American Journal of Humanities and Social Sciences Research (AJHSSR)
e-ISSN :2378-703X
Volume-5, Issue-4, pp-24-31
www.ajhssr.com
Research Paper Open Access

Stocks Portfolio Performance on Index LQ45 Using Sharpe, Treynor and Jensen Method.

Ni Made Sarini Kartika Putri[1], Ida Bagus Badjra[2]
[1,2]*Faculty of Economics and Business, Udayana University, Bali, Indonesia*

ABSTRACT : This study aims to determine how the performance of the stock portfolio on the LQ45 Index using the Sharpe, Treynor, and Jensen methods and to find out and analyze whether there are significant differences in the three methods. The sample selection in this study used purposive sampling, thus obtaining a sample of 34 stocks in the period August 2016-January 2019. The type of data from this study is quantitative descriptive data. Hypothesis testing used in this study is the Kruskal Wallis H test and Mean Rank using SPSS. The results of hypothesis testing using the Kruskal Wallis H test show that Chi-square or X2 = 4.553 with a probability value of 0.103. So, it can be seen that 0.103> 0.05 and x2 count <x2 table or 4.553 <5.99. These results indicate that there is no significant difference in portfolio performance as measured by the Sharpe, Treynor, and Jensen methods.

Keywords: *LQ45 Index, Portoflio Performance, Jensen method, Sharpe method, Treynor method*

I. INTRODUCTION

An investment in the present is more desirable among the community, investing can bring benefits in the future. The assets that can be invested are not only real assets, but also financial assets in the form of deposits and stocks. Investments at this time can be with a small capital. As for financial management, there are three financial decisions in profit-oriented organizations, namely funding decisions, investment and dividend policies (Triani & Tarmidi, 2019). Investors prefer to invest in financial assets because financial assets are easier to cash in and easier diversification(Ernawati, 2016). Financial assets are more promising a high rate of return compared to investing in real assets. An investor expects that the capital they have invested in these investments will be able to obtain a high level of return by obtaining a low risk(Stolper & Walter, 2017). Investors prefer financial assets because they are more liquid, easier to diversify and easier to change the combination of securities purchased (Lusardi et al., 2016). Investments in the form of stocks are a way for an investor to get a quick return on invested capital. Stocks are securities as proof of ownership of a company, where stocks can be used to invest in both long and short terms. Stock is a security instrument in short-term investment by utilizing capital gains. Capital gain is the profit obtained from the difference between buying and selling stocks (Surya & Purbawangsa, 2016). One collection of stocks that is favored by investors is a collection of stocks that are in the LQ45 Index, because the LQ45 index has high liquidity.

The LQ-45 index has 45 stocks that have been listed on the Indonesia Stock Exchange (IDX) which have high liquidity and have a large market capitalization and are ranked every six months based on certain criteria. Every six months at the beginning of February and August the stocks in the LQ45 index are ranked, if based on the selection criteria there are stocks that do not meet the criteria, they will be excluded from the index calculation and replaced with other stocks (Mujib & Candraningrat, 2021). The LQ45 index is trusted and objective by investment managers, financial analysts, and capital market observers in paying attention to the price movements of actively traded stocks (Ariasih & Mustanda, 2018)

When making a decision to invest, analysis is needed to assist an investor in choosing a good investment, by analyzing securities and portfolio management. According to Koumou (2020)says that portfolio theory is included as a modern theory of decision making in uncertain situations, aims to choose the optimal combination of stocks by owning (efficient portfolio), in the sense of providing results. the highest level of risk expected, or the lowest level of risk with the expected result.

When forming a portfolio, of course, it must have a relationship with which portfolio is chosen by bearing the risks and returns it will face, because an investor will be faced with the many differences in stocks in the portfolio. According to Zamfir et al. (2016), returns or results from investment can be interpreted as the results of profits or losses obtained by investors from their investment activities, therefore it is common for

investors that the purpose of investing is to get that return. Return or yield from investment can be interpreted as the result of profit or loss obtained by investors from their investment activities, therefore it is common for investors that the objective of investing is to get that return(Clementi & Palazzo, 2018). According to Hasanah (2019), A rational investor will choose an investment that will provide maximum returns with minimal risk or provide a certain return with a certain risk according to the preferences of each investor. Binangkit et al. (2017)that the performance of the stock portfolio also needs to be analyzed so that investors can find out where the portfolio has been done well so that they can be considered making investment decisions. There are three measures that can be used in evaluating portfolio performance using risk adjusted returns, namely: Sharpe Ratio, Treynor Ratio and Jensen Ratio.

