# The Influence of Sharpe, Treynor, and Jensen Indexes on the Performance of LQ45 Stock Portfolios Listed on the Indonesia Stock Exchange for the Period 2020-2022

**Sepri Uli Grahayu br Pasaribu, Khairunnisak, Siti Alhamra Salqaura**

## Abstract

This research aims to determine whether the Sharpe, Treynor and Jensen indices have a positive and significant The purpose of this study is to ascertain whether the performance of LQ45 stock portfolios listed on the Indonesia Stock Exchange during the 2020-2022 period is positively and significantly influenced by the Sharpe, Treynor, and Jensen indices. The data collection method of this study includes quantitative documentation. Panel data regression analysis and descriptive statistical analysis are the data analysis methods used. and testing the E-Views hypothesis. The findings indicated that, for the 2020–2022 period, the performance of the LQ45 stock portfolio listed on the Indonesia Stock Exchange was positively and significantly impacted by the sharpe index, but not by the treynor index, which had a negligible and positive impact. Conversely, the performance of the LQ45 stock portfolio listed on the Indonesia Stock Exchange between 2020–2022 was positively and significantly impacted by the jensen index. Concurrently, the performance of LQ45 stock portfolios listed on the Indonesia Stock Exchange for the 2020–2022 timeframe is positively and significantly impacted by the Jensen, Treynor, and Sharpe indices.

***Keywords***: Sharpe Index, Treynor Index, Jensen Index, Stock Portfolio Performance

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## Introduction

The development of investment in Indonesia began on December 14, 1912, when the Jakarta Stock Exchange was opened for business, and during the Dutch colonial era, investment in Indonesia started to grow. This stock exchange was initially known as the Jakarta Stock Exchange (JSX), located in Batavia (the former name of Jakarta). At that time, JSX was known as 'Call-Efek,' referring to stocks, with 'Call' referring to a leader who continuously announced prices like in an auction. In 1977, the Ministry of Finance established the Capital Market Executive Agency (Bapepam), which oversaw the official opening of JSX. To enhance accessibility, speed, and trading frequency, JSX implemented remote trading in 2001. A new chapter in the history of Indonesia's capital market was written when the JSX and the Surabaya Stock Exchange merged in 2007. This new entity became known as the Indonesia Stock Exchange, abbreviated as IDX.

The IDX also serves as an organization that manages and offers a meeting place between demand from buyers (investors) and the supply of securities from sellers (public companies). The capital market is the place where these securities are bought and sold. Therefore, IDX is responsible for conducting activities in the Indonesian capital market, including investments. Various types of investment activities in Indonesia include stock investments. Among the various stock indices available on the IDX is the LQ45 index. The collection of high-liquidity stocks selected based on regulations and selection conducted by the Indonesia Stock Exchange is known as the LQ45 index stocks. These LQ45 index stocks have prices that are actively traded on the Indonesia Stock Exchange and are also referred to as objective stocks for investment management (Azis and dkk, 2015). According to hartono (Hartono and Jogiyanto, 2017) the LQ45 index only includes the 45 most actively traded equities, selected based on specific criteria related to market size and liquidity.

According to Abd & Khalifa (2020), a stock portfolio is a collection of financial assets, including currencies, cash equivalents, or more commonly, stocks and bonds, owned by individuals or companies with the aim of reducing investment risk through diversification (H. Abd and E.-W. Khalifa, 2020). And according to Díaz et al. (2022), a stock portfolio is a set of stocks where investment resources are allocated for management purposes (R. Díaz, E. Solares, V. De-León-gómez, and F. G. Salas, 2022). Based on research conducted by Abd & Khalifa (2020) and Díaz et al. (2022), it can be concluded that a stock portfolio is a combination of various types of financial assets that are intangible but have value, such as stocks, bonds, currencies, and cash equivalents, designed to reduce investment risk through the principle of diversification.

Therefore, the formation of a portfolio aims to provide information to investors so they can use this data in making stock investment decisions. Risk evaluation is a major challenge for investors in analyzing a potential investment. Investors tend to demand higher returns as investment risks increase. As a strategy, investors can diversify within their portfolio stocks to reduce losses and investment risks (Harris Manurung, 2019).

