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Factors Affecting Financial Distress in State-Owned Enterprises: Evidence from Indonesia

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Abstract

This research aims to analyze the key factors that influence BUMN financial distress and determine a sample of 31 companies from a population of 44 BUMN that have the potential to experience financial distress. The results of the statistical analysis show that the variables that have a significant influence on financial distress are working capital, retained earnings, government equity, earnings before interest and taxes, and earnings management. Meanwhile, other variables that do not have a significant effect on financial distress are capital expenditure, contribution margin, government subsidies, operational efficiency, and cash flow from operations. The implication of this research is that government policy, as a shareholder, is needed to prioritize handling key variables that have a significant impact on BUMN financial distress. Government policy support is needed to meet working capital needs to fulfill company operations, encourage an increase in retained earnings as a source of cheap and permanent internal funds, and support from government equity not only for investment but also for settling long-term debt that is due. Encourage improvements in tariffs and increase the number of subsidies so that increasing earnings before interest and taxes will increase the level of financial distress for BUMN. Meanwhile, policies in the practice of accrual earnings management should be minimized or eliminated because earnings management practices like this tend to reduce the level of financial distress and are constrained by tariff policies because they are considered capable of achieving a certain level of profitability. The implications of this research require government policy, as the majority shareholder, to support improvements in cost structures and tariff structures so that State-Owned Enterprises can manage finances independently and avoid potential financial distress. Management policies are needed to prioritize variables that have a significant impact on the financial distress of State-Owned Enterprises.

Keywords: Cash flow from operation, Financial distress, Government subsidy.

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1. Introduction

This research focuses on analyzing *the financial distress* of State-Owned Enterprises or BUMN and examines several related key variables. This research is one of the topics whose role is important, especially in comprehensively revealing the phenomenon of financial difficulties, both state-owned companies in the form of Persero and state-owned companies in the form of public companies. The aim of establishing a BUMN in the form of a Persero is to provide goods or services of high quality and strong competitiveness and to pursue profits in order to increase the value of the company. Meanwhile, the aim of establishing a BUMN in the form of a Public Company is to carry out business for public benefit in the form of providing quality goods or services at prices that are affordable to the public based on the principles of healthy company management.

The phenomenon that has occurred so far is that among the 115 BUMNs reported in 2017, there are 44 BUMNs that have the potential to experience financial distress, consisting of five groups that have the potential to experience *financial distress*, namely: (a) receiving government subsidies for 5 BUMNs; (b) receiving additional government equity from 13 BUMNs; (c) the financial performance of 17 BUMNs resulted in a loss; (d) received a government subsidy and gained additional equity of 2 BUMNs; (e) received a government subsidy and the financial performance of 2 BUMNs resulted in a loss; and (f) received additional equity and the financial performance resulted in a loss for 5 BUMNs.

The phenomenon of the financial condition of State-Owned Enterprises that are dependent on subsidies requires additional government equity and has loss-making financial reports, indicating the potential for financial distress that could become more serious in the future. Therefore, it is important to conduct financial distress research, which is expected to provide input to stakeholders and BUMN management in preparing corporate strategies and policies. It is also hoped that the results of this financial distress research can provide an early signal for the preparation of tactical operational planning and strategic planning, so that in its implementation, it can be anticipated if changes occur in the key variables that influence financial distress.

The study of financial distress conducted so far is still hampered because previous research, such as comparative research on financial distress prediction models reported by Mustikaningrum, et al. [1], shows that there is a methodological gap in measurement, especially because the method for measuring financial distress is relatively simple compared to financial phenomena. BUMN distress is relatively very complex.

To overcome the gap in the financial distress measurement methodology used in previous research, this research employs a marginal theory-based financial distress measurement. This measurement is a novelty that addresses the weaknesses of previous research by utilizing a financial distress measurement method that produces a marginal score, ranging from zero to one or 0 to 100%. The advantage of this marginal score approach is that it enhances and develops financial distress measurements that can fill the methodological gaps that occurred in previous research. Weaknesses in the method of measuring financial distress in previous research, especially in terms of (a) the data used being a qualitative nominal scale, which is relatively simple compared to the complexity faced by companies experiencing financial distress, (b) the lack of uniformity among previous research in defining or determining the limits of companies experiencing financial distress, (c) previous research models not accounting for variations in companies experiencing financial distress, but generally assigning a value in the category of 0 or 1, (d) the inability of previous research to be conducted if there was only one group of companies, as the dependent variable data does not vary; for example, if the entire sample comes from the same group, namely companies experiencing financial distress (all values = 0 or 1), (e) previous financial distress research that utilized measurements based on scores from earlier studies is not relevant to current business and industrial conditions.

Based on the superiority of the novelty concept of measuring financial distress using marginal scores, it can be stated that this research can make a significant contribution to the implementation of financial distress studies in State-Owned Enterprises. This study can be implemented in terms of providing input to the company's main stakeholders such as shareholders, company management, employees, consumers, suppliers, banks, practitioners, researchers, and other parties who have an interest in the company. The results of this research are in the form of multiple linear regression equation estimates, which can be used as instruments or tools in the BUMN decision-making process.

The results of marginal score prediction calculations can be used for various internal purposes of BUMN, especially in terms of: (a) corporate planning with targets for achieving certain marginal scores that increase over time; (b) assessing the success of company management in achieving the programmed marginal performance score; (c) comparing the level of success in achieving marginal scores between BUMN; (d) as an instrument for monitoring the performance of BUMN management to focus more on strategies and policies on key variables to improve company performance with a better marginal score in the future; and (e) serving as a standard for assessing a company as a healthy company or as likely to experience financial distress based on the marginal score.

