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Research Article

Sharpe, Treynor and Jensen Methods in Doing Stock Portfolio Performance Analysis

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Abstract

This study aims to determine the performance of stock portfolios in the Property Industry, Real Estate and Building Construction sectors listed on the IDX for the period 2015 - 2019 using the Sharpe, Treynor and Jensen methods. The research method uses a comparative descriptive method. The population in this study were 91 companies. The sample selection technique used purposive sampling method and obtained a sample of 50 companies. The calculation of stock portfolio performance in this study uses a different test using One Way of Variance by Rank with Kruskal-Wallis. The results showed that there were significant differences in stock performance between the Sharpe, Treynor and Jensen methods. Another test by looking at the difference in the three mean ranks, the Treynor method is the one that shows the most consistency, because Treynor has the lowest mean rank difference compared to using the Sharpe and Jensen methods.

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Introduction

The property, real estate and building construction sectors play an important role in the economic and development sector in Indonesia. This sector is also an indicator to assess the economic development of a country. Developments in the property and real estate business sector are of course very attractive to investors because of the increase in land and building prices which continue to rise every year, land supply is fixed while demand will increase along with the increasing population and increasing human needs for housing., offices, shopping centers, and others. The building construction business in building facilities and infrastructure in Indonesia is growing and will also attract investors to invest because of the large number of developments. Investment in the capital market is one of the most developed investment fields today. A part from being a forum that brings together issuers and investors, investing in the capital market can also provide additional income in the form of capital gains and dividends for investors. To reduce the risk borne, investors can invest in various types of stocks by forming a portfolio. A stock portfolio is one of the strategies that investors use to reduce risk by allocating a certain amount of funds to various types of investments that can provide optimal returns. The strategy carried out aims to spread the possibility of risk without having to sacrifice the expected return (Christiaan, 2021; Husnan, 2005; Yanutama & Ismanto, 2020) A very important stage of the investment process is the portfolio performance evaluation stage. This is said to be important because it can identify whether the level of profit earned is in accordance with the risks borne and can provide information for investors to know as a whole what are the weaknesses and strengths of the portfolios that have been formed. In evaluating the performance of our portfolio, we do not only look at the level of return, but also the level of portfolio risk that must be borne and the objectives of the investment. The research phenomenon is based on data from the Indonesia Stock Exchange, the property sector index, real estate and building construction throughout 2017 fell 4.31% when the JCI actually jumped by 19.99%. The property sector did not improve even though Bank Indonesia interest rates fell and the loan to deposit ratio policy was relaxed. the performance of the property industry sector in the country which in the last 5 years has only grown at 3.5 percent. It is inversely proportional to national economic growth, which is in the range of 5 percent. The World Bank also released a report that the demand for housing in Indonesia reached 920 thousand units per year, while the availability figure only reached 400 thousand units per year. This shows the lack of development in the Property, Real Estate and Building Construction Industry in Indonesia which has not been able to meet the needs of housing in Indonesia. There are several studies that have been done before, regarding the measurement of portfolio performance using the Sharpe, Treynor and Jensen methods, namely research conducted by Hertina, Hidayat, and Saudi (2021) by conducting a comparison test of the three Sharpe Treynor models, and Jensen using the analysis tool pair sample test and ANOVA results. research shows that the method; Jensen, Sharpe, and Treynor differ significantly between the expected returns and those resulting from the 3 methods. This is due to differences in the variables used in the calculation and the need to standardize the performance measures used. Another study was conducted by Edy Hertina et al. (2021) using the Sharpe, Treynor, and Jensen methods with the Zscore and Kruskall wallis statistical tests.

Literature Review

Portfolio Performance Evaluation

Evaluation of portfolio performance is an important stage in the investment process because in this stage it can identify portfolios that have been formed or provide a relatively higher return rate than other portfolio returns and to find out these returns according to the level of risk borne. In addition to the level of return being considered, it is necessary to pay attention to other factors such as the level of portfolio risk and investment objectives.

Portfolio Performance Measurement

Erel, Myers, and Read Jr (2021) states that there are several methods of measuring portfolio performance that include the element of risk, namely the Sharpe, Treynor, and Jensen indices.

The three methods will then be used to analyze the portfolio performance in this study.

