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The Analysis of Risk Adjusted Return Portfolio Performance Share for LQ 45 Index in Indonesia Stock Exchange in 2010-2014 Periods

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Abstract

This research focuses on portfolio performance analysis of LQ45. The purpose of this research is to analyze the consistency of Sharpe index, Treynor index and Jensen index as measurement of risk-adjusted performance. This research uses Kruskal Wallish test to analyze the consistency of those indexes as measurement of risk-adjusted performance. Before that, standardized with Z-score transformation was conducted to test comparison between treatments. This result indicates that there is no significant difference between the techniques test. Furthermore, according to the three tools used, Treynor's shows the consistent result from performance measurement.

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1. Introduction

Portfolio can be interpreted as investment in various financial instruments that can be traded on the Stock Exchange and financial markets with the aim of spreading out the sources of acquisition and possible return of risk. Portfolio can also be interpreted as a series combination of assets invested and held by investors, both individuals and institutions. In capital markets, the portfolio associated with the portfolio of financial assets that is a combination of several stocks so investors can achieve optimal returns and minimize risk. The existence of a positive relationship between return

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and risk in an investment known as a high risk-high return, which means that the greater risk borne the greater generated return.

The expectation of an investment decision in the portfolio of course requires supporting information, such as the rate of return and risk (standard deviation). The problem is to determine the portfolio of stocks that generate high returns with low risk based on historical history. Investors should be aware in taking into account factors that affect the performance of the stock portfolio. The testing of portfolio performance was conducted to determine the extent of the portfolio held for an investor results.

Portfolio performance is not only measured by the magnitude of portfolio return, but also should consider the amount of risk that must be borne to obtain the magnitude of the return, or in other words should consider both the so called return compliance risk (risk adjusted return). (Jogiyanto, 2010).

To measure the performance of the portfolio, it can use three parameters developed by William Sharpe, Jack Treynor and Michael Jensen. The third performance measurement is called performance measures Sharpe, Treynor performance and performance Jensen (Tandelilin, 2010). All three models return to base its analysis on the past to predict the future return and risk (Samson, 2006).

Sharpe index emphasis on total risk (standard deviation), Treynor index emphasis on systematic risk as measured by beta, while the index Jensen emphasizes the difference between the actual rate of return earned by the portfolio expected rate of return if the portfolio on the capital market line (Jogiyanto, 2010). This explanation shows that the results of the calculation of the index will provide information on the performance of a portfolio of different rank.

The correlation between the indexes will reflect the consistency between employment indexes in the ranks of the portfolio. Consistency risk adjusted return is measured with Sharpe index, Treynor and Jensen reflected on the significance of the third correlation value measuring devices on different groups of stock portfolios. Index that has the highest correlation value in a diverse group stock portfolio can be regarded as an index that has a better consistency than the other indexes (Wikusuana and Purnawati, 2008).

The results of studies that have been done before, the portfolio performance measurement using Sharpe, Treynor and Jensen is Jobson and Korkie 1981 showed that Sharpe and Jensen showed good performance on monthly data and the small sample while Treynor not perform well on a small sample by using t-test analysis. While Kurniawan and Purnama (2001), Fadlul Fitri (2002), Yusman Suryana (2003), showed that the three models of portfolio performance measurement showed the same results or the consistency of the three methods. Suryawan research (2003) and Sulistyorini (2009) test result differences in portfolio performance measurement using Sharpe Index, Treynor index, and Jensen index with Kruskal Wallis test did not show any significant difference in measuring performance using Index Sharpe, Treynor, and Jensen. The difference of this research is still the case or whether there is a correlation inconsistency with the third performance measure describing portfolio. Based on this study, it aims to examine whether there are differences in the results or produces the same result between measurements of performance as measured through risk adjusted portfolio return.

1.1. Research Objectives

- To Analyzing the stock index return and market return of the 45 index in Indonesia Stock Exchange in period of 2010-2014.
- Analyze the total risk and systematic risk in the stock index LQ45 in Indonesia Stock Exchange in 2010-2014.
- Analyze the abnormal return (excess return) in LQ45 in Indonesia Stock Exchange 2010-2014.
- Analyze the performance of a portfolio of LQ45 index as measured by the method of Sharpe, Treynor and the LQ45 index in Indonesia Stock Exchange 2010-2014.

1.2. The Purpose Of The Research

- Giving input and consideration for investors and potential investors in investing in the stock market
- This study is expected to provide additional insights and views on the optimal stock portfolio performance by using Sharpe, Treynor and Jensen methods in adverse field stock.

