

**THE INFLUENCE OF CRUDE OIL PRICE, COAL PRICE AND US DOLLAR
STRENGTHENING UPON OPTIMUM PORTFOLIO RETURN IN MINING
COMPANY**

**(An Empirical Study of Indonesian Mining Companies in Indonesian Stock
Exchange)**

A THESIS

Presented as a Partial Fulfilment of the Requirements to Obtain the Bachelor Degree
in Accounting Department



Written by:

ZAHRA CHAIRANI BACHTIAR

Student Number: 16312044

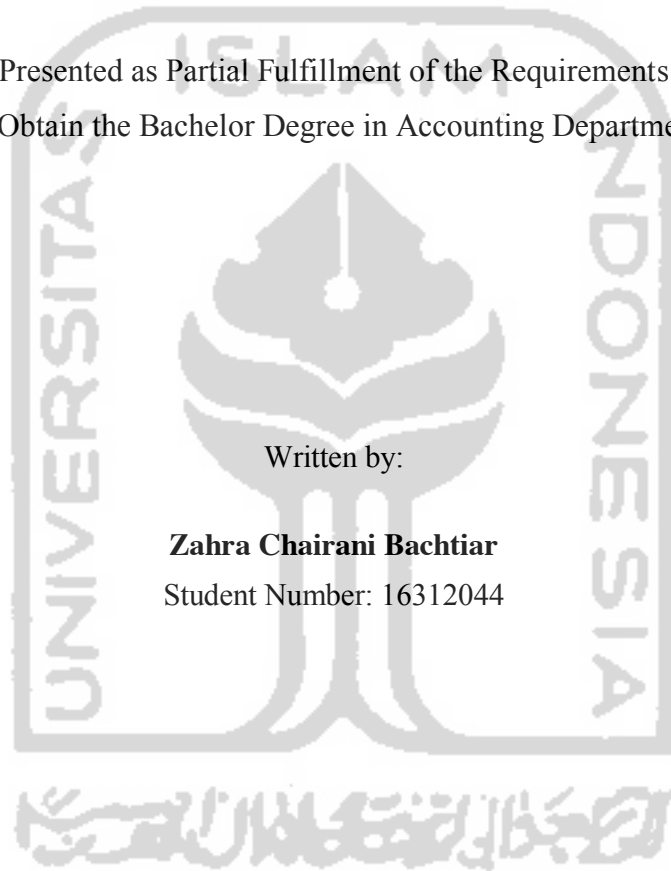
**DEPARTMENT OF ACCOUNTING
INTERNATIONAL PROGRAM
FACULTY OF BUSINESS AND ECONOMICS
UNIVERSITAS ISLAM INDONESIA**

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DECLARATION OF AUTHENTICITY

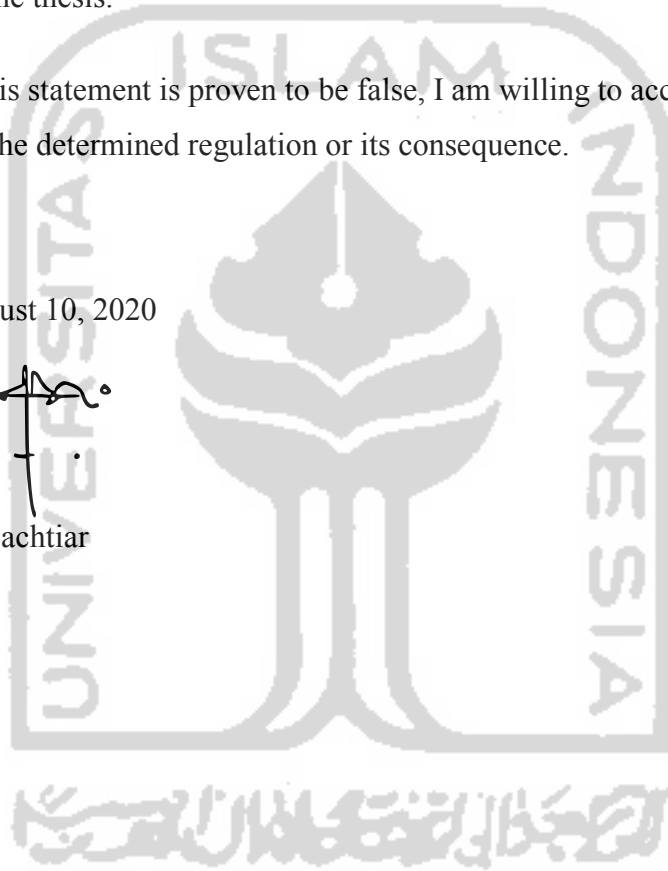
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Yogyakarta, August 10, 2020



Zahra Chairani Bachtiar



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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

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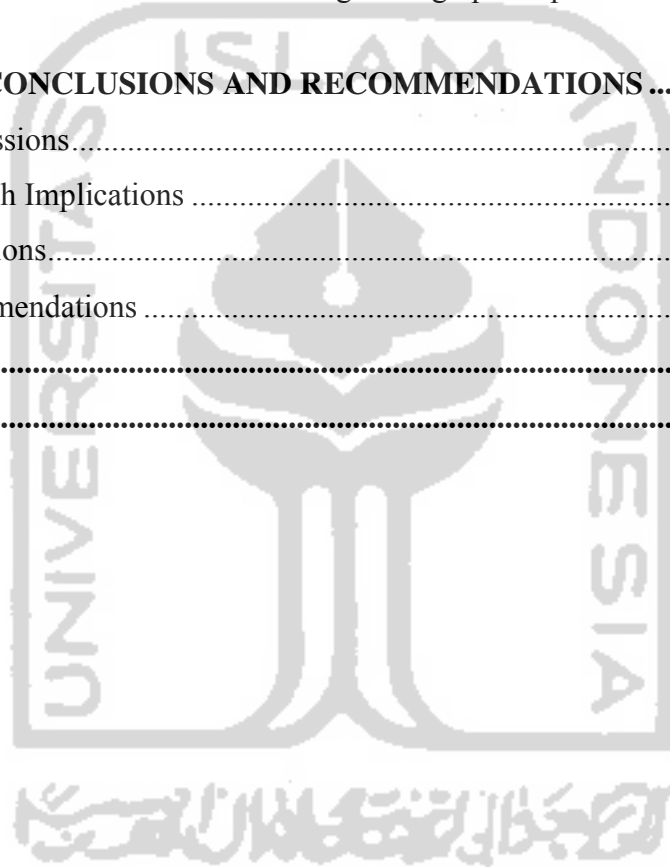
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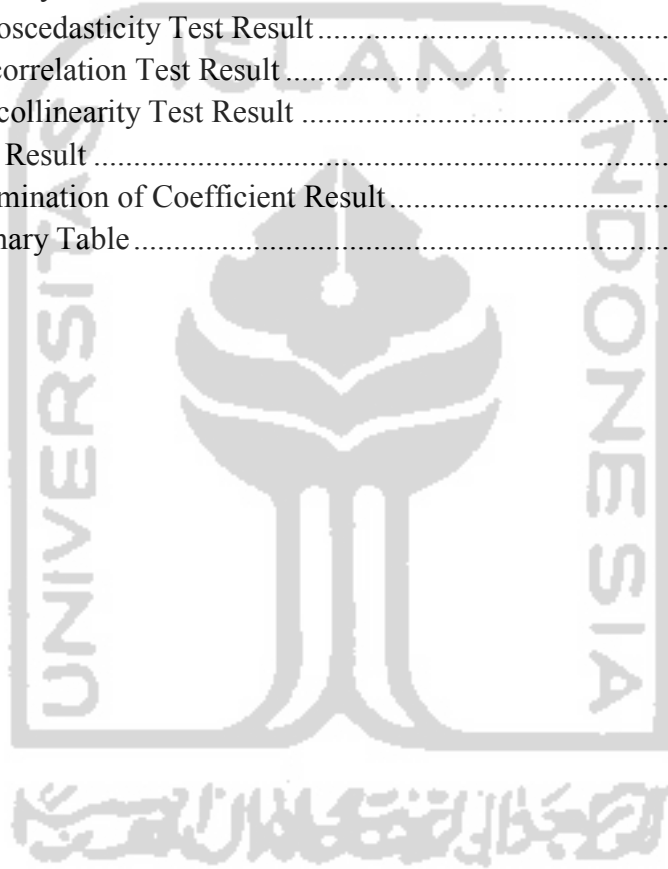
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ABSTRACT

A good investment is better done by considering several factors that can affect the risk and return. There are methods to construct optimum portfolio of investment in order to avoid high risk but maximize the return, one of them is single index method that is used in this research. The purpose of this study was to determine the influence of crude oil price, coal price, and dollar strengthening reflected from exchange rate upon optimum portfolio return. To analyze the results, this study utilized multiple regressions. The data of this research are classified as quantitative secondary data using daily share price of mining companies that has been calculated by single index method from 2016 until 2019. This research result found that crude oil price and coal price have significant positive influence upon optimum portfolio return, while exchange rate has been proven to have negative influence to the optimum portfolio return but it is not significant

Keyword: *Crude Oil Price, Coal Price, Exchange Rate, Single Index, Optimum Portfolio Return*

ABSTRAK

Investasi yang baik sebaiknya dilakukan dengan mempertimbangkan beberapa faktor yang dapat mempengaruhi resiko dan return. Terdapat beberapa metode untuk membangun portofolio investasi yang optimal untuk menghindari risiko tinggi tetapi memaksimalkan return, salah satunya dengan metode indeks tunggal. Tujuan penelitian ini adalah untuk mengetahui pengaruh harga minyak mentah, harga batubara, dan penguatan dolar yang tercermin dari nilai tukar terhadap return portofolio yang optimal. Untuk menganalisis hasil, penelitian ini menggunakan regresi berganda. Data penelitian ini diklasifikasikan sebagai data sekunder kuantitatif dengan menggunakan harga saham harian perusahaan pertambangan yang dihitung dengan metode indeks tunggal dari tahun 2016 sampai dengan 2019. Hasil penelitian ini menemukan bahwa harga minyak mentah dan harga batubara berpengaruh positif signifikan terhadap return portofolio optimal. Sedangkan nilai tukar terbukti berpengaruh negatif terhadap return portofolio optimal tetapi tidak signifikan.

