

Analysis of LQ45 share portfolio on Quadrimester I during the Covid-19 pandemic

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ABSTRACT

Investment is a way of getting profit by investing a certain amount of capital in certain assets. Investing in shares in LQ45 amid the Covid-19 pandemic is one way to benefit when many sectors are experiencing an economic downturn. The purpose of this study was to analyze the differences in the optimal portfolio of LQ45 stocks in the 2019 and 2020 quadrimester I. The samples of this study were companies listed in LQ45. This research method uses the treynor index and t-test. The results of this study are that there is a significant difference in the optimal portfolio using the treynor index model between quadrimester I 2019 and 2020 on LQ45 stocks, this is influenced by conditions amid the Covid-19 pandemic which affects all sectors. The highest optimal number of purchases in the month April 2020 is occupied by companies with the KLBF code, this is an advantage that the company gets during the Covid-19 pandemic. Future research is expected to be able to allocate investment funds optimally for each share to achieve optimal profits. The investor is expected to be able to estimate in advance the stocks that will be selected for their investment.

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1. Introduction

Investment is a delay in current consumption for use in efficient production for a certain period (Jogiyanto, 2013). Investment can be defined as an activity to place funds in one or more assets during a certain period with the hope of earning income and / or an increase in investment value (Wiksuana, 2017: 1). An investor buys several shares today in the hope of obtaining a profit from an increase in stock prices or a certain amount of dividends in the future, as a reward for the time of risk associated with the investment (Tandelilin, 2010: 2). Invested assets can be real assets or financial assets (Jogiyanto, 2014: 7). Investments in real assets are in the forms of land, property, and gold, while in financial assets it can be in the form of stocks, bonds, and deposits. The objective of investment is to improve the welfare of investors both in present and in the future (Wiksuana, 2017: 2). According to Tandelilin (2010), there are several reasons people invest, including to get a decent life in the future, reduce inflation, and tax saving purposes. Without the benefits that can be enjoyed from an investment, of course investors will not bother to invest, which at the end will be fruitless. In the investment world, it is known that there is a strong relationship between risk and return, that is, if the risk is high, the return will also be high and vice versa if the return is low, the risk will also be low (Fahmi, 2013; 23). Markowitz in Jogiyanto (2014: 285) explains that to minimize risk and still get a large enough return, we should form a portfolio. A portfolio is a group of securities that have a certain return and risk, where rational investors will choose a portfolio that provides the maximum return with a certain risk (Jorion, 2002; 323). The best way to analyze the market for good returns is through portfolio construction (Mohith, et al. 2017). The basic concept in portfolio management is the principle of diversification, whereby diversifying investors can reduce portfolio risk without the need to reduce the expected income on the portfolio (Wiksuana, 2017: 7). Portfolio construction is useful in diversifying risk rather than holding one share (Das & Agarwal, 2014). Investors will choose

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portfolios that can provide satisfaction through risk and return. Every investor invests his/her funds in a portfolio to get maximum return with lower risk (Poornima & Remesh 2016). The optimal portfolio is a portfolio with the best combination of expected returns and risks (Jogiyanto, 2015: 367; Nurhayati & Endri, 2020).

