The Analysis of Optimal Portfolio Formation: The Evidence from LQ-45 during the Covid-19

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Abstract

The purpose of this research was to determine the shares of the LQ 45 index members that can form an optimal portfolio during the one year of the Covid-19 pandemic, and to determine the proportion of each selected stock as well as the level of return and risk of the resulting portfolio. The method used is the Single Index Model approach. The results of the analysis show that using the Single Index Model approach, the shares of the LQ 45 Index members for the period April 2020 to March 2021 which can form an optimal portfolio consist of: ERAA of 0.3065, INKP of 0.217, ANTM of 0.216795, TKIM of 0.108794, PTPP is 0.058829, INCO is 0.064533, and BBTN is 0.027549.

Introduction

The COVID-19 pandemic has hit various sctors, including the stock market where many people are hesitant to invest in stocks. Many industries have been influenced by COVID-19, where since March 2020 the Composite Stock Price Index (IHSG) of the Indonesia Stock Exchange (IDX) has decreased because many investors have sold their shares. The performance of the Composite Stock Price Index (JCI) in the past year has had its ups and downs. As of January 3, 2020, the JCI is still perched at 6,323. Entering March 2020, the index seemed to be in free fall and was heading to its lowest point on March 24, 2020. At that time, the JCI closed at the level of 3,937 or down 26.55 percent since the beginning of 2020. The Composite Stock Price Index fell in the fastest pace since the 1998 crisis in the first quarter of 2020. I/2020, before recovering gradually starting in the middle of the third quarter of 2020 (market.bisnis.com). The pandemic caused the International Monetary Agency (IMF) to predict a global economic slowdown (Tjong & Michael, 2021). The Covid-19 pandemic in Indonesia affects the capital market and causes changes in trading times on the IDX and this is a negative signal (bad news) that causes investors to be more interested in selling their share ownership (Rahyuda, 2022). The COVID-19 pandemic conditions also affected stock market dynamics (Firdaus, 2018; He, Liu, Wang, & Yu, 2020; Liu, Manzoor, Wang, Zhang, & Manzoor, 2020), caused stock markets around the world to decline (Ngwakwe, 2020), and increased inefficiency in stock market (Lalwani & Meshram, 2020). In Indonesia, this also doesn't have a positive impact on the capital market and affects investors in making investment decisions (Pitaloka, Al Umar, Hartati, & Fitria, 2020). However, when the JCI was at its lowest level, it was used as a momentum for domestic retail investors to flock to the stock market. Starting from the third week of May 2020, there was an increase which indicated that stock trading began to show improvement. According to the Financial Services Authority (OJK), the increase in the number of investors represents a shift in income from consumption to investment, thereby increasing demand in the financial market. In Indonesia, the number of retail investors is almost 4 million during the 2020 pandemic. According to IDX records, the number of retail investors who are actively transacting is 90,000 investors per day. The high number of active investors has increased the frequency of stock trading to 619 thousand transactions per day. This set a record, making IDX the stock exchange with the highest frequency in Southeast Asia. The rise of return on investment in the capital market has made the need for securities analysis also increasing. This is because investors who will buy their funds in the capital market increasingly need information about securities which will later be closely related to the expected rate of return and the risks faced (Utami & Susanti, 2013). However, to overcome or reduce risk, investors need to diversify stocks through portfolio formation. Markowitz (1952) has proven that investment risk can be minimized by combining various assets into a portfolio. In reality, it will be difficult to form an optimal stock portfolio, especially in the midst of the COVID-19 pandemic, investors must be more careful in carrying out a holistic and diversified investment portfolio, because stock markets around the world experience a decline on average (Ngwakwe, 2020). Therefore, it is customary to use a proxy consisting of a large number of shares. In Indonesia, the formation of a portfolio can be done by selecting the shares listed on the IDX. To make it easier, investors can choose Blue Chips stocks such as the LQ 45 index, which is a collection of stocks with a high level of liquidity that promises high returns for investors. The LQ-45 index is one of the indices contained in the IDX where companies included in the index group have good financial performance. (Utami & Susanti, 2020). LQ-45 has become a reference for many leading investment management companies in forming portfolios and mutual fund bases, including individual investors. In addition, LQ-45 is also most often used as a reference for stock selection in various financial and investment research. To analyze the portfolio, a number of calculation procedures are needed through a number of data as input about the portfolio structure. One of the optimal portfolio analysis techniques performed by Elton, Gruber, Brown, and Goetzmann (1995), is to use the Single Index Model (SIM). Analysis of securities is done by comparing the excess retur to beta (ERB) with the cut-off rate (Ci) of each stock. Stocks that have an ERB greater than Ci are used as portfolio candidates, while on the other hand, namely Ci greater than ERB are not included in the portfolio. The determination of the optimal portfolio of SIM shares is based on the Naïve Diversification model and the Markowitz model. Naive Diversification is a traditional method which means spreading risk across several assets. The Markowitz model starts from historical data on individual stocks that are used as input, and is analyzed to produce outputs that describe the performance of each portfolio, whether classified as optimal portfolios or otherwise. The measure used in the Markowitz model portfolio is the correlation coefficient which shows the relationship between the two variables relative to their

