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Portfolio Optimization Using The Capital Asset Pricing Model (CAPM) And Multi Index Model In LQ45 Companies

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ABSTRACT
This study aims to determine the results of portfolio optimization using the Capital Asset Pricing Model (CAPM) and Multi Index Model in LQ45 companies. The research utilizes monthly stock data that consistently appear in the LQ45 index on the Indonesia Stock Exchange from 2012 to 2022. Seventeen stocks were selected: ADRO, ASII, BBCA, BBNI, BBRI, BMRI, ICBP, INCO, INDF, INTP, KLBF, MNCN, PTBA, SMGR, TLKM, UNTR, and UNVR. The data was collected from January 2012 to December 2022. Using the CAPM model, no optimal portfolio was formed. However, using the Multi Index Model, an optimal portfolio was formed consisting of four stocks: INDF, INTP, MNCN, and TLKM, generating a return of 0.28% and a risk of 1.29%. This study concludes that the Multi Index Model is capable of demonstrating optimal portfolio results.

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INTRODUCTION

Investment is the placement of a certain amount of funds made now with the hope of making a profit in the future. Investment can be in the form of real investment or financial investment. Real investment generally involves tangible assets such as land, machinery, buildings, and so on. Financial investment is an investment that involves written contracts such as shares and bonds (Nurmayanti & Indrawati, 2010). Investment decisions are based on investors' understanding of information related to their investment, however circulating market information can be understood differently by each investor (Sakinah, Purwanto, & Ermawati, 2021). Understanding related to different information allows bias in decision making, this is referred to as behavioral finance (Sattar, Toseef, & Sattar, 2020).

Investment behavior is not always rational and market conditions are not always efficient so that investors will show cognitive errors related to emotions in the decision-making process (Raut & Kumar, 2018). Therefore, Kapoora & Prosad (2017) suggest that investment decision making involving psychological factors plays a role in investor portfolio performance as well as market behavior which can form several market anomalies.

In investing, an investor must have an analysis of what will be gained from the investment because there are certainly risks associated with it. Risks in investing can be avoided by analyzing several shares to obtain minimal risk, or in other words forming a portfolio that is able to provide optimal profits or results (Tambunan, 2020). In a set of

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portfolios that have been formed, investors can choose a portfolio that suits their preferences. This selected portfolio is called the optimal portfolio (Maf'ula, Handayani, & Zahroh, 2018). To form an optimal portfolio, several assumptions need to be made regarding investor behavior in making investment decisions. A reasonable assumption is that investors tend to avoid risk (risk-averse). A risk-averse investor is one who, when faced with two investments offering the same rate of return but different levels of risk, will choose the investment with the lower level of risk. (Hartono, Rohaeni, & Kurniati, 2021).

There are several methods for calculating the level of return and risk to create an optimal portfolio, including the Capital Asset Pricing Model (CAPM) (Elbannan, 2015) and the Multi Index Model (Fauziyyah, Prahutama, & Sudarno, 2019). The CAPM model is a portfolio calculation method/model discovered by Sharpe in 1964 and Lintner in 1965, as cited by Elbannan (2015). This model is a development of a model previously discovered by Markowitz in 1959. Sharpe and Lintner added two assumptions to Markowitz's previous model. The first assumption is lending and borrowing at a risk-free rate, meaning that investors can borrow or lend any amount of money at the same risk-free return rate, regardless of the amount borrowed or lent. The second assumption is that all investors have homogeneous expectations that produce identical probability distribution estimates for future returns, that is, agreement on the total distribution of asset returns from t-1 to t. CAPM is used to measure the expected rate of return and relate it to the risk faced. The Multi Index Model is a model introduced by King in 1996, as cited by Fauziyyah, Prahutama, and Sudarno (2019). This model is an extension of the single index model method for analyzing an optimal portfolio, as it can demonstrate the possibility that more than one factor or index can influence stock returns.

There are factors that influence the movement of the IHSG, which include internal and external factors. The internal factors are instruments originating from within the country, such as exchange rates, interest rates, inflation, the money supply, and others. On the other hand, the influence of external factors includes the movements of foreign stock indices, such as the Dow Jones Index, the Hang Seng Index, and other foreign stock indices. International stock exchanges and commodity markets impact the domestic stock exchange and foreign exchange market (Kowanda et al., 2014). One of the indices that attracts considerable interest from investors in domestic investments is the LQ45 index. The LQ45 index is composed of 45 stocks that are the most actively traded, with companies that have high liquidity and the largest market capitalization (Safitri, Tarno, & Hoyyi, 2021). The group of companies listed in the LQ45 is one of the most sought after by capital market investors due to their strong fundamentals.

