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Value At Risk and Expected Returns of Portfolio (Companies Listed on LQ45 Index Period 2013–2016)

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Abstract

The objective of this research is to investigate whether there is a positive relationship between Value at Risk and Expected Portfolio Returns on the Indonesia Stock Exchange. The population of this research is companies listed on the LQ45 index for the period 2013–2016, and the sample is 20 companies that meet the criteria. Markowitz method was used to form 65 portfolios; each consists of a combination of two stocks that have a negative correlation. The result shows that there is no positive relationship between Value at Risk and Expected Portfolio Returns. On the contrary, the correlation coefficient indicated that there is a negative relationship between the variables, which means that there is an inverse relationship (high return low risk, and vice versa). It proves that the assumption of a rational investor is avoiding risk (risk averse). This result is also supported by the findings from Schroders Global Investment Trends Survey 2015, which shows that 63% of investors in Indonesia prefer to allocate their investments in instruments with low- and medium-risk levels. However, it does not mean that the concept of high-risk high-return is not applicable in Indonesia because the result is not significant.

Keywords: Value at Risk, Markowitz Method, Expected Return Portfolio

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1. Introduction

All investors have the objective to gain profit from equity investments in companies. Investors who invest their money in stock markets hope to gain profit from rising stock prices or the amount of dividends in the future. To achieve these objectives, the investor must perform an analysis of the shares to be purchased. A rational investor will focus on (1) the highest return rate with a certain level of risk and (2) a certain level of return with low risk. To reduce investment risk, investors can invest in various types of stock by forming a portfolio.

Financial professionals break investors into categories based on the investor's appetite for risk: risk averse, risk neutral and risk seeking. In determining the efficient

portfolio, there are two models that can be used, the Markowitz model and Single Index model. Single Index model assumes that the rate of return between two or more stocks will be correlated, move together and have the same reaction to one factor while The Markowitz model emphasizes the relationship between return and risk of the portfolio investment. The Markowitz model can overcome the weakness of random diversification. The assumption that the continuous increase in the number of stock in one portfolio will bring greater benefits is in contrast to the Markowitz model. The Markowitz model introduces a portfolio diversification model. The firm-specific risk reduction is done by diversifying so that only the systematic risk remains, also known as the insurance principle.

Understanding about risk is important for every investor and potential investor. Before making an investment decision, an investor should at least consider two things, the expected return and risk contained from investment alternatives. The higher the risk faced by an investor, the higher the investor to gain expected return.

In modern investment management, it is common to divide the total risk investment into two types of risks, namely systematic risk and unsystematic risk. According to Gallati (2003), the risk is defined as a condition in which an exposure may be harmful or disadvantageous. The risk in investments is the uncertainty faced because of the price of an asset or investment being smaller than the expected return.

Value at risk (VaR) is currently very popular and one of the most widely used risk measures in finance. It was popularized by Morgan in the 1990s. VaR can be defined as the estimated maximum loss to be gained over a certain period of time under normal market conditions at a certain confidence level (Jorion, 2007). For investors, risk is about the odds of losing money, and VAR is based on that common-sense fact. By assuming investors care about the odds of a really big loss, VAR answers the question, 'What is my worst-case scenario?' or 'How much could I lose in a really bad month?' (Harper, 2017).

The first research to examine the VaR-return relationship in the context of asset pricing was Bali and Cakici (2004). They investigated whether there is a relationship between VaR-return in portfolio level as well as the direction of the relationship of the two variables. They found that a strong relationship exists between expected returns and VaR at portfolio level. Iqbal and Azher (2014) also found that average portfolio returns are positively correlated with VaR. There is a strong relationship between expected portfolio returns and VaR. The results show that, the greater a portfolio's potential losses as captured by VaR, the higher will be the expected return.

This research will analyze the relationship between Value at Risk and average returns in portfolio level of companies listed on the Index LQ45 of the Indonesia Stock Exchange. The portfolio formation will be different from previous research which used a decile method to form portfolio, as this research will use the Markowitz method to form the portfolio. Companies listed on the LQ45 Index are selected for sampling on the basis of the consideration that they are the companies with the most significant capitalization rates and it will consist of companies with a broad range of industries, so that this research can provide a broader picture. The Pearson correlation test is used to examine whether there is a positive relationship between Value at Risk and expected portfolio return of Index LQ45 on the Indonesia Stock Exchange.

2. Literature Review

Investment is investing assets for the purpose of gaining profit in the future. Investing in the broadest sense means sacrificing dollars now to move forward in the future. There are two factors to consider in making the investment, the expected returns and risk. Almost all investments contain uncertainty, so investors do not know the results they will get. This is why investors tend to prefer investments that generate the highest returns, but do not like the high risk.

