Journal of Information Technology Education

Volume 8, Issue 1, 2024

# An Early Warning System Of Life Insurance Companies Distress In Indonesia

**Farida Titik Kristanti, Mia Nur Syafia**

**Article Info**

***Article History***

**Received:**
March ,2024

**Accepted:**
June , 2024

**DOI:**
**10.5281/zenodo.20719951**

***Keywords :***
Early Warning System, Financial Distress,Life Insurance

**Abstract**

*This study is intended to acknowledge the determining factors of financial distress in insurance companies in Indonesia so as to serve as an early warning system for insurance companies. The objects of this study are insurance companies registered in Financial Services Authority (Otoritas Jasa Keuangan – OJK) in Indonesia between 2015-2019. Purposive sampling was employed to determine the sample, resulted in 13 companies qualified for the criteria. The result of Logistic Regression shows that surplus change had a significant positive effect on the probability of the company to experience financial distress, while the while premium growth and firm size have a significant negative effect. Other variables, namely claim expense, liquidity, solvency margin and RBC did not have a significant effect on the probability of a company's financial distress. The results of this study have implications for insurance companies in Indonesia, in terms of reducing changes in surplus, increasing premium growth and firm size.*

## Introduction

Insurance companies are authorized institutions that provide protection against possible future risks by providing protection against financial losses caused by unexpected events (Dewi et al., 2017). According to data obtained from the Ministry of Health of the Republic of Indonesia, the number of people with life insurance continues to grow every year. In 2016, there were 171,939,254 residents who had life insurance from 258,705,000 residents. Meanwhile, in 2018 there were 208,054,199 people with life insurance out of a total population of 261,890,900. Unfortunately, this positive news was followed by contradicting incidents from several life insurance companies in Indonesia, specifically default.

In 2020, Jiwasraya experienced a default caused by liquidity pressure which resulted in negative equity of Rp 23.9 trillion in September 2019. According to the financial statement issued by Jiwasraya, this company also went through a negative net profit since 2017 to 2019, where in 2017 the financial statements were withdrawn (okezone, 2020). Another life insurance company, AXA Mandiri, is one of insurance companies supervised by the Financial Services Authority (OJK) due to its sinking investment value, causing financial loss to its customers that they were unable to pay the customers' claims. In addition, according to Wareza (CNBC Indonesia, 2020), Bumiputera 1912, an insurance company had a potential obligation to pay for customers' claims worth Rp 9.6 trillion. This condition caused Bumiputera 1912 to have a negative net profit for three consecutive years, from 2017 to 2019. This sparked concerns from customers of Jiwasraya and other life insurance companies.

These events show high likeliness of distress in life insurance companies in Indonesia. Therefore, supervision of life insurance companies must be carried out because the services offered by these insurance companies greatly rely on the condition or performance of the companies in the future. Good assessment and supervision will be the strength of insurance companies as an attempt to prevent the possibility of financial distress (Dewi et al., 2017), so as not to harm many parties.

Financial distress must be detected in the earliest manner to save the company from bankruptcy. Horne and Machowicz (2005:234) state that the tool used in researching financial performance and condition is financial ratios. Early Warning System is a method employed by an insurance company that serves as a reference for assessing the company's condition and financial performance to determine the health level of an insurance company. This method was launched by The National Association of Insurance Commissioners (NAIC), the supervisor organization of insurance companies in the United States. The Early Warning System method in Indonesia is also regulated in the Statement of Financial Accounting Standards (*PernyataanStandarAkuntansiKeuangan* - PSAK) No. 28. To outline, the Early Warning System (EWS) ratios include liquidity ratio, profitability ratio, solvency ratio and stability premium ratio.

Previous studies on financial distress have been conducted in many countries. A previous study was conducted by Yazdanfar and Ohman (2020) in Sweden with five SMEs (*Usaha Kecil Menengah* - UKM) industries as the objects Sweden in 2008-2015. Another study was conducted by Fernández et al. (2019) with a

bank in Spanish as the object of the study. A further study was carried out by Charalambakis and Garret (2019) with the object of research being Greek private firms that operated in Greece over the period 2003–2011. In Indonesia, a study was conducted by Kristanti (2020) with the object of banking companies in Indonesia in 2014-2017, while Kristanti, Rahayu and Isynuwardhana (2019) conducted their study with small and medium enterprises as their objects of study. Moreover, Kristanti and Isynuwardhana (2018) used industrial sectors in Indonesia as their study objects. While Kristanti and Effendi (2017)employed manufacturing industry as their object of study.