The Sharpe method is an assessment of portfolio performance using a standard deviation divider, which means that the Sharpe Method measures the total risk(Barillas et al., 2019). Total risk is the sum of systematic risk and unsystematic risk(Robiyanto, 2018). The Treynor method focuses more on systematic risk, namely the risk of the company with market risk, which is represented by the beta value of the portfolio as the benchmark(Verma & Hirpara, 2016). The Jensen method is an index that shows the difference between the real rate of return obtained by the portfolio and the expected rate of return if the portfolio is on the capital market line (Qur'anitasari et al., 2019). Binangkit et al. (2017) show that there is a significant difference between the performance of Sharpe, Treynor and Jensen of Sharia Stocks and Conventional Stocks in the Optimal Approach with the Single Index Model Approach during the 2013-2015 period. The higher performance of Sharpe, Treynor, and Jensen indicates better company performance. Research conducted Nuraindra & Fajar (2018)shows that the measurement of stock returns and the Sharpe index, Treynor index and Jensen Index in 2016 have significant differences.

Meanwhile, Nurlaeli & Artati (2020) show that there is no difference between the three methods in measuring portfolio performance, indicating that measurement using the Sharpe, Treynor, and Jensen methods does not produce a significant difference to the results of portfolio work. a period. Pratama (2021), Darmayanti et al. (2018)who use the Sharpe, Treynor, and Jensen methods show that there is no significant difference between testing with the Sharpe, Treynor and Jensen methods. The Treynor method has the lowest consistency of the differences between the three measures, due to the difference in mean rankings because Treynor has the lowest at 101.61.

II. HYPHOTHESIS DEVELOPMENT

With so many companies that are listed on the IDX, it makes it easier for investors to invest because of the many options for investing their funds. The best choice to invest in LQ 45 stocks, because they are liquid stocks with high market capitalization, have a high trading frequency, have good growth prospects and financial conditions, are not volatile and have been objectively selected by the IDX. The expectation of an investment decision is to get a high return, but every investment in a portfolio of course requires supporting information, such as the rate of return and risk (standard deviation). There are various models used to test portfolio performance, namely the Sharpe, Treynor, and Jensen models. But whether the final results between portfolio performance using the Sharpe, Treynor, and Jensen methods show the same or different results. The development of the concept of portfolio performance measurement occurred in the late 60's which was pioneered by Wiliam Sharpe, Jack Trenor, and Michael Jensen(Akbas et al., 2016). This concept is based on Capital Market theory, these three measures are known as the composite (risk-adjusted) measure of portfolio performance (Hutapea et al., 2020)

The sharpe index is a measure used to measure the excess return, or risk premium, per unit deviation in an investment asset or trading strategy. This measure is used to check the investment performance by adjusting the risk. The Sharpe index was developed by William F. Sharpe and is often referred to as the reward to variability ratio. The Sharpe index bases its calculations on the concept of the capital market line as a benchmark, namely by dividing the portfolio risk premium by the standard deviation. The standard deviation of return is a measure of the total risk for a portfolio, thus, the Sharpe index is the ratio of compensation to total risk (Alam & Aftab, 2017). The Treynor Index measures the risk-adjusted performance of an investment portfolio by analyzing the excess returns on the portfolio per unit of risk(Qudratullah, 2019). The assumption used in the Treynor index is that the portfolio is well diversified so that the risk that is considered relevant is systematic risk (as measured by beta) (Abdul Hamid & Cahyadi, 2020).The Jensen Index is a risk-adjusted performance measure that represents the average return on a portfolio or investment, above or below that predicted by the capital asset pricing model (CAPM), given the beta of the portfolio or investment and the average market return. Binangkit et al. (2017)show that there is a significant difference between the performance of Sharpe, Treynor and Jensen from Sharia Stocks and Conventional Stocks in the Optimal Approach with the Single Index Model Approach during the 2013-2015 period. The higher performance of Sharpe, Treynor, and Jensen indicates better company performance. Nuraindra & Fajar (2018)shows that the measurement of return stocks and Sharpe index, Treynor index and Jensen Index in 2016 has a significant

difference. Based on empirical studies from the results of previous research, the following hypotheses can be formulated:

H1: There is a significant difference in portfolio performance as measured using the Sharpe Index, Treynor Index, and Jensen Index methods.