A portfolio is a series of combinations of several assets that are invested by both individual and institutional investors. A rational investor will choose to hold efficient portfolios that provide the largest expected return with the same risk or, provide the smallest risk with the same expected return. Essentially, the formation of a portfolio is to reduce risk by diversifying, that is, allocating funds to various investment alternatives whose assets in the portfolio are mutually correlated. It is necessary to identify what proportion of funds will be invested in each asset in order to make a portfolio with large profits, but a small risk.

Measuring the returns and risks for single securities is important, but, for portfolio managers, returns and risks of all securities within the portfolio are needed. Nevertheless, return and risk of single securities are also useful because they will be used to calculate portfolio return and risk. The portfolio realized return is the weighted average of the realized returns of each of the individual securities in the portfolio and expected portfolio return is the weighted average of the expected returns of each of the single securities in the portfolio.

In portfolio theory, risk is expressed as a possible profit deviating from the expected. Therefore, risk has two dimensions, that is, deviate greater or less than the expected

return. Portfolio risk can be measured by the amount of standard deviation or variant of the single securities returns in the portfolio. The risk of a portfolio does not represent a weighted average of all the risks of a single security. Portfolio risk may be less than the weighted average risk of each single security.

Markowitz (1952), in his article entitled *Portfolio Selection*, suggests how an investor can form a portfolio that produces the highest level of profit based on a certain risk stage, or form the lowest-risk portfolio at a certain stage of profitability. Markowitz's diversification strategy seeks to combine portfolio assets with returns that have less than perfect positive correlations, with the goal of reducing portfolio risk (variance) without reducing returns. This model believes that additional shares in one portfolio, at a certain point, will further reduce the risk of diversification and will increase the risk level. The fundamental assumption underlying the Markowitz approach to portfolio analysis is that investors are basically risk-averse. Markowitz then developed a model of portfolio analysis that can be summarized as follows. First, the two relevant characteristics of a portfolio are its expected return and some measure of the dispersion of possible returns around the expected return; the variance is analytically the most tractable. Second, rational investors will choose to hold efficient portfolios – those that maximize expected returns for a given degree of risk or, alternatively and equivalently, minimize risk for a given expected return. Third, it is theoretically possible to identify efficient portfolios by the proper analysis of information for each security on expected return, variance of return and the interrelationship between the return for each security and that for every other security as measured by the covariance.

To reduce the risks they face, investors diversify their investments. Diversification in the statement means that investors need to establish a portfolio in such a way that risk can be minimized without reducing the expected return. Markowitz diversification is the formation of a portfolio taking into account the covariant and negative correlation coefficient between assets in order to reduce the level of portfolio risk. An example of two such securities is two stocks whose price always moves in opposite directions. If one rises, the other goes down with the same degree, and vice versa. Markowitz also found that diversification can always lower portfolio risk, as long as the correlation coefficient is not positively perfect or smaller than one.

Value at Risk or VaR is a statistical risk measurement method that estimates the maximum possible loss of a portfolio at a given level of confidence (Best, 1998). Simply, VaR would like to answer the question, how much (in percent or a certain amount of money) an organization, company or individual can lose during the investment period T with a confidence level of α. In relation to the ease of understanding of VaR

values, Stambaugh (1996) states that VaR has the following functions: a.) Providing a common language for risk; b.) Allowing for more effective and consistent internal risk management, risk limit setting and evaluation; and c.) Providing an investor-wide mechanism for external regulation, and providing investors with an understandable tool for risk assessment.

According to Jorion (2007), VaR has several benefits for financial institutions, regulators, non-financial corporations, and asset managers, including: (a) Passive role in information reporting – since VaR provides benefits in measuring overall risk, then VaR can be used in management of analyzing risks of investment and trading activities, and reporting of corporate risk to shareholders in non-technical scope more easily; (b) The defensive role in controlling risk – because VaR can be used to determine the position limits for business units and traders, then VaR can create a decisive factor for the comparison of risky activity in various markets; and (c) Active role in managing risk – because VaR can be used for the allocation of wealth among traders, business units, products and even whole institutions. The process begins with the adjustment of return on the risk, so it will automatically correct incentives for traders. In addition, VaR also helps portfolio managers make better decisions by providing a comprehensive consideration of the impact of riskier portfolio trade.

The first research to examine the VaR-return relationship in the context of asset pricing was Bali and Cakici (2004). They investigated whether there is a relationship between VaR-return in portfolio level as well as the direction of the relationship of the two variables. The regression of portfolio returns on VaR are statistically significant, which means that a strong relationship exists between average returns and VaR at portfolio level. Following Bali and Cakici (2004), in order to capture the relationship between VaR and expected returns, Chen et al. (2014) investigated the pricing of VaR on Taiwan's stock market and found a positive risk premium for VaR.