1. Sharpe Index. The Sharpe index was developed by William Sharpe and is often referred to as the reward-to-variability ratio. The definition of reward-to-variability is to measure the risk premium for each unit of risk in the portfolio. The Sharpe index bases its calculations on the concept of the capital market line, namely by dividing the portfolio risk premium by its standard deviation.
2. Treynor Index. The Treynor Index is a measure of portfolio performance developed by Jack Treynor, and this index is often called the reward-to-variability ratio (the assumption that the portfolio is well diversified so that the relevant risks are in systematic risk or beta). The Treynor index connects the level of portfolio return with the amount of risk from the portfolio. The assumption used by Treynor is that the portfolio is well diversified so that the risk that is considered relevant is systematic risk (measured by beta).
3. Jensen Index. The Jensen index is an index that shows the difference between the actual rate of return obtained by the portfolio and the expected rate of return if the portfolio is on the capital market line. The Jensen index is an excess of returns above or below the security market line. The Jensen index can easily be interpreted as a measure of how much the portfolio "beats the market". A positive index means that the portfolio provides a return greater than the expected return so it is a good thing because the portfolio has a relatively high return for its systematic risk level.

Investment is a term with several meanings related to finance and economics. In making the decision to invest, an investor must consider which stocks to choose. The stocks chosen must be those that provide a maximum return with a certain risk, or a certain return with a minimum risk. To find out which stocks are selected, it can be done by classifying the shares by forming an optimal portfolio of stocks. The term investment relates to the accumulation of a form of asset with the hope of obtaining future benefits. Islamic stocks also have the same rate of return and risk as conventional stocks. The resulting optimal portfolio is included in a measure of the performance of the stock portfolio. Portfolio performance using risk-adjusted return measures can be measured by the Sharpe index, Treynor index, and Jensen index (Erel et al., 2021). The stock portfolio criteria must know the rate of return and the resulting risk. Poor market conditions can reduce portfolio performance. Sharpe index can be used to rank several portfolios based on their performance, where the higher the Sharpe index of a portfolio compared to other portfolios, the better the portfolio performance. Portfolio performance can be measured by dividing the return over the portfolio volatility (Turcaş, Dumiter, Braica, Brezeanu, & OPREȚ, 2016).

Hypothesis

H_1: The results of measuring stock portfolio performance have no significant differences.
H_2: There are significant difference in the results of measuring portfolio performance using the Sharpe, Treynor, and Jensen Indixes.

Research Methodology

This study uses a descriptive method and is a quantitative study, because the data that has been collected and expressed is in the form of numbers. Quantitative research is usually used in research that aims to test a theory, present a fact or describe static, to show the relationship between variables and some are developing concepts, developing understanding or describing many things Liu, Liu, Shao, and Yu (2021). Data in the form of numbers will then be analyzed using statistical methods. The sampling technique used purposive sampling.

Research Sample Criteria:

1. Companies included in the category of the Property Industry, Real Estate and Building Construction sectors listed on the Indonesia Stock Exchange for the period 2015-2019.
2. Companies that own and publish share price data during the research period
3. A portfolio of stocks that are actively traded during the 2015-2019 period.

Research Results and Discussion

Comparative Analysis of Stock Portfolio Performance Using the Sharpe Index, Treynor Index and Jensen Index Method.

In this study, portfolio performance will be measured using three different methods, namely the Sharpe, Treynor, and Jensen methods. Portfolio performance measurement for the three different methods requires data in the form of portfolio return, standard deviation, market return and risk-free rate. Considering that the three methods have different formulations and performance measurement characteristics, the performance index value obtained from the calculation of the index number is different. The index value using the Sharpe method is in the range of -0.2042 to the maximum range of 0.2178. For index numbers with the Treynor method in the range of -0.0213 to the maximum range of 0.2774. Meanwhile, the index number using the Jensen method is in the range of -0.0198 to the maximum range of 0.0315. Each method of stock portfolio performance has a relative numerical basis that cannot be compared directly with one another, considering that the measurement methods are different. This makes this study necessary to standardize the index value of the three measurement methods.

Transformation Result Z-score (standardized)

In this study, to conduct a standard assessment of each performance measurement using the Z-score transformation method (standardized). Z-score is a way of converting data values into standardized scores which have a means equal to zero and a standard deviation equal to one.

