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Determination Of Lq 45 Stocks Portfolio Performance Model

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Abstract: The purpose of this study is to compare the optimal portfolio formation models and to evaluate the performance of LQ 45 stocks in Indonesia. This research uses quantitative analysis method used to form and analyze portfolio performance measurement by using Single Index Model, Constant Correlation Model and Markowitz with influenced by macroeconomic factor of Indonesia. This study found that the inflation rate, exchange rate, economic crisis, and GDP as the macroeconomic indicators used, generally affect the portfolio return. So it can be concluded that based on the four models of Portfolio Performance, the optimum portfolio with constant correlation model has the best result compared to single index model and Markowitz model. This means if investors who want to form an optimal portfolio can consider using a constant correlation model because the model can provide optimal return and risk than other models

Index Terms; Portfolio performance, Optimal, LQ45, Model, Risk

1 INTRODUCTION

Portfolio can be interpreted as an investment in various financial instruments that can be traded on the Stock Exchange and Money Market, where financial instruments include stocks, bonds, foreign exchange, deposits, stock price index, other derivative products. The objective is to deploy sources of return and possible risk. Portfolio theory serves to analyze the maximum profit with certain risks. The essence of this theory is to learn how to combine stocks into the portfolio[1]. Investors who want to invest in stocks are faced with the question where the right place to invest is. Investors are facing difficulties in identifying and analyzing stocks on the stock. Stocks indexes are formed to provide information to investors with provide an overview of stock price movements by using a stock price index. One of the stock indices that is often a reference investor in invest in stocks is the LQ 45 index. According to Yang (2016), the index is a stock index that has large market capitalization and high liquidity. This index consisting of 45 stocks with high liquidity, selected through several selection criteria such as by market capitalization, prospects and financial condition of the company. If we look the development, they are reliable as a reference investment[2]. It is not easy to get the desired return and minimum risk. This is because there are many factors that affect stock return and stock risk level. As an example of inflation, the exchange rate of rupiah and GDP, which according to research conducted by Wells, and Simorangkir states that inflation and exchange rate turns out to affect stock returns and market returns. Inflation has a positive effect on market return where if rising inflation will then cause the price of output to rise so that income the company will rise, the company's performance will rise, the stock price will rise and the composite stock price index will rise. Exchange rate index on the month the relevant positive effect on market return because if the index the exchange rate in the corresponding month increases then the selling value of the goods will rise, export demand is getting higher and corporate earnings will rise that resulting in the company's performance and stock will be good. The capital market conditions show that activity in the capital market has a close relationship with macroeconomic conditions; therefore stable macroeconomic conditions are the drivers for the development of the capital market (Suryani, 2015). The condition of the economic crisis will of course affect the stock market conditions that will degrade stock market performance a country experiencing an economic crisis. Research conducted by Prasetiono states that in the short term the value changes an exchange rate of 1 percent will result in a change of LQ 45 stock by 2.7 percent and 3.81 percent with opposite direction of change exchange rate changes. While in the long term changes in exchange rates by 1 percent will result in a change of LQ 45 stock by 1.17 percent and 0.72 percent in the opposite direction to change in value exchange. In the long run, exchange rate variables have an influence affect most of the LQ 45 stocks[3]. The measurement of a country's economy in macro analysis is Gross Domestic Product (GDP). GDP measures income streams and expenditure in the economy for a certain period. Increased GDP will lead to economic growth, and vice versa. If high economic growth then investment should be high as well but if investment increases then it should affect the stock return value in the company[4]. Aydemir in his research found that change profitability, interest rate, inflation and exchange rate have influence significant to changes in stock prices of business entities during the crisis period economy. Simorangkir looks at how the stock portfolio of blue chips in the stock exchange states that inflation, exchange rates and deposit rates affect the market return and also affect the level of profit and risks received by each share. Inflation and value index exchange rates have a positive effect on market returns while interest on deposits government has a negative effect on market return[5]. Suryani looked for an optimal stock portfolio using single index model and constant correlation model. Single index model is a portfolio model with using Excess return to Beta ratio (ERB) and C * value to get optimal portfolio. Unlike single index model, constant correlation model using Excess return to standard deviation (ERS). The optimal portfolio formed using a single index model as well as a correlation model constant indicates that investors should allocate the largest funds on TLKM Shares, while the optimal portfolio formed with using a constant correlation model has

