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An Empirical Study of Macroeconomic to Portfolio Performance : Sub-sector Building Construction with Crude Petroleum and Natural Gas

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Abstract

The Indonesian capital markets have show a remarkable recovery after financial crisis at the 1990. Although there was down at 2008, but consistency growth has succeed to record an outstanding performance at 2016. This paper aims to observate influence variable of macroeconomic in Indonesia as inflation, exchange rate, interest rate and oil price to return of building contruction with crude petroleum and natural gas sub-sector, and benchmark period 2014 to 2016. The methodology in used is multiple linear regression model, the independent and dependent variables is issued macroeconomic and return of both sub-sector and benchmark. The primary results from this research is increase of exchange range has negative effect or decrease to stock return on the sub-sector building construction (α = 5%), sub-sector crude petroleum and natural gas (α = 10%), and benchmark (α = 5%). Increase of crude oil price has negative effect or decrease to stock return on the sub-sector building construction (α = 5%) and benchmark (α = 10%). But different with variables inflation and interest rate, the both variables not significantly.

Keywords: Building construction, Crude petroleum and natural gas, Benchmark, Macroeconomic

1. Introduction

Investment is the allocation of funds for assets in the hope of gaining profit in the future. There are several types of investment that can be selected by investors, namely savings/deposits, foreign currencies, commodities, properties and capital markets. By type of assets, the investment consists of risky assets and risk-free asset. The type of investment to be reviewed in research is risky asset investment, i.e. the stock market. The question that arises is "why we need to invest?" Without us knowing, the value of Rupiah continues to increase which is one of its factors is the rate of inflation that occurs every year. One example, the price Toyota's new car at 1990 was IDR 30 million, while at 2017 it is reaching IDR 250 million. The increase in Toyota car price over the period of 27 years reaches 733% or an average of 27% per year. Therefore, it is very important to do investment to achieve financial expectations in the future.

The first step should be considered by investors before deciding to invest is to determine the purposes of investing. If one wants to do short-term investment with a better profit expectation, stock market is a promising investment option. Shares are securities issued by companies that show the ownership of the company, which is then traded on the stock exchange. Profit gained on stock market investment is in the forms of capital gains namely the difference of the selling price from the purchase price and dividend that is profit sharing obtained by the company. Investing in the stock market is risky on any investment decision. Risks that will be borne by investors are in the forms of capital loss or decrease in the selling price from the purchase price and of when the company is declared to be bankrupt or liquidated. Therefore, investors should conduct an evaluation first before deciding to invest in the stock market.

Stock price movements in the stock market are very sensitive in responding to the current economic condition. In addition, several other factors such as political issues, culture, religion and natural disasters can also be influential. An issue may be positively or negatively responded by some issuers and some others may not respond to the issue. From the internal side, some things like profit growth, dividend payout, and reputation, are also factors that affect stock price movements of an issuer. Bullish and bearish terms are common in the stock market where bullish is a condition where the movement of an issuer is increased or strengthened, while bearish

is a condition where the trend is decreasing or weakening.

The stock market is one of the types of investment instruments available in the capital market, namely open companies (go public) that issue shares for sale on the stock exchange. Currently, open companies listed on the Indonesia Stock Exchange (IDX) are 550 issuers, which are divided into 18 and 10 constituents of market and sectoral indices, respectively. This study will review stock market investments in the sub-sector of building construction and sub-sector of crude petroleum and natural gas. The building construction sub-sector is incorporated into the sectors of property, real estate and building construction, while petroleum and natural gas are incorporated into the mining sector.