III. RESEARCH METHODS

3.1 Research Design

The design used in this study is a comparative research design. The object of this research is to determine the performance of the stock portfolios incorporated in the LQ45 Index on the Indonesia Stock Exchange (IDX) for the period August 2016-January 2019.The data collection method used in this study is the non-participant observation method. The population of this study were all stocks included in the LQ45 index for the period August 2016-January 2019. The sampling method in this study was purposive sampling. The criteria that must be met in sampling are all companies that are included in the LQ45 index during the period August 2016-January 2019 and consistently and are included in the LQ45 index consecutively during the period August 2016-January 2019. From a population of 45 stocks which are included in the LQ45 index which is listed on the Indonesia Stock Exchange (IDX), only 34 stocks meet the sample selection criteria

Table 1. List of Research Samples

Stocks	
ADHI	AdhiKarya (persero) Tbk
ADRO	Adaro Energy Tbk
AKRA	AKR CorporindoTbk
ANTM	Aneka Tambang Tbk
ASII	Astra InternasionalTbk
BBCA	Bank Central Asia Tbk
BBNI	Bank Negara Indonesia (persero) Tbk
BBRI	Bank Rakyat Indonesia (persero) Tbk
BBTN	Bank Tabungan Negara (persero) Tbk
BMRI	Bank Mandiri (persero) Tbk
BSDE	BumiSerpongDamaiTbk
GGRM	GudangGaramTbk
HMSP	HM SampoernaTbk
ICBP	Indofood CBP SuksesMakmur
INCO	Vale Indonesia Tbk
INDF	Indofood SuksesMakmurTbk
INTP	Indocement Tunggal PrakasaTbk
JSMR	JasaMarga (persero) Tbk
KLBF	Kalbe FarmaTbk
LPKR	Lippo KarawaciTbk
LPPF	Matahari Department Store Tbk
MNCN	Media Nusantara Citra Tbk
PGAS	Perusahaan Gas Negara (persero) Tbk
PTBA	Tambang Batubara Bukit Asam (persero) Tbk
PTPP	PP (persero) Tbk
SCAM	Surya Citra Media Tbk
SMGR	Semen Indonesia (persero) Tbk
SRIL	Sri RejekiIsmanTbk
SSMS	SawitSumber Mas SaranaTbk
TLKM	Telekomunikasi Indonesia (persero) Tbk
UNTR	United Tractors Tbk
UNVR	Unilever Indonesia Tbk
WIKA	WijayaKarya (persero) Tbk
WSKT	WaskitaKarya (persero) Tbk

3.2 Identification of Portfolio Performance Appraisal Instruments

Calculating the Return on Individual Stocks (Rj) and the Average.

$Rj = \frac{p_1 - p_0}{p_o}$ .....(1)

Rj = *actualReturn* j
P_1 = The closing price of stocks at the end of the period
P_o = The closing price of stocks at the beginning of the period

$$\bar{R}j = \frac{\sum Rj}{n} \quad \text{.....(2)}$$

$\bar{R}j$ = Average of stocks return
$\sum Rj$ = The number of stocks returned in a certain period
n = Number of calculation periods

Finding the Average Risk-Free Rate of Return (Rf).

$$RFR = \frac{\sum BI \text{ rate}}{n} \quad \text{.....(3)}$$

RFR = *Risk free rate*
$\sum BI$ rate = The amount of interest rates for a certain period
n = Number of calculation periods

Calculating the Market Rate of Return (Rm) and Average

$$Rm = \frac{IHSG_t - IHSG_{t-1}}{IHSG_{t-1}} \quad \text{.....(4)}$$

Rm = *return market*
$IHSG_t$ = JCI value in the current period
$IHSG_{t-1}$ = JCI value in the previous period

The formula for average market returns

$$\bar{R}m = \frac{\sum Rm}{n} \quad \text{.....(5)}$$

$\bar{R}m$ = Average market returns
$\sum Rm$ = Total market returns in a given period
n = Number of calculation periods

Calculating Standard Deviation (σj).

