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Financial Distress Analysis Using the Ohlson Model in Indonesian State Owned Enterprises

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Abstract: This study aims to analyze financial distress conditions using the Ohlson financial distress model in SOEs Non-Financial Sector for the 2017-2020 financial year performance period. The object of analysis is non-financial and banking SOEs registered under Ministry of SOEs. The results of the study are: 1) The aggregate probability of default for all SOEs has increased from 2017 to 2020; 2) the highest increase is the Probability of Default in 2020 compared to the Probability of Default in 2019; 3) SOEs in the Tourism Sector are the sectors that experience the most financial distress in 2020, while the Plantation and Forestry sector are the least financial distress in 2020; 4) SOEs in the same sector may show a different trend of increasing/decreasing Probability of Default.

Keywords: Financial Distress, Ohlson, SOEs

INTRODUCTION

The dynamic development of the world economy requires good corporate management. Companies must always support to maintain and improve their performance in each sector in order to anticipate increasingly fierce business competition. Indonesia is a developing country which, along with these developments, growth in this country has also led to very tight competition in every line of business in every company, be it service companies, trading companies or manufacturing companies (Moch et al., 2019). The importance of conducting an analysis to predict bankruptcy (financial distress) is needed to anticipate bankruptcy in the future. There are two factors that can initiate bankruptcy, namely internal factors in the company, which is risks that occur in the company's internal environment. The second factor is external risk, usually there is an event that comes from outside the company and is beyond the company's control. These events are usually rare but have a significant impact on the company (Susanti et al., 2020).

The Covid-19 pandemic in 2020 is evidence of economic conditions that affect company value (Dwiantari & Artini, 2021). External conditions are also supported by other factors such as industry trends and company-specific problems that will lead to bankruptcy. The country's depressed macroeconomic conditions can have an impact on the inflation rate

and the domestic currency exchange rate. High inflation rates cause an increase in the price of goods, so that public demand for an item will decrease along with the price increase that occurs. This will also have an impact on production activities which will cause sales to the company to decrease due to reduced demand (Supriyanto & Darmawan, 2018). The weakening of the exchange rate will have an impact on the depreciation of the currency which causes an increase in production costs. This will increase the probability that the company will experience financial distress due to a decrease in company profitability. A decrease in revenue and profitability will reduce the company's ability to meet its obligations.

Financial distress is a broad concept which is used to describe a situation when a company faces financial difficulties (John, 2017). Financial difficulties begin when the company is unable to meet payment schedules or when cash flow projections indicate that the company is unable to make payments. Predicting financial distress is a very important thing for companies to do to anticipate the risk of bankruptcy that will occur in the future (Liahmad et al., 2021). According to Law Number 19 of 2003 concerning State-Owned Enterprises, State-Owned Enterprise (SOEs) is a business entity in which all or most of its capital is owned by the state through direct participation originating from separated state assets. In addition, based on the Minister of SOEs Regulation Number PER-04/MBU/03/2021 concerning the Organizational Structure of the Ministry of SOEs, there are 116 companies that can be categorized as SOE which are divided into 12 business sectors, namely the Energy, Oil and Gas Industry , Mineral and Coal Industry, Plantation and Forestry Industry, Food and Fertilizer Industry, Health Industry, Manufacturing Industry, Financial, Insurance and Pension, Telecommunications and Media, Infrastructure, Logistics, and the Tourism sector.

Based on the 2020 annual report of the Ministry of SOEs, the total assets of all SOEs have increased by IDR 7,772.7 trillion in 2019 to IDR 8,311.9 trillion in 2020. However, the revenue of all SOEs in 2020 amounted to IDR 1,929.9 trillion, decreased compared to revenue in 2019 of IDR 2,204.4 trillion. In line with this decrease in revenue, the profit in 2019 amounted to IDR 124.9 trillion, and in 2020 it experienced a significant decrease to IDR 13.29 trillion. According to the Ministry of SOEs, SOEs have consistently been able to contribute more than 16% to Indonesia's Gross Domestic Product (GDP) since 2018. SOEs have also contributed directly to the state in the form of dividends, taxes and other PNBP of IDR 377 trillion in 2020 and IDR 421 trillion in 2019 (Safrida & Gultom, 2021).

