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FINANCIAL DISTRESS PREDICTION: THE ROLE OF FINANCIAL RATIO AND FIRM SIZE

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Abstract
Financial distress reflects a continuous decline in the company's financial performance that needs to be predicted and minimized. Therefore, this study aims to test financial ratios in predicting financial distress moderated by firm size with a sample of 128 manufacturing companies listed on the Indonesia Stock Exchange in 2018-2020. The data analysis method is Structural Equation Model based on Partial Least Square (SEM-PLS) with SmartPLS 3.0. The results showed that leverage and liquidity negatively affected financial distress, but operating cash flow had the opposite effect. Meanwhile, firm size can moderate the effect of leverage and operating cash flow on financial distress, but on the other hand, firm size weakens the relationship of liquidity to financial distress. Therefore, the implications of this research for manufacturing companies serve as a benchmark for analyzing financial distress.

INTRODUCTION

Indonesia's economic growth in 2020 decreased due to Covid-19 by minus 2.07% (Kemenkeu, 2021). The decline in economic growth is expected by companies in Indonesia, especially manufacturing companies, to be able to compete and survive. However, companies that fail have the potential to experience financial problems or financial distress. Lucky & Michael, (2019); Santoso & Nugrahanti, (2022) revealed that financial distress is a condition of a company that is unable to pay its maturing financial obligations. In 2018, three delisted manufacturing companies from the Indonesia Stock Exchange, including PT. Jaya Pari Steel Tbk., PT. Dwi Aneka Jaya Kemasindo Tbk., and PT. Taisho Pharmaceutical Indonesia Tbk. PT. Dwi Aneka Jaya Kemasindo Tbk. was declared delisted by the Central Jakarta District Court because it has a liability of Rp428.27 billion to PT. Bank Mandiri Tbk (CNBC Indonesia, 2018).

Companies that go bankrupt cannot be separated from the liabilities that the company bears. Therefore, companies are expected to monitor their financial ratios which act as indicators for assessing the company's development (Liang et al., 2016). Financial ratios show how much the current and non-current liabilities are seen from leverage and liquidity (Ayash & Rastad, 2021; Chiaramonte & Casu, 2017; Isayas, 2021; Kalash, 2021). In addition, financial ratios can describe the company's ability related to cash receipts and disbursements for operational activities (Fawzi et al., 2015; Karas & Reznakova, 2020; Papadaki & Pavlopoulou-Lelaki,

2022). Some of these financial ratios are important for assessing the company's development. Therefore, the company seeks to optimize its finances so that its financial condition can be known.

Several previous studies showed different results. Findings of Waqas & Md-Rus (2018); Balasubramanian et al., (2019); Ikpesu (2019); Lucky & Michael (2019); Ugur et al., (2022) described that financial distress could be minimized by leverage. Meanwhile, Muigai & Muriithi (2017); Masdupi et al., (2018) show that increasing leverage causes the potential for companies to experience financial distress to be higher. Chiaramonte & Casu (2017); Waqas & Md-Rus (2018) illustrates that liquidity positively impacts financial distress. In contrast, the findings of Masdupi et al., (2018); Balasubramanian et al., (2019); Ikpesu (2019); Isayas (2021) explained that companies have a low ability to pay liabilities and interest expenses. Fawzi et al., (2015); Waqas & Md-Rus (2018); Karas & Reznakova (2020) argues that optimal operating cash flow can decrease the risk of a company experiencing financial problems or financial distress. However, different results by Sayari & Mugan, (2013); Balasubramanian et al., (2019); Phan et al., (2022) stated that the more operating cash flows out than cash inflows, the more difficult it is to pay.

The ability of financial ratios in analyzing financial distress cannot be separated from the number of company assets as reflected by the size of the company (Mselmi et al., 2017). The more assets owned, the company is classified as a large firm size, and vice versa. Cathcart et al., (2020) suggested that large companies are considered consumers of low-risk credit because they have a large collateral structure. Muigai & Muriithi, 2017; Gichaiya et al., 2019; Suharti et al., 2021) showed that firm size could strengthen financial ratios (leverage, liquidity, and operating cash flow) in predicting financial distress. On the contrary, Sunaryo (2021) described firm size weakens the relationship between financial ratios on financial distress. It is because companies with small assets are unable to pay off their liabilities are not able to run operations optimally, so they have the potential to experience financial problems.