Keywords: *Harga Minyak Mentah, Harga Batubara, Nilai Tukar, Indeks Tunggal, Return Portofolio Optimal*

CHAPTER 1: INTRODUCTION

1.1. Study Background

The presence of a country's stock exchange could have a major impact on the country's own development. From an economic perspective, a country with a stock exchange will have certain advantages, such as promoting economic development, urging investment activities, generating job vacancies, scanting the Debt Service Ratio (DSR) and the BUMN / State-Owned Enterprise's budget expenditure ("Peran dan manfaat pasar modal terhadap perekonomian nasional" 2014). From the perspective above, it could be said that the growth of stock exchange speeds up economic development. The more the stock exchange rose, the more the economic growth became urgent. Indonesian Stock Exchange (IDX/ISX) growth has provided evidence that Indonesia has good investment awareness creation for companies listed in IDX, or investors engaged in investment activities over the past nearly two decades.

The growth of stock exchange demands involved parties to develop investments. Every person or party has the probability to develop their performance as an investor. Moreover, the various ways to recognize which company shall be a good investment has been developed and by the improvement of technology, the level of accuracy will be more definite. Investors usually have more than one investment,

they will have a bundle of their investments that specifically called as portfolios. Markowitz (as cited in Varian 1993) realized that mathematics could not pick out a single optimal portfolio, it would be more efficient if it is seen as a set of portfolios. Therefore, from the optimal portfolio, researchers can analyse and identify any prediction that is reflected from portfolios calculation.

According to Pracanda and Abundanti (2017), investment is one of the capital-market activities aimed at obtaining the maximum profit from the investment. Risk is something investors need to pay attention to when investing. Risk cannot be eliminated but diversification (portfolio) can minimize risk. Optimum portfolio formation is achieved to provide investors with the lowest probability to get a certain return. As a return opportunity has been maximized, optimum portfolio construction is very necessary for the investors as what a proverb by Manullang (2012) stated “Don't put all your eggs in the same basket, because if the basket falls, all the eggs in the basket will break”. According to Tandellin (as a cited in Manullang, 2012), in the investment context, the previous proverb can be an advice to not put all the investment in one asset, because when it fails, everything will disappear. Regarding the portfolio construction in Indonesia, there were many researches analyse and elaborate how optimum portfolio constructed using several calculation model. Thus, it is clearly predicted that many investors especially in Indonesia had applied the optimum portfolio construction.

The on-going understanding of investment will give rise to discussions about risk and return. According to Susanti and Syahyunan (2013), the relationship between risk and return that is expected from the investment is a direct relationship. It is defined that the higher return expected, the higher risk that will be borne. Investors will always be willing to minimize the risk especially who have high expected return. The analysis that is related with the relationship between risk and return is Single Index model. Single index model is the technique to measure the amount or scale of risk and return in portfolio with the assumption that the movement of stock is only connected with market return. Single Index model is developed by William Sharpe which provides a simpler technique and make portfolio theory more applicable that is used to manage large amounts of securities (Eko, 2008). This index is useful for the investors to estimate and measure return and avoid confusion in deciding which stock is favourable to be included in their portfolio.

There are several previous studies that construct the idea of this research which is divided into three categories for each variable, those are crude oil price effect, coal price effect and exchange rate effect. For additional, there are also previous studies about macroeconomics effect that related with this research and became the supporting details. However, since this research is the new type of study, thus, the researcher links the theories and these previous researches into useful information to conduct the research. First, the previous research about crude oil price was presented by Hanafiah (2015) about the influence of crude oil price upon share

price and the result is crude oil price did not affect the share price. Another previous research about impact of crude oil price to the share price presented by Pribadi (2016) and obtain the result that crude oil price did not influence share price. However, another research presented by Gumilang, et al (2014) and Vivekananda, et al (2018) that crude oil price significantly influence the share price. Second, the previous research regarding coal price presented by Sundari (2015) and Luthfiyah (2020) which obtained the result that coal price significantly influence share price. In the other side, research presented by Najib (2019) gave result that coal price did not affect the share price. For additional, another research by Vivekananda, et al (2018) stated about macroeconomics factor that included coal price as a variable and presented the result if coal price affect share price significantly. Third, the research about impact from exchange rate to share price presented by Luthfiyah (2020) that obtain result if exchange rate influence share price significantly. However, the research presented by Nurfadillah (2020) gave result that exchange rate did not influence share price.

Other previous studies regarding the impact of macroeconomic aspect towards share price and return also presented by several researchers, they are a research by Riantani and Tambunan (2013) that explained about the factors of macroeconomics that possibly affect the return of stock. Lestari, et al (2016) also explained about the influence of macroeconomics factor such as Interest Rate, Exchange Rate, Inflation, Oil World, and the World Gold Price on Stock Price at Kompas100 Index. Olivia

(2016) and Sudirman (2018) that explained several factors that might affect IHSG or market price, which will take place in calculation of optimum portfolio return in this research. Another one is from Ilhamsyah and Arisyahidin (2019) that analysed about the trade war between USA and China toward the growth value of rupiah. Researches about Construction of Optimum Portfolio Return using Single Index Model have been conducted by several researchers. There are several researches that represent the optimum portfolio construction. There are seven researches, five of them were conducted overseas by foreign researchers and two of them were conducted in Indonesia by Indonesian researchers. The researches conducted overseas are by Terol et al. (2006), Mandal et al. (2013), Poornima and Remesh (2017), Nandan and Srivastava (2017), Navya and Shadique (2019) and two others that were conducted in Indonesia by Eko (2008) and Sukarno (2007). Generally, they compared Single index model to the previous measurement model which is used by Markowitz but they chose to use Single Index Model to measure Optimum Portfolio Return because the model gives simple calculation but suitable with large measurement of securities.

There are several kinds of companies that are listed in IDX. However, this research is going to take sample in mining companies. Usually, most researchers use manufacturing companies as their samples because they usually have big market and more liquid than other kinds of company but the researcher will use mining companies with the question that “could mining companies be affected by macroeconomic occurrence whereas Indonesia only has few mining companies that

are listed in IDX?”. It implies that if only few mining companies that are listed in Indonesia Stock Exchange, there is a probability that the companies might have their own market that always become their stake holders based on their unique speciality in serving their stakeholders. If the stakeholders want to invest in the mining companies, there might not be many options to plant it in. Besides, as stated in Warta Ekonomi (“Kontribusi industri tambang bagi pendapatan negara capai Rp46,6 triliun”, 2019) that the realization of the Non-Tax State Revenue (PNBP) of the mineral and coal sector in December 2018 was recorded Rp46.6 trillion. However, so far people out here still consider the mining industry to only have a negative impact on the environment. According to Ido Hutabarat, the chairman of the Indonesian Mining Association (IMA), Indonesia is known as a country that is rich in natural resources, especially in the mining sector. The big potential of the mining sector has become one of the main contributors to PNBP. Likewise, Chair of the Indonesian Geology Association, Sukmandaru Prihatmoko, said the evolution of the mining industry brought life civilization to the present era of the industrial revolution 4.0. He said that the mining industry is also able to improve the economy of the community because of the high absorption of human resources in the sector (“Kontribusi industri tambang”, 2019).

The mining sector is closely related to the economic activity of an area which impacts on the welfare of the community. It is believed that the good performance of mining companies can be one of the pillars of the regional economy to progress and

develop. Stated in Republika (“Sektor tambang yang turut membantu pembangunan nasional”, 2018) that one of the mining companies in the nickel sector, namely PT Vale Indonesia has also contributed significantly in economic development in East Luwu Regency, South Sulawesi Province. PT Vale Indonesia's Senior Manager of Communications, Budi Handoko, claimed that the economy of the East Luwu community was highly dependent on mining activities. This is because PT Vale's contribution to the Regency of East Luwu and the community has been enormous. Budi told Republika that most of locally-generated revenue received is from PT Vale Indonesia, even the income of South Sulawesi from PT Vale Indonesia is quite large. Based on the official records of the East Luwu Regency Government, the 2018 Regional Budget is recorded around Rp 1.5 trillion (“Sektor tambang”, 2018). Therefore, the topic of mining sector is very interesting to be adopted because their contribution to the Indonesian's economy and may also give impact to the economy such as PT Vale Indonesia. Hence, the capital from the company's capital especially from investor is also necessary in supporting the mining sector.

This research expects the result of comparison between those optimum portfolios to the crude oil price, coal price and dollars strengthening. Companies listed on IDX are relatively affected by the ups and downs of the US dollar. There are many possibilities that if the US dollar rises, the value of the IDR will go down and there will be no exception to stock fluctuations especially in companies listed in the IDX. US dollar still has at big influence on the stock listed in IDX because the

Indonesian economy is inseparable from US power as the largest trading country. There are several factors that would be reflected by the share price. Any kind of economic, political, social problem or anything else might be the factor that would affect share price and the combination return of portfolios that belong to the investors. The previous statement is supported by Riantani and Tambunan's (2013) research which studied about the impact of macroeconomics events. One example is reflected from 2018 when the United States experienced trade deficit which is covered by investments planted in United States companies. Since the United States is the biggest trade country especially in stock exchange, thus the US dollar has wide domination worldwide. Therefore, any countries involved with the United States trading may have a big possibility to be affected, included Indonesia.