With the significant contribution of SOEs to the national economy, if SOEs experience financial distress which can lead to bankruptcy, then the risk of negative impact on the national economy can occur. Indications of financial distress in SOEs can be seen from several indicators of financial ratios. The net profit margin ratio for all SOEs in 2019 was 5.7%, decreased in 2020 to 0.7%. The EBITDA margin ratio for all SOEs in 2019 was 16.7% and in 2020 it decreased to 14.5%. The return on assets ratio for all SOEs in 2019 was 1.6% and in 2020 decreased to 0.2%. The ratio of EBITDA to Interest Expense in 2020 was 3.1x, a decrease compared to the ratio of EBITDA to Interest Expense in 2019 of 5.0x.

There are various models to identify financial distress in companies, based on financial reports, market data, and based on artificial intelligence (Masdupi et al., 2018). Each of these models has advantages and disadvantages that need to be considered in research. Considering that the research object is a SOEs in Indonesia, and most of them are not companies whose shares are traded on the stock exchange, the Probability of Default calculation chosen in this study uses the Ohlson model. Ohlson's modeling is calculated using variables that are easily obtained in the company's periodic financial statements, starting from the income statement, financial statement position and also the cash flow statement. In addition, the output of Ohlson's calculations can be quantified on a percentage scale, making it easier to interpret the calculation results (Restianti & Agustina, 2018). Based on the background description above,

the authors are interested in conducting further research related to SOEs Financial distress with the title "Financial Distress Analysis with the Ohlson Model in Indonesian State-Owned Enterprises".

LITERATURE REVIEW

Financial Distress

Predicting financial distress is a very important thing for companies to do. It is useful in anticipating the risk of bankruptcy that will occur in the future for the company (Dwiantari & Artini, 2021). Financial distress generally refers to the condition that the company does not have the ability to pay its debt (Rafatnia et al., 2020). Financial Distress needs to be concern of all stakeholders, company owners, managers, investors, creditors and business partners and government institutions because the impact of bankruptcy is not only felt by the owners, but also other users of financial statements. Therefore, the prediction of financial distress needs to be done as a preventive measure to reduce the level of risk and danger of corporate bankruptcy.

The Financial Distress based on the Ohlson model

This study aims to predict financial distress with Ohlson Score, a ratio model using logit model created by Ohlson in 1980. Ohlson detects financial distress that occurs in companies by using logit analysis which is used to cover deficiencies in the multiple discriminate analysis method. Ohlson used logistic regression to develop a predictive model for financial distress by including nine independent variables consisting of several financial ratios. The regression equation in the Ohlson model is formulated as :

O Score = -1,32 - 0,407X1 + 6,03X2 – 1,43X3 + 0,0757X4 – 2,37X5 – 1,83X6 +0,285X7 – 1,72X8 – 0,521X9

Where:

X1 =SIZE (LOG total assets/GNP level index) (SIZE)
X2 =Total liabilities/total assets (TLTA)
X3 =Working capital/total assets (WCTA)
X4 =Current liabilities/current assets (CLCA)
X5 =1 if total liabilities > total assets; 0 otherwise (DUM.TLTA)
X6 =Net income/total assets (NITA)
X7 =Cash flow from operations/total liabilities (CFOTL)
X8 =1 if Net income is negative for 2 concecutive years; 0 otherwise (DUM.NI)
X9 =(NIt – NIt-1) / (NIt + NIt-1), where NIt is net income for the current period (NI.NOW)

And to calculate the probability of default from the Ohlson equation above, the following function is used:

$$P = \frac{e^{O\ Score}}{1 + e^{O\ Score}}$$

RESEARCH METHOD

This research was conducted by calculating and analyzing the Probability of Default of 10 SOEs sectors under the guidance of the Ministry of SOEs, for the period 2017 to 2020. Year 2017 was taken as the starting point for research considering the ease of analysis and also references from research by previous researchers, where periods of distress were identified in the past 3 to 5 years. This research also has limitations where it does not do identification and analysis that explains the causes of distress in each sector and in SOEs. In addition, this study also does not validate the accuracy of the identification of the Probability

of Default by comparing companies that experience default or bankruptcy in the period 2017 to 2020.