Closing price data is crucial in evaluating the performance of the LQ45 stock portfolio, and performance evaluation is conducted using the Sharpe, Treynor, and Jensen indexes. Closing price data is useful for determining the rate of return on these stocks. The following is

the result of data analysis from the IDX, which includes examining LQ45 stock data with closing prices useful for evaluating the performance of stock portfolios for the years 2020-2022, as follows:

**Table 1.** The Closing Price of LQ45 Stock

| 2020 | Closing Price SAHAM IDX LQ 45 | 2021 | Closing Price SAHAM IDX LQ 45 | 2022 | Closing Price SAHAM IDX LQ45 |
|---|---|---|---|---|---|
| Jan 01, 2020 | 962 | Jan 01, 2021 | 912 | Jan 01, 2022 | 940 |
| Feb 01, 2020 | 880 | Feb 01, 2021 | 945 | Feb 01, 2022 | 986 |
| Mar 01, 2020 | 691 | Mar 01, 2021 | 903 | Mar 01, 2022 | 1.023 |
| Apr 01, 2020 | 714 | Apr 01, 2021 | 894 | Apr 01, 2022 | 1.085 |
| May 01, 2020 | 726 | May 01, 2021 | 889 | May 01, 2022 | 1.057 |
| Jun 01, 2020 | 756 | Jun 01, 2021 | 845 | Jun 01, 2022 | 992 |
| Jul 01, 2020 | 803 | Jul 01, 2021 | 823 | Jul 01, 2022 | 979 |
| Aug 01, 2020 | 824 | Aug 01, 2021 | 866 | Aug 01, 2022 | 1.023 |
| Sep 01, 2020 | 737 | Sep 01, 2021 | 895 | Sep 01, 2022 | 1.011 |
| Oct 01, 2020 | 791 | Oct 01, 2021 | 953 | Oct 01, 2022 | 1.014 |
| Nov 01, 2020 | 883 | Nov 01, 2021 | 931 | Nov 01, 2022 | 1.008 |
| Dec 31, 2020 | 935 | Dec 31, 2021 | 931 | Dec 31, 2022 | 937 |

Source: www.idx.ac.id

Based on Table 1., it can be concluded that the monthly closing prices from 2020 to 2022 experienced fluctuations, with a tendency to rise and fall each month. This will have a positive or negative impact on the monthly return rate that investors will receive, as the closing prices of LQ45 stocks significantly influence the monthly return rate expected by investors. The monthly returns will then be calculated on an annual basis, and these annual returns will be used to calculate the Sharpe, Treynor, and Jensen index values for each year from 2020 to 2022. The following are the results of the data analysis of the Sharpe, Treynor, and Jensen Alpha indexes on the performance of LQ45 stocks, represented with a line graph for the period 2020-2022, as follows:

**Table 2**. Sharpe, Treynor, and Jensen Index Values Data for LQ45 Stocks

| Tahun | Sharpe | Treynor | Return | Jensen |
|---|---|---|---|---|
| 2020 | -0,047567 | 0,366046 | - 0,01681 | -0,18478 |
| 2021 | -0,397311 | -0,073110 | 0,01726 | -0,01624 |
| 2022 | -0,044198 | -0,011211 | -0,01360 | 0,03145 |

Source: Data processed with Excel (2024)

Based on Table 2, it can be concluded that the Sharpe index data shows negative results and a significant decrease from 2020 to 2022. This is due to the returns being lower than the risk, which leads to a negative and significant performance evaluation when using the Sharpe index. In Table 1.2, the Treynor index results are negative for 2021-2022 and positive only for

2020. This is because the returns are lower than the risk-free rate, even though the beta is greater than 1, indicating less risk compared to the market risk. Lastly, according to Table 1.2, the Jensen Alpha results are negative from 2020-2021 and positive only in 2022. The negative Jensen Alpha is caused by the return generated from investment activities being lower than the return after accounting for the risk taken.

According to Darmayanti et al. (2018), the Sharpe index is a performance metric that prioritizes total risk or standard deviation. Standard deviation can be used to describe how stock returns may differ from the average return. Previous period returns can be used to estimate the average future returns, and the standard deviation of previous period returns can be used to predict risk (Nyoman Candra Tri Wahyuni and Ni Putu Ayu Darmayanti, 2019).

The impact of the Sharpe index on the performance of LQ45 stock portfolios is that this index compares the returns generated by the portfolio with the risk taken. Anticipated returns and standard deviation are two important variables used by the Sharpe index to predict how well the portfolio will perform in the future. This index allows for predictions and evaluations of the relationship between total returns and projected volatility or risk (Harris Manurung, 2019). Susilowati et al. (2020) claim that the portfolio risk premium can be calculated by dividing it by the standard deviation, leveraging the concept of the capital market line. By dividing the portfolio risk premium by the standard deviation, Sharpe applies the concept of the capital market line (D. Susilowati, J. Juwari, and C. Noviadinda, 2020).