From the information above, it can be concluded that studies on financial distress in life insurance companies have not been conducted, particularly in Indonesia. This study is essential considering the potential of bankruptcy as discussed before, with its big impact that is the loss of public trust in insurance. The objective of this study is to acknowledge the determining factors of financial distress in insurance companies in Indonesia. The results of this study are expected to contribute to the development of science, especially the topic of financial distress in the field of finance. This study used five early warning ratios, namely: change in surplus ratio, premium growth ratio, claim expense ratio, solvency margin ratio, and liquidity ratio. In addition, additional variables were used, namely firm size and Risk Based Capital (RBC).

The organization of this study begins with an introduction describing the phenomena that occurred in the insurance business in Indonesia and the gaps of previous studies, as well as the objective of this study. Next, a literature review containing theories related to the research topic is presented. The research methodology discusses the process of selecting samples and the analytical techniques used. Lastly is the data and results which present findings and discussions, ended with a conclusion.

## Literature Review

### Insurance Life Companies

Insurance companies, including life insurance companies, differ from non-insurance companies. The difference lies in the costumer costs in the event of a failure. If a non-insurance company goes bankrupt, the customers of that company will lose a product or service value that has been purchased. Meanwhile, if an insurance company fails, the customers or policyholders will lose the paid premium, and this loss will not be compensated (Carson, 1993).

### Signal Theory

Signaling theory explains that the company's management forwards the signals to the users of financial statements. Signaling theory also presents company arguments by showing information, that is the financial statements in the capital market (Wolk et al., 2001). The aforementioned signals refer to important information that is confidential regarding the management’s efforts in dealing with the owner's requests. This information will affect the decisions of potential investors or investors of the company. The information includes records or descriptions, archives of the past, the present, and the future for the continuation of the company as well as impact for the company.

### Financial Distress

Financial distress is the stage of decreasing financial position of a company prior to liquidation or bankruptcy (Platt and Platt, 2002). One of the main causes of financial distress is business failure, which is a critical issue, especially for companies nearing bankruptcy with the sign being the inability to meet financial liabilities to creditors (Chang-e, 2006). In this case, the financial distress model is urgent to be developed and constantly updated for accuracy to anticipate potential financial problems that cause bankruptcy (Xie et al., 2011; Habib et al., 2013).

Financial distresscan also be interpreted as a condition where a company has negative EBIT, EBITDA, and net income for two consecutive years (Platt and Platt, 1991; 2002). Moreover, financial distress is also defined as the possibility of bankruptcy with characteristics of financial loss, low stock returns with high volatility, high leverage and low cash holdings (Campbell et al., 2010). Up to this day, many studies have explained and predicted bankruptcy, but only a few looked into financial distress. This is due to the challenge in objectively defining the onset of financial distress (Brahmana, 2013; Dewi et al, 2017).

### Insurance Firm’s Financial Ratio Analysis

Ratio analysis is a method that aims at presenting information obtained from selected financial statement data, and it can be shown in simple proportions, such as percentages or levels (Kieso et al., 2008). Ratio analysis is also a means to look into and get an understanding of the company's performance in terms of finance. In this case, financial ratio analysis can be a comparison between one company and another (Clive and Marsh, 2012:35).

Insurance companies have distinctive characteristics and are different from other non-insurance companies. Regulation on the control of the solvency of insurance companies has been a main emphasis in the state since the 1860s by NAIC, the association that developed an information system for insurance since 1970 (Carson, 1993). In this case, predicting financial distress can be done by analyzing financial ratios. Particularly for insurance companies, it is commonly called the Early Warning System method. This model is expected to be a benchmark for insurance companies. This Early Warning System method was developed by NAIC (Dewi et al.,

2017). In Indonesia, Early Warning System has been employed for insurance companies and it has been regulated in the Statement of Financial Accounting Standards (PSAK). The Early Warning System ratio is a financial ratio for insurance industry that differs in characteristics from non-insurance companies, due to different estimates in the financial statements of insurance companies and those of non-insurance companies (Dewi et al., 2017).