One of the methods used in determining the investment strategy is the formation of a portfolio, where the type of portfolio used is an active portfolio and a passive portfolio. Passive portfolio strategy includes the actions of managers who tend to be passive in investing in stocks and only base their stock movements on market index movements. This means that investors are not actively seeking information or buying and selling shares that can generate abnormal returns. Active portfolios include active investors' actions in selecting and buying and selling stocks, seeking information, keeping track of stock price movements and times and other active actions to generate abnormal returns. An investor in implementing this strategy must be careful in taking actions related to investment (Jones, 2004; 34). The momentum portfolio is an active portfolio strategy that investors and investment managers can use to improve the performance of their stock portfolios. This strategy is carried out by buying stocks that previously had good performance and selling stocks that previously had poor performance (Polakilan, 2015; Le, 2018; Le, *et al.*, 2018). In this strategy, investors will look for the right momentum or time, when the stock price certainly provides benefits for investors, namely by selling shares. According to Jogiyanto (2013: 337), an efficient portfolio (Efficient Portfolio) is a portfolio that is in a group (set) that is feasible to offer investors maximum return expectations for various levels of risk and minimum risk for various levels of expected returns. Efficient is always seen in terms of cost, then an efficient portfolio is also seen in terms of the most cost-effective of the various portfolios offered, because every investor does not want to invest their funds in places that are considered inefficient. The optimal portfolio is a portfolio with the best combination of risk and expected returns. All optimal portfolios are efficient portfolios. Investors who prefer risk will choose portfolios with high returns by paying higher risk compared to investors who do not like risk (Jogiyanto, 2013: 339). Portfolio performance using risk-adjusted return (a portfolio that includes risk and return) can be measured by the Sharpe index, Treynor index, and Jensen index (Tandelilin, 2010; Nguyen, *et al.*, 2020). Based on research from Pardosi and Wijayanto (2015), there is no significant difference between return and risk in the formation of an optimal portfolio using the Markowitz method, so this encourages research to use the Treynor method. The Treynor ratio is a measure of portfolio performance developed by Jack Treynor, and this ratio is often referred to as the reward to volatility ratio. The difference with the Sharpe ratio is the use of the securities market line as an approximate measure, and not the capital market line as in the Sharpe ratio. The assumption used by Treynor is that the portfolio is well diversified so that the risk that is considered relevant is systematic risk (measured by beta). The Treynor ratio is obtained by dividing the reduction in the average expected return by the risk-free rate by the portfolio beta.

The results of the research according to Zahid (2015) with the Treynor-Black Model show that in portfolio method an optimal portfolio can be formed consisting of nine stocks with the resulting return value better than the market return and Single-Index portfolio return and from the performance evaluation results using the Jensen, Sharpe method, Treynor, Sortino, Information Ratio, T2 and M2, Treynor's portfolio shows good performance because the value of the overall evaluation produces a positive value. The evaluation value of the Treynor index model portfolio is better than the evaluation value of the Single-Index portfolio. The portfolio method using the Treynor index model can form an optimal portfolio with good performance. Compared to the beginning of 2020, the outbreak of the corona virus caused the Indonesian stock market to not be separated from the 'infection' of the coronavirus outbreak, leaving the level of 6,000. JCI fell 4.87 percent from the level of 6,244 to 5,940 in a week. To note, the corona virus first appeared in Wuhan, Hubei Province, China. Meanwhile, the number of cases of the corona virus has spread to 16,600. This number is more than the victims who contracted the SARS virus in 2003. Even the World Health Organization (WHO) has declared the coronavirus epidemic a global emergency. Not only has an impact on health, but economists also predict the corona virus outbreak will cut China's economic growth by 2 percent in the first quarter of 2020. As a result, the Bamboo Curtain country has the potential to experience economic losses of up to US \$ 62 billion. The LQ45 Index is a complement to the Composite Stock Price Index (IHSG) and provides information for investors in analyzing stock price movements of stocks actively traded on the Indonesia Stock Exchange because 45 stocks listed in LQ45 have liquidity, financial condition, and good growth prospects. and has a high market capitalization and trading frequency. The advantage for companies that are included in the LQ 45 Index is that capital market players have recognized and believed that the company has a good level of liquidity and market capitalization and has good prospects in the future to encourage the increase in share prices in a positive direction (Lutfi & Hadiprajitno, 2014). The criteria for an issuer to be included in the LQ45 index calculation are to consider factors such as having been listed on the IDX for at least 3 months, transaction activity in the regular market, namely value, volume and frequency of transactions, number of trading days on the regular market, market capitalization in a certain period. as well as the financial condition and growth prospects of the company (Indonesia Stock Exchange, 2010). Entering the early trading period of 2020, the performance of the LQ-45 index is still positive, beating the average share price performance on the Indonesia Stock Exchange (IDX), following investors' buying action of these selected stocks. So far, the performance of the LQ-45 index since the beginning of the year (year to date / ytd) was positive 0.63% at the level of 1,020, higher than the performance of the Composite Stock Price Index (JCI) which was corrected 1.05% to the level of 6,233 at the close of Wednesday. (22/1/2020). In 2019, the performance of the LQ-45 index was able to grow by 3.23%, also better than the JCI which strengthened only 1.7%. The stock market crash is inevitable due to COVID-19. Many businesses have closed / gone bankrupt, unemployment has increased, poverty has increased, and the feeling of fear has gripped many investors so that

many investors have sold their shares so that stock prices plummeted all over the world stock exchanges. The Covid-19 pandemic conditions caused stock trading to decline in the first quarter of 2020 compared to 2019.