External factors, in this case the movement of foreign stock indices such as the Dow Jones Industrial Average Index and Hang Seng Index, have an influence on the movement of the IHSG itself. The Dow Jones index is an index originating from the United States and is one of the indexes that has the most influence on stock index movements in countries throughout the world. For example, when the subprime mortgage crisis in the United States (US) caused the Dow Jones index on the US stock exchange to decline and gave a negative signal to investors on the IDX, leading to a decline in the IHSG as well (Utama & Artini,

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2015). The United States is one of Indonesia's largest export destination countries, so the great economic power of the United States encourages Indonesia's economic growth (Nuraeni & Panjawa, 2021). The DJIA is one of the most famous and oldest stock indexes in the world and represents the largest and most prominent companies in the United States. As the main index in the US stock market, the DJIA is often used as a barometer for global economic health and the overall stock market. This makes it important for international investors, including those in Indonesia who want to understand global market trends. Because the United States is one of the largest economic powers in the world, DJIA movements often reflect global market sentiment. Investors in Indonesia monitor the DJIA to get an idea of global economic conditions that may influence the domestic market and their investment decisions. The Hang Seng Index is an index that monitors the stock market on the Hong Kong Stock Exchange. The Hang Seng Index is also one of the foreign index that considerable popularity in Indonesia.

Several aspects that make it popular in Indonesia include economic and investment relations with China. Hong Kong is an important financial center and is often considered the gateway to the Chinese market. Because economic and trade relations between Indonesia and China are quite significant, Indonesian investors often monitor the Hang Seng index to understand trends in the Chinese market and its impact on the global economy. Overall, the popularity of the Hang Seng index in Indonesia is explained by investors' interest in fast-growing Asian markets, economic relations with China, and the need to follow global market news and trends. Based on the description that has been stated, researchers are interested in carrying out optimal portfolio analysis using the Capital Asset Pricing Model (CAPM) and Multi Index Model on the LQ45 stock group with the addition of indices, namely the Hang Seng index and the Dow Jones Industrial Average index as a comparison in the Multi Index Model.

METHODS

This type of research is quantitative descriptive research which aims to describe portfolio optimization analysis between two models, namely the CAPM Model and the Multi Index Model. The research design carried out was a comparative design or comparison between two or more groups of data (Sugiyono, 2008). This research will analyze the optimal portfolio of LQ45 group companies in the period 2012 - 2022. In this research there are two groups of data obtained from the same subject. There are differences in the formulation of portfolio optimization calculations for companies in the LQ45 index group during 2012 - 2022. The two sets of data are calculated using two different methods or models, so the resulting data will be two separate sets that are unrelated to each other (independent).

The type of data used in this research is secondary data. Secondary data is data obtained by researchers indirectly from the research object. Data sources were obtained from the Indonesian Capital Market Directory (ICDM) and https://finance.yahoo.com for the observation period from 2012 to 2022. Data from this source was chosen because it is easier to access and extract.

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The data collection used in this study involves the observation method of the closing prices of the LQ45 index stock group and the closing prices of the IHSG, Dow Jones Industrial Average, and Hang Seng Index on the Indonesia Stock Exchange. The observed data covers the period from 2012 to 2022, sourced from the Indonesian Stock Exchange and Yahoo Finance websites. Data collection was carried out by reviewing the annual reports of the selected sample companies.

The population in this study are all companies that are members of the LQ45 index stock group on the Indonesia Stock Exchange from 2012 to 2022. Sampling was carried out using a purposive sampling method, which companies that were consistently in the LQ45 index throughout the period. Based on these criteria, there were 17 companies included in this research sample. The data analysis method is a way to measure, process and analyze the data. In accordance with the research method used, to calculate return and risk using the CAPM model and Multi Index Model.

RESULTS AND DISCUSSION

Capital Asset Pricing Model (CAPM)

Individual Stock Returns

Profits in shares, which are often referred to as returns, are a form of profit in the rate of return on individual shares for shareholders. Monthly closing prices are used to calculate individual returns in this study. The following individual stock return values were obtained by comparing the closing price values each month for each LQ45 company share during the observation period 2012 - 2022. Table 1. below describes the results of calculating individual share return rates for 17 companies in LQ45 during the 2012 - 2022 period.