The Treynor index affects the performance of LQ45 stock portfolios because it can reveal how well a portfolio generates returns relative to the amount of risk assumed. The portfolio's vulnerability to shifts in the overall market is measured by beta. The Treynor index evaluates portfolio performance by comparing the level of risk measured in beta (market risk or systematic risk) with the portfolio's risk premium, which is the difference between the average risk-free rate and the standard portfolio return (Harris Manurung, 2019). According to Putera Waspada (2022), Treynor assesses the Reward-to-Volatility Ratio (RVOR) for a well-diversified portfolio. Therefore, the Treynor index indicates that the net return of the portfolio is divided by the risk-free rate for each unit of market risk to evaluate the portfolio's performance. The symbol Tp is used to denote this portfolio (I. Putera Waspada, 2022).

The impact of Jensen's Alpha index on the performance of LQ45 stock portfolios shows whether the portfolio is able to generate returns that are higher or lower than expected based on the systematic risk faced. According to Zakarias & Tumewu (2015), Jensen's Alpha is an index that uses the Capital Asset Pricing Model (CAPM) to determine whether a financial manager outperforms the market index (V. A. Zakarias and F. Tumewu, 2015). The Jensen index measures the difference between actual returns and the expected returns of a portfolio when on the capital market line (Harris Manurung, 2019). Jensen's Alpha also uses the Security Market Line as a basis for creating equations (D. Susilowati, J. Juwari, and C. Noviadinda, 2020).

## Research Methods

Using quantitative techniques, associative analysis is the analytical methodology employed in this study. As the research object determines the research location, the study focuses on stocks listed on the Indonesia Stock Exchange (IDX) and those related to the LQ45 index for the years 2020–2022. The timeframe for conducting and writing this research spans from October 2023 to February 2024. The research population was determined based on information collected using the annual percentage change from 2020 to 2022. To obtain a standard proportion of the population, the sampling approach used is purposive sampling.

Purposive sampling involves matching sample data with the target population (Sugiyono D, 2017).

Secondary data is the type of data used in this study since it is not derived from physical data. This research employs purposive sampling based on specific criteria, leading to the following sample selection criteria: businesses that have continuously been listed on the LQ45 stock index of the Indonesia Stock Exchange during the 2020-2022 period, as well as LQ45 stock companies listed there for the same time frame. These companies will release regular financial reports on their continuously traded equities for the years 2020-2022. Therefore, panel data and secondary data are the types of data used in this research. According to Akbary (2017), panel data is created by combining cross-sectional and time series data. Secondary data, which is gathered for research through indirect methods, is the type of data used (A. Akbary, 2017).

This study includes one dependent variable and three independent variables. The performance of the LQ45 stock portfolio (Y) is the dependent variable, while the independent variables are the Sharpe index (X1), Treynor index (X2), and Jensen index (X3). According to Aini et al. (n.d., p. 2022), the Sharpe index (X1) is a metric used to determine portfolio quality by calculating the slope of the line connecting the risky portfolio to the risk-free interest rate (Y. N. Aini, B. Lestari, and Y. S. Oktora, 2022). The Treynor index (X2), as described by Harris Manurung (2019), is an index used to evaluate portfolio performance by comparing the portfolio's risk level, measured in terms of beta (market risk or systematic risk), with the portfolio's risk premium, which is the difference between the average portfolio return and the average risk-free rate (Harris Manurung, 2019). The Jensen Alpha Index (X3), according to Harris Manurung (2019), calculates the difference between the actual return of the portfolio and the expected return when positioned on the capital market line (Harris Manurung, 2019). According to Zatmiko (2023), stock portfolio performance (Y) is a step in the investment decision-making process, which also includes asset selection, investment policy, stock portfolio strategy, as well as monitoring and evaluation of portfolio performance (M. H. Zatmiko, 2023).