$$\sigma j = \sqrt{\frac{\sum_{t=1}^{n}(Rjt - \bar{R}j)^2}{(n-1)}} \quad \text{.....(6)}$$

σj = Standard deviation of return j
Rjt = Return actual j at time t
$\bar{R}j$ = Average return j
n = Period of observation

Calculating Beta(β_i).

$$\beta_i = \frac{\sigma_{i,m}}{\sigma_m^2} \quad \text{.....(7)}$$

βi = i-th beta stocks
$\sigma_{i,m}$ = Multiply the deviation of return I by the deviation of market returns
σ_m^2 = The return market variant

Sharpe's Index

$$\hat{S}\rho = \frac{\bar{R}\rho - \overline{RF}}{\sigma_{TR}} \quad \text{.....(8)}$$

$\hat{S}\rho$ = Portfolio Sharpe index.
$\bar{R}\rho$ = The average portfolio return ρ during the observation period..
$\overline{RF}$ = The average risk-free rate of return during the observation period..
σ_{TR} = The standard deviation of portfolio returns ρ during the observation period.

Treynor's Index

$$\hat{T}\rho = \frac{\bar{R}\rho - \overline{RF}}{\hat{\beta}_\rho} \quad \text{.....(9)}$$

$\hat{T}\rho$ = portfolio Treynor index.
$\bar{R}\rho$ = Average portfolio return ρ during the observation period.

$\overline{RF}$ = Average risk-free rate of return during the observation period..
$\hat{\beta}_\rho$ = portfolio beta ρ.

Jensen's Index

$\hat{J}\rho = (\bar{R}\rho - \overline{RF}) - \hat{\beta}_\rho(R_M - \overline{RF})$……..……(10)

$\hat{J}\rho$ = Jensen's index of portfolio.
$\bar{R}\rho$ = Average portfolio return ρ during the observation period..
$\overline{RF}$ = Average risk-free rate of return during the observation period..
$\hat{\beta}_\rho$ = portfolio beta ρ.
R_M = Return market..

IV. RESULTS AND DISCUSSION

The highest average return on individual stocks was in PTBA in the second period of 2017, which was 0.5633, while the smallest average return on individual stocks was in BBTN for the first period of 2018 which was -0.0661. The average risk-free return for the second period of 2018 occupied the highest average of 0.0571 while the second period of 2017 occupied the lowest average of 0.0429. The smallest average market return is in the first period of 2018 which is -0.0173 and the largest average market return is in the second period of 2017 which is 0.0210. The largest standard deviation value was in PTBA in 2017, the second period, which was 1.6751, while the lowest standard deviation value was in WIKA in 2017, the first period of 0.0139. The largest beta value is in PTPP in the second period of 2018, which is 7,1262, while the smallest beta value is in PTBA in the second period of 2017, which is -36.3525.

4.1 Stocks Portfolio Performance Analysis with the Sharpe Index Method

The performance value of the stocks portfolio using the Sharpe method shows that in the first period of 2016 ADRO got the highest value (0.7258), while WSKT got the lowest value (-2.2981). In the first period of 2017, UNTR got the highest score (0.1594), while WIKA got the lowest score (-5.8980). In the second period of 2017 PTBA got the highest score (0.3106), while SSMS got the lowest score (-2.7957).

In the first period of 2018 PTBA received the highest value (0.0674), while INDF received the lowest value (-2.9390). In the second period of 2018 ANTM got the highest score (0.9109), while HMSP got the lowest score (-2.6873). This shows that the stocks that get the highest value in each period can be said to have the most outperform stocks, which is because the total risk is much smaller than the return earned by an investor so that it can result in a performance above the performance of the LQ45 index. Meanwhile, the company that gets the lowest value in each period can be said to have the most underperforming stocks, which is because the total risk is much greater than the return earned by an investor so that it can result in underperforming the LQ45 index.

