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Detection of financial distress before and during the covid-19 pandemic: evidence from an automotive industry

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Abstract
This study aims to analyze the effect of profit and cash flow on financial distress in automotive sub-sector companies from 2017–2021. This quantitative descriptive research with a descriptive statistical analysis used panel data, a classical assumption test, and a statistic analysis through E-Views version 10. The results indicate that profit and cash flow affect financial distress. The results of the F test also show that profit and cash flow have a simultaneous effect on financial distress. A coefficient of determination of 0.929 indicates that 92.9% of financial distress is influenced by profit and cash flow, while only 7.1% is influenced by other variables.

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1. Introduction

Increasingly intense competition makes some companies fail, while those that survive need to develop by gaining a competitive advantage over competitors by innovating products and creating product characteristics different from competing products to increase the competitiveness of their products. Fluctuations in economic conditions that are difficult to predict can put companies at risk of bankruptcy if they cannot adapt. Financial distress is a real threat faced by companies.

Some of the possible financial conditions of companies experiencing financial distress are difficulties paying bank bills, a company income below the total costs (including the cost of capital incurred), and delays in the delivery of goods for companies that have negative operating profits. This condition gives a negative signal to investors when reviewing the company's profits.

Therefore, companies need to measure financial distress in order to avoid business failure. This research aims to measure financial distress and compare it before and during the pandemic using the Altman Z-Score. Researchers are also interested in identifying several factors that can affect a company's financial distress. Financial ratio factors that will be used to predict financial distress are profit and cash flow. Much research on predicting the bankruptcy of companies has been conducted in Indonesia. However, research on predicting the financial distress of companies compared to financial distress from the point of view of profit and cash flow is still very limited.

Profit was chosen as a variable because a company's profits are used as the basis for paying dividends to investors. If the company's profits are low or if a company has a deficit, investors will not receive dividends. If this happens continuously, investors will withdraw their investments because they will think the company is facing financial problems. Under these circumstances, investors can use profit as an indicator to determine the company's financial condition. Based on this, the researchers wanted to ascertain whether profit can predict a company's financial difficulties. Several studies, including those by Masdupi et al. (2018) and Ikpesu (2019), have linked profit to financial distress.

Another variable that will be used to predict a company's financial distress is cash flow. Cash flow provides important information about cash receipts and payments within a certain period. This allows information on company performance and sources of financial income to be obtained. Moreover, it can provide information on a company's ability to pay its debts—if a company's cash flow is high, then it can repay its loans. Meanwhile, if a company's cash flow is low, it is unlikely to be able to repay its loans; such companies are considered to be experiencing financial distress. Under these circumstances, cash flow can be used to determine a company's financial condition (Gao, 2018; Gertler and Gilchrist, 2018; Zubair et al., 2020).

Rahmawati and Setiawati (2022) showed that profit and cash flow have a significant effect on financial distress and that these two variables can be used to detect conditions of financial distress. Meanwhile, Suprihatin and Giftilora (2020) showed that profit and cash flow have no significant effect on financial distress. Therefore, the authors of the current work are interested in researching this topic further.

2. Literature review and hypotheses development

2.1. Signaling theory

According to Putra (2017), signal theory illustrates that a signal or cue is an action taken by a company's management that informs investors about how management sees the company's

prospects. This theory reveals that investors can distinguish between companies with high value and those with low value. Platt and Platt (2002) reported that company signals provide information about a company's financial and non-financial performance, as well as performance wallets that have been achieved by management to realize the hopes and decisions of shareholders.

2.2. Financial distress

Kristanti (2019) defines financial distress as the possibility of going bankrupt, which depends on the level of liquidation of assets in relation to the availability of credit. Kristanti (2019) states that financial difficulties represent a situation in which a company is no longer able to pay its obligations on time. It can also be indicated by situations in which a company cannot pay its obligations as reflected in cash flow projections.

2.3. Hypotheses development

Companies that have high profitability have large profits. This means that these companies are unlikely to experience financial distress. Juliani and Muslihat (2021) and Pratama and Setiawati (2022) confirmed that profit affects financial distress. However, Hariyanto (2018) and Julius (2017) indicated that profit does not affect a company's financial distress. Based on the previous studies mentioned above, the following hypothesis is proposed:

H1: Profit positively affects financial distress.