## Results

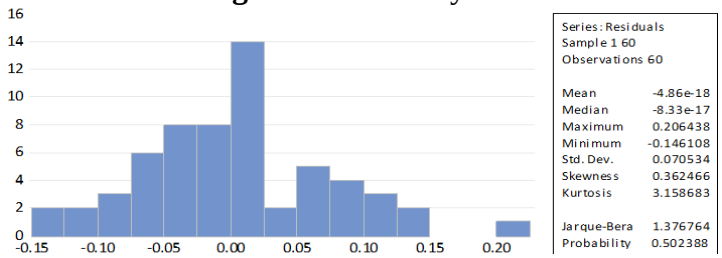
Secondary data obtained indirectly from the research object specifically, LQ45 stock data is often used in this research. This data is available on the official websites of the Indonesia Stock Exchange, **www.idx.co.id**, and **www.finance.yahoo.com**. The data collection period is 2020–2022. Factual stock data collected over the three-year period is used in this study. The study involves twenty research samples from twenty LQ45 stock companies that were actively and routinely listed on the Indonesia Stock Exchange (IDX) between 2020 and 2022.

## Classical Assumption Test

### Normality Test

The normality test is very useful in determining whether the regression model is normal or not by assessing how the data on the independent and dependent variables are distributed. Data is considered normal or non-normal based on the asymptotic significance level in the Jarque-Bera test; if it is greater than 0.05, the distribution is considered normal (Ghozali I, 2016).

**Figure 1.** Normality Test Result




Source: Data processed with E-Views (2024)

Based on Figure 1, the probability value is 0.502, which means it exceeds 0.05; therefore, the data in this study is considered to be normally distributed.

**Multicollinearity Test**

Based on the results of the multicollinearity test, which show that there is no high correlation value between the independent variables that exceeds 0.90, it can be concluded that there is no multicollinearity between the independent variables (Ghozali I, 2016). .

**Figure 2.** Multicollinearity Result

| | X1 | X2 | X3 |
|---|---|---|---|
| X1 | 1.000000 | 0.162611 | 0.822102 |
| X2 | 0.162611 | 1.000000 | 0.144834 |
| X3 | 0.822102 | 0.144834 | 1.000000 |

Source: Data processed with E-Views (2024)

Figure 2, which shows that there are no high correlation values between the variables that exceed 0.90, indicates the absence of multicollinearity.

**Heteroscedasticity Test**

The White test, which advances the squared residuals of the dependent variable plus the squared independent variables, is used in this study's heteroscedasticity test (Ghozali I, 2016). . The following criteria apply:

1. If the significance value is greater than 0.05 and the chi-square value is less than the chi-square table value, then there is no heteroscedasticity.
2. If the significance value is greater than 0.05 and the calculated chi-square value is less than the chi-square table value, heteroscedasticity is present.

**Result**

**Figure 3.** Heteroskedastisity

Dependent Variable: ABS(RESID)
Method: Panel EGLS (Cross-section random effects)
Date: 03/18/24 Time: 16:28
Sample: 2020 2022
Periods included: 3
Cross-sections included: 20
Total panel (balanced) observations: 60
Swamy and Arora estimator of component variances

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.044659 | 0.006962 | 6.414790 | 0.0000 |
| X1 | -0.004183 | 0.010942 | -0.382299 | 0.7037 |
| X2 | 0.000823 | 0.001441 | 0.570756 | 0.5704 |
| X3 | 0.032339 | 0.025432 | 1.271587 | 0.2088 |

Source: Data processed with E-Views (2024)

Figure 3 shows that the significance value (probability) is greater than 0.05, and the calculated chi-square value is less than the chi-square table value. Thus, there is no heteroscedasticity in the research data.

**Autocorrelation Test**

The purpose of the autocorrelation test is to determine whether the confounding error in period t of the linear regression model correlates with the error in period t-1 (previous). Autocorrelation occurs when data is displayed as a panel. One method to identify autocorrelation is the Durbin-Watson test (DW test). In this investigation, the Durbin-Watson test was used to perform the autocorrelation test. The following conditions indicate the use of the Durbin-Watson test for autocorrelation testing:

1. No autocorrelation occurs if DW<DL or DW>4-DL
2. Autocorrelation occurs if DU<DW<4-DU
3. No decision if SL<DW<DU or 4-DU<DW<4-DL

**Figure 4.** Autocorrelation Test Result

Dependent Variable: Y
Method: Panel EGLS (Cross-section random effects)
Date: 03/18/24 Time: 17:24
Sample: 2020 2022
Periods included: 3
Cross-sections included: 20
Total panel (balanced) observations: 60
Swamy and Arora estimator of component variances

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.053262 | 0.017416 | 3.058190 | 0.0034 |
| X1 | 0.170025 | 0.027723 | 6.133065 | 0.0000 |
| X2 | -0.003834 | 0.003646 | -1.051593 | 0.2975 |
| X3 | 0.466893 | 0.064502 | 7.238470 | 0.0000 |