4.2 Stocks Portfolio Performance Analysis with the Treynor Index Method

The value of the stock portfolio performance using the Treynor method, shows that in the first period of 2016 PGAS got the highest value (0.1027), while ADRO got the lowest value (-2.2609). In the first period of 2017, LPKR received the highest score (1.3457), while INDF received the lowest score (-0.6852). In the second period of 2017 LPKR (2.1914), while TLKM received the lowest score (-0.2617). In the first period of 2018 LPKR received the highest score (0.5603), while BSDE received the lowest score (-0.4490). In the second period of 2018 PTBA got the highest score (0.1980,) while HMSP got the lowest score (-0.1811). This shows that the stocks that get the highest value in each period can be said to have the most outperform stocks, which is because the total risk is much smaller than the return earned by an investor so that it can result in a performance above the performance of the LQ45 index. Meanwhile, the company that gets the lowest value in each period can be said to have the most underperforming stocks, which is because the total risk is much greater than the return earned by an investor so that it can result in underperforming the LQ45 index.

4.3 Stocks Portfolio Performance Analysis with the Jensen Index Method

In the first period of 2016, UNTR got the highest score (0.1094), while INCO got the lowest score (-0.2257). In the first period of 2017, SSMS received the highest value (0.1215), while the company Vale Indonesia Tbk with the code INCO stocks got the lowest value (-0.2909). In the second period of 2017, PGAS got the highest score (0.1006), while PTBA got the lowest score (-0.2751). In the first period of 2018 INCO got the highest score (0.1359, while the LPPF got the lowest score (-0.1806). In the second period of 2018 ANTM got the highest score (0.3467), while UNTR got the lowest score (-0, 1628). This shows that the stocks that get the highest value in each period can be said to have the most outperforming stocks, which is because the total risk is much smaller than the return earned by an investor so that it can produce a performance above the index

performance. LQ45. Meanwhile, the company that gets the lowest score in each period can be said to have the most underperforming stocks, which is because the total risk is much greater than the return earned by an investor so that it can result in underperformance of the LQ45 index.

4.4 Hypothesis Testing

Table 2. Npar Test

	N	Mean	Std. Deviation	Minimum	Maximum
Z-score	510	0,00000000	0,998033430	-7,803879	7,660617
Performance	510	2,0000	0,81730	1	3

The sample used in the study was 510 with a mean or average value of 0 and std. deviation of 0.998033430. The resulting minimum value of -7.803879 comes from the Sharpe method, while the maximum value of 7.660617 comes from the Jensen method.

Table 3 Results of the Kruskal Wallis H Z-score test

	Z-score
Chi-Square	4,553
df	2
Asymp. Sig.	0,103

Based on the table above, the results obtained from the Kruskal Wallis H test based on the Z-score data for the Sharpe, Treynor, and Jensen indexes show that the previously processed data resulted in Chi Square or X2 of 4.553 with a probability of 0.103. So, it can be seen that 0.103> 0.05 and x2 count <x2 table or 4.553 <5.99, so it can be concluded that there is no significant difference.

Table 4 Comparison between Index

		N	*Mean Rank*
Z-score	Sharpe	170	274,25
	Treynor	170	240,92
	Jensen	170	251,32
	Total	510	

Based on the table above, it shows that the Jensen method with a value of 251.32 shows the consistency of the absence of significant differences between the three methods, because the Jensen method has the lowest mean rank difference between the Sharpe method and also the Treynor method.

4.5 Research Implications

The implications that can be taken from the results obtained in this study are that there are no significant differences in the three methods, so in this case the performance measurement of portfolio stocks will be returned to investors regarding the final decision. When an investor puts more emphasis on portfolio beta as the main consideration, portfolio performance using the Treynor method may produce the best performance measure. However, if investors place more emphasis on the risk of storing portfolio returns, the Sharpe method that uses a portfolio standard deviation might produce a better measurement. However, if an investor is the main consideration, the difference between the portfolio risk premium and the market risk premium, the Jensen method will be the right method.

V. CONCLUSION

5.1 Conclusion

Based on the results that have been calculated the performance of the stock portfolio using the Sharpe method, the stocks that outperform in the first period of 2016 are 20 stocks, 24 stocks in the first period of 2017, 23 stocks in the second period of 2017, in the first period of the year. 2018 is 18 stocks, and in the second period 2018 is 21 stocks, while the rest is underperforming stocks. ANTM in the second period of 2018 can be said to have the best performance, while WIKA in the first period of 2017 can be said to have the worst performance compared to other stocks.