**Changes In Surplus Ratio**

The ratio of changes in surplus is one of the EWS ratios included in Profitability Ratio. This ratio shows indicates a fall or rise of the company's condition in the current year. Companies that are able to cover owed capital will have a positive value (Jhongpita et al., 2011). A number of previous studies have proven that there is a negative impact on changes in the surplus on the occurrence of financial distress. The higher the change in surplus, the lower the probability of the company experiencing financial distress (Kleffner and Lee 2009; Torona and Tiub, 2014; Dewi et al., 2017)

H1: Changes in surplus have a significant negative effect on the probability of the company's financial distress

**Premium Growth Ratio**

The premium growth ratio is one of the EWS ratios that are included in the Premium Stability Ratios. Premium growth ratio is used to measure the stability level of a premium in an insurance company. A significant decrease or increase in the volume of premium indicates a low level of stability in the insurance company's business activities. The increase in premium growth will also increase the income for insurance companies. However, this increase must be monitored, for it also will affect the risks that comes along – paying big claims will spark the possibility of financial distress in insurance companies (Dewi et al., 2017).

H2: Premium growth has a significant positive effect on the probability of the company's financial distress

**Claim Expense Ratio**

Claim expense ratio is one of the EWS ratios included in the Profitability Ratio. This ratio shows records of claims that occurred and the quality of their claim closing efforts. In insurance companies, this ratio is very vital, because it can affect the profits earned by the company (Rameschandra, 2013; Torona and Tiub, 2014; Dewi et al, 2014). Claim expense ratio is an indicator that explains the comparison between claim expense and premium income. If the claim expense is more than the premium income, this will lead to large expenses endured by the insurance company. If investment in insurance company is not proportionate with claim expenses, it can make the company unable to cover the customers' claims. Therefore, the higher the ratio of claims expense, the higher the probability of insurance companies to undergo financial distress (Amborse and Seward, 1998; Yusuf and Dansu, 2014).

H3: Claim expense has a significant positive effect on the probability of company's financial distress.

**Liquidity ratio**

The liquidity ratio provides information to assess the ability of insurance companies to meet liabilities and also indicates whether the insurance company is in a solvent condition or not (Dewi et al, 2017). The high liquidity ratio will affect the high liabilities that must be paid by an insurance company. The higher the liquidity ratio, the higher the probability of a company to go through financial distress (Brockett, 1994; Dewi et al, 2017; Harjadi and Sihombing, 2020). This is due to a tradeoff between liquidity and profitability. The higher the liquidity, the lower the profitability, and as a result, the higher possibility of financial distress.

H4: Liquidity has a significant positive effect on the probability of a company's financial distress.

**Solvency Margin Ratio**

This ratio includes paid-in capital, special reserves and retained earnings compared to the net premium. If the solvency margin ratio is high, it indicates that the owners' rights to the assets are greater than the claims of creditors. Conversely, if the solvency margin ratio is low, it indicates a high risk caused by overly high premium revenue (risk acceptance) compared to the company's funds. A low solvency margin ratio suggests high risk acceptance, resulting in higher probability of the company experiencing financial distress (Satria, 1994).

H5: The solvency margin has a significant negative effect on the probability of a company's financial distress.

**Firm Size**

Firm size is a special variable in defining the determinants of financial distress in this study. Many proxies are commonly used as indicators of a firm size, including total assets, logarithm of total assets, number of employees and logarithm of sales. The larger the size of a company, as measured by total assets, the greater the possibility of the company to survive. This is possible because large companies own better resources that can be used that lead to good performance so distress can be avoided. On the other hand, if a company has lesser total assets, it will result in higher probability of that company to experience financial distress (Kleffner and Lee, 2006; Rameschandra, 2013; Sharpe and Standik, 2007; Tornoa and Tiub, 2014; Dewi et al., 2017).

H6: Firm size has a significant negative effect on the probability of company's financial distress.

**Risk Based Capital (RBC)**

Risk-based capital is a measure of the amount of capital owned by an insurance company, which certainly will support its business operations to prevent financial distress. Solvency is the gap between confirmed assets level and required amount of paid-in capital (Dewi et al., 2017). In this case, the minimum limit determined by the OJK in this ratio is 120%. The lower the RBC ratio, the higher the probability of a company to endure

financial distress (Cummins et all., 1995; Tornoa and Tiub 2014; Dewi et al., 2017). This is likely because companies with high solvency are more capable of paying their liabilities and this is a good indication of the company's performance.
H7: Risk Based Capital (RBC) has a significant negative effect on the probability of a company's financial

**Method**

**Data and Variables**

This study is intended to define the determining factors of financial distress from Early Warning System ratios, firm size, and Risk-Based Capital for the probability of financial distress in insurance companies registered in OJK. The data used in this study is secondary data, namely the financial statements of life insurance companies registered in OJK that have been audited for a period of 5 years, from 2015 to 2019. Purposive sampling was employed with the sample criteria being having comprehensive research data during the study period. As a result, 13 companies were selected as the study sample.