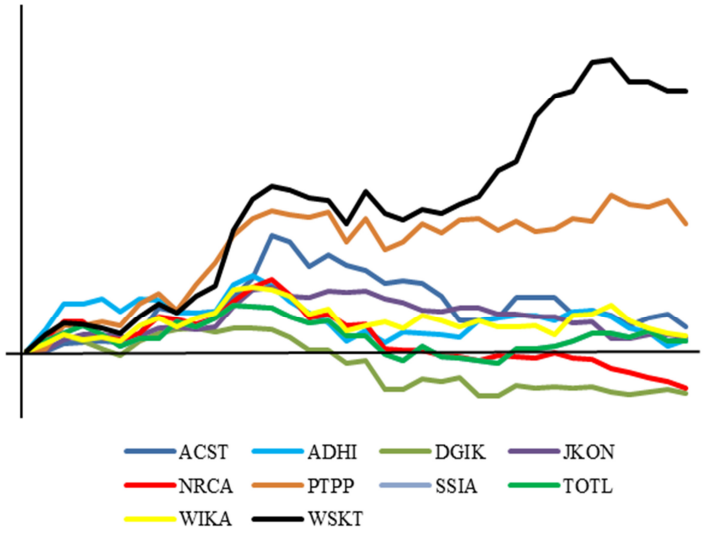

Figure 1.1 Growth of moving price emiten in sub-sector building construction period January 2014 to December 2016

An key drivers of Indonesia future economic growth is infrastructure investment. The period of 2015 to 2019 is era infrastructure sector, the project to be around 87% higher than the preceding five year period. The indicator will be support the growth of capital market in sub-sector of building construction. Guarantee of government project will be interested by investor. Figure 1.1 shows that emiten WSKT and PTPP have moving higher, while performance DGIK and NRCA is negative. The both higher is Indonesian state owned enterprises, this is be taken to promote a more stable investment environment. The outlook stock of market in prediction sub-sector building construction will be over performance to support growth of the performance benchmark.

The oil and gas production, the both in Indonesia has decreased. Data from statictic Indonesia shows at the 1996 oil production in 548.6 million barrel and at the 2015 is 286.8 million barrel, while gas production at the same period is 3.16 million MMscf and 2.95 MMscf. If seeing in figure 1.2, it shows that emiten in sub-sector crude petroleum and natural gas has experienced dramatic volatility and negative. This sub-sector under performance in stock market and additionally decreased the benchmark. But government project exploration can be considering the sub-sector might potentially to investment realisation in next few year. In predicting the stock price will be correction to growth up in stock market.

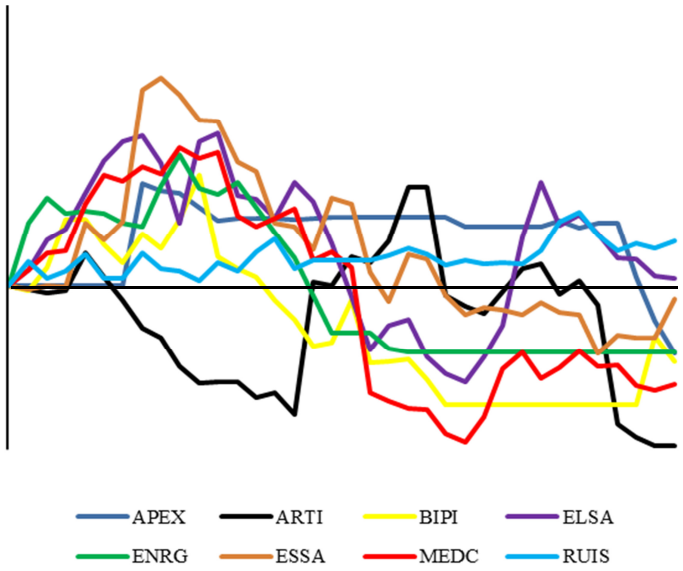

Figure 1.2 Growth of moving price of emiten in sub-sector crude petroleum and natural gas period January 2014 to December 2016

An important treatment of the stock market is macroeconomics, the modelling and policy discussion assign a relatively minor role to the stock market in investment decision (Fischer and Merton, 1984). So necessary explanations of fluctuation to given shock for stock market. Inflation, exchange rate, interest rate and oil price in prediction influence to moving price in stock market. The fourth variables will be review about fluctuations to shock price in sub-sector building construction, crude petroleum and natural gas, and benchmark. This result can be important information to considering in chosee emiten in both sub-sector or benchmark, to presenting outlook about portfolio and expectation gain can be received from the condition market.