Based on the results of the calculation of stock portfolio performance using the Treynor method, stocks that have outperforms in the first period of 2016 are 28 stocks, in the first period of 2017 there were 9 stocks, in the second period of 2017 there were 5 stocks, in the period first in 2018, there were 12 stocks, and in the second period in 2018, there were 10 stocks, while the rest were underperforming stocks. LPKR in the second period of 2017 can be said to be the stock that has the best performance, while ADRO in the first period of 2016

can be said to be the stock that has the worst performance compared to other stocks.

Based on the results of the calculation of the performance of the stock portfolio using the Jensen method, it can be concluded that the stocks that have outperforms in the first period of 2016 are 19 stocks, in the first period of 2017 there were 17 stocks, in the second period of 2017 there were 18 stocks, in In the first period of 2018, there were 17 stocks, and in the second period of 2018 there were 11 stocks, while the rest were underperforming stocks. ANTM in the second period of 2018 can be said to have the best performance, while INCO in the first period of 2017 can be said to have the worst performance of other stocks.

Hypothesis testing using the Kruskal Wallis H test shows that there is no significant difference in portfolio performance as measured using the Sharpe Index, Treynor Index, and Jensen Index methods.

5.2 Suggestions

Prospective investors should prior to investing their funds make long-term decisions by looking at which stocks have outperform and consistent value. For companies that are not included in the research sample, such as AALI, ASRI, BMTR, CPIN, ELSA, LSIP , MPPA, MYRX, PWON, SILO, SMRA to pay more attention to the total risk and return an investor can get so that the stock can be said to be outperforming.

5.3 Further Research

Future researchers are expected to use different analytical tools from this study, such as the Roy Safety First Ratio, MSR, and Information Ration. In order to be able to be a comparison against this research, and also be able to use the study period with a longer period of time with daily closing price data.

REFERENCES

[1] Triani, N., & Tarmidi, D. (2019). Firm Value : Impact of Investment Decisions, Funding Decisions and Dividend Policies. *International Jurnal Of Academic Research in Accounting, Finance, and Management Sciences*, *9*(2), 158–163. https://doi.org/10.6007/IJARAFMS/v9-i2/6107

[2] Ernawati. (2016). Risk of Profit Loss Sharing Financing: the Case of Indonesia. *Al-Iqtishad: Journal of Islamic Economics*, *8*(1), 101–116. https://doi.org/10.15408/aiq.v8i1.2511

[3] Stolper, O. A., & Walter, A. (2017). Financial literacy, financial advice, and financial behavior. *Journal of Business Economics*, *87*(5), 581–643. https://doi.org/10.1007/s11573-017-0853-9

[4] Lusardi, A., Michaud, P.-C., & Mitchell, O. S. (2016). Optimal Financial Knowledge and Wealth Inequality. *Physiology & Behavior*, *176*(1), 100–106. https://doi.org/10.1086/690950.Optimal

[5] Surya, D., & Purbawangsa, I. . A. (2016). Studi Komparatif Portofolio Optimal Stocks LQ 45 dan 50 Most Active Stocks By Trading Frequency. *E- Jurnal Manajemen Unud*, *5*(11), 7185–7213.

[6] Mujib, B., & Candraningrat, I. R. (2021). Capital Market Reaction to Covid-19 Pandemic on LQ45 Shares at Indonesia Stock Exchange (IDX). *American Journal of Humanities and Social Sciences Research (AJHSSR)*, *5*(3), 74–80.

[7] Ariasih, N. L. P. I., & Mustanda, I. K. (2018). Pembentukan Portofolio Optimal Menggunakan Model Indeks Tunggal pada Stocks Indeks LQ45. *E- Jurnal Manajemen Unud*, *7*(8), 1–30. https://doi.org/https://doi.org/10.24843/EJMUNUD .2018.v07.i08.p17.

[8] Koumou, G. B. (2020). Diversification and portfolio theory: a review. *Financial Markets and Portfolio Management*, *34*(1), 267–312.

[9] Zamfir, M., Manea, M. D., & Ionescu, L. (2016). Return on Investment – Indicator for Measuring the Profitability of Invested Capital. *Valahian Journal of Economic Studies*, *7*(2), 79–86. https://doi.org/10.1515/vjes-2016-0010

[10] Clementi, G. L., & palazzo, B. (2018). Investment and The Cross-Section of Equity Returns. *The Journal of Finance*, *1*(1), 1. https://doi.org/10.1111/jofi.12730

[11] Hasanah, N. N. (2019). Formation of Portfolio Analysis Optimal Model with A Single Index (Studies in IDX30 Index Period 2016-2018). *Progress Conference*, *2*(2), 355–364.