Meanwhile, another benefit of this research is that it can be implemented in a broader context, such as other state-owned companies outside this research, companies listed on the Stock Exchange, groups of companies according to more specific sectors, for example, the manufacturing sector, banking sector, service sector, etc., small and medium enterprises, and cooperatives.

Based on the contribution of the novelty or novelty of measuring financial distress referred to above, this research is important to carry out especially because of the more specific level of urgency in terms of: (a) mapping the marginal score achievement ranking of BUMNs that are still subsidized, receive additional state capital participation, and experience losses, so that the level of financial distress for each BUMN can be known; (b) providing input to BUMN management regarding priority factors that need to be considered in increasing the marginal score to overcome financial distress; and (c) becoming a reference for BUMN management in preparing strategies and policies related to variables that influence marginal scores for overcoming financial distress.

1.1. Main Problem

There are several financial performance problems that occur in state-owned enterprises, so the main problems that will be studied include the following: financial position reports, profit and loss performance, cash flow, and operational efficiency.

(1) (1) Do changes in the statement of financial position regarding the components of capital expenditure, working capital, retained earnings, and equity have a significant effect on the financial distress of State-Owned Enterprises?
(2) (1) Does the change in the statement of profit or loss in the components of earnings before interest and tax, contribution margin, and government subsidy have a significant effect on the financial distress of state-owned enterprises?
(3) (1) Do changes in financial management policies regarding operational efficiency components, accrual earnings management practices, and cash flows from operations have a significant effect on the financial distress of State-Owned Enterprises?

2. Literature Review and Development Hypothesis

2.1. Agency Theory

The theoretical basis used in this research is agency theory developed by Jensen and Meckling [2], which explains the relationship between two parties who have different interests: shareholders or principals who want to maximize dividend receipts per share or earnings per share, while company managers aim to maximize their compensation. Managers can manage the company to achieve the goals desired by shareholders, and they will be compensated appropriately to motivate them to fulfill their duties and obligations. The management of a company by managers is crucial as it is closely related to management strategies and policies that anticipate key variables influencing financial distress and impacting company value.

2.2. Marginal Theory

Consumer and producer behavior, as well as determining market prices at optimal quantities [3]. The implementation of the marginal approach is used to: (a) determine the minimum cost per unit with the condition that the marginal cost is the same as the average cost (MC=AC), (b) achieve the maximum level of profit or minimum loss with the condition that the marginal revenue is the same as the marginal cost (MR=MC), and (c) maximize income with the condition that marginal revenue is equal to zero (MR=0).

In the history of the development of marginal theory, [3]especially since the neoclassical period, such as: (a) the Austrian school with its main figure [4], who developed the theory of marginal utility in his work *Grundsätze der Volkswirtschaftslehre*; (b) the Cambridge school, which was pioneered by Alfred Marshall, with his main works including the pure theory of foreign trade in 1829; and (c) the Lausanne school, pioneered by Léon Walras, with his work *Elements of Pure Economics* in 1878.

In this research, the marginal concept was developed by adding a formula as a novelty in measuring financial distress, with a value ranging from zero to one, which is referred to as the marginal score or SMg. Companies tend to approach optimal conditions when SMg is close to 1, and they experience financial distress when SMg approaches zero.

The process of developing a financial distress measurement formula is based on a marginal approach used in the derivative functions of demand and supply function analysis, marketing analysis, cost theory, production theory, utility theory, and company management decisions in various market structures, etc. The method of analysis in the marginal concept is to use a mathematical approach and graphic analysis approach as in Cheng, et al. [3].

Optimum conditions or maximum profit are achieved at a balance between marginal revenue and marginal cost. Total profit (π) is obtained from total revenue (TR) minus total cost (TC) with the formula as in [3] below.

$$\pi = TR - TC$$

where: π, TR and TC are functions of quantity (Q)

Maximum profit is achieved when marginal revenue (MR) is equal to marginal cost (MC). MR is the change in total revenue per unit of output or sales. while MC is the change in total costs per unit of the following changes in output.

$$\frac{\Delta\pi}{\Delta Q} = \frac{\Delta TR}{\Delta Q} - \frac{\Delta TC}{\Delta Q} = 0 \text{or} \frac{\Delta TR}{\Delta Q} = \frac{\Delta TC}{\Delta Q}$$

This balance can be simplified to $MR - MC = 0$or with the balance MR = MC. And based on this balance, a marginal score (SMg) measurement formula was developed, namely in the first stage with the following comparison between MR and MC.

$$\frac{MR}{MC} = 1 \text{or} \frac{\Delta TR/\Delta Q}{\Delta TC/\Delta Q} = 1$$

Where: MR=marginal revenue, MC= marginal cost, ΔTR= change in total revenue, ΔTC=change in total cost, ΔQ= change in sales quantity.

2.3. Measuring Financial Distress Using the Marginal Score (SMg) Approach

The novelty of this research is the measurement of the dependent variable financial distress, or the level of financial difficulty of BUMN. Financial distress measurement uses a formula based on a marginal approach that has been adapted to the research objectives. To indicate the identity of the financial distress measurement formula, or YFINDIS, the term marginal score (SMg) is used.

Marginal score is a derivative of the balance formula MR=MC, which produces optimal conditions or maximum profits, as stated previously in mathematical equations and graphic analysis.