2. Literature Review

2.1. Theoretical Background

2.1.1. Capital Asset Pricing Model

Investment process shows how an investor making an investment decision on the effects of commonly marketed, and when to take the decision. Selection of many securities intended to reduce the risks covered. The portfolio is a collection of assets owned by investors who serve as the investment unit. Return and risk can be used as a means of evaluating the performance of a portfolio.

Capital Asset Pricing Model is a form of general equilibrium relationship for the return of assets separately developed by Sharpe (1964), Lintner (1965) and Mossin (1969), so the model is often called the CAPM form Sharpe-Lintner - Mossin (Jogianto 2010). The main thing of the CAPM is a statement about the relationship between expected risk premium of individual assets and its systematic risk.

2.1.2. Risk and Return

The main goal in investing is to maximize investor returns without forgetting the investment risk factors that must be faced. Risk is a possible difference between actual returns received by the expected return. The more likely the difference the greater the risk of the investment itself (Tandelilin, 2010). The magnitude is the amount of investment risk standard deviation of expected return. The standard deviation is the square root of the variance that shows how much the spread between random variables average. The greater the spread, the greater the variance or standard deviation of the investment will be return is one of the factors that motivate investors to invest and also are ward for the courage of investors bear the risk of their investments (Tandelilin, 2010:102)

2.1.3. Portfolio Performance

Measurement of portfolio performance is based on the theory of capital market which already incorporate risk factors is Sharpe index, Treynor index and Jensen index. A third explanation of the performance measures are as follows, (Jogianto, 2010).

- **Sharpe Index**
One of the methods used to compare the performance of the portfolio is by using the concept of capital market line / Capital Market Line (CML) or better known as the Reward to Variability Ratio (RVAR). RVAR value indicates the performance of the portfolio, the greater the value RVAR the more the performance of its portfolio.
- **Treynor Index**
Treynor as one of the index t used to measure portfolio performance, Treynor assumes that the portfolio is much diversified known as the Reward on Volatility Ratio (RVOR). Portfolio performance is calculated by the measuring is done by dividing the excess return with volatility. Meanwhile, the portfolio performance shows RVOL portfolio. As high the value of RVOL performance, the better the portfolio performance is.
- **Jensen Index**
As one of the measure of the portfolio performance, CAPM Jensen is very concerned in measuring the performance of the portfolio which is often referred to as Jensen ALPHA (differential return measure). In slope, the performance of the portfolio can also be determined by the intercept (intercept). The higher the return, the higher intercept portfolio is.

2.2 Theoretical Framework

There are various models used to test the performance of a portfolio, one of which is a Sharpe model Treynor, and Jensen. But at the end, the result between portfolio performance using the Sharpe index, Treynor, and Jensen

showed the same results or different. Based on some of the basic concepts and review of the literature on top of the theoretical framework used in this study can be seen in Figure 2.1 below.

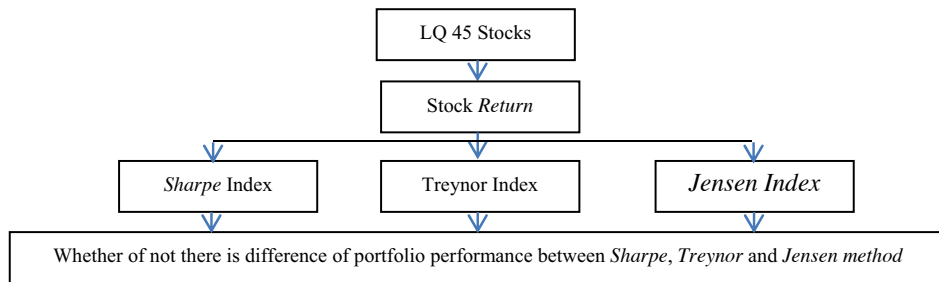


Figure 1 Theoretical Framework

2.2.1. Hypotesis

The hypotheses proposed in this study are as follows:

Ho: There is no significant difference of Sharpe, Treynor and Jensen methods in measuring the performance of a portfolio of stocks in the LQ45 index in Indonesia Stock Exchange 2010-2014.

Hi: There is a significant difference method of Sharpe, Treynor and Jensen in measuring the performance of the portfolio in LQ 45 index in Indonesia Stock Exchange 2010-2014

3. Research And Method

3.1. Type and Data Source

Data used in the study lists different types of secondary data, in the form of monthly stock index data incorporated in the calculation LQ45, LQ45 index, interest rate as an indicator of the risk free during the period 2010-2014.

3.2. Population and Sample

The population in this study is all publicly traded companies listed on the Jakarta Stock Exchange in the period 2010 to 2014. The sample in this study is purposive sampling. Based on sample, the selection of observation period is 5 years from 2010 to 2014 and obtained a sample of 14 stocks because it is consistently listed as the LQ45 index.