Table 1 lists the variables used in this study. Financial distress is a condition where the company has a negative profit (Elloumi&Guyie, 2001; Kristanti, Rahayu& Huna, 2015). These variables are dependent variables which in their calculation will use a dummy variable. Meanwhile, the dependent variables are the ratios included in the Early Warning System variable group (changes in surplus ratio, premium growth ratio, claim expense ratio, liquidity ratio and solvency ratio), and firm size and Risk-Based Capital.

Table 1. Desscripton Of Variables

| Variable | Definition |
|---|---|
| Financial Distress | A value of 0 indicates that the company is not experiencing financial distress, a value of 1 indicates that the company is experiencing financial distress, that is when it has negative profits |
| CISR (X1) | The ratio of changes in surplus is measured by the rise and fall in the company's own capital. |
| PGR (X2) | The premium growth ratio is measured by the gap between premium growth in the current year compared to the previous year. |
| CER (X3) | The claim expense ratio is measured by comparing the claim expense with the income earned from premiums |
| LIQ (X4) | Liquidity ratio is measured by comparing the current liabilities to current assets. |
| SMR (X5) | The solvency margin ratio is measured by the sum of paid-in capital, special reserves, and retained earnings divided by the net premium. |
| SIZ (X6) | Firm size is measured by Ln of total assets. |
| RBC | The risk-based ratio is the gap between the confirmed asset level and the required amount of paid-in capital |

**Model Spesification**

Logistics Regression was used to answer the study objectives. This was due to independent assumption that the multivariate normal distribution could not be fulfilled, because the variables used in this study were a combination of continuous (matrix) and categorical (non-metric) variables. The models used in this study were:

$$Ln\frac{FD}{1-FD} = \alpha + \beta 1\ X1 + \beta 2\ X2 + \beta 3\ X3 + \beta 4\ X4 + \beta 5\ X5 + \beta 5\ X6 + \beta 5\ X7 + e$$

where X1 = explanatory variable; $Ln\frac{FD}{1-FD}$ = the probability of the company experiencing financial distress. (Dummyvariable, 0 = companies that do not have negative profits, and category 1 = companies that have negative net income).To test whether the model was fit or not, it was necessary to test using Hosmer and Lemeshow's Goodness of Fit. If the null hypothesis was rejected, that was when the significance was equal to or less than 5%, it could be concluded that the model was fit and could be used to predict the observed value.

**Findings and Discussion**

**Summary Statistics**

Table 2 presents a summary of descriptive statistics, namely the mean, minimum, maximum and standard deviation of the variables, as follows:

Table 2. Statistic Descriptive

| | CISR | PGR | CER | LIQ | SMR | SIZE | RBC |
|---|---|---|---|---|---|---|---|
| Mean | 0.29 | 0.92 | 0.62 | 1.57 | 3.33 | 14.36 | 13.07 |
| Minimum | 0.00 | -0.32 | 0.10 | 0.11 | -0.24 | 11.75 | 1.25 |
| Maximum | 3.74 | 13.34 | 1.12 | 5.17 | 23.41 | 16.41 | 139.67 |
| Std. Dev | 0.61504 | 2.18818 | 0.26444 | 1.14126 | 4.27629 | 1.07438 | 19.8487 |
| Observations (N) | 65 | 65 | 65 | 65 | 65 | 65 | 65 |

The results of descriptive statistics showed that the CISR has a mean of 0.29 which was smaller than the standard deviation of 0.61504 this means that the data on the changes in surplus in this study varied or was not grouped with a minimum value of 0.00 and a maximum value of 3.74. Other variables that also had ungrouped data were PGR,SMR and RBC. Meanwhile, CER, LIQ and SIZ data tended to be grouped. The comprehensive descriptive data is shown in Table 2.