[12] Binangkit, I. D., Savitri, E., & Kamaliah. (2017). Stock Portfolio Performance Comparison between Conventional and Sharia Stocks with Single Index Model Approach : A Case Study on Indonesia Stock Exchange. *Applied Science and Technology*, *1*(1), 382–387. http://www.estech.org

[13] Barillas, F., Kan, R., Robotti, C., & Shanken, J. (2019). Model Comparison with Sharpe Ratios. *Journal of Financial and Quantitative Analysis*,*1*(1), 1–79. https://doi.org/10.1017/s0022109019000589

[14] Robiyanto, R. (2018). Performance Evaluation of Stock Price Indexes in the Indonesia Stock Exchange. *International Research Journal of Business Studies*, *10*(3), 173–182. https://doi.org/10.21632/irjbs.10.3.173-182

[15] Verma, M., & Hirpara, J. R. (2016). Performance Evaluation of Portfolio using the Sharpe, Jensen, and Treynor Methods. *Scholars Journal of Economics, Business and Management*, *3*(7), 382–390. https://doi.org/10.21276/sjebm.2016.3.7.4

[16] Qur'anitasari, Q., Nuzula, N. F., & Darmawan, A. (2019). Critical Analysis of Sharpe, Treynor and Jensen Methods in Analyzing Stock Portfolio Performance LQ-45 Stock Studies. *Asia Pacific Management and Business Application*, *008*(02), 89–104. https://doi.org/10.21776/ub.apmba.2019.008.02.2

[17] Nuraindra, Y. A., & Fajar, M. A. (2018). Comparative Analysis Of Sharia And Conventional Stock Performance Listed On Indonesia Stock Exchange In 2016-2018. *Profita*, *7*(8), 1–13.

[18] Nurlaeli, S., & Artati, D. (2020). Analisis Kinerja Portofolio Saham dengan Metode Sharpe, Treynor, dan Jensen. *Jurnal Ilmiah Mahasiswa Manajemen, Bisnis Dan Akuntansi (JIMMBA)*, *2*(6), 972–990. https://doi.org/https://doi.org/10.32639/jimmba.v2i6.690

[19] Pratama, M. R. (2021). Financial Performance of Islamic and Conventional Mutual Funds in Indonesia Stock Exchange. *Advances in Economics, Business and Management Research*, *168*(1), 322–327.

[20] Darmayanti, N. P. A., Suryantini, N. P. S., Rahyuda, H., & Dewi, S. K. S. (2018). Perbandingan Kinerja Reksa Dana Saham Dengan Metode Sharpe, Treynor, Dan Jensen. *Jurnal Riset Ekonomi Dan Bisnis*, *11*(2), 93. https://doi.org/10.26623/jreb.v11i2.1079

[21] Akbas, F., Armstrong, W. J., Sorescu, S., & Subrahmanyam, A. (2016). Capital Market Efficiency and Arbitrage Efficacy. *Journal of Financial and Quantitative Analysis*, *51*(2), 387–413. https://doi.org/10.1017/s0022109016000223

[22] Hutapea, G. M., Fathoni, A. F., & Efni, Y. (2020). Investigation of Capital Market Efficiency in Indonesia. *AFEBI Management and Business Review*, *4*(02), 117. https://doi.org/10.47312/ambr.v4i02.241

[23] Alam, P. S., & Aftab. (2017). Mutual fund performance; a study of sharpe ratio. *International Journal of Development Research*, *1*(1), 1.

[24] Qudratullah, M. F. (2019). Treynor Ratio to Measure Islamic Stock Performance in Indonesia. *Jurnal Fourier*, *8*(1), 1–13. https://doi.org/10.14421/fourier.2019.81.1-13

[25] Abdul Hamid, A. K., & Cahyadi, I. F. (2020). Analisis Kinerja Reksadana Saham Syariah Di Pasar Modal Indonesia Menggunakan Metode Sharpe, Treynor, Dan Jensen Periode 2017-2018. *MALIA: Journal of Islamic Banking and Finance*, *3*(2), 95. https://doi.org/10.21043/malia.v3i2.8408