Table 1. LQ45 Company Individual Share Returns for the 2012 – 2022 Period

No	Kode Emiten	Nama Perusahaan	Ri	σ^i
1	ADRO	PT. Adaro Energy Tbk.	1.24%	11.87%
2	ASII	PT. Astra International Tbk.	0.05%	7.70%
3	BBCA	PT. Bank Central Asia Tbk.	1.44%	5.51%
4	BBNI	PT. Bank Negara Indonesia (Persero) Tbk.	1.20%	9.52%
5	BBRI	PT. Bank Rakyat Indonesia (Persero) Tbk.	1.31%	7.95%
6	BMRI	PT. Bank Mandiri (Persero) Tbk.	1.13%	7.46%
7	ICBP	PT. Indofood CBP Sukses Makmur Tbk.	1.27%	6.69%
8	INCO	PT. Vale Indonesia Tbk.	1.48%	14.50%
9	INDF	PT. Indofood Sukses Makmur Tbk.	0.47%	6.53%
10	INTP	PT. Indocement Tunggal Prakarsa Tbk.	0.03%	9.44%
11	KLBF	PT. Kalbe Farma Tbk.	1.04%	6.52%
12	MNCN	PT. Media Nusantara Citra Tbk.	0.41%	13.32%

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12	MNCN	PT. Media Nusantara Citra Tbk.	0.41%	13.32%
13	PTBA	PT. Bukit Asam Tbk.	0.61%	11.72%
14	SMGR	PT. Semen Indonesia (Persero) Tbk.	0.04%	9.54%
15	TLKM	PT. Telkom Indonesia (Persero) Tbk.	0.97%	6.43%
16	UNTR	PT. United Tractors Tbk.	0.31%	8.76%
17	UNVR	PT. Unilever Indonesia Tbk.	0.35%	6.61%
		Rata-rata	**0.79%**	**8.83%**
		Maksimum	**1.48%**	**14.50%**
		Minimum	**0.03%**	**5.51%**

Sumber: www.finance.yahoo.com yang diolah

In table 1 above, it is found that the average monthly return value of LQ45 Company Individual Shares during 2012-2022 is 0.79%. The average monthly return value, if multiplied over a year, is approximately 9.48%, which might be seen as good enough to invest in this issuer. Of the 17 LQ45 companies above, there are companies that have the highest and lowest monthly returns. It can be seen that the company with the highest average monthly return during 2012-2022 is INCO, with an Ri value of 1.48% and the company with the lowest average return during 2012-2022 is INTP, with a value of 0.03. The average value of INCO's monthly return in a year is approximately 17.76%, where in terms of annual return percentage INCO has a higher return rate than the average return of companies in the LQ45 index for the 2012-2022 period. On the other hand, INTP's average monthly return, multiplied over one year, is 0.36%, where the annual return is quite much lower than the average annual return of other companies in the LQ45 index in the 2012-2022 period. Apart from that, the table above also shows the value of the monthly risk level for individual shares (σi) where the average monthly risk of LQ45 company shares during the 2012-2022 period is 8.83%. The stock that has the highest level of risk is INCO, namely 14.50%. The stock that has the lowest level of risk is BBCA, namely 5.51%.

Security Market Line (SML) Chart

A graphic depiction of the CAPM model can be seen by creating a Security Market Line (SML) graph. The relationship between systematic risk or beta (β) and expected return [E(Ri)] CAPM is depicted graphically as follows:

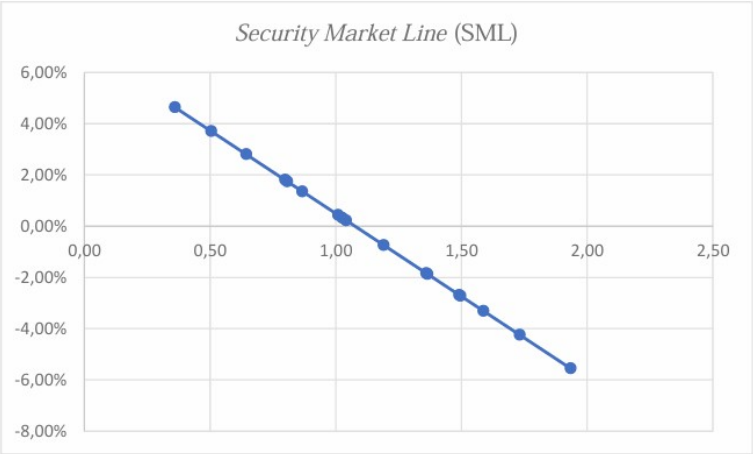

Figure 1. Security Market Line (SML) graph

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Stock Classification

Stock classification can be divided into two, namely efficient shares and inefficient shares. Efficient shares occur if Ri > E(Ri), whereas inefficient shares occur if Ri < E(Ri) (Susanti & Putra, 2019). For efficient shares, it can be used as a reference in buying shares in the LQ45 index. From the analysis explained above, the shares that are classified into efficient shares and inefficient shares are as follows:

Table 2. Classification of LQ45 Index Shares

No	Kode	Nama Perusahaan	Ri	E(Ri) CAPM	Kategori
1	ADRO	PT. Adaro Energy Tbk.	0.0124	0.0043	Efisien
2	ASII	PT. Astra International Tbk.	0.0005	-0.0183	Efisien
3	BBCA	PT. Bank Central Asia Tbk.	0.0144	0.0032	Efisien
4	BBNI	PT. Bank Negara Indonesia (Persero) Tbk.	0.0231	-0.0556	Efisien
5	BBRI	PT. Bank Rakyat Indonesia (Persero) Tbk.	0.0131	-0.0331	Efisien
6	BMRI	PT. Bank Mandiri (Persero) Tbk.	0.0113	-0.0268	Efisien
7	ICBP	PT. Indofood CBP Sukses Makmur Tbk.	0.0127	0.0370	Tidak Efisien
8	INCO	PT. Vale Indonesia Tbk.	0.0148	-0.0187	Efisien
9	INDF	PT. Indofood Sukses Makmur Tbk.	0.0047	0.0280	Tidak Efisien
10	INTP	PT. Indocement Tunggal Prakarsa Tbk.	0.0003	-0.0074	Efisien
11	KLBF	PT. Kalbe Farma Tbk.	0.0104	0.0174	Tidak Efisien
12	MNCN	PT. Media Nusantara Citra Tbk.	0.0041	-0.0423	Efisien
13	PTBA	PT. Bukit Asam Tbk.	0.0061	0.0022	Efisien
14	SMGR	PT. Semen Indonesia (Persero) Tbk.	0.0004	-0.0272	Efisien
15	TLKM	PT. Telkom Indonesia (Persero) Tbk.	0.0097	0.0135	Tidak Efisien
16	UNTR	PT. United Tractors Tbk.	0.0031	0.0180	Tidak Efisien
17	UNVR	PT. Unilever Indonesia Tbk.	0.0035	0.0463	Tidak Efisien

From the data in table 2. of the results of the LQ45 share classification, it is known that 11 LQ45 companies whose shares are classified as efficient and 6 companies whose shares are classified as inefficient. The factors that determine grouping are by comparing Ri and E(Ri), if Ri > E(Ri) then the shares will be grouped into efficient shares but conversely if Ri < E(Ri) then the shares will be grouped into efficient shares. which is inefficient. And if the results of the E(Ri) analysis show that the shares are efficient, then the shares should be purchased and used as an investment portfolio.

Comparison of ERB Value and Cut-Off Point (C*)

In this study, determining the optimal portfolio involves comparing the ERB value with the Cut-Off Point (C*). The stocks are ranked from the highest to the lowest ERB values. The value of C* is derived from the stock with the highest or maximum Ci value. Stocks that form the optimal portfolio are those with an ERB value greater than or equal to the ERB value at the C* point. Stocks with an ERB value lower than the ERB value at the C* point are excluded from the formation of the optimal portfolio.

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Table 3. Comparison of ERB Value and Cut-Off Rate (Ci)

Kode Saham	ERB	Ci	Evaluasi Saham	C* (Ci Maximum)
ADRO	-0.06475	-0.00671	TIDAK OPTIMAL	**-0.00671**
ASII	-0.06474	-0.02892	TIDAK OPTIMAL	
BBCA	-0.06475	-0.03224	TIDAK OPTIMAL	
BBNI	-0.06475	-0.03833	TIDAK OPTIMAL	
BBRI	-0.06475	-0.03705	TIDAK OPTIMAL	
BMRI	-0.06474	-0.03701	TIDAK OPTIMAL	
INCO	-0.06475	-0.00822	TIDAK OPTIMAL	
INTP	-0.06474	-0.01475	TIDAK OPTIMAL	
MNCN	-0.06475	-0.01567	TIDAK OPTIMAL	
PTBA	-0.06475	-0.00733	TIDAK OPTIMAL	
SMGR	-0.06485	-0.02286	TIDAK OPTIMAL	