The use of liabilities in the company's activities is described by measuring the company's leverage (Isayas, 2021; Geno et al., 2022). The more the company's obligations, the greater the responsibilities that must be paid in the future. Based on agency theory, leverage can be a tool of responsibility that reduces agency problems (Ugur et al., 2022). Accordingly, the company seeks to minimize agency costs by optimizing external funds to obtain large profits (Tekin & Polat, 2021); then the possibility of the company going bankrupt is slighter (Lucky & Michael, 2019). Meanwhile, companies that are able to manage liabilities effectively will have a good impact on the company's sustainability in the future (Waqas & Md-Rus, 2018). It shows that leverage is able to prevent the company's risk of experiencing financial distress (Balasubramanian et al., 2019; Ugur et al., 2022)

The number of the liability owned by the company is one of the factors in analyzing financial distress. Agency theory shows that greater liabilities can reduce agency costs (Poursoleiman et al., 2020); because managers will work effectively to increase profits compared to the amount borrowed (Lee & Manual, 2019). Therefore, liquidity is needed to assess the company's capability to pay current liabilities that will mature with its current assets (Ikpesu, 2019). The company's current assets are more than current liabilities are expected to be able to pay all liabilities and interest in the future (Masdupi et al., 2018). Companies that make the best use of their liabilities to generate greater profits, have an impact on healthy company finances and avoid financial distress problems. Chiaramonte & Casu (2017); Waqas & Md-Rus (2018) explained that liquidity could predict financial distress in a company.

The company's financial condition becomes essential information about the company's health, as well as the company's operating cash flow. Companies with a relatively high operating cash flow indicate that the company can pay the expenses that are part of operational activities (Finishtya, 2019). Based on agency theory, shareholders can provide full confidence in management performance through cash flow statements, so as to minimize agency conflicts (Dudley & Yin, 2018). In addition, it will provide good information for potential investors, so they are interested in giving their capital to the company. Sayari & Mugan (2013) explained that companies with cash flows from operations and investments also tend to have low credit risk. Therefore, operating cash flow shows a good influence on the company (Karas & Reznakova, 2020); so the potential for financial distress is getting smaller (Fawzi et al., 2015; Waqas & Md-Rus, 2018).

The use of financial ratios in analyzing financial distress cannot be separated from other factors such as few or many assets owned by the company (Masdupi et al., 2018). Companies with small assets take advantage of more significant liabilities for their growth, hence the interest expense incurred is also more significant. Meanwhile, Sardo et al., (2022) argues that large collateral structures are owned by large companies, because credit consumers have little risk. Therefore, creditors generally prefer large companies because of their low risk of financial distress (Ugur et al., 2022). In addition, firm size also reflects sufficient cash to fund its operational activities, so that operating cash flow represents a positive value (Papadaki & Pavlopoulou-Lelaki, 2022). It illustrates that the firm size can impact the relationship of financial ratios (leverage, liquidity, and operating cash flow) to financial distress (Muigai & Muriithi, 2017; Gichaiya et al., 2019; Suharti et al., 2021).

The novelty of this research lies in the research model that examines the role of firm size in moderating the effect of financial ratios on financial distress in manufacturing companies on the Indonesia Stock Exchange in 2018-2020. The selection of manufacturing companies as research samples, because this sector has an important role in the Indonesian economy during the Covid-19 pandemic. In addition, manufacturing companies have stable net income compared to other corporate sectors. Furthermore, Indonesia is also the largest manufacturing industry base in ASEAN and is one of five countries, namely China (28.8%), South Korea (27%), Japan (21%), Germany (20.6%), and Indonesia (20.5%) whose manufacturing industry sector is able to contribute above average (17%) to the country's economy (Kemenperin, 2019). This research has implications for manufacturing companies to pay more attention to their financial condition to prevent financial distress. Furthermore, for the government especially the Financial Services Authority, it can be a guideline for establishing regulations related to the measurement of the use of liabilities.