3.3. Method Of Collecting Data

Data used in this research is secondary data. Data was collected through the literature study by reading reference books, research journals, and other literature relating to the matter being investigated

3.4. Operational Variables

The operational definition of each variable can be seen in the following table.

Table 1 Definition of Operational Variable

No	Variable	Definition	Measurement Scale
1	Rate of return portfolio	Total of multiplication between the proportions of securities I on all securities in the portfolio with are turn realization of securities.	$R_p = \sum_{i=1} (W_i * +R_i)$
2	Risk free rate	Risk-free interest rate in period t	Proxi with interest rate of Bank Indonesia / SBI (Bank Indonesia Cetificate)
3	Market risk/portfolio systematic risk	Number of multiplication between the proportion o f securities I on beta of a stock	$\beta_p = \sum_{i=1} (X_i * +\beta_i)$
4	The risk of total(sum systematic c and Unsystematic	Deviation rate of return derived from the average rate of return	$\sigma_p = \frac{\sqrt{\sum RP - RF}}{\sqrt{(n - 1)}}$
5	Index Sharpe (RVAR)	Average ratio between the difference of portfolio returns and risks with a total risk-free return portfolio	$RVAR = \frac{TR_p - R_{BR}}{\delta_p}$
6	Index Treynor (RVOR)	Average ratio between portfolio return and risk-free returns with beta portfolio	$RVOR = \frac{TR_p - R_{BR}}{\beta_p}$
7	Index Jensen (ALPHA)	The difference between the average return of the minimum rate of return.	$\alpha_p = (TR_p - R_{BR}) - \beta_p(R_m - R_{BR})$

3.5. Data Processing Method

Data analysis method used in this research is quantitative analysis is used to analyze the performance measures portfolio of stock index in corporate in LQ45 index over the study period. Steps to measure the performance of the portfolio is as follows:

Measurement of portfolio performance

1. Calculate the Stock Return (R_i)

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

2. Calculate Market Return (R_m)

$$R_m = \frac{ILQ45_t - ILQ45_{t-1}}{ILQ45_{t-1}}$$

3. Calculate Total or Standard Deviation Risk (δ)

$$\delta = \frac{\sqrt{\sum_{i=1}^n (X_i - E(X_i))^2}}{n - 1}$$

4. Calculate Systematic Risk or Market Risk (β)

$$\beta_i = \frac{\delta_{tm}}{\delta_{m2}}$$

Or can be defined as following:

$$\beta_i = \frac{\sum_t^n = 1 (R_{it} - R_{it}) - (R_{mt} - R_{mt})}{\sum_t^n = 1 (R_{mt} - R_{mt})^2}$$

Excessreturn = $TR_p - RB_R$ 5. Calculate Excess return

Measurement of stock portfolio performance with Sharpe, Treynor and Jansen methods

1. Measuring Portfolio Performance by Using *Sharpe* Method:

$$RVAR = \frac{TR_p - R_{BR}}{\delta_\rho}$$

2. Measuring Portfolio Performance by Using *Treynor* Method:

$$RVOR = \frac{TR_p - R_{BR}}{\beta_\rho}$$

3. Measuring Portfolio Performance by Using *Jensen* Method:

$$\alpha_\rho = \alpha_\rho = (TR_p - R_{BR}) - \beta_\rho(R_m - R_{BR})$$

3.6. Data Analysis Tool

- In data processing and data analysis tools, researcher uses a program such as Excel and programs Statistics Package for Social Science 17.0 (SPSS 17.0)
- Comparison of the performance of a stock portfolio using statistical test
Given the size of the performance of each method has different characteristics, in this case each method does not have a limit on the same performance, it is necessary to transform to standardize the performance measurement using the transformation Z-score (standardized). Z score calculated by the following formula (Sugiyono, 2012)

$$Z = \frac{(X_1 - X)}{S}$$

Furthermore, to examine the comparative k independent samples, when shaped ordinal data, the technique used is Kruskal-Wallis (Sugiyono, 2012). The formula used in the test is as follows (Sugiyono, 2009)

$$KW = \frac{12}{N(N + 1)} \sum_{j=1}^k \frac{R_j^2}{n_j} - 3(N + 1)$$

Whether or not the difference in the test will be indicated by the results of the probability of testing with testing decisions:

- If the probability of the third test $\leq 0,05$ portfolio performance measurement method is different
- If the probability $\geq 0,05$, then a third test portfolio performance measurement method does not have a significant difference.