2. Literature Review

Macroeconomic variables such as inflation, BI interest rate, rupiah exchange rate against dollar and world crude oil price can influence market sentiment towards an issuer. A research conducted by Artha et al (2014) showed that the crisis that occurred at 2008 affected the trend of stock price movements in the agricultural sector. Macroeconomic variables that have significant effect are the rupiah exchange rate and world crude oil price.

The literature review purpose to compile and evaluates the research available about stock market in sub-sector building construction, crude petroleum and natural gas, benchmark, and four variable macoeconomics ad inflation, exchange rate, interest rate, and oil price. For the following :

2.1 Building construction

The sub-sector of building construction and sub-sector of petroleum and natural gas has their own advantages and disadvantages. The superiority of the building construction sub-sector is that the current government focuses on infrastructural development which attracts investors to invest in this sub-sector. A research conducted by Gultom et al. (2013) indicated that the systematic risk of building construction sub-sector is only 0.08% at the period from November 2012 to March 2013. The small level of market risk that could be a negative sentiment is also considered as its advantage. Meanwhile, the weakness of this sub-sector is the dependence of raw materials on imported products, so that when the value of the Rupiah weakens, it will affect the sub-sector. Research conducted by Octafia (2017) shows that the Rupiah exchange rate against the Dollar has a significant negative effect on the sectors of property, real estate and building construction. Natural disasters and human error also become the weaknesses of the sub-sector of building construction.

2.2 Crude petroleum and natural gas

The petroleum and natural gas sub-sector is the main sources of energy in Indonesia. This point is one of the advantages of the sub-sector due to the increasing dependence on energy and demand. The weakness of this sub-sector is that its price is fully depending on the international price unit in dollar. A research conducted by Putra and Moch T (2014) indicated that some issuers in the petroleum and natural gas sub-sector at the period of 2009 to 2012 which was tested using the Springate model was predicted to be bankrupt. This was due to the continuous decrease of the production and price of crude oil. This factor becomes the reference of the author to review the sub-sector of petroleum and natural gas.

2.3 Benchmark

Indonesia's benchmark stock index is Jakarta Composite Index (JCI). In 2016, JCI growth 15.32% it closed at IDR 5,296.71. In Southeast Asian Meanwhile, Thailand led stock markets with its bechmark stock index having gained 19.62%, followed by Indonesia. Malaysia's benchmark stock index was down 3% and the Philippines and Singapore also saw declines of 1.6% and 0.07%, respectively. With expectations economic growth up in 2017, relatively will followed by benchmark.

The research by Purbawati and Dana (2016) showed that volatility of JCI the comparison between the pre-crisis than after the subprime mortgage crisis, the volatility is lower in period before crisis. Its caused almost 85% trading transaction Indonesia uses currency USD, the effect of crisis in USA will be followed by Indonesia and also another countries in southeast asia. Benchmark is a major stock market index which tracks the performance of all companies listed on the Indonesia Stock Exchange (IDX), so if is good performance its explain that economic of growth up.

2.4 Inflation

The inflation calculated by Consumer Price Index (CPI), the index is a measure of the average price which consumers spend on a market-based of goods and services. Mahmood *et al.* (2014) analyzed that inflation affects stock price negatively. Chakravarty (2013) analyzed that stock price have an impact on inflation whereas the causality in the reserve direction is not prominent. Adusei (2014) finding that the inflation as a macroeconomic variable is a significant determinant of stock market return.

2.5 Exchange rate

Exchange rate is the price of nation's currency in terms of another currency. Fixed exchange rate are decided by central banks of a country by the mechanism of market demand and supply. Chakravarty (2013) analyzed that exchange rate shock affect production negatively though the impact on domestic prices is only negligible. Mgammal (2012) finding that a significant positive relationship between stock market price index and exchange rate in the short run. A research conducted by Octafia (2017) also showed similar results on macroeconomic variable of the rupiah exchange rate against the dollar. Such variable had a significant effect on the property sector, real estate and building construction.