Iqbal and Azher (2014) investigated whether stock portfolios with a higher maximum likely loss (as measured by VaR) earn higher expected returns. Starting from 1995 through December of each subsequent year, they sorted the sample of KSE stocks' VaR levels to determine the decile breakpoint for each VaR stock. They then allocated the stocks into 10 VaR deciles portfolios. Decile 1 comprises the 10%of stocks with the lowest VaR; decile 10 represents 10%of stocks with the highest VaR and computes the equally weighted average returns for the stocks in each decile. They found that average portfolio returns are positively correlated with VaR. There is a strong relationship between average returns and VaR. The direction of the relationship is positive, which means that both VaR and average return tend to increase together. The results

show that, the greater a portfolio's potential losses as captured by VaR, the higher will be the expected return. Portfolios of higher-VaR stocks appear to yield higher returns than lower-VaR portfolios.

This research aims to test whether there is a relationship between variables X (Value at Risk) and variable Y (Expected Portfolio Return). The portfolio formation will be different from the previous research as it will use Markowitz method instead of decile method to form the portfolio.

H_0: There is no positive relationship between Value at Risk and Expected Portfolio Return on the Indonesia Stock Exchange

H_a: There is positive relationship between Value at Risk and Expected Portfolio Return on the Indonesia Stock Exchange

3. Methods

This research is an associative research with the form of causal relationships. Associative research is a research that aims to determine the influence or relationship between two or more variables. The population in this research are companies listed on the Indonesia Stock Exchange and which are included in the LQ 45 index in the period January 2013 until December 2016. The reason for LQ 45's stock selection is to reduce or eliminate the liquidity problem or assuming that, by choosing the shares included in LQ45, the shares can be traded at any time at market price.

A purposive sampling technique is applied. Purposive sampling is a non-probability sampling method and occurs when 'elements selected for the sample are chosen by the judgment of the researcher. Researchers often believe that they can obtain a representative sample by using a sound judgment, which will result in saving time and money'. The criteria in this research are as follows:

1. Listed in the LQ45 index continuously for the period 2013–2016

2. Does not have a negative average return

Based on the aforementioned criteria, we obtained 20 companies as the sample.

The data required in this research are secondary data. The data used are the stock price data that have been published on the Indonesia Stock Exchange (IDX) and are accessible through www.yahoofinance.com and which will be processed to get return from each share. Data used for this research are monthly returns of stocks.

The research variables are defined as everything that is determined by the researcher to be studied, then, having obtained the information, drawing a conclusion. Based on the issues that have been discussed previously, the variables to be analyzed are grouped into:

1. Dependent Variable

   The dependent variable is the variable that is explained or influenced by independent variables. The dependent variable (Y) is expected portfolio returns. The expected profits to be gained from investment activities and also rewards for investors' decision to bear the investment risk.

2. Independent Variable

   Independent variables are variables that describe or affect other variables. The independent variable is Value at Risk of Portfolio. Value at Risk measures the worst expected loss that an institution can suffer under the normal market conditions at a given confidence level.

To analyze data in research requires techniques in accordance with the object of research. In this research, the analysis technique used is the Markowitz model to form the portfolio. Building a portfolio is one of the favorable alternatives for investors compared to purchasing individual shares. The formation of this portfolio can minimize the level of risk borne by investors due to the spread of risk.

The formation of the portfolio consists of two combinations of stocks that have a negative correlation, because the lower the correlation coefficient, the greater will be the benefits of diversification and optimal diversification will be achieved when the correlation coefficient is negative 1. After forming the portfolios, Value at Risk and expected returns of portfolio can be calculated.

Correlation is a statistical technique used to test whether there is a relationship and the direction of the relationship of two or more variables. To test the hypothesis proposed in this research, Pearson Product-Moment Correlation is used.

a. If Correlation Coefficient > 0, then there is a positive relationship between variables (H_a Accepted),

b. If the Correlation Coefficient < 0, then there is no positive relationship between variables (H_0 Accepted).

4. Result and Discussion

There are 45 stocks listed on the LQ45 Index on the Indonesia Stock Exchange, but there are only 27 stocks continuously listed for the period 2013–2016. Stock with average positive returns is also one of the criteria for the sample, so, if the stock has negative average returns, then it will be taken out. This leads the total sample to decrease to 20 stocks with observation for 48 months (four years).

From the 20 stocks, a portfolio will be formed using Markowitz method. Forming a portfolio is one of the favorable alternatives for investors compared to purchasing individual stock. A portfolio can minimize the level of risk borne by investors due to the spread of risk. In this research, the formation of the portfolio consists of two combinations of stocks listed on the LQ45 Index consecutively from 2013–2016.