The number of companies increased in the first quarter in 2020 compared to 2019, but there was a significant decrease in the number of stock transactions in 2020, the decline in these transactions was due to the Covid-19 pandemic. Seeing the decline in the number of stock transactions due to the pandemic and an increase in the number of companies in 2020, investors must be prepared to face new conditions, which in the future there will be several policies that will be changed and relaxed, including about investing, it is necessary to adapt where investors must rearrange their portfolios which is owned. During the COVID-19 pandemic, investors must be careful about investing in a holistic and diverse portfolio, because stock markets around the world have on average experienced a decline (Collins, 2020). Investors need to build a portfolio of multiple assets that will maximize returns for a certain level of risk. Likewise, with the expected rate of return, an investor can build a portfolio with the lowest possible risk. There are previous studies that analyzed stock returns before and after the occurrence of policies or pandemics, including Pramono (2007) which showed that there were changes in abnormal returns before and after the announcement of the right issue. Likewise, Kurniawati (2006) concluded that the announcement of earnings per share made by companies listed on the Indonesia Stock Exchange received reactions from the market. Meanwhile, research conducted by Suharyanto and Asma, (2013) concluded that there was no difference in abnormal stock returns before and after the announcement of the loan to value kpr regulation. Katti (2018) conducted a study entitled "The Influence of Political Events (Presidential Elections and Cabinet Composition Announcements) on Industrial Sector Shares in the Indonesia Stock Exchange. The purpose of this study is to determine the reactions and differences in abnormal returns of industrial sector stocks on the Indonesia Stock Exchange. (IDX) between before and after political events (presidential elections and announcement of cabinet composition). The sample of this study used a purposive sampling method, the sample in the study was 40 companies. The results of the study can be concluded that there is an abnormal return around national political events, but there is no difference in Average Abnormal Return (AAR) before and after political events. This shows that the predictions and information received by stock market players are relatively the same. Kiky (2020) conducted a study entitled "Risk Management of the 2020 Black Swan Event in Indonesia (Case Study of the Covid-19 Effect)". This research has had many significant impacts on various businesses in Indonesia. This pandemic was first announced by the government in March 2020 and as a result, the Composite Stock Price Index in Indonesia is moving towards a downward trend. The results confirmed that indeed after the announcement, the JCI decreased significantly and lost almost 50% of its initial value in December 2019. This research also shows that this event cannot be considered a black swan event because the JCI has been moving gradually to decline since February 2020. Anwar (2019) conducted on the effect of political events on Industrial Sector Shares in the Indonesia Stock Exchange.

This study uses 84 sample companies that have been selected through the purposive method for 14 days of the presidential election period, and 14 days of announcements from the cabinet event period. The results show that the presidential election event was able to influence the trading volume of the industrial sector, while the cabinet announcement event showed zero results (no effect at all) on the industrial sector stock trading that occurred on the Indonesia Stock Exchange. Rifa'I et al. (2020) state that there are differences in the Composite Stock Price Index before and after the 2020 Covid-19 Pandemic. Kusnandar and Bintari (2020) state that there is a statistically significant difference in abnormal returns before and after the announcement of changes in trading time on stock exchange transactions. This means that the announcement of the change in trading time on stock exchange transactions carried out by the Indonesia Stock Exchange is a negative signal which can be said to be a bad news announcement, so that investors are more interested in selling their share ownership rather than increasing their share ownership. The existence of a research gap from various previous studies and supported by the state of stocks whose price changes were greatly influenced by the Covid-19 pandemic encouraged researchers to examine stock portfolio analysis in LQ45 stocks. LQ45 shares are used in this study because these stocks are the most liquid stocks compared to others. So that the formulation of the problem that is formed is there a significant difference in the formation of the LQ45 stock portfolio in the first quadrimester 2019 and 2020?