Beside the dollar strengthening in exchange rate, this research expects another factor that might influence optimum portfolio return which is crude prices, because usually mining company's share price will depend on crude oil prices movements. Lestari, et al (2016) explained there are several macroeconomics factors that might influence the share price such as Interest Rate, Exchange Rate, Inflation, Oil World, and the World Gold Price. From Lestari's research, crude oil prices give significant negative effect to the share price. Therefore, there is probability that world oil prices might influence optimum portfolio return in mining company. This research also expects another factor that would influence optimum portfolio return in mining company besides dollar strengthening and crude oil price, which is a coal price. Coal

becomes the second alternative fuel after crude oil which actually both of them are always interrelated. When crude oil makes a price movement, then coal price will also make a movement. As stated in CNBC Indonesia by Kevin (April 19, 2018) that the increase in world crude oil prices will usually affect the prices of other commodities such as coal. The pressure on coal prices is the impact of China's coal import restriction policy, because it wants to push domestic coal prices and increase production. Responding to the rising of coal prices, the share price of listed coal mining companies on the Indonesian Stock Exchange (IDX) also traded higher: PT Adaro Energy Tbk (ADRO) rose 3.33%, PT Indo Tambangraya Megah Tbk (ITMG) rose 3.16 %, and PT Harum Energy Tbk (HRUM) rose 3.06%. Therefore, the movements of crude oil and coal price cannot be separated each other.

1.2. Problem Formulation

This research stated about the relationship between risk and return. The rising of crude oil, coal and dollar prices can be classified as macroeconomic variable that will affect the value of return. According to Riantani and Tambunan (2013), macroeconomic environment is an environment that can affect the company's operational performance. Macroeconomic variables that can directly affect company performance include interest rates, foreign exchange rates, international economic conditions, a country's economic cycle, inflation rates, tax regulations, and money supply. The object in this study such as Crude oil price, Coal prices and Dollar strengthening through the exchange rate will probably affect and give change in

several things, especially in share price and return. If a country's macroeconomic conditions change, investors will react and can result in changes in stock prices. The ability of investors to understand and predict macroeconomic conditions and the movement of global indices in the future will be very useful in making profitable investment decisions. Based on explanation above, making profitable investment is possible. Investors can calculate the risk, return, and choosing companies that might bring profitable feedback. By predicting and calculating possible profitability, investors can make portfolio to classify their investment. This study aims to answer the following question:

1. Does the Crude Oil prices influence the Optimum Portfolio Return in mining companies?
2. Does Coal prices influence the optimum Portfolio Return in mining companies?
3. Does Exchange Rate influence Optimum Portfolio Return in mining companies?

1.3. Study Objective

The purposes of this research are as follows:

1. To determine the influence of Crude Oil prices upon Optimum Portfolio Return in Mining Company.
2. To determine the influence of Coal Prices upon Optimum Portfolio Return in mining company

3. To determine the influence of Coal Prices upon Optimum Portfolio Return in Mining Company.

1.4. Research Contributions

This study is purposed and expected to give benefits and values for several concerned parties, such as companies, investors, academicians, and researchers. It is expected that this study contributes to the needs of every party concerned.

1. Companies

Companies are able to use this study for the consideration in investment management especially in Indonesia.

2. Investors

This Study will be useful for investors in investing funds by also considering stock that would bring best combination of portfolio especially for obtaining profitable return; how the companies react to changes such as macroeconomic environment especially in crude oil prices, coal prices and dollar strengthening through the exchange rate. It is by showing them the best calculation of measuring optimum portfolio after dollar strengthens.

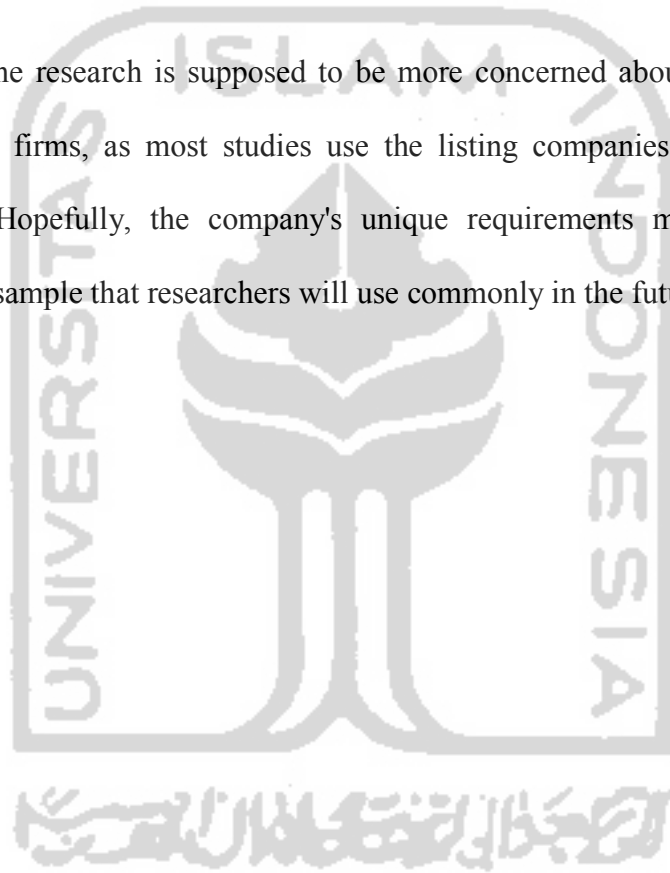
3. Academicians

This study is expected to give the concerned academicians the knowledge of Optimum Portfolio especially after dollar strengthens. This

study aims to contribute by giving a deeper understanding in the effect of dollar strengthening that is reflected from share price and return that is held by mining companies that are listed in Indonesia Stock Exchange.

4. Researchers

The research is supposed to be more concerned about the best stock exchange firms, as most studies use the listing companies as the analysis sample. Hopefully, the company's unique requirements may also be the research sample that researchers will use commonly in the future.



CHAPTER 2: LITERATURE REVIEW

2.1. Theoretical Review

2.1.1. Single Index Theory

In 1963, William Sharpe simplified portfolio measurement model by Markowitz with Single Index Model portfolio measurement. The Single Index Model explains the relationship between returns from each individual security with a market index return. According to Sukarno (2007), this model gives alternative methods for calculating variants of a portfolio, which are simpler and easier to calculate when compared to Markowitz calculation. This alternative approach can be used for a basis to solve problems in the preparation of the portfolio. As already formulated by Markowitz, which determines the efficient set of a portfolio, Single Index Model was created to complete Markowitz with the fewer calculation that make it simpler and more efficient.

Based on the previous explanation in Chapter 1, this research is based on previous researches that used the single index as a construction of optimum portfolio return conducted overseas, they are Terol et al. (2006), Mandal et al. (2013), Poornima and Remesh (2017), Nandan and Srivastava (2017), Navya and Shadique (2019) and two researches that were conducted in Indonesia by Eko (2008), and Sukarno (2007). Nandan and Srivastava (2017) stated that

single index gives benefit because it has fewer input and is easier to calculate, furthermore the proportion of investment in each stock included in the optimal portfolio was also computed. Then Navya and Shadique (2019) also added that using single index as construction of optimum portfolio return will help in analysing stock return and risk that allows possible combination of stocks in order to obtain the best return of portfolio. Therefore, this research will use this single index theory as the calculation of optimum portfolio return construction in order to obtain objective result of the analysis.

2.1.2. Mining Sector Index

Mining Sector index is the index that measures the price performance of all shares in the Main Board and Development Board contained in the Mining sector, refers to the Jakarta Stock Industrial Classification (JASICA) (“Indeks sektor pertambangan, 2020). Jakarta Stock Industrial Classification is a sectoral classification system used to categorize companies listed on the Indonesian stock exchange. This categorization is useful for capital market participants as a tool in making an investment decision. Indonesian Stock Exchange also calculates sectoral indices as performance indicators for each industry group. JASICA business segmentation is generally based on Indonesian business classifications published by the Central Bureau of Statistics (BPS) and follows the International Standard Industrial

Classification (ISIC). Due to the wide variety of core businesses in Indonesia naturally ISIC adjustments are needed.

2.1.3. Crude Oil

Crude oil or petroleum - a fossil fuel which is a raw material for fuel oil, gasoline and many chemical products - is an important source of energy because it has a significant percentage in meeting world energy consumption. According to Hakim (August 12, 2019), today, almost all human activities require oil, whether it's as a basic material, supporting material, or as a source of energy. Because of its big benefits, crude oil has a high selling price. Therefore, oil is classified as one of the most valuable commodities that can enrich the country who owns it. According to Indonesia Investment (July 4, 2016), although many countries are currently exploring the potential for renewable energy, the importance and dependence on crude oil in the world cannot be denied, nor ignored. Fossil fuels will remain the most important source of energy, with crude oil contributing 33%, coal 28% and natural gas 23% of total energy sources (cited in IMF, April 2011). Renewable energy sources only give few contribution to the total world supply of primary energy (primary energy including fossil fuels - oil, coal and natural gas -, nuclear energy and renewable energy - geothermal, hydropower, sunlight and wind).

2.1.4. Coal

Coal and crude oil are the two most important primary energy sources on earth. Coal is first used as an energy source, before the discovery of oil as a new energy source. Slowly, the use of coal is replaced by petroleum. This is due to the large number of countries that assess the use of coal as the cause of global warming and environmental pollution. On the other hand, high oil usage also causes an abundance of available oil. However, the coal commodity in 2000s generated significant profits for companies engaged in coal exports. The increase in commodity prices mostly was triggered by economic growth in developing countries. In the second half of 2016 coal prices surged to the high level in early 2014, giving a fresh air to the mining industry after the degradation in the previous years (“Batu Bara”, April 5, 2018).