respective standard deviations. The single index method is a relatively simple method and reduces the calculated variables, with a longer period and more samples, more accurate results will be obtained and can answer the problem of uncertainty in stock investment. This will help investors in making stock investment decisions (Firdaus, 2018). Research conducted by Firdaus (2018) shows that there are five stocks whose composition is in accordance with the formation of an optimal stock portfolio with a SIM, the five optimal stock portfolio are expected to have a return of 0.03645 or 3.65% per month and the risks that investors must face on his investment in the seventeen shares is 0.0124 or 0.01%. According to Uno and Syarif (2021) the formation of an optimal portfolio of stocks that are included in the LQ-45 Index for the period 2011-2013 using SIM found that there are stocks from 6 companies that can form an optimal portfolio and the portfolio is able to provide an expected return of 2.30% and contains risk of 0.09%. In contrast to the research conducted by Rahayu, Lestari, and Kuniawati (2021) by using a single index model for portfolio formation on stocks of the basic and chemical industry sectors on the IDX, the results show that stocks from 6 companies can form an optimal portfolio with different proportions, but the stock performance according to the basic and chemical industry sector returns for three years, namely 2011-2013 tends to decline. Analysis of the optimal portfolio formation has been carried out by several researchers, but the analysis of portfolio formation during the COVID-19 pandemic is still very rarely done. Information related to the formation of a stock portfolio in the midst of a pandemic will help potential investors or investors in making decisions to meet their investment needs. Where prospective and investors will get information about what stocks can be formed into an optimal portfolio of LQ 45 shares during the pandemic, what is the proportion of funds that must be invested, the amount of return and risk from the optimal portfolio of LQ 45 shares listed on the IDX in 2020 -2021 (during the pandemic) using a SIM.

Theoretical Background

Investment

Investment according to Hernandez-Vega (2021) is a commitment to a number of funds or other resources that are carried out at this time, with the aim of obtaining a number of benefits in the future. Investment is the placement of funds in various financial assets as an effort to increase capital or wealth, either through investment in real assets or investment through financial assets with the aim of obtaining optimal income with minimal risk in the future.

Return Investment

Return is the result obtained from the investment. Return can be divided into realized return and expected return. Realized return is a return has occurred. Return is calculated based on historical dara, realized return is important because it is used as a measure of the company's performance. This historical return is also useful as a basis for determining the expected return and risk in the future. Expected return is the return that investors expect to get in the future.

Investment Risk

Risk according to Hernandez-Vega (2021) is the possibility of the difference between actual and expected return. The smaller the possible difference, the lower the risk of the investment.

Portfolio Theory

Portfolios are several alternative investment opportunities by making combinations that can provide a choice of higher profit levels with a certain level of risk. In fact, investors often diversify their investments, namely combining various securities or forming portfolios. Keep in mind that the main objective of the portfolio is to find the optimum combination of various securities to obtain the maximum level of profit.