In this study, the objects of research is non-financial SOEs under Minister of SOE for the 2017-2020 performance period. The list of SOEs is taken from the Minister of SOEs Regulation Number PER-04/MBU/03/2021, where there are 116 companies that can be categorized as SOEs, which are divided into 12 sectors. The type of data used in this study is quantitative data in the form of secondary data obtained directly from the Ministry of SOEs, and Biro Pusat Statistik (www.bps.go.id). The data taken is in the form of annual financial report data including the company's balance sheet, profit and loss, and cash flow report.

The sectors in this study consist of 10 sectors, namely the Energy, Oil and Gas sector, Mineral and Coal sector, Plantation and Forestry sector, Food and Fertilizer sector, Health sector, Manufacturing sector, Telecommunications and Media sector, Infrastructure sector, Logistics sector, and the Tourism sector for the 2017-2020 performance period. This study does not include SOE in the financial and insurance sector, due to the different characteristics of financial reports.

Table 1. Sampling Process

Information	Amount
Number of SOEs registered under Ministry of SOE	**116**
Number of SOEs in the Insurance, Finance and Banking Sector	**12**
Number of Minority SOEs	**5**
Number of SOEs with a composition of 50%:50% ownership	**2**
Number of SOEs in the process of liquidation	**5**
Number of SOEs With Incomplete Data During the Study Period (2017-2021)	**4**
Number of Selected Samples	**88**

Source: Secondary data processed

RESULT AND DISCUSSION

Results

The agregate probability of default of all SOEs is increase from 2017 to 2020, with the highest increase being in 2020. The probability of default in 2017 was 30.9%, and increased significantly in 2020 to 51.9 %, with an average annual growth of 21%.

Table 2. Tabulation of Ohlson Score and Probability of Default all SOEs

	Ohlson score				Probability of Default (%)			
	2017	2018	2019	2020	2017	2018	2019	2020
All State Owned Enterprise	-0.81	-0.73	-0.68	-0.08	30.9	32.6	33.5	51.9

Source: data processing Ohlson Model (2022)

Probability of Default per SOEs Sector shows the same result, where all sectors experience an increase in the Probability of Default. However, the results of each sector show a different average increase.

Table 3. Tabulation of Ohlson Score and Probability of Default per sector

SOEs Sector	Ohlson score				Probability of Default (%)			
	2017	2018	2019	2020	2017	2018	2019	2020
Energy, Oil and Gas	-1.86	-1.72	-1.23	-1.03	13.5%	15.1%	22.6%	26.3%
Mineral and Coal	-4.18	-1.95	-0.92	-1.86	1.5%	12.5%	28.5%	13.5%
Plantation and Forestry	-1.68	-2.02	-1.12	-1.88	15.7%	11.7%	24.7%	13.2%
Food and Fertilizer	-0.36	0.91	-0.77	-0.77	41.0%	71.3%	31.5%	31.6%
Health	-4.64	-3.73	-1.87	-1.33	1.0%	2.3%	13.3%	21.0%
Manufacturing	-1.06	-0.52	-0.49	-0.35	25.8%	37.3%	37.9%	41.3%
Telecommunications and	-0.45	-0.49	-0.30	0.18	38.9%	37.9%	42.5%	54.4%

Media								
Infrastructure	-0.73	-0.69	-0.18	0.34	32.4%	33.4%	45.4%	58.3%
Logistics	-1.50	-1.35	-1.43	-0.96	18.2%	20.5%	19.3%	27.7%
Tourism	-0.01	-1.83	-1.14	3.53	49.7%	13.8%	24.3%	97.1%

Source: data processing Ohlson Model (2022)

As for 2020, the SOE sector with the highest Probability of Default is the Tourism sector, with a Probability of Default value of 97.1%, while the SOEs sector with the lowest Probability of Default is the Plantation and Forestry sector with a Probability of Default of 13.2%. The lowest average annual increase in Probability of Default for the period 2017 to 2020 was in the Food and Fertilizer sector by 6%, while the highest increase is 269% in the Mineral and Coal sector. A significant increase in the Probability of Default was also experienced by the Health sector sector by 223% and the Tourism sector by 101%.