In the initial stages of developing SMg measurements, a comparison formula was used, namely SMg = $\frac{MR}{MC}$. Optimal conditions if $\frac{MR}{MC}$= 1 or MR = MC or MR – MC = 0, and conditions are not optimal if $\frac{MR}{MC}$ > 1 or MR – MC > 1; and $\frac{MR}{MC}$< 1 or

MR – MC < 1, so that the comparison of MR and MC or marginal score is formulated with the absolute value of SMg = MR – MC, or SMg = $\sqrt{(MR - MC)^2}$with the optimal SMg value equal to zero. Then, for the purposes of statistical or econometric analysis in measuring financial distress in this research, the marginal score formula is adjusted, namely the optimal value is achieved when SMg = 1 or the BUMN's financial condition is in the best condition, and if the SMg value is close to zero, then the company tends to experience difficulties. finances or financial distress using the following formula.

$$YFINDIS = SMg = 1 - \sqrt{\left(\frac{MR-MC}{MR}\right)^2}$$

Where: MR or Marginal revenue = $\frac{\Delta TR}{\Delta Q}$, MC or Marginal cost = $\frac{\Delta TC}{\Delta Q}$, SMg=marginal score or YFINDIS, ΔTR= change in total revenue, ΔTC=change in total cost, ΔQ= change in sales quantity.

2.4. Financial Distress

Mustikaningrum, et al. [1] Research suggests a comparison of financial distress prediction models and reports that the history of financial distress began with Beaver [5] research, which established a dichotomous classification assessment based on a simple t-test in a univariate context. Using 79 companies (failing and non-failing), financial ratios aligned by industry and asset size from 1954 to 1964 disclosed specific financial ratios; Cash flow/Total Debt as the best predictor of corporate bankruptcy.

Beaver's study was then followed by Altman [6], who used Multivariate Discriminant Analysis, otherwise known as the Altman Z-Score. Altman used 66 companies, of which 33 were bankrupt and 33 were not bankrupt during the period 1946 - 1964, and identified five variables that were most relevant in calculating bankruptcy. The variables are: Working Capital to Total Assets, Retained Earnings to Total Assets, Profit before Interest and Tax to Total Assets, Market Value of Equity to Book Value of Total Debt, along with Sales to Total Assets. However, Ohlson [7] and Jones [8] mentioned several shortcomings in the Altman Z-Score with respect to normality norms and group dispersion.

They stated that the above assumptions are often underestimated in the Altman Z-Score model, which can lead to biased results. Ohlson [7] created an analytical model that is popular among researchers for measuring financial difficulties. Using data from 105 bankrupt companies as well as 2,058 non-bankrupt companies from the time he obtained the measure, current liquidity, performance, and financial structure (Total Liabilities to Total Assets) are the most important elements of bankruptcy.

Platt and Platt [9] Built a multi-industry financial distress model for US firms. Their most interesting finding is that bankruptcy and financial distress are not simply two sequential steps of the same process. In contrast, companies experience financial difficulties following poor operating results or as a consequence of external forces, whereas bankruptcy is an action that companies take to protect their assets, often as a result of balance sheet problems.

2.5. Statements of Financial Position

The financial position report shows the company's financial position up to the end of the reporting year, consisting of assets, liabilities, and equity. Report components that have the potential to influence a company's financial distress are capital expenditure, which is characterized by an increase in fixed assets; development of working capital, which is measured based on the difference between current assets and current liabilities; additional retained earnings originating from profits that are not distributed to shareholders; and additional funding from shareholders to assist in meeting investment funding needs. Empirical conditions show that the variables capital expenditure, working capital, retained earnings, and government subsidies influence the amount of marginal revenue and marginal cost, which are used as components in the formula for measuring the financial distress of State-Owned Enterprises. The financial distress measurement formulation shows that changes in the capital expenditure, working capital, retained earnings, and government subsidies have the potential to influence the company's financial distress. Based on the relationship between these variables, this research proposes the following hypotheses: H1a, H1b, H1c, and H1d.

$H_{1a:}$ Capital expenditure has a positive and significant effect on the financial distress of State-Owned Enterprises
$H_{1b:}$ Working capital has a positive and significant effect on financial distress of State-Owned Enterprises.
$H_{1c:}$ Retained earnings have a positive and significant effect on financial distress of State-Owned Enterprises.
$H_{1d:}$ Government equity has a positive and significant effect on financial distress of State-Owned Enterprises.

2.6. Statements of Profit or Loss

This financial report specifically records the income structure and cost structure for operational and non-operational activities. The operating income component includes income related to the company's main business and government subsidies. The components of the statement of profit or loss that are key variables and have the potential to influence the financial distress of State-Owned Enterprises are government subsidies aimed at helping the company's operational deficit, contribution margin as the excess of sales revenue over variable costs, and earnings before interest and taxes, which is the positive difference between operating income and operational costs.

Empirical conditions show that the variables government subsidy, contribution margin, and earnings before interest and taxes influence the amount of marginal revenue and marginal cost, which are used as components in measuring the financial distress of State-Owned Enterprises. The financial distress measurement formulation indicates that changes in the government subsidy, contribution margin, and earnings before interest and taxes variables have the potential to influence the company's financial distress. Based on measuring financial distress, which is closely related to changes in these variables, this research proposes the following hypotheses: H2a, H2b, and H2c.

$H_{2a:}$ Earning before interest and tax has a positive and significant effect on the financial distress of State-Owned Enterprises.

$H_{2b:}$ Contribution margin has a positive and significant effect on financial distress of State-Owned Enterprises.

$H_{2c:}$ Government subsidies have a positive and significant effect on the financial distress of State-Owned Enterprises.

2.7. Operational Efficiency

Operational efficiency is the level of comparison of operational income reported in the statement of profit or loss to the operational assets used by the company as reported in the statement of financial position. This operational efficiency ratio has the potential to influence the company's financial distress. The higher the value of this ratio, the more efficient the company's asset management tends to be in obtaining operational income, thus further strengthening the level of financial distress of State-Owned Enterprises. On the other hand, if the ratio value becomes smaller, there will be a tendency for less efficient asset management, which can lead to lower levels of financial distress and more serious financial difficulties.