**Regresion Result**

Table 3 presents the variables in the equation where this test aims to find out how the influence of each independent variable in this study with the dependent variable is. The test in this partialsignificance test uses regression coefficients by comparing the significance value (α) of 5% or 0.005

Table 3. Variable in the Equation

| | B | S.E | Wald | Sig. | Exp (B) |
|---|---|---|---|---|---|
| CISR | 3.464 | 1.631 | 4.510 | .034 | 31.949 |
| PGR | -.807 | .332 | 5.898 | .015 | .446 |
| ICR | .303 | 1.391 | .048 | .827 | 1.354 |
| LIQ | .129 | .350 | .136 | .712 | 1.138 |
| MSR | -.094 | .087 | 1.171 | .279 | .910 |
| SIZ | -1.552 | .533 | 8.476 | .004 | .212 |
| RBC | .025 | .025 | .981 | .322 | 1.026 |
| Constant | 23.209 | 7.559 | 9.427 | .002 | 1.2101E+!0 |

Table 3 shows data or results from life insurance companies in Indonesia in logistic regression, with the following formula:

$$\mathrm{L}n\frac{FD}{1-FD} = 23.209 + 3.464\mathrm{X1} + (0.807\mathrm{X2}) + 0.303\mathrm{X3} + 0.129\,\mathrm{X4} + (0.094\mathrm{X5}) + (1.552\mathrm{X6}) + 0\ .025\mathrm{X7}$$

Hosmer and Lameshow test showed that the fit model, the Chi square value of 2.292 had a significance of 0.942 which means it was not significant because it was greater than the 5% alpha. Nagelkerke R Square of 4.04% showed the joint effect of all independent variables on the probability of financial distress in life insurance companies in Indonesia. Table 3 shows the results of statistical tests from logistic regression. The models that can be made from these results are as follows:

Changes in surplus have a significant positive effect on the probability of financial distress in life insurance companies in Indonesia. Therefore, the hypothesis was rejected. This means that the higher the change in surplus, the higher the probability of financial distress. This is likely because the ratio of changes in surplus indicates that investors are depositing their capital to the company. However, in terms of the change in capital, from the data it can be seen the instability of the change in surplus, in life insurance companies in 2015 the average change in surplus was 0.92, in 2016 there was a drastic decrease to 0.16, whereas, in 2017 it increased again by 0.27 and in 2018 and 2019 it decreased again. In this case, fluctuations in the ratio of changes in surplus indicate that the insurance company cannot maintain the volatility of changes in surplus or paid-in capital. This instability may indicate that there are things that are not well financially so that it has the potential to increase the possibility of the company to undergo financial distress. This finding is in line with previous studies, conducted by Ulfan, Sutriswanto and Apriyanto (2016) and Dewi et all (2017) which showed that the ratio of changes in surplus is positive although not significant. However, it is not in line with a study conducted by Carson (1993) which proved that a high ratio of changes in surplus will reduce the probability of financial distress.

Premium growth in life insurance companies in Indonesia has a significant negative effect on the probability of financial distress. Therefore, the hypothesis was rejected.The lower the company's premium growth, the higher the probability of financial distress. Low premiums can indicate the company's poor performance as a result the company's inability to sell insurance products since premiums are one of the company's sources of income in the form of fees from insurance holders which can have a direct impact on company profits. If the premium declines, so will the company's profit, and that will increase the probability of the company to experience distress. High premiums do not always indicate instability in performance. This will also not be a problem for the company if the rise is in proportion to the company's capability in managing the insurance premiums properly that they are able to cover customers' claims as well. Average companies with high premium growth ratio values are in non-financial distress states, therefore the results of the regression coefficient of the premium growth ratio variable are negative (Zamachsyari, 2016). The findings of this study are unlike those of Pottier and Sommer (2011); Toronoa and Tiub (2014); Joseph and Dansu (2015) that showed evidence proving premium growth had a positive and significant effect. However, the findings of this study are in line with those of Dewi et al., (2017) that is negative although not significant. This finding is also in accordance with the statement of Kleffner and Lee (2009) that a high premium growth ratio cannot elevate the probability of a company's financial distress.

The results of the logistic regression test revealed that the claim expense ratio variable in life insurance companies in Indonesia had a positive effect on the possibility of financial distress, although it was not significant. Therefore, the hypothesis was rejected. A high claim expense will escalate the company's risk. The high risk endured by the life insurance company may not affect the company's performance if the insurance company can control the potential risks that will be encountered by the company to prevent financial distress. In this case, the normal limit of this ratio is 100% (Nurfadila et al., 2015). Accordingly, the amount of claim expense ratio does not affect whether the company will be in financial distress or not. The findings of this study are not in line with the one conducted by Dewi and Mahfudz (2016) which declared that the claim expense ratio had a positive and significant effect.

Liquidity gives ideas about the company's capability in handling its current liabilities. The statistical results show that in life insurance companies in Indonesia, liquidity has a positive effect on the possibility of financial distress although not significant. Therefore, the hypothesis was rejected. The likeliness of it is due to the fact that each company has a different standard of time to convert allowed assets into cash. Thus, neither high nor low ratio affects the possibility of the company experiencing financial distress.