2.1.5. Dollar Hegemony: The Changing and Reflection after Dollars

Strengthen

US dollar has been the first currency in the world after World War II ended, probably after the interwar era, US dollar has become today's leading currency. According to Norrlof (2014), the currency influence might bring two possibilities both advantages and disadvantages. For example, the more a currency is used as store of value, the greater the potential for a run on the currency and/or on banks. Generally, the greater the power of a currency, the

more vulnerable it will be to rapid withdrawal, which would generalize the greater scope of usage more rapidly. Dollars strengthening issues such as Trump Policies and the trading war between China and USA is probable to change the price and value in share which will reflect the optimum portfolio in investor's collection. Since The United States holds big influence in the world economy, the strengthening in dollars would be the big factor that changes a value of money all over the world specifically in stocks/shares.

Those statements above in dollar strengthening are supported by another statement from Samsul (2006) as cited in Olivia (2016) that the changes in one macroeconomic variable has a different effect on each type of stock, i.e. a stock may be affected positively while other shares are negatively affected. For example a sharp rise in the exchange rate of US dollar against rupiah will negatively impact issuers that have debt in dollars while the issuer's products are sold locally. Meanwhile, export-oriented issuers will receive a positive impact from the increase in US dollar. This means that the price of the issuers affected by the negative impact will decline in the Stock Exchange, while the issuers affected positively will increase their shares. Some issuers listed on the Stock Exchange will be negatively affected and some will be positively affected by sharp changes in the US \$ exchange rate.

2.2. Hypothesis Formulation

2.2.1. The Movement of Crude Oil Impact on Optimum Portfolio

According to Indonesia Investment (July 4, 2016), increasing demand of crude oil combined with concerns about its availability caused crude oil prices to reach record highs in history in the 2000s. Although this “upward” trend was temporarily interrupted by the 2008-2009 global financial crisis, world crude oil demand increased significantly after 2009 (and prices rose accordingly), mostly caused by the consumption level of crude oil in the developed countries that shows the growth of Gross Domestic Product (GDP) growth. China contributes to a large portion of world energy consumption and hence influences world market prices for primary energy sources. Therefore, can be assumed that the increased of crude oil price might raise the return in optimum portfolio especially in mining sector because the relation between two of them. Gumilang, Hidayat, & Endang (2014) found in their research if crude oil price has positive influence upon share price. Followed by Vivekananda, Achسانی & Maulana (2018), they prove that share price is positively influence by the crude oil price.

H1: Crude oil prices give positive influence to the optimum portfolio return.

2.2.2. The Movement of Coal Prices Impact on Optimum Portfolio

Return

Coal is the result of mining which began to be an alternative to replace crude oil. That is because the amount of crude oil available on earth is running low, and out of balance with the demand (Najib, 2019). Total coal is still quite a lot so that it can be used as an alternative to a substitute fuel derived from crude oil. Share price is a sensitive thing because its every single movement depend on the movements of other factors. Macroeconomics occurrence is believed giving impact to the share price based on the previous research. Crude Oil and Coal prices are included as the macroeconomics occurrence that might affect the share price especially for the mining company. The movement between crude oil and coal prices are interrelated, because the fluctuation between two of them are head to the same lane. When the crude oil raise, the coal price might raise to. According Indonesia Investment (July 4, 2016), based on the analysis, there is some evidence that there is a interrelation between coal and the oil market in several regions of the world. the results show that oil shocks can affect coal prices. On the other hand, coal shocks also have a significant effect on crude oil prices. However, the effect is going to the same track. The assumption is when crude oil price increases, coal price will also increase, those might influence the sector that engaged in that field such as mining company. The share price of them might raise and give the positive impact to the return of optimum portfolio because the

demand of crude oil and coal. (Sundari (2015) found in her research if coal price positively influence the return as if the demand of coal. Vivekananda, Achsani and Maulana (2018) in their research proved that coal price positively influence share price. Luthfiyah (2020) also proved that coal price has positive influence upon share price.

H2: Coal prices give positive influence to the optimum portfolio return.

2.2.3. Dollar Hegemony Impact on Optimum Portfolio Return

The existence of dollar hegemony theory brings the influence in share price on certain time when the dollar strengthens. This influence in share price is possible to give the changes in optimum portfolio whether the share price increase or decrease. The following figure is the statistical data provided by IDX:

Figure 2. 1. IDX Indices Highlights of 2017

Index	Q4 2017			YTD Change	QoQ Change	Greatest Gain (%)			Greatest Loss (%)		
	Highest	Lowest	Close			One Day	One Week	One Month	One Day	One Week	One Month
Composite	6,355.654	5,813.741	6,355.654	1,058.943	1,058.943	1.23%	1.63%	8.38%	-1.80%	-1.27%	1.90%
Index (IHSG)	Dec 29	Sep 04	Dec 29	19.99%	19.99%	Oct 25	Nov 22	Dec 29	Nov 30	Nov 15	Nov 30
Agriculture	1,817.112	1,576.078	1,616.307	-247.942	-247.942	1.39%	4.20%	-2.19%	-2.16%	-2.82%	-5.71%
	Sep 14	Dec 22	Dec 29	-13.30%	-13.30%	Sep 11	Sep 13	Nov 30	Sep 15	Dec 13	Dec 29
Mining	1,643.754	1,379.386	1,593.999	209.293	209.293	2.94%	8.68%	14.53%	-4.45%	-6.36%	2.68%
	Nov 01	Sep 27	Dec 29	15.11%	15.11%	Oct 24	Oct 25	Oct 31	Sep 13	Sep 27	Sep 29
Basic Industry & Chemicals	689.219	584.997	689.219	151.030	151.030	3.14%	5.20%	15.08%	-2.63%	-3.69%	-0.96%
	Dec 29	Sep 06	Dec 29	28.06%	28.06%	Oct 25	Dec 13	Dec 29	Nov 27	Nov 15	Sep 29
Miscellaneous	1,422.435	1,301.064	1,381.177	10.549	10.549	3.27%	2.50%	3.36%	-3.53%	-2.97%	-9.97%
Industry	Nov 24	Sep 28	Dec 29	0.77%	0.77%	Nov 22	Nov 22	Dec 29	Nov 30	Dec 13	Sep 29

Figure 2. 2. IDX Indices Highlights of 2018

IDX Indices Highlights

Index	Q4 2018			YTD Change	QoQ Change	Greatest Gain (%)			Greatest Loss (%)		
	Highest	Lowest	Close			One Day	One Week	One Month	One Day	One Week	One Month
Composite Index (IHSG)	6,194.498 Dec 28	5,702.822 Oct 11	6,194.498 Dec 28	-161.156 -2.54%	-161.156 -2.54%	1.93% Nov 29	2.50% Oct 18	4.43% Nov 30	-2.02% Oct 11	-2.91% Oct 04	-2.54% Oct 31
Agriculture	1,577.028 Oct 18	1,411.127 Nov 14	1,564.424 Dec 28	-51.883 -3.21%	-51.883 -3.21%	3.58% Oct 18	3.64% Oct 18	0.83% Dec 28	-2.26% Nov 14	-4.77% Nov 15	-7.79% Nov 30
Mining	1,987.817 Oct 01	1,660.198 Nov 27	1,776.497 Dec 28	182.498 11.45%	182.498 11.45%	2.51% Dec 03	2.20% Dec 06	-3.46% Dec 28	-5.02% Nov 21	-6.94% Nov 22	-12.76% Nov 30
Basic Industry & Chemicals	854.733 Dec 28	722.721 Oct 15	854.733 Dec 28	165.514 24.01%	165.514 24.01%	3.64% Nov 14	3.49% Nov 15	13.51% Dec 28	-3.68% Oct 15	-7.33% Oct 04	-9.73% Oct 31
Miscellaneous Industry	1,436.608 Dec 03	1,170.003 Oct 11	1,394.428 Dec 28	13.251 0.96%	13.251 0.96%	3.72% Nov 15	6.86% Nov 01	13.76% Nov 30	-3.16% Nov 12	-3.96% Oct 11	4.80% Dec 28
Consumer Goods Industry	2,608.844 Dec 27	2,255.249 Nov 12	2,569.267 Dec 28	-292.104 -10.21%	-292.104 -10.21%	2.87% Nov 29	4.41% Nov 29	6.85% Dec 28	-5.08% Nov 09	-4.40% Oct 04	-1.86% Nov 30

(2019). Retrieved from idx.com

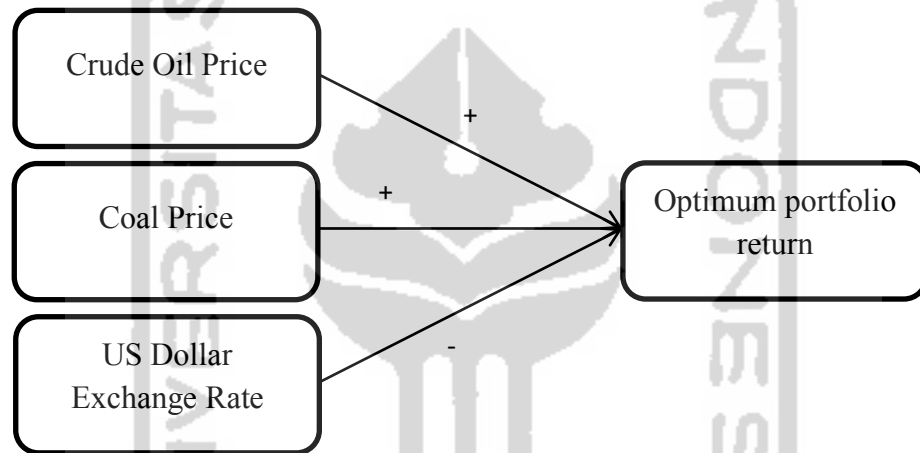
The statistical data of the fourth quarter in both years shown that mining sector reached a “red zone” of loss. In 2017 it was listed that mining company had the worst weekly loss in September but even getting worse in November 2018. It could be concluded that due to several macroeconomic events in both years, most sectors experienced loss in stocks exchange.

