East African Scholars Journal of Economics, Business and Management
Abbreviated Key Title: East African Scholars J Econ Bus Manag
ISSN 2617-4464 (Print) | ISSN 2617-7269 (Online)
Published By East African Scholars Publisher, Kenya

Volume-3 | Issue-5 | May-2020 | DOI: 10.36349/EASJEBM.2020.v03i05.005

OPEN ACCESS

Research Article

An Optimal Portfolio Performance Analysis of Lq45 Stocks

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Article History
Received: 18.04.2020
Accepted: 19.05.2020
Published: 30.05.2020

Journal homepage:
https://www.easpublisher.com/easjebm

Quick Response Code

Abstract: A stock is one of the most considered instruments in investing. As with other types of investments, the return of the shares and the degree of risk incurred by the investor are noteworthy. To optimize the yield and minimize the risk, the investors might form a stock portfolio. However, there is a necessity to perform an adequate analysis to set up an optimal portfolio – a portfolio which potentially provides the highest level of profit at a certain level of risk. In this analysis, the risk level and the profit level of the stock portfolio are being compared. This research aims to determine portfolio formation using Single Index Models, Constant Correlation and Markowitz on LQ45 index stocks. The method used is descriptive. This research took samples of stocks that went into the index of LQ45 for four consecutive periods from January 2012 to June 2017. The result of the study indicated that the optimum portfolio formation with the Single Index Method is more considerable than the Constant Correlation Method. It is following the consideration that the return and risk levels in the Single Index Method are more significant than the Constant Correlation Method which is with a return rate of 13.56 per cent rather than the return level of the Constant Correlation Method of 5.01 per cent. In terms of the risk level, the Single Index Method is 5 per cent, while the Constant Correlation Method showed 3 per cent. The high level of risk in the Single Index Method parallels its more substantial return level. The result corresponds to the investment principle of high-risk, high-return. The more considerable risk level of the Single Index Method compared to the Constant Correlation Method is presumably rooted from the less diversified compared to those using the Constant Correlation Method.

Keywords: Optimal Portfolio, Single Index Method, Constant Correlation Method.

INTRODUCTION

Investing is a capital outlay for one or more assets owned and in a period to expect a certain amount of profit in the future. Therefore, the consideration regarding the investments are threefolds: the period of the investment, the expected return rate, and the uncertainty of future payments. Investors are generally risk-averse but are expecting a maximum amount of return. Thus, the investment in the capital market is gaining more considerable traction on investors because it promises a higher rate of return compared to investments in the real asset sector as well as in the money market. Although the capital market investment promises a higher rate of return, the investors might need to remember that the higher the return, the higher the risk level might be. For that, as an investor, the most imperative thing to consider is how an investment can generate an optimal return at a minimal risk level. To minimize the risk they potentially bear, they could perform a diversification Husnan, S. (1998), A diversification can be done by combining various securities in an investment; in other words, forming a portfolio. To understand the investment process, an investor must first acknowledge several basic concepts of investment which will be the basis in each stage of investment decision making Rosdiana, R. (2019). The basic concept in a portfolio is how to allocate a certain amount of funds to different types of investments that will yield an optimum profit. Not all portfolios produce high expected returns and low risks. The optimal portfolio is that which provide a maximum expected return at a certain risk level or a certain expected return at a minimum risk level. The assessment of the optimal portfolio performance requires the use of relevant variables, i.e. profit and risk levels Husnan, S. (2001).

One type of investment instruments which is often in demand by investors is stock. Compared to bonds, stocks have a higher expected return, but at the same time, stocks impose a higher risk compared to bonds Harwaningrum, M. (2016). The large number of

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companies listed on the Indonesia Stock Exchange makes investors confused to determine an accurate decision to deliberate which stocks are safe and worth the investment outlay. Therefore, the Indonesia Stock Exchange assists investors to determine their choice by creating an index known as the Liquid Index 45 (LQ45). The index comprises stocks with large market capitalization and high liquidity (Sharpe, F. *et al*., 1997). The emergence of this index certainly helps the investors to choose right shares but does not merely mean that analysis will not be necessary anymore. It is because the stocks of companies that enter the LQ45 is not isolated from the ups and downs of return. The development of LQ45 from the year 2012 – 2017 is presented in Table 1.