Single Index Model (SIM)

SIM is a technique for measuring the returns and risks of a stock or portfolio. The model assumes

that stock returns are only related to market movements. If the market moves up, in the sense that the demand for shares increases, the stock price in the market will also rise. Conversely, if the market moves down, then the stock price in the market will also fall. Thus, stock returns are correlated with market returns. Every company is not the same in responding to market changes, some are less sensitive (DicCbshfsE et al., 2011).

Research Methods

Research Design

This research is a type of quantitative descriptive research. The description described in this study is everything related to the formation of a portfolio of shares of LQ 45 companies listed on the IDX during the one-year period of the COVID-19 pandemic, namely the April 2020 – March 2021 period using a single index model.

Population and Research Sample

In this reseacrh, the population is all shares of LQ 45 companies listed on the IDX the one-year period of the COVID-19 pandemic, namely the period April 2020 - March 2021, as many as 45 companies. The sampling technique was carried out by purposive sampling method, namely the determination of the sample based on certain considerations or criteria in accordance with the research objectives. The sample studied must be in accordance with the criteria set by the researcher, namely the shares of LQ 45 companies that are listed and actively traded on the IDX during the one-year period of the COVID-19 pandemic for the period April 2020 – March 2021, as well as company shares that continuously appear, in the LQ 45 group on the IDX during that period. From these criteria obtained samples that meet the requirements of 34 companies.

Data Collection Technique

The research data used is historical data on the monthly closing price of the company LQ 45 during the period April 2020 to March 2021, Jakarta Composite Index (JCI) data, and also the interest rate of Bank Indonesia which is a risk free component, which is obtained from statistics every month during the period April 2020 to March 202. issued by Bank of Indonesia.

Analysis Method

Data analysis was performed using a single index method to determine an efficient portfolio, while the calculations were performed using the Excel program. The steps to be taken are as follows: (1) Describe the development of the stock price of the LQ-45, JCI, and SBI companies. (2) Calculating market parameters, namely returns and risks from the stock exchange market, in this case the Indonesia Stock Exchange.

a)   Calculating stock returns (Ri) during the observation period using the following formulation:

$$R_i = \frac{P_t - P_{t-1}}{P_{t-1}}$$

Information:
R_i : stock returns
P_t : stock price at time t
P_{t-1} : stock price at time t-1

b)   Calculating the JCI index market return (R_{mt}) during the observation period with the following formulation:

$$R_{mt} = \frac{I_t - I_{t-1}}{I_{t-1}}$$

Information:

R_{mt} : Market returns
I_t : JCI index period t
I_{t-1} : JCI index period t-1

c)   Calculating the expected return (mean return) of shares during the observation period with the formulation:

$$E(R_i) = \frac{\sum(R_i)}{n}$$

Information:

$E(R_i)$: Mean stock return i
R_i : Individual stock returns each period
n   : Amount of data

d)   Calculating stock risk during the observation period with the following formulation:

$$\sigma_i^2 = \frac{\sum_{i=1}^{n}(Ri - \overline{Ri})2}{n-1}$$

σ_i^2 : stock variance or risk i
Ri : stock return i
$\overline{Ri}$: mean stock return i
n   : amount of data

e)   Calculating the beta of a stock with the formulation:

$$\beta_i = \frac{\sigma_i m}{\sigma m^2}$$

f)   Calculating the risk-free return symbolized by the SBI interest rate with a calculation per semester or six months.