Effects Specification

| | S.D. | Rho |
|---|---|---|
| Cross-section random | 0.000000 | 0.0000 |
| Idiosyncratic random | 0.118968 | 1.0000 |

Weighted Statistics

| | | | |
|---|---|---|---|
| R-squared | 0.907692 | Mean dependent var | 0.051287 |
| Adjusted R-squared | 0.902747 | S.D. dependent var | 0.362717 |
| S.E. of regression | 0.113114 | Sum squared resid | 0.716513 |
| F-statistic | 183.5560 | Durbin-Watson stat | 2.146153 |
| Prob(F-statistic) | 0.000000 | | |

Source: Data processed with E-Views (2024)

Based on Figure 4, it is known that the value of N (number of observations) = 60 and K (number of independent variables) = 3. Using the Durbin-Watson reference table with α = 5% or 0.05, the following conclusions are obtained from the autocorrelation test results.

According to the Durbin-Watson autocorrelation test results based on the data, there is no autocorrelation in this study. The following are the autocorrelation test results for this study:

1.6889 < 2.1461 < 2.3111; DU < DW < 4-DU

**Panel Data Regression Analysis**

To determine the extent to which the independent variables affect the dependent variable, a multiple linear regression analysis approach with a panel data model is used (Ghozali I, 2016). . The following panel data linear regression model is used:

Y = 0.053 + 0.170X1 - 0.003X2 + 0.466X3

The explanation is as follows:

1. In the absence of the Sharpe index (X1), Treynor index (X2), and Jensen index (X3) variables, the performance of the LQ45 stock portfolio variable (Y) increases by 53%, as indicated by the constant value of 0.53.
2. If other variables remain constant and the Sharpe index variable (X1) has increased by 17%, the performance of the LQ45 stock portfolio variable (Y) will decrease by 17%. The beta coefficient for X1 is 0.170. Conversely, the Y variable will increase by 17% if the X1 variable decreases by 17% while other variable values remain unchanged.
3. The Treynor index variable (X2) has a beta coefficient of 0.003, indicating that the performance of the LQ45 stock portfolio variable (Y) will increase by 0.3% if all other parameters remain the same and X2 grows by 0.3%. On the other hand, the Y variable will also decrease by 0.3% if all other variables remain the same and the X2 variable decreases by 0.3%.
4. The performance of the LQ45 stock portfolio variable (Y) will increase by 46.6% if the values of the other variables remain the same and the Jensen index variable (X3) has increased by 46.6%.

The X3 variable has a beta coefficient of 0.466. Conversely, if the X3 variable decreases by 46.6% and all other variables remain the same, the Y variable will also decrease by 46.6%.

**Panel Data Regression Estimation Model**

1. **Common Effect Model (CEM)**

**Figure 5.** Common Effect Model (CEM) Result

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.053262 | 0.016559 | 3.216454 | 0.0022 |
| X1 | 0.170025 | 0.026359 | 6.450456 | 0.0000 |
| X2 | -0.003834 | 0.003466 | -1.106014 | 0.2734 |
| X3 | 0.466893 | 0.061328 | 7.613067 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.907692 | Mean dependent var | 0.051287 |
| Adjusted R-squared | 0.902747 | S.D. dependent var | 0.362717 |
| S.E. of regression | 0.113114 | Akaike info criterion | -1.456493 |
| Sum squared resid | 0.716513 | Schwarz criterion | -1.316871 |
| Log likelihood | 47.69480 | Hannan-Quinn criter. | -1.401879 |
| F-statistic | 183.5560 | Durbin-Watson stat | 2.146153 |
| Prob(F-statistic) | 0.000000 | | |

Source: Data processed with E-Views (2024)

**Figure 6.** Random Effect Model (REM) Result

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.053262 | 0.017416 | 3.058190 | 0.0034 |
| X1 | 0.170025 | 0.027723 | 6.133065 | 0.0000 |
| X2 | -0.003834 | 0.003646 | -1.051593 | 0.2975 |
| X3 | 0.466893 | 0.064502 | 7.238470 | 0.0000 |

| Effects Specification | | |
|---|---|---|
| | S.D. | Rho |
| Cross-section random | 0.000000 | 0.0000 |
| Idiosyncratic random | 0.118968 | 1.0000 |

Weighted Statistics

| | | | |
|---|---|---|---|
| R-squared | 0.907692 | Mean dependent var | 0.051287 |
| Adjusted R-squared | 0.902747 | S.D. dependent var | 0.362717 |
| S.E. of regression | 0.113114 | Sum squared resid | 0.716513 |
| F-statistic | 183.5560 | Durbin-Watson stat | 2.146153 |
| Prob(F-statistic) | 0.000000 | | |

Source: Data processed with E-Views (2024)

## Descriptive Statistical Analysis

The condition of LQ45 stock portfolios listed on the Indonesia Stock Exchange for the years 2020–2022 is explained using descriptive analysis, with an emphasis on the impact of the Treynor, Jensen, and Sharpe indices on portfolio performance. A summary of the number of samples, mean, median, mode, standard deviation, etc., is described with descriptive analysis.