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better performance if compared to the optimal portfolio formed by using single index model. Establishing an optimal portfolio, investors should consider several other factors beyond the stock price factor, LQ-45 Index, Interest Rate of Bank Indonesia (SBI), macroeconomic factors and fundamental analysis of the issuer [6]. This study assumes that the rate of return between two stocks or more will be correlated (moving together) and have the same reaction to a single factor or index entered in the model, the LQ-45 Index. However, in reality the expected return and the level of risk described by the standard deviations and stock covariance are actually not only sensitive over there one influencing factor. Meanwhile, according to Gerlach (2005), the exchange rate of dollar against rupiah, interest rate, inflation and GDP growth simultaneously affect the stock price index of property sector, while partially exchange rate of dollar to rupiah have positive significant effect to stock price index of property sector while inflation has a significant negative effect on the stock index of the property sector. For Variable Interest rates and GDP growth are partially insignificant in affecting the Property index[7]. Zakaria (2015), states that variables macroeconomic factors that affect the Joint Stock Price Index and LQ45 are significant Industrial Production Index, Exchange Rate, and SBI Interest Rate. Exchange rate gives a positive influence on JCI and LQ45. While Industrial Production Index and Interest Rate give a negative effect against IHSG and LQ45. While Athukorala found that the weakening of the rupiah against the US dollar, the strengthening of the composite stock price index and rising world oil prices will provide a good return for energy stocks and energy mining in Indonesia Stock Exchange vice versa[8]. Nezky analyzed how the impact of the crisis in the United States against Indonesia's capital market significantly, she saw the movement of Composite Stock Price Index proven to provide a direct response to the change Dow Jones Industrial Average (DJI), where the change is more important in explaining the movement of Composite Stock Price Index compared to exchange rate, Production Index (IP), and International Trade Tax (PPI). The result showed that Indonesian capital market is still heavily influenced by foreign capital markets, so if a shock occurs on major stock indexes abroad it will easily lead to panic among domestic investors[9].

2 RESEARCH METHOD

The research is quantitative method which is used to form and analyze portfolio performance measure consisting of LQ 45 stocks using Single Index Model, Constant Correlation Model and Markowitz with influenced by the macroeconomic factor of Indonesia;[10]. The population in this study is all companies that go public and listed on the Indonesia Stock Exchange and entered into the LQ 45 Index in the period February 2011-July 2015. Sampling is done by purposive sampling with certain criteria such as: selecting stocks entering LQ 45 during the observation period (February 2011-July 2015), and not doing a stock split, because it will cause a deep bias stock return calculation. The list of appropriate LQ 45 company samples is based on the criteria it is as many as 10 companies[11].

Table 1. *List of companies in LQ 45 according to the research criteria*

No	Code	Name of Issuer Company
1.	AALI	PT. Astra Agro Lestari, Tbk
2.	ANTM	PT. Aneka Tambang (Persero), Tbk
3.	BBNI	PT.Bank BNI, Tbk
4.	BDMN	PT. Bank Danamon, Tbk
5.	BMRI	PT. Bank Mandiri, Tbk
6.	INDF	PT. Indofood Sukses Makmur, Tbk
7.	PTBA	PT. Tambang Batubara Bukit Asam, Tbk
8.	PGAS	PT. Perusahaan Gas Negara, Tbk
9.	TKLM	PT. Telekomunikasi Indonesia, Tbk
10.	UNTR	PT. United Tractors, Tbk