7) Develop optimal portfolio based on Single Index Model

Ranking stocks by Excess Return to Beta (ERB)

$$ERB = \frac{R_i - Rf}{\beta_i}$$

Where:

ERB = *excess return to beta*
R_i = expected stock return
R_f = *risk free return*
β_i = security beta i

Stocks with a low ERB ratio will not be included in the optimal portfolio. Thus, it takes a cut off limiting point that determines the limit of the ERB value which is said to be high. The magnitude of this point can be determined by the following steps:

a. Sort the stocks based on the largest ERB value to the smallest ERB value. Stocks with the largest ERB are candidates for inclusion in the optimal portfolio.
b. Calculate the value of B_i for each of the shares with the formula below:

$$B_i = \frac{\beta_i^2}{\sigma_{ei}^2}$$

c.   Calculate the value of C_i with the formula:

$$C_i = \frac{\sigma^2 m \sum_j^N (\overline{R_J} - R_f)\beta_j}{1 + \sigma_m^2 \sum_{j=1}^i \left\{ \frac{\beta_j^2}{\sigma_{ej}^2} \right\}}$$

d.   Determine the cut off point value, which is the largest C_i value.
e.   Stocks that make up the optimal portfolio are stocks that have a greater ERB or stocks with a value of ERB at point C*. while stocks that have a value of ERB that is smaller than the ERB at point C* are not included in the formation of an optimal portfolio (Elton et al., 1995).
f.   Determining Optimal Proportions
Determining the optimal proportion can be done by first finding the Zi of each asset that is included in the optimal portfolio combination. The Zi value is found by the following formula:

$$Z_i = \frac{\beta i}{\sigma ei2} (ERBi - C^*)$$

After that, the optimal weight of each asset included in the optimal portfolio combination can be calculated with the following equation:

$$X_i = \frac{Zi}{\sum_{j=1}^k Zj}$$

Where:
Z_i = Securities proportion scale i
B_i = Beta security i
σ_{ei}^2 = The variant of the I-th securities residual error which is also an unsystematic risk
ERB = Excess Return to Beta securities
X_i = Proportion of the i-th security

g.   Calculating the expected return and portfolio risk
$R_p = \sum X_i \overline{R_1}$
$\sigma^2_p = \beta^2_p . \sigma^2_m + (\sum_{i=1}^n W_i . \sigma_{ei})^2$

Results and Discussion

Optimal Portfolio Formation

In forming a stock portfolio based on the SIM, the variables that need to be known are the monthly JCI data, the monthly closing price of LQ 45 shares for the study period, and the BI rate as a risk free asset. From the data collected, the authors proceed to the next stage by calculating the market return of the JCI, and also the return of each LQ 45 stock. In addition, it is also necessary to calculate alpha (a), beta (β), variance (σ2i), market variance (σ2m), and unsystematic risk (σ2ei). The steps in forming an optimal portfolio using the SIM are:

Ranking stocks based on Excess Return to Beta (ERB)

To calculate the ERB, it is necessary to first use the risk-free return variable (Rf). The calculation results are as follows:

Table 1.
Calculation of ERB

No	Stock code	E(Ri)	Beta (βi)	(σ2ei)	Rf	ERB
1.	ADRO	0.019984	0.669326	0.012769	0.039583	-0.02928
2.	AKRA	0.046675	1.780255	0.011498	0.039583	0.003983
3.	ANTM	0.166116	3.404078	0.059669	0.039583	0.037171
4.	ASII	0.031234	0.638399	0.013334	0.039583	-0.01308
5.	BBCA	0.012527	1.191236	0.005734	0.039583	-0.02271
6.	BBNI	0.04021	1.839154	0.013653	0.039583	0.000341
7.	BBRI	0.036408	1.524257	0.010151	0.039583	-0.00208
8.	BBTN	0.0852	2.994436	0.059743	0.039583	0.015234
9.	BMRI	0.027354	1.062889	0.009492	0.039583	-0.01151
10.	BSDE	0.049409	1.479427	0.012947	0.039583	0.006641
11.	CPIN	0.034482	0.486157	0.011497	0.039583	-0.01049
12.	ERAA	0.095507	0.836571	0.022375	0.039583	0.066848
13.	EXCL	0.012126	1.890877	0.018866	0.039583	-0.01452
14.	GGRM	-0.00813	0.830145	0.005178	0.039583	-0.05748
15.	HMSP	0.002588	0.874598	0.012161	0.039583	-0.0423
16.	ICBP	-0.00537	0.077824	0.007321	0.039583	-0.57769
17.	INCO	0.069485	1.929766	0.017594	0.039583	0.015495
18.	INDF	0.007014	0.229002	0.008494	0.039583	-0.14222
19.	INKP	0.095992	1.043039	0.03031	0.039583	0.054081
20.	INTP	0.001999	1.218587	0.008765	0.039583	-0.03084
21.	ITMG	0.043236	2.10325	0.039233	0.039583	0.001737
22.	JSMR	0.046102	1.08892	0.01565	0.039583	0.005986
23.	KLBF	0.024367	0.043177	0.004115	0.039583	-0.35241
24.	MDKA	0.012491	2.367891	0.017385	0.039583	-0.01144
25.	PGAS	0.059573	3.199595	0.031708	0.039583	0.006247
26.	PTBA	0.019713	1.206687	0.009763	0.039583	-0.01647
27.	PTPP	0.095487	3.45238	0.040595	0.039583	0.016193
28.	PWON	0.054039	1.885002	0.014136	0.039583	0.007669
29.	SMGR	0.032846	1.168181	0.014651	0.039583	-0.00577
30.	TKIM	0.106494	2.537364	0.051304	0.039583	0.02637
31.	TLKM	0.01095	1.581751	0.010035	0.039583	-0.0181
32.	UNTR	0.028275	1.003889	0.013118	0.039583	-0.01126
33.	UNVR	-0.00654	0.375717	0.003579	0.039583	-0.12275
34.	WIKA	0.060699	2.268172	0.02044	0.039583	0.009309