Empirical conditions show that the operational efficiency variable influences the amount of marginal revenue and marginal cost, which are used as components in measuring the financial distress of State-Owned Enterprises. The financial distress measurement formulation indicates that changes in operational efficiency variables have the potential to influence the company's financial distress. Based on measuring financial distress, which is closely related to changes in operational efficiency variables, this research proposes the following hypothesis: H3.

$H_{3:}$ Operational efficiency has a positive and significant effect on financial distress of State-Owned Enterprises.

2.8. Accrual Earnings Management

Accrual earnings management practices are one of the key factors that influence the financial distress of State-Owned Enterprises. To achieve a certain level of profitability that is better than real conditions, the policy in earnings management practice is carried out by recognizing a certain amount of operational income in this period that should be recorded as income for the next period. On the other hand, a number of operational costs for this period are recorded as operational costs for the next period.

Empirical conditions show that the accrual earnings management variable influences the amount of marginal revenue and marginal costs, which are used as components in measuring the financial distress of State-Owned Enterprises. The financial distress measurement formulation indicates that changes in the accrual earnings management variable have the potential to influence the company's financial distress. Based on measuring financial distress, which is closely related to changes in the accrual earnings management variable, this research proposes the following hypothesis: H4.

$H_{4:}$ Accruals earnings management has a positive and significant effect on financial distress of State-Owned Enterprises.

2.9. Cash Flows from Operating Activities

Cash flows from operations affect the financial distress of State-Owned Enterprises, especially because the condition of these cash flows reflects the source of operational funds and the use of operational funds originating from changes in current assets, changes in current liabilities, and net income obtained by the company. Negative cash flow from operations indicates that the source of operational funds is smaller than the use of operational funds, which creates the potential for a relatively high level of financial distress or experiencing financial difficulties.

Empirical conditions show that the cash flows from operating variables influence the amount of marginal revenue and marginal cost, which are used as components in measuring the financial distress of State-Owned Enterprises. The financial distress measurement formulation indicates that changes in cash flows from operations have the potential to influence the company's financial distress. Based on measuring financial distress, which is closely related to changes in the cash flows from operating variables, this research proposes the following hypothesis H5.

$H_{5:}$ Cash flow from operations has a positive and significant effect on the financial distress of state-owned enterprises.

3. Methods

3.1. Sample and Data

The population of this study consists of BUMNs experiencing financial difficulties, while the sample was determined using the Slovin method as per[10-13] with the following formula:

$$n = N / (1 + (N \times e^2))$$

where N = total population of 44 BUMN experiencing financial difficulties; e = margin of error 10%, so that a sample size of 31 BUMN is obtained. The observation period for each sample company varied between one year and three years, and the final results obtained were 48 company-years of observation data.

3.2. Variables and Measurements

The variables used consist of independent variables and dependent variables. The independent variable consists of ten variables and one dependent variable, namely financial distress. The measurement of the independent variable uses previous research references, and the dependent variable employs a marginal theory approach as in Table 1 operationalization of variables below.

Table 1.
Operationalization of variables.

Variable	Acronym	Measurement	References
1. Financial Distress	YFNDIS	YFNDIS = 1 - ((MR - MC)² / MR) Where: MR = marginal revenue, MC = marginal cost	Cheng, et al. [3]
2. Capital Expenditure	CAPEX	CAPEX = (Asset/Fixed Assets(t) - Fixed Assets(t-1)) / Fixed Assets(t-1)	Abbas, et al. [14]
3. Working Capital	WC	WC = (Working Capital(t) - Working Capital(t-1)) / Working Capital(t-1)	Roysady, et al. [15]
4. Retained Earnings	RE	RE = (Retained Earning(t) - Retained Earning(t-1)) / Retained Earning(t-1)	Pibowei, et al. [16]
5. Government Equity	GEQ	GEQ = (Equity(t) - Equity(t-1)) / Equity(t-1)	He, et al. [17]
6. Earning Before Interest and Tax	EBIT	EBIT = (EBIT(t) - EBIT(t-1)) / EBIT(t-1)	Scholarski and Baker [18]
7. Contribution Margin	CM	ICM = (CMt - CMt-1) / CMt-1	Fraiha [19]
8. Government Subsidy	GS	GS = (Cost of Sales - Revenue) / Cost of Sales	Yang and Qian [20]
9. Operational Efficiency	EFO	EFO = Operating Income (Output) / Operating Assets (Input)	Tho'in and Muliasari [21]
10. Accruals Earning Management	ACEM	ACEM = (ΔCA - ΔCash) - (ΔCL - ΔSTD) - Depreciation Where: ΔCA = change in current assets, ΔCL = change in current liabilities, ΔCash = change in cash and cash equivalents, ΔSTD = change in short-term debt	Viana, et al. [22]
11. Cash Flow from Operation	CFO	CFO = (CFO(t) - CFO(t-1)) / CFO(t-1)	Diah and Putri [23]

3.3. Research Models

To test the hypothesis, this research uses a model of variables that influence financial distress, with the following equation model.