2.6 Interest rate

Interest rate is the proportion of a loan that is charged as interest to the borrower for use the facility of assets in cash or non cash. The reference or benchmark the Indonesia interest rate this often refers to the BI rate. Wuhan (2015) analyzed that impact of interest rates is different depending on the industry. Semuel (2015) finding a significant negative relationship of interest rate on Gross Domestic Product (GDP). Alam (2009) found that interest rate has siginificat negative relationship with share price.

2.7 Oil price

The oil and gas industry in Indonesia has experience dramatic volatility because sensitivity of oil prices. Oil price at mid-2008 at US$ 145 per barrel, collapsed by more than 70% and ended at 2008 at US$ 40 per barrel following the global financial crisis. Whrereas price the reference or benchmark of oil price world shows the decrease. Its that issue sensitivity in economic Indonesia because the increased consumption in every year. The generally refers to the reference price for buyers and sellers of crude oil is West Texas Intermediate (WTI).

3. Data Empirical

The data used is secondary data in the form of time series data of the sub-sectors of building construction and petroleum and natural gas listed on Indonesia Stock Exchange (IDX), monthly reports from January

2014 to December 2016 in IDX website (*http : //www.idx.co.id/*). There are ten issuers from the building construction sub-sector and eight issuers from the petroleum and natural gas sub-sector that have conducted an initial public offering (IPO) at January 2014. This study also uses the Indonesian's Benchmark Jakarta Composite Index (JCI), JCI data are obtained from the website of IDX (*http://www.idx.co.id/*), monthly reports from January 2014 to December 2016. The fourth macroeconomic variables studied in this research: inflation, exchange rate, interest rate and world crude oil price obtained from the website of Bloomberg (*https://www.bloomberg.com/asia*), monthly reports from January 2014 to December 2016.

4. Methodology

This research uses aplication E-Views 9 to analysis data, or model operation in mathematic is called multiple linear regression. The analysis purpose to determine the relationship and the influence between independent variables and a dependent variable. The model is following :

$$\mathbf{Y_{it} = \beta_0 + \beta_t X_{it} + \ldots + \beta_{kt} X_{k,it} + \mu_{it}}$$

Where :

- Y_{it} = Dependent variable (index return), where i = entity (index sub-sector and benchmark), and t = time (three year)
- β_{kt} = Coefficient of independent variable
- $X_{k,it}$ = Independents variable (inflation, exchange rate, interest rate, and oil price)
- μ_{it} = Error term

Return is the gain or loss of a security in a particular period. The return consists of the income and the capital gains relative in an investment, and it is usually quoted as a percentage. The conversion to percentage is following :

$$R_i, R_m = \frac{P_t - P_{t-1}}{P_{t-1}} \text{ where } t = 1, \ldots, N$$

Where :

- R_i = Return indeks sub-sector
- R_m = Return market (benchmark)
- P = Close price
- t = Time (monthly)

The conversion macroeconomic variable to percentage is following :

$X_{k,t} = \frac{V_{k,t} - V_{k,t-1}}{V_{k,t-1}}$ where $t = 1, \ldots, N$

Where :

- $X_{k,t}$ = Macroeconomic variable
- $V_{k,t}$ = Value (monthly)
- t = Time (monthly)