Source: Indonesia Stocks Exchange, 2015

The type of data used in this study is secondary data of stocks which is located at LQ 45 on the Indonesia Stock Exchange. LQ 45 shares have high trading frequency; have good prospects and financial condition. The stock data used is the period of February 2011 to July 2015 data. With the data component of Bank Indonesia certificate as a risk free component obtained from monthly statistical data in the period of February 2011 to July 2015[12]. The data sources used are: 1) The closing price of consistent stocks per month entered LQ 45 at Indonesia Stock Exchange (IDX) and JCI data from February 2011 to July 2015, 2) Interest rates from Bank Indonesia Certificates (SBIs) in the period February 2011-July 2015, and 3) Inflation data, rupiah exchange rate against dollar and GDP Indonesia February 2011- July 2015. Thus to perform a portfolio performance analysis and, some work steps will be done, the steps in this study can be as followed:

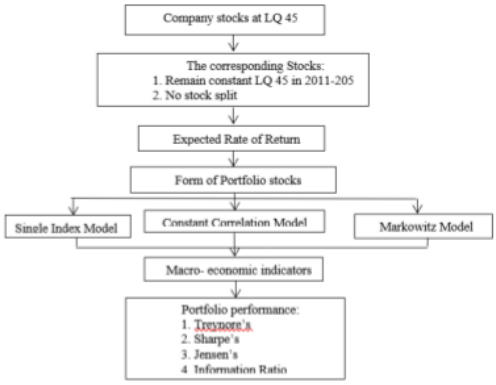

Fig 1*. The Research Framework*
Source: Mohi-u-Din, 2013; Suryani, 2015; author, 2017

Figure 1 show the steps of analysis, where it began with identifying which issuers are consistent and do not share the stock on the LQ 45 Index during the February period 2011 - July 2015. Using daily closing price data on the Index then calculates the expected rate of return, risk, the correlation between stock returns and covariates of the stock group which were analyzed. The next step is to find the optimal portfolio taking into account the effects of inflation, exchange rates, GDP, and the economic crisis. Therefore, to get the optimal portfolio the economic factors such as inflation, exchange rates, GDP, and the economic crisis must be taken into account (Mohi-u-Din, 2013). The next step is to form a stock portfolio using three methods, such as: Markowitz, Constant Correlation, and Single Index Model. At the stage of forming a portfolio with the Markowitz model, the step begins by calculating the return and standard deviation of stocks, looking for correlation and covariance, determining the stock portfolio;

optimal portfolio formation is done by determining the weight of each share included in the portfolio. To determine heavy stock used excel program add-in solver, with the target of minimizing the risk function for certainly expected returns [12]. Meanwhile, to calculate a stock portfolio using Single Index Model, it is necessary to calculate returns and stock deviation standards, returns and market risks, determine beta and systematic risk for each stock, calculate Excess Return to Beta Ratio (ERB), determine cut off point, and determine the proportion of shares to form an optimal portfolio. In the establishment of a stock portfolio using the Constant Correlation Model originally synonymous with the Single Index Model, the difference lies in determining the stock rating to be included in Constant Correlation model by calculating Excess Return to Standard Deviation [13]. Treynor's, Sharpe's, Jensen's, and Information Ratio Size are the four methods used to assess the performance of the three models. This performance appraisal has previously calculated the effect of macroeconomic factors on portfolio returns. The return of the portfolio that has been obtained is reorganized with macroeconomic variables to regain the value of the portfolio is already affected by macroeconomic variables (Mohi-u-Din, 2013). This measurement is done to see which model (Markowitz, single index model and Constant correlation model) provide optimum results for investors.

