

**OIL PRICE AND BANKRUPTCY PROBABILITY OF OIL AND GAS COMPANIES  
(STUDIES IN 3 ASIA-PACIFIC COUNTRIES)**

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***Abstract***

*The decline in oil prices is not only happen to oil prices in Indonesia, but also world oil prices. The world oil prices downturn has an impact on the world's oil and gas companies financial health. This study aims to provide empirical evidence about the effect of oil prices on the probability of bankruptcy in Indonesia, Singapore, and Australia.*

*The probability of bankruptcy in this study is measured by Altman Z-Score, developed by Edward Altman (1968). The price of oil in this study is measured by the price of Brent crude. The sample was 20 manufacturing firms listed at Indonesia Stock Exchange (IDX), Australian Securities Exchange (ASX) and Singapore Exchange (SGX) during the period 2013-2015 selected through purposive sampling*

*The results of this study indicate that by using simple regression model, oil prices significantly influence the probability of oil and gas companies in Indonesia, Singapore, and Australia.*

***Keywords:*** Oil Price, Probability of Bankruptcy, Altman Z-Score, Purposive Sampling, Simple Regresion Model

***JEL Classification:*** O57

**INTRODUCTION**

Crude oil prices in Indonesia encountered a downturn since 2015. Although Indonesian government raised the price of Premium gasoline on 18 November 2014 to IDR 8,500 per liter, the price of Premium gasoline decreased by 11.8% to IDR 7.600 per liter on



January 1, 2015. Changes in the price of Premium gasoline continued until the last changed to IDR 6.550 per liter on April 1, 2016.

The decline in oil prices is not only happen to oil prices in Indonesia, but also world oil prices. The benchmarks for the light crude oil group is West Texas Intermediate (WTI) in North America and Brent crude in Europe and Africa. West Texas Intermediate and Brent is the most used benchmarks for crude oil prices marker in the world market (Hammoudeh et al., 2008). At the end of 2014 the price of Brent crude and West Texas Intermediate, both of which are an international benchmark, has fallen by more than 45 percent from last year's prices.

Market price of crude oil fluctuations is determined by the mechanism of demand and supply as the fundamental factors (Nizar, 2012). On the demand side, economic growth affects the price of oil. World economic growth conditions affect oil prices in the international market in recent years. The global economy is in decline. Europe and Japan have not recovered from the previous economic crisis. On the other hand, China is now very careful guarding the weakening of economic growth, which amounted to 7.1% in 2015, 7% in 2016 and 6.9% in 2017 (World Bank, 2015). This makes the demand of the world's oil decreases causing oil prices downturn.

From the supply side, crude oil price fluctuation is strongly influenced by the availability or oil supplied by producer countries. Availability or supply of oil is closely associated with the production capacity, investment, and refinery infrastructure capacity (Kesicki, 2009). The condition of the world oil supply is currently in oversupply condition. Oil production in the United States have increased almost two-fold in the past few years. This made oil importers such as Arab, Nigeria, and Algeria had to find new markets in Asia. Similarly, Canada and Iraq continued to increase oil production. OPEC as an organization that is supposed to regulate the price and production of oil company refused to cut oil production that could raise world oil prices. Countries like Saudi and allies refuse to cut oil production. Meanwhile, Iran has just lifted the economic sanctions, continued to increase its oil production (Krauss, 2016).

The world oil prices downturn has an impact on the world's oil and gas companies financial health. According to a report released by Deloitte (2016) entitled "The crude



downturn for exploration & production companies", as much as 35% of oil and gas companies around the world or as many as 175 companies categorized in high-risk quadrant with the determining factor is the high leverage ratio and low debt service coverage. These companies have stockpiled a total debt of more than \$ 150 billion on their balance sheet. 50 of the 175 companies that have negative equity or leverage ratio above 100. Most likely these companies will be bankrupt by 2016, unless oil prices recover.