**Figure 7.** Descriptive Statistical Analysis Result

Date: 01/13/24 Time: 10:45
Sample: 2020 2022

| | Y | X1 | X2 | X3 |
|---|---|---|---|---|
| Mean | 0.051287 | -0.175183 | -0.596542 | 0.054667 |
| Median | -0.033331 | -0.246889 | -0.050033 | -0.015145 |
| Maximum | 1.303571 | 3.381495 | 9.083406 | 1.666039 |
| Minimum | -0.612500 | -2.915260 | -31.10533 | -0.621685 |
| Std. Dev. | 0.362717 | 0.984233 | 4.306675 | 0.421840 |
| Skewness | 1.531007 | 0.409779 | -5.900159 | 1.447139 |
| Kurtosis | 6.092430 | 5.182986 | 43.87994 | 6.378077 |
| Jarque-Bera | 47.34763 | 13.59275 | 4526.041 | 49.47061 |
| Probability | 0.000000 | 0.001118 | 0.000000 | 0.000000 |
| Sum | 3.077230 | -10.51099 | -35.79250 | 3.280018 |
| Sum Sq. Dev. | 7.762237 | 57.15414 | 1094.299 | 10.49899 |
| Observations | 60 | 60 | 60 | 60 |

Figure 7 shows that N, or the total number of data points in each variable, reaches 60. This figure comes from 20 research samples, namely, LQ45 equities that were actively listed on the Indonesia Stock Exchange (IDX) for the years 2020–2022.

Figure 7 shows that LQ45 stock performance ranges from a minimum of -0.6125 to a maximum of 1.3033. The research findings indicate that the LQ45 stocks sampled in this study have performance levels ranging from -0.612 to 1.303, with an average value of 0.0512 and a standard deviation of 0.3627. Abeka Tambang tbk (ANTM) has the highest LQ45 stock performance, while Ace Hardware Indonesia tbk (ACES) has the lowest.

Figure 7 shows that the Sharpe index for LQ45 stock performance ranges from a minimum of -2.9152 to a maximum of 3.3814. The sample study on LQ45 stocks produced data showing that Sharpe index performance varies from -2.9152 to 3.3814, with an average value of 0.0546 and a standard deviation of 0.4218. Adaro Energy tbk (ADRO) has the highest Sharpe index in LQ45 stock performance, while ADRO also has the lowest LQ45 stock performance.

Figure 7 shows that the Treynor index for LQ45 stock performance ranges from a minimum of -31.1053 to a maximum of 9.0834. The findings indicate that, for the LQ45 stocks examined in this study, Treynor index performance varies from -31.1053 to 9.0834, with an average value of -0.5965 and a standard deviation of 4.3066. Semen Indonesia (Persero) tbk (SMGR) has the highest Treynor index in LQ45 stock performance, while Indofood Sukses Makmur tbk (INDF) has the lowest LQ45 stock performance.

Figure 7 shows that the Jensen index for LQ45 stock performance ranges from a minimum of -0.6216 to a maximum of 1.6660. The sample study on LQ45 stocks produced findings showing that Jensen index performance varies from -0.6216 to 1.6660, with an average value of -0.5965 and a standard deviation of 4.3066. Abeka Tambang tbk (ANTM) has the highest Jensen index in its LQ45 stock performance, while Semen Indonesia (Persero) tbk (SMGR) has the lowest LQ45 stock performance.

## Panel Data Regression Model Selection Results

**Chow Test**

The fixed effect model and common effect model are compared and selected using the Chow test. The probability value (p) for cross-section F serves as the basis for selection. The common effect model is the chosen model if the p-value is greater than 0.05. On the other hand, the fixed effect model is chosen if the p-value is less than 0.05.