Energy, Oil and Gas Sector

The Energy, Oil and Gas Sector consists of 3 SOEs with the following Ohlson Score:

Table 4. Tabulation of Ohlson Score and Probability of Default Energy, Oil and Gas Sector

Name of SOE	Ohlson score				Probability of Default (%)			
	2017	2018	2019	2020	2017	2018	2019	2020
PT Pertamina	-2.15	-2.07	-2.19	-1.96	10.4%	11.2%	10.1%	12.3%
PT Perusahaan Listrik Negara	-2.89	-2.92	-2.30	-2.73	5.2%	5.1%	9.1%	6.1%
PT Energy Management Indonesia	-0.52	-0.17	0.79	1.60	37.2%	45.7%	68.8%	83.2%

Source: data processing Ohlson Model (2022)

In the Energy, Oil and Gas sector, there are 3 SOEs namely PT Pertamina, PT PLN and PT EMI. PT EMI is a consulting firm in the field of energy development, has indicated experiencing financial distress with a 2020 Probability of Default of 83.2%. Meanwhile, PT Pertamina and PT PLN generally has relatively low Probability of Default with 12.3% and 6.1%, however, the annual trend has increased.

Mineral and Coal Sector

The Mineral and Coal Sector with the following Ohlson Score:

Table 5. Tabulation of Ohlson Score and Probability of Default Mineral and Coal Sector

Name of SOE	Ohlson score				Probability of Default (%)			
	2017	2018	2019	2020	2017	2018	2019	2020
PT Indonesian Asahan Aluminium	-4.18	-1.95	-0.92	-1.86	1.5%	12.5%	28.5%	13.5%

Source: data processing Ohlson Model (2022)

In the Mineral and Coal sector, there is only 1 SOE, namely PT Inalum, where since 2017 PT Inalum has become the Holding Company and PT Aneka Tambang Tbk, PT Bukit Asam Tbk, PT Timah Tbk, and PT Freeport Indonesia as members of the Holding.

The Probability of Default for PT Inalum in 2020 is quite low at 12.5%, although it had increased to 28.5% in 2019. The average Probability of Default per year for the 2017-2020 PT Inalum is very high at 269% is due to the Probability of Default in 2017 which was 1.5%, increased to 12.5% in 2018 so that the annual growth is 730%.

Plantation and Forestry Sector

The Plantation and Forestry Sector consists of 2 SOEs with the following Ohlson Score:

Table 6. Tabulation of Ohlson Score and Probability of Default Plantation and Forestry Sector

Name of SOE	Ohlson score				Probability of Default (%)			
	2017	2018	2019	2020	2017	2018	2019	2020
Perum Perhutani	-1.69	-2.99	-2.07	-2.92	15.6%	4.8%	11.2%	5.1%
PT Perkebunan Nusantara III	-1.67	-1.05	-0.16	-0.84	15.9%	25.9%	46.0%	30.2%

Source: data processing Ohlson Model (2022)

In the Plantation and Forestry sector, there are 2 holding companies namely Perum Perhutani and PT Perkebunan Nusantara III. Probability of Default of Perum Perhutani is relatively low at 5.1% in 2020, with annual growth from 2017 to 2020 of 3%. Probability of Default of PT Perkebunan Nusantara III in 2020 was 30.2%, which decreased compared to 2019 which was 46%.

Even though they are in the same sector, PT Perhutani and PT Perkebunan Nusantara are in different sub-sectors with different business models. This could be an indication of the cause of the difference in the Probability of Default scores between PT Perhutani and PT Perkebunan Nusantara, even though they are in the same sector.

Food and Fertilizer Sector

Industry sector consists of 11 SOEs with the following Ohlson Score:

Table 7. Tabulation of Ohlson Score and Probability of Default Food and Fertilizer Sector