Stock price index is an indicator or reflection of changes in stock price. The movement of stock prices is an indicator of investor interest in investing. According to a report released Colonial First State (2015), entitled "The impact of lower oil prices on the Australian equities", oil prices downturn caused energy sector index S&P/ASX 200 declined value of nearly 18% in the December quarter 2015. In Indonesia Stock Exchange price index of mining stocks also declined. Changes in world oil prices has positive effect on the entire sector in the Indonesia Stock Exchange (Rahmanto et al., 2016). According to data compiled from Yahoo Finance, during 2015 the mining sector in particular has decreased the most, namely by 40%. The same thing happened in the Singapore Exchange, the FTSE ST Oil & Gas has declined by 34.3% during 2015. This situation is an indication that the interest of investors to invest in oil and gas company in Indonesia, Australia and Singapore has declined. World oil prices downturn resulted some oil and gas companies are experiencing financial difficulties and in danger of bankruptcy. This makes investing in oil and gas companies can be very costly.

Most companies go public in order to obtain alternative financing or funding sources. Investors will assess the company before deciding to invest. One way is by analyzing the ratings company information contained in the financial statements that reflect the company's performance and financial condition. Analysis reports aim to provide data needed to make investment decisions. The investment decision such as the decision to buy, sell, or retain ownership of a company. The market will respond to the fluctuations in the stock price of the company, if the company's financial condition and performance is good, then the company's stock price will also go up. Therefore, predictions and analysis of financial statements is essential not only for companies but also for stakeholders (Hadi and Anggraeni, 2010).



One form of the company's financial statements analysis is to predict its bankruptcy. At the time of oil prices downturn is the right time to analyze bankruptcy prediction on oil and gas companies. There are several models of bankruptcy prediction, one bankruptcy prediction method is by counting and classifying firms with Altman Z-Score. Altman is the first researcher to apply Multiple Discriminant Analysis for the analysis of bankruptcy. Altman Z-Score is generated by summing the results of multiplying a certain constant value each with 5 elements in the ratio of manufacturing companies. Based on the Z-score, companies are grouped into 3 groups: bankrupt, gray area, and financial healthy. Companies that categorized into bankruptcy is predicted to suffer financial distress within one or two year. For companies that fall within the gray area is predicted to have the possibility to go bankrupt but can still be saved if cautiously managed and take the right decision. Meanwhile, if the company categorized as financial healthy is predicted that the company will not experiencing financial distress. Based on the exposure to the above authors are interested in examining the relationship between world oil prices of Brent on the probability of bankruptcy. This study aims to determine the extent of world oil prices of Brent can affect the probability of bankruptcy directly.

## **HYPOTHESIS DEVELOPMENT**

The main objective of financial reporting is to provide relevant information to each user of financial statements both internal and external parties regarding the financial position, financial performance, and cash flows of the entity for making economic decisions. Users of financial statements may use the information contained in the financial statements in a straightforward manner using facts and data contained in the financial statements or to reprocess the data which is attached to the financial statements by analyzed the data according to the intent and purpose. Analysis of the financial statements is to use financial statements as the subject of the application of analytical tools and techniques to make the information less and see its relationship with the aim to determine the financial conditions, and can generate a more informed decision.

Financial statement analysis can help investors in making investment decisions. The investment decision in question is the decision to buy, sell, or retain ownership. Positive



earnings in large numbers reflect conditions established companies that can afford to pay high dividends. The market will respond to the fluctuations in the stock price of the company, if the company's financial condition and performance is good, then the company's stock price will also go up (Susanto and Ekawati 2006). The company also requires analysis of financial reports to know information about the condition and position of the company in more depth. This information can be useful for companies to plan, conduct, and assess the activity of the company in order to operate more effectively and efficiently. When companies operate more effectively and efficiently than its competitors it will make the company have the competitive advantage that makes the company gain an advantage over its competitors.

