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Potential Bankruptcy In Pulp And Paper Companies Listed On Stock Exchange And Its Impact On Stock Prices: The Case Of Indonesia

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***Abstract**: The pulp and paper industry is an industry that processes wood as a raw material for producing pulp, paper, boards, and other cellulose-based products. There are eight pulp & paper sub sector companies listed on the Indonesia Stock Exchange. It is known that the company has quite high debt in the 2014-2017, therefore the company is in an unsolvable condition. This study aims to examine the potential bankruptcy of pulp & paper companies listed on the Indonesia Stock Exchange. After the potential bankruptcy conditions are known, then the impact on stock returns is examined. Using the Altman Z-Score Modification approach it was found that the company was in a state of financial distress (unhealthy and experiencing large financial problems). It was found that financial distress statistically did not have a significant effect on stock returns.*
***Keywords:** bankruptcy, Altman Z-score, stock return, pulp & paper companies.*

I. Introduction

The pulp and paper industry is an industry that processes wood as a raw material for producing pulp, paper, boards and other cellulose-based products. The industry is dominated by North America, northern Europe (Finland, Sweden and West-Sea Russia), and East Asia (Siberia Russia, China, Japan and South Korea). Countries in the Australasian region and Brazil also have significant pulp and paper industries. The United States has become the main producer of paper until the position was taken by China in 2009 (Wikipedia, 2018).

The industry has been criticized by environmentalists such as the Natural Resources Defense Council for deforestation and clear-cutting systems carried out on primary forests. The industry also continues to expand globally to timber-producing countries such as Russia, China and Indonesia that have low labor costs, and oversight of tenuous environments

In 2017 Indonesia is the sixth largest paper producing country in the world (Ministry of Industry, 2017). Head of the Industrial Research and Development Agency (BPPI) Haris Munandar said, in 2013 Indonesia had 82 pulp and paper industries consisting of 4 pulp industries, 73 paper industries, and 5 integrated paper pulp industries with an installed capacity of 18 pulp and paper industries. 96 million tons.

The company was established as being able to operate as a going concern. In order for companies to continue business activities, good management is needed. Management is needed both for assets, debt, and company equity. Debt is one source of corporate funding. When debt is not managed properly, it is feared there will be a problem called financial distress.

Financial difficulties of a company are the first symptom when the company is in a non-solvable condition, when the company's ability to meet its long-term obligations is lower. When the company is unable to fulfill its obligations, the creditor has the legal power to file claims, including bankruptcy claims.

Currently there are 8 (eight) companies engaged in the pulp and paper industry and listed on the Indonesia Stock Exchange. The solvency ratio of a paper company (Table-1) in general has a value greater than 1 (one), which means it is in a unsolvable state.

The data in Table-1 shows that in 2016 the average DER of the pulp and paper industry has dropped, but the value remained larger than one so that the condition remained unsolvable. On average in the 2014-2017, the solvency measured by the DER was 1.585. This means that every IDR1,000 of equity bears a total debt of IDR1,585.

Unsolvable companies can face financial problems or difficulties. There are several factors causing financial difficulties. Internally these factors include: (1) cash difficulties, most of the bills are not realized in time, (2) the amount of debt, most of the debt is delayed payment, (3) losses from the company's operations, inefficient and weak control project finance. Whereas externally include: (1) the increase in fuel prices, resulting in an increase in production costs, (2) an increase in loan interest rates, resulting in an increase in capital costs (Hasymi, 2007).

When investors notice the condition of the company, then this will affect the stock price. The better condition of the company, the share price will increase. Increasing stock prices will provide a positive return for investors, vice versa.

Table-1. Solvability Ratio of Pulp and Paper Companies Listed on the IDX 2014-2017

Company	2014	2015	2016	2017
SPMA	1,50	2,00	0,50	0,80
KDSI	1,58	2,10	1,72	1,74
INKP	1,71	1,68	1,44	1,37
TKIM	1,91	1,81	1,66	1,59
KBRI	0,92	1,79	2,01	3,00
INRU	1,58	1,67	1,09	1,07
FASW	2,45	1,86	1,72	1,85
ALDO	1,24	1,14	1,04	1,17
rata-rata	1,61	1,76	1,40	1,57

Source: Financial Statement, 2014-2017

An analysis of bankruptcy is carried out to get an early warning of bankruptcy (the first signs of bankruptcy). The earlier the signs of bankruptcy are noticed, the better for management since management can make actions to avoid them. On the other hand, creditors and shareholders can also make preparations to overcome various bad possibilities. The signs of bankruptcy in this case can be seen using the accounting data stated in the financial statements.

This study aims to examine the potential bankruptcy of pulp and paper companies, especially pulp and paper companies listed on the Indonesia Stock Exchange. The research period is 2014-2017. After the potential bankruptcy is known, then the impact on stock returns is examined.