Based on 34 research samples, the stock that provides the highest level of expected return during the COVID-19 pandemic is ANTM stock, which is 0.1661, while the stock that produces the lowest expected return is GGRM stock, which is -0.00813. During this pandemic, there were 31 stocks that managed to get a positive expected return and only three stocks that had a negative expected return. Prospective investors and investors should choose stocks with a positive expected return.

Determine Cut-Off Rate (C*)

The amount of Cut-Off Rate (C*) is the highest Ci value of all shares. The value of C* is used to determine which stock limit points are included as optimal portfolio candidates.

Table 2.
Calculation of Cut-Off Rate

No	Stock code	$\frac{(Ri-Rf)\beta i}{\sigma 2ei}$	$\frac{\beta i2}{\sigma 2ei}$	$\frac{\Sigma(Ri-Rf)\beta i}{\sigma 2ei}$	$\frac{\Sigma \beta i2}{\sigma 2ei}$	Ci
1.	ADRO	-1.02736	35.0842	-1.02736	35.0842	-0.0022
2.	AKRA	1.097952	275.6352	1.097952	275.6352	0.001551
3.	ANTM	7.218612	194.2012	7.218612	194.2012	0.011524
4.	ASII	-0.39972	30.56466	-0.39972	30.56466	-0.00086
5.	BBCA	-5.62126	247.4914	-5.62126	247.4914	-0.00827
6.	BBNI	0.084387	247.7489	0.084387	247.7489	0.000124
7.	BBRI	-0.47676	228.8769	-0.47676	228.8769	-0.00072
8.	BBTN	2.286355	150.0858	2.286355	150.0858	0.003927
9.	BMRI	-1.36934	119.0138	-1.36934	119.0138	-0.00248
10.	BSDE	1.122667	169.0455	1.122667	169.0455	0.001867
11.	CPIN	-0.21571	20.55825	-0.21571	20.55825	-0.00048
12.	ERAA	2.09094	31.27879	2.09094	31.27879	0.004512
13.	EXCL	-2.75197	189.516	-2.75197	189.516	-0.00443
14.	GGRM	-7.64986	133.0876	-7.64986	133.0876	-0.01353
15.	HMSP	-2.6607	62.90086	-2.6607	62.90086	-0.00537
16.	ICBP	-0.47789	0.827243	-0.47789	0.827243	-0.0011
17.	INCO	3.279773	211.668	3.279773	211.668	0.005094
18.	INDF	-0.87813	6.174295	-0.87813	6.174295	-0.002
19.	INKP	1.941193	35.89404	1.941193	35.89404	0.004147
20.	INTP	-5.2256	169.4278	-5.2256	169.4278	-0.00869
21.	ITMG	0.195822	112.7536	0.195822	112.7536	0.000359
22.	JSMR	0.453557	75.76837	0.453557	75.76837	0.000893
23.	KLBF	-0.15967	0.453071	-0.15967	0.453071	-0.00037
24.	MDKA	-3.69004	322.5144	-3.69004	322.5144	-0.00489
25.	PGAS	2.017073	322.8611	2.017073	322.8611	0.002671
26.	PTBA	-2.45592	149.1448	-2.45592	149.1448	-0.00422
27.	PTPP	4.754264	293.6047	4.754264	293.6047	0.00655
28.	PWON	1.927751	251.3678	1.927751	251.3678	0.00282
29.	SMGR	-0.53721	93.14219	-0.53721	93.14219	-0.00102
30.	TKIM	3.309208	125.4904	3.309208	125.4904	0.005934
31.	TLKM	-4.51347	249.3274	-4.51347	249.3274	-0.00662
32.	UNTR	-0.86538	76.82694	-0.86538	76.82694	-0.0017
33.	UNVR	-4.84194	39.44551	-4.84194	39.44551	-0.01027
34.	WIKA	2.343147	251.6969	2.343147	251.6969	0.003426