3 Analysist and Result

Form of Portfolio This research will form a stock portfolio using Single Index Model, Constant Correlation Model and Markowitz model; therefore it is necessary to calculate return and standard deviation of stocks, return and market risk, and beta value (table 2). There is a negative expected return value of the selected shares, namely AALI stocks (-0.00107) and ANTM stocks (-0.01095). To calculate Alpha is by using intercept which is comparison of return of a stock with a market return for a given period, where Beta is calculated by using a slope that reflects the volatility of return a stock against market return (Lo, 2000). The beta value of the above ten stocks is worth positive which means that these shares have a positive effect with return market or stock return moves in the direction of market return movement. Single Index Model According Aydemir to establishment of optimal portfolio using single index model requires calculation of Excess Return to Beta Ratio (ERB) and cut off point (Ci). This ERB value will be compared with Ci value where if ERB value> Ci then the stock is entered into the optimal portfolio. There are seven stocks that have value ERB> Ci namely BBNI, BMRI, INDF, PGAS, PTBA, TLKM and UNTR where the seven stocks entered into the optimal portfolio. the other three shares do not go into the portfolio optimal because the ERB value is negative. After calculating the value of ERB and Ci then the next step is to find the proportion of funds for the incoming stock optimal portfolio. The proportion of funds for each of these shares is used to find the portfolio return value of each stock by multiplying it with the return value of each share which will then be added to form a portfolio return optimal because the ERB value is negative. After calculating the value of ERB and Ci then the next step is to find the proportion of funds for the incoming stock optimal portfolio. The proportion of funds for each of these shares is used to find the portfolio return value of each stock by multiplying it with the return value of each share which will then be added to form a portfolio return.Constant Correlation ModelThe establishment of a stock portfolio using Constant Correlation, the stock rating model to be included in the portfolio optimal is to calculate Excess Return to Standard Deviation (ERS). Determination of which shares are included in the portfolio that is with compare the value of ERS with Ci value where if value ERs> Ci then the stock goes into the optimal portfolio[Establishment of optimal portfolio using the Constant Correlation Model generates a set of similar stock portfolios Single Index Model. There are seven stocks that go into the portfolio optimum according to this model, namely BBNI, BMRI, INDF, PGAS, PTBA, TLKM and UNTR where the seven shares have ERS> Ci, three stocks others do not enter into the optimal portfolio because the ERS value is smaller of Ci value. After calculating the value of ERS and Ci, the next step is finding the proportion of funds for stocks that enter the optimal portfolio. Same as the single index model of proportion that has been obtained is used for calculate the return value of each stock into the portfolio that will be will add up all returns to get total portfolio return value. Markowitz Model From expected return and standard deviation data, then calculated the correlation of each stock. This is done to see the relationship between stock return movements (Mohi-u-Din, 2013; Suryani, 2015). If it's a stock has a negative correlation then the movement of return from the stock tends in contrast to other stocks, if the stock is positively correlated then the movement of return from the stock moves in the same direction with other stocks[14]. Overall, the correlation owned by 10 stocks is correlation positive. Next is to calculate the covariance of each stock with other shares. After getting the covariance value of the next stocks is to determine the weight for each stock where the amount the weight is divided by the same amount for each share. The weight for each stock is 0.1. From the calculation results can be concluded that the active portfolio generated based on the 10 shares have a return of 0.010658 or 1.0658 percent and has a standard deviation of 0.093456 or 9.3456 percent. Furthermore, by using the program where the goal is to divide the proportion of different investments to achieve optimal returns by minimizing risk. From portfolio data processing by minimizing risk, it is obtained the resulting standard deviation value is reduced from 0.093456 or 9.3456 percent to 0.072766 or 7.2766 percent. The proportion of weights has changed where previously each stock has the same weight value proportion, after optimizing the return by minimizing the risk, the weight gain is 0.386098 for PGAS and 0.613902 for TLKM. Another stock is given a zero weight because it is based on this calculation obtained optimal return value by minimizing risk. The return portfolio of this Markowitz model is 0.010658 with a risk of 0.072766. Portfolio Returns, Variance, and Standard Deviations The optimal portfolio models used in this study provide different combinations of results. This can be seen in the following table 2:

