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A Survival Analysis of Indonesian Distressed Company Using Cox Hazard Model

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ABSTRACT

The aim of this study is to see if the control of corruption and financial ratios affect the survival likelihood of financially distressed companies. Of the public listed companies noted on the Indonesian Stock Exchange between 2002-2014, sixty one (61) financially distressed companies were identified as samples via the purposive random sampling approach. The result of Cox proportional hazards regressions showed that the control of corruption had a negative impact on the survival likelihood of the distressed companies, which means the better control of corruption will make the company's financial distress decreased. Size also has a negative influence to the financial distress, the higher the size of the company will decrease the company's financial distress. But this study proved that the higher the liquidity of the company, the higher the company's financial distress. This study proves that agency problems exist in such companies and that corruption is an obstacle that impedes the economic growth.

Keywords: cox hazard model, distressed company, survival analysis.

JEL Classification: G33, G3

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INTRODUCTION

Until a few years ago, society views corruption as the third world war, a massive problem where greedy civil servants and politicians exploit their position and power to acquire wealth for their families and themselves (Asian Intelligence, 2014). 'War against Corruption' has become an important agenda for many international and government organizations in both developed and developing countries (Nguyen & Dijk, 2012).

From the Asian Intelligence (2014) data gathered, it was noted that Indonesia had acquired a bad score (8.85) for corruption impact on the business environment (the score range is 1-10 with 10 being the worst). This score is worse than the score held by other ASEAN countries such as Singapore (1.6), Malaysia (5.25), the Philippines (7.85), Thailand (8.25), and Cambodia (8.00). Based on the World Bank data extracted and by using the International Country Risk Guide Methodology (ICRG), it was noted that Indonesia's score of corruption control stood at 0.5, making it a country with an average risk (http://info.worldbank.org/governance/wgi/pdf/c102.pdf). A study focusing on the corruption impact on company's capital cost in Indonesia was conducted by Cashman, Harrison and Sheng (2014). Their result showed that in the property sector in Indonesia, the increase in corruption affects the cost of equity.

From their research done on Turkey, Ayaydin and Hayaloglu (2014) found that the corruption measure forecasted by the Corruption Price Index has a positive impact on the company's growth. In Vietnam, While, Rand and Tarp (2010) found that bribery has a negative impact on the company's growth. Meanwhile, the World Bank (2003) states that Corruption has a negative impact on the company's sales growth although it is not significant. From the literature reviewed, there were two opinions about the impact of corruption on the company's growth: positive or negative. If corruption, as one of the company's cost, can affect the company's growth, the condition brings about one question, does corruption affect the company's financial performance? This then leads to the question of how a company's financial distress is caused.

Data extracted from the Indonesian Stock Exchange showed that companies which had undergone financial distress from 2002 to 2014 also shrunk in number and it creates a negative equity average. These data further showed that corruption control in Indonesia had increased during the same period and this implies that there is an improvement in corruption control. However, in 2013 and 2014, the number of companies that had undergone financial distress increased along with their negative equity average. This then leads to another question, why did it happen?

One of the possible reasons causing the negative equity average during those years (2002-2014) could be attributed to the company's scale which could have grown bigger over time. When the activity scale of a company gets bigger, and if the company undergoes financial distress, then the negative equity will be high. The change occurring to a company's scale can also cause a change in the company's financial performance. Due to this, there is thus, a need to investigate whether the financial performance of a company plays a certain role in affecting the financial distress of the respective company. Besides considering the company's size, the variable of its operational risk, liquidity, profitability risk, return on assets, and market perception will also be investigated. For this to happen, the price book value is used as an indicator.

Previous studies which use financial ratio as an indicator in looking at bankruptcy prediction have been done (Beaver, 1966; Altman, 1968; Ohlson, 1980; Zmijeski, 1984; Louma & Laitinen, 1991; Wheelock & Wilson, 2000; Turetsky & McEwen, 2001; and Ahmad, 2013). Past studies show that corruption may negatively affect the company's growth that eventually will be a bad influence on company performance and could cause the company's financial distress. Another study also demonstrated that financial distress is influenced by the performance of companies as reflected in the financial ratios that are owned by the company. Therefore, this study aims to see if there is any influence between corruption and financial ratios leading to the financial distress of a company. This study is conducted by using the Cox's survival hazard model where the respective data of the companies undergoing financial distress during the period of 2002 to 2014 is assessed. As stated by Shumway (2001), Cox's survival hazard analysis technique is more accurate and consistent than other statistical models.