The result of the calculation of the cut-off point (C*) or the one with the highest Ci value in this study is 0.011524, namely ANTM shares. Therefore, the Ci value of ANTM shares will be used to determine which stock limit points are included as optimal portfolio candidates during the COVID-19 pandemic.

Determining Optimal Proportions

The optimal portfolio is to choose stocks that have an ERB value greater than or equal to the cut-off rate (Ci) or equal to the ERB at point C*. If the ERB value is greater than or equal to the cut-off rate, then the stock is included in the optimal portfolio candidate. If the ERB value is less than the cut-off rate value, then the stock is not included in the optimal stock portfolio candidate. The use

of the ERB value and cut-off rate has the advantage of considering systematic risk (beta). Systematic risk is unavoidable, but investors can choose stocks with a high ERB value. Beta and ERB values can be used to consider investment alternatives and optimize portfolios. Unsystematic risk can be avoided by diversification itself.

Formation of Optimal Stock Portfolio

The purpose of establishing an optimal stock portfolio is to reduce risk by means of diversification. After comparing the ERB with the Ci there are seven stocks whose ERB value shows greater than Ci, so that the seven stocks meet the criteria to enter into the formation of an optimal portfolio.

Table 3.
Formation of Optimal Stock Portfolio

No	Stock code	ERB	Ci	ERB-Ci	Zi	Xi
1.	ERAA	0.066848	0.004512	0.055324	2.068533	0.3065
2.	INKP	0.054081	0.004147	0.042557	1.46451	0.217
3.	ANTM	0.037171	0.011524	0.025647	1.463125	0.216795
4.	TKIM	0.02637	0.005934	0.014846	0.734237	0.108794
5.	PTPP	0.016193	0.00655	0.004669	0.397029	0.058829
6.	INCO	0.015495	0.005094	0.003971	0.435525	0.064533
7.	BBTN	0.015234	0.003927	0.003709	0.185922	0.027549

Stocks which comply the criteria to enter into the formation of an optimal portfolio are Erajaya Swasembada Tbk (ERAA), Indah Kiat Pulp & Paper Tbk. (INKP), Aneka Tambang (Persero) Tbk (ANTM), Pabrik Kertas Tjiwi Kimia Tbk. (TKIM), PP (Persero) Tbk. (PTPP), Vale Indonesia Tbk (INCO), dan Bank Tabungan Negara (Persero) Tbk. (BBTN). From this portfolio, it can be seen that during the COVID-19 pandemic, the formation of an optimal portfolio does not lead or is dominated by one industry. It can be seen that the portfolio is a collection of stocks from various industries in Indonesia. This shows that during the COVID-19 pandemic, the stocks from the portfolio are a collection of the most powerful stocks in their respective industries, and also the most resilient in this difficult situation.