The effect of changes in dollar (especially when it increases) is believed to give effect in share price at the market from the statement by Olivia (2016) that exchange rate, BI rate, and inflation will affect market price, so that it can be concluded that market price will give impact to the optimum portfolio return. With the analysis of influence from dollar hegemony especially when dollar strengthens, the optimum portfolio that is reflected from reacted share price upon dollar strengthening become a reaction whether the dollar strengthening is beneficial for the investment or not. Gumilang, Hidayat & Endang (2018) as the previous study found that

exchange rate has negative influence upon share price and Luthfiyah (2020) added and also found if exchange rate has negative impact to the share price.

H3: The Exchange Rate gives negative influence to the optimum portfolio return

Figure 2. 3. Independent and Dependent Variables Correlation



CHAPTER 3: RESEARCH METHOD

3.1. Type of Study

There are several parameters that can be used to measure portfolio performance, among others are Markowitz and Sharpe performance. This research plans to use Sharpe Single Index method to calculate optimum portfolio in mining companies after dollars strengthening. This study is classified as a quantitative-secondary study, as this study uses numerical and measurable data by generating them into useable statistics which also quantifies the variables from the sample population that are then reused and repurposed by the researcher as the secondary data.

3.2. Population and Sample

The population of data will be reflected from the research objective. The research objective is to examine the effect of dollar strengthening to optimum portfolio in mining company listed at Mining Sector Index. This means that the population is all mining companies that have been listed in IDX. The samples of this research are the mining companies in Mining Sector Index from IDX that has been calculated by single index model quarterly. Mining companies which are included in Main Board as criteria listed in the following:

- a. Mining companies that have net assets of at least Rp.100 billion.
- b. Mining companies that have operated for more than 3 years / 36 months

- c. The audited financial statements of the company for the last 3 years fulfilled audit requirements: first, the company that obtain unqualified opinion for the last two years. Second, the last audited financial statement stated that the net tangible asset is at least Rp 100 billion.
- d. The number of shares is at least 35% from un-controlling shareholders or one hundred million shares.
- e. At the time of a public offering, the number of shareholders is at least 1000 parties with requirement that the amount is the amount after the public offering and the average per month in the last six months.

The followings are several criteria for Development Board:

- a. The company has operated in the same primary business for at least 12 consecutive full months
- b. The company's audited financial statements for the last fiscal year covering at least 12 months and the last interim audited financial statements obtained unqualified opinion.
- c. The mining companies that have net assets of at least Rp.5 billion
- d. For companies that have not recorded net profits or are still experiencing business losses or operated for less than two years, then at least when at the end of the second financial year since recorded, they have to obtain operating

income and net income based on financial projections that are announced on the stock exchange.

e. The number of shares owned by the un-controlling shareholders after a public offering of at least 50 million shares or a minimum of 35% of paid up capital.

f. The number of shareholders of at least 500 who have a securities account effect in guarantee agreement when the public offering must be in full capability.

3.3. Data Collection Method

This research used secondary data taken from the daily share price of the mining companies that are listed in Mining Sector Index (that met the criteria) and calculated by single index model quarterly in 2016-2019 as the samples. The data will be obtained from the website of Yahoo Finance (www.finance.yahoo.com), the official website of Indonesian Stock Exchange (www.idx.co.id), and any sources containing the needed data.

3.3.1. Data Types

Data used in this research are classified as a time series data that are collected from 2016-2019 and the calculation will be done quarterly on four years.

3.3.2. Data Collected

Based on the criteria of data mentioned above, there are 44 mining companies that are listed in Mining sector Index at the adjustable certain period of time (2016-2019), which is explained on the following table:

Table 3. 1. The Selection of Sample

No	Description	Number of Companies
1	Mining Companies listed 2016-2019	49
2	Mining Companies excluded from Mining Sector Index and non-listed in yahoo finance	17
	Total Sample	32

3.4. Research Variables

The trade war between USA and China has been predicted to give the negative effect on many macroeconomics factors such as crude oil price, coal price, and share price. When the Crude oil and Coal prices decreased, it might be reacted by the share price that also decrease and when the dollar strengthen the share price might also decrease. For obtaining the Optimum Portfolio Return, Single Index Method will be used as the calculation.

This research examines the effect of Crude Oil Prices, Coal Prices and Dollar Strengthening through the exchange rate towards Optimum Portfolio Return in mining companies that are included in Index Mining Sector IDX and listed in yahoo finance at the period from 2016-2019. The price of Crude Oil, Coal and Exchange Rate might be fluctuated around 2016-2019 caused by macroeconomics effect, thus, this research expect that the fluctuation of the three independent variables can influence the Optimum Portfolio Return especially in mining companies. The price of crude oil and coal will be taken quarterly from Index Mundi (*indexmundi.com*) and the exchange rate price taken from Trading View (*tradingview.com*).

3.4.1. Single Index Measurement

Single Index Model measurement requires several points as follows (Susanti & Syahyunan, 2013):

1. Return and Stock Risk

a. Stock return is the difference between the opening price and the closing price of the shares plus the dividends that may be paid by the company periodically divided by the opening price of the shares.

$$R_i = \frac{P_t - P_{t-1} + D_t}{P_{t-1}}$$

R_i = Realization Return

P_t = Share price of t period

P_{t-1} = Share price of previous period

D_t = Cash dividend in ending period

Besides, the expected return is the return expected by the investor to be generated by the investment produced, calculated by the formula below:

$$E(R_i) = \frac{\sum_{t=1}^n R_{it}}{n}$$

$E(R_i)$ = Expected return of i share

R_{it} = Return of i share on t date

n = Period or total of observation date

b. Stock risk is the difference between the expected return and the realized return. Standard deviation is a measurement used to calculate the risk associated with realized returns if the probability of an event is unknown. Standard deviation is the square root of variance.

$$\sigma_i^2 = \sum_{t=0}^n \frac{[R_{it} - E(R_i)]^2}{n}$$

σ_i^2 = Variance return of i share

R_{it} = Return of i share on t date

$E(R_i)$ = Expected Return of i share on t date

n = Period or total of observation date

2. Return and Market Risk

a. The rate of market return can be reflected in the return composite index or Composite Stock Price Index (IHSG). Market return can be calculated by:

$$R_{mt} = \frac{IHSG_t - IHSG_{t-1}}{IHSG_{t-1}}$$

R_{it} = Market return t period

$IHSG_t$ = IHSG t period

$IHSG_{t-1}$ = IHSG previous period

While the expected market return is the return expected by investors to be generated by the market, it can be calculated using the formula:

$$E(R_m) = \frac{\sum_{t=1}^n R_{mt}}{n}$$

$E(R_m)$ = Market expected return

R_{mt} = Market return on t date

n = Period or total of observation date

b. Market Risk is the difference between expected return and realized market return, and can be calculated by the formula below:

$$\sigma_m^2 = \sum_{t=0}^n \frac{[R_{mt} - E(R_m)]^2}{n}$$

σ_i^2 = Variance return of market

R_{mt} = Market return on t date

$E(R_m)$ = Market expected return

n = Period or total of observation date

3. Beta and Alpha

a. Beta is a coefficient that measures the effect of changes in market returns to changes that occur in stock returns. Beta can be calculated by first calculating the covariance between stock returns and stock returns. Beta can be measured by dividing covariance of return i securities and market return with variance of market return, calculated by:

$$\sigma_{im} = \sum_{t=1}^n [R_i - E(R_i)] [R_m - E(R_m)]$$

σ_{im} = Covariance between security and market

R_i = Return on share

$E(R_i)$ = Expected Return of i share on t date

m = The number of likely outcomes for share for the period

Then, Beta can be calculated by:

$$\beta_i = \frac{\sigma_{im}}{\sigma_m^2}$$

β_i = Beta of share/security

σ_{im} = Return of covariance between i share and market return

σ_m^2 = Market return variance

b. Alpha is a variable that is not influenced by market return. In other words, this variable is an independent variable, different from beta which is the dependent variable because it is influenced by market returns, and can be calculated by:

$$\alpha_i = E(R_i) - \beta_i \cdot E(R_m)$$

α_i = Alpha share/security

$E(R_i)$ = Expected Return of i share on t date

$E(R_m)$ = Market expected return

4. Variance and Residual Error

The variance of residual errors is a variable that shows the magnitude of the unique unsystematic risk that occurs in a company which is measured by:

$$\sigma_{ei}^2 = \sigma_i^2 - \beta_i^2 \cdot \sigma_m^2$$

σ_{ei}^2 = Residual error variance

σ_i^2 = Residual variance

β_i^2 = Beta of share

5. Determine the Optimal Portfolio by Using a Single Index Model

After the return, variance, beta, and alpha of each stock are known, the next step to determine the optimal portfolio using a single index model is to calculate the level of Excess Return to Beta (ERB) and determine the Cut off Rate (C_i), as follows:

a. The Excess Return to Beta (ERB) level is the difference between expected returns and market returns which is then divided by beta. This shows that ERB can connect between return and risk of a security. ERB can be calculated by:

$$ERB_i = \frac{E(R_i) - R_{br}}{\beta_i}$$

ERB_i = Excess return to beta of i share

$E(R_i)$ = Expected Return of i share on t date

R_{br} = Asset return risk free

β_i = Beta of share/security

b. Cut off Rate (C_i) is a limiting point used to determine whether a stock can be included in a portfolio or not. Shares included in the portfolio are shares that have $C_i \leq ERB$. C_i can be calculated by first calculating A_i and β_i value for each i-securities, and can be calculated by:

$$A_i = \frac{[E(R_i) - R_{br}] \cdot \beta_i}{\sigma_{ei}^2}$$

$E(R_i)$ = Expected Return of i share on t date

R_{br} = Asset return risk free

β_i = Beta of share/security

σ_{ei}^2 = Residual error variance

$$B_i = \frac{\beta_i^2}{\sigma_{ei}^2}$$

β_i = Beta of share/security

σ_{ei}^2 = Residual error variance

After obtaining the value of A_i and β_i , then, C_i can be calculated by:

$$C_i = \frac{\sigma_m^2 \sum_{j=1}^i A_j}{1 + \sigma_m^2 \sum_{j=1}^i \beta_j}$$