Table 1. Comparison of Composite Stock Price Index (IDX Composite) and LQ45 Index (The year 2012-2017)

Period	IDX Composite	LQ45
2012	4,316.67	735.04
2013	4,274.18	711.14
2014	5,226.95	898.58
2015	4,593.01	792.03
2016	5,296.71	884.62
2017	6,355.65	1,079.39

Source: www.idx.go.id

The LQ45 index performance fluctuates annually. The performance of the stocks included in the LQ45 shows a rising tren. It is seen from the index growth of 735.04 at the end of 2012 to 711.14 by the end of 2013. At the end of 2014, the index has increased to 898.58 from 711.14 at the beginning of the year. While at the end of the year 2015, the index has suffered a decline to 792.03. The figure bounced back to 884.62 at the end of 2016, then subsequently sustained the increase to 1.079.39 at the end of 2017. These rising figures indicated that the performance of LQ45 index has an increasing trend. Portfolio analysis can be employed to determine the optimal return at minimal risk. There are several portfolio analysis models that can be applied; a Single Index Model is one of them. An optimal portfolio analysis that uses a single index model is simpler to apply in determining which stocks can result in maximum return at minimum risk, as well as being able to determine the proportion of funds required (Susanti, S. 2013). In addition, there is also the Constant Correlation Model which can be utilized to examine an optimal portfolio of stocks, which assumes that the correlation of all combination from the same stocks.

LITERATURE STUDY

Investment

Investment is a commitment of a certain amount of funds or other resources which undertaken at this time, intending to obtain a certain amount of profit in the future. An investor buys a number of stocks today in the hopes of benefiting from a rising share price or a certain amount of dividends in the future, in exchange for the time and risk associated with the investment (Andy. 2008).

Stock

Stock is a popular financial market instrument. Issuing stocks is one of the means companies acquire capital for their business. On the other hand, stocks are an investment instrument that is much in demand by investors. It is because stocks can provide an attractive level of return. According to (Tandelilin, E. 2001), the shareholders will gain several benefits: the distribution of dividends, capital gains, and possession of voting rights for common stock shareholders in a General Meeting of Shareholders (GMS) or Extraordinary General Meeting of Shareholders (EGMS).

Portfolio Theory

A portfolio is a field of science which examines explicitly how an investor does to lower the risk of investing in a minimum level, including one with such risk diversification (Fahmi, I. 2015). The efficient portfolio is a portfolio which offers the investors the maximum return expectations of varying risk levels as well as the minimum risk for varying levels of return expectations. The optimal portfolio is a portfolio with the most significant return expectations and risk combinations. All optimal portfolios are efficient.

Return and Stock Risk

In investing, the consideration which should be undertaken by investors is the return or level of return and risk gained. Return is the profit gained by the company, the individual and the institution from the investment decision done (Jogiyanto. 2000).

Single Index Model

The Single Index Model is based on observations that the price of a security fluctuates in the direction of the market price index (Fahmi, I. 2015). Stock prices will tend to rise when the market price index rises, vice versa. Therefore, the relationship between securities returns and market returns (Sharpe, F. *et al*., 1997):

$$Ri = \alpha i + \beta i.RM + ei$$

Where:

Ri = the return to *i* securities

αi = a random variable which shows the composition of the return to *i* securities

which is independent of the market performance

βi = the coefficient which measures the change of Ri due to the change of RM

RM = The return level of the market index, which is also a random variable

ei = the residual error which is a random variable with expectant value is equal to zero

Random variables which show the return, which is independent of the market performance (α), only relates to micro-events affecting individual companies only, not affecting the industry in general. Such events are strikes, fires, and issues related to the company. The Single Index Model uses its own assumptions. The first assumption is that the residual error of the *i* securities is not covariant with the residual error *j* securities. The next assumption is that ei is not covariant with market indices return, and short-selling is not allowed. The assumptions of the Single Index Model imply that securities are collectively moving as they have a shared relationship to the market index.