Portfolio in the CAPM Model

In this research, in the CAPM model no optimal portfolio is formed. This is illustrated in 11 stocks which are included in the efficient stock group where the average return during 2012 - 2022 is higher than the expected return value. However, the 11 efficient stocks showed suboptimal results in forming a portfolio based on the Excess Return to Beta (ERB) value which was smaller than the Cut-Off Rate (Ci) value. The results of calculating the portfolio return formed from the five stocks with the largest ERB values also show a return value of -2.62% with a risk level of 7.45%.

Multi Index Model

Profits in shares, which are often referred to as returns, are a form of profit in the rate of return on individual shares for shareholders. Monthly closing prices are used to calculate individual returns in this study. The following are the individual return rates of 17 LQ45 companies:

Table 4. LQ45 Company Individual Share Returns for the 2012 – 2022 Period

No	Kode Emiten	Nama Perusahaan	Ri
1	ADRO	PT. Adaro Energy Tbk.	1.24%
2	ASII	PT. Astra International Tbk.	0.05%
3	BBCA	PT. Bank Central Asia Tbk.	1.44%
4	BBNI	PT. Bank Negara Indonesia (Persero) Tbk.	1.20%
5	BBRI	PT. Bank Rakyat Indonesia (Persero) Tbk.	1.31%
6	BMRI	PT. Bank Mandiri (Persero) Tbk.	1.13%
7	ICBP	PT. Indofood CBP Sukses Makmur Tbk.	1.27%
8	INCO	PT. Vale Indonesia Tbk.	1.48%
9	INDF	PT. Indofood Sukses Makmur Tbk.	0.47%
10	INTP	PT. Indocement Tunggal Prakarsa Tbk.	0.03%
11	KLBF	PT. Kalbe Farma Tbk.	1.04%
12	MNCN	PT. Media Nusantara Citra Tbk.	0.41%
13	PTBA	PT. Bukit Asam Tbk.	0.61%
14	SMGR	PT. Semen Indonesia (Persero) Tbk.	0.04%
15	TLKM	PT. Telkom Indonesia (Persero) Tbk.	0.97%
16	UNTR	PT. United Tractors Tbk.	0.31%
17	UNVR	PT. Unilever Indonesia Tbk.	0.35%
		Rata-rata	**0.79%**
		Maksimum	**1.48%**
		Minimum	**0.03%**

Sumber: www.finance.yahoo.com yang diolah

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In table 4 above, it is found that the average monthly return value of LQ45 Company Individual Shares during 2012-2022 is 0.79%. The average monthly return value, if multiplied over a year, is approximately 9.48%, which might be seen as good enough to invest in this issuer. Of the 17 LQ45 companies above, there are companies that have the highest and lowest monthly returns. It can be seen that the company with the highest average monthly return during 2012-2022 is INCO, with an Ri value of 1.48% and the company with the lowest average return during 2012-2022 is INTP, with a value of 0.03. The average value of INCO's monthly return in a year is approximately 17.76%, where in terms of annual return percentage INCO has a higher return rate than the average return of companies in the LQ45 index for the 2012-2022 period. On the other hand, INTP's average monthly return, multiplied over one year, is 0.36%, where the annual return is quite much lower than the average annual return of other companies in the LQ45 index in the 2012-2022 period .

IHSG, Dow Jones, and Hang Seng Index Returns

For analysis of calculations of index returns, the data sources used are IHSG, Dow Jones and Hang Seng Index data. IHSG is used because it is able to represent all stock trading activities on the IDX. The Dow Jones index is an index originating from the United States and is one of the indexes that has the most influence on the movement of stock indices in countries throughout the world. The Hang Seng Index is an index that monitors the stock market on the Hong Kong Stock Exchange. This index monitors and records the daily movements of the largest companies on the Hong Kong stock market and is the main indicator of the performance of the Hong Kong stock market.