***Table 2**. Return, Variance, and Standard Deviations Portfolio*

Portfolio Stocks	*Single Index Model*	*Constant Correlation Model*	*Markowitz Model*
ER Portfolio	*0.020359884*	*0.056043723*	*0,010658*
Variance	*0.003993323*	*0.001401696*	*0.005295*
Std. Deviations	*0.063192748*	*0.037439229*	*0.072766*
Coefficient Variance	*310.378723*	*66.803608*	*682.736*

Source: author, 2017

The result of the establishment of an optimal portfolio based on a variety of optimal portfolio model portfolio return is obtained; variance and standard deviation are different (Lee, 2010; Suryani, 2015). The highest portfolio return is obtained by using the method of constant correlation model with the return of 0.056043723 or value of 5.6043723% followed by a Single Method Index, and Markowitz models. Meanwhile, the lowest variance value owned by the constant model of correlation models with value 0.037439229, the coefficient value of the variation of the three models, which shows the best value, is the constant correlation model (66.803608). Macroeconomic Factors on Selected Portfolio ReturnsBased on the calculation, the regression of the three models studied is as follows:

1. Single Index Model: $Y = -0.22229 - 1.62464X_1 + 4.89^{\wedge}05X_2 - 2^{\wedge}-07X_3 - 0.02715X_4+e$
2. Constant Correlation Model: $Y = -0.23096-1.54489 X_1+5.62^{\wedge}-05 X_2 - 2.6^{\wedge} -07 X_3 -0.04557 X_4 +e$
3. Markowitz Model: $Y = -0.33245-1.90244X_1+ 0.000081X_2-4.9228^{\wedge}-07X_3-0.09708651X_4+e$

The estimation of model based on statistical method will at table 3 as follows:

Table 3. *The estimation of Portfolio Model*

No	Model	F-test	R-squared	Macroeconomic indicator			
				Inflation	Exchange Rate	GDP	Economic Crisis
1	Single Index	3.036	0.168	-2.043	2.120	2.428	-0.448
2	Constant Correlation	3.107	0.172	-2.046	2.292	2.272	-0.580
3	Markowitz	3.344	0.181	-0.979	3.448	1.196	-1.764