The calculations to determine the optimal portfolio will simpler if it is based on a number that can determine whether a security can be included in the optimal portfolio. The number is the ratio between the excess return to Beta (ERB). The optimal portfolio will contain securities which have high ERB. Securities that have negative ERB will not be incorporated into the optimal portfolio. The determination of the high or low boundary of the ERB value depends on the delimiter point (cut-off point/C*) (Jogiyanto. 2000). The securities that have an ERB ≥ value of C* are securities that make up the optimal portfolio. Whereas securities that have an ERB < value of C* are not included in the optimal portfolio candidate.

Constant Correlation Model

The Constant Correlation Model has the assumption that the correlation coefficient between the shares pair is constant; thus the value of the correlation coefficient is the average of the value of the correlation coefficient of stocks that are included in the optimal portfolio (Jogiyanto. 2000). This model does not allow short-selling. Short-selling means selling stocks that are not owned Elton, G. (2001). The correlation coefficient is a statistical measure that shows relative concurrent movements (relative comovements) between two variables Zubir, Z. (2011). This measure will explain the extent to which the return of a security relates to one another in a diversified context. The size is usually symbolized by (ρi,j) and the value is between +1.0 to -1.0,

Where:

a) ρi,j = +1.0; means a perfect positive correlation. This type of correlation will not provide any risk reduction benefits. The portfolio risk resulting from the combination is the average of the risks of individual securities.

b) ρi,j = 0; Means no correlation. This type of correlation reduces the risk significantly. The more amount of securities are included in the portfolio, the more significant the risk reduction benefits gained.

c) ρi,j =-1.0; means a perfect negative correlation. This form of correlation will eliminate the risk of both securities.

The optimal portfolio preparation procedure with the Constant Correlation Model is identical to that of the Single Index Model. The difference is that the Constant Correlation Model uses Excess Return To Standard (ERS) deviation as the reference number.

The optimal portfolio will contain securities that have high ERS (Tandelilin, E. 2001). Securities that have negative ERS are not incorporated into the optimal portfolio candidate. Determination of the up or bottom limit of the ERS value depends on the barrier point (cut-off point/C*). The securities that have a value of ERS greater than or equal to C* are securities that make up the optimal portfolio. Conversely, the securities that have ERS value less than C* are excluded in the optimal portfolio candidate.

RESULTS AND DISCUSSION

Single index Model

The Single Index Model is based on the price movements of a security that fluctuates in the direction of the market price. A Beta of a security shows the extent to which the market returns effect to the securities return. The optimal portfolio formation based on a Single Index Model uses the reference number of ERB (Excess Return to Beta). ERB is formulated as a difference between the average return of shares with mean risk-free against the stock Beta.

The average return of shares is derived from fluctuations and changes in the stock price each month during the observation period. Standard deviation is used to measure the total risk of a security, i.e. systematic risk and non-systematic risk. The market return is seen from the price change of IDX Composite. The following figure shows the return and the standard deviation of the stock selected as the sample as well as the return and market standard deviation.

Average return and IDX Composite standard deviation:

1. Mean Return Market: 0.077%
2. Standard deviation: 0.67%

In addition to shares return, the value of ERB (Excess Return to Beta) is also based on the average interest rate of risk-free investments and the value of Beta. In this context, the researcher uses the interest rate of SBI (Bank Indonesia Certificate) as a reference for

risk-free investment interest rate. SBI is regarded by many investors as risk-free (Fahmi, 2011:173). The average of SBI interest rates is used to form and measure the optimal portfolio performance of the research sample, which is from January 2012 to December 2018. On average, the SBI rate of the period is 0.765%.

A stock Beta is a number that reflects the extent of market fluctuations (IDX Composite) influence on the shares. Beta also shows the systematic risk of a security that cannot be diversified anymore. The higher the return that the securities generate, the higher the security Beta will be.