2. Literature Review

2.1. Theoretical background

Portfolio theory states that both risk and return must be considered, assuming a formal framework is available to measure them both in portfolio formation. In its basic form, portfolio theory begins with the assumption that the rate of return on future securities can be estimated and then determines risk by varying the distribution of returns. With certain assumptions, portfolio theory produces a linear relationship between risk and return. Portfolio theory is an investment approach initiated by Harry M. Markowitz who is an economist who graduated from the University of Chicago who won the Nobel Prize in economics in 1990. Portfolio theory is concerned with estimating investors' expectations of risk and return, which are measured statistically to create a portfolio. the investment. Markowitz describes how to combine assets into an efficient portfolio diversification. In this portfolio, risk can be reduced by adding the number of types of assets to the portfolio and the expected return can increase if there are differences in the price movements of the combined assets ("Harry Max Markowitz"). In practice, investors in securities often diversify. in investing by combining various securities, in other words they form a portfolio.

According to Husnan (2015: 45), a portfolio means a set of investments. This stage involves identifying which securities to choose and what proportion of funds will be invested in each of these securities. The selection of many securities (investors diversify) is intended to reduce the risk borne. The choice of these securities is influenced, among others, by risk preferences, patterns of cash requirements, tax status, and so on. It would be difficult for us to form a portfolio consisting of all investment opportunities, because it is usually used as a proxy consisting of many stocks or market indexes. For example, the Jakarta Stock Exchange uses the Composite Stock Price Index (IHSG) or the LQ45 Index. In the evaluation phase, investors assess the portfolio performance, both in terms of the level of benefits obtained and the risks borne. According to Husnan (2003: 45), it is not true that portfolios that provide higher returns must be better than other portfolios. Portfolio theory states that both risk and return must be considered, assuming a formal framework is available to measure them both in portfolio formation. In its basic form, portfolio theory begins with the assumption that the rate of return on future securities can be estimated and then determines risk by varying the distribution of returns. With certain assumptions, portfolio theory produces a linear relationship between risk and return. Portfolio theory assumes that rational investors refuse to increase risk without an increase in expected returns. The relationship between accepted risk and expected return is the basis for modern lending and investment decisions. The greater the risk on the investment or loan, the greater the rate of return desired to cover that risk. An event study is a study that studies market reactions to an event whose information is published as an announcement (Jogiyanto, 2014). Ball and Brown (1968) and Fama (1970) used the event study methodology as it is widely used today. In the last two decades, event studies have been used to examine events outside of economic issues. Like Chen and Kim (2007) who examined the avian flu outbreak and the Severe Acute Respiratory Syndrome (SARS) outbreak also influenced market reactions in Asian countries. Hapsari (2012) examined the market reaction to terrorist bomb attacks in Indonesia, and Trisnawati (2011) examines the effect of political events (presidential elections) on changes in stock trading volume and stock prices. In conducting an event study, MacKinlay (1997) stated that Ball and Brown and Fama, Fisher, Jensen and Roll carried out five stages as follows: (1) defining the date the market received news; (2) estimate the yield if this news does not exist; (3) measure the difference between the observed yields and the yields if this news does not exist, or measure the abnormal return; (4) calculating the cumulative abnormal returns, and aggregating the cumulative abnormal returns among sectors or companies; (5) statistically testing aggregate returns to determine whether the abnormal returns are significant or not. In the event study, the observation period is divided into two, namely the estimated period and the event period. The estimated period is the period before the event while the event period is the period around the occurrence of the event to be studied. Event study research is classified into four categories (Jogiyanto, 2014: 7), namely Information Content, Event study is used to test the information content of an event. If an event or information contains information, the market will respond, which is indicated by an abnormal return. Market Efficiency, Efficient market testing is a continuation of testing the information content. If the information content test only tests for abnormal returns as a market reaction, the efficient market test continues by testing the reaction speed of the market. The market is called information efficient if an event or information is fully and quickly responded to by the market. Model evaluation, model evaluation is a study that evaluates which model is most suitable for certain conditions. Metric Descriptions, Metric description category research tries to explain the causes of market reactions in a more advanced way.