The solvency margin suggests a company's ability to pay its premiums. The findings showed that the solvency margin had no significant negative effect on the possibility of financial distress. Therefore, the hypothesis was rejected .This is likely due to the normal limit of this ratio being 33.33% which means a ratio close to or below that number will experience financial distress, but the lowest solvency margin ratio is held by PT Asuransi Jiwa IndosuryaSukses which in 2018 did not endure negative profits or financial distress, which was 84%, while on the other hand the value that was far above the normal limit was experiencing financial distress, which was 2341% held by PT Hanwa Life Insurance. Therefore, neither high nor low solvency margin ratio affects the possibility of a company undergoing financial distress. In this case, the high or low premium income does not affect the company's financial condition if the company can manage the premiums for investment. The findings of this study are in line with a study conducted by Zamachsyari (2016) which suggested that the solvency margin ratio had a significant negative effect.

The size of life insurance companies in Indonesia has a significant negative effect on the possibility of financial distress. Therefore, the hypothesis was accepted. The smaller the size of the company, the greater the probability that the life insurance company will experience financial distress. In this study, the firm size variable uses a proxy for total assets owned. High assets will define the company's fit condition because it can mean that the company has a good information system, resources and competent staff. Certainly, all of this will result in a more efficient and effective company performance. In addition, big companies with all the resources they have, will mostly find it easier to compete in the market than the small ones. This finding is in line with a study conducted by Sharp and Standik (2007); Dewi et al. (2017) as they stated that company size had a significant negative effect.

Risk Based Capital portrays the capital of life insurance companies in Indonesia. The result of the statistical test suggests that it has a positive effect on the probability of financial distress, although not significant.Therefore, the hypothesis was rejected. RBC calculation is used to provide information about the level of solvency of the company when paying the risk of claims. The risk of this claim may arise due to a deviation between the management of assets and debt. Referring to regulations of OJK the minimum limit in this ratio is 120%, which has become the requirement of all insurance companies in Indonesia. Based on data collection carried out in this study, all companies have an RBC ratio of more than 120% which indicates good company's solvency results. The findings of this study are in line with the one conducted by Dewi et al. (2017) which suggested that the RBC variable had a significant positive effect on the company's financial distress.

The findings of this study will have implications on life insurance companies in Indonesia. High surplus changes, low premium growth, and small firm size will intensify the probability of company's financial distress. Thus, life insurance companies in Indonesia are expected to always direct all their efforts in order to have a low capital surplus, because the increase in paid-in capital may reduce economic profitability. In addition, companies must constantly increase its premium growth. High premium growth if managed properly can improve the company's performance which of course will have an impact on the company's income and profits so as to prevent financial distress. Not to be ignored is also the urge that the companies must grow their assets, because large assets benefit them greatly, resulting the capability to compete in the market and even win it. Consequently, the company's income will also surge and ultimately can prevent the company from experiencing financial distress. Furthermore, life insurance companies, particularly in Indonesia, must continue to maintain the stability of the companies' good financial performance.

Other than investors, for sure, there are other parties who can benefit from the findings of this study, namely customers. For these two parties, the most important thing is when making investment choices. They must pay close attention to the company's financial performance before making their choice. A good life insurance company is one that (incomplete sentence)

.

**Conclusion**

This study investigates the effect of early warning system ratio, firm size and risk-based capital on financial distress. The test results suggest that the ratio of changes in surplus, premium growth and firm size have a significant effect on financial distress in life insurance companies registered to financial services authorities in Indonesia. This implies that these three variables are the determining factors in the occurrence of financial distress in life insurance companies in Indonesia. Other variables, namely the ratio of claim expense, liquidity, margin solvency and risk-based capital have no significant effect. These findings will certainly have implications, be it for the company, customers and investors. They need to be able to understand the parameters of the early warning system ratio, particularly the three determining ratios. Additionally, life insurance companies must maintain company stability by continuously analyzing their financial ratios using the early warning system and other ratios as an attempt evade the possibility of financial distress. For customers and investors of life insurance companies in Indonesia, it is imperative that they must pay close attention to the company's financial performance as well as to the ratio limits that have been set by the government, in this case the financial services authority prior to making a decision.