It is hoped that the outcomes of this study can contribute to knowledge in a number of ways. Firstly, this study contributes to the knowledge of financial distress prediction in emerging markets as the findings noted are certainly different from those observed in developed countries particularly the issue of corruption. Secondly, by using Cox's survival hazard model, this study provides a more accurate forecast of the prediction made.

LITERATURE REVIEW

Corruption

Corruption is the abuse of public power for private gains (Cuervo-Cazurra, 2006). As an important issue worldwide, corruption is often associated with someone who has the discretionary power to allocate certain resources (Jain, 2001). Such power is owned by the political elites, the administrators, and the legislators (Athanasouli, Goujard, & Sklias, 2012). Corruption is an obstacle to a country' economic growth and its political stability. Literature have long supported this claim although some claim that corruption may not have any adverse effect on a country. Khan (2006), for instance, provided evidence to show that there were only a few developing countries in the world with low levels of corruption suggesting that corruption exists all over the world. The only is its intensity.

There are two main strands of literature which can be used in discussing the concept of corruption. The first one is that corruption is an obstacle to the economic growth of a country. This is supported by empirical evidence (la Porta, De Silanes, Shleiter & Vishny, 1999) and Treisman, 2003).which showed that corruption correlates negatively to the economic growth and development of a country. The second strand of literature posits that corruption has a positive impact on the company's growth which is attained by the company though facing the bureaucracy and cutting the process (Wei, 1998).

Thus far, there is little study to suggest that there is an association between corruption and the financial distress experienced by a company and due to this reason, it is hereby assumed that corruption correlates negatively with a company's growth. In the context of this study, a growing company is deemed to be a company that does not experience any financial distress.

Further, it is also assumed that the control of corruption will have a negative effect on the likelihood of companies suffering from financial distress.

In this study, the corruption indicator data were extracted from the Country Risk Guide Methodology (ICRG) which is located within the Political Service Group (PRS). Besides acquiring the complete set of data from the research period of between 2002-2014, this study also chooses to apply the ICRG index.

Financial Ratios

In their study, Jensen and Meckling (1976) explored agency costs, and the sources of such agency costs were termed as monitoring costs, bonding costs and residual loss respectively. The agency problem noted in the agency theory will bring more costs to the agency and this happens because the company uses debts that had been developed, based on the relationship between the owners and creditors. Increased debt will increase the risk of non-payment of fixed obligations of the company, and this can cause those companies to suffer financial distress. This happens in companies because the larger the debt of the company is, the bigger the risk of the company in being unable to pay for its fixed obligations. Besides, the asymmetric information developed by the owners and shareholders can cause a lopsided condition where one party has more information (manager) than the other party (investor). This lopsidedness make companies more likely to maintain their debts as a result of bad signaling. Consequently, the risk these companies experience can cause the financial distress to become greater.

Leverage

In the context of banking or economy, Financial Ratios is measured by comparing the total debt and the total asset. Literature focusing on financial distress gives specific evidence for the association between the financial leverage and the financial distress of a company. Beaver (1966) used the univariate analysis and stated that the debt ratio is one of the six best predictors for a company's failure. Flagg, Giroux and Wiggins (1991) found that the debt ratio effect is significantly positive to business failure. Positive effect is also shown in the study of Tinoco and Wilson (2013) and Ahmad (2013), who found evidence to suggest that the bigger the company's leverage, the bigger its possibility of suffering from financial distress.

Operational Risk

Operational risk showed the sales ability of the total assets used. Hopefully, the possibility to become bankrupt will decrease when the asset ratio towards the total sales decreases. Thus, in this study, operational risk is expected to have a positive effect on the company's financial distress. The study done by Parker, Peters and Turetsky (2011) showed that the operational ratio is less than 1 hazard ratio which means that the possibility of a company suffering from financial distress also decreases although this may not be significant.

Size

The company's size is measured by its log total assets (Parker, *et al.*,, 2011, and Rommer, 2005). The bigger the company's assets, the bigger its risk in keeping its performance. The possibility of such companies becoming bankrupt is expected to increase as the companies gets bigger in size. This study supports the idea that there is a positive effect between the company's size and its possibility of becoming bankrupt (see Parker, *et al.*,. (2011). The same study done in the US showed that the bigger the size of a company, the bigger its possibility of suffering from financial distress. The result noted here is consistent with the studies done by Tinoco and Wilson (2003) and Fich and Slezak (2008).