2.2. Hypotheses

Nafia (2018) explained that the optimal portfolio with the Single Index Method consists of seven stocks, while the optimal portfolio using the Markowitz Method consists of five stocks. Based on these two methods, the calculation of the Sharpe Index, Treynor Index and Jensen Index in the Markowitz method has a higher value than the Single Index Method, which makes the optimal portfolio with the Markowitz Method have a better performance. Poornima and Aruna (2015) used the Sharpe's single index model and the efficient frontier Markowitz method with a sample of banking and IT companies in India from January 2010 to December 2015, the results showed that there were three companies selected for portfolio formation, including: Ramco Systems (50%), Axis Bank (38%) Bank of Baroda (12%). Nandan and Srivastava (2017) used a sample of Nifty 50 stocks in the period 1 from August 2010 to July 31, 2015 with the Markowitz efficient frontier method, getting the results that there were 24 stocks that met the optimal portfolio requirements. The largest proportion of shares is held by shares in the banking and pharmaceutical sectors. Rifa'I et al. (2020) stated that there are differences in the Composite Stock Price Index before and after the 2020 Covid-19 Pandemic. Systematic risk is smaller than unsystematic risk if investors use portfolio diversification. Kusnandar and Bintari (2020) stated that there is a statistically significant difference in abnormal returns before and after the announcement of changes in trading time on stock exchange transactions. Andriyani, et al. (2016) stated that there is no significant difference between the optimal portfolio and the return and risk of individual stocks that form optimal portfolios using the constant correlation model and stochastic dominance methods.

H₁: *There is a significant difference between the optimal portfolio using the LQ45 quadrimester I 2019 stock treynor index model against the 2020 I quadrimester.*

3. Research Methods

This study compares the use of the treynor index model to form the optimal stock portfolio from LQ45. The results of the study can be used as a guideline for making stock portfolios from making investment decisions during the corona pandemic. The population in this study is the stocks listed in LQ45. The formation of this optimal stock portfolio is carried out on

stocks that are included in LQ45 quadrimester I in 2019 and compared to Quadrimester 1 in 2020 which is the closing price of each month obtained from the Indonesia Stock Exchange (IDX) website, www.idx.co.id and www.finance.yahoo.com. Analysis of optimal portfolio performance is carried out for stocks including LQ45. The technical analysis used in determining the performance of the stock portfolio with a single index and measuring performance using the Treynor index.

In this study using quantitative analysis of available stock price data, this study uses the Treynor Index Model and t Test to compare the performance of shares per sector. Optimal portfolio performance analysis is carried out for each of the primary, secondary, and tertiary sectors. The technical analysis used in determining the performance of the stock portfolio with the Single Index and measuring performance using the Treynor index in this study are as follows (Hartono, 2010):

- 1) Calculate the level of stock returns and *expected return*

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

$$E(R_i) = \alpha_i + \beta_i * E(R_m)$$

- 2) Calculate the index of market returns, alpha and beta

$$R_m = \frac{IHSG_t - IHSG_{t-1}}{IHSG_{t-1}}$$

$$\alpha_i = E(R_i) - \beta_i * E(R_m)$$

$$\beta_i = \frac{\sigma_{im}}{\sigma_m^2}$$

- 3) Calculate stock risk (R_i) and market risk (R_m)

$$Var(R_i) = \sum_{j=1}^n ([R_{ij} - E(R_i)]^2 * p_j)$$

$$standar\ deviasi\ (\sigma) = \sqrt{Var(R_i)}$$

$$Var(R_m) = \sum_{j=1}^n ([R_{mj} - E(R_m)]^2 * p_j)$$

$$standar\ deviasi\ (\sigma) = \sqrt{Var(R_m)}$$

- 4) Residual or risk variants are not systematic

$$\sigma_i^2 = \beta_i^2 * \sigma_m^2 + \sigma_{ei}^2$$

- 5) Calculate *excess return to beta*

$$ERB_i = \frac{E(R_i) - R_{BR}}{\beta_i}$$

- 6) Calculate *cut off-point* (C^*)