Table 2. Beta shares period January 2012 – December 2018

No	Stock Code	ERB	No	Stock Code	ERB
1	ADRO	-0.027377775	11	INTP	0.072847229
2	AKRA	0.210013639	12	JSMR	-0.05126401
3	ASII	-0.046646997	13	KLBF	-0.14681066
4	BBCA	0.115441288	14	LPKR	-0.349998409
5	BBNI	0.674101986	15	PGAS	-0.051640755
6	BBRI	0.02062002	16	PTBA	-0.018161347
7	BMRI	0.076564413	17	TURI	-0.04151438
8	GGRM	0.155717684	18	TLKM	0.157876751
9	ICBP	0.220478024	19	UNVR	0.03187361
10	INDF	0.346752201			

Source: Data processed, 2019

The stock candidate in the establishment of an optimal portfolio with a Single Index Model is a stock that has a sizeable and positive ERB (Excess Return to Beta) value. Stocks with a low ERB and negative value are excluded from optimal portfolio candidates. ERB also shows the relationship between return and risk. The following table presents the ERB shares ranking from the largest to the smallest that will be the optimal portfolio candidate.

Table 3. Stock Rank Based on ERB

No	Stock Code	ERB	No	Stock Code	ERB
1	ADRO	0.00104	11	INTP	0.003728
2	AKRA	0.006421	12	JSMR	0.001635
3	ASII	0.002002	13	KLBF	-0.00599
4	BBCA	0.062145	14	LPKR	-0.00579
5.	BBNI	0.008344	15	PGAS	0.000621
6.	BBRI	0.002747	16	PTBA	-0.00071
7.	BMRI	0.003295	17	TURI	0.001925
8.	GGRM	0.008275	18	TLKM	0.025966
9	ICBP	0.019523	19	UNVR	0.003114
10	INDF	0.007184			

Source: Data processed, 2018

From the results of ERB calculations, there are 17 issuers whose ERB are positive. They are ADRO, AKRA, ASSI, BBCA, BBNI, BBRI, BMRI, GGRM, ICBP, INDF, INTP, JSMR, PGAS, SMGR, TLKM and UNVR. In addition, three issuers have negative ERB, namely KLBF, LPKR and PTBA. These issuers are automatically eliminated from the list of optimal portfolio candidates.

Calculation of Cut-Off Rate (Ci)

The cut-off point is an ERB value delimiter, which is used to determine the value of ERB considered as high. Stocks that make up an optimal portfolio are stocks that have an ERB value greater than or equal to the ERB value at the cut-off point (C *) point. Stocks that have a smaller ERB value than ERB value in point C* are not included in the optimal portfolio formation. The cut-off point (C*) value is the most considerable Ci value. The table below shows the value of cut-off rate from issuers that have a positive value of ERB.

Table 4. Determination of Cut-Off Points based on ERB

No	Stock code	ERB	Ci	C	Portfolio Candidates
1	ADRO	0.00104	0.0000696	0.0023952	Excluded
2	AKRA	0.006421	0.0010041		Included
3	MILLION ASII	0.002002	0.0005933		Excluded
4	BBCA	0.062145	0.0004237		Included

5	BBNI	0.008344	0.0023952	Included
6	BBRI	0.002747	0.0004734	Included
7	BMRI	0.003295	0.0007648	Included
8.	GGRM	0.008275	0.0007117	Included
9	ICBP	0.019523	0.0008539	Included
10	INDF	0.007184	0.0014701	Included
11	INTP	0.003728	0.0006063	Included
12	JSMR	0.001635	0.0003160	Excluded
13	KLBF	-0.00599	-0.0003508	Excluded
14	LPKR	-0.00579	-0.0007639	Excluded
15	PGAS	0.000621	0.0000582	Excluded
16	PTBA	-0.00071	-0.0000144	Excluded
17	TURI	0.001925	0.0004596	Excluded
18	TLKM	0.025966	0.0006036	Included
19	UNVR	0.003114	0.0004239	Included