Source: Prasetiono, 2012; author, 2017

The result of F test can be concluded that the value of F arithmetic in the three optimal portfolio model is bigger than F table (2.525215). It implies that macroeconomic variables (crisis, inflation, exchange rate and GDP) together affect the variable portfolio return (Prasetiono, 2012; Nugroho, 2018). The t-test results for the model explains that correlation constant value t count variable exchange rate and GDP was 2.292 and 2.272 bigger than t-table (2.000298) thus exchange rate and GDP variables have a significant influence on portfolio return, partially. As for the variable inflation and crisis, only the inflation variables that significantly influence the portfolio return (t count <t-table or 2.046 <-2.000298). Based on this t-test variable exchange rate and GDP have a positive influence on the portfolio return while variable inflation and crisis adversely affect the portfolio return. Coefficient of determination can be seen in R-squared, and the small value will result for single index model (16.9%), constant correlation (17.2%), Markowitz (18.1%) means that macroeconomic variables are only able to explain a small portion of the diversity of data and some of the diversity of data is explained by variables other independent that has not been incorporated into the model. The results of F-test and t-test that has been done then the research hypothesis can be answered. Hence, the calculation, Ha_1 which states that the value of inflation negatively affects the stock portfolio return is acceptable for all three optimal portfolio models (Engle, 2004). Although not significant for Markowitz's model, the value of inflation is closely related to the decline in purchasing power, both individually and firmly; the high inflation rate will result in a decrease in firm performance and result in lower stock returns This is in accordance with the research undertaken by Aydemir (and Mohi-u-Din) states that inflation has a negative effect on the stock index, while other opinions are derived from Mohi-u-Din studies, rising inflation will increase share prices which then increase the rate of return stock. The second hypothesis (Ha_2) which states the exchange rate of rupiah against the dollar has a positive effect on the acceptable portfolio return; the calculation results show for the three models of optimal portfolio exchange rate variable has a significant positive effect with portfolio return. This is in line with research conducted by Maysami et al, Exchange Rate gives effect positive against JCI and LQ45. Nesky also found a positive effect of exchange rate on stock returns[15]. The results of research conducted by Yang conducted during the economic crisis explained that partially exchange rate has a positive and significant influence on stock prices. Changes in exchange rates affect fixed assets and debt the company is based on the company's financial position (Kuok et al, 2015). For example, companies that expect income (long positions) will be useful with depreciation of the rupiah, while those with liabilities (short positions), such as imports of finished goods, raw materials and will affect the cash outflow so that the loss. The crisis variable for the three models based on the calculation does not have significant influence so that Ha_4 is not acceptable. It means the company is able to maintain its performance in order to be able survive and compete in the local market and the global market so as to attract investors to invest their capital into the company. This is not in accordance with research from Nezky where the crisis in the United States significantly affects the Indonesian capital market. However, this is in line with the research undertaken by Goldstein which shows that magnitude foreign ownership, increased financial structure, high contribution from regional trade, and rationale "countercyclical" and fiscal monetary policy will help the region to face the negative impact of the crisis[16]. The variable of GDP value has significant effect to return portfolios in the Single Index, and Constant Correlation Model, it indicates an increase or decrease in GDP will affect the interest of investors to invest in stocks so that will increase the stock price and will eventually increase stock returns. In the Markowitz model, GDP has no significant effect (reject Ha_3) this indicates increased or declining GDP less can affect investor interest to investing in Markowitz's portfolio. According to Prasetiono and Zakaria economic growth (GDP) has a significant influence in the short term with positive coefficients but not in long term with negative and insignificant coefficients to LQ 45 stocks[17]. Return Portfolio influenced Macroeconomic Factors Once the portfolio returns calculation results obtained, the next step is to seek return of portfolio affected by macroeconomic factors. The portfolio return will be used to calculate stock portfolio performance that has been influenced by macroeconomic factors.

Table 4*. Return, Variance, Standard Deviation and Coefficient of Variation Portfolio influenced Macro Economic Factors*

Stocks Portfolio	Single Index Model	Constant Correlation Model	Markowitz Model
ER Portfolio	0.020432	0.050231	0.009009
Variance	0.002022	0.002131	0.003842

Std. Deviation	*0.044965*	*0.046167*	*0.061982*
Variance of Coefficient	*220.071457*	*91.90938*	*688.0009*

Source: Welss, 1999; Prasetiono, 2012; author, 2017

The portfolio return value of each model changes after being influenced by macroeconomic factors. The highest portfolio return value is obtained by constant correlation model with value 0.050231 while the value of variance with the lowest value is by using single index model method with value 0,002022. Coefficient Value Variation compared to before influence by macroeconomics has increased in Constant Correlation Model and Markowitz Model which mean level data variations are increasing or heterogeneous after regression using macroeconomic variables in this study. Coefficient Value The small variation shows good value because it shows small variation of data which in stock means describes relatively small risk, from third model after done by regression with macroeconomic factor got result constant correlation model has a low coefficient value of the variation indicates a lower risk (91.90938) than other models[18].Selected Portfolio Performance MeasurementPortfolio performance measurement is done to see if the resulting portfolio is good based on several performance measurement methods portfolio. Based on Nugroho (2018), portfolio performance measurements with macroeconomic influences (inflation, crisis, GDP and exchange rate) are expected to illustrate the real conditions of investment in the capital market. The measurement results are influenced by the macroeconomic performance of the portfolio for each index is as follows:

***Table 5**. Sharpe, Treynor, Jensen and Information Ratio Indexes*

Stocks	*Sharpe's*	*Treynor's*	*Jensen's*	*Information Ratio*
Single Index Model	*0,324256*	*0,019853*	*0,011035*	*9,518796*
Constant Correlation	*0,961256*	*0,062603*	*0,040957*	*42,30214*
Markowitz	*0,050936*	*0,006148*	*0,000678*	*-3,30136*