Companies that have high cash flow have high liquidity. This means that these companies are unlikely to experience financial distress. Hutauruk et al. (2022) and Oktasari et al. (2022) showed that cash flow affects financial distress. However, Rahayu et al. (2021) and Hariyanto (2018) showed that cash flow does not affect financial distress. Based on the previous studies mentioned above, the following hypothesis is put forth:

H2: Cash flow positively affects financial distress.

3. Methods

The sample of this study includes 14 automotive companies and 70 firm-year observations. A documentation technique is used to obtain the data. Specifically, data are collected from the financial reports of the automotive sub-sector firms listed on the Indonesia Stock Exchange from 2017–2021.

This study uses an analysis model that has been tested previously, namely Altman's Z-Score, to predict the level of bankruptcy. The Altman Z-Score analysis model can provide a high level of accuracy in predicting corporate bankruptcy. Altman developed three Z-Score models: the original Altman Z-Score, which was followed by a revised version of the Altman Z-Score and the most recent modified version of the Altman Z-Score.

The most recent Altman Z-Score model is used in this study. In this model, the Z-Score calculation formula is as follows:

$$Z = 6.56X1 + 3.26X2 + 6.72X3 + 1.05X4$$

where:
Z = Bankruptcy index
X1 = Working capital/total assets
X2 = Retained earning/ total assets
X3 = EBIT/total assets

X4 = Book value of equity/book value of debt

Companies are classified as either healthy or bankrupt based on the Z-Score model of Altman (1983), with the following criteria: If Z" > 2.60, the company is in the healthy condition. If Z" = 1.1–2.60, the company is in the gray zone or gray area. If Z" < 1.1, the company is in the unhealthy condition or bankrupt.

4. Results

After processing using E-Views version 10, it was carried out using the Hausman test and Chow test to obtain the most appropriate model. The result indicated that the best model for this study was the fixed effect model. Then, the classical assumption test was carried out. The obtained results were valid data and continued statistical analysis tests. The effects of profit and cash flow on financial distress were determined by carrying out t and F tests. The results are presented in Table 1 below:

Table 1. Regression

Variables	Coefficient	Std. Error	t-Statistics	Prob.
C	3.321847	0.326713	10.16748	0.0000
Profit	38.60456	2.708953	14.25073	0.0000
Cash flow	1.285671	0.543822	2.364139	0.0217
Effects Specification				
Cross-Section Fixed (Dummy Variables)				
R-squared	0.944800	Mean dependent var		5.574529
Adjusted R-squared	0.929467	SD dependent var		6.818989
SE of regression	1.810991	Akaike info criterion		4.223257
Sum squared residue	177.1031	Schwarz criterion		4.737199
Likelihood logs	-131.8140	Hannan-Quinn criter.		4.427401
F-statistics	61.61767	Durbin-Watson stat		2.380219
Prob (F-statistic)	0.000000			

4.1. The effect of profit on financial distress

The results show that the profit Prob (t-statistic) value is 0.0000 < 0.05, indicating that profit affects financial distress. One of the uses of profit information is to determine a company's ability to distribute dividends to investors. According to Djongkan and Rita (2014), profit has a greater predictive value than cash flow in predicting the financial distress of a company. The profit model is considered strong enough to be used as a predictive model for financial distress with a flow model compared to cash.

The results of this study are in line with research by Pratama and Setiawati (2022), which shows that profit affects financial distress. If a company experiences sustainable profit growth, then the company is not in a state of financial distress. Investors will be the focus of companies' profits because when a company generates high profits, investors receive dividends. A high profit ratio value indicates that a company has no financial problems. Conversely, if the value of the profit ratio is low, then a company is vulnerable to financial problems.

4.2. The effect of cash flow on financial distress

The results show that the Prob value (t-statistic) is 0.0217 < 0.05, indicating that cash flow affects financial distress. Because the statement of cash flows is an integral part of other financial

statements, its use provides precise results for evaluating the sources and uses of company cash in all company activities. Thus, it can help users of financial statements evaluate the structure and financial performance of a company.