Liquidity

Literature showed liquidity as the direct determinant of a company's ability to defend against bankruptcy (Chen & Lee, 1993). Liquidity is measured by comparing company's current asset and current debt which are related to its capability to defend the cash flow. The high liquidity level will decrease the company's possibility of failing financially. This means that the company will have the capability to pay its obligations on due time. Most illiquid companies will become financially insolvent and finally, turn bankrupt. Parker, *et al.,* (2011) found that liquidity has a negative effect on the company's financial distress possibility. A study by Elloumi and Gueyle (2001) in Canada also found that high liquidity will decrease the company's possibility of being in financial distress. Abdullah (2006) in his study of Malaysian companies also noted that the more liquid the company is, the smaller its possibility will be to experience financial distress.

Profitability

The ratio, which is measured by the return on sales (EBIT/Sales), shows the company's capability of recover itself from financial distress. The high operational profit margin shows that the company is capable of gaining high operational profit which enables the company to pay all its financial obligations. This profitability ratio is expected to have a negative correlation with the company's possibility of becoming bankrupt. Thus, the higher the company's capability to gain profit, the smaller the possibility of being in financial distress. Studies of the same possibility were conducted by Parker, *et al.,* (2011) and Donato and Nieddu (2014) in Italy. They found that the higher the company's capability to gain profit, the smaller its possibility of being in financial distress.

Return on Assets

To measure the company's capability in gaining profit which is entirely based on its assets, the Return on Assets measure is applied. This measures the whole effectiveness of the company in gaining profit through its available assets based on its capability to gain profit from the invested capital. Louma and Laitinen (1991) used Cox's proportional hazard model to show that there is a negative effect between the return on investment and the company's failure. The study

by Ahmad (2013) on Indonesian companies used the logic model to measure and he too noted that there was a negative effect between Return on Assets and financial distress.

Price Book Value

In economy, an efficient market will usually contain non-financial information such as management quality or product strategy and its influence on the accounting data. In banking, the basic perception is measured by the price book value towards the Market Value whereby the higher value gives a negative signal of the market perception towards the company's prospect (Fama & French, 1992). When the market risk ratio increases, it reflects the lower market judgment which may lead to a high possibility of bankruptcy. A study done by Parker *et al.,.*(2011) indicated that there was a hazard ratio of bigger than 1 (>1) and this is a signal of increasing bankruptcy if the market perception increases, even if it is not significant.

Price Earnings Ratio

Price Earnings Ratio is the ratio between price and earning. The low value of this ratio shows that the market has low company earnings growth forecast. The high forecast of the company's earnings shows that there is a high capability of the company to gain high profit which is expected to decrease the company's possibility of being in financial distress. Price Earnings Ratio shows the amount the investor would pay for each dollar of profit that is reported (Brigham & Houston, 2010). Price Earnings Ratio also shows the earnings growth of a company, and this is something which interests the investor. It also affects the share price movement. The smaller the share price earnings ratio, the better it will be for the investor because this means that the share is cheap and the company's working performance is getting more efficient and effective. In other words, the company's asset usability to gain earning is also better. Because of this condition, there is an assumption that the PER affects negatively on the probability of the company's failure.

METHODS

To see the effect of the control of corruption and the financial ratios on the company's financial distress condition, Cox's survival hazard analysis technique was used. This technique is used to explain or to predict the occurrence and timing events. Right censoring happens when some people do not experience the event. Cox regression is also a parametric method, thus, robust to non-normal distributions. This is very important because the data of the financial ratio and the corruption control are not normally distributed.

Hazard rate, which is available in Cox's Proportional Hazard Model, shows the likelihood of an event. Then, the estimation of parameter values for the variables was analyzed by comparing the proportional effect on the hazard rate and the baseline hazard (Parker, *et al.*, 2011). Coefficient b shows the change in hazard rate when there is one unit change in the independent variable if other variables do not change. If the value of the hazard ratio is 1, it means that the change in the independent variable is constant. If the value of the hazard ratio

is less (more) than 1, it shows a lower (higher) likelihood of financial distress.

The event under this study is the financial distress condition experienced by banks. Financial distress is a condition whereby a company is unable to fulfill its obligation thus, showing its negative equity value in its financial report (Beaver, 1966). The company's status is coded 1 if it suffers financial distress, i.e. when it has negative equity. It is coded 0 if it does not suffer financial distress. Time is the time where a company experiences the event. The observation period in this study was from 2002 to 2014. Variable predictors or covariates in this study include the control of corruption and the financial ratios include leverage, operational risk, size, liquidity, profitability risk, return on assets and price book value.

The population identified for this study are public listed companies noted on the Indonesian Stock Exchange. Purposive random sampling was used in this study. The sampling criteria comprise the condition that companies had suffered from financial distress during the research period between 2002-2014; companies must own complete dataset and companies have to be non-financial companies. Only those companies that had experienced financial distress were chosen as the samples because as stated by Parker, *et al.,* (2011), the use of samples only for the financial distressed companies will increase the power of survival analysis test because observing well-defined companies will point in time. From the purposive random sampling used, 61 companies were identified as samples.