Source: Engle, 2004; author, 2017

Based on the Sharpe index, the optimal portfolio generated through the constant correlation model gets a high value compared to other models of 0.961256. The high Sharpe index value explains that the stock portfolio has performance the good one (Engle, 2004). Based on the Sharpe index model that delivers performance the good is the optimal portfolio model with constant correlation model. Performance measurement using Treynor index shows constant correlation model is a model of optimal portfolio models that provide the best performance with an index value of 0.062603, followed by model single model (0.019853) then Markowitz (0.006148). The higher the Treynor indexes show the better the performance of the portfolio. The result show that Jensen index model, the portfolio has good performance is with constant correlation model with index value is 0.040957 followed by single index model (0.011035) and Markowitz model (0.000678). Performance measurement using the information ratio also shows the best portfolio performance is by constant correlation model then followed by single index model (9.518796) and Markowits model (-3.30136). Measurement of portfolio performance using four methods produce optimal portfolio selection that the best performance among the three portfolios is constant correlation models followed with a single model and Markowitz models index models. Selected Portfolio Performance Comparison with Portfolio Average WeightedAmong the three optimal portfolio models, the model gives a return and the best risk based on performance measurement methods is constant correlation model. This model will then be compared with portfolio formed by using the weighted average of the selected portfolio (Suryanti, 2015). The weight of the stock to calculate the expected return of each share is divided equally with 7 selected stocks so that respectively shares gain weight 0.142857143. While the value of variants and standards deviation.

***Table 6**. Return, Variance, and Standard Deviation Portfolio Average Weighted*

Stocks	*EP*	*Sharpe's*	*Treynor's*	*Jensen's*	*Information Ratio*	*Variance*	*Std. Deviation*
Average Weighted	*0.016689*	*0.257004*	*0.014161*	*0.006870*	*-1.51384*	*0.001778*	*0.042164*

Source: Suryanti, 2015; author, 2017

The calculation of portfolio return by using the average weighted resulted in lower returns (0.016688544) compared with constant correlation model (0.050231). Variance and standard deviation from the weighted average yields a value lower than constant correlation model, therefore to see the value of stock performance will have a value both when the value is high, of all the average model performance measurement values weighted above the values obtained below the constant performance measurement values correlation model.

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4 Conclusion

Single index model and constant correlation model produce the combination of the same shares are BBNI, BMRI, INDF, PGAS, PTBA, TLKM and UNTR. As for Markowitz model combination of the resulting stock are PGAS and TLKM, while the return portfolio of this Markowitz model is 0.010658 with a risk of 0.072766. Portfolio return results using a constant correlation model gives a return combination (0.056043723) and better risk (0.037439229), followed by singles index model with return of 0.020359884 and risk of 0.063192748 as well as the Markowitz model with a return of 0.010658 and the risk of 0.072766. Based on the F test can be concluded that the macroeconomic variables which investigated collectively affect the portfolio return. According to the t test which is done against the crisis variables for the three models based on calculation has no significant effect so that Ha_4 can be rejected. The variable of GDP value does not significantly influence the portfolio return only on the Markowitz model (reject Ha_3), while for other models have significant effect (accept Ha_3). Ha_1 is acceptable on each model the formation of a portfolio where inflation has a negative effect or has the opposite relationship to portfolio return. Based on Ha_2 calculation is unacceptable because of its positive value indicating unidirectional relationship with portfolio return Based on the four models of optimal portfolio performance assessment and based on the coefficient of variation, the

establishment of an optimal portfolio with constant correlation model has a performance. The result also implied that investors who want to form an optimal portfolio can consider using a constant correlation model because the model can provide optimum return and risk compared to single index and Markowitz model.

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PAGE 1

PAGE 2

PAGE 3

PAGE 4

PAGE 5

PAGE 6