**Figure 8.** Uji Chow Result

| Effects Test | Statistic | d.f. | Prob. |
|---|---|---|---|
| Cross-section F | 0.717088 | (19,37) | 0.7783 |
| Cross-section Chi-square | 18.811277 | 19 | 0.4690 |

Source: Data processed with E-Views (2024)

Based on Figure 8, it is known that the cross-section chi-square statistic value is 18.811277 with a probability value of 0.4690, which is greater than Alpha 0.05, so the best model to use is the common effect model. Therefore, the data testing continues to the LM Test (Lagrange Multiplier).

**Hausman Test**

The Hausman Test technique is used to compare and select between the random effect model and the fixed effect model. The probability density function (p) for random sections is used to make a decision. If p > 0.05, the random effect model is the most accurate. However, the fixed effect model is the most accurate if p is less than 0.05. Therefore, Hausman analysis is not necessary since the Chow model is based on the common effect model.

**Lagrange Multiplier Test (LM Test)**

The Lagrange Multiplier Test (LM Test) is used not only to ensure that the results of the fixed effect model and random effect model are consistent but also to assess whether the random effect model is better than the common effect model. This is the final stage in selecting the best model, which is achieved when the Chow and Hausman tests show that one model is superior to the other.

**Figure 9.** Lagrange Multiplier Test Result

| | Test Hypothesis | | |
|---|---|---|---|
| | Cross-section | Time | Prob. |
| Breusch-Pagan | 1.360379 | 72.04321 | 73.40359 |
| | (0.2435) | (0.0000) | (0.0000) |

Source: Data processed with E-Views (2024)

Based on Table 4.9, it is known that the Breusch-Pagan (BP) probability value is 0.0000, which is less than Alpha 0.05, so the best model to use is the random effect model.

**Hypothesis Testing**

**Partial Test (t-test)**

The partial test (t-test) is used to examine the impact of a single independent variable on the dependent variable. The t-test is used to determine whether the independent variable has a statistically significant partial effect on the dependent variable (Ghozali I, 2016). . The test is conducted using a significance threshold of 0.05 (α = 5%) and the following criteria:

1. Based on t calculated value and t table:

a) If the t calculated value > t table, then Ho is rejected, and Ha is accepted.
b) If the t calculated value < t table, then Ho is accepted, and Ha is rejected.

2. Based on the significance/probability value:
   a) If the significance value < 0.05, then Ho is rejected, and Ha is accepted.
   b) If the significance value > 0.05, then Ho is accepted, and Ha is rejected.

**Figure 10.** Partial Test Result

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.053262 | 0.017416 | 3.058190 | 0.0034 |
| X1 | 0.170025 | 0.027723 | 6.133065 | 0.0000 |
| X2 | -0.003834 | 0.003646 | -1.051593 | 0.2975 |
| X3 | 0.466893 | 0.064502 | 7.238470 | 0.0000 |

Source: Data processed with E-Views (2024)

Based on Figure 10, it can be seen that the partial influence of the independent variables on the dependent variable is as follows:

1. The t-test result on the Sharpe index variable (X1) shows a t calculated value of 6.133065 > t table value of 4.30265273 and a significance value of 0.0000 < 0.05, so Ho is rejected and Ha is accepted, meaning that the Sharpe index variable has a positive and significant effect on the performance of the LQ45 stock portfolio.
2. The t-test result on the Treynor index variable (X2) shows a t calculated value of 1.051593 < t table value of 4.30265273 and a significance value of 0.2975 > 0.05, so Ho is accepted, and Ha is rejected, meaning that the Treynor index variable does not have a positive and significant effect on the performance of the LQ45 stock portfolio.
3. The t-test result on the Jensen index variable (X3) shows a t calculated value of 7.238470 > t table value of 4.30265273 and a significance value of 0.0000 < 0.05, so Ho is rejected, and Ha is accepted, meaning that the Jensen index variable has a positive and significant effect on the performance of the LQ45 stock portfolio.

**Simultaneous Test (F-Test)**

One way to conduct a simultaneous significance test is by looking for a significant F-value at the used significance level ($\alpha = 0.05$). Therefore:

1. There is a simultaneous effect of the independent variables on the dependent variable if F < 0.05 is significant.
2. There is no simultaneous effect of the independent variables on the dependent variable if F > 0.05 is significant.

**Figure 11.** Sumultaneous Test (F-Test)

| | |
|---|---|
| R-squared | 0.907692 |
| Adjusted R-squared | 0.902747 |
| S.E. of regression | 0.113114 |
| F-statistic | 183.5560 |
| Prob(F-statistic) | 0.000000 |

Source: Data processed with E-Views (2024)

Figure 11 shows that the performance of the LQ45 stock portfolio is jointly influenced by the Jensen, Treynor, and Sharpe indices. The results of the simultaneous test (F-test) show a probability value (F-statistic) of 0.0000 < 0.05.