II. Literature Review

Pulp and Paper Industries in Indonesia

Indonesia's exports of pulp and paper in 2017 reached USD5.8 billion or IDR78.3 trillion. Especially for pulp, the export value is USD2.2 billion with the main destinations are China, South Korea, India, Bangladesh, and Japan. Meanwhile for paper exports worth USD3.6 billion with destination countries to Japan, US, Malaysia, Vietnam, and China (Pablo, 2018).

The Ministry of Industry projects that Indonesia's pulp and paper industries will grow 2.1% inline with increasing demand in the global market. Edy Sutopo, Director of Forestry and Plantation Products at the Ministry of Industry, at the opening of the Indonesian Pulp and Paper Association (APKI) at JIExpo Kemayoran on Thursday (05/03/2018) explained that the growth forecast of the pulp and paper industry is still around 2.1%, following growth in global demand. Demand in developing countries is 4.1% per year, while in developed countries is 0.5% per year. Panggah Susanto, Director General of Agro Industry at the Ministry of Industry, revealed that the world's paper needs are currently at 394 million tons and will continue to increase to 490 million tons by 2020.

Susanto believes that the need of paper will still increasing amid the growth of the digital industry that adopts the paperless concept. It was stated that opportunities were still open, domestic or foreign markets continue to grow even though there was a certain trend of paper which has negative growth, which was mainly due to the development of the paperless internet. Currently the national paper industry's production capacity reaches 16 million tons per year, while pulp production reaches 11 million tons per year (Pablo, 2018).

Financial Difficulties and Bankruptcy

One important aspect of analyzing company financial statements is their ability to predict the continuity or survival of a company. The company's survival prediction is important for management and company owners to anticipate the possibility of bankruptcy.

An analysis of bankruptcy is carried out to get an early warning of bankruptcy (the first signs of bankruptcy). The earlier the signs of bankruptcy are known, the better for management since management can immediately make improvements action. On the other hand, creditors and shareholders can anticipate and make preparations to overcome various bad possibilities that might be faced by the company.

Bankruptcy signs can be seen using accounting data. The data needed is sourced from the Financial Report, both from the Balance Sheet, and the Profit or Loss Report.

The health of a company can be described as a line that shows the most extreme healthy position to the most extreme unhealthy side. The health description of a company can be described as shown in Figure-1 below.

Healthy	**Unhealthy**
Not experiencing finansial problem liquid)	Unsolvable (higher debt than asset)

Figure-1 Company's Health

Source: Hanafi dan Halim, 2003

Short-term financial difficulties are temporary and usually are not severe. However, if it does not handled properly, such difficulties can develop into difficulties, unsolvable condition. If it reaches the condition of unsolvable the company can be liquidated or reorganized (Hanafi and Halim, 2003).

Bankruptcy is usually interpreted as a situation or situation where the company fails or is unable to fulfill the debtor's obligations anymore because the company experiences shortages and insufficient funds to run or continue its business. The condition of financial distress is a situation where the company's cash flow operations are unable to cover the company's liabilities at that time, such as Letter of Credit (L/C) or interest costs, so the company is forced to take a corrective action. Financial distress can bring a company to experience a default on its contract, which in the end must be carried out financial restructuring of the company, creditors, and equity investors of the company.

In practice or in empirical research, financial difficulties are difficult to define. Financial difficulties could mean liquidity difficulties (short term) to bankruptcy statements. Liquidity difficulties are the mildest difficulty. While the statement of bankruptcy is the most difficult difficulty. Empirical research usually uses the statement of bankruptcy as a definition of bankruptcy.

The financial distress model needs to be known. When management knows financial distress earlier, actions can be taken to overcome it. Several parties concern about financial distress predictions are (1) Lenders, to decide on lending or determine policies in monitoring loans given, (2) Investors, help investors to know the future of companies whose shares are owned or will be owned by investors, (3) Regulators, regulators have the responsibility to oversee the ability of debt and stability payers, (4) Government, especially related to companies that involve large numbers of people, (5) Auditors, financial distress prediction is a useful tool for auditors to make a going concern assessment of a company, and (6) Management, financial distress predictions are useful for companies to avoid bankruptcy and can automatically avoid direct and indirect costs that will arise in the event of bankruptcy. Direct costs for bankruptcy include fees for accountants and lawyers. Whereas indirect costs includes the provisions for sale or loss due to court provisions.

Altman Z-score

Altman (1968) uses the Multiple Discriminant Analysis method, which produces a score known as Altman Z-score. The score shows the condition of the company in connection with the possibility of bankruptcy. Altman uses five types of financial ratios, which are: (1) working capital to total assets, (2) retained earnings to total assets, (3) earnings before interest and taxes to total assets, (4) market value of equity to book value of total debts, and (5) sales to total assets.

The five bankruptcy estimation variables are studied using a sample of 66 companies, divided into two, each of which 33 companies went bankrupt and 33 companies that did not. Altman's study results were able to obtain a prediction accuracy rate of 95% for one year data before bankruptcy and a 72% prediction of accuracy for two years data before bankruptcy. In addition, it is also known that companies with low profitability have high potential to experience bankruptcy.

