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# Bankruptcy Prediction Analysis of General Insurance Companies Using the Ohlson Model

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**Abstract**

General insurance companies play an important role in maintaining economic stability by transferring financial risks from individuals and companies to insurance companies. However, insurance companies are not immune to the risk of bankruptcy that can arise due to factors such as inability to manage claims, premium fluctuations, and insufficient capital. Early detection of potential bankruptcy becomes very important to prevent greater losses. This study aims to analyze the prediction of bankruptcy in general insurance companies in Indonesia using the Ohlson Model. The Ohlson model is based on logistic regression, taking into account several financial variables such as leverage, profitability, and company size to estimate the probability of bankruptcy. The results of the study are expected to provide insights for insurance company management and regulators in identifying bankruptcy risks and taking appropriate preventive measures. In addition, this study contributes to enriching the literature related to the application of bankruptcy prediction models in the context of the insurance industry in emerging markets. From the analysis, it was found that out of 13 general insurance companies listed on the Indonesia Stock Exchange (IDX), the Ohlson value for all companies is below 0.38, which indicates that the sampled companies still have fairly good financial stability. The research results are expected to provide insights for insurance company management and regulators in identifying bankruptcy risks and taking appropriate preventive measures. In addition, this study contributes to enriching the literature related to the application of bankruptcy prediction models in the context of the insurance industry in emerging markets.

*Keywords:* Bankruptcy, general insurance company, Ohlson model.

## 1. Introduction

As a participant in the financial market, the insurance industry contributes significantly to maintaining economic stability. By providing insurance services, it allows consumers to transfer risks to insurance companies that will insure the insured against various financial hazards that the insured may face. However, insurance companies may experience difficulties or fail due to events covered by insurance, changes in company assets, or insufficient capital to cover unexpected losses. Therefore, it is imperative to detect suspected insolvency as soon as possible to find out the flaws that need to be corrected and stop actual insolvency (Khalil, Liu, Salah, Fathalla, & Ali, 2022).

The financial statements of a company can be used to minimize the risk of bankruptcy. By using data from the financial statements, interested parties can assess the company's performance based on several aspects. One of the financial statement analyses is a bankruptcy prediction analysis using a prediction model. The model is based on an analysis of indicators that have the ability to indicate a threat to a company's finances (Saputri, Widarno, & Harimurti, 2022). There are several models that can be used to predict company bankruptcy, such as the Altman Z-Score model, Zmijewski model, Springate model, Grover model, and Ohlson model. In this study, the model that will be used is the Ohlson model. This provides its own advantages in detecting the threat of bankruptcy early, especially for insurance companies because they often face more complex risks than other sectors.

**Table 1:** Research Gap

| Author | Research Topic | Ohlson Model | Insurance Company | Research Object > 1 |
|---|---|---|---|---|
| Saputri, Widarno, & Harimurti (2018) | Bankruptcy Prediction Using Zmijewski Model and Ohlson Model | ✓ | - | ✓ |

| | | | | |
|---|---|---|---|---|
| Nasir, Kamaludin, Midiastuty (2024) | Comparison of Bankruptcy Prediction Models | ✓ | - | ✓ |
| Putri, Dyah Puspitasari (2018) | Comparison of Bankruptcy Prediction Analysis Models | ✓ | ✓ | - |
| Özparlak (2022) | Prediction of Company Bankruptcy During the Covid-19 Pandemic | ✓ | - | ✓ |
| This research | Bankruptcy Prediction Analysis of General Insurance Companies Using the Ohlson Model | ✓ | ✓ | ✓ |

Several previous studies have analyzed bankruptcy prediction using the Ohlson model. For example, research by Saputri, Widarno, & Harimurti (2018) comparing the Zmijewski model and the Ohlson model, then research by Nasir, Kamaludin, Midiastuty (2024) which discusses the comparison of bankruptcy prediction models for several non-insurance companies. As for other studies, such as those conducted by Putri (2018), the research examines bankruptcy prediction analysis, but does not focus on general insurance companies. Then, research by Özparlak (2022) examining bankruptcy during the Covid-19 pandemic, the study is relevant to specific economic conditions but has not yet led to general insurance companies. From the research that has been done, there is no study that explicitly focuses on predicting the bankruptcy of general insurance companies, especially by using the Ohlson model.

This study aims to fill the gap by analyzing the bankruptcy of general insurance companies more comprehensively, using the Ohlson model as a predictive tool. In addition, general insurance companies face a number of specific challenges that can accelerate the risk of bankruptcy, such as premium fluctuations, poor claims management, and the inability to manage reserves. Therefore, the application of a more structured and precise bankruptcy prediction model, such as the Ohlson model, can be an effective tool for management and regulators in taking preventive steps before the company enters a deeper phase of bankruptcy. Accurate predictions are not only beneficial for the company, but also for the stability of the financial market as a whole, given the important role of insurance companies in the modern economy.

## 2. Literatur Review

### 2.1. Bankruptcy

Companies that can no longer manage their operations effectively are in a situation of bankruptcy, which is a very serious liquidity hazard. On the other hand, financial distress is liquidity that can result in bankruptcy. The bankruptcy declaration serves as a legal basis when parties, such as creditors, file a bankruptcy lawsuit. The puIDRose of a bankruptcy study is to identify potential bankruptcy cases early on. The sooner the symptoms of bankruptcy are identified, the better it is for management, as it allows for potential remedies. Both shareholders and creditors can foresee the various bad outcomes that could occur (Putri, 2018).