In the midst of world oil prices downturn, the biggest fear for stakeholders in the oil and gas company is the financial health of the company. The threat of bankruptcy due to low selling prices led the management and investors to be more cautious in making decisions. One way of predicting bankruptcy is by analyzing the information contained in the financial statements. Prediction bankruptcy Altman's Z-score is one of the models for predicting bankruptcy in manufacturing, non-manufacturing company, and the private company years prior to the bankruptcy. Z-score as a bankruptcy prediction model first using Multiple Discriminant Analysis (MDA) has a level of accuracy that is quite high at 94 percent. Z-score is calculated based on the ratio 5 is the working capital to total assets, retained earnings to total assets, earnings before interest and taxes to total assets, and market value of equity to total liabilities, and sales and total assets.

The  $X_1$  ratio or Working capital to total assets show the level of liquidity by comparing working capital to total assets. working capital is calculated from the difference between current assets by current liabilities. The higher the value of the ratio of working capital to total assets, the less likely the company went bankrupt. The  $X_2$  ratio or the Retained earnings to total assets measure the cumulative profitability of the company from time to time. This ratio also describe the age of the company because the younger the company tend to have the lower ratio. The higher the value of the ratio of retained earnings to total assets, the less likely the company went bankrupt. The  $X_3$  ratio or Earnings before interest and taxes to total assets measure the level of productivity of the company's assets. This ratio is considered proper for studies related to financial distress because of the continuity of the



company's operations are based productivity levels of its assets. The higher the value of the ratio of earnings before interest and taxes to total assets, the less likely the company went bankrupt. The  $X_4$  ratio or Market value Book value of equity to total debt capital market value compares with the amount of debt. Companies are considered to have failed generally have a small ratio for having more debt than their own capital. The higher the value of the ratio of market value of equity to book value of total debt, the less likely the company experienced kebangkrutan. The  $X_5$  ratio or Sales to Total Assets show the ability of the company's assets in generating sales. This ratio is generated by dividing the number of sales by total assets. This ratio is less effective when comparing company with different business sectors.

This study aims to determine whether there is influence of bankruptcy prediction model Altman Z-score on oil and gas companies listed on IDX, ASX and SGX. Thus the hypothesis of this study is

**H1:** The decline in the price of Brent crude has an influence on the probability of bankruptcy on the company's oil and gas sector.

## **RESEARCH METHOD**

### **Population and Sample**

This study examined 20 companies oil and gas company in Indonesia, Singapore, and Australia in 2013-2015. The sampling method in this research is purposive sampling.

The criteria used in the selection of the sample is (1) Companies that have a primary business activity in the oil and gas sector; (2) Listed in Indonesia Stock Exchange (IDX), Australian Securities Exchange (ASX) and Singapore Exchange (SGX) in the period 2013-2015 with a complete financial data; (3) Prepare financial statements to the date of the financial ended December 31; (4) Perform production activities (refinery). After elimination obtained 20 companies that meet the criteria.



## **Variable Operationalization**

### ***Dependent Variable***

The dependent variable (Y) is the variable that is affected or which become due for their independent variable. The dependent in this research is the Z-Score resulting from the calculation 5 financial ratios namely  $X_1$  (Working Capital / Total Assets) for measuring the liquidity of the company,  $X_2$  (Retained Earnings / Total Assets) to measure the ability of cumulative profit companies,  $X_3$  (Earning Before interest and Tax / Total Assets), and  $X_4$  (Market Value of Equity / Book Value of Debt) and  $X_5$  (Sales / Total Assets) were calculated from the financial statements of companies oil and gas listed on the Indonesia Stock Exchange (IDX), Australia Securities Exchange (ASX) and Singapore Exchange (SGX). Formula for Z-score is:

$$Z = 1.2X_1 + 1.47X_2 + 3.3X_3 + 0.6X_4 + 1.0X_5$$

### ***Independent Variable***

The independent variable (X) are variables that affect the dependent variable. Variables used in this research is the market price of Brent oil. The market price of Brent crude is used as the benchmark prices on the world oil market. In addition to Brent crude, West Texas Intermediate crude is also commonly used as a benchmark in world oil prices. Benchmarks for the light crude oil group is West Texas Intermediate (WTI) in North America and Brent crude in Europe and Africa. West Texas Intermediate and Brent is the most famous oil prices marker for crude oil in the world market (Hammoudeh et al., 2008).