Until present, Z-Score is still more widely used by researchers, practitioners, and academics in accounting than other prediction models. The results of research developed by Altman:

$$Z = 1.2Z_1 + 1.4Z_2 + 3.3Z_3 + 0.6Z_4 + 0.999Z_5 \quad \text{...} \; (1)$$

Note:
Z_1 = *working capital / total asset*
Z_2 = *retained earnings / total asset*
Z_3 = *earnings before interest and taxes / total asset*
Z_4 = *market capitalization / book value of debt*
Z_5 = *sales / total asset*

The model developed by Altman underwent a revision. Altman made the revision as an adjustment so that the prediction model for bankruptcy is not only for manufacturing companies that go public but also can be applied to companies that do not go public. This model is hereinafter referred to as the Modified Atlman S-Score Model.

The old model has been revised in one of the variables used, to become:

$$Z' = 0.717Z_1 + 0.847Z_2 + 3.107Z_3 + 0.420Z_4 + 0.998Z_5 \quad \text{.....} \quad (2)$$

Note:
Z_1 = *working capital / total asset*
Z_2 = *retained earnings / total assets*
Z_3 = *earnings before interest and taxes / total asset*
Z_4 = *book value of equity / book value of debt*
Z_5 = *sales / total asset*

Based on the latest formula, Altman divides the company based on the Z-score value to:
a. If the Z-score is <1.23: the company is classified as unhealthy and has large financial problems and the potential bancruptcy of the company is very high.
b. If 1.23 <Z-score <2.99 the company has the potential to experience bankruptcy
c. If Z-socre is> 2.99, the company is classify as healthy.

The accuracy of the Altman Z-score model reaches 90 percent of the actual events. Based on the results of the study it can also be concluded that the closer to the moment of bankruptcy, the greater the level of validity of the results of the predictions made by the model.

Z-Score can be used by investors to assess their investment security since they can be used to protect investors from investing in potentialy bankcrupt companies. However, users of this approach should be careful in interpreting the score, especially regarding their relevance to the situations of the industries.

Previous Studies

Several previous studies regarding the prediction of bankruptcy have been carried out. Putra (2012) examined the effect of institutional ownership and prediction of bankruptcy on corporate values. The study is conducted on the top ten listed in Indonesia Stock Exchange companies that won the corporate governance perception index for the period 2006-2010. Results of the study show that only bankruptcy predictions have a significant effect on firm value, whereas institutional ownership does not have an influence and can even reduce the value of the company which is indicated by a negative regression value.

Fathuddin (2008) examined the prediction of bankruptcy of mining companies listed as the Jakarta Islamic Index in 2005-2006. This study uses two variables which are financial ratios as independent variables and predictions of bankruptcy as dependent variables. The data analysis method used is Altman Multivariate Discriminant Analysis. The results showed that in 2005 from seven sample companies, two companies were predicted not to experience bankruptcy, three companies were in prone conditions, and two companies were predicted to experience bankruptcy. In 2006 there were three companies that were predicted not to experience bankrupt, two companies in vulnerable conditions and two other companies were predicted to experience bankruptcy.

Haryanto (2008) examined the effect of bankruptcy prediction on the stock price of consumer goods industry companies listed on the Indonesia Stock Exchange. The study uses the Altman Z-Score Method. Results show that in 2005 there were two companies predicted to go bankrupt, ten companies were included in the grey area category (prone to bankruptcy), and four companies were predicted not to go bankrupt. In 2006, one company was predicted to go bankrupt. Nine companies are in the grey area position, and 6 companies are predicted not to go bankrupt. In 2007 one company was predicted to go bankrupt, eleven companies entered the grey area position, and four companies were predicted not to go bankrupt. It was concluded that the prediction of bankruptcy with the Altman Z-Score method had no effect on stock prices.

Apergis, Sorros, Artikus, and Zisis (2011) aim to investigate the performance of a company's stock price as indicated by the probability of bankruptcy in connection with the Altman model. Empirical results show that companies with lower bankruptcy indicators have lower stock prices. Conversely when the indicator of bankruptcy is increased, stock prices rise. The researcher found that the return affected Altman Z-score and vice versa. Researchers note that their empirical research focuses on mature stock markets and during periods of low season at the stock exchange, so it may not apply to periods of economic growth where stock prices may increase rapidly since it causes extreme positive stock returns.

Liao and Mehdian (2016) use a set of financial ratios as inputs to estimate an Aggregate Bankruptcy Index (ABI). The researcher compared the results of these indices by estimating Z-score multivariate discriminant analysis. It was found that ABI had stronger predictive abilities.

Idrees and Qayyum (2018) investigated the relationship of financial distress and equity return risk from companies experiencing financial distress at PSX. Financial distress is measured by O-score. It was found that financial distress and market-to-book value equity risks did not statistically significantly explain stock returns because of the inefficient markets siuation. The influence of company size is significant in explaining returns. The researcher suggests that it is important to predict financial distress with better predictors to avoid uncertainty.