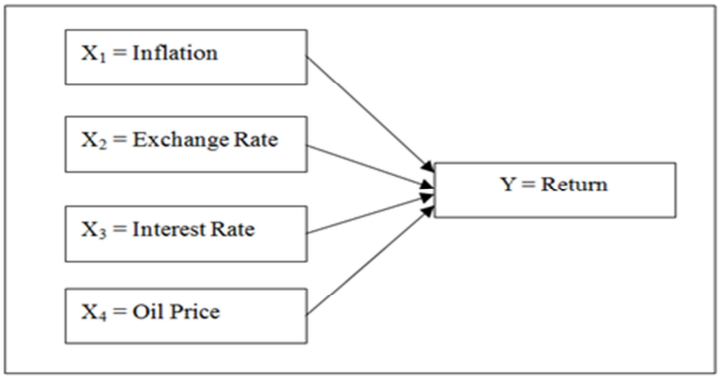

Figure 3.1 Conceptual framework

4. Results and Discussion

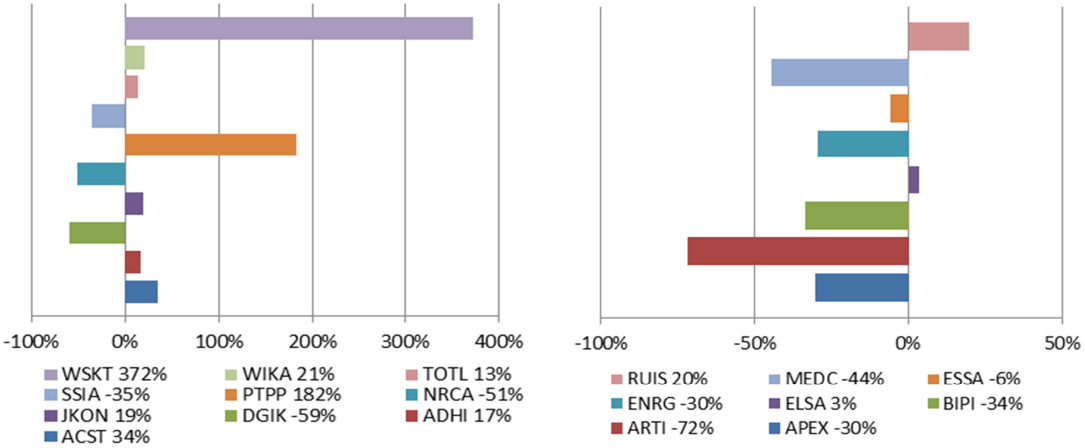

Figure 4.1 Growth of stock price in both sub-sector, building construction (left) with crude petroleum and natural gas (right) period January 2014 to December 2016

Notes : Growth (%) = (close price of stock at December 2016 – close price of stock at January 2014)/close price of stock at January 2014, WSKT = waskita karya, WIKA = wijaya karya, TOTL = total bangun persada, SSIA = surya semesta internusa, PTPP = pembangunan perumahan, NRCA = nusa raya cipta, JKON = jaya konstruksi, DGIK = nusa konstruksi enjiniring, ADHI = adhi karya, ACST = acset indonusa, RUIS = radiant utama interinsco, MEDC = medco energi internasional, ESSA = surya esa perkasa, ENRG = energi mega persada, ELSA = elnusa, BIPI = benakat integra, ARTI = ratu prabu energi, APEX = apexindo pratama duta.

Figure 4.1 shows that the percentage of stock price average in the sub-sector of building construction is higher than the oil and natural gas period 2014-2016. The growth highest of stock price increased is WSKT up to 372% in sub-sector building construction, while sub-sector crude petroleum and natural gas is ARTI of 72%. From 10 stock in the building construction, 7 stock growth up and 3 stock growth down. In contrast as sub-sector crude petroleum and natural gas, of the 8 stock, only 2 stock growth up. These results indicate that the capital gains obtained in the construction sub-sector are higher than those of petroleum and natural gas.

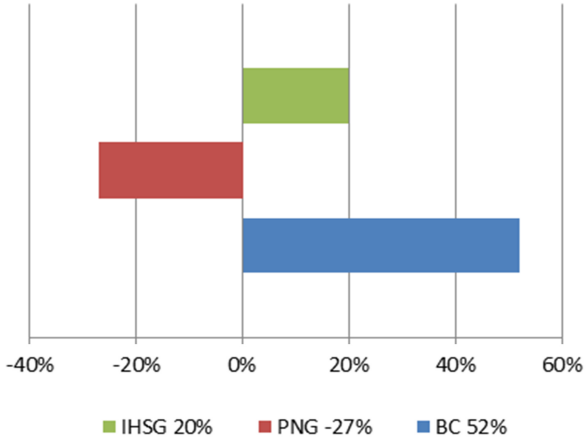

Figure 4.2 Growth of index price in sub-sector building construction with crude petroleum and natural gas, and index market period January 2014 to December 2016.