Financial problems can occur when cash flow is insufficient to pay off existing debt. This makes the company force management to consider all options to maintain the company's viability. There are also other indicators, including high loan default rates where businesses default on loans by not making interest or principal payments. Financial distress is defined as the inability to pay debts which is the definition of financial distress (Nasir, Kamaludin, & Midiastuty, 2024).

### 2.2. Financial Statements

Performance improvement needs to be maintained and improved by every company to maintain continuity so that financial conditions remain stable and not problematic. In general, the performance of a company is shown in the published financial statements (Marsenne, Ismail, Taqi, & Hanifah, 2024). Financial statements are formal documents that provide an overview of the activities and financial status of a company, group or individual. It is an important instrument for stakeholders to evaluate the performance and financial status of an entity (Babuska, 2021). Financial statements also have an important role in analyzing the potential bankruptcy of the company. One approach that is often used is financial ratio analysis which combines various aspects of financial statements to assess performance and make informed decisions.

### 2.3. General Insurance

Insurance is a contract involving two or more parties that binds the insurer to compensate the insured for losses. Insurance can also be defined as legal liability to an insured third party for a payment based on the death or life of an insured person. The insurer agrees to this contract by receiving an insurance premium from the insured (Sinaga, 2022).

There are various kinds of insurance, including life insurance, general insurance, and reinsurance. General insurance is a service business that aims to compensate the insured or policyholder for any loss, damage, or profit-related expenses as a way to fulfill legal obligations to third parties involved in an incident. General insurance serves as a risk transfer tool to reduce the financial impact of future unexpected events that include vehicle, health, home, and travel insurance (Robson, 2015).

## 3. Materials and Method

### 3.1. Materials

The calculation in this study focuses on examining the financial statements of 13 general insurance companies listed on the Indonesia Stock Exchange (IDX), as listed in table 2. The calculation of the Ohlson value in 2023 uses various related financial indicators, such as the amount of assets, liabilities, capital, profit, and operating cash which are then written in tables 3, 4, and 5. This study also uses GNP data in 2020, 2021, 2022, and 2023 obtained from the Satu Data Perdagangan website.

As a comparison, the Ohlson value of insurance companies whose licenses have been revoked by OJK will also be calculated so that the company is said to be bankrupt. One of the companies that has been claimed to be bankrupt is PT Asuransi Jiwasraya.

**Table 2:** Insurance Company

| No | Code | Company Name |
|---|---|---|
| 1 | ABDA | Asuransi Bina Dana Arta Tbk. |
| 2 | AHAP | Asuransi Harta Aman Pratama Tb |
| 3 | AMAG | Asuransi Multi Artha Guna Tbk. |
| 4 | ASBI | Asuransi Bintang Tbk. |
| 5 | ASDM | Asuransi Dayin Mitra Tbk. |
| 6 | ASJT | Asuransi Jasa Tania Tbk. |
| 7 | ASMI | Asuransi Maximus Graha Persada |
| 8 | ASRM | Asuransi Ramayana Tbk. |
| 9 | MREI | Maskapai Reasuransi Indonesia |
| 10 | RELI | Reliance Sekuritas Indonesia |
| 11 | VINS | Victoria Insurance Tbk. |
| 12 | MTWI | Malacca Trust Wuwungan Insuran |
| 13 | TUGU | Asuransi Tugu Pratama Indonesia |
| 14 | Jiwasraya | Asuransi Jiwasraya |

**Table 3:** Insurance Company Financial Statements for the Period of 2023

| Code | ABDA | AHAP | AMAG | ASBI | ASDM |
|---|---|---|---|---|---|
| Total Assets | IDR2,670,480,149 | IDR997,499,000,000 | IDR5,116,000,794 | IDR874,529,342,000 | IDR982,940,217,000 |
| Total Liabilities | IDR1,115,605,924 | IDR781,520,000,000 | IDR3,410,344,046 | IDR584,515,655,000 | IDR611,216,174,000 |
| Total Capital Work | IDR193,316,724 | IDR323,178,000,000 | IDR500,155,252 | IDR87,096,618,000 | IDR49,067,308,000 |
| Current Liabilities | IDR184,718,985 | IDR735,540,000,000 | IDR218,824,752 | IDR94,476,472,000 | IDR179,691,823,000 |
| Current Assets | IDR142,447,925 | IDR956,160,000,000 | IDR330,495,993 | IDR767,806,841,000 | IDR388,768,279,000 |
| Net Profit | IDR84,581,307 | IDR4,979,000,000 | IDR148,073,877 | -IDR44,346,000,000 | IDR21,037,991,000 |
| Previous Net Profit | IDR91,144,434 | -IDR7,469,000,000 | IDR169,774,422 | IDR416,410,000,000 | IDR18,551,067,000 |
| Operational Cash | IDR722,652,379 | IDR271,660,000,000 | IDR97,176,075 | IDR4,194,673,000 | IDR13,693,684,000 |