There are several methods of measuring financial distress. Djamaluddin et al (2017) found that there is not any significant difference between predictions of financial distress using either Altman's, Ohlson's or Zmijewski's approaches. While the results of the study of Liao and Mehdian (2016) found that the Aggregate Bankruptcy Index (ABI) has stronger predictive abilities.

III. Research Method

This research is quantitative descriptive. The condition of the company's financial distress is explained by the Altman Z-score. The variables used are Altman scoring elements, which are:

Z1 = working capital / total asset
Z_2 = *retained earnings / total assets*
Z_3 = *earnings before interest and taxes / total asset*
Z_4 = *book value of equity / book value of debt*
Z_5 = *sales / total asset*

Altman's score is an independent variable that could affect stock returns. Stock return is the return obtained by investors from the increase in the company's stock price. Return is calculated based on the log difference between two prices at two times (Amenc and Sourd, 2003). Daily stock return (Rit) is calculated by formula as below.

$$R_{it} = \ln \frac{clo\sin g\_price(t)}{Clo\sin g\_price(t-1)}$$

The data used is ratio scale secondary data. Data collected from the company's financial statements, specifically the balance sheet and profit or loss statement. The data needed includes the value of: current assets, current debt, total assets, net income, dividend payments, retained earnings, sales, EBIT, total debt, and total equity.

The stock price is the daily closing price of shares, obtained from yahoofinance.com. The stock price observation period is conducted 1 (one) week after the company announces the Audited Financial Report. For this reason, information is needed on the date the company announces the Audited Financial Report.

Based on the figures in the Financial Report, tabulations are made on the numbers forming the Altman Z-score element. Then the Z-score is calculated by the equation (2).

The results of the calculation of the score from Altman Z-score will produce a value with the conclusion (1) companies that are not healthy and have large financial problems and the risk of the company experiencing bankruptcy is very high (Z-score <1.23), (2) the company has the potential bankruptcy (1.23 <Z-score <2.99), and (3) the company is included in the healthy criteria (Z-socre> 2.99).

Based on the stock price of each company, calculated returns generated by each company. Simple linear regression is carried out to determine the effect of bankruptcy on the return generated.

The equation used is:

R = a + bZ-score + e ..... (3)

where:

R = return
a = constant
b = regression coefficient
Z = Altman Z-score
e = error

Based on the results of data processing on the regression as above, analyzing the ability of Z-score to explain the diversity of returns that occur, through the coefficient of determination. The coefficient of determination is a measure to determine the suitability or accuracy between predicted values with its sample data (Suharyadi and Katidjan, 2015).

Allegedly the Z-score affects the return that occurs. The higher the Z-score, the more the company avoids the potential for bankruptcy, meaning its performance is good. A company that performs well will increase its share price (positive return).

Hypothesis:

Ho: $b \leq 0$

Ha: b > 0

When the value of b (regression coefficient) > 0 means that there is an effect of Z-score on stock returns. The influence was tested to determine its significance. The test used is the t test. When the probability or significance is <0.05, then the effect is significant.

The effect of Altman Z-Score on stock return movements was analyzed using panel data regression analysis. There are several steps should be done in conducting panel data regression analysis which steps are slightly different than the usual multiple regression analysis, which are:

1. Selection of the best estimation model
2. Statistical test based on estimation model
3. Classical Regression Assumption Test
    a. Side distribution normality test (error)
    b. Heteroscedasticity test
    c. Autocorrelation Test
4. Analysis of the effect of independent variables on the dependent variable based on the best model.

Selection of the Best Estimation Model

The classical regression assumption in panel data will depend on the estimation method/model used. If the estimation method used is Pooled Least Square (PLS) or Fixed Effect Models (FEM), the classical regression assumption test, heteroscedasticity and autocorrelation test will be carried out. But if the estimation method used is the Random Effects Model (REM) method, heteroscedasticity test is not needed since the REM method uses the General Least Square (GLS) approach.

Therefore, the first step taken in panel data regression analysis is to choose the best model. To choose the best estimation model there are three tests, which are:

1. Chow Test. This test is used to choose between PLS estimation and FEM estimation.
2. Hausman Test. This test is used to choose between FEM estimation and REM estimation.
3. Test the Lagrange Multiplier. This test is used to choose between REM estimation and PLS estimation.Uji Chow.

Clearly the selection of the estimation method between the three methods can be illustrated in Figure-2. below.