Source: Data processed, 2018

According to the table above, from 19 shares an optimal portfolio candidate, there are 11 stocks that will form an optimal portfolio using the Single Index Model. The other four stocks are not included in the optimal portfolio formation because of its ERB value is less than C*. In the table above, the most substantial Ci value is 0.0023952, which becomes C* (cut-off point). The figure will be used as the boundary of a stock entry in the portfolio. The Issuers, whose ERB value is higher than the value of C*, will be included in the optimal portfolio component. From the table above, it is apparent that there are ten stocks that meet the criteria to enter into optimal portfolio formation because it has an ERB value more significant than the C* value. They are AKRA, BBCA, BBNI, BBRI, BMRI, GGRM, ICBP, INDF, INTP, TLKM, and UNVR.

The Proportion of Funds Determination

The optimal portfolio will be formed when the formerly selected shares are allocated according to their respective weights. The stocks weighting requires several data, i.e. stock beta values, stock residue variants, shares ERB, and cut-off point (C*) values. The calculation result of the weighted 11 shares with the Single Index Model is presented in the following table.

Table 5. Results of Determining Proportion of Funds Using Single Index Method

Issuer	Xi	Wi
AKRA	0.553813	11.35%
BBCA	0.087999	1.80%
BBNI	1.334722	27.35%
BBRI	0.039123	0.80%
BMRI	0.167507	3.43%
GGRM	0.493794	10.12%
ICBP	0.714295	14.64%
INDF	1.069541	21.92%
INTP	0.177593	3.64%
TLKM	0.241143	4.94%
UNVR	0.108734	2.18%

Source: Data processed, 2018

From the calculation above, the amount of percentage of funds for each share in the portfolio is BBNI 27%, INDF 21.92%, ICBP 14.64%, AKRA 11.35%, GGRM 10.12%, TLKM 4.94%, INTP 3.64%, BMRI 3.43%, UNVR 2.18, BBCA 1.80%, BBRI 0.80%.

Expected Return and Portfolio Risk Calculations

After determining the proportion of funds of each portfolio-forming stock, the expected return portfolio (ER(p)) can be calculated. Besides, the risk of the portfolio with the equation (Beta p) also can be calculated. The expected return calculation results are illustrated in the following table.

Table 6. Expected Return calculation results and portfolio risk based on a single index method

Issuer	ER(p)
AKRA	0.02%
BBCA	0.41%
BBNI	0.21%
BBRI	-0.01%
BMRI	-0.01%

GGRM	0.04%
ICBP	0.23%
INDF	0.08%
INTP	-0.01%
TLKM	0.20%
UNVR	0.01%
Portfolio	1.13% 13.56%
Stdev P	0.066601

Source: Data processed, 2018

The table above shows that the portfolio formed from the four stocks provide a rate of the expected return of 1.13% per month or 13.56% per year. The return generated in the table above is an average return realized with the proportion of funds instilled in the portfolio. The portfolio deviation standard, which can be translated into the risk of the portfolio is 0.066601 or 6.66%.

Constant Correlation Model

The optimal portfolio formation using the Constant Correlation Model is based on the assumption that the correlation coefficient between shares is constant. The measure explains the extent to which the return of a security relates to one another in a diversified context. The optimal portfolio preparation procedures with a Constant Correlation Model use an ERS (Excess Return to Standard Deviation) value as a reference. The ERS value is the difference between the average return of the shares and the average risk-free investment rate against the standard deviation of the stock. Standard deviation illustrates the total risk of a security, i.e. systematic risk and non-systematic risk. ERS, which will become the optimal portfolio candidate, should have a high and positive value. Stocks that have negative ERS value will not be included in the optimal portfolio formation.

There are 16 stocks that have positive ERS value and make these stocks the optimal portfolio candidate. These stocks are ADRO, AKRA, ASSI, BBCA, BBNI, BBRI, BMRI, GGRM, ICBP, INDF, INTP, JSMR, PGAS, SMGR, TLKM and UNVR. There are three issuers that have negative values: KLBF, LPKR, PTBA and the issuers are excluded from the list of optimal portfolio candidates.

