Analysis of Optimal Portfolio Comparison on Shares of Sri Kehati by using Single Index Model and Random Model

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Abstract.
The purpose of this study is to provide empirical evidence that the determination of a stock portfolio using a single index model can provide optimal returns compared with the determination of stock portfolio using a random model. The sample in this research is 25 shares joined in SRI-KEHATI selected using purposive sampling. The data analysis technique used the average test for two independent samples (Mann Whitney Test (U Test)). The results showed that the determination of the stock portfolio using a single index model can provide optimal return compared to the determination of the stock portfolio using random model.

Keywords:*Portfolio, Single Index Model and Random*

I. INTRODUCTION

The Indonesia Stock Exchange (IDX) is a combination of the stock exchange or capital market, namely the Jakarta Stock Exchange (Jakarta Stock Exchange) and the Surabaya Stock Exchange (Surabaya Stock Exchange). The Indonesia Stock Exchange (IDX) was once one of the best exchanges in Southeast Asia in 2013. 1996. The prospect of such rapid growth of the capital market in Indonesia was apparently driven by the interest of foreign investors entering the Indonesian capital market. (kompas.com).The capital market has several strategic functions that make This institution has an appeal, not only for those who need fundsand lenders, but also to the government. In this era of globalization, all countries pay great attention to the capital market because it has a strategic role in strengthening the economic resilience of a country. (Jogiyanto, 2014).

Capital market as an alternative long-term investment and as an investment medium for investors. By investing in stocks in the capital market, investors expect to be able to double their capital compared to returns from other investments. The size of the return depends on the willingness of investors to take risks. The greater the risk taken, the greater the expectation of getting a return, such as the characteristics of the stock, namely high risk-high return. Stocks can provide the possibility for high returns, but can also cause investors to experience great risk.

Each investment option has a different level of return and risk. In fact, the level of profit and risk between stocks will be different even in the same industry.

This is caused by differences in internal factors (management, marketing, and competitive ability) and external factors (government policies, social security, culture, defense and security, competitors as well as people's tastes and purchasing power). In deciding an investment, investors pay attention to two important things, namely the return and risk of the investment. For securities that have the same return, investors will choose the lowest risk. As for securities that have the same risk, investors will choose a high return. With this stock diversification, it is hoped that it will reduce the level of risk. Diversification is done by means of a stock portfolio.

Alternative stock selection and portfolio determination can be done using various analytical tools, one of which is using a single index model. The single index model is widely used as an analytical tool to get an efficient portfolio, in addition to the simple model it is also easy to operate. Investors must be rational in dealing with the stock trading market. However, investors sometimes only follow individual desires, join in or gamble in determining portfolios. This is better known as random or random portfolio determination (without regard to the relevant investment characteristics).

This research refers to the research conducted by Henry Dwi Wahyudi (2002). Henry Dwi Wahyudi researches investment analysis and optimal portfolio determination on the Jakarta Stock Exchange. The study concluded that the determination of the portfolio using the Single Index Model can provide optimal returns compared to determining the portfolio randomly or randomly. Thus, an investor who wants to be involved in the capital market in buying and selling shares must leave the culture of joining in or gambling and so on which is irrational (as an investor, you must be rational in dealing with the stock buying and selling market).
Meanwhile, research conducted by Susanti (2012) concluded that the determination of a portfolio using the Single Index Model can provide optimal returns and the resulting risk is smaller than the Random Model.Research conducted by Prastiwi (2006) shows that the return generated by determining the portfolio using the Random Model and Single Index Model shows that there is no difference in the expected return of the portfolio.

II. METHODS

The research instruments used in this study are:

Table 3.3. Research Instruments

No.	Variable	Definition	Measurement	Scale
1.	Single Index Model	The single index model is to compare the excess return to beta (ERB) which is the excess return over the risk free rate on other assets and the	Ri = ai+βi.Rm+ei Elton and Gruber (1995) in Risnawati (2009)	Ratio

		cut off rate (Ci) (Rachmanto, 2002).		
2.	Random Model	Random diversification (random or native diversification) is the formation of a portfolio by choosing securities at random without regard to the characteristics of the relevant investments such as the return of the securities themselves (Jogiyanto, 2016: 338-339).	-	-

Source: Data processed

III. RESULTS AND DISCUSSION

Data Description

Descriptive statistics

Descriptive statistics are statistics used to analyze data by describing or describing the data that has been collected as it is without intending to make conclusions that apply to the public or generalizations (Sugiyono, 2015: 147). Descriptive statistical tests are carried out to provide an overview or description of the observational sample of a data seen from the average value (mean), standard deviation, highest value, lowest value of each variable. The results of descriptive statistical analysis can be seen in Table 4.1 below:

Table 4.1. Descriptive statistics

Descriptive Statistics

	N	mean	Std. Deviation	Minimum	Maximum
Return_Portfolio	20	.0010	.00096	.00	.00
Determination_Portfolio	20	1.50	.513	1	2

Source: Output spss ver 16

Based on Table 4.1, it can be seen that the portfolio return variable with a value of 20 has a minimum value of 0.00, a maximum value of 0.00, an average (mean) of 0.0010, and a standard deviation of 0.00096. While the variable for determining the portfolio with a value of n totaling 20 has a minimum value of 1, a maximum value of 2, an average (mean) of 1.50, and a standard deviation of 0.513.

Sample Selection

The sample selection was carried out by purposive sampling, namely permanent companies that were included in the SRI-Kehati index during the Research Period, namely May 2016 - April 2017 and these companies also had

complete data during the research period from May 2016 to April 2017. The sample companies in this study can be seen in the Appendix.