METHODS

All companies listed on the Indonesia Stock Exchange (IDX) in 2018-2020 as the research population. Sampling using purposive sampling method, with the following criteria:

Table 1. Research Sample Criteria

No.	Criteria	Total
1.	Manufacturing companies listed on the IDX in 2018-2020.	171
2.	Manufacturing companies that consistently published complete annual reports and financial statements for 2018-2020.	(12)
3.	Manufacturing companies that published annual reports and financial statements in rupiah (Rp) for 2018-2020.	(31)
	Number of Research Samples per Year	128
	Amount of Data During Research Year	384

Source: Processed data (2022)

This study uses financial report data and annual reports of manufacturing companies up to 2020, due to the positive growth of the manufacturing industry sector between the second quarter and third quarter of 2020 of 5.25%. In addition, the manufacturing industry sector is reflected in Bank Indonesia's Prompt Manufacturing Index (PMI-BI) in the fourth quarter of 47.29%, an increase from 44.91% in quarter III-2020 and 28.55% in quarter II-2020 (Bank Indonesia, 2021). Furthermore, the food and beverage industry grew 1.66% in the fourth quarter of 2020, and the manufacturing sub-sector, namely the automotive industry and the cement industry, also made a positive contribution. Leverage (LV), liquidity (LQ), operating cash flow (OCF) as the independent variables of this research. The independent research variables and their indicators are presented in Table 2.

Table 2. Independent Variables and Research Indicators

Variables	Indicators	Reference	
LV	DAR	= Total Liabilities/Total Assets	Ugur et al. (2022)
LQ	CR	= Current Assets/Current Liabilities	Waqas & Md-Rus (2018)
OCF	OCF	= Operating Cash Flow/Total Assets	Waqas & Md-Rus (2018)
FD	Z-Score	$= 1.2\ X_1 + 1.4\ X_2 + 3.3\ X_3 + 0.6\ X_4 + 1.0\ X_5$	(Kukreja et al., 2020)
FS	Size	= Log (Total asset)	(Isayas, 2021)

The Z-Score formula used in this study describes X_1 as working capital to total assets. Next, X_2 describes retained earnings to total assets, X_3 shows earnings before interest and tax to total assets, X_4 describes the market value of equity to total liabilities, while X_5 shows sales to total assets (Gupta & Mahakud, 2022).

Structural Equation Model based with Partial Least Square (SEM-PLS) with SmartPLS 3.0 software as a data analysis technique in this research. The use of SEM-PLS to test latent constructs or variables with indicators. The evaluation of the inner model (structural model) is a test procedure in the SEM-PLS analysis (Ghozali & Latan, 2015). The equations of the inner model in this study are as follows:

$$\eta = \gamma_1\xi_1 + \gamma_2\xi_2 + \gamma_3\xi_3 + \gamma_4\ (\xi_1{*}\xi_4) + \gamma_5\ (\xi_2{*}\xi_4) + \gamma_6\ (\xi_3{*}\xi_4) + \varsigma \quad \text{.....(1)}$$

The inner model formula in this study describes ξ as Ksi (exogenous latent variable), while η as Eta (endogenous latent variable). Furthermore, γ is Gamma (small), the coefficient of influence of exogenous on endogenous variables, while ς is Zeta (small), model error.

RESULTS

The descriptive statistics shown in Table 3 aim to provide a more informative view of the research sample data.