The stock correlation coefficient shows concurrent movements between two variables. The measure spans from +1.0 to -1.0. A correlation coefficient that is worth +1.0 means a perfect positive correlation, which is a form of correlation that does not reduce risk. A correlation coefficient that is worth 0 means there is no correlation, which is a form of correlation that will significantly reduce the risk. A -1.0 correlation coefficient means a perfect negative correlation, which is a form of correlation that eliminates the risk of both securities.

Table 7. ERS Calculation Results

No	Issuer	ERS	No	Issuer	ERS
1	ADRO	0.008024	10	INDF	0.104976
2	AKRA	0.079639	11	INTP	0.047328
3	ASII	0.037426	12	JSMR	0.023052
4	BBCA	0.148333	13	KLBF	-0.04303
5	BBNI	0.152524	14	LPKR	-0.06504
6	BBRI	0.036112	15	PGAS	0.005754
7	BMRI	0.052189	16	PTBA	-0.00293
8	GGRM	0.073128	17	TURI	0.031054
9	ICBP	0.120282	18	TLKM	0.115399
			19	UNVR	0.033443

Source: Data processed, 2018

From the result of ERS calculation, it is summarized that the issuers which have positive value are ADRO, AKRA, ASSI, BBCA, BBNI, BBRI, BMRI, GGRM, ICBP, INDF, INTP, JSMR, PGAS, SMGR, TLKM and UNVR. The issuers who have negative values are removed from the list of optimal portfolio candidates.

Calculation of Cut-Off Rate (Ci)

After obtaining a positive ERB value, the cut-off rate (Ci) is also calculated by using equation (Ci). The cut-off point is the delimiter of ERS value which determines a certain value of ERS considered as high. Stocks that make up an optimal portfolio are stocks that have ERS value higher than the ERS value at the cut-off point (C*). Stocks that have ERS value less than ERS in point C* are not included in the optimal portfolio formation. The cut-off point (C*) value is the most substantial Ci value.

Table 8. The Results of Cut-Off Rate (Ci) Determination based on ERS

No	Stock Code	ERS	Ci	C*	Portfolio Candidates
1	ADRO	0.008024	0.0000097	0.0001836	Included
2	AKRA	0.079639	0.0000958		Included
3	ASII	0.037426	0.0000450		Included
4	BBCA	0.148333	0.0001785		Included
5	BBNI	0.152524	0.0001836		Included
6	BBRI	0.036112	0.0000435		Included
7	BMRI	0.003295	0.0000628		Included
8.	GGRM	0.008275	0.0000880		Included
9	ICBP	0.019523	0.0001448		Included
10	INDF	0.007184	0.0001263		Included
11	INTP	0.003728	0.0000570		Included
12	JSMR	0.001635	0.0000277		Included
13	KLBF	-0.00599	-0.0000518		Excluded
14	LPKR	-0.00579	-0.0000783		Excluded
15	PGAS	0.000621	0.0000069		Included
16	PTBA	-0.00071	-0.0000035		Excluded
17	TURI	0.001925	0.0000374		Included
18	TLKM	0.025966	0.0001389		Included
19	UNVR	0.003114	0.0000456		Included

Source: Data processed, 2018

From the information presented in the table above, it is acknowledged that the most considerable Ci value is 0.0001836. The figure then plays a role as C* (cut-off point) which will be used as the boundary of a stock entry in the portfolio. Issuers whose value is higher than the value of C* will be entered in the optimal portfolio component. From the table above, it is identified that four stocks meet the criteria to enter into optimal portfolio formation since it has an ERS value more significant than the C* value, they are ADRO, AKRA, ASSI, BBCA, BBNI, BBRI, BMRI, GGRM, ICBP, INDF, INTP, JSMR, PGAS, SMGR, TLKM and UNVR. Whereas KLBF, LPKR and PTBA have the ERS value smaller than the C* value.