Table 1.
Value of Mean and Standard Deviation of Output Z-score

Descriptive Statistics

N		Minimum	Maximum	Mean	Std. Deviation
Zscore	150	-.2609	.2774	-.018885	.0730046
Method	150	1	3	2.00	.819
Valid N (listwise)	150				

Source: Result of Data Processing (2020)

Table 1 shows the number of samples in this study as many as 150 with a mean value of -0.018885 and a standard deviation of 0.730046. The resulting minimum value of -0.2609 is generated from the Sharpe index measurement and the maximum value of 0.2774 is generated from the Jensen index measurement.

Kruskal-Wallis Test Results

After knowing the ranking of each portfolio performance measurement using different methods, the next step is to test whether the portfolio performance will have the same ranking when measured using three different methods. Because the data used next is in the form of ranking, then testing with non-parametric statistics will be more appropriate to use. This test is done by comparing the same sample or the same case with different conditions. Each sample is measured under all conditions, so for a design like this it is called a One-way analysis of variance by rank with the method used is the Kruskal-Wallis test

Table 2
Kruskal Wallis Test Results against the Z-score of the Sharpe, Treynor and Jensen Indices

Test Statistics[a, b]
Nilai

Kruskal-Wallis H	10.675
Df	2
Asymp. Sig.	.005

a. Kruskal Wallis Test
b. Grouping Variable: Metode

Source: Result of Data Processing (2020)

Testing between treatments that have the lowest mean rank difference is the most consistent form of portfolio performance measurement method. The results of the mean rank test can be seen in table 3 as follows:

Table 3
Comparison between the Sharpe, Treynor, and Jensen Treatment Indices

Ranks

	Method	N	Mean Rank
Zscore (Amount)	Sharpe	50	59.28
	Treynor	50	81.57
	Jensen	50	85.65
	Total	150	

Source: Result of Data Processing (2020)

Table 4
Difference in Mean Rank Index Sharpe, Treynor dan Jensen

Method	Difference			Amount
	Sharpe	Treynor	Jensen	
Sharpe (59.29)	0	22.28	26.36	48.64
Treynor (81.57)	22.28	0	4.08	26.36
Jensen (85.65)	26.36	4.08	0	30.44

Source: Result of Data Processing (2020)

By looking at the difference between the three mean ranks, the Treynor method is the method that shows the most consistency, because Treynor has the lowest mean rank difference against Sharpe and Jensen. The results of this study support the research conducted by Hertina et al. (2021) which states that there is a significant difference between testing using the Sharpe, Treynor and Jensen methods. This is due to differences in the variables used in the calculation of each method. The Jensen, Sharpe and Treynor method is built with different assumptions, because:

1. The Sharpe performance measure is constructed with the assumption that it is a measure

of return from the ratio of returns divided by risk. The Sharpe method states that the portfolio performance series is calculated which is the net yield of the portfolio with a risk-free interest rate per unit, and if it gets a positive and bigger result, then portfolio performance is getting better.

2. The Treynor Performance Measure is built on the assumption that stocks are highly diversified. Is a measure of return per unit risk. This excess return is defined as the difference between the return on shares and the risk-free rate of return in the same evaluation period. The Treynor method states that the Treynor index is the right measuring tool because it is a fully diversified portfolio.

3. The Jensen performance measure is built with an assumption model that investors will estimate a constant rate of return during the investment period by obtaining the Jensen ALPHA rate of return above (below). So that the predictive power of the 3 methods is different and this proves that the results are significantly different.

Conclusion

1. According to Sharpe, the measure of stock portfolio performance dominantly shows negative results, with a minimum value of -0.2042 on ACST shares, and a maximum value of 0.2178 in INPP shares. This shows that the performance of the stock portfolio during the observation period still provides returns below the risk-free rate.

2. Treynor's calculation, the stock portfolio produces a minimum value of -0.0213 on ACST shares, and a maximum value of 0.2774 on JKON shares. This can be caused by the inclusion of a market risk variable (beta coefficient) which measures the level of response of stocks to market movements into the analysis of the calculation of return and portfolio risk.

3. Jensen's calculation, using the market risk variable (beta coefficient) in its calculations, yields a minimum value of -0.0198 on ACST shares and a maximum value of 0.0315 on OMRE shares.

4. The difference in results is significant in measuring portfolio performance in the Property Industry, Real Estate and Building Construction sectors listed on the IDX

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