Optimal Portfolio Composition of Shares.

From the seven shares, it is necessary to calculate the proportion of funds for each share. The proportion of these funds is of course calculated by mathematical calculations. The proportion of these funds is obtained by calculating a weighted scale beforehand with the aim of obtaining the right proportion of funds. After obtaining the weighted scale of shares, then the proportion of shares can be calculated by dividing the weighted scale of each share by the total number of weighted scales. Determining the optimal proportion can be done by first finding the Z_i value of each asset that is included in the optimal portfolio combination. After that, the optimal weight of each asset that is included in the optimal portfolio combination can be calculated. Table 3 shows the proportion of funds that make up the optimal portfolio of stocks, ERAA is 0.3065, INKP is 0.217, ANTM is 0.216795, TKIM is 0.108794, PTPP is 0.058829, INCO is 0.064533, and BBTN is 0.027549. This proportion shows a maximum return with a certain risk or vice versa a certain return with minimal risk. In addition, the stock also has an ERB value that is greater than Ci. Stocks with the highest proportion of funds are investment alternatives that investors should choose.

Amount of Return and Risk from Optimal Portfolio of Shares

The stocks which are included in the optimal portfolio consist of seven LQ 45 company stocks that produce the best expected return and risk. The optimal portfolio of LQ 45 company shares has an expected return of 0.1101, while the risk that must be faced from the optimal portfolio according to the calculation results is 0.2095. This return will affect the decision of investors to invest in the

company's shares LQ 45 because it has a higher expected return than the expected return market or expected return risk free.

Table 4.
Individual and Portfolio Return Return and Risk

No	Stock code	E(Ri)	E(Rp)	E(RI)-E(Rp)	Risk	Rp	Risk-Rp
1.	ANTM	0.166116		0.055965	0.244272		0.034755
2.	BBTN	0.0852		-0.02495	0.244425		0.034907
3.	ERAA	0.095507		-0.01464	0.149582		-0.05994
4.	INCO	0.069485	0.110151	-0.04067	0.132641	0.209517	-0.07688
5.	INKP	0.095992		-0.01416	0.174096		-0.03542
6.	PTPP	0.095487		-0.01466	0.201482		-0.00803
7.	TKIM	0.106494		-0.00366	0.226505		0.016987

If it compared between individual stock returns and portfolio stock returns, there is one individual stock, namely ANTM which provides higher returns than portfolio returns, but the risk of individual stocks is also higher than portfolio risk. The other four stocks, namely ERAA, INCO, INKP, and PTPP, provide lower individual risk than portfolio stocks, but also provide lower returns than portfolio returns. In fact, two other stocks, namely BBTN and TKIM, provide lower returns than their portfolio returns, and have a higher individual risk than portfolio risk. This proves that by forming an optimal portfolio, you can diversify or reduce risk. Especially during the COVID-19 pandemic where almost all investors will be more careful in spending their investment funds. The profit of investing in stocks depends on many things, but the main thing is that it depends on the ability or strategy of the investor in managing his investment portfolio and the ability to read the market and the company's fundamentals.

Conclusions

Stocks which comply the criteria to enter into the optimal portfolio formation using Single Index Model during the COVID-19 pandemic period April 2020 to March 2021 are Erajaya Swasembada Tbk (ERAA), Indah Kiat Pulp & Paper Tbk (INKP), Aneka Tambang (Persero) Tbk (ANTM), Pabrik Kertas Tjiwi Kimia Tbk (TKIM), PP (Persero) Tbk (PTPP), Vale Indonesia Tbk (INCO), and Bank Tabungan Negara (Persero) Tbk (BBTN). With the respective proportions of 0.3065, 0.217, 0.216795, 0.108794, 0.058829, 0.064533, and 0.027549. This proportion shows a maximum return with a certain risk or vice versa a certain return with minimal risk. The optimal portfolio has an expected return of 0.1101, while the risk that must be faced from the optimal portfolio is 0.2095. The return generated from this optimal portfolio is higher than the return when investing in individual stocks.

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