Table 5. IHSG Returns for the 2012 – 2022 Period

Bulan	IHSG	*Return*	Bulan	IHSG	*Return*	Bulan	IHSG	*Return*	Bulan	IHSG	*Return*
Jan-12	3,942		Jan-15	5,289	1.19%	Jan-18	6,606	3.93%	Jan-21	5,862	-1.95%
Feb-12	3,985	1.10%	Feb-15	5,450	3.04%	Feb-18	6,597	-0.13%	Feb-21	6,242	6.47%
Mar-12	4,122	3.42%	Mar-15	5,519	1.25%	Mar-18	6,189	-6.19%	Mar-21	5,986	-4.11%
Apr-12	4,181	1.44%	Apr-15	5,086	-7.83%	Apr-18	5,995	-3.14%	Apr-21	5,996	0.17%
May-12	3,833	-8.32%	May-15	5,216	2.55%	May-18	5,984	-0.18%	May-21	5,947	-0.80%
Jun-12	3,956	3.20%	Jun-15	4,911	-5.86%	Jun-18	5,799	-3.08%	Jun-21	5,985	0.64%
Jul-12	4,142	4.72%	Jul-15	4,803	-2.20%	Jul-18	5,936	2.37%	Jul-21	6,070	1.41%
Aug-12	4,060	-1.98%	Aug-15	4,510	-6.10%	Aug-18	6,018	1.38%	Aug-21	6,150	1.32%
Sep-12	4,263	4.98%	Sep-15	4,224	-6.34%	Sep-18	5,977	-0.70%	Sep-21	6,287	2.22%
Oct-12	4,350	2.06%	Oct-15	4,455	5.48%	Oct-18	5,832	-2.42%	Oct-21	6,591	4.84%
Nov-12	4,276	-1.70%	Nov-15	4,446	-0.20%	Nov-18	6,056	3.85%	Nov-21	6,534	-0.87%
Dec-12	4,317	0.95%	Dec-15	4,593	3.30%	Dec-18	6,194	2.28%	Dec-21	6,581	0.73%
Jan-13	4,454	3.17%	Jan-16	4,615	0.48%	Jan-19	6,533	5.46%	Jan-22	6,631	0.75%
Feb-13	4,796	7.68%	Feb-16	4,771	3.38%	Feb-19	6,443	-1.37%	Feb-22	6,888	3.88%
Mar-13	4,941	3.03%	Mar-16	4,845	1.56%	Mar-19	6,469	0.39%	Mar-22	7,071	2.66%
Apr-13	5,034	1.88%	Apr-16	4,839	-0.14%	Apr-19	6,455	-0.21%	Apr-22	7,229	2.23%
May-13	5,069	0.69%	May-16	4,797	-0.86%	May-19	6,209	-3.81%	May-22	7,149	-1.11%
Jun-13	4,819	-4.93%	Jun-16	5,017	4.58%	Jun-19	6,359	2.41%	Jun-22	6,912	-3.32%
Jul-13	4,610	-4.33%	Jul-16	5,216	3.97%	Jul-19	6,391	0.50%	Jul-22	6,951	0.57%
Aug-13	4,195	-9.01%	Aug-16	5,386	3.26%	Aug-19	6,328	-0.97%	Aug-22	7,179	3.27%
Sep-13	4,316	2.89%	Sep-16	5,365	-0.40%	Sep-19	6,169	-2.52%	Sep-22	7,041	-1.92%
Oct-13	4,511	4.51%	Oct-16	5,423	1.08%	Oct-19	6,228	0.96%	Oct-22	7,099	0.83%
Nov-13	4,256	-5.64%	Nov-16	5,149	-5.05%	Nov-19	6,012	-3.48%	Nov-22	7,081	-0.25%
Dec-13	4,274	0.42%	Dec-16	5,297	2.87%	Dec-19	6,300	4.79%	Dec-22	6,851	-3.26%

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Jan-14	4,419	3.38%	Jan-17	5,294	-0.05%	Jan-20	5,940	-5.71%	**Jumlah**	**65.01%**
Feb-14	4,620	4.56%	Feb-17	5,387	1.75%	Feb-20	5,453	-8.20%	**E(Rm)**	**0.50%**
Mar-14	4,768	3.20%	Mar-17	5,568	3.37%	Mar-20	4,539	-16.76%	**Maksimum**	**9.44%**
Apr-14	4,840	1.51%	Apr-17	5,685	2.10%	Apr-20	4,716	3.91%	**Minimum**	**-16.76%**
May-14	4,894	1.11%	May-17	5,738	0.93%	May-20	4,754	0.79%		
Jun-14	4,879	-0.31%	Jun-17	5,830	1.60%	Jun-20	4,905	3.19%		
Jul-14	5,089	4.31%	Jul-17	5,841	0.19%	Jul-20	5,150	4.98%		
Aug-14	5,137	0.94%	Aug-17	5,864	0.40%	Aug-20	5,238	1.73%		
Sep-14	5,138	0.01%	Sep-17	5,901	0.63%	Sep-20	4,870	-7.03%		
Oct-14	5,090	-0.93%	Oct-17	6,006	1.78%	Oct-20	5,128	5.30%		
Nov-14	5,150	1.19%	Nov-17	5,952	-0.89%	Nov-20	5,612	9.44%		
Dec-14	5,227	1.50%	Dec-17	6,356	6.78%	Dec-20	5,979	6.53%		