The model used in this study is:

$$hi(t) = ho(t).\exp(b1\ CC + b2\ LEV + b3OR + b4Sz + b5Liq + b6\ Proft + b7\ ROA + b8PBV + b9\ PER).$$

LEV is the company's leverage. It shows the comparison between the total debt and the total asset. OR is the company's operational risk. It shows the operational risk measured by comparing the total asset and the total sales. Size is the company's size. It is measured by the log of the total asset. Liquidity is measured by comparing the current asset and the current debt. Profitability is the profitability risk seen by comparing the operating income and sales. Return on asset is measured by comparing the earnings after tax and the total asset. PBV is the Price Book Value. It reflects the market perception and is measured by comparing the book value common equity and the market value common equity. PER is price earnings ratio.

RESULTS AND DISCUSSION

The descriptive data test (table 1) showed that the average of the leverage is 1.1785 with a range going between 0.0001 – 5.1105 and the standard deviation of 0.7847. The variables noted from the operational risk, liquidity, profitability, Return on Asset, Price Book Value and Price Earnings Ratio, have the standard deviation value which is smaller than the mean. This suggests that the value of the mean can be used as the representative of the entire data.

Table 1. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
CC	61	0.1700	0.6700	0.2987	0.1655
LEV	61	0.0001	5.1105	1.1785	0.7847
OPRISK	61	0.0685	28.7298	3.8539	50.5494
SIZE	61	2.7536	7.9342	5.7965	0.9001
LIQ	61	0.0878	14.0978	2.4451	3.3266
PROFT	61	-17.4366	5.0313	-0.5063	2.5771
ROA	61	-987.7700	0.8485	-16.9775	126.5033
PBV	61	-113.1400	93.4900	-3.6180	22.3373
PER	61	-0.4000	2.3894	0.0499	0.37869

Source: estimation results

The Omnibus Test of Model showed a likelihood of -2 is 354.012 with Chi-Square of 40.233. This is significant to 1% alpha. It shows that the model is fit. The result of the statistics test noted in Table 2 showed three (3) variables that affected the company's likelihood of suffering from financial distress. The liquidity has a positive significant effect at alpha 5%, size significant is at alpha 10% with negative effect, and the control of corruption significant is at alpha 1% with negative effect. It seems that Agency problems exist in this company. The average leverage is 1.178 and this indicates that the companies were not applying a conservative capital structure management hence, causing the companies to experience financial distress.

The result of Cox's Proportional Hazard Model showed that an increase in the control of corruption would lead to a possibility of a decrease for companies to suffer from financial distress. Thus, this result supported the findings noted in other studies which state that corruption has a negative effect on the company's likelihood to suffer financial distress. The higher the corruption control of a country is, the smaller the cost it has to pay. The smaller cost would cause a decrease of its possibility to suffer financial distress. In this research, the data of corruption control taken from the ICRG showed that the value got bigger. This means that the control of corruption in Indonesia is also getting better. The better steps taken by the Indonesian government to handle corruption indicates the active work of the Corruption Eradication Commission (KPK). This move seems to have a positive effect on the companies' financial performances which enable the companies to avoid financial distress.

The test using Cox's Proportional Hazard Model also showed that size is the variable that had negative effect on the company's likelihood to suffer from financial distress. This means that the bigger the company size, the smaller the company's likelihood of suffering from financial distress. When the company gets bigger, the assets would also become bigger thereby, making the company's capability of getting external capital sources higher. Thus, if the company suffers from financial distress, the company could easily use its external capital source to recover. This makes the company's possibility of suffering from financial distress smaller. The larger companies would be able to have qualified human resources which help to support the company's performance and indirectly, helps these companies to avoid financial distress. Large companies could also be more efficient in getting other resources such as raw materials or other supplies. This occurs because of the bargaining power large companies have

over smaller companies. With a lower cost, the company could also generate larger profits and thereby, avoid suffering from financial distress. This study is not consistent with the findings of the study noted by Parker, et.al. (2011), Tinoco and Wilson (2003), and Fich and Slezak (2008).