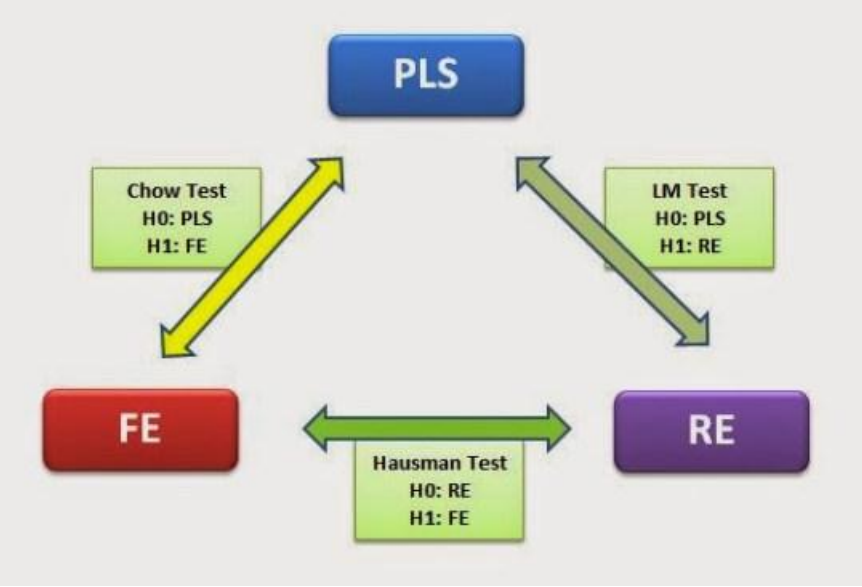

Figure-2. Estimation Method of Panel Data

A good model is a model that meets the assumptions of classical regression. This study uses three formal tests of classical regression assumptions, which are the distribution of normality test, side heterogeneity test, and side autocorrelation test.

Formal test to see the pattern of equalization of this model using the skewness kurtosis test (sk_test). This formal test was first explained by D'Agostino, Belanger, and D'Agostino Jr. (1990). The hypothesis for the

sk_test test is the normal spread range if the Chi2 Probability value is greater than 0.05. If the Chi2 Probability value is less than 0.05 then the side does not spread normally.

The formal test of the next classic regression assumption is the absence of side heteroscedasticity problems. This test was carried out using the Breusch-Pagan test approach. Decision making on the Breusch-Pagan test is based on the probability of t-statistical testing. If the t-statistical probability value is greater than the alpha value = 0.05 then the equivalent is declared homogeneous. If the t-statistic value is smaller than the value of 0.05, then conclusions can be drawn as if the side is not homogeneous (heteroscedastic).

The formal assumption test is the existence of heteroscedastic problems. This test was carried out using the Breusch-Pagan test approach. Decision making on the Breusch-Pagan test is based on the probability of statistical testing. If the statistical profbability value is greater than alpha value = 0.05 then the homogeneous equivalent is declared. If the t-statistic value is smaller than the value of 0.05, then the conclusions can be drawn as if the side is not homogeneous (heteroscedastic).

A formal test to test for the presence or absence of autocorrelation in the model setting was the Wooldridge Test. If the Probability value > F is greater than 0.05, it can be concluded that there is no autocorrelation problem in the model.

IV. Resulis And Discussion

Analysis of Possible Corporate Bankruptcies

As explained in the previous chapter, the analysis of company bankruptcy possibilities in this study uses the Altman Z-Score method that has been revised. The equation used is equation-2. :

$$Z' = 0.717Z_1 + 0.847Z_2 + 3.107Z_3 + 0.420Z_4 + 0.998Z_5 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

note:

Z1 = *working capital / total asset*
Z2 = *retained earnings / total assets*
Z3 = *earnings before interest and taxes / total asset*
Z4 = *book value of equity / book value of debt*
Z5 = *sales / total asset*

Based on equation-2 above, it is calculated the value of Z-Score for each company in each year (Table 2), shows that the majority of companies throughout the period 2013-2017 are at risk of experiencing bankruptcy (52.5%) and potentially bankrupt (47.5%). None of the companies has a Z-score above 2.99. This finding shows that the pulp and paper companies listed on the Indonesia Stock Exchange are in an unhealthy condition and experience major financial problems.

V. Analysis of the Effect of Altman Z-Score on Stock Return

Asset Pricing is an analysis of stock returns in the financial sector. Asset pricing development began since Markowitz (1982) developed an asset pricing model. According to Harry Markowitz, an investor will choose an asset, in this case, the stock portfolio is based on two main variables, which are the return taken from the mean return of the asset, and the risk variable taken from the variance of the return. According to Markowitz, an investor will choose assets based on the mean-variance aspect of maximazer. In other words, investors in the capital market will choose stocks in the capital market based on the risk variable and stock returns.

In this study, the risk variable used for pricing assets is the risk of possible bankruptcy of the company. This study tries to see whether the possibility of a company's bankruptcy risk can explain the movement of stock returns in pulp and paper companies. The risk of corporate bankruptcy is obtained using Altman Z-Score as explained in the previous section.

Testing to choose the best model between PLS and FEM produces a calculated F- value of 1.01 with a significance of 0.4457. The Prob value > F greater than 0.05 indicates that there is not any individual effect, therefore the FEM approach is not feasible.

The second model test was conducted to choose between the PLS model and the REM model. The choice between the PLS or REM model uses the formal Lagrange Multiplier test. The results in the test show Prob > Chi2 worth 0.4447. This value is greater than 0.05 so it can be concluded that the best approach is PLS.

Since PLS is the best model, it is necessary to do a classic assumption test. A good model is a model that meets classic assumptions. This study uses three formal tests of classical regression assumptions, the distribution of normality test, side heterogeneity test, and side autocorrelation test. The multicollinearity problem test in this study is not applicable since there are only one independent variable.