The portfolio diversification grouping in this research is based on correlation test results on the stocks. From these values, they are then grouped into two stocks that have negative correlation into one portfolio. From the results of the correlation coefficient of each share, there are 65 combinations of shares that have a negative correlation. The proportion used in this research is the same proportion (50%: 50%).

The highest expected portfolio return is on portfolio 53, which is a combination of PT. Indofood CBP Sukses Makmur Tbk. and PT. Unilever Tbk., which is equal to 0.0207 or 2.07%, while the lowest expected portfolio return is on portfolio 49, which is a combination of shares of PT. Gudang Garam Tbk. and PT. Bukit Asam Coal Mine Tbk., which is equal to 0.0045 or 0.45%.

For the Value at Risk calculation, portfolio 27 has the smallest Value at Risk, which is 6.48%. That means that, if an investor invests in portfolio 27, the maximum loss that will be borne by the investor will be 6.48% of the investment. The highest Value at Risk is 16.06%, which is portfolio 37. Investors will maximally lose 16.06% of their money if they invest in this portfolio.

Testing the hypothesis aims to determine the relationship of the independent variable (Value at Risk) on the dependent variable (Expected Portfolio Returns). The following table is the result of correlation models in this research.

Based on Table 1, the correlation coefficient value is –0.113. If Correlation Coefficient < 0, then there is no positive relationship between variables (H_0 Accepted). The correlation coefficient from the results of this data analysis is negative, thus indicating the direction of the relationship is inversely proportional. The coefficient interval is < 0.21, so the level of correlation between Value at Risk and Portfolio Return is very weak. The result shows that there is a weak negative relationship between Value at Risk and

TABLE 1: Correlations test result.

		VaR	Return
VaR	Pearson Correlation	1	−0.113
	Sig. (2-tailed)		0.370
	N	65	65
Return	Pearson Correlation	−0.113	1
	Sig. (2-tailed)	0.370	
	N	65	65

Expected Portfolio Return of the LQ45 Index on the Indonesia Stock Exchange, which means that, if Value at Risk increases, then Expected Portfolio Return decreases, and vice versa.

The result of this research is different from previous research that found a strong positive relationship between Value at Risk and Expected Portfolio Return. This is also contrary to a very popular phrase in finance, which is 'high-risk high-return'. The principle of high-risk high-return is used as the basis for decision-making in financial planning, especially investment. However, it proves the assumption of a rational investor is avoiding risk (risk averse). This result is also supported by the findings from Schroders Global Investment Trends Survey 2015 which shows that 63%of investors in Indonesia prefer to allocate their investments in instruments with low and medium risk levels.

However, it does not mean the concept of high-risk high-return is not applicable in Indonesia because the probability value is high, which means that the negative relationship between variables is not significant. When a significance test results in a high probability value, it means that the data provide little or no evidence that the alternative hypothesis is false. So, more evidence is needed to support that there is a negative relationship between Value at Risk and Expected Portfolio Return in Indonesia.

In this research, the portfolio consists of two stocks that have negative correlation in order to reduce the risk. In addition, risk diversification also can be done by increasing the number of assets (more than two) into the portfolio until the portfolio provides certain returns for investors with minimal risk or offers under the same conditions with maximal returns. It is possible that the concept of high risk high return can occur by adding more stocks to the portfolio, so the risk will be reduced. Still, the benefits of portfolio risk reduction will reach its peak point when the portfolio consists of several types of stocks, and, after that, the benefits of portfolio risk reduction will not have its effect again.

5. Conclusion

Based on the results of the calculation of the data that has been done as described, as well as the problems and objectives of the background of this research, it can be concluded that: Value at Risk has no positive relationship with Expected Portfolio Return of companies listed on the LQ45 Index on the Indonesia Stock Exchange for period 2013–2016. The correlation coefficient is negative (–), indicating the opposite relationship, meaning the relationship between the two variables is inversely proportional. The result shows that there is a weak negative relationship between Value at Risk and Expected Portfolio Returns, which means the greater a portfolio's potential losses as captured by VaR, the lower will be the expected portfolio return. It also indicates that the higher the risk, the lower will be the expected portfolio return, and vice versa. It shows that Indonesian investors prefer to invest in low risk stocks or in avoiding risk, which is in line with Markowitz's theory that assumes investors are rational and avoid risk when possible.

The significant test result shows a high probability value, which indicates there is insufficient evidence to conclude that there is a significant linear relationship between Value at Risk and Expected Portfolio Return on the Indonesia Stock Exchange. More evidence is needed to say that there is a negative relationship between the two variables. The concept of high risk high return can likely happen by increasing the number of stocks in the portfolio.

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