Table 3. Descriptive Statistical Analysis

Variables	N	Minimum	Maximum	Mean	Median	Std. Deviation
LV	384	0.078	3.935	0.515	0.467	0.402
LQ	384	0.003	7.917	2.094	1.621	1.466
OCF	384	0.001	0.914	0.112	0.104	0.106
FD	384	0.115	16.338	4.126	2.838	3.401
FS	384	10.634	14.546	12.307	12.219	0.685

Source: SmartPLS results (2022)

Table 3 states the results of descriptive statistical tests with a total data of 384. The mean of leverage (LV) is greater than the median, but smaller than the maximum. This shows that on average the company has a high amount of liability, but it is still within normal limits. The mean of liquidity (LQ) is higher than the median, but lower than the maximum. This shows that the average company is able to pay its current liabilities with its assets. The mean of operating cash flow (OCF) is greater than the median, but less than the maximum. This illustrates that some companies have positive operating cash flow, so they are able to carry out the company's operational activities and pay all costs.

The mean of firm size (FS) is greater than the minimum and median, but less than the maximum. This shows that the average company is included in the category of large companies with large amounts of assets. The minimum financial distress (FD) value of 0.115 indicates the company is in a distress zone or has the potential to experience bankruptcy (Z Score < 1.80), while the maximum value of 16.338 indicates the company is in a safe zone or avoiding the risk of bankruptcy. The mean value of financial distress is greater than the median value, but smaller than the maximum value. It is illustrate that the average company is in a safe zone or avoided from financial distress risk (Z Score > 3.00). Further, the analysis of the inner model (structural model) was also carried out in this study which aims to analyze the relationship between variables in the study. Each criterion will be explained as follows:

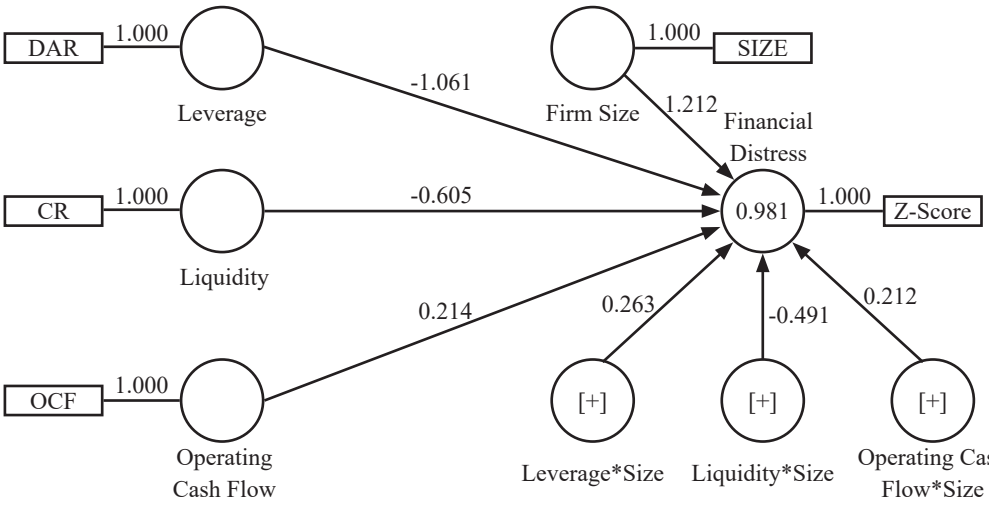

Figure 1. Inner Model Result

Table 4. R-Square and F-Square

Variables	R-Square	R-Square Adjusted	F-Square
LV			0.235
LQ			0.043
OCF			0.013
FS			0.230
FD	0.981	0.981	
LV*FS			0.223
LQ*FS			0.118
OCF*FS			0.099

Source: SmartPLS results (2022)

Based on Table 4 shows that financial distress (FD) can be explained by leverage (LV), liquidity (LQ), operating cash flow (OCF), and firm size (FS) of 98.1%. Meanwhile, 1.9% is explained by other variables outside the variables studied. Meanwhile, there is a weak influence, namely the effect of operating cash flow on financial distress. In addition, there is a moderate influence, namely the influence of liquidity on financial distress, the effect of operating cash flow and liquidity on financial distress moderated by firm size. There is also a strong influence, namely the influence of leverage and firm size on financial distress, and the effect of leverage on financial distress moderated by firm size. Further, path analysis on variable relationships will be shown in Table 5.