The proportion of Funds Determination

The optimal portfolio will be formed when the selected shares are allocated according to their respective weights. The weighting of these stocks requires the stock standard deviation value, average paired share correlation coefficient, ERS values, and cut-off point (C*) values. The weighted calculation result of eight shares with the Constant Correlation Model can is demonstrated below.

Table 9. The Results of Proportion of Funds Determination Based on Constant Correlation Method

Issuer	Xi	Wi	Issuer	Xi	Wi
BBNI	1.869927	20.83%	JSMR	0.334655	3.73%
INDF	1.601653	17.84%	TURI	0.33168	3.70%
AKRA	0.881279	9.82%	BBRI	0.303899	3.39%
ICBP	0.812943	9.06%	TLKM	0.260134	2.90%
GGRM	0.693193	7.72%	BBCA	0.091414	1.02%
BMRI	0.611071	6.81%	ADRO	0.068297	0.76%
ASII	0.573602	6.39%	PGAS	0.047495	0.53%
INTP	0.494814	5.51%	UNVR	0.437383	4.65%

Source: Data processed, 2018

From the calculation above, the amount of percentage of funds for each share in the portfolio from the highest respectively are BBNI amounting to 20.83%, INDF of 17.84%., AKRA by 9.82%, ICBP of 9.06%, ICBP amounting to 8.70%, GGRM by 7.72% BMRI of 6.81%, ASII of 6.39%, INTP of 5.51%, UNVR amounted to 4.65%, JSMR of 3.73%, SMGR of 3.70%, BBRI amounting to 3.39%, TLKM for 2.90%, BBCA of 1.02% ADRO of 0.76% and PGAS of 0.53%.

Expected Return and Portfolio Risk Calculation

After determining the proportion of funds of each portfolio-forming stock, it can be calculated the expected return portfolio with the equation ER(p) and subsequently, the risk of the portfolio with the equation (Beta p) can also be calculated. The expected return calculation results are illustrated in the following table.

Table 10. The Results of The Expected Return and Portfolio Risk Calculation Based on Constant Correlation Method

Issuer	ER(p)
ADRO	0.00%
AKRA	0.01%
ASII	-0.03%
BBCA	0.22%
BBNI	0.05%
BBRI	-0.02%
BMRI	-0.03%
GGRM	0.02%
ICBP	0.12%
INDF	0.04%
INTP	-0.02%
JSMR	-0.01%
PGAS	0.00%
TURI	-0.02%
TLKM	0.11%
UNVR	0.02%
Portfolio	0.42%
	5.01%
Stdev P	0.034662

Source: Data processed, 2018

The figures above show that the portfolio formed from 16 shares provides a rate of the expected return of 0.42% per month or 5.01% per year. The return generated in the table above is an average return realized with the proportion of funds instilled in the portfolio. The portfolio deviation standard, which can be interpreted into the risk of the portfolio is 0.034662 or 3.46%.

Portfolio Performance Assessment

The researcher attempted to investigate the optimal portfolio performance simulations using the Single Index Method and the Constant Correlation Method**.** Based on these simulations, the researcher assessed that the optimum portfolio formation with Single Index Models is more favourable than the Constant Correlation Model. The result agrees with the consideration that the return and risk level on the Single Index Model (with a return rate of 13.56 per cent) is higher than that of the Constant Correlation Model (with a 5.01 per cent return rate). While in terms of the risk level, the Single Index Model generated 6.66 per cent compared to 3.47 per cent resulted from the Constant Correlation Model.

The high level of risk in the Single Index Model corresponds to the higher return level. It is arguably in line with the investment principle that is high-risk high-return. The more considerable risk level of the Single Index Method compared to the Constant Correlation Method is presumably rooted from the less diversified compared to those using the Constant Correlation Method.