6. Determine the magnitude of the fund proportion (X_i)

After portfolio formed, then, determine the proportion of fund (X_i)

from each share or security. X_i can be calculated by the formula:

$$W_i = \frac{X_i}{\sum_{j=1}^k X_j}$$

With X_i equal to:

$$X_i = \frac{\beta_i}{\sigma_{ei}^2} (X_i - C^*)$$

W_i = The proportion of i share

m = Amount of share in portfolio optimum

β_i = Beta of share/security

σ_{ei}^2 = Residual error variance

ERB_i = Excess return to beta of i share

C^* = The value of cut-off point which is the biggest value

7. Calculate Risk and Return of the Portfolio

a. Expected return of portfolio is the weighted average of the individual returns of each portfolio forming share, which can be calculated using the following formula:

$$E(R_p) = \alpha_p + \beta_p \cdot E(R_m)$$

$E(R_p)$ = Expected return of portfolio

α_p = The weighted average from alpha each security

β_p = The weighted average from beta each security

$E(R_m)$ = Market expected return

b. Portfolio risk can be calculated by determining the amount of variance of the portfolio. Variance of portfolio can be calculated by the formula:

$$\sigma_p^2 = \beta_p^2 \cdot \sigma_m^2 + \sum_{i=1}^n W_i^2 \cdot \sigma_{ei}^2$$

σ_p^2 = Variance of portfolio

$\beta_p^2 \cdot \sigma_m^2$ = Risk related with market

$W_i^2 \cdot \sigma_{ei}^2$ = The weighted average of unique risk from each company

3.5. Analysis Technique

3.5.1. Descriptive Statistics

Statistics is a set of numbers organized or displayed in the form of a list/table, frequently accompanied by pictures that generally referred to as diagrams or graphs. Statistics can make it easier to make conclusions and to take decisions based on the existing data.

3.5.2. Classical Assumption Test

3.5.2.1. Normality Test

Normality Test is a test conducted with the aim to assess the distribution of data in a group of data or variables, whether the distribution of data is normally distributed or not (Hidayat, 2013).

3.5.2.2. Heteroscedasticity Test

Heteroscedasticity Test is a test that assesses whether the regression model has a variation in the residual variation for all observations. This test is one of the classic assumption tests needed for multilinear regression. When the expectation of heteroscedasticity is not met, then the regression model is declared invalid as a predictive tool (Hidayat, 2013).

3.5.2.3. Autocorrelation Test

Autocorrelation test is a statistical analysis conducted to find out whether there is a correlation between variables in the prediction model and the change in time. Therefore, if the assumption of autocorrelation occurs in a prediction model, then the value of disturbance is no longer paired freely, but paired by autocorrelation. Autocorrelation test in the linear regression model must be done if the data is time series data or time series. Because what is meant by autocorrelation is actually: a value on a particular sample or observation is strongly influenced by the value of previous observations (Hidayat, 2017).

3.5.2.3. Multicollinearity Test

Multicollinearity test is a test performed to determine if there are intercorrelations or colinearities between independent variables in a regression model. In a regression model, intercorrelation is a linear relationship or a strong relationship between an independent variable or predictor variable and other predictor variables (Hidayat, 2016).

3.6. Multilinear Regression

The analysis in this research uses the multilinear regression. Regression analysis is analyzing research hypotheses method that aims to test whether there is an impact between one to another variables. This study helps to define the influence of

two or more independent variables (X) on the dependent variable (Y). Therefore, the multilinear formula in this research would be:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e$$

Where:

Y = Optimum Portfolio Return

X1 = Crude Oil Price

X2 = Coal Price

X3 = Exchange Rate

α = Constanta

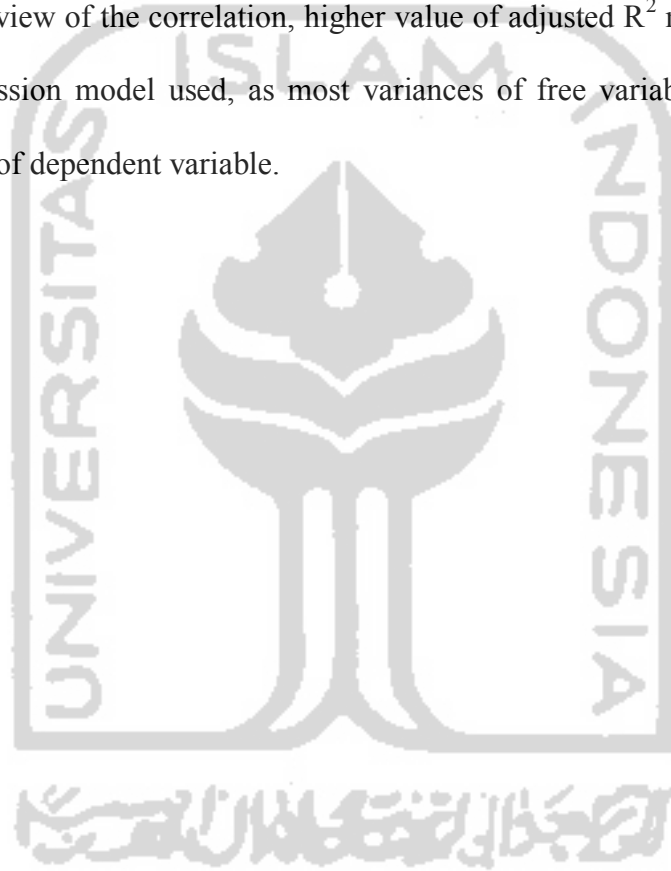
e = error

3.6.1. t Test

The t test is used to test whether there is a significant effect of each independent variable on the dependent variable. To do this test, by looking at the Probability Value of the results of the t test using a level of confidence of 95%, while the error rate (α) tolerated by 0.05 (5%). If the probability value < 0.05 with $\alpha = 5\%$, the model being tested will have a significant effect between these variables result compared to the t table.

3.6.2. Determination of Coefficient (R^2)

This test is used to assess the closeness degree of the relationship between the independent variable and the dependent variable demonstrated by the adjusted R^2 magnitude. The used of adjusted R^2 could provide more accurate view of the correlation, higher value of adjusted R^2 means that better the regression model used, as most variances of free variables will explain variance of dependent variable.



CHAPTER 4: DATA ANALYSIS AND DISCUSSIONS

4.1. Statistic Descriptive

This chapter presents data analysis using statistical methods including explanation from the findings. It also describes the data analysis and the relationships findings produced from the tests and the theories stated.

Table 4. 1. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Crude Oil Price	16	441828.17	1067866.00	781394.8981	172552.65820
Coal Price	16	682956.67	1710154.33	1174779.8306	294038.38217
Exchange Rate	16	13274.67	15038.33	13925.6244	527.47776
Optimum Portfolio Return	16	-2051.09	0.03	-128.2189	512.76564

Source: Secondary data processed, 2020

Table 4.1 presents the descriptive analysis from 16 quarters taken from the calculation of Optimum Portfolio Return in Mining Companies start from January 2016 - December 2019. The descriptions are as follows:

- a) The minimum value of X1 (Crude Oil Price) is 441828.17. This value is the lowest price of crude oil during 2016 - 2019. The lowest price reached was at the first quarter of 2016. Then, the maximum value is 1067866.00 that is reflected from the third quarter of 2018. The average value of X1 (Crude Oil Price) is 781394.8981, while the standard deviation from this measurement is 172552.65820.

- b) The minimum value of X2 (Coal Price) is 682956.67 that is listed in the first quarter of 2016, while the maximum is 1710154.33 reflected from the third quarter of 2018. The average value of X2 (Coal Price) is 1174779.8306, and the standard deviation is 294038.38217.
- c) The minimum value of X3 (Exchange Rate) is 13274.67 that is reflected from the third quarter of 2016, and the maximum value is 15038.33 that is reached in the fourth quarter of 2018. The average of X3 (Exchange Rate) is 13925.6244 during 2016-2019, while the standard deviation is 527.47776.
- d) The minimum value of Y (Optimum Portfolio Return) is -2051.09. It means that the investor did not obtain any gain the portfolio in the third quarter of 2016. For the maximum value of Y (Optimum Portfolio Return) is 0.03, which means the highest probability value that investor can obtain is having the portfolio in mining company in the fourth quarter of 2019. The average of Y (Optimum Portfolio Return) is -128.2189, while the standard deviation is 512.76564.

4.2. Classical Assumption Test

As stated in the previous chapter, this research used four classical assumption tests, which are normality test, heteroscedasticity test, autocorrelation test, and multicollinearity test. The results are as follows:

4.2.1. Normality Test

Table 4. 2. Normality Test Result

Kolmogorov-Smirnov Z	Asymp. Sig.	Conclusion
0.525	0.946	Normal

Source: Secondary data processed, 2020

The data will be normally distributed when p-value is higher than the alpha value (α). The confidence level used is 95%, while automatically the alpha is 5% (0.05). From Table 4.2 above, the p-value is reflected from Asymp. Sig. is 0.946. It means that $0.946 > 0.05$, or in other term $p\text{-value} > \alpha$, therefore, it is concluded that with 95% confidence level, the errors are normally distributed.