The results of this study are in line with research by Hutauruk et al. (2022) and Oktasari et al. (2022), which shows that cash flow affects financial distress. The results of this study are in line with a theory stating that high and low levels of a company's operating cash flow can cause a company's financial distress. This is because cash flow from operating activities can determine whether a company's operations can generate cash that can be used to pay off loans and maintain the company's operating capabilities so that the company's value will increase, thus keeping the company far from financial distress.

4.3. The simultaneous effect of profit and cash flow on financial distress

Based on the output table of the fixed effect model, the Prob value (F-statistic) is 0.000 < 0.05. Thus, it can be concluded that there is a significant simultaneous effect of profit and cash flow on financial distress. Therefore, it can also be concluded that profit and cash flow can be used to predict financial distress. These results are reinforced by the value of adjusted R Square, according to which the two variables affect 92.9% of financial distress.

4.4. Comparison of financial distress before and during the pandemic

Table 2 below presents the average values of financial distress in automotive sub-sector companies before and during the COVID-19 pandemic. The pre-pandemic period in this study was 2017–2019, while the pandemic period was 2020–2021.

Table 2. Altman Z-scores of financial distress before and during the pandemic for sub-sector automotive companies

Category	Total company before the pandemic (2017–2019)	Total company during the pandemic (2020–2021)
Healthy category Z value > 2.60	9	10
Gray area category Z value between 1.1 and 2.60	2	1
Unhealthy category Z value < 1.1	3	3

Table 3. Altman Z-scores of financial distress for each company

Code	Year	Financial distress (Y)				Results	Average	
		Working capital / total assets	Retained earning / total assets	Ebit / total assets	Total equity / total debt		Before covid (2017–2019)	During covid (2020–2021)
ASII	2017	0.0771	0.3824	0.1432	1.1233	3.8944	3.8250 Healthy	4.7124 Healthy
	2018	0.0497	0.3693	0.1473	1.0236	3.5947		
	2019	0.0827	0.3980	0.1427	1.1306	3.9859		
	2020	0.1377	0.4395	0.1140	1.3692	4.5399		
	2021	0.1538	0.4448	0.1389	1.4214	4.8849		
AUTO	2017	0.1482	0.4077	0.1190	2.6876	5.9223	5.7914 Healthy	5.7926 Healthy
	2018	0.1225	0.4061	0.1179	2.4348	5.4762		
	2019	0.1315	0.4272	0.1366	2.6690	5.9755		
	2020	0.1567	0.4316	0.1041	2.8831	6.1613		
	2021	0.1358	0.4163	0.1098	2.3220	5.4239		
MPMX	2017	0.1043	0.1434	0.0536	0.9041	2.4617	4.9617 Healthy	4.0473 Healthy
	2018	0.2669	0.4236	0.0409	2.7630	6.3080		
	2019	0.1847	0.3578	0.0619	3.1629	6.1155		
	2020	0.1055	0.3357	0.0374	2.1913	4.3386		
	2021	0.0949	0.3032	0.0483	1.7334	3.7561		
IMAS	2017	-0.0812	0.0452	0.0439	0.4195	0.3496	-0.0277 Not healthy	-0.3316 Not healthy
	2018	-0.1589	0.0455	0.0380	0.3370	-0.2849		
	2019	-0.1073	0.0355	0.0239	0.2666	-0.1477		
	2020	-0.1209	0.0170	0.0164	0.3563	-0.2529		
	2021	-0.1480	0.0107	0.0257	0.3365	-0.4102		
GJTL	2017	0.1523	0.2299	0.0660	0.4551	2.6702	2.5721 Gray Area	3.1163 Healthy
	2018	0.1459	0.2082	0.0540	0.4247	2.4447		
	2019	0.1420	0.2319	0.0589	0.4941	2.6015		
	2020	0.1617	0.2670	0.0810	0.6274	3.1340		
	2021	0.1951	0.2598	0.0498	0.6069	3.0987		
TIME	2017	-0.0139	0.0776	0.0036	1.0446	1.2826	1.2246 Gray Area	2.6475 Healthy
	2018	0.0204	0.0535	-0.0127	1.0000	1.2728		
	2019	0.1253	-0.1802	0.0121	0.7641	1.1183		
	2020	0.1203	-0.1034	0.0645	1.0335	1.9707		
	2021	0.1718	0.0188	0.1495	1.0771	3.3242		
GDYR	2017	-0.1297	0.4010	0.0055	0.7633	1.2948	1.0444 Not healthy	0.7160 Not healthy
	2018	-0.1723	0.4003	0.0043	0.7595	1.0005		
	2019	-0.2147	0.4022	0.0189	0.7699	0.8380		
	2020	-0.2046	0.3530	0.0010	0.6311	0.4781		
	2021	-0.1708	0.3702	0.0236	0.6756	0.9539		