The results of the side distribution normality test shows that the Chi2 Probability value is 0.0278. This value is less than 0.05 so it can be concluded that side distribution does not spread normally. The results of the heterogeneity test shows a probability value of 0.0401 so that it can be concluded that the side distribution does

not contain heteroscedastic properties. Furthermore, the results of the Wooldridge Test shows that the Probability value > F is 0.3226. This value is greater than 0.05 so it can be concluded that there is not any problem with autocorrelation in the model.

Table 2. Pulp and Paper Companies Z-Score 2013-2017

Companies	Year	Z-Score	Classification
	2013	2,24	Potentially Bankcrupt
	2014	2,20	Potentially Bankcrupt
ALDO	2015	2,37	Potentially Bankcrupt
	2016	2,57	Potentially Bankcrupt
	2017	2,28	Potentially Bankcrupt
FASW	2013	1,33	Potentially Bankcrupt
	2014	1,33	Potentially Bankcrupt
	2015	0,98	High Risk of Bankcruptcy
	2016	1,33	Potentially Bankcrupt
	2017	1,35	Potentially Bankcrupt
INKP	2013	0.77	High Risk of Bankcruptcy
	2014	0.81	High Risk of Bankcruptcy
	2015	0.88	High Risk of Bankcruptcy
	2016	0.92	High Risk of Bankcruptcy
	2017	1.16	High Risk of Bankcruptcy
INRU	2013	0.44	High Risk of Bankcruptcy
	2014	0.65	High Risk of Bankcruptcy
	2015	0.54	High Risk of Bankcruptcy
	2016	0.62	High Risk of Bankcruptcy
	2017	0.82	High Risk of Bankcruptcy
KBRI	2013	2.96	Potentially Bankcrupt
	2014	0.47	High Risk of Bankcruptcy
	2015	0.09	High Risk of Bankcruptcy
	2016	0.04	High Risk of Bankcruptcy
	2017	-0.10	High Risk of Bankcruptcy
KDSI	2013	2.28	Potentially Bankcrupt
	2014	2.44	Potentially Bankcrupt
	2015	1.85	Potentially Bankcrupt
	2016	2.39	Potentially Bankcrupt
	2017	2.35	Potentially Bankcrupt
SPMA	2013	1.37	Potentially Bankcrupt
	2014	1.40	Potentially Bankcrupt
	2015	1.10	High Risk of Bankcruptcy
	2016	1.73	Potentially Bankcrupt
	2017	1.77	Potentially Bankcrupt
TKIM	2013	0.88	High Risk of Bankcruptcy
	2014	0.82	High Risk of Bankcruptcy
	2015	0.71	High Risk of Bankcruptcy
	2016	0.72	High Risk of Bankcruptcy
	2017	0.76	High Risk of Bankcruptcy

The results of data processing with the PLS approach shows the value of F-Statistics probability and t-statistic is 0.825. It can be concluded that the probability of corporate bankruptcy (Altman Z-score) does not have a significant effect on the return of shares of pulp and paper companies.

The classic regression assumption test results above show that the probability of bankruptcy function model for the movement of returns cannot be used since there is a problem with the spread of the side distribution that is not normally spread. Therefore this study try to use the next test, the outlier test. This test is used to find out if there are outlier data that damage the distribution of data.

This formal outlier test uses a model developed by Cook (1977) known as Cook Destance. Outlier testing in this study using STATA 11 data processing tools. From the results of the test, it was found that there were three outlier data so that all three data were omitted from the processed data (see annex).

After omitting outliers data, the data processing procedure is repeated from the first step to the last step. Estimated results after stepping outlier data show that the value of t-statistics and F-Statistic which are still greater than 0.05, therefore it can be concluded that the bankruptcy risk function model of the company cannot predict the movement of pulp and paper stock returns

The classical regression assumption test results also show relatively similar results, which is side distribution that does not spread normally. The other classic regression assumption test results are also relatively the same, that there are not any heteroscedasticity and autocorrelation problems exist. Thus, it can be concluded that the probability of bankruptcy of companies using Altman Z-Score cannot be used to carry out asset pricing shares, especially in the pulp and paper group of companies.

The findings of this study are not inline with several previous studies in Indonesia. Lasmanah et al. (2013) predict the financial condition of the distress of transportation sub-sector companies listed on IDX 2007-2011 using the Altman method. He found that Altman Z-score have a significant effect on the share price of the transportation sector. Likewise with the findings of researcher Lestari et al. (2016) who examined the predictions of financial distress in the Pharmaceutical sub-sector of the company which were registered on the IDX in 2009-2014. It was found that the Z-score had a significant effect on stock prices. The same results was found in the study of Syamni et al. (2018) on a study of the predisposing model of bankruptcy of 19 coal mining companies listed on the Stock Exchange in 2013-2015. Using the Ohlson approach, Altman Modification, Grover, Springate, and Zmijewski it was found that Ohlson and Altman Modification were the dominant prediction models and influenced the stock prices of coal companies in Indonesia. Another study by Wiyarni (2018) using data from four (4) cigarette companies listed on the Indonesia Stock Exchange in 2013-2016 concluded that only one (1) company was found to be bankrupt and the Z-score had a significant effect on stock prices.