Sumber: www.finance.yahoo.com yang diolah

In table 5. above, it describes the monthly market returns from 2012-2022 where it can be seen that the average value of market returns (Rm) is 0.50%. From this data it can also be illustrated that March 2020 had the lowest market return rate, namely -16.76%, so it can be explained that in that month IHSG trading experienced sluggishness or weakening. In contrast to November 2020, from the table data above the highest market return was 9.44% so it can be explained that in that month IHSG trading experienced strengthening. The condition of the COVID-19 pandemic which has attacked almost all countries in the world has also had an impact on economic conditions in Indonesia, where this can be seen in the IHSG movement which experienced fluctuations during the outbreak of COVID-19 in Indonesia.

Formation of an optimal portfolio for the LQ45 stock group using the Capital Asset Pricing Model (CAPM)

In the CAPM model there are 11 companies that are included in the efficient stock classification out of 17 companies that are consistently included in the LQ45 stock group for the period January 2012 – December 2022. The stocks included in the research sample are stocks that are continuously included during each month of the research period. in the LQ45 stock group. The data needed in the research are the closing price of the sample companies, the closing price of the IHSG, and the ORI interest rate during the research period. Stock classification can be divided into two, namely efficient shares and inefficient shares. Efficient shares occur if Ri > E(Ri) whereas inefficient shares occur if Ri < E(Ri). For efficient shares, it can be used as a reference for investors in buying shares in the LQ45 index and can be used as a reference in forming an optimal portfolio. But investors also need to always follow market developments by looking at market returns (Rm), in this case the IHSG, risk-free asset return rates (Rf), and individual stock systematic risk levels (beta).

After finding a company that is included in the efficient stock classification, the next step is to determine the shares that can be used as an optimal portfolio. Determining the optimal portfolio can be done by carrying out calculations to find the Excess Return to Beta (ERB) value. ERB is the difference between expected return and risk-free asset return. ERB means measuring the excess return relative to one unit of risk that cannot be diversified which is measured by Beta. This ERB also shows the relationship between two determining factors of investment, namely return and risk. After getting the ERB value for each stock with an efficient classification, a calculation is then carried out to find the Cut-Off Rate (Ci) value. Ci is the cutoff value used to decide whether an asset should be included in a

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portfolio or not. Ci is the C value for the asset-i which is calculated from the accumulation of values A1 to Ai and values B1 to Bi. The largest Ci value is the cut-off point (C*) for assets included in the optimal portfolio.

Formation of an optimal portfolio for the LQ45 stock group using the Multi Index Model

Forming an optimal portfolio for the LQ45 stock group using the Multi Index Model also uses the same research sample data, namely 17 companies that are consistently included in the LQ45 during the period January 2012 – December 2022. In this research, the index used is IHSG and there are two external indices The countries used are the Dow Jones Industrial Average (DJIA) index and the Hang Seng index. IHSG is used because it is able to represent all stock trading activities on the IDX. The Dow Jones index is an index originating from the United States and is one of the indexes that has the most influence on the movement of stock indices in countries throughout the world. The Hang Seng Index is an index that monitors the stock market on the Hong Kong Stock Exchange. This index monitors and records the daily movements of the largest companies on the Hong Kong stock market and is the main indicator of the performance of the Hong Kong stock market.

In the Multi Index Model, there is an optimal portfolio formed from four shares, namely INDF, INTP, MNCN, and TLKM. The Multi Index Model has characteristics that cover several important aspects in determining the optimal portfolio. The Multi Index Model is a more complex model than the Single Index Model, where the risk factors are not only focused on a single market index but involve various other indexes or risk factors, such as industry factors, macroeconomic factors, or other specific factors. The portfolio optimization process in the Multi Index Model is more complex because more variables are taken into account and is usually used by investors who want to adjust their portfolios to various types of risk, not just general market risk. Investors who understand and anticipate various economic and industry factors will find this model more suitable for their purposes. With these characteristics, the Multi Index Model provides a more comprehensive approach in determining the optimal portfolio compared to simpler models. This model allows portfolio managers to make more informed investment decisions, taking into account a variety of relevant risk factors.