Model (1): measures financial distress based on marginal scores, and to test hypotheses H1 to H5, the following analysis model is used.

$$YFINDIS = \beta_0 + \beta_1 CAPEX + \beta_2 WC + \beta_3 RE_t + \beta_4 GEQ + \beta_5 EBIT + \beta_6 CM + \beta_7 GS + \beta_8 EFO + \beta_9 ACEM + \beta_{10} CFO + e$$

Model (2): measure financial distress based on the Altman score, for sensitivity analysis in this research, then compare the results of Model (1)

$$Zs\_Alt = \beta_0 + \beta_1 CAPEX + \beta_2 WC + \beta_3 RE_t + \beta_4 GEQ + \beta_5 EBIT + \beta_6 CM + \beta_7 GS + \beta_8 EFO + \beta_9 ACEM + \beta_{10} CFO + e$$

Model (3): measure financial distress based on the Springate score, for sensitivity analysis in this research, then compare the results of Model (1)

$$Zs\_Spr = \beta_0 + \beta_1 CAPEX + \beta_2 WC + \beta_3 RE_t + \beta_4 GEQ + \beta_5 EBIT + \beta_6 CM + \beta_7 GS + \beta_8 EFO + \beta_9 ACEM + \beta_{10} CFO + e$$

Model (4): uses independent variables that are directly related to the statement of financial position, and the statement of profit or loss, so it does not use variables operational efficiency and cash flows from operating variables.

$$YFINDIS = \beta_0 + \beta_1 CAPEX + \beta_2 WC + \beta_3 RE_t + \beta_4 GEQ + \beta_5 EBIT + \beta_6 CM + \beta_7 GS + \beta_8 ACEM + e$$

Where: YFINDIS = financial distress based on marginal score (SMg), Zs_Alt= Altman score used to measure financial distress, Zs_Spr = Springate score used to measure financial distress, CAPEX = capital expenditure growth, WC = working capital growth, RE = growth retained earnings, GEQ_t = growth in equity, EBIT = growth in earnings before interest and tax, CM = growth in contribution margin, GS = government subsidy, EFO = level of operational efficiency or productivity, ACEM = accruals earning management, CFO_t = growth in cash flow from operating, β_0: constant, $\beta_1 \ldots \beta_{10}$: regression coefficient, e_t = error.

4. Empirical Results

4.1. Descriptive statistics

The data structure of this research uses 10 independent variables and one dependent variable, along with 48 observations. Descriptive statistics show the minimum, maximum, mean, and standard deviation data structure for each variable as in Table 2.

Table 2.
Descriptive statistics.

Variable	N	Minimum	Maximum	Mean	Std. Deviation
YFNDIS	48	0.47	1.00	0.771	0.164
CAPEX	48	0.00	0.05	0.008	0.008
WC	48	0.00	0.80	0.401	0.084
RE	48	0.00	0.43	0.080	0.109
GEQ	48	0.00	7.17	0.972	1.604
EBIT	48	0.00	0.64	0.079	0.117
CM	48	0.00	0.15	0.071	0.035
GS	48	0.00	4.25	0.702	0.776
EFO	48	-42.83	95.79	1.926	20.123
ACEM	48	-0.39	0.21	-0.086	0.133
CFO	48	4.62	9.14	6.836	1.072

Where: YFINDIS = financial distress based on marginal score (SMg), CAPEX = growth in capital expenditure, WC = growth in working capital, RE = growth in retained earnings, GEQ_t = growth in equity, EBIT = growth in earnings before interest and tax, CM = growth in contribution margin, GS = government subsidy, EFO = level of operational efficiency or productivity, ACEM = accruals earning management, CFO_t = growth in cash flow from operating,

4.2. Correlation Matrix

Correlation shows the degree of the pairwise relationship between variables, with quantities ranging from zero to one. A degree with a magnitude close to one indicates a strong relationship, whereas a degree close to zero indicates a weak relationship. The degree of the pairwise relationship or correlation between the variables of this research is presented in Table 3.

Table 3.
Correlation matrix (Pearson).

Var	YFNDIS	CAPEX	WC	RE	GEQ	EBIT	CM	GS	EFO	ACEM	CFO	N
YFNDIS	1	0.123				0.492*	-0.164	-0.195	0.073	-0.259	0.053	48
CAPEX		1	0.039	-0.119	-0.237	-0.132	0.046	-0.184	-0.110	-0.055	0.200	48
WC			1	-0.247	-0.016	0.450*	0.458*	-0.139	0.048	0.070	-0.216	48
RE				1	-0.054	-0.188	-0.004	0.393*	0.078	0.045	0.242	48
GEQ					1	0.150	-0.034	-0.150	-0.041	-0.084	-0.044	48
EBIT						1	-0.341†	-0.248	0.090	-0.126	-0.155	48
CM							1	0.065	0.035	0.143	-0.128	48
GS								1	0.090	0.104	0.126	48
EFO									1	-0.143	0.344*	48
ACEM										1	-0.141	48
CFO											1	48

4.3. Regression Analysis

The results of regression calculations to test the hypothesis and sensitivity analysis are presented in Table 4, which consists of Model 1 to test the hypothesis, Model 2 for sensitivity analysis using Altman's Z-score, Model 3 analysis using Springate's Z-score, and Model 4 using independent variables that are used to measure the influence of independent variables specifically from the statement of financial position and statement of profit or loss.

Table 4.
Result of regression analysis (hypotheses testing).