4.2.2. Heteroscedasticity Test

Table 4. 3. Heteroscedasticity Test Result

Independent Variable	Sig.	Conclusion
Crude Oil Price	0.251	Heteroscedasticity free
Coal Price	0.842	Heteroscedasticity free
Exchange Rate	0.894	Heteroscedasticity free

Source: Secondary data processed, 2020

The purpose of the heteroscedasticity test is to demonstrate that the data are free of residual inequality. From Table 4.3 above, the variables have sig. value > 0.05 , which can be concluded that the data used by this research are free from heteroscedasticity problem.

4.2.3. Autocorrelation Test

Table 4. 4Autocorrelation Test Result

DW	dU < DW < (4-dU)	Result
2.292	1.6961 < 2.292 < 2.3039	No Autocorrelation

Source: Secondary data processed, 2020

The autocorrelation test of this research used the tool of Durbin-Watson (DW). If the DW value is between the dU and (4-dU), the data will be regarded as having no autocorrelation problem. From Table 4.4, it implies that the value of DW is between the value of dU and (4-dU). Therefore, it is concluded that the value is free from autocorrelation problem.

4.2.4. Multicollinearity Test

Table 4. 5. Multicollinearity Test Result

Model	Collinearity Statistics		Result
	Tolerance	VIF	
Crude Oil Price	0.499	2.003	Non Multicol
Coal Price	0.543	1.840	Non Multicol
Optimum Portfolio Return	0.787	1.270	Non Multicol

Source: Secondary data processed, 2020

This research used VIF (Variance Inflation Factor) to test the multicollinearity. According to Santoso (2015), the value usually varies from 1-4. If it is more than that, the data are considered as having problems with

multicollinearity. Based on Table 4.5, the VIF is in the range of 1-4, therefore, it is concluded that there is no multicollinearity problem.

4.3. Multilinear Regression

The analysis in this research uses the multilinear regression. Regression analysis is analyzing research hypotheses method that aims to test whether there is an impact between one to another variable. The regression formula used by this research is as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e$$

The regression result is presented below:

4.3.1. t Test

Table 4. 6. t Test Result

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	11.963	22.042		0.543	0.597
Crude Oil Price	1.317	0.373	0.658	3.530	0.004
Coal Price	0.865	0.379	0.408	2.284	0.041
Exchange Rate	-4.408	2.480	-0.264	-1.777	0.101

T Test Result

Source: Secondary data processed, 2020

The t test is used to test whether there is a significant effect of each independent variable in the dependent variable. This research used significant

level of α 5%. It means that hypothesis is supported if it is lower than significant level (α) of 5% (0.05). Based on Table 4.6 that is done by SPSS, it can be concluded that:

- a) Crude Oil Price has the Sig. value of 0.004, or in other term it is lower than the significant level of 0.05. It means that Crude oil price has the significant influence upon Optimum Portfolio Return. Therefore, H1 is accepted.
- b) Coal Price has the Sig. value of 0.041 which is lower than the significant level of 0.05. Therefore, it is concluded that coal prices give significant influence to Optimum Portfolio Return and H2 is accepted.
- c) Exchange Rate has the Sig. value of 0.101, if it is compared to the significant level (α), it is higher than 0.05. Thus, exchange rate has no influence upon Optimum Portfolio Return and H3 is rejected.

4.3.2. Determination of Coefficient (R^2)

Table 4. 7. Determination of Coefficient Result

R- squared	0.792
Adjusted R-squared	0.740

Source: Secondary data processed, 2020

The Determination of Coefficient (R^2) is to test how much independent variables influence the dependent variable. According to Table 4.7, the value of adjusted R^2 is 0.740 or 74%. This value means that the variance of all independent variables (Crude Oil Price, Coal Price, and

Exchange Rate) could influence 74% of the dependent variable (Optimum Portfolio Return). While the rest of 0.260 or 26% is influenced by the other variables excluded from this research.

4.4. Hypothesis Testing

4.4.1. H1: Crude oil prices have positive influence to the optimum portfolio return

The first hypothesis in this research is crude oil price has a positive influence to the optimum portfolio return. According to Table 4.6, t table shows that crude oil price has greater value than the significant level (α) of 5% or 1.753 ($3.530 > 1,746$). It indicates that the raise of crude oil prices has significant influence upon optimum portfolio return. It is line with the previous research that found the crude oil variable has a significantly positive effect on share price (Gumilang, Hidayat, & Endang, 2014; Vivekananda, Achsani & Maulana, 2018), but there is a differentiation because in this research, share price is presented as the form of optimum portfolio return that depends on the stability of share price (Tamuunu & Rumokoy, 2015). While, the previous researches that have contrast result with this research, which stated that crude oil price does not have influence upon share price are presented by Hanafiah (2015) & Pribadi (2016). It is probably caused by different case study and period taken by previous researchers that may affect

different result. Hence, H1 shows crude oil price has positive influence upon optimum portfolio return.

4.4.2. H2: Coal prices have positive influence to the optimum portfolio return

The second hypothesis in this research is coal price has a positive influence to the optimum portfolio return. According to Table 4.6, t table shows that crude oil price has greater value than the significant level (α) of 5% which is 1.746 ($2.284 > 1.746$). It indicates that the raise of coal prices has significant influence upon optimum portfolio return. The data have similar result with the previous research (Sundari, 2015; Vivekananda, Achsani and Maulana, 2018; Luthfiah, 2020) that is, coal price affects share price. While the contrast result shown by previous researcher (Najib, 2019) that coal price does not have significant influence upon share price. It is probably caused by different case study and the period taken by previous researcher. Hence, H2 shows coal price has positive influence upon optimum portfolio return.

4.4.2. H3: The Exchange Rate gives negative influence to the optimum portfolio return

The third hypothesis in this research is the exchange rate (dollar strengthening) has influence to the optimum portfolio return. According to Table 4.6, t table shows that exchange rate has lower value than the significant level (α) of 5% which is 1.746 ($-1.777 < 1.746$). It indicates that the raise of

exchange rate does not have influence upon optimum portfolio return. From Table 4.6, it implies that exchange rate has no influence because the t value is lower than α ($5\%=1.746$) and the significant value higher than α of 5%. This result is supported by the previous research by Nurfadillah (2020) that stated exchange rate does not affect share price. Meanwhile, the previous research by Luthfiyah, (2020); Gumilang, Hidayat & Endang, (2018) found different result that is, exchange rate has effect on the share price. Therefore, based on the data, H3 shows that exchange rate has no influence upon optimum portfolio return.

4.5. Discussion

The results of data processed are presented as summary table below:

Table 4. 8. Summary Table

Hypothesis	Independent Variable	T- Statistic	Sig.	Information
H1	Crude Oil Price	3.530	0.004	Supported
H2	Coal Price	2.284	0.041	Supported
H3	Exchange Rate	-1.777	0.101	Not Supported

4.5.1. The Influence of Crude Oil Price upon Optimum Portfolio

Return.

The results of this research show that crude oil price significantly affect optimum portfolio return. According to the data, the crude oil price was

fluctuated during 2016-2019 that could be caused by the demand of crude oil. The price could increase when the demand of crude oil increase, and it could decrease when the crude oil has less demand.

Thus, this is in line with the theory that the crude oil is the first source energy that is used in the world. By the increasing and decreasing demand, the price can be higher or lower. However, crude oil price fluctuation can also be caused by the countries that produce it. About 62% of the world's oil reserves are in the Middle East and are centred in five countries: Saudi Arabia, United Arab Emirates, Qatar, Iraq and Kuwait. Not all of these countries are producing optimally, due to widespread conflict and economic sanctions. From this, it can be concluded that the improvement of political and security conditions in the Middle East has a great ability to increase oil supply and push oil prices down; while the increasing tensions can make markets worry about diminishing supply, and pushing up oil prices (Nirmala, 2016). From those statements, obviously that the increasing or decreasing crude oil prices can affect share price and also return especially on mining companies that have direct relationship to the crude oil price.

The previous studies that give similar result which stated that crude oil has significant influence are by Gumilang, et al (2014) and Vivekananda, et al (2018) and the previous study that have contradictory result with this research are by Hanafiah (2015) and Pribadi (2016).

4.5.2. The Influence of Coal Price upon Optimum Portfolio Return.

The results of this research show that coal price significantly affect optimum portfolio return. According to the data, the coal price was fluctuated during 2016-2019 that could be caused by the demand of coal. The price could increase when the demand of coal increase, and it could decrease when the coal has less demand. It has similar demand direction with crude oil that will fluctuate based on demand. For instance, coal had the high demand on July 2018 when China was tightening domestic productions which need the additional supplies of coal, and this had triggered the increase of coal demand and price (Anggraeni, 2018). On the contrary, in November 2018, the coal price decreased because Indonesia restricted the demand from China in order to escalate its domestic coal products. However, at that time, several countries also underwent the decreasing coal price due to the deceleration of world economy (Santoso, 2018).

The influence of coal price is in line with the theory that mentioned if coal price is the source of energy after crude oil, which has made coal is also important for usage. Therefore, the demand and other causes can affect optimum portfolio return through the share price especially in mining companies which are closely related to this term. The previous researches that stated that the influence of coal price affect significantly presented by Sundari (2015) Vivekananda, et al (2018) and Luthfiyah (2020). Nevertheless, the

research that was presented by Najib (2019) stated if the coal price did not give any influence upon share price.