However the results of this study supports the findings of Haryanto (2012) who study the industrial sector of consumer goods on the IDX. It was concluded that the prediction of bankruptcy with the Altman Z-Score method has no effect on stock prices.

The findings of this study support the study of Idrees and Qayyum (2018) which examines the impact of financial risk distress on equity returns on non-financial firms in Pakistan. It was concluded by the researcher that financial distress is statistically insignificant in explaining stock returns in relation to inefficient markets.

The efficient market hypothesis theory states that securities are publicly traded, the price will be very volatile. Shleifer and Summers (1991) explain that Samuelson (1965) proves that stock prices are random walks if rational competitive investors need a fixed rate of return, and Fama (1965) shows that stock prices are indeed close to random walks if the efficient market hypothesis strengthens.

The evident that the company's bankruptcy risk model does not impact stock return movements is very likely to occur, since the theory of asset pricing has not been consistently proven in every capital market. Fama (1996) once wrote article regarding the theory of Capital Asset Pricing Model (CAPM) which is the main basis of asset pricing to date "CAPM dead or alive?".

Since the emergence of asset pricing theory to predict stock return movements which was initiated by Markowitz and later developed with a formal model by Sharpe (1964), Lintner (1965) and Mossin (1966) with CAPM theory, this asset pricing theory arousing discussion. Since empirical research found through this model is not proven (Fama and French, 1996), many researchers provide suggestions for the development of this model such as Merton (1971 and 1973), Ross (1976), Breeden (1979), Machina (1982), Chamberlain (1983), Gibbon et. al (1989), Abel (1990), Fama and French (1994), and Fama and French (2014).

In the end of the development of the CAPM model, it is divided into three main parts, which are classical CAPM theory which refers to the initial CAPM equation, the theory of Arbitrage Pricing Theory (APT) developed by Ross (1976) which refers to systematic risk of macroeconomic, and theory Fama and French (FM) Three Factors (1995), and Five Factors Model (2014) FM models which basing their assumptions on unsystematic risk.

Besides to these models, some researchers also try to find other risk models that can affect stock returns and prices including the risk of corporate bankruptcy with Altman Z-Score. Some of these researchers

are Putra (2012), Haryanto (2008), and Apergis, Sorros, Artikus, and Zisis (2011). Some studies have been proven but some of them are also not proven.

The inconsistency of asset pricing models based on rational market assumptions has led to a new group, the behavioral finance. The behavioral finance approach is based on a psychologycal approach where investors are assumed as having irrational behavior. This approach began to develop in 1990 by Shleifer and Summers. They describe alternatives to an efficient market paradigm that emphasizes the role of investor sentiment and limited arbitration in determining asset prices. Shleifer and Summers (1990) point out that limited arbitration assumptions are more general and reasonable as market descriptions for risk assets than perfect arbitration assumptions that are the basis of market efficiency. With limited arbitrage, the movement of investor sentiment is an important determinant of stock prices. They also show that a limited arbitration approach produces a large number of implications about investor behavior and speculative prices that are consistent with empirical evidence. Through a limited arbitration approach Shleifer and Summers show that the approach produces several new implications that can be tested about yields on securities. Thus, it is not an issue that the investor sentiment approach has changed the usual financial discipline.

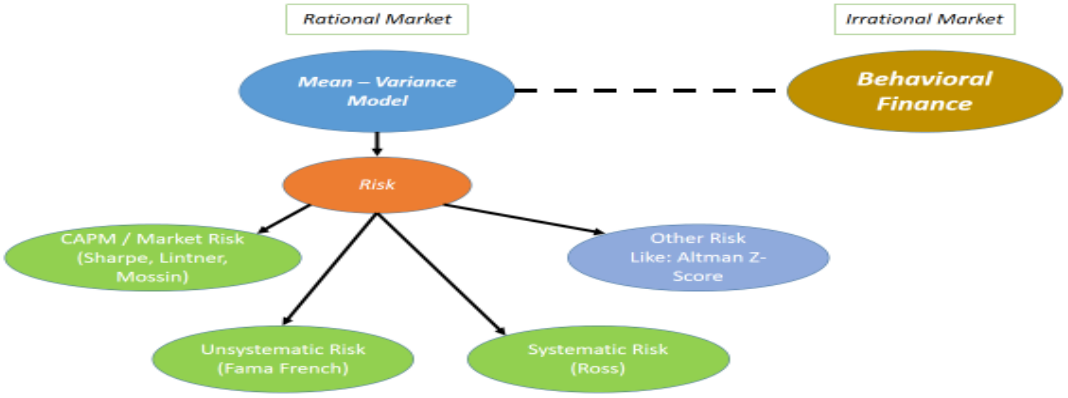

Figure-3. Rational Market vs Irrational Market

Therefore in the theory of asset pricing the unproven of one theory is usual. This finding can be the basis for empirical evidence for other theories. Even when all models that have rational market assumptions are not proven, there is a possibility that behavioral finance approaches and theories can answer and predict patterns of stock return movements.