LPIN	2017	0.4022	0.5382	0.7015	6.3154	15.7382	16.7587 Healthy	15.8945 Healthy
	2018	0.3986	0.5878	0.0368	9.7599	15.0259		
	2019	0.3996	0.6377	0.0119	14.0303	19.5118		
	2020	0.3996	0.6333	0.0176	11.1383	16.4996		
	2021	0.3049	0.6035	0.0324	10.5755	15.2894		
INDS	2017	0.3452	0.2273	0.0677	7.4011	11.2313	12.0105 Healthy	10.9793 Healthy
	2018	0.3694	0.2443	0.0597	7.6161	11.6177		
	2019	0.2804	0.2244	0.0458	9.8128	13.1825		
	2020	0.2970	0.2200	0.0264	9.7659	13.0973		
	2021	0.3161	0.2356	0.0680	5.2975	8.8612		
BRAM	2017	0.2225	0.1893	0.1201	2.4832	5.4916	5.8898 Healthy	5.6950 Healthy
	2018	0.1955	0.1900	0.0978	2.8980	5.6023		
	2019	0.2270	0.1928	0.0773	3.7513	6.5756		
	2020	0.2156	0.1657	-0.0131	3.7763	5.8315		
	2021	0.2142	0.1713	0.1260	2.6175	5.5585		
BOLT	2017	0.3091	0.1489	0.1305	1.5395	5.0066	4.3414 Healthy	3.3725 Healthy
	2018	0.2143	0.1418	0.1015	1.2850	3.8990		
	2019	0.2330	0.1597	0.0724	1.5073	4.1184		
	2020	0.1579	0.1216	-0.0183	1.6706	3.0637		
	2021	0.1636	0.1677	0.0748	1.4844	3.6813		
CARS	2017	0.4581	0.1336	0.0501	0.2604	4.0511	3.7013 Healthy	0.0652 Not healthy
	2018	0.4478	0.1406	0.0488	0.2606	3.9974		
	2019	0.3386	0.1536	0.0024	0.3023	3.0553		
	2020	0.0645	0.0351	-0.1398	0.1949	-0.1968		
	2021	0.1065	-0.0306	-0.0603	0.1277	0.3273		
PRAS	2017	0.0007	0.0260	0.0315	0.7812	1.1208	0.3282 Not healthy	1.5338 Gray Area
	2018	-0.0841	0.0310	0.0376	0.7274	0.5660		
	2019	-0.2178	0.0052	0.0059	0.6384	-0.7022		
	2020	0.1663	0.0022	0.0119	0.4524	1.6530		
	2021	0.1235	0.0018	0.0229	0.4236	1.4145		
SMSM	2017	0.4707	0.5579	0.2958	2.9719	10.0153	10.5867 Healthy	10.5845 Healthy
	2018	0.4940	0.5845	0.2970	3.3034	10.6100		
	2019	0.5398	0.6000	0.2648	3.6744	11.1347		
	2020	0.5619	0.5985	0.2054	3.6430	10.8425		
	2021	0.5494	0.5864	0.2406	3.0417	10.3266		

5. Conclusion

Based on this research on automotive sub-sector companies in Indonesia from 2017–2021, profit and cash flow influence financial distress, both separately and simultaneously. In other words, rising or falling profits and cash flow affect financial distress.

Regarding the overall financial distress categories, none of the 14 analyzed automotive sub-

sector companies experienced decreased financial distress scores before or during the pandemic. In other words, the COVID-19 pandemic did not cause potential financial distress in these automotive sub-sector companies. Thirteen companies did not move to a lower category during the pandemic compared to before the pandemic; only one company experienced a decrease in its Z-Score that resulted in a change from the healthy category (before the pandemic) to the unhealthy category (during the pandemic).

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