Table 2. Statistical results

Variables	Cox Proportional Hazard Regression	
	Hazard Ratio	p-value
Control of Corruption	0.000***	0.000
Leverage	1.163	0.376
Operational risk	1.015	0.594
Size	0.678*	0.053
Liquidity	1.105**	0.046
Profitability risk	1.024	0.770
ROA	0.999	0.542
PBV	1.008	0.293
PER	0.477	0.109

Source: estimation results
*) significant at alpha10%
**) significant at alpha 5%
***) significant at alpha 1%

From this study, it appears that liquidity has a positive and significant effect on the company's likelihood of suffering from financial distress. If the current ratio increases, the financially distressed Indonesian companies run by families also rises. The average liquidity of family firms (companies) is 2.4451, showing a high liquidity. If the company has liquidity, its profitability would reduce. If the company is not profitable, it is likely to suffer losses so there would be a chance that the company would enter into a financial distress condition. This finding of the current study is supported by Pranowo, Achsani, Manurung and Nuryantono (2010) and Kristanti, Sri, and Huda (2016) who looked at Indonesian companies and located evidence which showed a positive effect between current ratio and financial distress.

It also appears that Leverage does not have any effect on financial distress. This finding is inconsistent with the reports noted by Kristanti, et.al. (2016) who found that there is no significant effect between operational risk and the company's financial distress. However, Tinoco and Wilson's (2013) study as well as Ahmad's (2013) study were contrary to this study.

The operational risk,that was measured by dividing the total asset with the total sales also does not show a significant effect on the company's likelihood to suffer from financial distress. The average of the operational risk is relatively low, that is 16.15. This means that the company's sale is still relatively small as compared to its total asset; it also means that the operational risk is not strong enough to affect the company's likelihood of suffering from financial distress. The study done by Kristanti, et.al. (2016) on Indonesian Family Business indicated that there was no significant effect between operational risk and the company's financial distress. This finding is also proven by a study conducted by Parker, et.al. (2011) in the USA.

In addition, this study also found that Profitability does not have any effect either. This is because in this study profitability which was measured by comparing the expenses and sales

showed the company's capability to gain profits. In this study, it was found that the average operating income of the company was -0.421. This means that the company had difficulty in paying its fixed cost. The findings of this study is also consistent with the results noted by Kristanti, *et al.,.* (2016) who indicated that there was no significant effect between profitability and the company's financial distress.

Return on Asset, likewise, does not show any significant effect on the company's likelihood to suffer from financial distress. Return on Asset which is owned by the company was measured by dividing the earnings after tax with its total asset. The descriptive data extracted from this study showed that the average of the ROA has a negative value,that is -16.9775. This means that most Indonesian companies suffered loss during the research period. It further indicated that most companies had negative operating income and that it would be difficult for the company to pay its fixed obligation because its profit was negative. As a result, the company's possibility of suffering from financial distress is higher. This finding is not shocking because the samples in this research were all companies which had suffered from financial distress.

The higher the company's earnings growth forecast, the higher the PER of the company would be. The PER had no significant effect on the company's likelihood of suffering from financial distress. When the PER gets bigger, the company's possibility of suffering from financial distress got smaller and vice versa. The PER average noted in this study is 0.04. This means that the market's judgement of the company's earnings growth would be low in the future. This can be understood because the company samples extracted for this study comprised of those that suffered from financial distress. However, the market still judged the forecast of the company's earnings growth to be positive. Thus, the high PER, which means good market judgment on the company's earnings, would minimize its possibility of suffering from financial distress.

The Price Book Value is the basic market judgment for a company if the value of the PBV gets better. The average PBV is -3.6180. In this study, it was noted that the PBV did not have any effect on the company's financial distress because although the company's financial condition was indicated not so well, it was not strong enough to make the company suffer financial distress. The findings of this study are consistent with the results of the study done by Kristanti, *et al.,* (2016) which indicated that there was no significant effect between the PBV and the company's financial distress.

CONCLUSION

This study can be used by governments as input for future improvements to be made to the control of corruption so as to increase economic growth which can be achieved by reducing companies experiencing financial distress. Corruption in Indonesia has a negative effect on the likelihood of companies to suffer from financial distress. This study proves that corruption is an obstacle for the country's economic growth. When the control of corruption gets better, the company's possibility of suffering from financial distress gets lower. This study also proves that agency problems exist. The high mean of leverage shows that the company did not implement a conservative capital structure management. As for the size of the company,

by being a large company with a better bargaining power, the company has a viable option to consider because it can decrease the likelihood of experiencing financial distress. There is a trade-off between profitability and liquidity, the higher the liquidity, the lower the company's ability to earn a profit. As a result, companies may experience financial distress

This study still has some weaknesses. Therefore, future studies might want to consider adding the variable of macro-economic and or corporate governance. In developing countries such as Indonesia, the macro condition is relatively easy to change. This can affect the companies' working performance and finally, cause financial distress. Good corporate governance, which has been applied in many companies, is expected to be able to affect the companies' performance and then affect the companies' possibility of suffering from financial distress.

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