**References**


Ambrose, J. M., & Seward, J. A. (1998). Best's Ratings, Financial Ratios and Prior Probabilities in Solvency Prediction. Journal of Risk and Insurance, 55, 229-244. Retrieved from https://doi.org/10.2307/253325

Aldilia, N., Leo, &Oktaviano. (2019). "Rapor Merah Asuransi Jiwa: Terburuk 5 TahunTerakhir". https://finansial.bisnis.com/read/20190228/215/894490/rapor-merah-asuransi-jiwa-terburuk-5-tahun-terakhir. Accesed in 20 Juni 2020.

BarNiv, R., &Hershbarger, R. A. (1990). Classifying Financial Distress in the Life Insurance Industry. The Journal of Risk and Insurance, 57(1). 110. Retrieved from https://doi.org/10.2307/252927

Brahmana, R. K. (2004). Identifying Financial Distress Condition in Indonesia Manufacture Industry, Birmingham Business School, University of Birmingham. Retrived from https://www.semanticscholar.org/paper/Identifying-Financial-Distress-Condition-in-Brahmana/24cd956712dfdf9c981b8538b5497cdc024b1a82

Brockett, L, P., Cooper, W. W., Golden, L. L., &Pitaktong, U. (1994). A Neural Network Method for Obtaining an Early Warning of Insurer Insolvency. The Journal of Risk and Insurance, 61(3)., 402-424. Retrieved from https://doi.org/10.2307/253568

Campbell, J. Y., Hilscher, J., &Szilagyi, J. (2010). Predicting Financial Distress and The Performanceof Distressed Stocks. Journal of Investment Management, 9(2), 14-34. Retrived from https://dash.harvard.edu/bitstream/handle/1/9887619/JOIM_predicting_financial_11.pdf

Carson, J.E. (1993). Financial distress in The Life Insurance Industry: An Empirical Examination. 4th Afril International Colloqium, pp1211-1240. Retrieved from http://www.iaablog.org/AFIR/colloquia/Orlando/Carson.pdf

Carson, J. E., & Hoyt, R. E. (2003). An Empirical Examination of Sample Selection Methods in The Context of Life Insurer Financial Distress. Journal of Insurance Issues. 26(2), 114-128. Retrieved from https://www.jstor.org/stable/41946223

Chang-e, S. (2006). The causes and salvation ways of financial distress companies: An empirical research on the listed companies in China. Beijing University.

Cummins, J. D., Harrington, S. E., & Klein, R. (1995). Insolvency Experience, Risk Based Capital, and Prompt Corrective Action in Property-Liability Insurance. Working Paper The Wharton Financial Institutions Center, 1-42. Retrieved from https://doi.org/10.1016/0378-4266(94)00136-Q

Dewi C.T.T., &Mahfudz (2017). Effect of Change in Surplus Ratio, Incurred Loss Ratio, Liquidity Ratio, Premium Growth Ratio, Firm Size and Risk Based Capital to Predict the Posibilities of Financial Distress: The Case of Indonesian Non-Life Insurance Listed in Indonesia Insurance Directory. Journal of Computational and Theretical Nanoscience. 23(8), 7285-7288. Retrieved from https://doi.org/10.1166/asl.2017.9352

Eduardo T., &Tornoa, T. S. (2014). An early warning system on the Propensity of survival and failure of non-life insurance firms in the philippines. J. Bus. Finance, 02(01), 47-55. Retrieved from https://esciencepress.net/journals/index.php/JBF/article/view/555

Charlambakis, C., E. & Garret, I. (2019). On Corporate Financial Distress Prediciton: What can we learn from private firms in developing economy? Evicence from Greece. Review of Quanitative Finance and Accounting, 52, 467-491. Retrieved from https://link.springer.com/article/10.1007/s11156-018-0716-7

Irene. (2020) "Fakta TerkiniKasusJiwasraya, ManipulasiLaporanKeuanganhinggaRencanaPenyelesaian." https://economy.okezone.com/read/2020/01/17/320/2154310/fakta-terkini-kasus-jiwasraya-manipulasi-laporan-keuangan-hingga-rencana-penyelesaian. Accesed 20 Juni 2020

Kleffner, A. E., & Lee, R. B. (2006). Measuring P&C Insurer Solvency: A North American Investigation. Insurance and Issues, 1-20. Retrievred from https://link.springer.com/article/10.1057/gpp.2008.14

Kristanti, F,T. (2020). Survival Analysis of Indonesian Companies. J.Fin. Bank Review. 5 (2). 39-47. Doi.org/10.35609/jfbr.2020.5.2.(1)

Kristanti, F.T., Effendi, N. (2017). A Survival of Indonesia Distressed Company Using Cox Hazard Model, Int. Journal of Economics and Management, 11(S1), 157-169.