**Table 4:** Insurance Company Financial Statements for the Period of 2023

| Code | ASJT | ASMI | ASRM | MREI |
|---|---|---|---|---|
| Total Assets | IDR498,723,000,000 | IDR961,063,073,477 | IDR1,850,769,013,354 | IDR4,772,680,650,982 |
| Total Liabilities | IDR174,350,000,000 | IDR575,621,048,674 | IDR1,172,290,013,843 | IDR337,678,614,409 |
| Total Capital Work | IDR160,971,000,000 | IDR305,793,376,048 | IDR25,004,930,516 | IDR319,490,785,796 |
| Current Liabilities | IDR174,350,000,000 | IDR28,408,053,111 | IDR37,260,070,705 | IDR352,009,233,400 |
| Current Assets | IDR393,320,000,000 | IDR734,451,947,633 | IDR477,930,627,916 | IDR3,362,765,780,809 |
| Net Profit | IDR4,019,000,000 | IDR7,568,967,642 | IDR30,803,830,006 | IDR61,360,000,000 |
| Previous Net Profit | IDR574,000,000 | -IDR86,331,829,021 | IDR14,029,157,477 | IDR37,590,000,000 |
| Operational Cash | IDR9,957,000,000 | IDR4,232,444,667 | IDR47,145,716,827 | IDR8,205,872,867 |

**Table 5:** Insurance Company Financial Statements for the Period of 2023

| Code | RELI | VINS | MTWI | TUGU |
|---|---|---|---|---|
| Total Assets | IDR758,808,075,462 | IDR242,935,000,000 | IDR888,404,282,553 | IDR16,003,743,000,000 |
| Total Liabilities | IDR125,228,901,983 | IDR89,306,000,000 | IDR461,081,702,518 | IDR9,351,637,000,000 |
| Total Capital Work | IDR499,490,785,796 | IDR162,569,000,000 | IDR28,894,770,430 | IDR177,779,000,000 |
| Current Liabilities | IDR128,931,978,101 | IDR27,226,000,000 | IDR2,896,062,254 | IDR63,608,000,000 |
| Current Assets | IDR238,677,567,829 | IDR189,795,000,000 | IDR16,072,143,806 | IDR44,401,000,000 |
| Net Profit | IDR36,087,566,094 | IDR6,479,000,000 | IDR12,249,439,146 | IDR1,282,538,000,000 |
| Previous Net Profit | IDR36,239,960,446 | IDR8,664,000,000 | -IDR8,365,721,381 | IDR386,289,000,000 |
| Operational Cash | IDR44,278,409,200 | IDR3,162,000,000 | IDR16,072,143,806 | IDR273,646,000,000 |

**Table 6:** Financial Statements Insurance Company

| Code | Jiwasraya |
|---|---|
| Total Assets | IDR15,726,246,000,000 |
| Total Liabilities | IDR54,362,749,000,000 |
| Total Capital Work | IDR235,000,000,000 |
| Current Liabilities | IDR1,380,226,000,000 |
| Current Assets | IDR7,073,576,000,000 |
| Net Profit | -IDR4,046,500,000,000 |
| Previous Net Profit | -IDR4,140,445,000,000 |
| Operational Cash | IDR54,677,000,000 |

**Table 7:** Indonesia *Gross National Product* Data

| Year | Constant Price | Current Price |
|---|---|---|
| 2020 | IDR10,722,999,300,000,000 | IDR15,443,353,200,000,000 |
| 2021 | IDR11,120,059,700,000,000 | IDR16,976,751,400,000,000 |
| 2022 | IDR11,710,247,900,000,000 | IDR19,588,089,900,000,000 |
| 2023 | IDR12,301,393,600,000,000 | IDR20,892,376,700,000,000 |

### 3.2. Method

#### 3.2.1. Ohlson Model

Ohlson (1980) examined the next bankruptcy prediction model, motivated by previous research. The bankruptcy prediction model was derived by Ohlson as a replacement for the Altman Z-Score model. To determine the likelihood that a company will go bankrupt or not, this study uses logistic regression. Ohlson's model consists of nine variables consisting of various financial ratios, which distinguishes it from previous study models (Saputri, Widarno, & Harimurti, 2022). Here is how Ohlson presents his calculation model (Insani, Pontoh, & Said, 2024):

$$O = -1.32 - 0.407X_1 + 6.03X_2 - 1.43X_3 + 0.0757X_4 - 2.37X_5 - 1.83X_6 + 0.285X_7 - 1.72X_8 - 0.512X_9 \quad (1)$$

with,

$X_1$ : natural logarithm (ln) of total assets to Gross National Product (GNP) price index
$X_2$ : ratio of total liabilities to total assets
$X_3$ : ratio of working capital to total assets
$X_4$ : ratio of current liabilities to current assets
$X_5$ : dummy variable, with a value of 1 if total liabilities exceed the value of total assets and 0 otherwise.
$X_6$ : net income to total assets ratio
$X_7$ : operating cash to total liabilities ratio
$X_8$ : dummy variable, with a value of 1 if the net profit is negative for the last two years and 0 otherwise
$X_9$ : the percentage change in net income from the current year to the previous year divided by the sum of net income for both years.

The score criteria obtained by a company from the Ohlson model is if the score obtained by the company exceeds 0.38, then the company is predicted to have the potential for bankruptcy. Conversely, if a company has a score of less than 0.38, then the company is predicted not to have the potential for bankruptcy.