Name of SOE	Ohlson score				Probability of Default (%)			
	2017	2018	2019	2020	2017	2018	2019	2020
Perum BULOG	-2.07	1.65	0.31	-1.66	11.2%	83.8%	57.6%	15.9%
Perum Perikanan Indonesia	-0.75	-0.74	0.04	1.15	32.0%	32.3%	50.9%	76.0%
PT Berdikari	0.65	1.11	0.87	0.72	65.7%	75.2%	70.4%	67.2%
PT Bhanda Ghara Reksa	-1.63	-1.76	-2.22	-2.61	16.3%	14.7%	9.8%	6.9%
PT Garam	-5.04	-3.78	-2.63	-1.01	0.6%	2.2%	6.7%	26.6%
PT Perikanan Nusantara	-1.19	-1.38	0.26	2.08	23.4%	20.1%	56.4%	88.9%
PT Pertani	-0.64	1.24	-0.49	0.02	34.6%	77.5%	38.0%	50.5%
PT Perusahaan Perdagangan Indonesia	-1.55	-2.35	-1.19	-2.51	17.5%	8.7%	23.3%	7.5%
PT Pupuk Indonesia	-1.75	-1.99	-2.23	-2.39	14.8%	12.0%	9.7%	8.4%
PT Rajawali Nusantara Indonesia	-1.14	-0.60	-0.39	-1.36	24.3%	35.5%	40.4%	20.3%
PT Sang Hyang Seri	11.09	18.63	-0.83	-0.93	100.0%	100.0%	30.3%	28.3%

Source: data processing Ohlson Model (2022)

In the food and fertilizer sector, the SOEs Probability of Default score has quite a variety of variations. There are companies with a low Probability of Default below 10% in 2020, namely PT Bhanda Ghara Reksa at 6.9%, PT Perusahaan Perdagangan Indonesia at 7.5%, and PT Pupuk Indonesia at 8.4%. However, there are also several companies with a high probability of default, namely PT Perikanan Nusantara at 88.9%, Perum Perikanan Indonesia at 76% and PT Berdikari at 67.2%. In this sector, there are also several SOEs that have been able to lower their Probability of Default score on an annual average since 2017-2020, namely PT Bhanda Ghara Reksa with a growth Probability of Default of minus 24%, PT Sang Hyang Seri with minus 25% and PT Pupuk Indonesia with minus 17%.

Health Sector

The Health Industry Sector with an Ohlson Score as follows:

Table 8. Tabulation of Ohlson Score and Probability of Default Plantation and Forestry Sector

Name of SOE	Ohlson score				Probability of Default (%)			
	2017	2018	2019	2020	2017	2018	2019	2020
PT Bio Farma	-4.64	-3.73	-1.87	-1.33	1.0%	2.3%	13.3%	21.0%

Source: data processing Ohlson Model (2022)

SOEs in the Health sector only consists of 1 SOE, namely PT Bio Farma as the holding company which oversees several former SOEs namely PT Kimia Farma and PT Indo Farma. The Probability of Default from PT Bio Farma for 2020 is 21.0% which is relatively low, however, the Probability of Default has continued to increase from 2017 to 2020, with an average annual growth of 223%.

Manufacturing Sector

In the Manufacturing Industry Sector, there are 10 SOEs with an Ohlson Score as follows:

Table 9. Tabulation of Ohlson Score and Probability of Default Manufacturing Sector

Name of SOE	Ohlson score				Probability of Default (%)			
	2017	2018	2019	2020	2017	2018	2019	2020
PT Biro Klasifikasi Indonesia	-4.04	-3.97	-4.09	-4.80	1.7%	1.9%	1.6%	0.8%
PT Dahana	-2.04	-1.47	-1.59	-2.14	11.5%	18.7%	16.9%	10.5%
PT Dirgantara Indonesia	-0.73	0.40	-0.68	-0.30	32.5%	60.0%	33.5%	42.4%
PT Industri Nuklir Indonesia	2.36	2.76	1.53	4.61	91.4%	94.1%	82.2%	99.0%
PT Krakatau Steel Tbk	-0.94	-0.30	2.63	0.37	28.0%	42.6%	93.3%	59.1%
PT LEN Industri	0.48	1.30	1.45	2.21	61.8%	78.5%	81.0%	90.1%
PT PAL Indonesia	0.83	2.21	1.05	1.96	69.5%	90.2%	74.0%	87.6%
PT Pindad	0.03	0.33	0.74	1.36	50.7%	58.2%	67.7%	79.5%
PT Sucofindo	-3.51	-3.39	-3.32	-3.50	2.9%	3.3%	3.5%	2.9%
PT Surveyor Indonesia	-2.99	-3.08	-2.63	-3.25	4.8%	4.4%	6.7%	3.7%

Source: data processing Ohlson Model (2022)