At this time of Brent crude is more widely used as a benchmark, because it is used not only in Europe but also a benchmark in the area of West Africa and the Mediterranean. Even the price of oil in Southeast Asia had already started to follow the benchmark oil price Brent (Nunan, 2012). Brent crude oil has more influence on world oil prices globally compared to WTI. This makes the price of Brent crude oil is the best indicator of world oil prices.



### Data Analysis Method

To test the hypothesis developed in this study, this research used regression analysis with the help of IBM SPSS Statistics software. There are three models of the regression equation which will be tested in this study, namely Indonesia regression model, the regression model Australia, and Singapore regression model. The regression equation used in this study are as follows:

$$PK = \alpha + \beta_1 HM_{it} + e$$

Information:

PK = Probability of Bankruptcy

HM = Oil Prices

$\alpha$  = Constant

$\beta_1$  = Regression Coefficient

e = Error

## RESULTS

### Descriptive Statistics Analysis

**Table 1. Descriptive Statistics Analysis**

Indonesia				
Tahun	Rata-Rata	Standar Deviasi	Minimum	Maksimum
2013	2.690	2.392	0.749	7.330
2014	2.719	2.185	0.608	6.412
2015	1.610	1.254	-0.103	2.779
Australia				
Tahun	Rata-Rata	Standar Deviasi	Minimum	Maksimum
2013	1.819	1.768	0.101	5.788
2014	1.251	1.636	-0.629	4.030
2015	0.219	1.227	-1.186	1.959
Singapura				
Tahun	Rata-Rata	Standar Deviasi	Minimum	Maksimum
2013	2.252	0.645	1.562	3.222
2014	1.513	0.904	0.349	2.871
2015	1.313	0.875	-0.105	2.116





In table 1, we can see the comparison value of Z-score on the state of Indonesia, Australia, and Singapore. In 2013, 2014 and 2015, countries that have a Z-score highest on average is Indonesia. While Australia is the lowest average Z-Score value. It can be seen that most of the companies in the three countries experienced a decline in the value of Z-score in the period June 2013 to December 2015. 16 of the 20 companies has Z-Score decreased with the most downturn is Nido Petroleum (NDO) with a decrease of -198.06%. However, 4 of the 20 companies has increased Z-score in the period June 2013 to December 2015. The company is Ratu Prabu Energi (ARTI), Radiant Utama Intersco (Ruis), Keppel Corp (BN4), and Swiber (BGK) with Swiber (BGK) as a company that is has the highest increase of 99.54%. Nevertheless, that does not mean companies are not affected by the drop in oil. The increase in the value of Z-score occurred in the second semester of 2015 after declining in the first semester of 2015.

From June 2013 until December 2015 the value of Z-score companies do not always declined. Only three companies which decreased continuously from June 2013 until December 2015, such as Incremental Oil Gas (IOG), Tap Oil Limited (TAP), and Kris Energy Ltd (SK3). While another company in Indonesia, Singapore, and Australia Z-score experienced rises and falls in the period June 2013 to December 2015

The decline in world oil prices began in mid 2014. However, the effects of the decline in oil prices affect in the early half of 2015. It can be seen from a Z-score of companies in the first semester of 2015 when compared with the value of Z-score the second semester of 2014, 18 the company experienced a significant decline, while the two remaining are Santos Ltd. (STO) and Keppel Corp (BN4) experienced an insignificant increase or steady.