Variable	Predict.	Model 1: Hypotheses Testing Coeff.	Sig.	Model 2: Sensitivity Z Score: Altman Coeff.	Sig.	Model 3: Sensitivity Z Score: Springate Coeff.	Sig.	Model 4: Sensitivity Financial Statement Coeff.	Sig.
(Constant)		0.621	0.000	2.886	0.000	11.797	0.239	0.759	0.000
CAPEX	+	2.194	0.164	0.533	0.884	15.582	0.075	2.209	0.152
WC	+	0.794	0.066	0.814	0.733	13.055	0.132	1.509	0.080
RE	+	0.726	0.081	3.049	0.028	5.353	0.524	2.056	0.003
GEQ	+	0.321	0.006	0.469	0.552	0.448	0.852	0.702	0.030
EBIT	+	0.000	0.998	0.000	0.998	0.000	0.998	0.000	0.998
CM	+	0.000	0.999	0.000	0.999	0.000	0.999	0.000	0.999
GS	+	0.003	0.265	0.003	0.265	0.003	0.265	0.003	0.265
EFO	+	0.002	0.008	0.002	0.008	0.002	0.008	0.002	0.008
ACEM	-	-0.267	0.075 *	-0.045	0.924	-0.470	0.484	-0.287	0.054 *
CFO	+	-0.020	0.325	0.170	0.001 ***	-1.541	0.266		
Dependent Vrb.			YFINDIS	Zs_Alt		Zs_Spr		YFINDIS	
Adjusted R Square			0.44	0.35		0.31		0.42	
F-Statistics			4.7	3.96		2.98		5.68	
Prob-F Statistics			0	0		0.01		0	
Durbin-Watson			2.02	1.94		1.88		2.28	
Total Obs.			48	48		48		48	

Where: YFINDIS = financial distress based on marginal score (SMg), Zs_Alt= Altman score used to measure financial distress, Zs Spr = Springate score used to measure financial distress, CAPEX = capital expenditure growth, WC = working capital growth, RE = growth retained earnings, GEQ_t = growth in equity, EBIT = growth in earnings before interest and tax, CM = growth in contribution margin, GS = government subsidy, EFO = level of operational efficiency or productivity, ACEM = accruals earning management, CFO_t = growth in cash flow from operating, β_0 : constant, $\beta_{1 \ldots} \beta_{10}$: regression coefficient, e_t = error. Based on the table of calculation results above, the estimated research results are expressed in the following regression equation.

YFINDIS = 0.621 + 2.194 CAPEX + 0.481 WC + 0.726 RE + 0.021 GEQ + 0.860 EBIT
+ 0.278 CM + 0.032 GS + 0.0005 EFO – 0.267 ACEM + 0.020 CFO

5. Discussion

Capital expenditure (CAPEX) has a positive and insignificant effect on financial distress with a coefficient of 2.194 and a significance level of 0.164, which is greater than alpha 10%. The positive influence of the capital expenditure variable shows that increasing investment has the potential to increase the level of financial distress, improve financial performance, and avoid financial distress. The insignificant effect of capital expenditure indicates that changes in this variable have no significant impact on changes in the level of financial distress, especially because investment in a certain period does not immediately have an impact on financial distress. The impact of investment management will affect long-term periods in the future, especially if there is a failure to generate financially viable returns.

Working capital (WC) has a positive and significant effect on financial distress with a coefficient of 0.481 and a significance level of 0.082, which is smaller than alpha 10%. The positive influence of the working capital variable means that increasing working capital positively impacts the level of financial distress and the company's financial performance, especially due to increasing liquidity and the ability to settle short-term financial obligations that are due. The significant influence of the working capital variable shows that companies need to pay attention to controlling working capital, as it is necessary to maintain short-term operational needs so that the company can run smoothly. On the other hand, if working capital is constrained, business operational activities will be affected in meeting short-term obligations and fulfilling the needs of the company's business cycle.

Retained earnings (RE) have a positive and significant effect on financial distress, with a coefficient of 0.726 and a significance level of 0.001, which is less than a 1% alpha. The positive influence of changes in the retained earnings variable has a positive impact on financial distress, which means that an increase in this variable will strengthen the financial performance position, especially because the portion of profits that is not distributed to shareholders will increase the level of financial distress and further strengthen the ability of cash flow to finance the company's operational needs. The significant influence of retained earnings on financial distress proves that this variable is able to produce a better financial distress level position because undistributed profits or additional retained earnings have a direct effect on funding needs. On the other hand, if profits are distributed completely to shareholders, the company must prepare a certain amount of funds to fulfill the distribution of dividends to shareholders, thereby potentially suppressing the company's liquidity.

Government equity (GEQ) has a positive and significant effect on financial distress, with a coefficient of 0.021 and a significance level of 0.086, which is smaller than alpha 10%. The effect of changes in government equity positively impacts the increase in the level of financial distress, indicating that adding government equity will have a direct effect on increasing the cash flow of company funding that can be used primarily to meet investment needs, pay off long-term debt, and strengthen the company's liquidity. Changes in the government equity variable have a very significant impact on changes in the level of financial distress, which means that the government, as a shareholder, needs to pay attention to the company when it experiences worsening financial distress. In this case, a response from company management is needed to actively report to shareholders to obtain additional government equity if the company experiences a decreasing level of financial distress.

Earnings before interest and tax (EBIT) has a positive and significant effect on financial distress, with a coefficient of 0.860 and a significance level of 0.000, which is less than a 1% alpha. The positive influence of the earnings before interest and tax variable shows that increasing a company's profitability can increase the level of financial distress or help avoid financial difficulties, especially because profitability can increase the company's funding ability to meet operational needs and fulfill financial obligations that are due. The significant influence of the earnings before interest and tax variable indicates that this variable has a substantial impact on the company's financial condition, so management must focus on efforts to enhance profitability in order to avoid increasing financial distress or decreasing financial performance.

The contribution margin (CM) has a positive and insignificant effect on financial distress, with a coefficient of 0.278 and a significance level of 0.665, which is greater than alpha 10%. A positive influence means that increasing the contribution margin impacts increasing the level of financial distress or strengthening the company's financial position, because an increase in the difference between sales and variable costs will enhance the company's financial potential. This is because increasing contribution levels indicate that at a certain price, lower variable costs are required, or at certain variable costs, greater sales are obtained. The insignificant effect of the contribution margin on financial distress means that increasing the contribution margin requires additional investment in production research and development to achieve lower variable costs or to improve quality to set higher prices, so that increasing the contribution margin has no significant effect on increasing the level of financial distress.