#### 3.2.2. Gross National Product

Gross Domestic Product (GDP) is a critical economic indicator that measures the total value of all goods and services produced within a country's borders over a given period of time. It can be calculated using three main methods: the production approach, the income approach, and the expenditure approach, with the latter focusing on total spending by households, firms, governments, and foreign buyers (Cristina Batusaru, 2023).

$$GNP\ Price\ Index = \frac{Current\ GNP\ Price}{Constant\ GNP\ Price} \quad (2)$$

#### 3.2.3. Research Steps

The steps in this research are:

(a) Collecting the necessary data, such as the amount of assets, liabilities, capital, profit, and operating cash of each company to be analyzed as well as GNP value at current prices and GNP value at constant prices.
(b) Calculating the GNP price index.
(c) Calculating nine financial variables.
(d) Calculating the Ohlson value based on the variables that have been searched.
(e) Interpret the results, Ohlson value $< 0.38$ indicates that the company has a low risk of bankruptcy, while the value of Ohlson $> 0.38$ indicates that the company has a high risk of bankruptcy.

## 4. Results and Discussion

The GNP price index in 2023 is calculated as follows.

$$GNP\ Price\ Index = \frac{Current\ GNP\ Price}{Constant\ GNP\ Price} \times 100 = \frac{20{,}892{,}376{,}700{,}000{,}000}{12{,}301{,}393{,}600{,}000{,}000} \times 100 = 169.837$$

Based on tables 3, 4, dan 5, $X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8$ and $X_9$ will be calculated. The following is the calculation for Bina Dana Arta Tbk Insurance.

$$X_1 = ln\frac{2{,}670{,}480{,}149}{169.837} = 16.571$$

$$X_2 = \frac{1{,}115{,}605{,}924}{2{,}670{,}480{,}149} = 0.418$$

$$X_3 = \frac{193{,}316{,}724}{2{,}670{,}480{,}149} = 0.072$$

$$X_4 = \frac{184{,}718{,}985}{142{,}447{,}925} = 1.297$$

$$X_5 = \begin{cases} 0, & 1{,}115{,}605{,}924 < 2{,}670{,}480{,}149 \\ 1, & 1{,}115{,}605{,}924 > 2{,}670{,}480{,}149 \end{cases} = 0$$

$$X_6 = \frac{84{,}581{,}307}{2{,}670{,}480{,}149} = 0.032$$

$$X_7 = \frac{722{,}652{,}379}{1{,}115{,}605{,}924} = 0.648$$

$$X_8 = \begin{cases} 0, & 84{,}581{,}307 > 0 \ \ dan \ 91{,}144{,}434 > 0 \\ 1, & 84{,}581{,}307 < 0 \ \ dan \ 91{,}144{,}434 < 0 \end{cases} = 0$$

$$X_9 = \frac{84{,}581{,}307 - 91{,}144{,}434}{84{,}581{,}307 + 91{,}144{,}434} = -0.037$$

For other insurance companies, the values of $X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8$ and $X_9$ can be seen in the following table.

**Table 8:** Ohlson Model Variable Calculation in 2023

| Code | ABDA | AHAP | AMAG | ASBI | ASDM | ASJT | ASMI |
|---|---|---|---|---|---|---|---|
| $X_1$ | 16.571 | 22.494 | 17.221 | 22.362 | 22.479 | 21.800 | 22.456 |
| $X_2$ | 0.418 | 0.783 | 0.667 | 0.668 | 0.622 | 0.350 | 0.599 |
| $X_3$ | 0.072 | 0.324 | 0.098 | 0.100 | 0.050 | 0.323 | 0.318 |
| $X_4$ | 1.297 | 0.769 | 0.662 | 0.123 | 0.462 | 0.443 | 0.039 |
| $X_5$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $X_6$ | 0.032 | 0.005 | 0.029 | -0.051 | 0.021 | 0.008 | 0.008 |
| $X_7$ | 0.648 | 0.348 | 0.028 | 0.007 | 0.022 | 0.057 | 0.007 |
| $X_8$ | 0 | 1 | 0 | 1 | 0 | 0 | 1 |
| $X_9$ | -0.037 | -4.999 | -0.068 | -1.238 | 0.063 | 0.750 | -1.192 |

**Table 9:** Ohlson Model Variable Calculation in 2023

| Code | TUGU | MTWI | VINS | RELI | MREI | ASRM |
|---|---|---|---|---|---|---|
| $X_1$ | 22.269 | 22.377 | 21.081 | 22.220 | 24.059 | 23.112 |
| $X_2$ | 0.584 | 0.519 | 0.368 | 0.165 | 0.071 | 0.633 |
| $X_3$ | 0.011 | 0.033 | 0.669 | 0.658 | 0.067 | 0.014 |
| $X_4$ | 1.433 | 0.180 | 0.143 | 0.540 | 0.105 | 0.078 |
| $X_5$ | 0 | 0 | 0 | 0 | 0 | 0 |
| $X_6$ | 0.080 | 0.014 | 0.027 | 0.048 | 0.013 | 0.017 |

| | | | | | | |
|---|---|---|---|---|---|---|
| $X_7$ | 0.029 | 0.035 | 0.035 | 0.354 | 0.024 | 0.040 |
| $X_8$ | 0 | 1 | 0 | 0 | 0 | 0 |
| $X_9$ | 0.537 | 5.308 | -0.144 | -0.002 | 0.240 | 0.374 |