The Company is expected to bankrupt one to two years if the value of the Z-Score was under 1.81. While the company considered financially healthy when a Z-Score is above 2.99. Companies that have a Z-Score values between 1.81 and 2.99 is believed to have a healthy financial condition but has the probability to go bankrupt if wrongly managed.

In 2013, there were 10 of the 20 companies that have a Z-Score below 1.81, or in other words to be predicted bankrupt within one to two years. In 2014, the number of companies that have a value below 1.81 Z-Score increased to 11 from 20 companies. By



2015 the number of companies that have a Z-Score below 1.81 again increased to 14 from 20 companies.

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It show that the predicted outcome from Z-score calculation that 10 out of 20 companies will be bankrupt within a period of one to two years. But it proved to be inaccurate because of the 10 companies are still in operation until 2015. There is some evidence suggesting why a Z-score failed to predict the bankruptcy is because these companies are multinational companies that have lines of business outside of the oil sector and the companies supported by the parent company has a strong financial condition or an enterprise supported by the state. In addition anomaly of years studied and the limited sample of data used can also be a cause disruption of the value of Z-score.

### **Classical Assumption Test**

Test for normality in this study using the Kolmogorov-Smirnov (K-S). If the significance value is greater than 0.05, it can be concluded that the residual in the regression model are normally distributed. The test results of the all three regression models Indonesia, Australia, and Singapore showed that the residue in the regression model are normally distributed, namely 0056, 0569, 0296. In other words, the regression model of the three countries are eligible to use because it has meet the assumptions of normality of data.

Multicollinearity test was conducted using the Run Test. Data can be said autocorrelation free, if the significance value greater than 0.05. The test results showed that the significance of each country that is 0.398 for Indonesia model, 0.109 for Australia model, and 0.063 for Singapore model. The results of the third Test Run these countries have a value above 0.05. It can be concluded that the residual value of the three models is random or no autocorrelation between residual value.

Heteroscedasticity test aims to test whether the regression model occurred inequality residual variance from one observation to another observation (Ghozali, 2013). Based on the scatterplot graph, there is no clear pattern, and dots spread randomly above and below the number 0 on the Y axis on the third regression model. These results indicate that all three models freed from their studies and have qualified heteroscedasticity regression analysis.



## Hypothesis Test

**Table 2. t Test Result**

Model	Unstandardized		Standardized	T	Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta		
1 (Constant)	-.639	.957		-.688	.509
Indonesia	.036	.011	.488	3.263	.003
2 (Constant)	-.629	.596		-1.056	.296
Australia	.022	.007	.424	3.178	.003
3 (Constant)	.313	.340		.922	.363
Singapura	.015	.004	.553	3.873	.000

This research was conducted with a significance level ( $\alpha$ ) of 0.05 or 5%. From the table above, note that the  $t_{\text{count}}$  value obtained models Indonesia amounted to 3.263. This value will be compared with the value of the  $t_{\text{table}}$  on the t distribution table. With  $\alpha = 0.05$ ,  $df = 34$  ( $36-1-1$ ), for two-tailed test values obtained  $t_{\text{table}} \pm 2.032$ . From these values seen that  $t_{\text{count}}$  obtained amounted to 3.263, are outside  $t_{\text{table}}$  value (-2.032 and 2.032). In accordance with the criteria of testing the hypothesis that  $H_0$  and  $H_1$  accepted, meaning the price of oil significantly influence the probability of bankruptcy on the model of Indonesia.

From the table above, note that the  $t_{\text{count}}$  value obtained by the Australian model is 3.178. This value will be compared with the value of the  $t_{\text{table}}$  on the t distribution table. With  $\alpha = 0.05$ ,  $df = 46$  ( $48-1-1$ ), for two-tailed test values obtained  $t_{\text{table}} \pm 2.013$ . From these values seen that  $t_{\text{count}}$  obtained at 3,178, are outside  $t_{\text{table}}$  value (-2.013 and 2.013). In



accordance with the criteria of testing the hypothesis that  $H_0$  and  $H_1$  accepted, meaning the price of oil significantly influence the probability of bankruptcy on the Australian model.