Notes : Growth (%) = (index price at December 2016 – index price at January 2014)/index price January 2014, IHSG = indeks harga saham gabungan (benchmark), PNG = crude petroleum and natural gas, BC = building construction.

Figure 4.2 shows that the percentage of growth sub-sector of building construction is higher than the oil and natural gas, than index market at period 2014-2016. Sub-sector building construction increased to 52%, benchmark is 20%, but different with sub-sector crude petroleum and natural gas decreased in level 27%. This condition indicate that sub-sector building construction contributed that growth up of benchmark, otherwise sub-sector crude petroleum and natural gas cause growth down of benchmark.

Macroeconomic analysis of the stock price response or in statistics is called econometrics sees the relationship between inflation rate, exchange rate, BI rate, and world crude oil price as independent variables, and stock response as dependent variable. Table 11 shows three important things that can be concluded: First, the Rupiah exchange rate against the US Dollar (USD) has a negative correlation to the index of the JCI index and construction sub-sector. Second, the price of world crude oil has a negative relationship to the sub-sector of building construction. Thirdly, the BI rate and the inflation rate do not affect the two sub-sectors and benchmark.

Table 4.1 Multiple regression variable of macroeconomic to return index sub-sector building construction, crude petroleum and natural gas, and benchmark from January 2014 to Desember 2016

Variable	BC		PNG		IHSG	
	Coefisien	Probability	Coefisien	Probability	Coefisien	Probability
C	0.0200	0.1476	-0.0088	0.5180	0.0065	0.2092
INFLATION	0.0035	0.4439	-0.0068	0.1381	-0.0002	0.9240
USD-IDR	-1.0861	0.0464*	-1.0517	0.0538**	-0.7935	0.0003*
BI RATE	-0.2592	0.7842	-0.1968	0.8356	-0.3240	0.3657
OIL PRICE	-0.2763	0.0425*	0.0236	0.8582	-0.0975	0.0560**

Notes : BC = building construction, PNG = crude petroleum and natural gas, IHSG = benchmark, * = significant pada (α = 5%), ** = significant (α = 10%)

The Rupiah exchange rate against the Dollar is the most influential macroeconomic variable on the investor interest to invest in the stock as a whole (JCI). Table 4.1 shows that if the Rupiah exchange rate against the Dollar is strengthened by 1% then the rate of return earned will increase by 1.0861% in the construction sub-sector (α = 5%), if the Rupiah exchange rate against the Dollar is strengthened by 1% then the rate of return earned will increase by 1.0517% in the petroleum and natural gas sub-sectors (α = 10%), and if the Rupiah exchange rate against the Dollar is strengthened by 1%, then the return rate will increase by 0.7935% in the benchmark (α = 5%). The results are in accordance with previous studies reviewed in other sectors undertaken

by Munib (2016) and Parulian (2016) that the exchange rate has a significant effect on the banking sector. Research conducted by Wijayaningsih (2016) and Raraga (2012) also showed the same result that the rupiah exchange rate had a dominant effect on the market index.

From the result can be concluded that if the Rupiah exchange against the Dollar weakens, investor interest to buy the shares of construction sub-sectors, petroleum and natural gas sub-sectors, and the stock market as a whole will decline. This is because the Rupiah exchange rate variable to the dollar is a reflection of the economic condition of a country, so that if a negative cycle occurs, it will become negative sentiment that could disrupt the economic stability which consequently will reduce the interest of foreign investors to invest in the stock market of Indonesia. The case example in this study is the data at 2015 in the event of economic crisis since the rupiah exchange rate continued to weaken, JCI fell significantly. The use of the dollar as a reference for international trade traction is also a factor that causes the exchange rate issue against the dollar as a catalyst in the stock market. Data from the Ministry of Industry (2014) indicated that 64% of national industries rely on imported raw materials, making it particularly vulnerable to fluctuations in the rupiah against the dollar. The sub-sector of building construction and sub-sector of petroleum and natural gas are industries that rely on imported raw materials. Therefore, the two sub-sectors will respond if there is fluctuation of rupiah exchange rate against dollar, especially on company profit.