**Coefficient of Determination ($R^2$) Test**

The coefficient of determination ($R^2$) ranges between 0 and 1 and is expressed as a percentage. An $R^2$ value close to zero, according to Ghozali (2016), indicates that the independent variables have limited ability to explain the variance in the dependent variable (Ghozali I, 2016). . An $R^2$ value close to 1 means that the independent variables provide almost all the information needed to predict the dependent variable.

**Figure 12.** Determination Test ($R^2$)

| | |
|---|---|
| R-squared | 0.907692 |
| Adjusted R-squared | 0.902747 |
| S.E. of regression | 0.113114 |
| F-statistic | 183.5560 |
| Prob(F-statistic) | 0.000000 |

Based on Figure 12, the $R^2$ value is 90.27% or 0.902747. This coefficient of determination indicates that the Treynor, Jensen, and Sharpe indices have the capacity to explain and provide all the necessary data for the LQ45 stock portfolio performance.

**Relationship Between Sharpe Index and LQ45 Stock Portfolio Performance**

According to Kalebos (2022), the Sharpe Index is an approach based on the Capital Market Line (CML) concept used to evaluate portfolio performance and understand the relationship between risk and return in the capital market (A. H. Kalebos, 2022). The Sharpe Index compares portfolio risk premium (the difference between the portfolio's average return and the risk-free asset) to portfolio risk or standard deviation (σ). Accodring Mokta (2013), The Capital Market Line (CML) provides an optimal relationship for expected returns and efficient portfolio risk, not distinguishing between unique and systematic risks of individual securities (Mokta Rani Sarker, 2013).

Since the average return tends to be higher than the risk-free rate and the standard deviation is relatively low, a higher Sharpe ratio (Harris Manurung, 2019). Additionally, by dividing the portfolio's risk premium by its standard deviation, the Sharpe Index applies the Capital Market Line concept (Susilowati et al., 2020). Thus, it can be said that the correlation between the Sharpe Index and the LQ45 stock portfolio performance provides insight into how well the portfolio generates returns relative to the risk taken. The better the portfolio generates returns according to the level of risk taken, the higher the Sharpe Index value.

**Relationship Between Treynor Index and LQ45 Stock Portfolio Performance**

The Treynor method compares the portfolio's risk level, measured by beta (market or systematic risk), with the portfolio's risk premium (the difference between the average portfolio return and the average risk-free rate) to evaluate portfolio performance (Harris Manurung, 2019). By dividing the portfolio's risk premium by its beta, the Treynor Index applies the Capital Market Line concept (D. Susilowati, J. Juwari, and C. Noviadinda, 2020). Therefore, it can be said that the Treynor Index and the LQ45 stock portfolio performance are related because the index can reveal how much profit the portfolio can generate given the amount of risk taken.

**Relationship Between Jensen Index and LQ45 Stock Portfolio Performance**

According to Harris Manurung (2019), the Jensen Index method calculates the difference between the actual return of an asset and the expected return when on the Capital Market Line (Harris Manurung, 2019). It is also based on the Security Market Line concept (D. Susilowati, J. Juwari, and C. Noviadinda, 2020). impact of the Jensen Index on the performance of the LQ45 stock portfolio is measured under the Capital Asset Pricing Model (CAPM) concept, where the investment manager's ability to generate returns above expectations is measured by the Jensen Index, commonly referred to as Jensen's Alpha.

Therefore, it can be said that the correlation between the LQ45 stock portfolio performance and the Jensen Index indicates that, given the systematic risk involved, the portfolio has the potential to provide higher returns than anticipated. Conversely, if the portfolio generates returns lower than anticipated given the systemic risk it faces, as indicated by the Jensen Index.

**Conclusion**

The findings of this study indicate that, in part, the performance of the LQ45 stock portfolio listed on the IDX for the period 2020-2022 is positively and significantly influenced by the Sharpe Index, that portfolio performance is positively and significantly influenced by the Jensen Index, and that portfolio performance is positively and significantly influenced by the Treynor Index. Furthermore, during the period of 2020-2022, the performance of the LQ45 stock portfolio listed on the IDX is positively and significantly influenced by the simultaneous presence of the Treynor, Jensen, and Sharpe indices.

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