Furthermore, $X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8$ and $X_9$ obtained are entered into the Ohlson Model equation. The following is the calculation of the Ohlson Model for one of the insurance companies, namely Asuransi Bina Data Arta Tbk.

$$O = -1.32 - 0.407X_1 + 6.03X_2 - 1.43X_3 + 0.0757X_4 - 2.37X_5 - 1.83X_6 + 0.285X_7 - 1.72X_8 - 0.512X_9$$

$$O = -1.32 - 0.407(16.571) + 6.03(0.418) - 1.43(0.072) + 0.0757(1.297) - 2.37(0) - 1.83(0.032) + 0.285(0.648) - 1.72(0) - 0.512(-0.037)$$

$$O = -5.404$$

From the calculation results, it is obtained that the Bina Data Arta Tbk. Insurance company has an Ohlson value of $-5.404 < 0.38$, which means the company has a low risk of bankruptcy. For other insurance companies, the value of the Ohlson Model calculation can be seen in the following table.

**Table 10:** Calculation Results Using the Ohlson Model

| No | Code | Ohlson Value 2021 | Ohlson Value 2022 | Ohlson Value 2023 |
|---|---|---|---|---|
| 1 | ABDA | -8.654 | -8.309 | -5.404 |
| 2 | AHAP | -5.838 | -6.341 | -5.181 |
| 3 | AMAG | -4.962 | -4.653 | -4.408 |
| 4 | ASBI | -6.002 | -6.308 | -7.504 |
| 5 | ASDM | -6.951 | -6.931 | -6.821 |
| 6 | ASJT | -9.319 | -8.582 | -8.902 |
| 7 | ASMI | -8.699 | -9.385 | -8.411 |
| 8 | ASRM | -7.173 | -7.199 | -8.406 |
| 9 | MREI | -9.861 | -8.094 | -11.832 |
| 10 | RELI | -7.771 | -7.254 | -8.593 |
| 11 | VINS | -8.940 | -8.385 | -10.254 |
| 12 | MTWI | -6.226 | -9.154 | -10.915 |
| 13 | TUGU | -7.981 | -8.229 | -7.134 |

Based on table 10, it is obtained that all general insurance companies obtained from the IDX in 2021-2023 have an Ohlson value $< 0.38$, which indicates that these companies have a low risk of bankruptcy. Asuransi Bintang Tbk, Asuransi Ramayana Tbk, and Malacca Trust Wuwungan Insuran have a decreasing or increasingly negative Ohlson value, indicating a decrease in the risk of bankruptcy of the three companies. Then, the company Asuransi Harta Aman Pratama Tbk, Asuransi Jasa Tania Tbk, Asuransi Maximus Graha Persada, Maskapai Reasuransi Indonesia, Reliance Sekuritas Indonesia, Victoria Insurance Tbk, and Asuransi Tugu Pratama Indonesia have fluctuating Ohlson values, this shows that these insurance companies have an increasing and decreasing risk of bankruptcy in the last three years. Meanwhile, the companies Asuransi Bina Data Tbk, Asuransi Multi Artha Guna Tbk, and Asuransi Dayin Mitra Tbk have an Ohlson value that is increasingly positive every year, indicating that the three companies have an increasing risk of bankruptcy.

Furthermore, the Ohlson value of an insurance company whose business license is revoked by the Financial Services Authority (OJK) so that the company is said to be bankrupt, namely PT Asuransi Jiwasraya. The calculation of the Ohlson model at PT Asuransi Jiwasraya was carried out based on the company's financial statements in 2020. The variable calculation results can be seen in table 11.

**Table 11:** Ohlson Model Variable Calculation

| Variable | Ohlson Value |
|---|---|
| $X_1$ | 25.416 |
| $X_2$ | 3.456 |
| $X_3$ | 0.014 |
| $X_4$ | 0.195 |

| | |
|---|---|
| $X_5$ | 1 |
| $X_6$ | -0.257 |
| $X_7$ | 0.001 |
| $X_8$ | 1 |
| $X_9$ | -0.011 |

Next, the Ohlson value for PT Asuransi Jiwasraya will be calculated.

$$O = -1.32 - 0.407(25.416) + 6.03(3.456) - 1.43(0.014) + 0.0757(0.195) - 2.37(1) - 1.83(-0.257) + 0.285(0.001) - 1.72(1) - 0.512(-0.011)$$

$$O = 5.561$$

After calculating using the Ohlson model, the Ohlson value is $5.561 > 0.38$, which means that the company is at great risk of bankruptcy. This shows that the Ohlson model is correct in predicting bankruptcy.

## 5. Conclusion

Based on the results and discussion, 13 general insurance companies listed on the IDX in 2021-2023 have an Ohlson value $< 0.38$ which indicates that these companies have a relatively low risk of bankruptcy. On the other hand, the Jiwasraya Insurance company, which was declared bankrupt in 2020, produced an Ohlson value of $5.561 > 0.38$ which indicates that the company's bankruptcy is significant. These results imply that the Ohlson model can be a valid predictor of corporate bankruptcy, both in stable conditions and in more vulnerable situations. The model is able to capture important financial variables such as leverage, profitability, and firm size, which significantly contribute to the estimated probability of bankruptcy. The use of this model in the context of general insurance companies in Indonesia provides a clear picture of the company's financial resilience, which can help company management and regulators in taking preventive measures to maintain the stability of the insurance industry.