Table 5. Path Coefficient

Path Coefficient	Original Sample	P-Values	Decision
LV → FD	-1.061	0.000	Received
LQ → FD	-0.605	0.035	Received
OCF → FD	0.214	0.098	Rejected
LV*FS → FD	0.263	0.000	Received
LQ*FS → FD	-0.491	0.002	Rejected
OCF*FS → FD	0.212	0.004	Received

Source: SmartPLS results (2022)

Table 5 shows the path coefficients consisting of the original sample and P-Values. The original sample shows the direction of the positive or negative relationship. In addition, this study uses a significance value of 5% or 0.05. Therefore, P-Values show a significant relationship, if the value is less than 0.05 (P-Values < 0.05).

DISCUSSION

The test results show a negative and significant effect of leverage on financial distress, which indicates that large company liabilities have the potential for the company to develop by utilizing these liabilities. More than 50% of the 384 annual reports and financial statements of manufacturing companies that were sampled in this study had a high leverage value. This shows that the average company that is the research sample has a large amount of liability. Seen in several companies that became the research sample with a larger total liability, namely PT. Astra International Tbk, PT. Indofood Sukses Makmur Tbk, PT. Semen Indonesia (Persero) Tbk. Some companies prefer funding from external sources, such as liabilities that are easier to obtain compared to issuing new shares which have to spend more funds (Lucky & Michael, 2019). Optimal liability management is able to minimize agency conflicts, so that agency costs are lower and the company's finances are better (Kalash, 2021). The results of this research are consistent with the findings of Waqas & Md-Rus (2018); Ikpesu (2019); Lucky & Michael (2019); Ugur et al., (2022) which proves that leverage can minimize the potential for financial distress. Meanwhile, in contrast to the research Muigai & Muriithi (2017); Masdupi et al., (2018) which states that high leverage makes companies fall into financial distress in the future.

Tests on the effect of liquidity on financial distress showed negative and significant results. Approximately 50% of the 128 manufacturing companies that were the sample of the study had a high percentage of liquidity. This shows that the average company that is the research sample has large current assets to pay its current liabilities. Some of the companies that were sampled, such as PT. Gudang Garam Tbk, PT. Hanjaya Mandala Sampoerna Tbk, PT. Sido's Herbal and Pharmaceutical Industry Tbk has larger current assets than its current liabilities. In line with this, liquidity shows that the company can facilitate optimal governance activities, thereby reducing agency costs (Ho et al., 2021). Therefore, the company's high level of liquidity can minimize the potential for the company to experience financial problems (Dudley & Yin, 2018). This finding is in line with Chiaramonte & Casu (2017); Waqas & Md-Rus (2018) explained that liquidity can reduce companies experiencing financial distress. Contrasted with Masdupi et al., (2018); Balasubramanian et al., (2019); Ikpesu (2019); Isayas (2021), which indicates that liquidity can increase the potential for financial distress.

The test results show that operating cash flow has a positive and insignificant effect on financial distress. About 51% of the 384 annual reports and financial reports of manufacturing companies that were sampled in this study had unfavorable operating cash flow. It illustrates that a company that has a negative operating cash flow indicates that the company is unable to pay all expenses in operational activities (Papadaki & Pavlopoulou-Lelaki, 2022). Continuously negative operating cash flow can reduce shareholder confidence regarding the company's condition and there is the potential for the company to go bankrupt (Karas & Reznakova, 2020). The agency theory view also describes companies with smaller operating cash flows, so the ownership of the company's cash becomes less (Soet et al., 2018). In line with research Sayari & Mugan, (2013); Balasubramanian et al., (2019); Phan et al., (2022) which shows operating cash flow can affect the occurrence of financial distress in the

company. Meanwhile, the results of this research differ from the research of Waqas & Md-Rus (2018); Karas & Reznakova (2020) which explains that operating cash flow has an impact on lowering financial distress problems.