CONCLUSIONS

Based on the research, it was concluded that the use of the CAPM model showed that there was no optimal portfolio formed on LQ45 index shares. In the Multi Index Model, there are four shares formed as an optimal portfolio, namely INDF, INTP, MNCN, and TLKM with the proportion of funds dominated by INDF shares. This shows that the Multi Index Model is able to provide a comprehensive approach because it includes variables from more than one index in the process of forming an optimal portfolio so that investors are able to carry out a more in-depth analysis before investing because it also takes into account current global market conditions and can have an influence on domestic market.

REFERENCE

Bodie, Z., Kane, A., & Marcus, A. (2017). Investments. New York: McGraw Hill Education.

Elbannan, M. A. (2015). The Capital Asset Pricing Model: An Overview of The Theory. International Journal of Economics and Finance, VII(1), 216-228.

Fauziyyah, B. K., Prahutama, A., & Sudarno. (2019). Analisis Portofolio Optimal Menggunakan Multi Index Model (Studi Kasus: Kelompok Saham IDX30 periode Januari 2014 - Desember 2018). Jurnal Gaussian, Volume 8, Nomor 1, 58-67.

Hartono, N. P., Rohaeni, O., & Kurniati, E. (2021). Menentukan Portofolio Optimal Menggunakan Model Markowitz. Jurnal Riset Matematika, I(1), 57-64.

Kapoora, S., & Prosad, J. (2017). Behavioral Finance: A Review. Procedia Computer Science, 50-54.

Kowanda, D., Binastuti, S., & Pasaribu, R. F. (2014). Pengaruh Bursa Saham Global, Asean, dan Harga Komoditas Terhadap Indeks Saham Gabungan, dan Nilai Tukar EUR/USD. Jurnal Akuntansi & Manajemen, 79-88.

Maf'ula, Z., Handayani, S. R., & Zahroh, Z. A. (2018). Portofolio Optimal Dengan Penerapan Model Markowitz Sebagai Dasar Keputusan Investasi (Studi Pada Perusahaan Yang Tergabung Dalam Indeks Lq-45 Tahun 2014). Jurnal Administrasi Bisnis, vol. 63, 18.

Nuraeni, R., & Panjawa, J. L. (2021). Analisis Pengaruh Indeks Harga Saham Asing Terhadap Indeks Harga Saham Gabungan Dengan Pendekatan Error Correction Model. Journal of Economics Research and Policy Studies, 25 39.

Nurmayanti, P., & Indrawati, N. (2010). Dasar-Dasar Analisis Investasi dan Portofolio. Palembang: Citrabooks Indonesia.

Raut, R., & Kumar, R. (2018). Investment Decision-Making Process Between Different Groups of Investors: A Study of Indian Stock Market. Asia-Pacific Journal of Management Research and Innovation 14(1-2), 39-49.

Safitri, K., Tarno, & Hoyyi, A. (2021). Pengukuran Kinerja Portofolio Optimal Saham LQ45 Menggunakan Capital Asset Pricing Model (CAPM) dan Liquidity Adjusted Capital Asset Pricing Model (LCAPM). Jurnal Gaussian, Vol. 10 No. 2, 230-240

Sakinah, T., Purwanto, B., & Ermawati, W. J. (2021). Analisis Penghindaran Risiko Pada Keputusan Investasi Di Pasar Modal Indonesia. Jurnal Aplikasi Manajemen dan Bisnis, Vol. 7 No. 1, 66-74.

Sattar, M. A., Toseef, M., & Sattar, M. F. (2020). Behavioral Finance Biases in Investment Decision Making. International Journal of Accounting, Finance and Risk Management, 69-75.

Sugiyono. (2008). Metode Penelitian Kuantitatif Kualitatif dan R&D. Bandung: ALFABETA.

Tambunan, D. (2020). Investasi Saham di Masa Pandemi COVID-19. Jurnal Sekretari dan Manajemen, IV, 117-118.

Utama, I. A., & Artini, L. S. (2015). Pengaruh Indeks Bursa Dunia Pada Indeks Harga Saham Gabungan Bursa Efek Indonesia. Jurnal Manajemen, Strategi Bisnis dan Kewirausahaan, 65-73.