$$A_j = \frac{[E(R_i) - R_{BR}] * \beta_i}{\sigma_{ei}^2}$$

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

$$C_i = \frac{\sigma_m^2 \sum_{j=1}^i A_j}{1 + \sigma_m^2 \sum_{j=1}^i B_j}$$

- 7) Calculate the proportion of each share

$$W_i = \frac{Z_i}{\sum_{i=1}^k Z_i}$$

$$Z_i = \frac{\beta_i}{\sigma_{ei}^2} (ERB_i - C^*)$$

- 8) Calculate the portfolio, portfolio alpha and portfolio beta

$$E(R_p) = \alpha_p + \beta_p * E(R_m)$$

$$\alpha_p = \sum_{i=1}^n W_i * \alpha_i$$

$$\beta_p = \sum_{i=1}^n W_i * \beta_i$$

9) Calculate portfolio risk

$$\sigma_p^2 = \beta_p^2 * \sigma_m^2 + \sum_{i=1}^n W_i^2 * \sigma_{ei}^2$$

10) Calculate the performance of the stock portfolio using the Treynor index

$$\hat{T}_p = \frac{\bar{R}_p - \bar{RF}}{\hat{\beta}_p}$$

After obtaining the results of the stock portfolio performance in each of the primary, secondary, and tertiary sectors, then to test the hypothesis using the Independent T-Test Sample Test

4. Results and Discussion

Based on the treynor index calculation that has been carried out on LQ45 shares in Quadrimester I Year 2019 and it is attached to Appendix 1, companies with the EXCL code during January to April occupied the highest position in the optimal number of share purchases in the portfolio. Based on the treynor index calculation that has been carried out on LQ45 shares in the first quadrimester of 2020, the optimal number of purchases with the highest percentage is occupied by companies with the BRPT code of 38.5 percent in January. In February, it was occupied by companies with the ADHI code of 50.6 percent. In March it was occupied by a company with the SRIL code of 13.4 percent and in April it was occupied by KLBF of 95.3 percent, this is because during the first three months of 2020 amid the Covid-19 pandemic, KLBF recorded net sales of up to Rp 5.8 trillion. This number grew by 8.01% compared to the same period in the previous year which amounted to Rp 5.37 trillion, the increase in sales in the first quarter of 2020 came from the distribution and logistics segment which increased by 13.21% year on year (YoY) to Rp 1.8 trillion (www.invest.kontan.co.id). The health sector, such as the pharmaceutical company Kalbe Farma, is a good choice during the Covid-19 pandemic because medicines are very much needed by the community today. Based on the results of Table 1, the average return value in the first quadrimester in 2019 is 83.32% and in 2020 is 139.18%. Portfolio beta is a systematic risk measure of a stock, so that in the first quadrimester of 2019 it was 5,407 and in 2020 it was 7,406. Risk free is a risk-free investment as seen from the Bank Indonesia Certificate (SBI), so that the Treynor index value is obtained as shown in Table 1.

Table 1
T Test Results on LQ 45 Quadrimester 1 Shares in 2019 and 2020

	Year	N	Mean	Std. Deviation	Std. Error Mean
Treynor	2019	4	0.155	0.027	0.013
	2020	4	0.233	0.473	0.236

Table 2
Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Treynor	Equal variances assumed	7.842	0.031	-0.327	6	0.755	-0.077	0.237	-0.658	0.502
	Equal variances not assumed			-0.327	3.020	0.765	-0.077	0.237	-0.829	0.674

Based on the results of the analysis, the t value is -0.327 with a significance level of 0.031 < 0.050, so Ho is rejected and H1 is accepted, so there is a significant difference in the optimal portfolio using the treynor index model when the momentum of Covid-19 in the same period is in the LQ45 index. This is due to the covid-19 outbreak which caused business actors and economic movements to weaken, this triggered a decline in the value of shares on the LQ45 stock index. This is also based on the momentum theory. This theory says that the momentum portfolio is one of the active portfolio strategies that investors and investment managers can use to improve the performance of their stock portfolios. This strategy is carried out by buying stocks that previously had good performance and selling stocks that previously had poor performance (Polakilan, 2015). In this strategy, investors will look for the right momentum or time, when the stock price certainly provides benefits for investors, namely by selling shares. This study supports previous research, namely research conducted by Sirait et al. (2012) showing that there is a significant difference in the average abnormal return before and after the event. Nurhaeni (2009) shows that there is a significant difference in the average stock trading volume activity before and after the event. Sari, et