Firm size in moderating the relationship of leverage to financial distress shows positive and significant results. This shows that firm size has a unidirectional relationship, meaning that firm size strengthens the relationship between leverage and financial distress. In addition, about 50% of the manufacturing companies in the sample have large assets which reflects that some companies are classified as large-scale companies. It illustrates that the company's size affects the liabilities and assets owned so that it can predict financial distress. Cathcart et al., (2020) revealed that increasing liabilities among large companies increase the Z-Score, making them financially healthy. This condition can occur because the company can pay its liabilities and interest to minimize agency costs and increase company profits. Kalash (2021) explained that small companies use external funding sources, such as liabilities, to carry out their activities. In line with this, Muigai & Muriithi (2017); Gichaiya et al., (2019) revealed that the size of the company has a good impact on the company's finances, thereby minimizing the risk of the company experiencing financial distress.

The effect of liquidity on financial distress moderated by firm size shows negative and significant results. This shows that firm size has the opposite relationship, meaning that firm size weakens the relationship between liquidity and financial distress. In addition, more than 50% of the 128 manufacturing companies that were sampled have large assets along with large liabilities. This indicates that the company's assets do not guarantee that the company is able to pay its liabilities and interest expense at maturity (Mselmi et al., 2017). The greater the liability borrowed, the higher the interest expense must be borne (Ho et al., 2021). If the company has the same amount of assets and liabilities, it tends to use all assets to pay its liabilities but not for interest expense. Isayas (2021) explained that if this condition continues, it will cause financial problems in the future. In line with this, Zelie (2019) showed that firm size is insignificant to financial distress.

The relationship between operating cash flow and financial distress moderated by firm size shows positive and significant results. This shows that company size has a unidirectional relationship, meaning that company size strengthens the effect of operating cash flow on financial distress. In line with this, around 50% of the 128 manufacturing companies have sufficient assets. Therefore, it illustrates that the greater the company's assets, the smoother the operating cash flow and minimize the potential for financial distress. Fawzi et al., (2015); Kamaluddin et al., (2019) revealed that a positive company's operating cash flow indicates that the company is able to meet all its expenses and is able to utilize its assets properly. In line with this, Abdu (2022); Walela et al., (2022) stated that a large number of assets reflects a good financial condition, so as to be able to keep away from the potential for financial distress. This is in contrast to research by Tilehnouei et al., (2018); Sunaryo (2021) illustrates that the size of the company is not able to indicate the company's financial condition is in a safe, gray, or distress zone. The implications of the results of this study for the management of manufacturing companies can be an indicator of corrective action before the company experiences financial distress or potential bankruptcy. In addition, for the government to be taken into consideration in setting financial policies for manufacturing companies. Furthermore, investors and potential investors can be taken into consideration in making decisions when investing.

CONCLUSION

Based on 384 annual reports and financial statements of manufacturing companies listed on the Indonesia Stock Exchange for 2018-2020, it provides evidence that around 50% of the sample companies have high leverage and liquidity values. In line with this, the results of the study prove that leverage and liquidity have a negative and significant effect on financial distress, while operating cash flows show the opposite. In addition, firm size is able to moderate the corelation between leverage and operating cash flow to financial distress. It is different from the case with the size of the company which weakens the corelation between liquidity and financial distress. This shows that the assets owned by the company do not guarantee that the company is able to pay its liabilities and interest expenses at maturity. This research contributes to the measurement of financial ratios which play an important role in predicting the potential for financial distress in companies before the Covid-19 pandemic from 2018 to 2019, and when the Covid-19 pandemic first entered Indonesia in 2020. Therefore, this study provides benefits for manufacturing companies by providing information about the financial position of companies in the safe, gray, or distressed zone. In addition, the Financial Services Authority provides benefits related to setting regulations in the transition period from the Covid-19 pandemic to the endemic.

This research has several limitations; namely, it is only limited to the manufacturing sector in Indonesia, where further research is recommended further to expand the industrial sector for the research sample. In addition, the study results show that firm size cannot moderate or weaken the impact of liquidity on financial distress. It is prove companies tend to have the same assets and liabilities. Therefore, the assets owned by the company are only for paying liabilities but not for loan interest. Further research is suggested to analyze other factors that influence companies to predict financial distress.

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