4.5.3. The Influence of Dollar Strengthening upon Optimum Portfolio Return.

The result shows that dollar strengthening through exchange rate has no influence on the optimum portfolio return. It could happen because during 2016-2019, the share price always fluctuated every day in almost all companies. The fluctuation may affect share price and it is reflected in the portfolio however, it does not have any effect directly to the return of portfolio because the calculation using single index has gone through the process of diversification which is a combination from several companies and might decrease the risk.

According to the theory, the movements of exchange rate can affect the return. Besides, the case of escalating trade war between US and China had proven that it affected share price especially in 2018 but obviously not affect portfolio returns because the optimum portfolio return at that year is relatively stable even though the dollar strengthening. Therefore, in this research the theory cannot be proven from the result because in fact, exchange rate does not affect the optimum portfolio return. The previous studies that show similar result with this research and stated if exchange rate has no influence upon share price is by Nurfadillah (2020), while Gumilang, Hidayat

& Endang, 2018 and Luthfiah (2020) gave contradictory result with this research which stated if exchange rate influences the share price.



CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

This research is purposed to determine the influence of rising in crude oil price, coal price and exchange rate (dollar strengthening) upon optimum portfolio return in mining companies with certain criteria that is mentioned in Chapter 3. The conclusions that can be drawn from this research are as follows:

1. Crude oil price has positive and significant influence to the optimum portfolio return and it is supported by the data gathered. Thus, based on the result of this research, crude oil price does affect the optimum portfolio return.
2. Coal price has positive and significant influence to the optimum portfolio return and it is supported by the data gathered. Thus, based on the result of this research, coal price affects the optimum portfolio return.
3. Exchange rate has no influence to the optimum portfolio return and it is supported by the data gathered. Thus, based on the result of this research, exchange rate does not affect the optimum portfolio return.

5.2. Research Implications

The implications of this research based on the conclusions are as follows:

1. This research is intended to lead to the knowledge development especially regarding the optimum portfolio construction using single index model

and the factor that can influence it. By diversification, the risk on portfolio that are invested can be minimized and the return can be maximized. It is implied from H3 that exchange rate does not have any influence but because evidently the strengthening in dollar did not really affect directly to the optimum portfolio return. However, the other variables (crude oil and coal prices) significantly affect the optimum portfolio return even though the share price through the process of diversification. It indicates that the movements of crude oil price and coal price have a high influence upon optimum portfolio return especially in mining companies.

2. Crude oil and coal price move into the same direction. When crude oil and coal price raised, it can imply that the demand of both of them also raise, while mining companies have high possibilities of impact then the share price also increase and return in portfolio can be increased too. It also gives information that the investors must be aware of the high influence of crude oil price and coal price because the price of crude oil and coal cannot be really expected in the future, it may sometimes rise, but also weak afterwards.

5.3. Limitations

This research has limitations which could affect the research results as follows:

1. This research is a new type of research, further research is needed in similar topics so it will give another point of view regarding this research.
2. The big gap among mining companies caused the inequality in share price range. Several companies have high share prices, but some other companies have low share prices and they are not comparable. Therefore, it makes several companies cannot be compared in optimum portfolio calculation using single index.

5.4. Recommendations

Based on the research conducted, there are several things that need to be improved. The researcher suggests the following recommendations:

1. Future studies are expected to expand this topic in order to elaborate more explanation and perspective as the development of knowledge.
2. The researcher predicted other factors could influence the Optimum Portfolio Return besides Crude Oil Price and Coal Price. It is expected that future work will introduce a new variable to strengthen the study model or also expand the period in order to have more consideration.

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Appendix 1: List of Mining Companies year 2016-2019 listed in Mining Sector Index and Yahoo Finance

No	Code of Stock	Company Name
1	CTTH	Citatah Tbk.
2	ANTM	Aneka Tambang Tbk.
3	TINS	Timah Tbk.
4	PSAB	J Resource Asia Pasific Tbk.
5	MDKA	Merdeka Copper Gold Tbk.
6	INCO	Vale Indonesia Tbk.
7	DKFT	Central Omega Resources Tbk.
8	CITA	Cita Mineral Investindo Tbk.
9	ADRO	Adaro Energy Tbk.
10	ARII	Atlas Resources Tbk.
11	BRMS	Bumi Resources Minerals Tbk
12	BSSR	Baramulti Suksessarana Tbk.
13	BUMI	Bumi Resources Tbk.
14	BYAN	Bayan Resources Tbk.
15	DEWA	Darma Henwa Tbk.
16	DOID	Delta Dunia Makmur Tbk.
17	GTBO	Garda Tujuh Buana Tbk.
18	HRUM	Harum Energy Tbk.
19	ITMG	Indo Tambangraya Megah Tbk.
20	KKGI	Resource Alam Indonesia Tbk.
21	MBAP	Mitrabara Adiperdana Tbk.
22	MYOH	Samindo Resources Tbk.
23	PKPK	Perdana KARYA Perkasa Tbk.
24	PTBA	Bukit Asam Tbk.
25	PTRO	Petrosea Tbk.
26	TOBA	Toba Bara Sejahter Tbk.
27	BIPI	Astrindo Nusantara Infrastruktur Tbk
28	ELSA	Elnusa Tbk.
29	ENRG	Energi Mega Persada Tbk.
30	ESSA	Surya Esa Perkasa Tbk.
31	MEDC	Medco Energi Internasional Tbk.
32	RUIS	Radiant Utama Interinsco Tbk.

Appendix 2: Data used for regression

1. Independent Variables: Crude Oil Price, Coal Price, Exchange Rate

Data presented as Rupiah

Quarter	Crude Oil Price	Coal Price	Exchange Rate
2016 1st Quarter	441828,17	682956,67	13756,33
2016 2nd Quarter	596780,77	687435,37	13546,00
2016 3rd Quarter	586762,50	881355,47	13274,67
2016 4th Quarter	649657,77	1261053,00	13485,33
2017 1st Quarter	706763,37	1088412,67	13432,00
2017 2nd Quarter	657569,80	1060963,40	13406,67
2017 3rd Quarter	668809,73	1261191,67	13482,00
2017 4th Quarter	794382,10	1329182,00	13608,67
2018 1st Quarter	877234,93	1398154,00	13705,00
2018 2nd Quarter	996956,03	1458712,33	14191,33
2018 3rd Quarter	1067866,00	1710154,33	14743,33
2018 4th Quarter	954673,27	1534132,33	15038,33
2019 1st Quarter	860682,20	1361052,10	14326,00
2019 2nd Quarter	936041,62	1158529,79	14389,00
2019 3rd Quarter	852385,26	968403,74	14272,00
2019 4th Quarter	853924,85	954788,42	14153,33

2. Dependent Variables: Optimum Portfolio Return

Measurement result of Optimum Portfolio return calculated by Single Index Method

Quarter	Optimum Portfolio Return
2016 1st Quarter	0,00882
2016 2nd Quarter	0,01226
2016 3rd Quarter	-2051,09
2016 4th Quarter	0,00891
2017 1st Quarter	0,00636
2017 2nd Quarter	0,00004
2017 3rd Quarter	0,00875

2017 4th Quarter	0,01150
2018 1st Quarter	0,00432
2018 2nd Quarter	0,00502
2018 3 rd Quarter	0,00499
2018 4th Quarter	0,00959
2019 1st Quarter	-0,52654
2019 2nd Quarter	0,00504
2019 3rd Quarter	-0,00326
2019 4th Quarter	0,03151

Appendix 3: Statistic Descriptive using SPSS

	N	Minimum	Maximum	Mean	Std. Deviation
Crude Oil Price	16	441828.17	1067866.00	781394.8981	172552.65820
Coal Price	16	682956.67	1710154.33	1174779.8306	294038.38217
US Dollar Exchange Rate	16	13274.67	15038.33	13925.6244	527.47776
Optimum portfolio return	16	-2051.09	.03	-128.2189	512.76564
Valid N (listwise)	16				

Appendix 4: Classical Assumption Test

1. Normality Test

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		16
Normal Parameters ^{a,b}	Mean	.0000000
	Std. Deviation	.28576270
Most Extreme Differences	Absolute	.131
	Positive	.092
	Negative	-.131
Kolmogorov-Smirnov Z		.525
Asymp. Sig. (2-tailed)		.946

a. Test distribution is Normal.

b. Calculated from data.

2. Heteroscedasticity Test

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
	(Constant)	4.360	11.127	.392	.702
1	Crude Oil Price	-.227	.188	-.447	.251
	Coal Price	.039	.191	.072	.842
	US Dollar Exchange Rate	-.170	1.252	-.040	.894

a. Dependent Variable: abs_res

3. Autocorrelation Test

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.890 ^a	.792	.740	.31949	2.292

a. Predictors: (Constant), US Dollar Exchange Rate, Coal Price, Crude Oil Price

b. Dependent Variable: Optimum portfolio return

4. Multicollinearity Test

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	11.963	22.042		.543	.597		
	Crude Oil Price	1.317	.373	.658	3.530	.004	.499	2.003
	Coal Price	.865	.379	.408	2.284	.041	.543	1.840
	US Dollar Exchange Rate	-4.408	2.480	-.264	-1.777	.101	.787	1.270

a. Dependent Variable: Optimum portfolio return

Appendix 5: Regression Result

1. T Test

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	11.963	22.042		.543	.597
	Crude Oil Price	1.317	.373	.658	3.530	.004
	Coal Price	.865	.379	.408	2.284	.041
	US Dollar Exchange Rate	-4.408	2.480	-.264	-1.777	.101

a. Dependent Variable: Optimum portfolio return

2. Adjusted R²

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.890 ^a	.792	.740	.31949

a. Predictors: (Constant), US Dollar Exchange Rate, Coal Price, Crude Oil Price