Government subsidy (GS) has a positive and insignificant effect on financial distress with a coefficient of 0.032 and a significance level of 0.268, which is greater than alpha 10%. Changes in the government subsidy variable have a positive effect on the level of financial distress because additional government subsidies will increase the company's funding ability to meet the financial deficit, as the amount of operating income is smaller than operating costs. The influence of the government subsidy variable is not significant, especially because the amount of subsidy provided is only limited to meeting the deficit to avoid losses, but is unable to meet investment funding needs and fulfill financial obligations that are due, so it has a less significant influence on the level of financial distress experienced by the Agency. State Owned Enterprises.

Operational efficiency (EFO) has a positive and insignificant effect on financial distress, with a coefficient of 0.0005 and a significance level of 0.625, which is greater than alpha 10%. Changes in this variable have a positive and insignificant effect on financial distress, especially because operational efficiency, caused by an increase in the ratio of sales to total assets, will be followed by a greater increase in operating costs. Therefore, the impact on increasing the level of financial distress is not significant. The positive influence indicates that increasing operational efficiency has the potential to further increase the level of financial distress, but it is not significant because the cost of production also increases.

Accruals earnings management (ACEM) has a negative and significant effect on financial distress, with a coefficient of -0.267 and a significance of 0.075, which is smaller than the alpha of 10%. Increasing earnings management practices impacts the reduction of financial distress. This occurs because the earnings management policy is intended to increase profitability in the profit and loss report, but it has a negative impact on the level of financial distress due to the necessity of paying taxes on reported profits and additional employee and management bonus expenditures, which have the potential to suppress the company's liquidity capacity.

Cash flow from operations (CFO) has a positive and insignificant effect on financial distress, with a coefficient of 0.020 and a significance level of 0.325, which is greater than alpha 10%. An increase in cash flow from operating variables impacts the company's level of financial distress, especially because the company is able to settle financial obligations that are due. However, the influence of this variable is not significant, particularly because cash flow increases at the end of the year due to the use of new loans, either from bank loans or bond loans, prepared at the end of the year to pay off financial obligations in the following period. This also shows that the cash balance at the end of the year increased, but at the beginning of the following year, it was used to pay off maturing debts, so changes in cash flow from operations had no significant effect on the level of financial distress of State-Owned Enterprises.

5.1. Sensitivity Analysis

Sensitivity analysis was conducted by comparing the marginal theory-based financial distress measurement with the Altman Z-Score and Springate Z-Score measurement models as stated in the study, namely:

(a) Model Z=Score Altman: Z-Score = 6,56 X1 + 3,26X2 + 6,72 X3 + 1,05 X4

Where: Z= financial distress index, X1= working capital/total asset, X2= retained earnings / total asset, X3= earnings before interest and taxes/total asset, X4= book value of equity/book value of total liabilities.

(b) Model Z-Score Springate: Z-Score = 1,03 A + 3,07 B+ 0,66 C + 0,4 D

Where: Z-Score = financial distress, A= Working capital / Total asset, B= Net profit before interest and taxes / Total asset, C= Net profit before taxes / Current liabilities, D= Sales / Total asset.

The results of the sensitivity calculations, as stated in table 4, can be presented in the form of the regression equations for Models 2, 3 and 4 below.

Model (2): measure financial distress based on the Altman score, for sensitivity analysis in this research, then compare the results of Model (1)

Zs_Alt = 2.886 + 0.533 CAPEX + 0.410 WC + 0.349 RE + 0.067 GEQ + 0.610 EBIT
+ 1.061 CM + 0.094 GS + 0.0004 EFO – 0.112 ACEM + 0.170 CFO

Model 2 sensitivity analysis uses Altman's Z-score in measuring financial distress, and the results show that the government equity variable has a positive and significant effect on financial distress, with a coefficient of 0.067 and a significance level of 0.022 or the same as the significance level of model 1 in this study. Meanwhile, the cash flow from operating variables has a positive and significant effect on financial distress, with a coefficient of 0.170 and a significance level of 0.000 or not the same as the estimation model of this research.

Model (3): measure financial distress based on the Springate score, for sensitivity analysis in this research, then compare the results of Model (1)

Zs_Spr = 11,797 + 15,328 CAPEX + 32,560 WC + 16,050 RE + 0,750 GEQ +
46,202 EBIT + 14,754 CM + 1,564 GS + 0.013 EFO – 3,291 ACEM +1,541 CFOs

Model 3 sensitivity analysis uses Springate's Z-score in measuring financial distress, and the results show that the working capital variable and the Earnings before interest and taxes variable have a positive and significant effect on financial distress or the same as the significance level of model 1 in this study.

Model (4): uses independent variables that are directly related to the statement of financial position, and the statement of profit or loss, so it does not use variables operational efficiency and cash flows from operating variables.

FINDIS = 0.759 + 2.209 CAPEX + 0.518 WC + 0.669 RE + 0.022 GEQ + 0.834 EBIT
+ 0.257 CM + 0.025 GS – 0.287 ACEM

Sensitivity analysis model 4 uses independent variables related to the statement of financial position and statement of profit or loss, and the results show that the variables working capital, retained earnings, government equity, Earnings before interest and taxes have a positive and significant effect on financial distress. Meanwhile, the accruals earnings management variable has a negative and significant effect on financial distress or is the same as the significance level of model 1 in this research.