From the table above, note that the  $t_{\text{count}}$  value obtained is equal to 3,874 Singapore model. This value will be compared with the value of the  $t_{\text{table}}$  on the t distribution table. With  $\alpha = 0.05$ ,  $df = 34$  ( $36-1-1$ ), for two-tailed test values obtained  $t_{\text{table}} \pm 2.032$ . From these values seen that  $t_{\text{count}}$  obtained at 3,874, are outside  $t_{\text{table}}$  value ( $-2.032$  and  $2.032$ ). In accordance with the criteria of testing the hypothesis that  $H_0$  and  $H_1$  accepted, meaning the price of oil significantly influence the probability of bankruptcy on the Singapore model.

### Analysis Coefficient of Determination

**Table 3. Coefficient of Determination**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Indonesia	.488 <sup>a</sup>	.238	.216	1.95189
Australia	.424 <sup>a</sup>	.180	.162	1.40374
Singapura	.553 <sup>a</sup>	.306	.286	.69285

The coefficient of determination ( $R^2$ ) aims to measure how far the ability of the model to explain variations in the dependent variable. The coefficient of determination is between zero and one. A small ( $R^2$ ) value means that the ability of the independent variables in explaining the variation of the dependent variable is very limited. According to the table above, shows that the coefficient of determination is 21.6% for Indonesian model. This shows that the price of oil contributed to the probability of bankruptcy in Indonesia amounted to 21.6%, while the remaining 78.4% is the contribution of other variables not examined. Australian model obtained determination coefficient of 16.2%. This shows that the price of oil contributed to the probability of bankruptcy by 16.2%, while the remaining 83.8% is the contribution of other variables not examined. While the value of the coefficient of determination Singapore model is 28.6%. This shows that the price of oil contributed to the bankruptcy probability of 28.6%, while the remaining 71.4% is the contribution of other variables not examined

## CONCLUSION AND IMPLICATION

Based on the results of data analysis and implication, can be obtained several conclusions. Oil prices affect the probability of the three countries studied. The price of oil in Indonesia has a significant influence on the probability of bankruptcy with the contribution of 21.6% for Indonesian model. This shows that the price of oil contributed to the probability of bankruptcy in Indonesia amounted to 21.6%, while the remaining 78.4% is the contribution of other variables not examined. Oil prices in Australia have a significant effect on the probability of bankruptcy with the contribution of 16.2%. This shows that the price of oil contributed to the probability of bankruptcy by 16.2%, while the remaining 83.8% is the contribution of other variables not examined. Oil prices in Singapore have a significant effect on the probability of bankruptcy with the contribution of 28.6%. This shows that the price of oil contributed to the bankruptcy probability of 28.6%, while the remaining 71.4% is the contribution of other variables not examined.

Variable oil price in the country of Indonesia, Singapore, and Australia showed a positive and significant effect on the probability of bankruptcy. The results of this study indicate that the increase in world oil prices of Brent will increase company's Z-Score. The lower the price of oil will decrease the sales of oil and gas companies. With production costs remain the same make profit of the company go down. It is also impacted by the decline of interest in investment in oil and gas that can be seen from the decline in stock prices.

There are 10 of the 20 oil and gas company in Indonesia, Australia and Singapore, which have a Z-Score below 1.81, or in other words to be predicted bankrupt within one to two years. In 2014, the number of companies that have a value below 1.81 Z-Score increased to 11 from 20 companies. By 2015 the number of companies that have a Z-Score below 1.81 again increased to 14 from 20 companies.

Suggestions for future research could examine the effect of oil prices on the entire corporate sector. Moreover, future research can add another independent variables, control variables, or mediating variables to determine other variables that affect the probability of bankruptcy. Researchers can also use other bankruptcy prediction models such as Springate, Zmijewski, or CA-Score.



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