - 3.908x_5^t \quad (4)$$

Where:  $T$  = Turnaround category;  $x_1$  = Company size;  $x_4$  = Level of distress;  $x_5$  = Industry type

The turnaround model produces an accuracy rate of 95.31%, misclassification of 1.75% in the non-turnaround category, and misclassification of the turnaround category of 28.57%. Multicollinearity test was performed on 3 turnaround variables to see the correlation between variables in the model. The company size, level of distress, and industry type variables have VIF values of 1,478, 1,112, and 1,056, respectively. The VIF value of the three variables does not indicate a strong relationship between variables. Based on the test results, the estimated turnaround model has good statistical results and accuracy. Model interpretation and evaluation are explained further in the discussion part.

## 5. Discussion

In the discussion part, hypotheses that have been developed will be further analyzed. The results of the hypothesis test are as follows:

The company size variable in the turnaround model has a significance value of 0.0944 at the 10 percent level. The coefficient on the model with a value of -1.766 explains that company size has a significant negative relationship to a turnaround in the mining and agriculture sectors, so hypothesis 1 which states the positive relationship of company size variables is rejected. The relationship of company size with a turnaround in this study shows that companies with smaller assets have better transition opportunities, this result is different from research conducted by Chenchehene & Mensah (2014) which states that companies with larger assets have more opportunities to perform a transition. The negative relationship between company size and turnaround in this study is consistent with research conducted by Ciorogariu & Goumas (2011). Companies with small assets are believed to have fewer hierarchical levels, this makes the process of communication with stakeholders easier, and the company can adapt quickly to determine the change of strategy.

The level of distress variable has a significance value of 0.0208 or significant at the 5 percent level. The coefficient on the model with a value of -4.818 explains that changes in the level of distress have a negative and significant relationship to a turnaround in the mining and agriculture sectors, so hypothesis 4 which states the level of distress variable has a significant negative relationship to a turnaround is accepted. The negative relationship between the level of distress and turnaround shows that companies that have improved financial performance have a better opportunity to perform the transition, the results of this study are consistent with research conducted by Candrawati (2008), Francis & Desai (2005).

Industrial type variable has a significance value of 0.0479 or significant at the level of 5 percent. The coefficient on the model with a value of -3.908 explains that the agricultural sector has a better transition opportunity than the mining sector, so hypothesis 5 which states that the industrial type variable has a significant relationship to a turnaround is accepted. Rasheed (2005) states that the competitive industry environment and industry maturity influence the alternative and effectiveness of turnaround strategies implemented by companies with financial difficulties. Certain industries or companies are most likely to face financial difficulties due to the decline experienced by related sectors (Mukhopadhyay et al., 2018). Capital market statistics in the 2007-2016 period show that the agricultural sector has a better performance compared to the mining sector. The agricultural sector depreciated in 4 periods with an average of 26.7 percent, while the mining sector depreciated in 6 periods with an average of 31.4 percent. The performance of the two sectors in the 2007-2016 period is consistent with the results of the study, the coefficient value of the industrial type variable indicates that the agricultural sector has a better chance of transition than the mining sector.

In the next discussion part, alternative strategies will be formulated based on changes in the value of financial ratios and research variables. During the 2007-2016 period, there were 74 samples of companies with distress conditions and 66 samples with non-distress conditions. In 2015, when the economic recession occurred, 11 companies were identified as distress category. In contrast to the 2015 crisis period, the number of distress companies in 2008 had the lowest number. The number of companies that experienced distress during the two crisis periods showed that the company's capabilities to adapt to the environment tended to be different. Companies can use several alternative strategies to overcome a decline in financial performance. In a study conducted by Smith & Graves (2005), efficiency-oriented and entrepreneurial-oriented strategies are considered to be an alternative in overcoming the decline in financial performance. Alternative strategies that have been formulated are as follows:

The first alternative is efficiency-oriented, one of the mining sector companies in the 2007 period succeeded in implementing this strategy by reducing its operational assets. The strategy is carried out by selling machinery and equipment assets, and also purchasing several intangible assets.

The second alternative is entrepreneurial-oriented, there are companies in the mining and agriculture sectors in the 2007 period that have succeeded in implementing this strategy by increasing total assets and sales. The strategy is carried out by reclassifying assets and investing in property. The increase in assets was also caused by the increase in the value of receivables and cash on hand.

The third alternative is entrepreneurial oriented, one of the mining sector companies in the 2015 period has succeeded in implementing this strategy by conducting assets divestment and increasing the company's profit. The strategy is carried out by divestment of exploration assets and make a significant increase in profit.



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### 6. Conclusion, Limitations, and Suggestions

#### Conclusion

The results showed that the transition of the company's financial performance is influenced by the variables of company size, level of distress and industry type. Alternative strategies that have been formulated consist of efficiency and entrepreneurial oriented strategies. Based on studies that have been conducted, the agricultural sector has a better probability of transition than the mining sector.

#### Limitation and suggestions

This research has limited scope, so the model can only be used in certain industries. The limitations of research data also pose a challenge in producing a reliable model used to predict the transition of company financial performance. Future studies are expected to provide a broader picture of the variables that affect the company's financial performance transition, especially external factors.

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