Comparison of single index model and random model in calculation.

a. Single Index Model

In this study, the portfolio that is a candidate for the single index model is a portfolio that has an ERb value greater than the Ci value (ERb > Ci). From the calculations that have been carried out, there are 10 portfolio candidates that meet the following criteria:

Table 4.2. Single Index Model Portfolio Candidate

No.	Company Code	ERb		ci
1.	ASII	0.0009295616	>	0.0007219453
2.	BBCA	0.0018210634	>	0.0004587682
3.	BBNI	0.0013159310	>	0.0004870338
4.	BBRI	0.0008468395	>	00007012053
5.	BDMN	0.0002090652	>	0.0001455920
6.	INDF	0.0006425802	>	0.0004399263
7.	JPFA	0.0009954931	>	0.0000427628
8.	KLBF	0.0006498958	>	0.0002965196
9.	TINS	0.0010832557	>	0.0001029606
10.	UNTR	0.0009465320	>	0.0001958797

Source: Data processed

b. Random Model

The selection of a random model portfolio candidate is done with the help of the Microsoft Excel program with the "RAND" formula. This model allows each portfolio to have the same opportunity to become a candidate. Based on the selection of portfolios using a single index model, 10 portfolios were obtained, so the researcher will also choose 10 portfolios that will be used as candidates for the random model. The randomization of the portfolio which became the random model was obtained by the candidates as follows:

Table 4.3. Random Model Portfolio Candidate

No.	Company Code	E(Ri)
1.	PJAA	-0.0000372864
2.	PGAS	0.0000338569
3.	ADHI	-0.0004064532
4.	UNVR	0.0002641815
5.	LSIP	-0.0001529585
6.	BBCA	0.0013237454
7.	BDMN	0.0018297176
8.	SMCB	-0.0003612168
9.	UNTR	0.0027141251
10.	INDF	0.0008217436

Source: Data processed

Hypothesis Testing Results

After analyzing stocks and obtaining candidate portfolios with single index models and random models, hypothesis testing will be carried out by comparing portfolio returns between stocks that are candidate portfolios using a single index model with stocks that are candidates for portfolio random models.

Hypothesis testing was carried out with the average test for two independent samples (Mann Whitney Test (U Test)). Before testing the hypothesis, the hypothesis can be formulated as follows:

H0 : Determining a stock portfolio using a single index model can provide a non-optimal return compared to determining a stock portfolio using a random model.

H1 : Determining a stock portfolio using a single index model can provide optimal returns compared to determining a stock portfolio using a random model.

The decision-making criteria in the Mann Whitney test (U Test) with a significance level of 0.05 are as follows:

- If Pvalue (Asymp. sig. (2-tailed)) < 0.05 then H0 is rejected
- If Pvalue (Asymp. sig. (2-tailed)) > 0.05 then H0 is accepted

The following results of hypothesis testing using the SPSS program can be seen in the following table:

Table 4.4 Mann Whitney Test Results (U Test) Mean Rank

Ranks

	Determination_Portfolio	N	Mean Rank	Sum of Ranks
Return_Portfolio	Single Index	10	13.20	132.00
	Random	10	7.80	78.00
	Total	20		

Source: SPSS Output ver 16

The table above shows the Mean Rank or the average rank of each group. The first group (Single Index) has an average rating value of 13.20, which is greater than the average rating of the second group (Random) which is 7.80.

Table 4.5 Mann Whitney Test Results (U Test) P Value

Test Statisticsb

	Return_Portfolio
Mann-Whitney U	23,000
Wilcoxon W	78.000
Z	-2.044

asymp. Sig. (2-tailed)	.041
Exact Sig. [2*(1-tailed Sig.)]	.043a
a. Not corrected for ties.	
b. Grouping Variable: Determination_Portfolio	

Source: SPSS Output ver 16

The table above shows a U value of 23,000 and a W value of 78,000. When converted to a Z value, the amount is -2.044. The sig value or P Value is 0.041. It turns out that the P Value is less than the probability (0.041 < 0.05) then H0 is rejected, meaningDetermining a stock portfolio using a single index model can provide optimal returns compared to determining a stock portfolio using a random model.

Discussion

After testing the hypothesis, it is known that stock portfolio determination using a single index model can provide optimal returns compared to stock portfolio determination using a random model. The results of this study are in accordance with research conducted by Linda Ratna Sari (2015) examining the comparison of stock returns of Kompas 100 using a single index model and a random model showing that determining a stock portfolio using a single index model can provide optimal returns compared to determining a stock portfolio using a random model. . This research is also supported by research conducted by Ni Putu Nonik Hariasih and Dewa Gede Wirama (2016) with research results stating that there are differences in portfolio returns using a single index model and a random model. Determining the optimal portfolio using a single index model can provide a higher return than the random model portfolio.

IV. CONCLUSION

Based on the hypothesis testing that has been done on 20 stock portfolios by comparing the single index model with the random model, it can be concluded that the determination of the stock portfolio using the single index model can provide optimal returns compared to determining the stock portfolio using the random model.

V. ACKNOWLEDGMENTS

After analyzing and discussing the problems that occur, namely the use of a single index model and a random model in assessing risk and stock returns for the choice of investing in SRI-Kehati Index companies on the IDX, the suggestions that can be given are as follows:

1. The model used in this study is a single index model and a random model with daily closing prices. For further research, other models can be used such as non-linear models, mean variance models, goal programming models. And can add a test of the correlation between stocks in the formation of a portfolio.

2. In this study, using a sample belonging to the SRI-Kehati Index stock. It is likely to be taken into consideration in further research by using stocks other than the SRI-Kehati index, so that a larger number of samples can be obtained.
3. The stock sample used in this study is SRI-Kehati with an observation period from May 2016 to April 2017, for further research, data that is not only included in the SRI-Kehati calculation factor or can extend the research period.

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