The fact that the bankruptcy risk variable of the company is not proven to predict the movement of pulp and paper stock returns can be the basis for other theories such as Ross's systematic risk/Arbitrage Pricing Theory (APT), unsystematic risk/Fama French Three Factors and Five Factors Models, CAPM, or Behavioral Finance which believes investors behave irrationally.

Not proven that the risk bankruptcy model of the company towards stock return movements is a natural thing. This is because until now the theory of asset pricing has not been consistently proven in every capital market in every time and every country.

The inconsistency of asset pricing models based on rational market assumptions has led to a new group, namely behavioral finance. The behavioral finance approach is based on a psychology approach where investors assume irrational behavior. This approach began to develop in 1991 by Shleifer and Summers. Shleifer and Summers (1991) review alternative market efficient approaches. Their approach rests on two assumptions. Firstly some investors are not fully rational and their demand for risk assets is influenced by their beliefs or sentiments that are not fully justified by fundamental news. Secondly arbitrage which is defined as trading by investors that is fully rational and not subject to such sentiments - is risky and therefore limited. Both of these assumptions together imply that changes in investor sentiment are not fully offset by arbitration and hence affect securities returns. They argue that this approach is in many ways superior to the efficient market paradigm on financial markets.

VI. Conclusion And Recommendation

The results showed that based on the pulp & paper company financial data for the 2014-2017 in Indonesia Stock Exchange, the companies are in a condition of potentially experiencing bankruptcy. Using the

Altman Z-score Modification approach it was found that the Z-score did not have a significant effect on stock returns. Most likely investors in Indonesia, especially investors in the pulp & paper industry are irrational.

Further research is needed to be able to describe investors in the Indonesia Stock Exchange, whether they are rational or irrational investors.

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Annex

PLS-FEM Model Determination Test Output

```
Fixed-effects (within) regression               Number of obs      =        39
Group variable: emiten                          Number of groups   =         8

R-sq:  within  = 0.0023                         Obs per group: min =         4
       between = 0.0001                                        avg =       4.9
       overall = 0.0013                                        max =         5

                                                F(1,30)            =      0.07
corr(u_i, Xb)  = -0.0887                        Prob > F           =    0.7939
```

ri	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
z_score	-.0854645	.3242233	-0.26	0.794	-.7476169	.576688
_cons	.465294	.4330445	1.07	0.291	-.4191008	1.349689
sigma_u	.40277321					
sigma_e	.88541417					
rho	.17145309	(fraction of variance due to u_i)				

F test that all u_i=0: F(7, 30) = 1.01 Prob > F = 0.4457

Lagrange Multiplier Test

```
Breusch and Pagan Lagrangian multiplier test for random effects

        ri[emiten,t] = Xb + u[emiten] + e[emiten,t]

        Estimated results:
                         |       Var     sd = sqrt(Var)
                ---------+------------------------------
                      ri |    .7654196       .8748826
                       e |    .7839582       .8854142
                       u |    .0240485       .1550757

        Test:   Var(u) = 0
                                 chibar2(01) =     0.02
                              Prob > chibar2 =   0.4447
```

PLS Estimation Model Output

Source	SS	df	MS		
Model	.038730471	1	.038730471	Number of obs	= 39
Residual	29.0472128	37	.785059804	F(1, 37)	= 0.05
				Prob > F	= 0.8254
Total	29.0859432	38	.765419559	R-squared	= 0.0013
				Adj R-squared	= -0.0257
				Root MSE	= .88604

ri	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
z_score	-.0414134	.1864516	-0.22	0.825	-.4192003	.3363735
_cons	.4097006	.2747704	1.49	0.144	-.1470371	.9664382

Skewness and Kurtosis Test

```
                    Skewness/Kurtosis tests for Normality
                                                      ------- joint ------
    Variable |  Obs  Pr(Skewness)  Pr(Kurtosis)  adj chi2(2)  Prob>chi2
-------------+-----------------------------------------------------------
         res |   39      0.1450        0.0150         7.16        0.0278
```

Heteroskedasticities Test

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of ri

         chi2(1)      =     4.21
         Prob > chi2  =   0.0401
```

Side Autocorelation Test

```
Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
    F(  1,       7) =      1.132
           Prob > F =      0.3226
```

Estimation Model Results After Outlier Removal

Source	SS	df	MS		
Model	.319853087	1	.319853087	Number of obs	= 36
Residual	12.5390441	34	.368795413	F(1, 34)	= 0.87
				Prob > F	= 0.3583
				R-squared	= 0.0249
				Adj R-squared	= -0.0038
Total	12.8588971	35	.367397061	Root MSE	= .60729

ri	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
z_score	-.1216267	.130601	-0.93	0.358	-.3870399	.1437864
_cons	.5541237	.1983361	2.79	0.008	.1510562	.9571911