The Probability of Default in the Manufacturing Sector SOEs shows a variation. There are several SOEs with high Probability of Default scores, and several SOEs with relatively low Probability of Default scores. SOEs with a low Probability of Default score in 2020 are PT Biro Klasifikasi Indonesia with a Probability of Default of 0.8%, PT Sucofindo of 2.9% and also PT Surveyor Indonesia with a Probability of Default of 3.7%. Meanwhile, SOEs with a high probability of default are PT Industri Nuklir Indonesia with a probability of default of 99%, PT LEN Industri with 90.1% and PT PAL Indonesia with 87.6%. In terms of growth, almost all SOEs in the Manufacturing sector have experienced an increase in the Probability of Default, except for PT Biro Klasifikasi Indonesia, which has experienced a decrease in the average Probability of Default from 2017 to 2020 of -18%.

Telecommunications and Media Sector

The Telecommunications and Media Services Sector consists of 29 SOEs with the following Ohlson Score:

Table 10. Tabulation of Ohlson Score and Probability of Default Telecommunication and Media Sector

Name of SOE	Ohlson score				Probability of Default (%)			
	2017	2018	2019	2020	2017	2018	2019	2020
Perum Jasa Tirta I	-5.54	-5.29	-4.73	-5.35	0.4%	0.5%	0.9%	0.5%
Perum Jasa Tirta II	-4.32	-4.05	-7.57	-3.55	1.3%	1.7%	0.1%	2.8%
Perum LKBN Antara	1.04	-0.33	0.60	-0.09	73.9%	41.9%	64.5%	47.8%
Perum Percetakan Negara Republik Indonesia	-0.33	-0.13	1.45	0.82	41.8%	46.9%	80.9%	69.5%
Perum Produksi Film Negara	0.47	-0.00	-0.16	-1.06	61.4%	50.0%	46.1%	25.7%
PT Amarta Karya	-0.13	0.61	1.29	0.90	46.8%	64.8%	78.5%	71.1%
PT Balai Pustaka	-0.29	0.11	-0.02	0.80	42.9%	52.6%	49.4%	68.9%
PT Barata Indonesia	-0.75	0.19	0.36	1.21	32.0%	54.6%	58.9%	77.0%
PT Bina Karya	0.37	0.41	-0.18	-0.15	59.1%	60.0%	45.5%	46.3%
PT Boma Bisma Indra	0.41	0.78	0.64	0.86	60.0%	68.5%	65.4%	70.2%
PT Djakarta Lloyd	-0.52	-1.21	-0.84	0.25	37.2%	22.9%	30.2%	56.3%
PT Dok dan Perkapalan Kodja Bahari	6.21	5.62	5.27	7.88	99.8%	99.6%	99.5%	100.0%

PT Dok dan Perkapalan Surabaya	5.59	3.23	3.93	4.08	99.6%	96.2%	98.1%	98.3%
PT Indah Karya	-0.03	-0.13	1.20	2.34	49.3%	46.8%	76.9%	91.2%
PT Indra Karya	-0.64	-0.13	0.34	1.01	34.5%	46.8%	58.4%	73.4%
PT Industri Kapal Indonesia	-1.49	-0.80	-1.18	-0.52	18.4%	31.0%	23.4%	37.4%
PT Industri Telekomunikasi Indonesia	1.04	2.90	3.48	3.56	73.9%	94.8%	97.0%	97.2%
PT Kawasan Berikat Nusantara	-2.47	-2.55	-1.54	-0.31	7.8%	7.3%	17.6%	42.3%
PT Kawasan Industri Makassar	-2.89	-1.70	-3.18	-3.49	5.2%	15.5%	4.0%	3.0%
PT Kawasan Industri Medan	-4.42	-3.53	-4.07	-2.78	1.2%	2.9%	1.7%	5.8%
PT Kawasan Industri Wijayakusuma	-4.82	-4.07	-2.87	-2.99	0.8%	1.7%	5.4%	4.8%
PT Kliring Berjangka Indonesia	0.85	0.73	0.78	0.71	70.0%	67.4%	68.5%	67.0%
PT PDIP	-1.58	-2.47	-1.74	-0.20	17.0%	7.8%	14.9%	45.1%
PT Perusahaan Pengelola Aset	-1.56	-1.19	-0.48	0.39	17.4%	23.3%	38.2%	59.6%
PT Primissima	3.14	1.72	2.34	3.12	95.9%	84.8%	91.2%	95.8%
PT Semen Kupang	2.54	2.41	2.12	2.26	92.7%	91.8%	89.3%	90.6%
PT Telkom Indonesia Tbk	-3.50	-3.22	-2.95	-2.67	2.9%	3.9%	5.0%	6.5%
PT Virama Karya	0.81	-1.01	-0.67	-0.71	69.2%	26.7%	33.8%	32.9%
PT Yodya Karya	-0.30	-1.18	-0.35	-1.19	42.5%	23.4%	41.2%	23.3%