## References

Babuska, E. W. (2021). Financial Statements as the Basis for the Systematics of Risks in the Accounting Area. *Journal of Accounting and Auditing: Research & Practice*, 1-14.

Cristina Batusaru, A. B. (2023). Tracking Economic Growth: A Correlation Analyse on the Determinants of Gross Domestic Product. *International Conference Knowledge Based Organization* , 24-29.

Insani, F., Pontoh, G. T., & Said, D. (2024). Corporate Bankruptcy Prediction Model: A Systematic Literature Review. *International Journal of Business, Economics and Management*, 143-159.

Khalil, A. A., Liu, Z., Salah, A., Fathalla, A., & Ali, A. (2022). Predicting Insolvency of Insurance Companies in Egyptian Market Using Bagging and Boosting Ensemble Techniques. *IEEE Access*, 117305-117314.

Marsenne, M., Ismail, T., Taqi, M., & Hanifah, I. A. (2024). Financial Distress Prediction with Altman, Springate, Zmijewski, Taffler, and Grover Models. 181-190.

Nasir, M., Kamaludin, & Midiastuty, P. P. (2024). Perbandingan Model Prediksi Kebangkrutan: "Model Altman Z-Score, Foster F-Score, Springate S-Score, Ohlson T-Score, Zmijewski X-Score, Fullmer H-Score, Zavgreen Pi Score, dan Grover G-sScore". *Jurnal Akuntansi Unihaz*, 52-64.

ÖZPARLAK, G. (2022). Validity Analysis of Financial Failure Prediction Models During the Covid-19 Pandemic. *Journal of Yasar University*, 249-276.

Putri, D. P. (2018). Comparison of Bankruptcy Prediction Models Analysis (Altman, Springate, Grover, Ohlson, and Zmijewski) on PT. Asuransi Harta Aman Pratama, TBK. 156-165.

Robson, J. (2015). General Insurance Marketing: a Review and Future Research Agenda. *Journal of Financial Services Marketing*, 282-291.

Saputri, I. R., Widarno, B., & Harimurti, F. (2022). Analisis Prediksi Kebangkrutan Model Zmijewski dan Model Ohlson pada Badan Usaha Milik Negraa (BUMN) yang Terdaftar di Bursa Efek Indonesia (BEI). 95-107.

Sinaga, W. (2022). Tinjauan Yuridis Terhadap Hak dan Kepentingan Pemegang Polis Asuransi. *Jurnal Hukum tora: Hukum untuk Mengatur dan Melindungi Masyarakat*, 341-356.

## Appendix

**Table 12:** Insurance Company Financial Statements for the Period of 2022

| Code | ABDA | AHAP | AMAG | ASBI | ASDM |
|---|---|---|---|---|---|
| Total Assets | IDR2,472,106,000,000 | IDR933,279,000,000 | IDR4,717,862,245 | IDR902,011,218,000 | IDR888,973,513,000 |
| Total Liabilities | IDR966,617,847,000 | IDR723,212,000,000 | IDR3,017,525,352 | IDR622,187,887,000 | IDR523,847,643,000 |
| Total Capital Work | IDR193,316,724,000 | IDR323,178,625,152 | IDR500,155,252 | IDR87,096,618,000 | IDR49,067,308,000 |
| Current Liabilities | IDR145,026,244,000 | IDR668,200,000,000 | IDR162,602,865 | IDR92,660,086,000 | IDR179,790,803.000 |
| Current Assets | IDR118,574,080,000 | IDR903,280,000,000 | IDR349,388,472 | IDR815,029,013,000 | IDR369,013,004,000 |
| Net Profit | IDR91,144,434,000 | -IDR7,469,000,000 | IDR169,774,422 | IDR416,410,000 | IDR18,551,067,000 |
| Previous Net Profit | IDR157,363,000,000 | IDR15,416,000,000 | IDR149,438,469 | IDR621,896,000 | IDR20,284,359,000 |
| Operational Cash | IDR445,550,439,000 | IDR214,567,000,000 | IDR77,402,505 | IDR2,226,509 | IDR12,911,272,000 |

**Table 13:** Insurance Company Financial Statements for the Period of 2022

| Code | ASJT | ASMI | ASRM | MREI |
|---|---|---|---|---|
| Total Assets | IDR499,031,756,093 | IDR1,063,470,852,516 | IDR1,627,241,657,686 | IDR4,286,100,000,000 |
| Total Liabilities | IDR181,189,695,973 | IDR686,518,502,953 | IDR1,013,123,874,462 | IDR2,889,100,000,000 |
| Total Capital Work | IDR160,971,259,054 | IDR305,793,376,048 | IDR152,141,920,000 | IDR103,558,336,200 |
| Current Liabilities | IDR1,140,384,734 | IDR69,941,175,212 | IDR401,470,822,051 | IDR401,826,577,760 |
| Current Assets | IDR18,106,727,479 | IDR798,378,558,166 | IDR1,816,887,410,747 | IDR3,015,516,965,737 |
| Net Profit | IDR574,000,000 | -IDR86,331,829,021 | IDR86,497,518,155 | IDR37,600,000,000 |
| Previous Net Profit | IDR346,000,000 | IDR19,550,788,783 | IDR64,959,423,205 | -IDR291,000,000,000 |
| Operational Cash | IDR9,785,303,347 | IDR77,197,937,942 | IDR55,266,203,084 | IDR5,907,535,062 |