Furthermore, comparing statistics calculated with Chi-Square statistical tables with the following criteria:

- a. If statistics count < statistical tables, then all three measurement methods do not differ significantly
- b. If the count statistics > Statistical tables, the three measurement methods differ significantly.

After testing the continuation of Kruskal Wallish, it also mean that the rank difference between treatment portfolio performance measurement to determine the method which is the most consistent performance

4. The Research Findings and Discussion

Selection is based on the observation sample in 5 years periods from 2010 to 2014 obtained a sample of 14 stocks because it is consistently listed as LQ45. As for the 14 stocks that were sampled is: (1) Astra Argo Lestari Tbk (AALI), (2) Aneka Tambang Tbk (ANTM), (3) Astra Internasional Tbk (ASII), (4) Indofood SuksesMakmur Tbk (INDF), (5) Tambang Batu Bara Bukit Asam Tbk (PTBA), (6) Timah Tbk (TINS), (7) Perusahaan Gas Negara Tbk (PTGS), (8) Telekomunikasi Indonesia Tbk (TLKM), (9) Bank Central Asia Tbk (BBCA), (10) bank Danamon Indonesia Tbk (BDMN), (11) Bank Negara Indonesia Tbk (BBNI), (12) Bank Rakyat Indonesia (BBRI), (13) United Tractor Tbk (UNTR), (14) Unilever Indonesia Tbk (UNVR). In a more detailed analysis and stock index return on the market index return LQ45 index in Indonesia Stock Exchange 2010-2014 period are described as follows:

4.1. Stock Return Index

Return index of shares over the period 2010 to 2014 with a range of minimum and maximum range of -0.0371 0.0669, if the index returns a positive company and the value the greater the return that will be better received. This means that on average over the study period from 2010 to 2014 amounted to -0.0371 lowest return in 2011 found in the company TINS, while the highest return in 2010 amounted to 0.0669 BBNI contained in the company.

4.2. Return Index Market

The average returns of the market index that is ILQ 45 during the period 2010-2014 with a range of at least -0.023 and a maximum range of 0.0212. If the stock return market has positive index, then the value is greater the return that is received, the better. This means that during the study period 2010 to 2014, the lowest return is -0.023 occur in 2013, while the highest return at 0.0212 occurred in 2010.

4.3. Total Risk

The average risk of total investments during the period 2010 to 2014 as measured by the standard deviation method is known range of at least 0.0284 and a maximum range of 0.3761. This means that during the study period 2010 to 2014 amounted to 0.0284 the lowest risk contained in PGAS Company in 2014 while the highest risk is 0.3761 is in BBRI company.

4.4. Systematic Risk

The average systematic risk investments during the period 2010 to 2014 as measured by beta know able range of at least -0.3817 and maximum range of 1,2.5837. The larger the beta value the more sensitive the company is to market changes. This means that during the study period 2010 to 2014 low of systematic risk -0.3817 AALI contained in the company in 2011, which means the company is not sensitive to changes in the market, while the highest was 2.5837 systematic risk contained in company BBNI in 2014 which means the company is more sensitive to market changes.

4.5. Excess Return Of Stock Index For LQ 45

The amount of return over (excess return) over the period 2010 to 2014 were obtained from the difference between expected returns with a risk-free return (risk free) in this case is the interest rate. The larger the value, the greater the excess return earned returns compared with the interest rates. During the study period, 2010 to 2014, the average

magnitude Excess lowest return of -0.0324 contained in the company ASII which means the company has a rate of return that is lower than the interest rate, while the highest excess return amounted to 0.0457 contained in the company BBNI in 2010 which means that the company return greater than the interest rate.

4.6. *Stock Portfolio Performance with Sharpe Method*

Average portfolio based on Shape in the period 2010 to 2014 the minimum value in the range of -2.3762 so that the maximum range is equal to 0.0178. During the study period the company that has the best performance according to Sharpe index is BBNI with a value of 0.0178 in 2010, while the company that owns the worst performance according to Sharpe index is TLKM in 2011 with a negative value of -2.3762.

4.7. *Stock Portfolio Performance with Atreynor Method*

The average performances of the portfolio based Treynor method in the period 2010 to 2014 are in the range of at least -1.5214 until maximum range is equal to 4,573. During the study period the company that has the best performance according to the Treynor index is TINSie in the year 2014 with a positive value of 4573 while the company that has the worst performance in Treynor index is TLKM on (Telecommunications IndonesiaTbk) in the year 2011 with a negative value of -1.5214.