al. (2017) state that there is a significant difference in the average trading volume before and after the 2016 US presidential election. Rifa'I et al. (2020) state that there are differences in the Composite Stock Price Index before and after the Covid-19 Pandemic year. 2020. Kusnandar and Bintari (2020) state that there is a statistically significant difference in abnormal returns before and after the announcement of changes in trading time on exchange transactions. In accordance with the optimal portfolio theory where investments are advised to buy shares in a variety of different stocks which is called diversification, this applies to the first quadrimester of 2020 in general. In the first three months, namely January, February, and March, the shares purchased were diversified, but at the end of the Quadrimester, namely April, the shares purchased were generally not diversified. In April 2020, almost all the recommended portfolio percentages were dominated by one share, namely KLBF, so there was no diversification. KLBF shares are the stock code of the Kalbe Farma Company, which is engaged in the health sector, especially pharmaceuticals. In accordance with an event study, the Covid-19 pandemic during this research period caused a decline in performance in almost all existing sectors. However, there are several sectors that did not experience a decline and instead increased, namely the health sector. This is because the public prefers not to make purchases that are not needed and use the funds for health problems such as at community events buying masks, hand sanitizers, common fever medicines such as paracetamol and so on. This is what makes one of the largest pharmaceutical companies in Indonesia, namely Kalbe Farma (KLBF), has soaring value that it is recommended to be used as a stock portfolio.

5. Conclusions and Suggestion

Based on the results of this discussion, the conclusion of this study is that there is a significant difference in the optimal portfolio using the Treynor index model between the 2019 and 2020 quadrimester I on LQ45 stocks, this is influenced by conditions amid the Covid-19 pandemic which affects all sectors. The highest optimal number of purchases in April 2020 is occupied by companies with the KLBF code, this is an advantage that the company gets during the Covid-19 pandemic. The health sector, such as the pharmaceutical company Kalbe Farma, is a good choice during the Covid-19 pandemic because medicines are very much needed by the community today. Based on the discussion of the results of the research and the conclusions drawn, some suggestions for investors can be made, namely that the investor is expected to be able to estimate in advance the stocks that will be selected for investment. This is very important because it will affect the allocation of funds to each company that is in every share in LQ45. Allocating funds according to the right calculations will allow these investors to get optimal returns on each existing share, even during the Covid-19 pandemic. Further researchers are advised to use different variations, by using different variations of research time and selecting sectors to be used with various available models such as CAPM, and other single index models such as the Markowitz index and the Jensen index. Future research can use existing stock exchanges in other countries. This study has limitations, namely that it only uses one type of research index model, namely the Treynor index without using other indices such as the Markowitz index or the Jensen index as a comparison of portfolio values, and this study only compares quadrimester I in 2019 and 2020.