**Table 14:** Insurance Company Financial Statements for the Period of 2022

| Code | RELI | VINS | MTWI | TUGU |
|---|---|---|---|---|
| Total Assets | IDR693,414,980,000 | IDR297,046,000,000 | IDR989,741,834,422 | IDR13,358,610,000,000 |
| Total Liabilities | IDR316,695,180,000 | IDR110,511,000,000 | IDR749,724,065,352 | 7,754,869,000,000 |
| Total Capital Work | IDR50,000,000,000 | IDR146,057,361,600 | IDR264,703,033,100 | IDR177,779,000,000 |
| Current Liabilities | IDR67,472,250,000 | IDR30,153,218,071 | IDR217,273,841,361 | IDR310,398,000,000 |
| Current Assets | IDR491,193,330,000 | IDR232,900,000,000 | IDR422,306,997,937 | IDR4,677,161,000,000 |
| Net Profit | IDR4,674,940,000 | IDR8,663,000,000 | -IDR8,365,721,381 | IDR386,290,000,000 |
| Previous Net Profit | IDR44,502,050,000 | IDR12,309,000,000 | IDR3,302,382,925 | IDR224,687,000,000 |

| | | | | |
|---|---|---|---|---|
| Operational Cash | IDR9,318,280,000 | IDR6,225,000,000 | IDR12,830,392,796 | IDR339,511,000,000 |

**Table 15:** Insurance Company Financial Statements for the Period of 2021

| Code | ABDA | AHAP | AMAG | ASBI | ASDM |
|---|---|---|---|---|---|
| Total Assets | IDR2,495,890,568,000 | IDR666,904,000,000 | IDR4,652,817,906 | IDR874,396,604,000 | IDR822,740,369,000 |
| Total Liabilities | IDR983,788,000,000 | IDR544,768,000,000 | IDR2,793,055,857 | IDR599,039,561,000 | IDR461,044,434,000 |
| Total Capital Work | IDR193,316,724,000 | IDR226,565,500,000 | IDR500,155,252 | IDR87,096,618,000 | IDR49,067,308,000 |
| Current Liabilities | IDR136,297,336,000 | IDR508,357,715,121 | IDR206,602,693 | IDR126,225,557,000 | IDR778,470,550,000 |
| Current Assets | IDR1,077,268,758,000 | IDR354,359,726,479 | IDR393,524,149 | IDR838,371,858,000 | IDR365,646,173,000 |
| Net Profit | IDR157,363,000,000 | IDR15,416,000,000 | IDR149,438,469 | IDR621,896,000 | IDR20,284,359,000 |
| Previous Net Profit | IDR138,204,000,000 | IDR10,507,000,000 | IDR107,253,266 | IDR10,456,654,000 | IDR26,804,614,000 |
| Operational Cash | IDR385,152,941,000 | IDR209,125,000,000 | IDR104,029,021 | IDR2,956,813,000 | IDR11,241,496,000 |

**Table 16:** Insurance Company Financial Statements for the Period of 2021

| Code | ASJT | ASMI | ASRM | MREI |
|---|---|---|---|---|
| Total Assets | IDR527,852,244,647 | IDR981,089,572,950 | IDR1,411,160,148,272 | IDR3,981,200,000,000 |
| Total Liabilities | IDR219,398,368,810 | IDR518,209,589,004 | IDR862,113,850,198 | IDR2,598,200,000,000 |
| Total Capital Work | IDR160,971,259,054 | IDR305,793,376,048 | IDR152,141,920,000 | IDR103,558,336,200 |
| Current Liabilities | IDR2,883,620,749 | IDR48,622,235,482 | IDR496,932,874,695 | IDR496,898,769,749 |
| Current Assets | IDR20,314,972,052 | IDR717,279,405,147 | IDR1,921,413,000,989 | IDR2,204,451,423,136 |
| Net Profit | IDR346,000,000 | IDR19,550,788,783 | IDR64,959,423,205 | -IDR291,000,000,000 |
| Previous Net Profit | -IDR7,767,000,000 | -IDR88,526,593,736 | IDR65,549,370,649 | IDR105,000,000,000 |
| Operational Cash | IDR8,301,695,852 | IDR14,755,175,125 | IDR57,935,642,231 | IDR8,792,546,992 |