4.8. *Stock Portfolio Performance with Jensen Method*

The average performance of the portfolio based methods Jensen from the period 2010 to 2014 are in the range of at least -0.1418 until maximum range is equal to 0.7727 If the index performance Jensen/positive Alpha and the greater the portfolio's performance is getting better. During the study period the company that has the best performance according to Jensen index is BBRI (Bank Rakyat Indonesia) with a positive value of 0.7727 in 2010 while the company has the worst performance according to Jensen index is AALI (Astra Argo Lestari Tbk) in 2014 with a negative value by -0.1418.

4.9. *The Comparative of Stock Portofolio Performance with Sharpe, Treynor and Jansen Indexes*

Based on the *kruskal wallish test*, the comparison of stock portofolio performance with Shape, Treynor and Jensen methods on LQ 45 index can be seen from the below table.

Table 2 The Result of Kruskal Wallish Test on Z-score Sharpe, Treynor and Jensen Indeks

Test Statistics ^{a,b}	
	Zscore
Chi-Square	1.313
Df	2
Asymp. Sig.	.519

a. Kruskal Wallis Test

b. Grouping Variable: Indeks

Source: Analysis Result 2014

Based on the table above is obtained $X^2=1.313$ with 0.519 significance. It can be seen that the probability of testing $0.519 \geq 0.05$ and X^2 count $1.313 < 5.99 X^2$ table. These results indicate that there was no significant difference in testing methods Sharpe, Treynor and Jensen. Thus the hypothesis in this study received. Performance measurement using methods Sharpe, Treynor and Jensen do not produce any significant difference on the results of performance of the portfolio during the period.

Additional testing by comparing the performance of the portfolio as a treatment calculation of Kruskal Wallish obtained no significant difference between each treatment is to see a third difference between the mean rank. The comparison treatment for each method can be seen in the following table.

Table 3 The Comparison *Treatment* between Sharpe, Treynor and Jensen Indexes

	Method	N	Mean Rank
ZScore	Sharpe	70	112.27
	Treynor	70	102,61
	Jensen	70	101.61
	Total	210	

Source: Analysis Result 2014

By looking at the difference between the three mean ranks methods, Treynor showed the most consistency to the lack of distinction between the three measurements, due to the difference in the mean Treynor choose the lowest rank on Sharpe and Jensen.

5. Conclusion And Suggestions.

5.1. Conclusion

There Based on the results of research and discussion, the conclusions that can be drawn in this study are:

- a. The highest stock return index is 0.0669 for BBNI (Bank Negara Indonesia Tbk) company in 2010 and the lowest is TINS (TimahTbk) in 2011 amounted to -0.0371. As for the highest market return at 0.0212 occurred in 2010 and the lowest was -0.023 occurred in 2013.
- b. The total lowest average risk investments were PGAS that was 0.0284 in 2014 and the highest was 0.3761 BBRI contained in the company in 2011. As for the average systematic risk low of -0.338 are in PGAS Company in 2014 and the highest was 1,326 for ASII (Astra International Tbk).
- c. The lowest average excess return is -0.0324 for ASII and the highest was 0.0457 found on BBNI in 2010. In this research, there are companies that excess its negative return that is ANTM, PTBA (Tambang Batubara Bukit AsamTbk) and TINS (TimahTbk)
- d. Stock portfolio performance assessed by the Sharpe, Treynor and Jensen methods
 1. Portfolio performance by using Sharpe method
During the study period, BBNI has the best performance with a value of 0.0178 in 2010 while the company that has the worst performance is TLKM in 2011 with a negative value of -2.3762.
 2. Portfolio performance by using Treynor method
During the study period, the company that has the best performance based on Treynor method is TINS in 2014 with a positive value of 4573, while the company that has the worst performance is TLKM on (Telecommunications Indonesia Tbk) in the year 2011 with a negative value of -1.5214.
 3. Portfolio performance by using Jensen method
During the study period, according to Jensen method, the company that has the best performance is BBRI (Bank Rakyat Indonesia) with a positive value of 0.7727 in 2010, while those with the worst performance is AALI (Astra Argo Lestari Tbk) in 2014 with a negative value of - 0.1418.

There is no significant difference between testing with Sharpe, Treynor and Jensen methods. Treynor method has the most consistency of the lack of distinction between the three measurements, due to the difference in mean rank because Treynor has the lowest at 101.61

5.2. Suggestion

Based on the conclusion of the advice that can be given in the hope it will do further analysis to give better results, then a few suggestions as follows.

- a. Portfolio performance calculation can be used to calculate the equity fund individual and sectoral as well as in the calculation of bond mutual funds
- b. Performance analysis of portfolios by using daily data in the calculation of portfolio return
- c. Future researchers can use other indexes such as the Reward to Market Risk, Reward to Diversification and information ratio.

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