5.2. Summary of Results

A summary of the results of this research is presented in Table 5, and the results show that there are five independent variables that have a positive and significant effect on financial distress, which aligns with the predictions and supports the hypothesis proposed in this research.

Table 5.
Summary results of the hypothesis testing.

Hypotheses		**Pred. Sign**	**Status**
H1a	Capital expenditure has a positive impact on the financial distress of state-owned enter rises	+	Not supported
H 1b	Working capital has a significant positive impact on the financial distress of state-owned enter rises	+	Supported (positive significant
H1c	Retained earning has a significant positive impact on the financial distress of state-owned enterprises	+	Supported (positive significant)
H 1d	Government equity has a significant positive impact on the financial distress of state-owned enterprises	+	Supported (positive significant)
H2a	Earning before interest and taxes has a significant positive impact on the financial distress of state-owned enterprises	+	Supported (positive significant)
H2b	Government subsidy has a significant positive impact on the financial distress of state-owned enterprises	+	Not supported
H2c	Contribution margin has a significant positive impact on the financial distress of state-owned enter rises	+	Not supported
H3	Operational efficiency has a significant positive impact on the financial distress of state-owned enter rises	+	Not supported
H4	Accruals earning management has a significant positive impact on the financial distress of state-owned enterprises	-	Supported (negative significant)
H5	Cash flow from operating has a significant positive impact on the financial distress of state-owned enterprises	+	Not supported

The independent variables that support the hypothesis are working capital, retained earnings, government equity, earnings before interest and taxes, and accrual earnings management. Meanwhile, the other variables do not support the hypothesis at the level of significance, but the direction of the positive influence on financial distress supports the hypothesis.

5.3. Discussion of Findings

This research found that five independent variables showed conformity with the hypothesis, while the other five independent variables did not have a significant effect on financial distress. The independent variables that have a positive

and significant influence on the financial distress of State-Owned Enterprises are the variables working capital, retained earnings, government equity, earnings before interest and taxes, and accruals earnings management.

The policy implication of these findings is that company management needs to prioritize strategies and policies in the company's work program related to these variables in order to increase the marginal score level or avoid increasingly serious financial distress. Other variables that have no significant influence on financial distress remain programmed, but on a scale that is not a priority.

The findings of this research provide input for the management of State-Owned Enterprises in preparing strategies and policies related to key variables that influence the company's financial distress. Furthermore, the results of this research can also be used to predict future levels of financial distress by using estimated coefficients of independent variables and predictions of changes in these variables. Finally, the estimated regression coefficient from this research can be used to evaluate the level of financial distress achieved by the company.

6. Limitations and Future Research Directions

The limitations of this research are mainly data collection, which is limited to secondary data and lacks direct information from key persons and decision-makers of State-Owned Enterprises. For this reason, future research directions are expected, namely: (a) complementing this research by collecting information and data relating to the company management decision-making process, especially in relation to factors that influence financial distress, (b) developing the implementation of measuring financial distress with a proxy score marginal to other BUMNs that are not experiencing financial difficulties, (c) measuring BUMN financial distress is recommended to be more specific according to industry groups, for example, banking, public services, manufacturing, agriculture, energy, etc., and (d) it is recommended that subsequent research develop a marginal score-based financial distress measurement for companies listed on the Indonesian Stock Exchange.

7. Conclusion

Based on the discussion of the results of the statistical analysis above, it can be concluded as follows. (a) Capital expenditure has a positive and insignificant effect on BUMN financial distress, which means that this variable does not support the hypothesis. Changes in this variable have no significant effect on financial distress, especially because the impact of investment is long-term in generating returns, while within a certain period of time, you have to fulfill debt obligations and interest on the investment. (b) Working capital has a positive and significant effect on BUMN financial distress, especially because the greater the net working capital, the greater the company's liquidity conditions and the ability to settle short-term financial obligations that are due. (c) Retained earnings have a positive and significant effect on BUMN financial distress. This happens because an increase in this variable supports the funding ability to meet financial obligations and strengthen the company's financial position. (d) Government equity has a positive and significant effect on the financial distress of BUMN because additional government equity is intended to strengthen the financial position in financing the company's operations and investments. Additional equity strengthens funding because it is permanent and does not incur repayment obligations and interest costs like debt funding. (e) Earnings before interest and tax have a positive and significant effect on BUMN financial distress because the increase in earnings before interest and tax will strengthen the liquidity position to meet operational funding and company investment development. (f) Contribution margin has a positive and insignificant effect on the financial distress of BUMN, especially because the increase in contribution margin caused by a decrease in variable costs requires investment costs in research and development programs, so increasing the contribution margin has no significant effect on the financial distress of BUMN. (g) Government subsidies have a positive and insignificant effect on BUMN's financial distress because government subsidies are only limited to helping overcome operational deficits. Settlement of debt obligations and interest is not included in government subsidies, so this variable has no significant effect on financial distress. (h) Operational efficiency has a positive and insignificant effect on BUMN financial distress. The positive influence shows that increasing operational efficiency has the potential to further increase the level of financial distress, but it is not significant because an increase in sales of a certain number of assets will be followed by an increase in the cost of production. (i) Accruals earnings management has a negative and significant effect on BUMN financial distress. The negative influence means that the policy of increasing profitability through earnings management practices will increase profitability but does not show real conditions and has an impact on the tax burden which will make it difficult for the company's liquidity, so that the level of financial distress tends to decrease. (j) Cash flow from operations has a positive and insignificant effect on BUMN financial distress. The effect is not significant because the cash balance at the end of the year is obtained from new loans such as bond sales which will be used to pay off financial obligations in the following period.

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