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Appendixes

Appendix 1

Calculation of Treynor Index in Quadrimester I Year 2019

Jan		Feb		Mar		Apr	
Company Code	Purchase Amount	Company Code	Purchase Amount	Company Code	Purchase Amount	Company Code	Purchase Amount
ADRO	0.6%	ADHI	0.9%	ADHI	0.6%	ASII	1.2%
AKRA	8.5%	AKRA	0.8%	BBNI	8.0%	BBRI	13.6%
BBCA	2.0%	BJBR	10.3%	BBRI	10.9%	BBTN	0.4%
BBRI	4.2%	BKSL	10.4%	BKSL	0.1%	BJBR	0.8%
BBTN	2.7%	BRPT	9.9%	BMRI	0.1%	BKSL	0.1%
BKSL	0.1%	ELSA	10.2%	BSDE	0.9%	EXCL	28.0%
BRPT	0.4%	EXCL	14.5%	EXCL	31.7%	ICBP	1.3%
BSDE	0.5%	JSMR	1.1%	INTP	15.1%	INDF	1.6%
ELSA	0.1%	LPKR	10.3%	ITMG	1.9%	MEDC	7.3%
EXCL	16.7%	MNCN	10.7%	JSMR	7.2%	PTBA	5.9%
INCO	6.9%	PGAS	10.5%	PGAS	0.8%	PTPP	0.1%
INDF	0.1%	SRIL	0.2%	PTBA	0.2%	SCMA	5.2%
INDY	6.3%	SSMS	10.2%	PTPP	1.4%	WIKA	11.9%
INKP	3.5%		100.0%	SMGR	5.4%	WSBP	20.2%
INTP	0.9%			WIKA	14.4%	WSKT	2.3%
ITMG	1.6%			WSBP	0.5%		100.0%
JSMR	5.9%			WSKT	1.0%		
KLBF	2.1%				100.0%		
LPKR	0.0%						
LPPF	2.6%						
MEDC	6.8%						
MNCN	1.4%						
PGAS	4.9%						
PTPP	3.6%						
SMGR	4.1%						
TLKM	0.1%						
UNVR	2.0%						
WIKA	7.0%						
WSKT	4.4%						
	100.0%						

Note: Processed Data

Appendix 2

Treynor Index Calculation for Quadrimester I Year 2020

Jan		Feb		Mar		Apr	
Company Code	Purchase Amount	Company Code	Purchase Amount	Company Code	Purchase Amount	Company Code	Purchase Amount
BBNI	8.7%	ADHI	50.6%	ADHI	0.8%	ADHI	3.0%
BMRI	31.8%	AKRA	0.6%	ADRO	0.4%	ADRO	0.2%
BRPT	38.5%	BBCA	0.8%	AKRA	0.0%	AKRA	0.3%
GGRM	16.5%	BBNI	2.4%	ANTM	4.2%	ASII	0.0%
ICBP	4.4%	BBRI	4.0%	ASII	2.1%	BBNI	0.1%
	100.0%	BJBR	0.4%	BBCA	0.2%	HMSP	0.3%
		BSDE	0.3%	BBRI	0.3%	INDY	0.1%
		HMSP	0.0%	BBTN	8.4%	KLBF	95.3%
		INCO	1.6%	BJBR	0.3%	SCMA	0.1%
		INDY	0.3%	BKSL	4.7%	SMGR	0.1%
		ITMG	16.5%	BSDE	0.1%	SSMS	0.5%
		KLBF	1.3%	ELSA	5.1%		100.0%
		LPPF	4.7%	EXCL	6.9%		
		MEDC	0.5%	HMSP	1.7%		
		PGAS	14.9%	INCO	0.0%		
		SCMA	0.6%	INDF	5.1%		
		SMGR	0.2%	INDY	0.0%		
		SSMS	0.3%	INKP	4.2%		
			100.0%	INTP	1.6%		
				ITMG	0.1%		
				JSMR	2.3%		
				KLBF	4.1%		
				LPKR	0.4%		
				LPPF	0.5%		
				MEDC	0.0%		
				MNCN	8.0%		
				PGAS	0.0%		
				PTBA	4.0%		
				PTPP	3.8%		
				SCMA	0.0%		
				SRIL	13.4%		
				SSMS	0.0%		
				TLKM	4.3%		
				TPIA	3.7%		
				UNTR	1.2%		
				WSBP	3.9%		
				WSKT	4.0%		
					100.0%		

Appendix 3**2019 and 2020 Treynor Quadrimester Index Calculation Results**

Year	2019				2020			
Month	Average Return (%)	Beta Portfolio	Risk Free (%)	Treynor Index	Average Return (%)	Beta Portfolio	Risk Free (%)	Treynor Index
Jan	2.86	3.531	0.41667	0.007	14.58	1.054	0.50	0.134
Feb	347.23	3.679	0.39583	0.943	522.93	27.336	0.50	0.191
Mar	-28.10	8.161	0.37500	-0.035	9.68	0.561	0.50	0.163
Apr	11.30	6.257	0.37500	0.017	9.53	0.674	0.50	0.134
Total	333.30	21.628	1.56250	0.932	556.72	29.625	2.00	0.622
Average	83.32	5.407	0.39063	0.233	139.18	7.406	0.50	0.156



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