**Table 17:** Insurance Company Financial Statements for the Period of 2021

| Code | RELI | VINS | MTWI | TUGU |
|---|---|---|---|---|
| Total Assets | IDR734,486,420,000 | IDR356,588,000,000 | IDR534,962,808,558 | IDR12,838,271,000,000 |
| Total Liabilities | IDR362,441,560,000 | IDR115,985,000,000 | IDR397,498,550,318 | IDR7,497,879,000,000 |
| Total Capital Work | IDR50,000,000,000 | IDR146,057,361,600 | IDR152,581,911,600 | IDR177,778,000,000 |
| Current Liabilities | IDR101,252,980,000 | IDR32,328,854,441 | IDR119,875,447,929 | IDR176,186,000,000 |
| Current Assets | IDR380,447,210,000 | IDR285,653,000,000 | IDR168,224,110,480 | IDR3,818,367,000,000 |
| Net Profit | IDR44,502,050,000 | IDR12,309,000,000 | IDR3,302,382,925 | IDR224,687,000,000 |
| Previous Net Profit | IDR21,112,699,772 | 6,212,000,000 | IDR2,426,478,187 | IDR318,341,000,000 |
| Operational Cash | IDR26,894,370,000 | IDR4,191,000,000 | IDR4,788,279,504 | IDR368,851,000,000 |

**Table 18:** Ohlson Model Variable Calculation in 2022

| Code | ABDA | AHAP | AMAG | ASBI | ASDM | ASJT | ASMI |
|---|---|---|---|---|---|---|---|
| $X_1$ | 23.416 | 22.442 | 17.155 | 22.408 | 22.394 | 21.816 | 22.573 |
| $X_2$ | 0.391 | 0.775 | 0.640 | 0.690 | 0.589 | 0.363 | 0.646 |
| $X_3$ | 0.078 | 0.346 | 0.106 | 0.097 | 0.055 | 0.323 | 0.288 |
| $X_4$ | 1.223 | 0.740 | 0.465 | 0.114 | 0.487 | 0.063 | 0.088 |
| $X_5$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $X_6$ | 0.037 | -0.008 | 0.036 | 0.000 | 0.021 | 0.001 | -0.081 |
| $X_7$ | 0.461 | 0.297 | 0.026 | 0.000 | 0.025 | 0.054 | 0.112 |
| $X_8$ | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| $X_9$ | -0.266 | -2.880 | 0.064 | -0.198 | -0.045 | 0.248 | 1.586 |

**Table 19:** Ohlson Model Variable Calculation in 2022

| Code | TUGU | MTWI | VINS | RELI | MREI | ASRM |
|---|---|---|---|---|---|---|
| $X_1$ | 25.104 | 22.501 | 21.298 | 22.145 | 23.967 | 22.998 |
| $X_2$ | 0.581 | 0.757 | 0.372 | 0.457 | 0.674 | 0.623 |
| $X_3$ | 0.013 | 0.267 | 0.492 | 0.072 | 0.024 | 0.093 |
| $X_4$ | 0.066 | 0.514 | 0.129 | 0.137 | 0.133 | 0.221 |
| $X_5$ | 0 | 0 | 0 | 0 | 0 | 0 |
| $X_6$ | 0.029 | -0.008 | 0.029 | 0.007 | 0.009 | 0.053 |
| $X_7$ | 0.044 | 0.017 | 0.056 | 0.029 | 0.002 | 0.055 |
| $X_8$ | 0 | 1 | 0 | 0 | 1 | 0 |
| $X_9$ | 0.264 | 2.304 | -0.174 | -0.810 | -1.297 | 0.142 |

**Table 20:** Ohlson Model Variable Calculation in 2021

| Code | ABDA | AHAP | AMAG | ASBI | ASDM | ASJT | ASMI |
|---|---|---|---|---|---|---|---|
| $X_1$ | 23.517 | 22.198 | 17.232 | 22.469 | 22.408 | 21.964 | 22.584 |
| $X_2$ | 0.394 | 0.817 | 0.600 | 0.685 | 0.560 | 0.416 | 0.528 |
| $X_3$ | 0.077 | 0.340 | 0.107 | 0.100 | 0.060 | 0.305 | 0.312 |
| $X_4$ | 0.127 | 1.435 | 0.525 | 0.151 | 2.129 | 0.142 | 0.068 |
| $X_5$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $X_6$ | 0.063 | 0.023 | 0.032 | 0.001 | 0.025 | 0.001 | 0.020 |
| $X_7$ | 0.391 | 0.384 | 0.037 | 0.005 | 0.024 | 0.038 | 0.028 |
| $X_8$ | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| $X_9$ | 0.065 | 0.189 | 0.164 | -0.888 | -0.138 | -1.093 | -1.567 |

**Table 21:** Ohlson Model Variable Calculation in 2021

| Code | TUGU | MTWI | VINS | RELI | MREI | ASRM |
|---|---|---|---|---|---|---|
| $X_1$ | 25.155 | 21.977 | 21.572 | 22.294 | 23.984 | 22.947 |
| $X_2$ | 0.584 | 0.743 | 0.325 | 0.493 | 0.653 | 0.611 |
| $X_3$ | 0.014 | 0.285 | 0.410 | 0.068 | 0.026 | 0.108 |
| $X_4$ | 0.046 | 0.713 | 0.113 | 0.266 | 0.225 | 0.259 |
| $X_5$ | 0 | 0 | 0 | 0 | 0 | 0 |
| $X_6$ | 0.018 | 0.006 | 0.035 | 0.061 | -0.073 | 0.046 |
| $X_7$ | 0.049 | 0.012 | 0.036 | 0.074 | 0.003 | 0.067 |
| $X_8$ | 0 | 0 | 0 | 0 | 1 | 0 |
| $X_9$ | -0.172 | 0.153 | 0.329 | 0.356 | 2.129 | -0.005 |