World crude oil prices have negative sentiment to the sub-sector of building construction ($\alpha = 5\%$) and to market index ($\alpha = 10\%$). Table 4.1 shows that if world crude oil price is decreased by 1% then the rate of return earned will increase by 0.2763% in the sub-sector of building construction, and if world crude oil price is decreased by 1%, then the rate of return gained will increase at 0.0975% in the benchmark. From these results, it can be concluded that the decline in world crude oil prices will attract investors to invest in the sub-sector of building construction and the stock market as a whole. This is due to the increase in world crude oil prices caused by limited availability, increased demand and strengthening dollar value. In relation to the rupiah exchange rate variable against the dollar, the strengthening of the dollar against the rupiah followed by the increase in world crude oil prices will reduce investor interest in the sub-sector of building construction and the overall market index.

The results of the research show that world crude oil prices have no significant effect on the petroleum and natural gas sub-sector. Similar results were also obtained in previous research by Hanafiah (2015) which stated that world crude oil price did not affect stock price, based on a case study at PT Bumi Resources Minerals Tbk at the period of January 2008 until December 2013. It can be concluded that decreasing investor interest in the petroleum and natural gas sub-sector of the period of 2014-2016 were not caused by the decline in world crude oil prices.

The inflation rate and BI interest rate changes have no effect on investor interest in sub-sectors of construction and petroleum and natural gas, as well as market conditions in general. A research conducted Tyas et al. (2014) showed that the inflation rate had significant effect only on LPKR issuers (PT Lippo Karawaci Tbk) from a total of 10 issuers tested. The results of research conducted by Kasidi (2013) in Tanzania and Quartey (2010) in Ghana showed that the inflation rate has a negative impact on economic growth, which will have an impact on the investment climate in the country. In Indonesia, the highest increase of inflation rate comes from the increase of fuel oil. While the decline in BI interest rates will affect the stability of the rupiah exchange rate and inflation rate. From these results, it can be concluded that the decline in investor interest is not entirely due to macroeconomic conditions, but also due to the electability of the companies that continue to experience losses due to the decrease in the amount of production.

The rupiah exchange rate against the dollar and world crude oil prices are macroeconomic variables that affect the rate of return on the sub-sector of building construction and the sub-sector of petroleum and natural gas. Here are some considerations in allocation and investment:

1. If the rupiah exchange rate against the dollar continues to strengthen, the proportion of investment fund allocation recommended in risky assets (stock portfolio) is of 75% to 100%;
2. If the rupiah exchange rate against the dollar is stable or the fluctuation is less than 1%, the proportion of investment fund allocation recommended in risky assets is of 75%;
3. If the rupiah exchange rate against the dollar continues to weaken more than 1% but still below 3%, the proportion of investment fund allocation recommended at risky assets is of 50% -75%;
4. If the rupiah exchange rate against the dollar continues to weaken by more than 3% but still below 5%, the proportion of investment fund allocation recommended at risky assets is less than 50%;

5. If the rupiah against the dollar continues to weaken by 5% or more, it is advisable not to invest in risky assets.

5. Conclusion

Two primary results are drawn from this research. First, the information moving price represent return rate sub-sector building construction higher than crude petroleum and natural gas. Company in sub-sector building construction is grow up at period 2014 to 2016, while another sub-sector is grow down. Last, increase of exchange range has negative effect or decrease to stock return on the sub-sector building construction (α = 5%), sub-sector crude petroleum and natural gas (α = 10%), and market index (α = 5%). Increase of crude oil price has negative effect or decrease to stock return on the sub-sector building construction (α = 5%) and market index (α = 10%). But different with variables inflation and interest rate, the both variables not significantly.

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