Kristanti, F,T.., Isynuwardhana, D. (2018) Survival Analysis of Industrial Sectors in Indonesia Companies. Jurnalkeuangan dan perbankan, 22(1), 23-36. Retrieved from https://jurnal.unmer.ac.id/index.php/jkdp/article/view/1601

Kristanti, .F.T, Rahayu, S., &Isynuwardhana, D. (2019). The Survival of Small and Medium Business. *Polish Journal of Management Studies.* 20 (2),

Marsh., & Clive. (2012). Financial Management for Non FinancialManagers.GreatBritania and United State: Kogan Page Limited.

Paulson, A., Rosen, R., Mohey-Deen, Z., & McMenamin, R. (2013). How liquid are U.S. lif life insurance liabilities. Chicago: The Federal Reserve Bank September.

Platt, H., & Platt, M. (1991). "A Note pn the Use of Industry-Relative Ratios in Banckrupty Prediction. Journal of Economics and Finance, 15, 1183-1194. https://doi.org/10.1016/0378-4266(91)90057-S

Platt, H., & Platt, M. (2002) Predicting Corporate Financial Distress: Refelctions on Choice-Based Sample Bias. Journal of Economics and Finance, 26(2), 184-199. https:// doi.org/10.1007/BF02755985

Pottier, S. W., & Sommer, D. W. (2011). Empirical Evidence on the Value of Group Level Financial information in insurer solvency. Risk Management & Insurance Review, 14 (1), 73-88. Retrieved from https://doi.org/10.1111/j.1540-6296.2011.01195

Rameshchandra, P. O. (2013). Solvency analysis: A study of public and private Insurance companies in India. Indian Journal of Applied Research, 3(5). 1-4. Retrieved from https:// doi.org/10.15373/2249555X/JAN2013/37

Sharpe, I. G., & Stadnik, A. (2006). Statistical Early Warning Model of Financial Distress in Australian General Insurance. The Journal of Risk and Insurance.74(2), 377-399. Retrieved from https://www.jstor.org/stable/4138441

Senbet, L. W., & Wang, T. Y. (2012). Corporate Financial Distress and Bankruptcy: A Survey. USA: Forthcoming. https://doi.org/10.1561/0500000009

Habib, Ahsan., Md. Borhan Uddin Bhuiyan., &Ainul Islam. (2013). Financial Distress, Earning Management and Market Pricing of Accrual During the Global Financial Crisis. Managerial Finance, 39(2), 155-180. Retrieved from https://doi.org/10.1108/03074351311294007

Horne V. James., & John M Wachowiz (2005). Fundamental of Financial Management (Book 1, 4th Edition). Jakarta: SalembaEmpat

Kieso, Donald E., Jerry J. Weygandt., & Terry D. Warfield. (2008). Akuntansi Intermediate. (Book 1, 12 Edition). Jakarta: Erlangga

Wolk, et al (2001). "Signaling, Agency Theory, Accounting Policy Choice". Accounting and Business Research. 18 (69), 47-56.

Xie, Chi., Changqing Luo., & Xiang Yu. (2011). Financial Distress Prediction Based on SVM and MDA Methods: The Case of Chinese Listed Companies. Quality & Quantity, 45(3), 671-686. Retrieved from https://doi.org//10.1007/s11135-010-9376-y

Yanurasia, A. (2019). “PertumbuhanAsuransi Lesu, ApaPenyebabnya?”. https://www.cnbcindonesia.com/investment/20190708143811-21-83378/pertumbuhan-industri-asuransi-lesu-apa-penyebabnya. Accesed in 10 Oktober 2020

Yusuf, T. O., &Dansu, F. S. (2014). Effect of Claim Cost On Insurers’ Profitability In Nigeria. International Journal of Business and Commerce, 3(10), 1-20. https://doi.org/10.14738/assrj.54.4380ggg

Yazdanfar, D., &Ohman, P. (2020). Financial distress determinants among SMEs: empirical evidence from Sweden. Journa of Economics Studies, 47(3), pp 547-560. https://doi.org/10.1108/JES-01-2019-0030

Paule, J. et al. (2019). Prediction of financial distress in the Spanish bankin system an application using artificial neural networks. Applied Economic Analysis, 28 (2), pp 69-87. https://doi.org/10.1108/AEA-10-2019-0039

**Author Information**

**Farida TitikKristanti**
Telkom University
Jl Telekomunikasi, TerusanBuah Batu Bandung, West Java, Indonesia

**Novita Mia Nur Syafia**
Telkom University