Table 11. Group Statistics

RETURN_GROUP		N	Mean	Std. Deviation	Std. Error Mean
RETURN_SIM_CM	1.0000000	11	0.00103	0.00134	0.00040
	2.0000000	16	0.00026	0.00065	0.00016

Table 12. Independent Samples Test

		Levene's Test for Equality of Variances		T-Test for Equality of Means						
		F	Sig.	Q	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
RETURN_SIM_CM	Equal Variances assumed	9.433	0.005	1.995	25	0.057	0.00077	0.00038	-0.00002	0.00156
	Equal variances not assumed			1.768	13.237	0.100	0.00077	0.00043	-0.00017	0.00170

H_0: X1 ≠ X2: The optimum portfolio return level formed using a Single Index Method differ significantly with the optimum portfolio return level established using the Constant Correlation Method.

H_1: X1 = X2: The optimum portfolio return rate established using a Single Index Method does not differ significantly with the optimum portfolio return level established using the Constant Correlation Method.

The Basis of Decision Making:
The Significance Level Used Is 5%.

- If the value of Prob > 0.05 then H_1 is accepted
- If the value of Prob < 0.05 then H_0 is accepted

According to the table above, it can be seen that the value of prob (sig 2-tailed) of 0.057 is higher than the significance value of 5%. Hence, H_0 was rejected. Therefore based on the statistic calculation result, it can be concluded that the optimum level of return portfolio using Single Index Method does not diverge significantly with those formed with Constant Correlation Model.

CONCLUSIONS AND SUGGESTIONS

Based on the results of the calculations and discussion, it can be achieved several conclusions:

a. Based on the calculation of optimal portfolio formation with the Single Index Model, from eight LQ45 shares selected, It was obtained a combination of 11 shares, namely: BBNI 27%, INDF 21.92%, ICBP 14.64%, AKRA 11.35%, GGRM 10.12%, TLKM 4.94%, INTP 3.64%, BMRI 3.43%, UNVR 2.18, BBCA 1.80%, and BBRI 0.80%.
b. Based on the calculation of the optimal portfolio formation with the Constant Correlation Model, there are 16 LQ45 shares which included, with the following weighted: BBNI of 20.83%, INDF of 17.84%, AKRA is 9.82%, ICBP is 9.06%, ICBP is 8.70%, GGRM of 7.72% BMRI of 6.81%, ASII of 6.39%, INTP of 5.51%, UNVR amounting to 4.65%, JSMR of 3.73%, SMGR of 3.70%, BBRI amounting to 3.39%, TLKM amounting to 2.90%, BBCA amounting to 1.02%, ADRO at 0.76% and PGAS amounting to 0.53%.
c. Based on these simulation results, the researchers assess that in the establishment of an optimum portfolio with the Single Index Method is better than the Constant Correlation Method. This is in accordance with the consideration that the return and risk levels in the Single Index Method are more significant than the Constant Correlation Method with a return rate of 13.56 per cent and 5.01 per cent respectively. In terms of the risk level, the Single Index Method is also more significant than that of the Constant Correlation Method, which accounts for 5 per cent and 3 per cent, respectively. The high level of risk in the Single Index Method parallels its more substantial return level. The result corresponds to the investment principle of high-risk, high-return. The more considerable risk level of the Single Index Method compared to the Constant Correlation Method is presumably rooted from the less diversified compared to those using the Constant Correlation Method.

Based on the above conclusions, there are some suggestions to consider. These suggestions are as follows:

1. Investors can use the Single Index Model in determining the optimal portfolio. This model can provide investors with an overview related to the optimal portfolio shares, the proportion of funds, the return level and the stock risk that must be borne by the investor. Such information can be utilized as a primary reference in making investment decisions on the establishment of a stock portfolio.
2. For companies whose shares are not yet in the optimal portfolio establishment, it is expected to conduct a stock performance evaluation. This evaluation aims to obtain an optimal return so that its stock can be more favourable for the investors in the future.
3. Further research is advised to focus on short-term investors. Short-term investors will usually outlay their funds in less than one year. In doing so, the research period can be shrunk into less than one year.
4. For further research, it is advisable to use different stock indices sectors to expand the research validity and benefit more companies in different sectors as it could provide performance evaluations for their stocks.

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