Source: data processing Ohlson Model (2022)

Telecommunications and Media Services Sector consists of 29 state-owned companies. There are several SOEs with a low Probability of Default score below 10%, namely PT Telkom Indonesia Tbk, PT Kawasan Industri Medan, PT Kawasan Industri Wijayakusuma, PT Kawasan Industri Makassar, Perum Jasa Tirta I, and Perum Jasa Tirta II. Meanwhile, several SOEs with a high probability of default above 90% include PT Dok and Perkapalan Kodja Bahari, PT Dok and Perkapalan Surabaya, PT Industri Telekomunikasi Indonesia, PT Primissima, PT Indah Karya and PT Semen Kupang.

Infrastructure Sector

Services Sector Infrastructure consists of 10 SOEs with an Ohlson Score as follows:

Table 11. Tabulation of Ohlson Score and Probability of Default Infrastructure Sector

Name of SOE	Ohlson score				Probability of Default (%)			
	2017	2018	2019	2020	2017	2018	2019	2020
Perum Perumnas	-1.29	-0.59	1.30	1.11	21.6%	35.7%	78.7%	75.3%
PT Adhi Karya Tbk	0.23	0.05	0.32	1.17	55.6%	51.1%	57.9%	76.3%
PT Brantas Abipraya	-0.04	-0.40	-0.05	0.88	49.0%	40.2%	48.8%	70.7%
PT Hutama Karya	0.13	0.29	-0.04	0.63	53.3%	57.2%	48.9%	65.2%
PT Jasa Marga Tbk	0.09	0.47	0.63	0.65	52.3%	61.5%	65.3%	65.6%
PT Pembangunan Perumahan Tbk	-1.00	-0.69	-0.34	0.29	27.0%	33.5%	41.5%	57.1%
PT Semen Baturaja Tbk	-2.24	-1.84	-1.73	-1.64	9.6%	13.7%	15.0%	16.2%
PT Semen Indonesia Tbk	-2.43	-3.19	-1.38	-1.74	8.1%	4.0%	20.2%	15.0%
PT Waskita Karya Tbk	-0.02	-0.17	0.17	1.53	49.4%	45.7%	54.3%	82.1%
PT Wijaya Karya Tbk	-0.77	-0.82	-0.72	0.49	31.6%	30.6%	32.8%	62.1%

Source: data processing Ohlson (2022)

The infrastructure sector consists of 10 SOEs engaged in construction, infrastructure and cement. In general, the Probability of Default for SOEs Infrastructure has experienced an increasing trend from 2017 to 2020. Several companies with a high Probability of Default in 2020 include PT Waskita Karya with 82.1%, PT Adhi Karya with 76.3%, and Perum

Perumnas by 75.3%. Meanwhile, the Probability of Default for SOEs Cement is relatively low, namely the Probability of Default for PT Semen Indonesia is 15.0% and Semen Baturaja is 16.2%.

Logistics Sector

Sector Logistics Services consists of 12 SOEs with the following Ohlson Score:

Table 12. Tabulation of Ohlson Score and Probability of Default Logistics Sector

Name of SOE	Ohlson score				Probability of Default (%)			
	2017	2018	2019	2020	2017	2018	2019	2020
Perum Damri	-2.06	-2.36	-2.20	0.77	11.3%	8.6%	10.0%	68.2%
Perum PPD	2.27	1.36	0.62	0.70	90.6%	79.6%	65.0%	66.8%
PT ASDP Indonesia Ferry	-6.03	-4.39	-4.11	-3.59	0.2%	1.2%	1.6%	2.7%
PT Industri Kereta Api	0.24	0.15	0.99	2.30	56.0%	53.8%	73.0%	90.8%
PT Kereta Api Indonesia	-1.52	-1.61	-1.37	0.36	17.9%	16.7%	20.3%	58.9%
PT Pelabuhan Indonesia I	-2.82	-1.26	-0.46	-0.40	5.6%	22.1%	38.7%	40.1%
PT Pelabuhan Indonesia II	-1.06	-1.12	-1.12	-0.72	25.7%	24.7%	24.7%	32.7%
PT Pelabuhan Indonesia III	-1.47	-0.80	-1.14	-4.45	18.7%	31.0%	24.2%	1.2%
PT Pelabuhan Indonesia IV	-3.03	-2.27	-2.09	-1.42	4.6%	9.3%	11.0%	19.4%
PT Pelayaran Nasional Indonesia	-5.08	-5.17	-4.29	-4.06	0.6%	0.6%	1.3%	1.7%
PT Pos Indonesia	-0.37	-0.40	-0.51	-1.74	40.8%	40.1%	37.4%	14.9%
PT Varuna Tirta Prakasya	2.91	1.63	-1.50	0.76	94.8%	83.6%	18.2%	68.1%

Source: data processing Ohlson (2022)

In the Logistics sector, there are various variations on the realization of SOEs Probability of Default. There are several SOEs with a low Probability of Default in 2020, namely PT ASDP Indonesia Ferry at 2.7%, PT Pelindo III at 1.2% and PT Pelni at 1.7%. Meanwhile, several SOEs with a high probability of default include PT INKA with 90.8%, Perum Damri with 68.2%, Perum PPD with 66.8% and PT Varuna Tirta Prakasya with 68.1%.

Tourism Sector

The Tourism Sector consists of 9 SOEs with the following Ohlson Score:

Table 13. Tabulation of Ohlson Score and Probability of Default Tourism Sector

Name of SOE	Ohlson score				Probability of Default (%)			
	2017	2018	2019	2020	2017	2018	2019	2020
Perum LPPNPI	-4.74	-4.23	-5.40	-0.14	0.9%	1.4%	0.4%	46.4%
PT Angkasa Pura I	-1.98	-1.53	-0.76	0.72	12.1%	17.8%	32.0%	67.2%
PT Angkasa Pura II	-3.12	-2.52	-1.80	-0.43	4.2%	7.4%	14.2%	39.4%
PT Garuda Indonesia Tbk	1.14	1.01	0.69	2.46	75.8%	73.3%	66.5%	92.1%
PT Hotel Indonesia Natour	-3.92	-3.96	-3.59	-2.39	1.9%	1.9%	2.7%	8.4%
PT Pengembangan Pariwisata Indonesia	-3.26	-3.44	-2.41	-1.95	3.7%	3.1%	8.2%	12.5%
PT Sarinah	-1.51	-2.72	-0.93	1.40	18.1%	6.2%	28.2%	80.2%
PT Survai Udara Penas	22.82	6.86	10.56	31.85	100.0%	99.9%	100.0%	100.0%
PT Taman Wisata Candi	-5.52	-5.93	-6.61	0.22	0.4%	0.3%	0.1%	55.4%

Source: data processing Ohlson (2022)

In the Tourism and Support sector, there are various variations in the realization of the SOEs Probability of Default. Several SOEs with a low Probability of Default in 2020, namely PT Hotel Indonesia Natour at 8.4% and PT Pengembangan Pariwisata Indonesia at 12.5%. Meanwhile, several SOEs with a high probability of default include PT Survey Udara Penas with 100%, PT Garuda Indonesia with 92.1%, and PT Sarinah with 80.2%.

CONCLUSION

Based on the background description, literature review and observing the results of calculating the Probability of Default of SOEs for each sector, several research conclusions can be drawn as follows: 1) The probability of default of all SOEs in aggregate from 2017 to 2020 has increased, with the highest increase being in 2020 compared to the probability of default in 2019. 2) The sectoral level the Probability of Default also shows the same results, where all sectors experience an increase. However, each sector shows a different average annual increase. 3) The SOEs Tourism Sector are the sectors that experience the most financial distress in 2020, while the Plantation and Forestry sector experience the least financial distress in 2020. 4) SOEs in the same sector can show different trends of increasing/decreasing Probability of Default. For this reason, a deeper analysis is needed down to the sub-sector level to get a deeper picture related to the Probability of Default of SOEs in the same sector.

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